ASIAN STUDIES

SPECIAL ISSUE
HISTORY OF LOGIC IN CONTEMPORARY CHINA

Contents

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HISTORY OF LOGIC IN
CONTEMPORARY CHINA

Forewords

Asian Studies and the History of Chinese Logic: A Long and Fruitful Journey

Jana S. ROŠKER, Editor-in-Chief

The history of logic in China is a topic of increasing relevance, not only because the subject is still far too neglected and little known in Western scholarship, but also because it can help us better understand modern China and its scientific and academic contributions to the contemporary world.

Chinese logic has always been the focus of interest of this journal in the field of Chinese thought and philosophy. Even in the original version of this journal, which was titled *Asian and African Studies* until 2012, we published several essays (e.g., Cui 2005; Wu 2005; Rošker 2005a: 2010a: 2010b, etc.) and even a special issue (see Rošker 2005b) on the problems of Chinese logic and its history. In recent years, the journal has also published several other articles dealing with the broader topic of Chinese logic (see, e.g., Hashi 2016; Vrhovski 2021a; Cui 2021).

This special issue outlines the process of the introduction of logic in 20th century China. It describes the institutional as well as the conceptual and theoretical dimensions of this process, and presents the work of numerous eminent intellectuals who devoted their lives to promoting and introducing a public discourse of logic during this period. It also presents the Chinese institutional background that enabled the development of logic in China, such as academies, university departments, journals, and academic societies.

We are very honoured and pleased to have succeeded in attracting two more than competent scholars to edit this special issue. The first is the internationally renowned Professor Chen Bo from Wuhan University, the second Dr. Jan Vrhovski, a research fellow from the University of Ljubljana. Both guest editors have already successfully collaborated last year when they published a special issue in the internationally renowned journal *Contemporary Chinese Thought* on the main implications of Bertrand Russell's visit to China in 1920–1921 (see Chen 2021; Vrhovski 2021a).

We are, of course, particularly pleased that Professor Chen Bo was willing to guest edit this issue, as he is one of the most influential, prolific, and knowledgeable contemporary Chinese scholars in this field of research. Professor Chen received his PhD from Renmin University of China in 1994, and is currently Professor of

Humanities and Social Sciences at the School of Philosophy, Wuhan University. Previously, he was a full professor at Department of Philosophy, Peking University from 1998 to 2021.

He has a strong international reputation in his research areas and has been a visiting scholar at the University of Helsinki (1997–1998), CSCC Fellow at the University of Miami, USA (2002–2003), Oxford University (2007–2008), and Nihon University (2014), among others. Professor Chen has received awards from the American Council of Learned Societies, the National Academy of Sciences, and the Social Science Research Council. In the past decade, he has organized several international conferences at Peking University on Frege, Quine, Kripke, Williamson, Hintikka, paradoxes, truth, modality, philosophical education, contemporary society, and metaphilosophy and philosophical methodology.

His major Chinese academic monographs include *Studies on Quine's Philosophy: From Logical and Linguistic Points of View* (1998), *Studies in Philosophy of Logic* (2004, revised and improved 2013), *Studies on Paradoxes* (2014), *Analytic Philosophy: Critique and Construction* (2018), to name a few. He has published nearly 300 articles in Chinese or English. Due to space constraints, we mention only his major articles on the history of Chinese logic (see Chen 2018), comparative logic (see Chen 2012; 2014; 2019; 2021), and classical Chinese logic (see, e.g., Chen, 2006; 2009) in the bibliography of this brief preface.

Jan Vrhovski, on the other hand, received his PhD from Charles University in Prague with a dissertation on *Patterns of Thought and Numbers: A History of Mathematical Logic in Late Republican and Early Socialist China (1930–1960).* Despite his young age, he has already published a large number of original academic papers in international journals with high impact factor, including *History and Philosophy of Logic* (Vrhovski 2021d; 2021e), *Journal of the Oxford Centre for Buddhist Studies* (Vrhovski 2020a), *Review of Religion and Chinese Society* (Vrhovski 2021f), and others. For several years he has also been among the most prolific contributors to this journal (see Vrhovski 2019; 2021b; 2021c).

We are particularly pleased and grateful to the two guest editors for their great help in selecting and collecting so many important and interesting articles on the history of Chinese logic written by some of the most brilliant contemporary Chinese scholars in this field of research. They all deserve the greatest credit for recording, systematizing, and interpreting the studies of logic in China and for bringing this fascinating subject to the attention of the wider Western academic world.

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History of Logic in Contemporary China (1949–2021)

CHEN Bo and Jan VRHOVSKI, Guest editors

For any Western scholar interested in the history of Chinese logic or the broader intellectual history of modern China, the past ten years have been filled with excitement, as more and more monographs, edited volumes and articles on the history of logic in China started to appear in Western academia. This process of the formation of Western studies on the history of logic in China gained significant momentum with the separate, yet still inherently interlinked, revitalizations of the studies of "Chinese logic" on the one side, and the modern history of logic in China on the other. Following early important contributions by Anglophone scholars based at American and European universities, in particular those of Bo Mou, Chad Hansen, Christoph Harbsmeier and others, a new wave of scholarship on Chinese traditional logic was established in the West as the first building block in Western interest in the history of logic in China. One of the first and more recent significant advances in Western scholarship on the overlapping conceptual histories of Chinese and Western logic in China was made in 2011, when the book *Discovery of Chinese Logic* by Joachim Kurtz was published. Arguably, historical studies like the one conducted by Kurtz, and the rising interest in the notion of Chinese logic amongst Western philosophers and sinologists, resulted in a more significant increase of both general scholarly interest and subsequently also various kinds of publications authored by Western scholars. Apart from individual contributions made by scholars like, for example Lisa Indraccolo, Rafael Suter, Liu Fenrong, Jeremy Seligman and others, in recent years the more concerted efforts of Western scholars started bearing fruit. Concurrently, the gradual rise of Western scholarly interest in the history of logic in China also prompted an increase in academic exchanges with Chinese scholars in the field, and in turn also an increase in English language publications, in which the above-mentioned Western scholars joined their efforts with their Chinese colleagues. Amongst the most significant recent results of such collaborations we can count publications such as *Dao Companion to Chinese Philosophy of Logic* (2020) edited by Yiu-ming Fung and *The Gongsun Longzi and Other Neglected Texts* (2020) edited by Rafael Suter, Lisa Indraccolo, and Wolfgang Behr. Together with edited volumes like *Philosophy of Language, Chinese Language, Chinese Philosophy* (Bo Mou ed. 2018) and the recent publication of the first collated anthology of the School of Names

(*Mingjia* 名家) by Ian Johnston and Wang Ping (2019), all these publications mark the start of a new stage in Anglophone studies on the history of Chinese logical thought and history of logic in China.

Published one year before the next monumental monograph in the above-listed series, the *Handbook of Logical Thought in China* edited by Liu Fenrong, Jeremy M. Seligman and Zhai Jingcheng (forthcoming in 2023, Springer), this special issue aims at filling in an important gap in Western scholarship by presenting a collection of articles summarizing and evaluating major advances in Chinese studies in logic in the last 70 years. The second special issue on logic in the *Asian Studies* journal, this special issue will be one of first such issues focusing on development of research on logic in contemporary China (PRC) published in English in a Western scholarly journal. Moreover, the great majority of the contributions collected in this issue were authored by the leading Chinese researchers in the relevant subfields of logic, from philosophers of logic to established experts in branches of logic such as mathematical logic, inductive logic and so on. Since the contributors also include the authors of the above-mentioned forthcoming handbook, this special issue could also be regarded as a part of the same collaborative efforts between Western and Chinese scholars in establishing a common platform that could more efficiently showcase both the achievements and advances in Chinese academic research on or related to logic, as well as Western research on the history of logic in China.

The heart of this special issue consists of nine articles surveying different aspects of research on logic in modern and contemporary China, of which the first three present a general overview of logic as a scientific discipline and a subject of study.

Chen Bo's extensive overview of the conceptual and scientific development of various types of logic thus presents a sort of panoramic view over the intricate and complex networks that underlay the research of logic in China in the last 70 years. Chen's exhaustive and comprehensive study does not provide a general historical and contextual outline within which the remaining contributions are to be read and understood, but more an important spearheading attempt at presenting a concise image of the complex scenery of Chinese research on logic to a Western readership. In a more focused manner, Hu Yang's and Hu Zehong's retrospective and prospective account of studies in philosophy of logic offers important insights into the very identity of this concept in the Chinese discursive contexts. By so doing, the authors not only set out to sketch the general developmental trends in past and current Chinese research on the philosophy of logic, but also strive to address the very question of the identity of the whole discourse within the Chinese intellectual sphere on the one side, and to illuminate its segments that overlap

with the Western discourse on the other. Dealing with similar methodological issues, Zhai Jincheng and Liu Yongqiang explore the various historical dimensions of native Chinese studies on traditional "Chinese logic". In their paper, Zhai and Liu aim at creating a more consistent and concise historical narrative, interconnecting the period of initial establishment of the discipline with the subsequent two main stages in the development of research into China's own logical past and heritage. Akin to the preceding study, the importance of Zhai's and Liu's contribution also resides in their very meaningful presentation of the more recent trends and the possible future trajectories in Chinese research on logic.

The second section of this special issue contains a selection of articles focusing on more technically specialized branches of contemporary Chinese logic, which in the recent decades obtained more attention by virtue of their applicability in natural sciences and emerging technologies. Generally speaking, the papers collected in this section provide both a critical discussion of the historical backgrounds of these technologically pertinent branches of logic, as well as more in-depth assessments of the theoretical and technological challenges underpinning their past, present, and future developmental trends. This section opens with the article by Liu Fenrong and Li Dazhu, exploring the extremely interesting developments in one of the most recently emerged branches of logic, known as the social network logic. Tracing its origins back to the epistemic logics of the latter half of the 20th century and providing a detailed outline of its recent results and developmental directions, the authors present the intricate and rapidly developing landscape of Chinese studies of this new discipline. One of the key contributions of this extremely timely and relevant study consists, undoubtedly, in the authors' detailed outline and explanation of the recent Chinese advances in the graph game logic approach. Ren Xiaoming gives a concise introduction into the past and new developments in Chinese studies of contemporary inductive logic, presenting the most important Chinese research on Hume's problem of induction and probabilistic inductive logic in the light of general theoretical developments in the field, and placing the more recent advances in Pascalean and non-Pascalean probabilistic logic into a perspective with the theoretical aspects connected to advances in artificial intelligence (AI) and related technologies. This is followed by Wu Hongzhi's detailed investigation of the past and current trends in Chinese studies of informal logic and critical thinking. Similar to other contributions, probably the greatest contribution of Wu's article resides in its thorough evaluation of the current situation of research on this important branch of logic in China, and the long process of integrating Chinese researchers into international academic circles. The most outstanding results in Chinese studies of logic of natural language are outlined in Zou Chongli's and Li Kesheng's contribution, another

ground-breaking contribution to the Western scholarship on the history of logic and related sciences in contemporary China.

The penultimate section of the present issue is devoted to the century-long presence of mathematical logic in China and its developments in the more recent past. It opens with Jan Vrhovski's exhaustive study of the evolution of the notion and academic discipline of mathematical logic in the 1930s, in which the author reveals some formerly less well-known facts pertaining to the early disciplinary branching of the field into a philosophical and mathematical field of study. Vrhovski's detailed discussion of the early of contemporary mathematical logic in China is followed by a comprehensive analysis of the more recent developments provided by Wang Hongguang and Du Guoping. In their paper on Chinese research on mathematical logic and foundations of mathematics, Wang and Du outline the past developments in the field on the one hand and showcase the most recent significant results in the field on the other. While this paper represents one of the first concentrated accounts on Chinese research in the field of the past few decades, its most pertinent aspect resides in its systematic presentation of Chinese mathematical logicians' contributions to medium logic and their creation of a relatively unique type of logical notation.

In the final section of this special issue some space has also been allocated to comparative and other analytical excursions into traditional Chinese logic and techniques of argumentation (rhetoric). In this regard, a new comparative approach towards interpreting one of the central texts of Chinese traditional logic, the *Gongsun Longzi* 公孙龙子, was adopted by She Sheqin in her critique of the concept of reference-based judgment of the treatise "Zhiwu lun 指物论" in light of Friedrich Hölderlin's ideas on judgment and human existence. Presenting a contrast to She's essentially ontological view on traditional Chinese logic, in her article Jana S. Rošker sets out to demonstrate the possibility of meaningfully analysing Hui Shi's logical paradoxes by means of the method of sublation. Finally, more light is cast on the use of historical parables in Marcin Jacoby's article analysing techniques of indirect persuasion in the *Lüshi Chunqiu* 吕氏春秋 (*Master Lü's Spring and Autumn Annals*). By and large, all three papers employ innovative and revealing approaches through which the traditional Chinese logic and discourses on argumentation can be presented to both Western and Chinese readership in entirely new ways.

Last but not least, the editors hope that this special issue will serve as a new and important building block in establishing a stronger bridge spanning the gaps that still exist between China and the West, facilitating a more bilateral and efficient exchange of knowledge between these rich and diverse academic communities.

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Logic as Discipline and Subject

70 Years of Logic in China, 1949–2019

CHEN Bo*

Abstract

This article outlines the history of logic in China from 1949 to 2019. Firstly, it presents a rough picture of Chinese logic before 1949 using broad brushstrokes. Secondly, it divides the whole process of development into two stages. In the first 30 years from 1949 to 1979, Chinese logic made some achievements, but also went along some detours, and its overall situation was unsatisfactory. In the latter 40 years from 1979 to 2019, due to Deng Xiaoping's reform and opening up, many Chinese logicians went abroad for academic visits or to study degrees in foreign universities or research institutes, gradually became familiar with and even integrated into the international mainstream of logic teaching and research, and ushered in the great flourishing of logic in China we see today. Finally, it draws four lessons from this process of development, as follows. 1) Let politics and academia live in peace, by respecting and adhering to the idea of academic freedom. 2) Academic advances cannot be achieved in isolation from the world, so we should fully embrace the international academic community, while insisting on our own independent thinking. 3) We should always adhere to the policy of "letting a hundred flowers blossom and a hundred schools of thought contend", so that different academic viewpoints and tendencies can be improved and developed in their mutual collision. 4) We should cultivate academic self-confidence, gradually make the change from pure follow-up learning to original work in some fields of logic.

Keywords: Chinese logic, logic teaching, popularization of logic, research on logic, reform and opening up, letting a hundred flowers blossom and a hundred schools of thought contend

Sedemdeset let logike na Kitajskem, od 1949 do 2019

Izvleček

Članek orisuje zgodovino logike na Kitajskem med letoma 1949 in 2019. Na začetku poda grobo sliko razvoja kitajske logike pred letom 1949. Nadalje razdeli celoten razvojni proces na dve stopnji. Čeprav je v prvih tridesetih letih, od 1949 do 1979, kitajska logika ustvarila nekaj dosežkov, je hkrati na svoji poti tudi zašla, tako da je bilo njeno splošno stanje na koncu nezadovoljivo. V naslednjih štirih desetletjih, med letoma 1979 in 2019, je zaradi Deng Xiaopingovih reform in odpiranja Kitajske svetu veliko kitajskih logikov

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dobilo priložnost študirati na tujih univerzah in raziskovalnih inštitutih. Tako so se postopno seznanili z osrednjimi mednarodnimi trendi v poučevanju in preučevanju logike, ali pa so se vanje tudi sami vključili, s čimer so utrli pot velikemu uspehu logike na Kitajskem. Na koncu članek poda še naslednje štiri lekcije, ki izhajajo iz preteklega razvojnega procesa: 1) Politika in akademija naj sobivata v miru, medtem ko naj prva dosledno spoštuje idejo akademske svobode in ji tudi sledi. 2) Znanstvenega napredka ni mogoče doseči v izolaciji od sveta. Zaradi tega se moramo v polnosti odpreti mednarodni akademski skupnosti, medtem ko hkrati vztrajno gojimo tudi samostojno misel. 3) Vedno moramo slediti politiki »naj cveti sto cvetov in sto šol naj tekmuje med seboj«, da se lahko v medsebojnih trkih izpopolnijo ter razvijejo različna akademska stališča in težnje. 4) Gojiti moramo akademsko samozavest in postopoma doseči prevoj iz učenja ob sledenju drugim do položaja vodilnega v posameznih vejah logike.

Ključne besede: kitajska logika, poučevanje logike, popularizacija logike, raziskovanje logike, reforme in odpiranje svetu, kampanja stotih rož

Chinese Studies in Logic before 1949

Aside from ancient Greek and Indian logic, Chinese logic from the pre-Qin period represents one of the three major sources of logic in the world. The latter, however, has not got a continuous developmental history, and almost passed into obscurity after the Han dynasty. Notwithstanding the fact that, in the time of late Ming dynasty, Li Zhizao 李之藻 (1571–1630) and others had already produced a translation of Aristotle's *De logica* (*Mingli tan* 名理探), and that Matteo Ricci (Chinese name Li Madou 利玛窦, 1552–1610) and Xu Guangqi 徐光启 (Seu Kwang-ke, 1562–1633) composed a translation of Euclid's *Elements*, these early translations did not have any great influence. In the late Qing dynasty, Yan Fu 严复 (1854–1921) and other Chinese scholars, who embarked upon the mission of saving the nation and ensuring its survival (*jiuwang tucun* 救亡图存), produced Chinese translations of such notable works as Mill's *System of Logic* (*Mule mingxue* 穆勒名学), W. S. Jevons' *Logic Primer* (*Mingxue qianshuo* 名学浅说) and *Logic* (*Bianxue* 辩学), as well as a translation of *Logic* (*Ronrigaku* 论理学) by the Japanese philosopher Ōnishi Hajime 大西祝, but these early translations were still not very influential. In the Republic of China (ROC) period, among the many young people who chose to pursue their studies at foreign universities there were some who were able to study or even conduct specialized research in logic. Following their return to the homeland, these young scholars continued their interest in logic by translating and publishing Western as well as Japanese works on the subject. According to incomplete statistics, in the period between the 1920s and 1940s

almost 30 different works in Western traditional logic were introduced to China by means of translation, including popular textbooks used at foreign universities, such as, for example, the textbook *An Introductory Logic* composed by the professor and head of the research institute at Cornell University in the United States. (Ju 2013, 2)

At the same time, these foreign-educated scholars also started composing their own textbooks for their courses on logic given at Chinese senior secondary schools, normal schools, and universities. Among these textbooks the most important were the following: Jiang Weiqiao's 蒋维乔 *Lectures in Logic* (*Lunlixue jiangyi* 论理学讲义) from 1912; Zhang Zihe's 张子和 *New Logic* (*Xin lunlixue* 新论理学) from 1915; Tu Xiaoshi's 屠孝实 *Outline of Logic* (*Mingxue gangyao* 名学纲要) from 1925; Zhu Zhaocui's 朱兆萃 *The ABC of Logic* (*Lunlixue ABC* 论理学ABC) from 1928; Wang Zhanghuan's 王章焕 *A Summary of Logic* (*Lunlixue daquan* 论理学大全) from 1930; Shen Youqian's 沈有乾 *Logic* (*Lunlixue* 论理学) from 1936, and his *Logic for Senior Secondary Schools* (*Gaozhong lunlixue* 高中论理学) from 1938,[1] Jin Yuelin's 金岳霖 *Logic* (*Luoji* 逻辑) from 1937 (script 1935), and Zhang Shizhao's 章士钊 *Essentials of Logic* (*Luoji zhiyao* 逻辑指要)[2] from 1943.

In 1920, in the framework of his one-year visit to China, Bertrand Russell delivered a series of lectures on mathematical logic at Peking University. Although originally four lectures were planned, the series was soon interrupted due to Russell falling ill. Later, in 1921, the notes from his lectures were collected and published in the form of a monograph by the New Knowledge Publishing House of Peking University. One year later, a Chinese translation of Russell's book *Introduction to Mathematical Philosophy* was also published. In that way, mathematical logic started to become known to Chinese scholars. A few years later, in 1927, Wang Dianji's 汪奠基 *Treatise on Logic and Mathematical Logic* (*Luoji yu shuxue luoji lun* 逻辑与数学逻辑论) was published, in which the author discussed the elementary principles of traditional formal logic and mathematical logic. In fact, Wang's book was an unabridged Chinese translation of his thesis from the University of Paris, but also the first textbook of mathematical logic written by a Chinese scholar. Other works containing an account of mathematical logic included Shen Youqian's *Modern Logic* (*Xiandai luoji* 现代逻辑) from 1933; Wang Dianji's *Modern Logic* (*Xiandai luoji* 现代逻辑) from 1937; Jin Yuelin's *Logic*, and Mou Zongsan's 牟宗三 *Logical Paradigms* (*Luoji dianfan* 逻辑典范) from 1940. Among these, only Jin Yuelin's *Logic* has any great success, having been used widely and thus garnered greatest influence. Originally,

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1   The latter is a reprint of the 1933 edition.

2   This work was originally composed for his lectures at Beida in 1917, which is quite apparent when one looks at its language and content.

the book was the script used for Jin's lectures on logic given at Tsinghua University. It is divided in four main parts: the first part speaks about the theory of inference in traditional logic; in the second part, Jin advances a critical account of the existential problems of traditional logic, discussing in particular the existential import of subjects in categorical propositions; the third part introduces the logical system of Whitehead's and Russell's monumental work *Principia Mathematica* (1910–1913), including propositional calculus, predicate calculus, calculus of classes, and relational calculus; the fourth and last part discusses meta-logic of logical systems and conceptions of logic, involving concepts like the completeness, consistency, and independence of logical axioms, and numerous other elementary logical concepts such as "necessity", "contradiction", "implication", the characteristics and status of the so-called "three laws of reasoning" (i.e. the law of identity, the law of contradiction, and the law of excluded middle), and so on. It was through Jin Yuelin's *Logic* and his teaching that China's earliest generation of talented scholars in modern logic was fostered, in which there was no lack of internationally respected experts like Hao Wang 王浩 and also a great number of outstanding specialists such as Shen Youding 沈有鼎, Wang Xianjun 王宪均, Hu Shihua 胡世华, Zhou Liquan 周礼全, and Yin Haiguang 殷海光, among others. Hence, one can rightly claim that Jin Yuelin was the founder of modern logic in China.

In the field of the history of ancient Chinese logic, the most influential treatise was Hu Shih's 胡适 doctoral dissertation from Columbia University entitled *The Development of the Logical Method in Ancient China* (English, 1922; Chinese translation, 1983). Hu's treatise was

> not only China's first periodized historical monograph on ancient Chinese logic, but also the first book introducing ancient Chinese logical thought in English language. Its rich, and rather original, content was of considerable reference value and enlightening impact on the later more advanced research in ancient Chinese logic. (Zhou 2004, 423)

Apart from Hu' treatise there was also Zhang Shizhao's *Essentials of Logic*, which was both a textbook in logic as well as a study in Chinese ancient logic, in which the author strived to realize his noble aspiration to "advance a unique perspective by blending together the Chinese and the Western" (ibid.).

The Influence of Soviet Textbooks

In the ten and more years after 1949, due to then existing political circumstances the People's Republic of China (PRC) regarded the Soviet Union as its "big

brother", and consequently engaged in comprehensive learning from the Soviets, and the field of logic was no exception. There, one of the most important objectives was the publication of Chinese translations of numerous Soviet logic textbooks, some of which even obtained several different translations. These textbooks included the following: *Logic* (*Luojixue* 逻辑学) by S. N. Vinogradov and A. H. Kuzmin (1950), a secondary school textbook approved by the Soviet ministry of education; *Logic* (*Luoji* 逻辑) by M. S. Strogovich (1950); *A Course Syllabus in Logic* (*Luoji jiaoxue dagang* 逻辑教学大纲) edited by V. T. Makarov (1956); *Logic* (*Luojixue* 逻辑学) by D. P. Gorsky (1957); and *Logic* (*Luoji* 逻辑) edited by Gorsky and Tavanec (1957). Among these, the Chinese translations of the textbooks *Logic* by Strogovich and *Logic* by Gorsky and P. V. Tavanec had the highest circulation and were used most widely.

By and large, the general appearance of Soviet textbooks on logic can be known from the layout of chapters in the last two textbooks. Strogovich's *Logic*, for instance, is composed out of 12 chapters, whose titles were as follows: "The Object of Logic"; "The Fundamental Laws of Logical Thinking"; "Formal Logic and Dialectical Logic"; "Concepts, with a Special Focus on their Nature, Intensions and Extensions, Kinds and so on"; "Definition of Concepts"; "Differences between Concepts and their Classification"; "Judgments, with a Special Focus on Structures of Categorical Judgments and their Types"; "Judgments (Continued), with the Special Focus on Truth-relations between Categorical Judgments, Negation of Categorical Judgments, etc."; "Inference, Direct Inference"; "Syllogisms"; "Inductive Methods"; and "Proof". Based exclusively on Aristotelian logic, the content of this textbook did not even touch upon topics such as compound judgments and their inferences. The book *Logic* by Gorsky and others, on the other hand, was comprised of 16 chapters altogether: "The Object and Meaning of Logic"; "Concepts, with a Special Emphasis on their Characteristics, Intensions and Extensions, Kinds and so on"; "Logical Inference and Deduction of Concepts, with an Emphasis on Restriction and Generalization, Definition, and Classification of Concepts"; "Judgments, with an Emphasis on their Definition, Structure and Classification"; "Kinds of Simple Judgments (i.e. Categorical Judgments)"; "Kinds of Compound Judgments"; "Inference and Direct Inference"; "Syllogisms"; "Disjunctive, Hypothetical, and Relational Inference"; "Inductive Inference"; "The Method of Identifying Causal Connections between Phenomena, i.e. the Five Methods for Searching Causation of Mill"; "Analogy"; "Hypothesis"; "Proof"; "Errors in Proving"; and "The Fundamental Laws of Logic". Compared with the former, this latter textbook contained more material related to compound judgments and their inferences.

Soviet textbooks on logic possess a number of common characteristics, as follows: the first is the confinement of their content to traditional formal logic, and mainly

to Aristotelian logic, that is to categorical propositions and their inferences. Apart from such instances, there also exist textbooks which are richer with regard to the propositional logic of the Stoics, and thus compound propositions and their inferences. For the most part, however, these textbooks all contain the inductive logic of Bacon and Mill. The second common feature is that they all endeavour to found their interpretations of logical principles on the basis of Marxist philosophy, and thus to expound on concepts, judgments, inferences, truth and fundamental laws of logic in accordance with materialist dialectics. These logical textbooks also contain quite a lot of ontology and epistemology-related contents, while some textbooks even include chapters that straightforwardly discuss the relationship between formal logic and materialist dialectics.

Soviet textbooks of this kind shaped the basic pattern of Chinese textbooks on logic issued in the following two or three decades. By and large, the structure of these textbooks unfolds in the following sequence: the object and meaning of logic, concepts, categorical judgments, compound judgments, direct inference and syllogisms, inference of compound judgments, traditional logic of induction, proof and refutation, and the fundamental laws of logical reasoning. Only a few textbooks placed topics like the law of identity, law of contradiction, law of excluded middle and law of sufficient reasons in the second chapter, while some of them discussed these in the final chapter. In their investigation of logical principles and problems, these textbooks strived to implement the position, viewpoints, and methodology of Marxist philosophy.

Let us mention in passing that as late as in 1981 the Shanghai People's Publishing House still published a translation of a new Soviet textbook on logic, *Formal Logic* (*Formalnaya logika*) edited by I. Y. Chupakhin and I. N. Brodsky. This book, which was originally published in 1977, was an approved textbook used at departments of philosophy at Russian universities and already greatly differed from the former Soviet textbooks on logic, in the sense that it principally absorbed the content of modern mathematical logic. Its content was structured as follows: "Introduction"; part one, entitled "General Logic: Elementary Logical Forms and Methods of Thinking", which consists of five chapters: "Concepts, Judgments, with the Main Focus on Categorical Judgments, while also Touching upon Compound Judgments and Modal Judgments"; "The Fundamental Laws of Formal Logic, i.e. the Laws of Identity, Contradiction, Excluded Middle and Sufficient Reason"; "Inference, Speaking Mainly about Categorical Inference and its Syllogisms, Inference of Compound Judgments and Inductive Reasoning, etc."; "Logical Method of Scientific Thought, Mainly Discussing Categories, Definitions, Proof and Refutation, Method of Axiomatization, the Five Methods of Searching Causation, Hypothesis and Method of Probability, etc.". Part two was entitled

"Symbolic Logic", and encompassed the following six chapters: "Truth Tables and Normal Formulae of Propositional Logic"; "Natural Deduction of Propositional Logic"; "Formalised Syllogisms"; "Natural Deduction of Predicate Logic", and "Modal Logic". Quite evidently, this represents a sample structure for an attempt to conjoin the contents of traditional formal logic and modern mathematical logic within one textbook. Although such attempts have the disadvantage of excessively mixed and disorderly contents, lacking in internal connectedness, in the final analysis they made an important first step in the direction of integrating traditional logic and modern mathematical logic.

The Great Debates on Questions of Logic under the Leadership of Mao Zedong

In the first half of the 20th century, two major debates on questions about logic took place within the Chinese academic world, behind both of which there lurked the shadow of Soviet ideology.

> Around the 1930s, with its centre in the Soviet Union, in China arose a tide of rejecting formal logic by means of dialectics. In the year 1930, a widescale criticism of Deborin's school of thought broke out in Soviet philosophical circles, which itself also incorporated an overall rejection of formal logic and so on as being equal to metaphysics (in contrast to dialectics). This served as a background for the Chinese criticism and rejection of formal logic in the 1930s. In 1940, Stalin rehabilitated formal logic, and the criticism of formal logic in Soviet philosophical circles was temporarily announced as concluded, so that by 1947 the teaching of formal logic was reinstated in the Soviet Union. In 1950, after Stalin issued the document "Marxism and Problems of Linguistics", which affirmed the functions of formal logic, its position in the Soviet Union changed radically. These later developments served as the background of the development of Chinese logic in the 1950s. (Ju 2013, 8)

Back in the 1930s, a few leftist intellectuals, like Xu Kaixing 许凯兴, Guo Zhanbo 郭湛波, Ye Qing 叶青, Ai Siqi 艾思奇, Pan Zinian 潘梓年, Li Da 李达 and others, under the influence of contemporary Soviet ideology, authored a series of articles in which they equated formal logic with idealism on one side, and metaphysics as the counterpart of dialectics on the other. In their writings, the authors even demanded that the status of formal logic as an academic discipline or science should be revoked. Similar views were also upheld by Mao in the first edition of

his classic work "On Contradiction" (*Maodun lun* 矛盾论; 1937), but were later deleted from the subsequent editions of the text. In 1954, Ma Te 马特 published the short booklet entitled *On the Rudimentary Rules of Logical Thinking* (*Lun luoji siwei de chubu guilü* 论逻辑思维的初步规律), in which he maintained that while formal logic represents an inferior form of logic, dialectical logic represents an advanced form, and thereby rekindled the great polemic on the relationship between formal logic and dialectics. Later, in 1956, Zhou Gucheng 周谷城 published an article entitled "Formal Logic and Dialectics" (*Xingshi luoji yu bianzhengfa* 形式逻辑与辩证法), in which he advanced his theory of "master and subordinate": dialectics is the master and formal logic its subordinate; although the master and subordinate differ from each other, they can never be separated. This theory posed a direct challenge to the "theory of inferior and advanced". Consequently, Zhou's article not only gave rise to a great controversy, but also attracted the attention of Mao Zedong. As a consequence, Mao read many articles that were published in the framework of the then polemics on logic, and also personally convened several public conferences on the topic, calling for their conformity with the official motto "let a hundred flowers bloom and a hundred schools of thought contend" (*baihua qifang, baijia zhengming* 百花齐放，百家争鸣), and expressing his own support for the ongoing great debate on questions of logic. On November 4, 1957, Mao invited a group of philosophers and logicians to join him at Zhongnanhai 中南海, the headquarters of the Communist Party of China, to conduct a discussion on the questions about logic. Among the invited scholars were Jin Yuelin, Zhou Gucheng, Wang Fangming 王方名, and Huang Shunji 黄顺基. Before and after that event, Mao also met on many occasions with his friend Zhou Gucheng, together with whom he investigated the problematics relating to logic and whose views he also often openly supported (see Xu 2018; Feng 2007). By virtue of Mao's participation, and under his support or even leadership, the great debates on the questions about logic were not only conducted in an atmosphere of extreme enthusiasm, but also continued for many years. The pertinent papers that were published in that period in Chinese periodicals were later collected in three major volumes of *The Anthology of Discussions on the Questions about Logic* (*Luoji wenti taolun ji* 逻辑问题讨论集), and published in the years 1959, 1960, and 1962 by the Shanghai People's Publishing House.

The principal questions about logic that were put under discussion in the 1950s and 1960s—such as the relationship between formal logic and dialectical logic, the object, characteristics and use of formal logic, the objective foundations of formal logic, the relationship between veracity and correctness in formal inference, the revision, remodelling and developmental directions of formal logic, inductive inference and methods (cf. Wu 1979)—were not at all technical questions of logic

in the strictest sense, but rather a set of philosophical questions about logic. I once commented that, on one hand, these debates have positive consequences such as the disassociation of formal logic from idealist philosophy and metaphysics (in contrast to dialectics), and the founding of its basis on Marxist philosophy, whereby it regained legitimacy from the current official ideology, which later enabled it to become disseminated, popularized and regain a certain degree of advancement. On the other hand, the same discussion also produced some negative consequences, such as: 1) Under the Soviet influence, the subject of these discussions was limited almost exclusively to traditional formal logic, while insufficient attention was devoted to the new mathematical logic, which was sometimes even the subject of a rejectionist attitude and criticism. In this way, Chinese research on logic had lost the chance to get back in step with international currents in the field, which critically delayed and slowed down the entire process of its modernization. 2) By filling the pages of logical treatises and textbooks with numerous concepts and categories from philosophical epistemology and dialectics, a wide variety of technical questions of logic, which had originally been philosophically neutral, had also gained an overinflated philosophical label. Thus, instead of being considered as an instrument of philosophy, as had been the case originally, logic became overly dependent on philosophy. 3) In certain segments of the Chinese circle of logicians, it fostered a shallow academic atmosphere, where no concrete or creative research on logic itself was conducted, and where, instead, scholars would commit their work to studying a series of obsolete theoretical questions and engage in irrelevant philosophical chatter (cf. Chen 2000, 9–10).

Two Major Waves of Popularization of Logic in China

In the 1950s and 1960s, as a political leader with absolute authority, Mao Zedong often discussed or even stressed in official party documents that in writing their articles people should conform to logic, and thus that the cadres employed by the Party and government administration ought to study logic. Following his public appeals, the cadres and young students set off a surge in studying logic, thus forming the first major wave of popularization of logic in China. At that time a few relevant groups were established in the country, which focused on selecting and reprinting Chinese and foreign treatises on logic that had previously been published in Chinese. Thus, for instance, in 1960s the SDX Joint Publishing Company (Sanlian shudian 三联书店) edited and issued the *Logic Book Series* (*Luoji congkan* 逻辑丛刊), which comprised the following 11 volumes: *Organon* (Francisco Furtado and Li Zhizao, transl. and com.); Mill's *System of Logic* (Yan Fu, transl.); *Logic Primer* (written by Jevons and translated

by Yan Fu); *Logic* (by Jevons, translated by Wang Guowei); *Outline of Logic* (*Lunlixue gangyao* 论理学纲要, by Wataru Totoki 十时弥, translated by Tian Wuzhao 田吴炤); *New Logic* by Zhang Zihe; *Outline of Logic* by Tu Xiaoshi; *Logic* by Jin Yuelin; *Essentials of Logic* by Zhang Shizhao; *Logic and the Science of Logic* (*Luoji yu luojixue* 逻辑与逻辑学, by Pan Zinian 潘梓年; 1937); and *Selected Translations from History of Logic* (*Luoji shi xuanyi* 逻辑史选译, by T. Ziehen et al., translated by Wang Xianjun). To answer Mao's appeals, the five foremost senior Chinese experts in logic—Jin Yuelin, Wang Dianji, Shen Youding, Zhou Liquan and Zhang Shangshui 张尚水—took action and composed the book *An Everyday Reader in Logic* (*Luoji tongsu duben* 逻辑通俗读本). The work was comprised of five chapters, discussing primarily topics such as concepts, judgments, inference, the fundamental laws of formal logic, and argumentation (proof and refutation). The special features of this work are its conceptual clarity, succinctness, and comprehensibility, which made it suitable for being used by beginners in formal logic. The first edition of the book was issued in 1962 and reprinted in 1964, while it was reissued in a revised version in 1978, this time under the title *A Concise Reader in Formal Logic* (*Xingshi luoji jianming duben* 形式逻辑简明读本). The last version was reprinted several times, reaching a very wide readership, and influencing quite a few generations of Chinese readers.

In 1977, under the presidency of Deng Xiaoping, the entrance system was reinstated in Chinese universities. Consequently, in the following year, Chinese universities welcomed the first generation of students after the Cultural Revolution to have been accepted in their studies by virtue of their final college exams. In the same year, the state re-promulgated the official appeal to "March towards science" (*xiang kexue jinjun* 向科学进军), causing the generation of youth to long for new knowledge and making the reading of books a common trend in the entire Chinese society. Still under the influence of Mao, at the time almost all university students, no matter whether focusing on the humanities or on natural sciences, were obliged to take a course in logic. As a learning requirement for those who were unable to enter universities, the state set up the Self-Taught Higher Education Examinations for adults, where, in many fields of study formal logic was listed as a compulsory subject. In 1981, Peng Yilian 彭漪涟 and Yu Shihou 余式厚 co-authored the book *Fun with Logic* (*Quwei luojixue* 趣味逻辑学), which focused on explaining logical principles by telling stories, and offered a great degree of accessibility for the common reader, because of which the book was widely welcomed in Chinese society. Until this day, I still clearly remember the joy and delight with which I read this book. In 1984, the Ministry of Education commissioned Wu Jiaguo 吴家国 to compile the work *A Synopsis of General Logic for Self-Taught*

Examinations (*Putong luoji zixue kaishi dagang* 普通逻辑自学考试大纲; 1986). Five years later Wu and Ma Yuke 马玉珂 coedited a volume entitled *Principles of General Logic* (*Putong luoji yuanli* 普通逻辑原理; see later edition Ma 1997), which sold very many copies. Apart from the regular university studies and self-study higher education examinations for adults, there also existed various forms of non-governmental schools, the most wide-ranging and influential of which was the China Correspondence University of Logic and Languages (*Zhongguo luoji yu yuyan hanshou daxue* 中国逻辑与语言函授大学). According to the introduction from its official website, this university was opened in 1982 and has now educated more than half a million students, the majority of whom specialized in formal logic. From the 1980s until the start of this millennium, logic training classes for self-taught examinations blossomed all over the country, so that even university teachers in logic started teaching logic at various places outside of their universities to make more money. At the same time, the sales of books on logic skyrocket; some of them easily sold in tens or even hundreds of thousands of copies, while some sold in the millions. We can call this stage the second major popularization of formal logic in China.

On a brief note, allow me to mention that, in the following years, two of my own books on logic have also proved very effective in disseminating and popularizing knowledge in this field: the first was entitled *What is Logic?* (*Luojixue shi shenme?* 逻辑学是什么?), the second *Fifteen Lectures on Logic* (*Luojixue shiwu jiang* 逻辑学十五讲). The books were published in the *Experts' Courses in General Knowledge Book Series* (*Mingjia tongshi jiangzuo shuxi* 名家通识讲座书系) by Peking University Press in the years 2008 and 2016, respectively. Both garnered a wide acclaim among readers, and both sold several hundred thousand copies.

The Development of General Education in Logic at Chinese Universities

The development of teaching logic at Chinese universities in the period between 1949 and 2019 can be clearly divided into two stages, that is, before and after Deng Xiaoping's reforms and the opening of China to the outside world. Considering the importance of logic education, in the following paragraphs we shall cast some light on this development by means of a relatively extensive overview of the logic textbooks used in PRC in the above-mentioned two periods.

In the 1960s, due to its close relations with Soviet academia, the Renmin University of China ("RUC" for short) (*Zhongguo Renmin daxue* 中国人民大学) became a major centre of Chinese higher education. Already back in 1958, the

university's teaching and research section for logic compiled the work *Formal Logic* (*Xingshi luoji* 形式逻辑), whose content is quite close to that of the Soviet logic textbooks. It consisted of twelve chapters, as follows: "Introduction"; "On the Object and Meaning of Formal Logic"; "Concepts"; "Judgments"; "The Fundamental Laws of Formal Logic"; "Inference"; "Direct Inference"; "Categorical Syllogisms"; "Hypothetical and Disjunctive Syllogisms"; "Inductive Inference"; "Analogy and Hypothesis"; "Proof". In addition to these, the chapter on judgments was also followed by an appendix on the expression of concepts and judgments in Chinese language. Thereafter, investigation of special manifestations and applications of traditional formal logic in the Chinese language became one of the main special features of logic textbooks compiled at RUC. Later, the book was reprinted several times. The second edition appeared in 1980, and the second revised edition in 1984. Even though the contents in the second edition were still almost the same as in the first, the second contained two additional appendices: "Logical Analysis of Argumentative Treatise" and "A Brief History of Logic". As pointed out by Zhuge Yintong 诸葛殷同, "having had an immense circulation within the country, these two volumes produced a profound and long-lasting impact" (Zhuge 1997, 151).

In 1962 Jin Yuelin took charge of the compilation of the textbook *Formal Logic* (*Xingshi luoji* 形式逻辑), which was intended for use in the humanities at national colleges and universities. Other scholars who took part in creating the work were mostly senior Chinese experts in logic, like Wu Yunzeng 吴允曾, Zhou Liquan, Yan Chengshu 晏成书, Zhuge Yintong, and so on. The final version of the first draft of the book, which was completed by the following year, was later compiled by Zhou Liquan and reached its final form in 1965. However, due to the breakout of the Cultural Revolution, the launch of the book was postponed until 1979, when it was finally published. Although this book is essentially limited to traditional formal logic, its content was considerably expanded in comparison with the above-mentioned Soviet textbooks. It consisted of the following seven chapters: "The Object and Uses of Formal Logic"; "Concepts"; "Judgments, Involving Categorical, Relational, Compound, and Modal Judgments"; "Deductive Inference, Including Direct Inference, Syllogisms, Relational Inference, Inference of Compound Judgments and Modal Inference"; "Inductive Inference"; "The Fundamental Laws of Formal Logic, Focusing Only on the Laws of Identity, Contradiction and the Excluded Middle, and not Mentioning the Law of Sufficient Reason"; "Argumentation, Discussing Both Proof and Refutation". The book also contained one appendix on resources in the history of logic. Overall, this textbook is an example of an outstanding work on traditional formal logic, whose major and most important features are the conciseness of its content, the precision of its exposition on the subject, the elegant and succinct writing style,

carefully selected examples, and meticulously designed selection of exercises. Back in those years I conscientiously read the book several times and completed each and every exercise contained therein, establishing the initial foundations of my knowledge and technical mastery of logic using this book.

After the end of Cultural Revolution in 1976, China embarked upon an entirely new path. In May 1978, a nationwide symposium on logic was held in Beijing, at which Zhang Jialong 张家龙 presented his report entitled "Modernization of Formal Logic" (*Xingshi luoji de xiandaihua* 形式逻辑的现代化), in which he raised his critique of several problems in teaching material on traditional logic in Chinese national education. Moreover, in his report Zhang proposed enriching and developing traditional logic with modern logic by compiling a new generation of logic textbooks that would incorporate the spirit, content, and methodology of modern logic. At the second national symposium on logic, in August 1979, Wang Xianjun gave a lecture entitled "Modernization of Logical Curricula" (*Luoji kecheng de xiandaihua* 逻辑课程的现代化), in which he proposed the universal reform of academic programs and courses in logic offered to students of the humanities at Chinese colleges and universities, that is, to modernize their contents. Subsequently, the policies favoured by Zhang and Wang gave rise to an intense debate on the "modernization of logic" that went on for more than ten years. In the course of debate, three main positions on how to modernize logical curricula were formed: the first was the "theory of replacement", that is to replace traditional formal logic with mathematical logic; the second was the "theory of assimilation", that is to assimilate some contents from mathematical logic into the framework of traditional logic; and the third was the "theory of coexistence", which maintained that traditional formal logic on one side and mathematical logic on the other both have their advantages and both are needed, and must therefore be offered separately while maintaining a harmonious coexistence. Following a few decades of development, the ultimately prevailing form of teaching material are the textbooks on "introductory logic", combining both traditional and modern logic.

The most successful textbook in the category "theory of assimilation" is the work *General Logic* (*Putong luoji* 普通逻辑), edited by Wu Jiaguo. This was the main textbook in logic for studies in the humanities at national colleges and universities, the compilation of which was organized by the Ministry of Education. It was composed by eleven renowned teachers of logic from various Chinese universities, while the compilation of the final manuscript was done by Wu Jiaoguo. The book was finally published in 1979 by the Shanghai People's Publishing House. Afterwards it underwent three revisions, having been released in four different editions, each time incorporating more and more contents related to modern logic. In 1995,

the book was awarded the "First Prize of the Third Awards for Excellent Text-books in General Higher Education" by the National Education Committee. The total number of copies printed to date has probably exceeded three million, which testifies to the extensive use and huge influence of this book. Wu later wrote an article speaking about the guiding ideas behind the compilation of this textbook:

> The bulk of general logic must consist of the quintessential features from traditional logic, and must be suitable for absorbing the basic knowledge of mathematical logic, forming a teaching system combining the two kinds of logic; logical form must not only include deductive but also inductive inferences; the rules of syllogism can be divided into structural rules, general rules and rules of derivation, which differ from each other in their respective level; the scopes of application of laws of contradiction and excluded middle possess no distinction in broadness and narrowness; the law of sufficient reason can be retained, but not as a universal logical law but as a law of argumentation; in argumentation, the methods and rules of proving need to be harmonised with each other in order to eliminate logical contradictions. (Wu 2004, 117)

As a result of Deng Xiaoping's reforms, the circle of Chinese logicians started gradually gaining greater familiarity with the situation in logic education in the West. Consequently, a few textbooks written in English soon became the subject of serious study by a certain group of Chinese logicians. Under the planning and preparations of myself, three textbooks on logic, widely used at Western universities, were translated into Chinese and published: the eleventh edition of *Introduction to Logic* (*Luojixue daolun* 逻辑学导论) by Irving M. Copi et al. was translated into Chinese by Zhang Jianjun 张建军 and others, and published in 2007. A Chinese translation of the thirteenth edition of the textbook was produced and published in 2014. This work became immensely popular, and until this day remains a bestseller among such textbooks in China. Secondly, the tenth edition of Patrick J. Hurley's *A Concise Introduction to Logic* (*Jianming luojixue daolun* 简明逻辑学导论) was translated by myself, Song Wengan 宋文淦 and others, and published in 2010. And, thirdly, the ninth edition of H. Kahane's *Logic and Philosophy: A Modern Introduction* (*Luoji yu zhexue: xiandai luoji daolun* 逻辑与哲学: 现代逻辑导论) was translated into Chinese by Zhang Jianjun and others, and published in 2017. Apart from those works, Hu Zehong 胡泽洪 and others also produced a translation of Copi's *Essentials of Logic* (*Luoji yaoyi* 逻辑要义 (2013)).

Under the influence of Western logic textbooks, a succession of work of the type "an introduction to logic" were compiled and published in China. The first

noteworthy such textbook was the *New Course in Logic* (*Xin luoji jiaocheng* 新逻辑教程) edited by Song Wenjian 宋文坚 and authored by Zhou Beihai 周北海, Liu Zhuanghu 刘状虎, Li Xiaowu 李小五, Deng Shengqing 邓生庆 and others, which was published in 1992. In this work prominence is given to a framework set around modern logic, focusing mainly on elaborating the basic content of modern deductive and inductive logics. It consists of the following nine chapters: "The Object, Methodology, and Meaning of Logic"; "Formulae, Truth Tables, Normal Formulae, and Formal Proof of Propositional Logic"; "Propositional Calculus"; "Traditional Predicate Calculus"; "Formulae of Predicate Calculus"; "Operations, Inference and Proofs in Predicate Logic"; "Modal Logic"; "Naïve Set Theory"; "Inductive Logic". Based on this textbook, a group of members of the teaching and research section for logic at Peking University compiled another book, *Logic* (*Luojixue* 逻辑学), the compilation of which was supervised by Song Wenjian as editor-in-chief and Guo Shiming 郭世铭 as assistant editor. This book, which was first published in 1998 by the People's Publishing House, consisted of seven chapters: "Preface; "Propositional Logic"; "Categorical Logic"; "Monadic Predicate Logic"; "Predicate Logic"; "Inductive Logic"; "Logical Methods". In addition, the book also contains an appendix: "A Brief Introduction to Applied Logic, Introducing Modal Logic, Temporal Logic, Intuitionist Logic, Many-Valued Logic, and Free Logic". In comparison with other textbooks, these two volumes already contained a considerable amount of modern logic, and hence also the most systematic, thorough, and accurate exposition of the principles and methodology of modern logic. However, for this reason it was only rarely put to use at Chinese universities.

Between 1984 and 1992, during my tenure in the teaching and research section for logic at RUC, and under my participation and even guidance, my colleagues at that section compiled a textbook entitled *Logic* (*Luojixue* 逻辑学). The book, which was first issued in 1996, included the following eight chapters: "Preface"; "Propositional Logic"; "Categorical Logic"; "Modal Logic"; "Inductive Logic"; "The Fundamental Laws of Logic"; "Proof and Refutation"; "Fallacies". This book belongs to the "integrative type" of textbooks on traditional logic and modern logic. Its second and third editions emerged in the years 2008 and 2014, having attained fairly wide use at Chinese universities. Later, after I moved to Peking University, I authored a new textbook *Introduction to Logic* (*Luojixue daolun* 逻辑学导论) on my own. The book was published in 2003 and consisted of the following six chapters: "Logic is a Science of Inference and Argument"; "Propositional Logic"; "Categorical Logic"; "Predicate Logic"; "Inductive Logic"; "Informal Logic". Apart from these main chapters it also contained the following appendix: "Formalization Method and Formal Systems". In the years 2006, 2014, and 2020, the second, third and fourth editions of the book were published, from which

the above-mentioned appendix was omitted. This textbook not only further approached the Western style of "introduction to logic", but also had extensive use.

Other relatively important Chinese logic textbooks that were published after Deng Xiaoping's reforms include: *Principles of Formal Logic* (*Xingshi luoji yuanli* 形式逻辑原理 (1982)) by Zhuge Yintong and others; *Introduction to Logic* (*Luoji daolun* 逻辑导论 (1996)) by the teaching and research section for logic of Zhongshan University; *A Course in Logic* (*Luojixue jiaocheng* 逻辑学教程 (1999)) edited by He Xiangdong 何向东; *Introduction to Logic* (*Luojixue daolun* 逻辑学导论 (2000)) edited by Peng Yilian; *Foundations of Logic* (*Luoji jichu* 逻辑基础 (2004)) by Wang Lu 王路; *Introduction to Logic* (*Luojixue daolun* 逻辑学导论 (2005)) by Huang Huaxin 黄华新 and Zhang Zexing 张则幸; *Logic* (*Luojixue* 逻辑学 (2007)) by Hu Zehong and others; *A Basic Course in Logic* (*Luojixue jichu jiaocheng* 逻辑学基础教程 (2008)) by the teaching and research section for logic of Nankai University, as well as the *Logic* (*Luojixue* 逻辑学 (2017)) volume of the Ministry of Education's "Ma Engineering Project" Key Textbooks ("Ma gongcheng" zhongdian jiaocai "马工程" 重点教材) series, which was edited by He Xiangdong, and composed by a large group of Chinese experts in logic.

Teaching and Research of Mathematical Logic

In China, scholars who engage in work on mathematical logic can be divided into two main groups. The first is the Association for Research in Modern Logic attached to the Chinese Association of Logic (*Zhongguo luoji xuehui* 中国逻辑学会). The majority of the members of this organisation are concerned with education activities and compilation of teaching material relating to mathematical logic, while only a minority engage in research into mathematical logic in the strictest sense. However, in recent years this group has changed rapidly with the arrival of the younger generation of Chinese logicians. The second is the mathematical logic branch of the Chinese Mathematical Society (Zhongguo shuxue xuehui 中国数学学会). The members of this group engage to a greater extent in research on mathematical logic, but to a much lesser degree maintain contact and communicate with the members of the Association of Logic, causing the latter to be rather unfamiliar with the research of the former. I myself am one of the representatives of the latter, possessing only a vague idea of the state of research and concrete advances in Chinese mathematical logic. The overview of teaching and research of mathematical logic in China is summarized in this article based on two main sources: the first is the chapter 2 on "Mathematical Logic" by Zhao Xishun 赵希顺 in *Contemporary Chinese Research in Logic 1949–2009* (*Dangdai*

Zhongguo luojixue yanjiu 1949-2009 当代中国逻辑学研究 1949–2009, edited by Ju Shier 鞠实儿, pp. 50–122); the second is my own experience and perception that matured together with Chinese studies in logic following the 1980s reforms.

Between the 1930s and early 1950s, after logicians like Shen Youding, Wang Xianjun, Hu Shihua, Mo Shaokui 莫绍揆, and others returned from their studies abroad, mathematical logic in China started developing. Despite of the influence of Soviet criticism of mathematical logic, by the 1960s teaching and research on this subject in China reached a relatively high level of development. Apart from having compiled and translated several textbooks on mathematical logic, China's leading experts such as Hu Shihua, Mo Shaokui, Shen Youding, and others also published some articles in prestigious international periodicals such as *The Journal of Symbolic Logic*. From the 1970s onwards, a former student of Jin Yuelin, the American-Chinese mathematical logician Hao Wang, often returned to China to lecture. His lectures, which were collected in the book *Popular Lectures on Mathematical Logic* (*Shuli luoji tongsu jianghua* 数理逻辑通俗讲话) and officially published in 1981, enabled contemporary Chinese logicians to better understand the new developmental circumstances and advances in Western mathematical logic.

After the launch of Deng Xiaoping's reforms in 1978, the collection of mathematical logic textbooks that have left the deepest impressions on their readers include Hu Shihua's and Lu Zhongwan's 陆中万 *Foundations of Mathematical Logic* (*Shuli luoji jichu* 数理逻辑基础; 2 volumes, (1981)); Wang Xianjun's *Introduction to Mathematical Logic* (*Shuli luoji yinlun* 数理逻辑引论; (1982)); Mo Shaokui's *A Preliminary Introduction to Mathematical Logic* (*Shuli luoji chubu* 数理逻辑初步 (1980)); *A Course in Mathematical Logic* (*Shuli luoji jiaocheng* 数理逻辑教程 (1982)), and *Theory of Recursion* (*Diguilun* 递归论 (1987)) as well as his translation of S. C. Kleene's *Introduction to Metamathematics* (*Yuanshuxue daolun* 元数学导论; (1987)); Wang Shiqiang's 王世强 *Foundations of Model Theory* (*Moxinglun jichu* 模型论基础 (1987)); Zhang Jinwen's 张锦文 *Introduction to Axiomatic Set Theory* (*Gongli jihelun daoyin* 公理集合论导引 (1991)); Zhu Shuilin's 朱水林 translation of A. G. Hamilton's *Logic for Mathematicians* (*Shuli luoji* 数理逻辑 (1987)), and Yan Chengshu's *Introduction to Set Theory* (*Jihelun daoyin* 集合论导引 (1994)). As I know, the most widely used of these was Wang Xianjun's *Introduction to Mathematical Logic*, while Mo Shaokui's *A Preliminary Introduction to Mathematical Logic* also reached a very broad readership, having had the greatest effect with regard to the dissemination of mathematical logic in China.

In the period following the Deng Xiaoping's reforms, a new generation of outstanding mathematical logicians emerged in China, such as Wu Wenjun 吴文俊, Tang Zhisong 唐稚松, Yang Dongbing 杨东屏, Zhang Jinwen, Zhou Haoxuan

周浩旋, Hong Jiawei 洪加威, Luo Libo 罗里波, Shen Fuxing 沈复兴, Ding Decheng 丁德成, Li Xiang 李祥, Li Wei 李未, Feng Qi 冯琦, Zhang Qingyu 张清宇, Zhang Yi 张羿, Yang Yue 杨跃, and Zhao Xishun, among others. These scholars have produced a great number of international-level research achievements and are all actively engaged in the international frontiers of their fields of research (see Ju 2013, 50–122.). In recent years, in collaboration with Yang Yue and other scholars in Singapore, Hao Zhaokuan 郝兆宽 and Yang Ruizhi 杨睿之 from Fudan University have contributed much to the advancement of research both in set theory and the thought of Kurt Gödel, and also to the compilation of mathematical logic textbooks.

A Period of Flourishing Research in Dialectical Logic

In China, dialectical logic was once generally believed to be a science concerned with studying the forms, methodology, and laws of dialectical thinking. From 1949 to the 1980s, or even up to the early 1990s, represents the period in which dialectical logic flourished in China. In my opinion, this was an aggregate outcome of various different causes: 1) The first resided in the fact that the traditional Chinese philosophy, such as, for example, the *Book of Changes* (*Zhouyi* 周易), the philosophy of Laozi and Zhuangzi, Buddhist philosophy and so on, contained a strong focus on the grand narrative of the universe, having paid particular attention to the circulations and changes underlying the various things and phenomena that exist, thinking about the same question from several different angles, striving to refrain from epistemic stiffness, rigidity, and attachment. All these aspects possess a strong resemblance to dialectical thought. 2) German classical philosophy, represented by Kant and Hegel, has had a great influence on China. As a consequence, Hegel's representative works, popularly referred to as "large logic" and "small logic", together with his dialectics of "thesis-antithesis-synthesis", were commonly referred to as "dialectical logic". 3) Marxist philosophy, which inherited and transformed German classical philosophy, is the official ideology in China, and in some of its classical works "dialectical logic" is often mentioned and advocated. 4) The philosophical circles of the Soviet Union, which for a period of time was revered by China as its "big brother", all propagated and studied dialectical logic. Some of the related works were also translated into Chinese, including M. M. Rosenthal's *Principles of Dialectical Logic* (*Principy dialekticheskoi logiki*; *Bianzheng luoji yuanli* 辩证逻辑原理 (1962)), M. N. Alekseyev's *Dialectics of the Forms of Thinking* (*Dialektika form myshleniya*; *Siwei xingshi de bianzhengfa* 思维形式的辩证法 (1961)), P. V. Kopnin's *Dialetics, Logic, Science* (*Dialektika, logika, nauka*; *Bianzhengfa, luoji, kexue* 辩证法, 逻辑, 科学 (1981)) and *Dialectics as*

Logic and Epistemology (*Dialektika kak logika i teoriya poznaniya; Zuowei renshilun he luoji de bianzhengfa* 作为认识论和逻辑的辩证法 (1984)). All these works had a great impact on Chinese academia.

In the 1980s and 90s, several Chinese research treatises and even textbooks on dialectical logic were published in China. The domestic research on dialectical logic can be summarized with a list of the following seven research directions: comparative research on dialectical and formal logic; research on the theory of categories; research on the methodology of sciences; research on non-classical logics; dialectical examination of new results on modern logic and philosophy of logic; research on the practical applications of dialectical logic; studies in the intellectual history of dialectical logic (cf. Ju 2013, 375–86). Zhou Liquan's *Hegel's Dialectical Logic* (*Heigeer de bianzheng luoji* 黑格尔的辩证逻辑; 1989) is a representative contribution in the framework of the last kind of approach. Although within the framework of these studies there also emerged many valuable insights and achievements, generally speaking, due to unclear distinctions between dialectical logic and dialectical materialism, the logical colouration of their results was rather weak, which is also why they have not attained wide recognition or approval. Consequently, since the beginning of the 21st century, dialectical logic has gradually withdrawn to the fringes of the Chinese academic world, to the degree that it is today very difficult to detect any signs of its presence.

Continuous Advance of Research in the History of Chinese Logic

In my opinion, between the years 1949 and 2019, in comparison with other branches of the science of logic, the history of Chinese logic is a field of research which made significant progress and attained plentiful results in China, and, at the same time, is still brimming with controversies and enthusiasm. I concur with the following generalizations: in this period of time

> research in history of Chinese logic can be roughly divided into three periods, namely, the opening period of research in history of Chinese logic in the first 17 years since the founding of PRC, the period of scientific construction of history of Chinese logic in the 1980s, and the period of deepening and reassessment of the research in history of Chinese logic from the 1990s up to the present day. … the differentiating feature between the second and third period was marked by the publication of the key item *History of Chinese Logic* (five volumes) in 1989, which was commissioned in the framework of the national Sixth Five-Year Plan. On

the other hand, while the main subject of the former period consisted in founding history of Chinese logic as an academic discipline, in the latter period equal stress was laid both on research and reassessment, in the course of which several different positions on Chinese logic took shape. (Ju 2013, 396)

The representative achievements of the first period include the following publications: Shen Youding's *Logic of the Mohist Canon* (*Mojing luojixue* 墨经逻辑学; first published as a series of papers in 1960 and then as a collected work in 1980), Zhan Jianfeng's 詹剑峰 *Mohist Formal Logic* (*Mojia de xingshi luoji* 墨家的形式 逻辑 (1956)), and Wang Dianji's *History of Logical Thought in China* (*Zhongguo luoji sixiang shi* 中国逻辑思想史, completed in 1960, published in 1979), *An Analysis of Historical Material on Logical Thought in China* (*Zhongguo luoji sixiang shike fenxi* 中国逻辑思想史料分析 (1961)) as well as a series of his articles from the period under discussion (cf. ibid., 399).

Below we will focus our discussion on the last two periods of studies on the history of Chinese logic. Attempts to answer questions such as how we should actually carry out research on the history of Chinese logic, what kind of interpretational frameworks should be adopted, gave rise to controversies and disagreements among different researchers, and especially among different generations of researchers, and in turn also to several different approaches. By and large, however, we can distinguish between two major approaches, as follows.

The first approach chose from certain Western (in a narrow or general sense) theories of logic—such as, for example, traditional formal logic, mathematical logic, informal logic, theories of argumentation or semiotics—to serve as the interpretational framework for the relevant logical material in Chinese classics. These background theories were thus used to reconstruct ancient Chinese logic, while judgments were then made by means of comparative research on the advantages and disadvantages of such logics. For the most part, the scholars furthering this kind of approach emphasized the generality of human thought and universality of logical theories, making use of Western theories of logic in their hermeneutics of Chinese classics, and closely pursuing the ideas of unity, resemblance, and fusion between Chinese and Western theories of logic. As the framework of their interpretations, some scholars chose Western traditional formal logic, while some of them even went as far as to choose ideas, methods, and techniques from modern mathematical logic. The representative achievements of this kind of research include the monumental five-volume work *History of Chinese Logic* edited by Li Kuangwu 李匡武 (1989), which was an achievement of one of the key-projects of the national Sixth Five-Year Plan. Apart from this large-scale work, the

following titles are also among the main achievements of such efforts: the series *Selected Material in History of Logic in China* (*Zhongguo luoji shi ziliao xuan* 中国逻辑史资料选; 5 volumes (1991)) published as a complement to the former, Sun Zhongyuan's 孙中原 *History of Logic in China* (*Pre-Qin Period*) (*Zhongguo luoji shi* (*xian-Qin juan*) 中国逻辑史(先秦卷) (1987)), and *Studies in Chinese Logic* (*Zhongguo luoji yanjiu* 中国逻辑研究 (2006)), Zhou Yunzhi's 周云之(ed.) *History of Chinese Logic* (*Zhongguo luoji shi* 中国逻辑史 (2004)), and so on. Other scholars, like Song Wenjian, Cheng Zhongtang 程仲棠 and Wang Lu, have also insisted on using Western formal logic for interpreting the material found in Chinese classics. At the same time, however, they merely regarded formal logic as a theory of inferential form, capable of guaranteeing that certain conclusions necessarily follow from their premises. Based on their research, in ancient China there did not exist anything similar to Aristotelian logic, which leads to the conclusion that in Chinese antiquity there was no logic as such—but only discourses like the science of names (*mingxue* 名学), science of disputation (*bianxue* 辩学), and science of argumentation (*lunbianxue* 论辩学). Moreover, researchers like Li Xiankun 李先焜, Cai Boming 蔡伯铭, Chen Zongming 陈宗明, Chen Daode 陈道德, Zeng Xiangyun 曾祥云 and others maintained that semiotics is a better paradigm for studies on the history of Chinese logic. The traditional manner of considering Western formal logic as the paradigmatic research, and then randomly cutting off any material from ancient Chinese classics and subjecting it to causal interpretation, can never be coherent, but commits serious systemic mistakes of deviating from the original meaning of those classics, drawing simple parallels between the Chinese and the Western, etc. On the other hand, adopting a semiotic paradigm and regarding ancient Chinese logic as a form of semiotics of a natural language incorporating syntax, semantics, and pragmatics, can be more faithfully decipher the entirety and the original meaning of ancient Chinese classics, and consequently produce more rational and accommodating interpretations. In this regard, the most representative research results include Chen Zongming's *Chinese Pragmatic Thought* (*Zhongguo yuyongxue sixiang* 中国语用学思想 (1997)), Lin Mingjun's 林铭钧 and Zeng Xiangyun's *A New Exploration of the Sciences of Names and Disputation* (*Ming-bianxue xin tan* 名辩学新探 (2000)), and Chen Daode's and Zeng Xiangyun's *Studies in Pre-Qin Sciences of Names and Disputations in the Perspective of Semiotics* (*Fuhaoxue shiye xia de xian-Qin ming-bianxue yanjiu* 符号学视野下的先秦名辩学研究 (2017)).

The second approach strives to emphasize the interrelatedness between logic and culture, advocating the use of comparative methods founded on "historical analysis and cultural hermeneutics" in our attempts to interpret and construct ancient Chinese logic on the basis of the original characteristics of Chinese culture. This

approach gives prominence to the differences in modes of human thought and particularities of logical theories within different cultures, opposing the attempts at forcefully inculcating Chinese logical material into the framework of Western logic and using the later for drawing oversimplified parallels between the two. The majority of the proponents of this approach have earned their doctorates under the scholarly influence of Professor Cui Qingtian 崔清田 at Nankai University, who is considered to have been the nucleus of formation of the "Nankai School" of studies in the history of Chinese logic.[3] Cui maintains that:

> Logic is the science of the structure and form of logical thinking, which is influenced by culture. It not only possesses logical commonalities but also particularities. With commonalities we refer to fixedness of the nature of logic, of which the common object is the most elementary. Particularities, on the other hand, designate those features of logic that appear within different historical and cultural contexts, such as the differences between prevailing types of inferences, as well as the discrepancies between the methods of formulating forms of inferences. Taking this kind of view on logic as a precondition and foundation, one can disapprove of the view that Western traditional logic and modern formal logic are the only kind of logic, recognising those logics that derive their differences from their cultural backgrounds and possess their own characteristics. Hereby we can also confirm that "Chinese logic" is a form of learning within Chinese national learning and was not merely discovered within Chinese studies of Western logic. "Chinese logic" thus contains commonalities identical to those of Western science of logic, while at the same time also possesses particularities which differ from those of the latter. (Cui 2011, 49)

The principal achievements obtained in this way posit that Chinese ancient logic constitutes the science of names and science of disputation that are different from traditional formal logic, of which the latter uses "*tuilei* 推类" as the leading type of inference. Moreover, its *tuilei* has got the characteristics of analogical reasoning and belongs to probabilistic inferences. The representative results of this option include: *A Coursebook in History of Chinese Logical Thought* (*Zhongguo luoji six-iang shi jiaocheng* 中国逻辑思想史教程; 1988 first edition, 2001 second edition) edited by Wen Gongyi 温公颐 and Cui Qingtian; *Science of Names and Science of Disputation* (*Mingxue yu bianxue* 名学与辩学 (1997)) edited by Cui Qingtian; *A Comparative Study of Mohist Logic and Aristotelian Logic* (*Mojia luoji yu Yalishid-uode luoji bijiao yanjiu* 墨家逻辑与亚里士多德逻辑比较研究 (2004)) by Cui

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3   For English versions of Cui's studies, see Cui (2005; 2021).

Qingtian; *A Study of the Pre-Qin Science of Names* (*Xian-Qin mingxue yanjiu* 先秦名学研究 (2004)) by Zhai Jincheng 翟锦程; *Research on Tuilei Logic in Ancient China* (*Zhongguo gudai tuilei luoji yanjiu* 中国古代推类逻辑研究 (2012)) by Liu Mingming 刘明明, and *A New Theory of Pre-Qin Logic* (*Xian-Qin luoji xinlun* 先秦逻辑新论 (2017)) by Zeng Zhaoshi 曾昭式.

Following the path of emphasizing the interrelatedness of logic and culture, Ju Shier went even further, positing that logical theories are influenced by different elements such as cultural factors, social environment, motivations of the cognitive subject, etc. The logic of different cultures is thus bound to possess different characteristics; maybe it could even be claimed that different cultures are also likely to have different logics. Moreover, cultural relativism and logical diversity cannot be tolerated by the formal and informal logics which can be found in Western tradition. Ju also proposed a general theory of argumentation, advocating its application as the framework for the reconstruction of history of Chinese logic (see Ju 2010). Working with his PhD students, Ju published a series of research articles advancing this kind of approach, although no systematic monograph has yet been published on the topic.

Here it also needs to be mentioned that in the last ten years several other monographs have been published which summarized and reassessed Chinese logical studies over the course of the last century. Works of this type include, for example, *A Century of Studies in Logic* (*Luojixue bainian* 逻辑学百年 (1999)) edited by Zhao Zongkuan 赵总宽; *Importing and Studying Western Logic* (*Luojixue de chuanru yu yanjiu* 逻辑学的传入与研究 (2005)) by Song Wenjian, as well as *Contemporary Chinese Research in Logic 1949–2009* edited by Ju Shier, which is frequently cited in this study.

Chinese research on Indian *hetuvidyā* (*yinmingxue* 因明学) consists of studies of logic in Tibetan and Chinese Buddhist scriptures. In this respect, I concur with the following claims:

> New Chinese research of *hetuvidyā* in Chinese Buddhist literature can be further divided into three main stages: the first stage lasted from 1949 to 1966 …, the time when it takes no fashion; the second period lasted from the start of Cultural Revolution to its end, when on the continent research and teaching of *hetuvidyā* was completely stopped; the third stage lasts from 1978 up to the present day, and represents the time when research in *hetuvidyā* was revived and entered a new period of flourishing. (Ju 2013, 397)

As far as I am aware, in the third period at least three researchers have made outstanding achievements: the first is Shen Jianying 沈剑英, whose representative

works include *Studies in Hetuvidyā* (*Yinmingxue yanjiu* 因明学研究 (1985)), and *Studies in Buddhist Logic* (*Fojiao luoji yanjiu* 佛教逻辑研究; 2013); the second is Zheng Weihong 郑伟宏, who is the author of several works on *hetuvidyā*: *Literal Explanation of the Nyāyamukha* (*Yinming zhengli men lun zhijie* 因明正理门论直解 (2008)), *Studies in Hetuvidyā in Chinese Buddhism* (*Hanchuan Fojiao yinming yanjiu* 汉传佛教因明研究 (2007)), *Collated and Annotated Commentary on Nyāyamukha with Modern Translation and Studies* (*Yinming dashu jiaoshi, jinyi, yanjiu* 因明大疏校释、今译、研究 (2010)), and *A General Survey on Buddhist Logic* (*Fojiao luoji tonglun* 佛教逻辑通论 (2016)); and the third is Zhang Zhongyi 张忠义, whose works include *A New Theory of Hetuvidyā* (*Yinming xinlun* 因明新论; ed. (2006)), *Hetuvidyā* (*Yinming* 因明; ed. (2007)), and the monograph *Boring into Hetuvidyā* (*Yinming lice* 因明蠡测 (2008)). At the beginning of the 21st century, *hetuvidyā* was included in the national plan of "rescuing disappearing sciences" (*qiangjiu juexue* 抢救绝学), and has since received enormous support. As a result, many newly graduated doctors of philosophy engage in research on *hetuvidyā*, and this field of studies is experiencing great enthusiasm, with many thriving areas of work.

The Lonesome Advance of Studies in the History of Western Logic

Compared with the research on the history of Chinese logic, it appears that Chinese studies on the history of Western logic have never reached the same level of popularity. Accordingly, the number of scholars who continue pursuing this field has remained relatively low, yet at the same time they have also seen considerable achievements and made quite significant progress.

In the period before the Deng Xiaoping reforms, systematic research on the history of Western philosophy was still rare in China. As a rule, "a brief history of logic" could only be found in logical textbooks, often only in the form of appendices. In this period, a few treatises on history of logic were translated into Chinese, such as *Selected Translations from History of Logic* (*Luoji shi xuanyi* 逻辑史选译 (1961)) by T. Ziehen et al., and *History of Modern Logic* (*Istorija logiki novogo vremeni*; *Jindai luoji shi* 近代逻辑史 (1964)) by P. S. Popov, both translated by Wang Xianjun and others. Still, a comparatively more systematic research into Aristotelian logic was provided by Zhou Liquan in a series of articles, which included "Aristotle's Logical Theory of Inference" (*Yalishiduode guanyu tuili de luoji lilun* 亚里士多德关于推理的逻辑理论 (1963)) and, in the decades to follow, also his paper "Aristotle on the Law of Contradiction and the Law of Excluded Middle" (*Yalishiduode lun maodunlü he paizhonglü* 亚里士多德论矛盾律和排中律 (1981)). In the 1980s,

the Research Society for the History of Western Logic was established as a new branch of the Chinese Association of Logic. Following its establishment, a series of research treatises and articles on the history of Western logic were published. These included the third part of Wang Xianjun's *Introduction to Mathematical Logic* (*Shuli luoji yinlun* 数理逻辑引论; 1982), which gave a general overview of the developmental history of mathematical logic from Leibniz to Gödel; *Studies in the History of Western Logic* (*Xifang luoji shi yanjiu* 西方逻辑史研究 (1984)) edited by Jiang Tianji 江天骥; *History of Western Logic* (*Xifang luoji shi yanjiu* 西方逻辑史 (1984)), and *A Comparative History of Logic* (*Bijiao luoji shi* 比较逻辑史 (1989)) by Yang Baishun 杨百顺; the government approved textbook for colleges and universities *History of Western Logic* (*Xifang luoji shi* 西方逻辑史 (1985)) edited by Ma Yuke; *Formalization: The Development of Modern Logic* (*Xingshihua: Xiandai luoji de fazhan* 形式化：现代逻辑的发展 (1987)) by Zhu Shuilin; *The Development of Modern Logic* (*Xiandai luoji de fazhan* 现代逻辑的发展 (1989)) by Zheng Yuxin 郑毓信; *History of Western Formal Logic* (*Xifang xingshi luoji shi* 西方形式逻辑史 (1991)) by Song Wenjian; *History of Logical Theories in Europe and America* (*Ou-Mei luoji xueshuo shi* 欧美逻辑学说史 (1994)) by Zheng Wenhui 郑文辉; *Aristotle's Syllogistic from the Standpoint of the Modern Formal Logic* (*Yalishiduode de sanduanlun* 亚里士多德的三段论 (1995)) by Jan Łukasiewicz and translated by Li Xiankun 李先焜 and others; *A Life of Reason—Studies in the Thought of Kurt Gödel* (*Lixing de shengming – Gedeer sixiang yanjiu* 理性的生命——哥德尔思想研究 (2000)) by Liu Xiaoli 刘晓力; *Gödel's Program* (*Gedeer gangling* 哥德尔纲领 (2018)) by Hao Zhaokuan 郝兆宽, and *Logical Aspects of Peirce's Philosophy* (*Piershi zhexue de luoji mianxiang* 皮尔士哲学的逻辑面向 (2012)) by Zhang Liuhua 张留华. However, the great majority of the books published in the earlier period were based on secondhand material, lacking reliability and systematicity. With the start of the 21st century, more attention was given to the thought of Frege, Peirce and Gödel, when a group of younger scholars such as Zhang Liuhua, Liu Jingxian 刘靖贤, Liu Xinwen 刘新文, He Zhaokuan and others published a series of studies of fairly high quality.

Zhang Jialong's long-term engagement in research on the history of Western logic yielded significant contributions to this field. Working with other scholars, he translated two important treatises: *Concise History of Logic* (*Abriss der Geschichte der Logik*; *Jianming luoji shi* 简明逻辑史 (1977)) by Heinrich Scholz, and *The Development of Logic* (*Luojixue de fazhan* 逻辑学的发展 (1985)) by William and Martha Kneale, of which the latter is a very detailed and reliable, systematically and carefully written work on the history of logic. Apart from these, Zhang also published numerous studies on the history of logic, including the monograph *Developmental History of Mathematical Logic—From Leibniz to Gödel* (*Shuli luoji fazhan shi*

– *cong Laibunici dao Gedeer* 数理逻辑发展史——从莱布尼茨到哥德尔 (1993)); the edited volume *Intellectual History of Logic* (*Luojixue sixiang shi* 逻辑学思想史 (2004)); the monograph *Aristotelian Theory of Logic from the Perspective of Modern Logic* (*Cong xiandai luoji de guandian kan Yalishiduode de luoji lilun* 从现代逻辑的观点看亚里士多德的逻辑理论 (2016a)), and the anthology *Discussions on History of Logic* (*Luoji shi lun* 逻辑史论 (2016b)). Among these, the book *Developmental History of Logic* represents China's first comprehensive and systematic treatise on the history of mathematical logic from Leibniz to Gödel. In its opening parts, the book enumerates the methodological principles for research on the history of mathematical logic, dividing its development into four main periods: prehistory, the early stages, foundation and development. The book further expounds on these stages by adopting principles such as integrating logical method and historical method, concluding with illustrating both the external moving forces and internal patterns of the development of mathematical logic, and casting some new light on the dialectical relationship between mathematical logic and social practice. In the discussion on the major results of mathematical logic, particular emphasis was placed on the analysis of logical methods, and, furthermore, on providing a general overview and summary of the philosophical significance of these important results.

Having served as an MA student of Zhou Liquan in early years and under his guidance, Wang Lu engaged in research on Aristotelian logic, which later resulted in his book *Aristotle's Theory of Logic* (*Yalishiduode de luoji xueshuo* 亚里士多德的逻辑学说 (1991)). This volume represents a reliable yet also profound research work. Later, he also translated works like *Collection of Frege's Philosophical Works* (*Fuleige zhexue lunzhu xuanji* 弗雷格哲学论著选辑 (1994)), and Frege's *The Foundations of Arithmetic* (*Die Grundlagen der Arithmetik*; *Suanshu jichu* 算术基础 (1998)), and published a specialized monograph entitled *Studies in Frege's Thought* (*Fuleige sixiang yanjiu* 弗雷格思想研究 (1996)). Aside from that, he also translated different kinds of classics and research writings on the history of logic, including W. D. Ross' book *Aristotle* (*Yalishiduode* 亚里士多德 (1997)); T. Gilby's *Barbara Celarent—A Description of Scholastic Dialectic* (*Jingyuan bianzhengfa* 经院辩证法 (2000)); Johannes Duns Scotus' *De Primo Principio* (*The First Principle*; *Diyi yuanli* 第一原理 (2004)), and William of Ockham's *Summa Logicae* (*Sum of Logic*; *Luoji daquan* 逻辑大全 (2006)).

Sustained Deepening of Research into Inductive Logic

According to the research conducted by Ren Xiaoming 任晓明 and others (Ren, Li, and Cheng 2010), soon after modern inductive logic had been introduced to

China in the 1980s, Chinese research on this underwent a change of its direction from classical to modern inductive logic. A further three major changes of direction at the secondary and primary levels are as follows: a turn from informal research to formal research as well as the synthesis of formal and informal research; a shift from inductive logic of causal relations to probabilistic inductive logic; and a shift from Pascalean probability to non-Pascalean probability.

The key role in advancement of the research on inductive logic in China was played by Jiang Tianji (1915–2006). Its origins can be traced back to 1984, when Jiang delivered a series of lectures on modern inductive logic in Shenyang 沈阳. One year later, in 1985, Jiang published an English article entitled "Scientific Rationality, Formal or Informal?" in *The British Journal for the Philosophy of Science* (Jiang 1985). This was followed by the publication of his Chinese monograph *An Introduction to Inductive Logic* (*Guina luoji daolun* 归纳逻辑导论) in 1987, in which he provided a systematic discussion of modern inductive logic. During the 1990s, Jiang published a further series of Chinese articles on modern inductive logic. Apart from that, he also influenced his colleague Gui Qiquan 桂起权 and served as a doctoral supervisor to a number of future experts (including Zhu Zhifang 朱志方, Chen Xiaoping 陈晓平, Ren Xiaoming, and Pan Tianqun 潘天群). Furthermore, following Jiang's initiative many colleagues from other Chinese universities also shifted their research to inductive logic, and finally a school of research on inductive logic was formed by those scholars gathering around Jiang.

Another important scholar to have made significant contributions to Chinese research on inductive logic was Wang Yutian 王雨田 (1928–2012). He was in charge of the research team focusing on problems of inductive logic and artificial intelligence in the framework of the National 863 Project, and served as the editor-in-chief of the monographs *Introduction to Inductive Logic* (*Guina luoji daoyin* 归纳逻辑导引 (1992)) and *Inductive Logic and Artificial Intelligence* (*Guina luoji yu rengong zhineng* 归纳逻辑与人工智能 (1995)) that were part of the same project. Furthermore, Ju Shier's work *Studies in Non-Pascalean Inductive Probabilistic Logic* (*Fei-Basika guina gailü luoji yanjiu* 非巴斯卡归纳概率逻辑研究 (1993)) can also be counted as one of the main accomplishments of Chinese studies on inductive logic. In this book, he systematically analysed G. Shackle's potential surprise theory and Cohen's theory of inductive support and grading of inductive probability, establishing his own formal system of non-Pascalean probability—a system of syntax about hypotheses with law-like degree. Other important Chinese treatises on inductive logic include: Deng Shengqing's 邓生庆 *Inductive Logic: An Evolution from Classical to Modern Form* (*Guina luoji: cong gudian xiang xiandai leixing de yanjin* 归纳逻辑：从古典向现代类型的演进 (1991)); Li Xiaowu's 李小五 *Modern Inductive Logic and Probabilistic Logic* (*Xiandai guina luoji*

yu gailü luoji 现代归纳逻辑与概率逻辑 (1992)), Ren Xiaoming's *A Comprehensive Exploration into Modern Inductive Logic* (*Dangdai guina luoji tanze* 当代归纳逻辑探赜 (1993)); Chen Xiaoping's *Inductive Logic and Inductive Paradoxes* (*Guina luoji yu guina beilun* 归纳逻辑与归纳悖论, (1994)), and *Bayesian Methods and Scientific Rationality – Reflections on Hume's Problem* (*Beiyesi fangfa yu kexue helixing – dui Xiumo wenti de sikao* 贝叶斯方法与科学合理性——对休谟问题的思考 (2010)); Gui Qichuan and others' *The Logic of Chance and Risk* (*Jiyu yu maoxian de luoji* 机遇与冒险的逻辑 (1995)); Xiong Liwen's 熊立文 *The Development of Modern Inductive Logic* (*Xiandai guina luoji de fazhan* 现代归纳逻辑的发展 (2004)), and Deng Shengqing's and Ren Xiaoming's co-authored *A Century of Inductive Logic* (*Guina luoji bainian licheng* 归纳逻辑百年历程 (2006)).

In his English paper from 1993, Ju Shier demonstrated the insolvability of Hume's problem of induction within the scope of logic, or, in other words, that in logic there is no way to provide neither a positive nor a negative answer to the problem. Outside of the scope of logic, he advanced the concept of local rationality and the method of local justification of induction, attempting to use them to explain how a local justification, rejection or suspension of inductive rationality is possible. Furthermore, he also provided the reconstructive procedure of local induction of scientific research. In a 2001 article, I demonstrated that the background of Hume's problem implicitly contains three unfounded presuppositions: Hume accepted a universal necessary notion of knowledge, having not only looked for deductive necessity but also wanting to explain the necessity of causal relations and universality of empirical knowledge under the confines of sense experience. Since these conditions stand in mutual conflict with each other, this renders Hume's problem essentially logically insoluble. Finally, I also put forward an argument for inductive reasoning based on the concept of practical necessity, proposing a comprehensive program for research on inductive logic (Chen 2001).

Much valuable work on the theory of decision making and game theory was done by Pan Tianqun, Tang Xiaojia 唐晓嘉 and others. Pan Tianqun, for instance, published a series of highly influential treatises on these topics, including: *Introduction to Methodology of Behavioral Science* (*Xingdong kexue fangfalun daolun* 行动科学方法论导论 (1999)); *Living by Game: A Game-Theoretical Reading of Social Phenomena* (*Boyi shengcun – shehui xianxiang de boyilun jiedu* 博弈生存——社会现象的博弈论解读 (2002)); *Studies in Logical Structure of Social Decision-Making* (*Shehui juece de luoji jiegou yanjiu* 社会决策的逻辑结构研究 (2003)); *Game-Theoretical Thinking—Logic Enables You to Make Optimal Decisions* (*Boyi siwei – luoji shi ni juece zhi sheng* 博弈思维——逻辑使你决策致胜; 2005), and *The Way of Cooperation—On the Win-Win Methodology in Game Theory* (*Hezuo zhi dao – boyi zhong de gongying fangfalun* 合作之道——博弈中的共赢方法论 (2010)). In the

last few years, and in cooperation with her doctoral students, Tang Xiaojia has done much high-standard work relating to the logical aspects of game theory and decision making. In a recently published article (Tang 2018), starting from the perspective of the questions "what are the requirements of research in theory of decision making?" and "what can be done with modern logic", she discusses the multifarious practical value of modern logic in research on decision making theory: it can provide linguistic tools for formally characterizing research on decision making, and defining the algorithms for decision making on the basis of such characterization, describing and demonstrating the strategic capability of the subject, and revealing the difficult problems and predicaments with which we are confronted in the process of decision making, and assisting us in the search for the way to resolve such difficulties. She further urged logicians to engage in research on decision-making theory and join efforts of the related experts to resolve various kinds of challenges that arise in the process of rational decision-making. In this very process, logical knowledge can not only promote the development of decision-making theory, but also promote the establishment of new logical theories and technologies.

The Rise of Research on the Logic of Natural Languages

In the period between the 1960s and the early 1990s, in a community of scholars represented by Wang Fangming, Zhang Zhaomei 张兆梅, Sun Zupei 孙祖培, and others, special attention was devoted to research on the special manifestations and application of traditional formal logic in the Chinese language. Representative research in this regard includes Sun Zupei's *Essay Writing and Logic* (*Wenzhang yu luoji* 文章与逻辑 (1986)), and Chen Zongming's reputed work *Logic in Talking and Essay Writing* (*Shuohua xie wenzhang zhong de luoji* 说话写文章中的逻辑 (1989)).

Zhou Liquan (1921–2008) has contributed immensely to Chinese studies on the logic of natural languages ("LNL" for short). In the 1960s, he began to research novel theories such as the speech act theory as advanced by J. L. Austin and J. R. Searle, the theory of conversational implicature by H. P. Grice, as well as other important issues relating to semantics and pragmatics, and thereby introducing the novel wave of research on LNL into Chinese academia. In China, the so-called "logic of natural languages" refers to the logical science which studies the inferences in natural languages through linguistic designation and communication. During the 1960s, Zhou published one article to demonstrate that formal logic ought to investigate the concrete meaning of expressions in natural languages under specific contexts. From the 1980s onwards, he also advocated the view that

research on LNL ought to be conducted on the joint theoretical basis of modern logic, modern linguistics and rhetorics, emphasizing that by using modern logic in the analysis of natural language a new system of logic could be created, whereby the use and scope of logical theory would be expanded and enriched, providing a more effective tool for everyday human thinking and communication. In his 1994 work *Logic—A Theory of Correct Thinking and Successful Communication* (*Luoji – Zhengque siwei he chenggong jiaoji de lilun* 逻辑——正确思维和成功交际的理论), Zhou attempted to implement these positions. This book distinguishes between three different levels of pragmatics: formal, descriptive, and applied. In his opinion, epistemic logic, deontic logic, logic of commands, logic of questions and so on all belong to the category of formal pragmatics. In contrast, concepts such as context, speech act, conversational implicature, presuppositions and rhetoric belong to descriptive pragmatics. Finally, acts like speech, lecturing, debates and their interrelated contents all belong to the domain of applied pragmatics. Furthermore, he also developed the theory of four-level meanings for four different forms of sentences, that is, proposition for abstract sentence, propositional attitude for sentence, significance for discourse, intension (*yisi* 意思) for discourse in a context of communication. Under his direct guidance and influence, there appeared two further generations of young Chinese logicians who also focused their research on LNL.

The first generation of researchers in LNL includes Wang Weixian 王维贤, Li Xiankun and Chen Zongming, whose cooperation resulted in a joint monograph entitled *Introduction to Logic of Language* (*Yuyan luoji yinlun* 语言逻辑引论 (1989)), which represents the first specialized monograph on the topic of LNL in China. Apart from this monumental monograph, each of these scholars also individually authored books on the same topic. Thus, for example, Wang Weixian published *Collected Papers on Linguistics* (*Yuyanxue lunwen ji* 语言学论文集) in 2007; Li Xiankun published *Language, Symbols and Logic* (*Yuyan, fuhao yu luoji* 语言、符号与逻辑) in 2006, and, finally, Chen Zongiming published *An Outline of Logic of Chinese Language* (*Hanyu luoji gailun* 汉语逻辑概论) and *Chinese Pragmatic Thought* (*Zhongguo yuyongxue sixiang* 中国语用学思想), in 1993 and 1997, respectively. All the above scholars also made important contributions to dissemination and research on semiotics in China.

The second generation of researchers working on LNL includes Zou Chongli 邹崇理, Cai Shushan 蔡曙山, Huang Huaxin 黄华新, Hu Zehong, Xia Nianxi 夏年喜 and others, of whom Zou Chongli and Cai Shushan were PhD students under Zhou Liquan's supervision. In his research, Zou focuses on the formal semantics of natural languages, such as Montague grammar, categorial grammar, and transformational-generative grammar. He has published three books on LNL:

Logic, Language and Montague Grammar (*Luoji, yuyan he Mengtaige yufa* 逻辑、语言与蒙太格语法 (1995)); *Studies in Logic of Natural Languages* (*Ziran yuyan luoji yanjiu* 自然语言逻辑研究 (2000)), and *Logic, Language and Information* (*Luoji, yuyan he xinxi* 逻辑、语言和信息 (2002)). Cai Shushan's research, on the other hand, is mostly concerned with speech act theory and illocutionary logic, aiming to further develop the work of Austin and Searle, and subsequently establish a formal system of illocutionary logic. He has published two books in LNL: *Speech Acts and Illocutionary Logic* (*Yanyu xingwei he yuyong luoji* 言语行为和语用逻辑 (1998)), and *Language, Logic and Cognition* (*Yuyan, luoji he renzhi* 语言、逻辑和认知 (2007)). Huang Huaxin primary research interests involve topics from cognitive pragmatics, such as pragmatic presuppositions, metaphor, and discourse. He has co-authored several specialized monographs, including *Descriptive Pragmatics* (*Miaoshu yuyongxue* 描述语用学 (2005)); *Formal Analysis of Sentence Meaning in Chinese* (*Hanyu juyi de xingshi fenxi* 汉语句义的形式分析 (2011)); *Introduction to Semiotics* (*Fuhaoxue daolun* 符号学导论 (2016)), and *Logic, Language and Cognition* (*Luoji, yuyan yu renzhi* 逻辑、语言与认知 (2017)), and in cooperation with others he has also produced a series of translations, such as E. Steinhart's *The Logic of Metaphor: Analogous Parts of Possible Worlds* (*Yinyu de luoji: Keneng shijie zhi keleibi bufen* 隐喻的逻辑: 可能世界之可类比部分 (2009)), and J. D. McCawley's *Everything that Linguists Have Always Wanted to Know about Logic* (published under the Chinese title *Yuyan de luoji fenxi* 语言的逻辑分析 [Logical Analysis of Language] (2011)), as well as coedited a number of book series on language and cognition.

Finally, the third generation of researchers on LNL are still in the process of formation. Currently, the most prominent among them is Liao Beishui 廖备水, who in his work integrates research on the discourse of natural languages and their logic with artificial intelligence research, taking part in high-level international research cooperation. So far, Liao has published a great number of internationally pioneering research results.

The Import and Flourishing of Philosophical Logic

According to my own detailed examination (cf. Chen 1997), in Western academia philosophical logic came into vogue in the period between the 1930s and 1940s, while in the period since the 1950s up to the present it still represents a vigorously developing and newly ascending group of different branches of logic. It takes mathematical logic (mainly first-order logic) as its direct foundation, while it takes as the objects of its research traditional philosophical concepts and categories on

the one hand, and the application of logic in various concrete sciences on the other. As a research field it thus aims to construct different kinds of logical systems with direct philosophical significance. The group of philosophical logics can be divided into two subgroups: the first is deviant logics, formally manifested as alternative systems of classical logic, including relevance logic, intuitionist logic, free logic, partial logic, logic of counterfactuals, many-valued logics, quantum logic, and fuzzy logic, among others; the second is applied logic, formally manifested as expanded systems of classical logic, such as modal logic, deontic logic, temporal logic, epistemic logic, logic of interrogatives, logic of commands, logic of preference and so on (see also Chen 2013, 13).

Since it is practically impossible to give a comprehensive and precise overview of Chinese studies in such a vast and extensive field in a short study like the present one, here I will try to sketch the whole picture by presenting the work of several representative scholars in the field.

Since the 1980s, a series of introductory works, textbooks, and research treatises on philosophical logic have been published in China. These, for example, include *Introduction to Contemporary Logical Science* (*Xiandai luoji kexue daolun* 现代逻辑科学导论 (vol. 1 and 2, 1987, 1988)) edited by Wang Yutian. This book, which was compiled by a group of younger Chinese scholars under the editorship of Wang, provided a quite complete survey of the current situation of logical research outside China. Similar works also include *The Logical Science Today* (*Jinri luoji kexue* 今日逻辑科学 (1990)) edited by Cui Qintian. Moreover, there are also the following books: Zhou Liquan's *Introduction to Modal Logic* (*Motai luoji yinlun* 模态逻辑引论 (1986)); the Chinese translation of B. F. Chellas' *Introduction to Modal Logic* (*Motai luoji yinlun* 模态逻辑引论 (1989)) produced by Zheng Wenhui and others; Kang Hongkui's 康宏逵 translation of *Logic of Possible Worlds* (*Keneng shijie de luoji* 可能世界的逻辑 (1993)) by Ruth B. Marcus and others; Zhou Beihai's *Introduction to Modal Logic* (*Motai luoji yinlun* 模态逻辑引论 (1997)); Gong Zhaoxiang's 弓肇祥 *General Modal Logic* (*Guangyi motai luoji* 广义模态逻辑 (1993)), and *New Developments in Epistemic Logic* (*Renzhi luoji xin fazhan* 认知逻辑新发展 (2004)); Zhou Zhenxiang's 周祯祥 *Deontic Logic* (*Daoyi luoji* 道义逻辑 (1999)); Li Xiaowu's *Infinitary Logic* (*Wuqiong luoji* 无穷逻辑 (vol. 1 and 2, 1996, 1998)); *Logic of Conditionals* (*Tiaojianju luoji* 条件句逻辑 (2003)); *Lectures on Modal Logic* (*Xiandai luojixue jiangyi – Motai luoji* 现代逻辑学讲义——模态逻辑 (2005)); *Lectures on Logic of Artificial Intelligence* (*Rengong zhineng luoji jiangyi* 人工智能逻辑讲义 (2005)), and *Specific Topics on Dynamic Epistemic Logic* (*Dongtai renzhi luoji zhuanti* 动态认知逻辑专题; English version published in 2010); Song Wengan's *Logic of Questions* (*Wenti luoji* 问题逻辑 (1998)); Zhou Changle's 周昌乐 *Introduction to Epistemic Logic*

(*Renzhi luoji daolun* 认知逻辑导论 (2001)); Gui Qiquan and others' *Paraconsistent Logic and Artificial Intelligence* (*Cixietiao luoji yu rengong zhineng* 次协调逻辑与人工智能 (2002)); Tang Xiaojia's *Logical Analysis of Cognition* (*Renzhi de luoji fenxi* 认知的逻辑分析 (2003)); Du Guoping's 杜国平 *The Essentials of Classic Logic and Non-Classic Logics* (*Jingdian luoji yu feijingdian luoji jichu* 经典逻辑与非经典逻辑基础 (2006)); and Yu Junwei's 余俊伟 *Studies in Deontic Logic* (*Daoyi luoji yanjiu* 道义逻辑研究 (2005)). Each of these works contributed their share to the spread and development of philosophical logic in China.

Although Zhang Qingyu 张清宇 (1944–2011) maintained a broad knowledge and research interest in philosophical logic, his research mainly focused on paraconsistent logic. His works include *Studies in Philosophical Logic* (*Zhexue luoji yanjiu* 哲学逻辑研究 (1997)) and *Paraconsistent Logic* (*Fuxietiao luoji* 弗协调逻辑 (2003)). The former, which was co-authored with Guo Shiming and Li Xiaowu, offers a relatively systematic and accurate exposition of first-order logic, modal logic, temporal logic, logic of conditionals, many-valued logics, relevance logic, intuitionist logic, paraconsistent logic and Gödel's incompleteness theorems. Zhang obtained a series of significant results in the field of paraconsistent logic.

On the basis of his penetrating analysis of da Costa's system of paraconsistent logic, he constructed systems of paraconsistent logic of conditionals *PIW, C_nW*, paraconsistent modal logic $C_nG¢$, paraconsistent logical systems Z_n and Z_nUS, minimal paraconsistent systems of temporal logic with operators G and H, and minimal paraconsistent systems of temporal propositional logic with operators U and S, all of which together expanded the research direction of paraconsistent logic, enriched the theoretical systems of such logics, and thereby advanced Chinese research-level in this particular type of logic (Ju 2013, 153).

In the field of philosophical logic, Feng Mian 冯棉 primarily researched relevance logic, intuitionist logic and modal logic. As a prolific writer, he authored a wide collection of books: *Classic Logic and Intuitionist Logic* (*Jingdian luoji yu zhijue zhuyi luoji* 经典逻辑与直觉主义逻辑 (1989)); *General Modal Logic* (*Guangyi motai luoji* 广义模态逻辑 (1990)); *Relevance and Entailment Logic* (*Xianggan yu yantui luoji* 相干与衍推逻辑 (1993)); *Possible Worlds and Logical Research* (*Keneng shijie yu luoji yanjiu* 可能世界与逻辑研究 (1996)); *Studies in Relevance Logic* (*Xianggan luoji yanjiu* 相干逻辑研究 (2010)); *Structural Inference* (*Jiegou tuili* 结构推理 (2015)), and *Relevance and Entailment Predicate Logic* (*Xianggan yu yantui weici luoji* 相干与衍推谓词逻辑 (2018)), and these works had a significant impact on the spread of and research on philosophical logic in China.

Xu Ming 徐明 mainly undertakes research on temporal logic. Together with Nuel Belnap and others he co-authored the English language book *Facing the Future:*

Agents and Choices in Our Indeterminist World (Oxford University Press, 2001), and has published more than 20 articles in some of the world's leading academic journals, such as *The Journal of Symbolic Logic* and *Journal of Philosophical Logic*.

In 1999, Zhou Beihai published an article in *The Journal of Symbolic Logic*, in which he established a new type of semantic framework for modal logic—grafted frames—proving the completeness of the system of modal logic S1. In 2010, together with Mao Yi 毛翊, Zhou cowrote an article which was published in the internationally acclaimed journal *Synthesis*, and in which the authors provided four semantic layers of common nouns.

Liu Fenrong's 刘奋荣 research mainly involves the logic of rational agency. In her work, Liu has developed several models to explain how information dynamically transforms the preferences of individuals and other agents. In her book *Reasoning about Preference Dynamics* (2011), which was originally written in English as her dissertation at the University of Amsterdam, she developed a new integrated theory using modern information flow and action logic, explaining what exactly preference is and how it changes. She also proposed systems of dynamic logic, which describe the external conditions that act as triggers for the transformation of preference, including new information, suggestions, and commands. Most importantly, this work built new bridges connecting several different scientific disciplines (from philosophy and computer science to economics, linguistics, and psychology), and thus garnered wide influence across the fields. In her current work she focuses on the logical analysis of information flows and decision making within social contexts, where her analysis encompasses both individual subjects as well as social groups. She herself is well recognized by her international colleagues in contemporary logic circles.

Wang Yanjing's 王彦晶 research revolves around epistemic logic. He has published numerous articles on the topic in internationally influential A&HCI journals. In recent years, he proposed and advanced an integrative research project for the field of epistemic logic—the logic of "knowing whether/how/why/what/who"—that would thus surpass the standard epistemic logic of "knowing that" (knowing a single proposition) (cf. Wang 2018).

Gradual Flourishing of the Philosophy of Logic

In the 1980s and 1990s, Susan Haack's book *Philosophy of Logics* (1978) became widely read among the younger generation of Chinese logicians, and thus the philosophy of logic started to become well known in the Chinese circle of logic.

According to my own research, the philosophy of logic aims to reveal the implicit fundamental hypothesis, background assumptions or preconditions underlying general logic or specific logical systems, and to challenge their rationality and investigate the possibilities of alternative choices. There exist at least two different perspectives from which one can approach philosophy of logic: epistemological and ontological (Chen 2013, 17).

Through attentive reading of Haack's *Philosophy of Logics* as well as other works, I established my own understanding of the philosophy of logic, and gradually started conducting independent research in the field. I subsequently authored and published four monographs on this topic: *Elements of Philosophy of Logic* (*Luoji zhexue yinlun* 逻辑哲学引论 (1990)); *Introduction to Philosophy of Logic* (*Luoji zhexue daolun* 逻辑哲学导论 (2000)); *Philosophy of Logic* (*Luoji zhexue* 逻辑哲学 (2005)) as well as *Studies in Philosophy of Logic* (*Luoji zhexue yanjiu* 逻辑哲学研究 (2013), the expanded edition of my book *Introduction to Philosophy of Logic*). Some of these works reached a broad readership and became widely used as textbooks at Chinese universities. In addition to these titles, my book *Studies on Paradoxes* (*Beilun yanjiu* 悖论研究 (2014)) presented an exhaustive investigation of paradoxes, providing a relatively in-depth research of a wide array of different paradoxes. Since 2007 I have authored more than 20 English articles which were published in different international A&HCI journals, the majority of which were devoted to the philosophy of logic.

In his book *The Conception of Logic* (*Luoji de guannian* 逻辑的观念 (2000)), Wang Lu posits that logic exclusively describes a science investigating the relation of "necessary follow" of conclusions from certain premises, while other types of so-called "logic", for instance "inductive logic" or "dialectical logic", are not at all true logics, because their focus does not reside with the relation of "necessary follow". The book initiated to a wide-ranging and intense polemic regarding the following questions: What is logic? How should we investigate logic? Was there in ancient China such a thing as logic? How should we approach the history of Chinese logic? How should we study Western philosophy? Wang wrote another book entitled *Being and Truth: The Cornerstones of Metaphysics* (*Shi yu zhen: xing er shang xue de jishi* 是与真：形而上学的基石 (2003)), which explores the philosophical significance of "to be" and "truth" as well as their corresponding terms in Chinese, which also gave rise to fierce debates in the fields of logic and philosophy.

Zhang Jianjun was the first Chinese scholar to have systematically studied logical paradoxes, whose principal interest resides in mathematical and semantic paradoxes. He has published several different book about paradoxes, of which the most influential is his *Introduction to Studies on Logical Paradoxes* (*Luoji beilun yanjiu*

yinlun 逻辑悖论研究引论; first published in 2002, a revised edition published in 2014). In this book, he discusses the constituents and classifications of paradoxes, as well as the origins and characteristics of different paradoxes. Additionally, he has also conducted comparative research of different kinds of solutions for paradoxes, exploring the standards of correctly eliminating paradoxes, and at the same time distinguishing between different hierarchies of researching paradoxes and their mutual interactions. He has also edited the collective monograph *Studies in Frontier Problems in Contemporary Philosophy of Logic* (*Dangdai luoji zhexue qianyan wenti yanjiu* 当代逻辑哲学前沿问题研究 (2014)), which clarifies and evaluates the advances in the Western philosophy of logic since the 1970s.

In their co-authored book *Genetic Research of Non-Classic Systems of Logic* (*Fei-jingdian luoji xitong fashengxue yanjiu* 非经典逻辑系统发生学研究 (2011)) Ren Xiaoming and Gui Qiquan carried out a genealogical investigation of non-classical logical systems, such as modal logic, intensional logic, deontic logic, the logic of indicative conditionals, inductive probability logic, fuzzy logic, quantum logic, many-valued logics, paraconsistent logic, formalized dialectical logic and the logic of argumentation. From their investigation, they drew the following conclusions: the central question of the philosophy of logic is the question of an exact match between the concepts of system-relative and extra-systematic validity of inference. As they emphatically noted:

> … in contrast to the academic world of philosophy of science, where a climate of fallibilism has already taken the upper hand, in the current Chinese circle of logicians the influence of epistemic inerrancy is still standing strong. It is highly probable that this has turned into a great intellectual impediment for Chinese logic's "reform and opening up"! Its reform ought to be done with greater courage and at a more rapid pace! A new practice would inevitably open up new ground for logic and help it to rapidly overcome the old delimiting norms. People must in no way stop marching onwards on hearing the warning "not logic". To make innovations in logic scholars must be adept at turning the philosophy of logic into a weapon, encouraging the departure from various kinds of classic systems and bring about a contest between oppositions, to finally pave the way for the emergence of new non-classic logics! (Ren and Gui 2011, 222)

Focusing on theories of truth, free logic, and their philosophical characteristics, Hu Zehong composed two books on the philosophy of logic: *Rethinking Philosophy of Logic* (*Luoji de zhexue fansi* 逻辑的哲学反思 (2004)) and *Studies in Philosophy of Logic* (*Luoji zhexue yanjiu* 逻辑哲学研究; Hu et al., 2014). The work *Studies*

maintains that the philosophy of logic is a scientific discipline which studies logic, in particular modern logic and the philosophical questions of its development. The book consists of an introduction and the following nine chapters: "The Scope and Characteristics of Logic"; "Logic, Language, and Existence"; "Truth and the Theories of Truth" (two chapters); "Meaning and Reference"; "Modal Logic and its Philosophical Questions" (three chapters); and "Free Logic and its Philosophical Questions". The first five chapters represent a comprehensive philosophical investigation of logic, with a particular focus on modern logic, whereas the last four chapters select two concrete branches of modern logic, namely modal logic and free logic, presenting a relatively in-depth investigation of their inherent philosophical questions.

In the recent years, Li Na 李娜 and her PhD students have conducted systematic research on axiomatic theories of truth, which covered classical axiomatic theories of truth, as well as axiomatic theories of truth based on intuitionism and set theory. Collectively, they have published several quite high-quality papers, and their achievements of the project supported by the National Social Science Fund were evaluated as "excellent".

Xiong Ming's 熊明 research focuses mainly on truth theory and liar-type paradoxes, on which he published a book entitled *Arithmetic, Truth, and Paradoxes* (*Suanshu, zhen yu beilun* 算术、真与悖论 (2017)). He developed a new truth schema—a relativized T-schema—the procedure of which is to expand Tarski's T-schema ('A' is true if and only if A) onto a relational framework. Or, in other words, speaking about arbitrary possible worlds *u* and *v* within the same framework, if *u* is accessible to *v*, then it is possible to establish the truth of A in *u*, if and only if A can be established in *v*. By virtue of this new kind of T-schema, Xiong was able to obtain a series of new results relating to the problem of liar-type paradoxes, which were for the most part published in important international A&HCI journals.

The Introduction of Informal Logic and Critical Thinking

Informal logic and critical thinking, two mutually highly overlapping concepts, were introduced to China in the 1990s. As the current editors-in-chief of the journal *Informal Logic*, Ralph Johnson and Anthony Blair, pointed out: informal logic is "a branch of logic whose task is to develop non-formal standards, criteria, procedures for the analysis, interpretation, evaluation, criticism and construction of argumentation" (Johnson and Blair 1977, 147). According to my own research, "critical thinking" has got the following four important meanings: a reformist movement in education which originated in the United States and grew to popularity in Europe; it

is an intellectual trait, orientation, and habit which must be possessed by a qualified citizen and an innovative talent in today's society; a string of reflective capacities, methods and strategies which must be adopted for making rational decisions about what we should believe or how we should act; a curriculum which aims at fostering the disposition, habit and ability of critical thinking (Chen 2017, 22).

After the year 2000, specialized treatises and textbooks on informal logic, and especially English works on critical thinking, underwent large-scale translation into Chinese. Some of these books were even translated more than once. In parallel to the translated works, Chinese scholars also published many introductory articles on informal logic and critical thinking, and subsequently some textbooks on the same subjects. The most noteworthy among these works are: Wu Hongzhi's 武宏志 and Zhou Jianwu's 周建武 *Critical Thinking: from the Perspective of Argumentation Logic* (*Pipanxing siwei: lunzheng luoji shijiao* 批判性思维：论证逻辑视角; first edition 2005, second edition 2010, third edition 2016); Liu Zhuanghu's 刘壮虎 and Gu Zhenyi's 谷振诣 *A Coursebook in Critical Thinking* (*Pipanxing siwei jiaocheng* 批判性思维教程 (2006)); Yang Wujin's 杨武金 *Logic and Critical Thinking* (*Luoji yu pipanxing siwei* 逻辑与批判性思维 (2009)); Dong Yu's 董毓 *Principles and Methods of Critical Thinking* (*Pipanxing siwei de yuanli he fangfa* 批判性思维的原理和方法 (2010)), and Chen Muze's 陈慕泽 and Yu Junwei's *Logic and Critical Thinking* (*Luoji yu pipanxing siwei* 逻辑与批判性思维 (2011)). In my judgment, Liu Zhuanghu's and Gu Zhenyi's *Coursebook* and Dong Yu's *Principles and Methods* are much better than the rest of these textbooks. In the same period, critical thinking courses also started to be offered at Chinese universities. It should be mentioned that Wu Hongzhi made significant contributions to the dissemination of and research on informal logic and critical thinking in China. He authored quite many articles on critical thinking and composed or co-authored several textbooks, while at Yan'an University he founded the 21st Century New Logic Research Institute in 2008. In his work *Schemes of Argumentation* (*Lunzheng xingshi* 论证型式 (2013)) he provides a systematic introduction to as well as independent research on argumentation schemes. Last but not least, in the last few decades, Xiong Minghui 熊明辉, Xie Yun 谢耘 and other Chinese researchers have managed to publish articles on informal logic, critical thinking and theory of discourse in leading international SSCI and A&HCI journals.

Transformations in Research on Legal Logic

Chinese studies on legal logic started in the 1980s, when the first set of related textbooks were published in China. At this early stage, however, the label "legal

logic" (*falü luoji* 法律逻辑) described nothing new except adding examples of the principles of traditional logic from law and judicial practice. It was only after the year 2000 that a few Western works on legal inference and proof were translated into Chinese, and that a certain group of Chinese legal scientists started taking part in research on legal logic. Subsequently, using different kinds of resources or instruments—such as traditional formal logic, mathematical logic, informal logic, critical thinking, discourse theory, theory of legal inference and proof, legal science and legal philosophy—Chinese scholars started researching logical problems of law, judicial investigation and judicial trials and so on, and in turn developed an independent theory of legal logic. In the words of Lei Lei 雷磊:

> Legal logic has its application in legal epistemology, especially in theories about application of law. Legal logic represents an integral part of legal argumentation theory, it is applicable in the justification aspects but not discovery ones of law. The centre of its research resides in structural theory of legal norms and mode theory of legal argumentation. While the theory of norms studies the types of norms and the construction of normative systems, on the other hand, the theory of legal argumentation focuses on the elementary modes of legal debates. These, however, only constitute the object theories of legal logic, while the latter still requires a form of metatheory, which concerns with three main problems: Are norms the object of logical research? Is there any need for a special kind of logic about norms? Would this kind of logic abut norms be equipped with special logical laws? Furthermore, legal logic is faced with the limitations from two aspects, namely whether it recognizes law as a science, as well as the possibility that legal logic itself might implicitly contain limitations of its domain or its perspective. Hence, legal logic must take legalization (*falühua* 法律化) and formalization as the two main directions in the future. (Lei 2017, 188)

Recent Chinese research on legal logic includes the following publications: Wang Hong's 王洪 *Legal Logic* (*Falü luojixue* 法律逻辑学; first edition 2001, second edition 2016) and *Reasoning in Statutory Law and Case Law* (*Zhidingfa tuili yu panlifa tuili* 制定法推理与判例法推理; first edition 2013, second edition 2016), Zhang Jicheng's 张继成 *Practical Coursebook in Legal Logic* (*Shiyong falü luoji jiaocheng* 实用法律逻辑教程 (2004)); Zhang Baosheng's 张保生 *Theories and Methods of Legal Reasoning* (*Falü tuili de lilun yu fangfa* 法律推理的理论与方法 (2000)); Xie Xingquan's 谢兴权 *The Path to Justice—Studies in Methodology of Legal Reasoning* (*Tongxiang zhengyi zhilu – falü tuili de fangfalun yanjiu* 通向正义之路——法律推理的方法论研究 (2000)); Chen Rui's 陈锐 *Theory of Legal*

Reasoning (*Falü tuililun* 法律推理论 (2006)); Luo Shiguo's 罗仕国 *Science and Values: Introduction to Legal Reasoning as Practical Reason* (*Kexue yu jiazhi: zuowei shijian lixing de falü tuili daolun* 科学与价值：作为实践理性的法律推理导论 (2006)), and Xiong Minghui's *Lawsuit Argumentation—A Logical Analysis of Lawsuit Contest* (*Susong lunzheng – susong boyi de luoji fenxi* 诉讼论证——诉讼博弈的逻辑分析 (2010)), etc.

The Successive Establishment of Institutions for Logical Research

Before 1978, Chinese universities had no research institutes specialized in logic. From the 1990s onwards, however, quite a few new research institutes for logic were established in quick succession at Chinese universities, such as the Institute of Logic and Cognition at Sun Yat-sen University ("ILC" for short) (Zhongshan daxue luoji yu renzhi yanjiusuo 中山大学逻辑与认知研究所, est. 1997); Institute of Logic at China University of Political Science and Law (Zhongguo zhengfa daxue luoji yanjiusuo 中国政法大学逻辑研究所, est. 2002); Institute of Modern Logic and Applied Logic at Nanjing University (Nanjing daxue xiandai luoji he yingyong luoji yanjiusuo 南京大学现代逻辑与逻辑应用研究所, est. 2003); Centre for Logic, Language, and Cognition at Peking University (Beijing daxue luoji, yuyan yu renzhi yanjiu zhongxin 北京大学逻辑、语言与认知研究中心, est. 2004); Research Centre for Logic and Intelligence at Southwest University (Xinan daxue luoji yu zhineng yanjiu zhongxin 西南大学逻辑与智能研究中心, est. 2004); Research Centre for Logic and Cognitive Science at Beijing Normal University (Beijing shifan daxue luoji yu renzhi kexue yanjiu zhongxin 北京师范大学逻辑与认知科学研究中心; 2005); Research Centre for Language and Cognition at Zhejiang University ("CSLC" for short) (Zhejiang daxue yuyan yu renzhi yanjiu zhongxin 浙江大学语言与认知研究中心, est. 2007); Research Institute for Modern Logic and Philosophy of Science and Technology at Renmin University of China (Zhongguo Renmin daxue xiandai luoji yu kexue jishu zhexue yanjiusuo 中国人民大学现代逻辑与科学技术哲学研究所, est. 2007), and Tsinghua University—University of Amsterdam Join Research Centre for Logic ("JRC" for short) (Qinghua daxue – Amusitedan daxue luojixue lianhe yanjiu zhongxin 清华大学-阿姆斯特丹大学逻辑学联合研究中心, est. 2013). After their establishment, these research institutes all underwent favourable development. Currently, the most excellences of these institutions include ILC, JRC and CSLC: all of them have extensive and high-level international communication and cooperation, and are undergoing a transformation from a pure "follower" to sort of "leaders" in the international trends of logical research. (For more details see Chen 2018)

Chinese Logicians Start Entering the International Academic Arena

In the period between the 1950s and 1980s, the Chinese circle of logicians were in a state of almost complete isolation from the West, as a consequence of which there was a general lack of understanding of the situation in the field of logic outside China. At the same time, only an extremely small number of Chinese logicians managed to publish their research results in European and American logical, mathematical or philosophical journals. Due to the last four decades of reforms and opening up to the world, the state of Chinese logic has undergone a radical change compared to its state prior to 1978. At present, Chinese logicians are having substantial contacts with their international colleagues, at the same time many scholars have gained at least a year's experience of visiting or studying abroad, while some of them even earned their PhD degrees from foreign universities. Moreover, many Chinese logicians can now take part in or even preside over international academic conferences or workshops, and publish their articles in SCI, SSCI and A&HCI journals specialized in logic and philosophy, and or their monographs with English publishing houses. The most prominent among these scholars include myself, Zhao Xishun, Ye Feng 叶峰, Liu Fenrong, Xiong Wei 熊卫, Liao Beishui, Cheng Yong 程勇, Ma Minghui 马明辉, and Wang Yanjing. I was even elected as a titular member of Institut International de Philosophie (Paris) (IIP) in 2018, and of Académie Internationale de Philosophie des Sciences (Bruxelles) (AIPS) in 2021. Apart from these scholars, the following should also be noted in this context: Ju Shier, Huang Huaxin, Zhou Beihai, Liu Hu 刘虎, Wang Wei 王玮, Wen Xuefeng 文学锋, Xiong Minghui, Xie Yun, Pan Tianqun, Xu Cihua 徐慈华, Ju Fengkui 琚凤魁, Zhang Lifeng 张力锋, and others. Such successes are the most persuasive sign of the rise in standards in Chinese logical research (for more details see Chen 2018).

Conclusion: Experiences and Lessons

Looking back at the past seven decades, we can feel quite a few regrets. Although, sharing its path with our republic, Chinese academic logic has walked a winding road, gaining an incredibly complex set of experiences, but it has still been able to embrace its ideals and, under the burden of its long-term mission, demonstrated unyielding initiative and tenaciousness. Due to such long-term efforts, Chinese academic logic was ultimately able to overcome its obstacles and thread down its great path forward, forging ahead towards development and prosperity. After careful reflection on past experience, I can provide at least four lessons which

ought to serve as guidance for the future development of Chinese logic, or put more broadly, Chinese academics:

1. Let politics and academia each manage their appointed domains, thereby truly respecting and sustaining academic freedom

In the three decades between 1949 and 1979, the main reason for the comparatively slow development of Chinese logic resided in the meddling of political powers. In the ROC period, owing to the efforts of Jin Yuelin and others, the newly emerging discipline of mathematical logic already reached a certain level of dissemination in China, having also educated a generation of new talent. In this period, some young scholars who earned their doctorates at European and American universities also had the opportunity to lead Chinese logic to the frontiers of modern science. Then, after the Revolution, and due to the intertwining of many different factors, the PRC regarded the Soviet Union as its "big brother", and engaged in unconditional learning from and emulation of the Soviets in all aspects and levels, to the degree that even logic as a completely non-ideological science was not exempt from this wholescale Sovietization. Thus, because in the Soviet Union mathematical logic was subjected to a long period of criticism and rejection, China also followed suit, criticizing and rejecting it as well, which ultimately resulted in a great delay in the development of mathematical logic in China. In addition to this, under the influence of Soviet ideology even traditional formal logic became equated with idealism and metaphysics (in contrast to dialectics), with the intention to eliminate its theoretical foothold. Fortunately, it was also due to political intervention that, under Mao Zedong's guidance, the great debates on logic happened in the 1950s and 1960s. These debates caused formal logic to regain its legitimacy and enabled its survival. Similarly, it was also Mao's support which led to two major waves of popularization of logic in China. As such, it is indeed the case that both the success and failures of logic in China were both due to the same cause.

In reality, the fundamental principles of dealing with the relationship between academia and politics ought to be let academia be taken care of by the academics and politics by politicians, they must not arbitrarily overstep their boundaries, and this will give rise to the peaceful coexistence of both sides. The criterion for clear partition of their territories is the national constitution: scholars are also citizens, and thus are obliged to abide by the constitution, while opinions against the constitution ought to be subjected to censorship and acts against the constitution to legal sanction. But, on the other hand, for any opinion and action, as long as it does not violate the constitution and its stipulated civil rights and stays within the category of speech, it belongs to the scope of civil liberties and academic

freedom, into which no authority has the right to interfere. Even a poor person with his simple and poor abode has the courage to announce: The wind can enter, the rain can enter, but the king of the realm cannot. Our historical experiences have repeatedly made clear that respecting, protecting and supporting academic freedom is the fundamental precondition for preventing errors, discovering truth, and creating academic prosperity.

2. Science cannot advance in isolation from the international academic community; it needs to warmly embrace the community and, at the same time, insist on independent thinking

Academia is essentially a public undertaking, the commonality of which can be conveyed with one word: *sharing*. First of all, through engaging in sharing their works with other members of academic community, a scholar is therefore able to get challenged, gain enlightenment, carry out consultations with their colleagues, and thereby enliven their own thought. Only by being able to stand on the shoulders of giants can a scholar gain a broader perspective and attain more outstanding ideas. Secondly, by sharing their own research results with other scholars, and thereupon receiving the feedback, criticism or challenges, a scholar can advance, deepen and develop their own theories or viewpoints, or inspire other members of the academic community to do the same. The smaller an academic community is, the greater the probability that it will get enshrouded in kind of bias. In contrast, the greater the community, the smaller the chance that it will be controlled by such bias. Again, a scholar only qualifies as an independent member of the academic community if they arrive at their own distinct viewpoints about a certain problem by means of independent reflection. Such a scholar also learns from and exchanges their views with other members of the community, and in that way also makes their own contribution to that community. If a scholar abandons independent thinking and conforms to the views of the majority, having no independent views or theories of their own, this will lead to the following outcome: if other people are between 1 and 9, such scholar will amount only to 0, having no special value of their own, but instead, through attaching themselves to the rears of the others, he highlights the significance and value of other scholars. The process of Chinese academic logic in the last seven decades serves as yet another example to corroborate all this. When Chinese logic was isolated from the rest of the world, its conditions was appropriately bad, while, on the other hand, when the country opened its doors and Chinese logic was able to embrace the world beyond, its potential also came to life, enabling it to attain development and prosperity. In the years to come, we must always remember this valuable lesson.

3.   The promulgation of the "let a hundred flowers bloom and a hundred schools of thought contend" policy enabled different academic views to attain improvement and advancement through mutual collision

An immense advantage of the Hundred Flowers campaign was to offer other possibilities, revealing alternative prospects, which had a corrective function for already existing ideas and learning. However, it seems that in the end only one branch was able to thrive, one single flower could bloom, and only one school of thought was allowed to dominate, thus what the campaign often produced was academic monotony, obstinate, bogged down or even characterized by complete academic statis. Even if, following Deng Xiaoping's reforms, a certain group of my Chinese peers once wanted to achieve the dominance of mathematical logic in the Chinese circle of logic, to the extent that they even wanted to freeze logic up to the level of mathematical logic, in particular to the level of the first-order logic, the reality soon turned the course of things into another direction. Stemming from several kinds of considerations and, above all, the practical demands of this era, Western logic ultimately treated the already extant mathematical logic as a mere method and instrument, while instead its main developmental focus shifted to advancing new deviant logics and expanded logics on the one hand, and developing new theories in philosophy of logic on the other. Moreover, this development even led to the advancement of informal logic and critical thinking as theoretical complements for the flaws and shortcomings of mathematical logic. Chinese logicians must always keep in mind this important lesson from the past, and always adhere to the policy of "let a hundred flowers bloom and a hundred schools of thought contend", letting different academic views adequately compete against each other, and thereby enabling their unceasing progress and improvement.

4.   Gradually fostering academic self-confidence, to advance from follow-up learning to leading in innovation

Because of China's stagnation and backwardness in the early modern era, in its contacts with the external world and especially with Western countries, we actively or passively played a role of a student or follower: while others were developing science and technology, we were merely learning from their science and technology; while others were doing research in philosophy, we were merely researching others' philosophy; while others had discovered or invented logic, we were merely studying and researching the logic from them. Although, in the past this stage of learning was necessary, it now needs not only to be surpassed but we now already possess the capacity to advance to the next stage: if others are researching X, we must study how the others research that X. Moreover, we should also join the others in their research of that X, and produce the Chinese people's own contributions to the research. Under the leadership of Ren Zhengfei 任正非, the Huawei company works

exactly in this manner. It developed and expanded its own strengths, and therefore garnered great respect and met many challenges. Chinese logic ought to follow the same pattern as Huawei's, by gradually making the change from follow-up learning to leading. In the creative domain of logic, Chinese logicians must also make their own significant contributions, and we hope this day will arrive soon!

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The Philosophy of Logic in China: A 70-year Retrospective and Prospects for the Future

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Abstract

This 70-year retrospective of the Chinese work on philosophy of logic is presented mainly in terms of the notion of the "philosophy of logic", the notion of logic and the social-cultural role of logic. It generally involves three kinds of questions, namely, how to distinguish philosophical logic from the philosophy of logic, what the nature and scope of logic is from Chinese scholars' point of view, and why the social-cultural role of logic is underscored in the Chinese context. Finally, some of the prospects for the future studies of philosophy of logic in China are indicated.

Keywords: philosophy of logic, the Chinese context, the exclusive/inclusive notion of logic, the social-cultural role of logic

Filozofija logike na Kitajskem: retrospektiva zadnjih 70 let in obeti za prihodnost

Izvleček

Retrospektiva kitajskega doprinosa k preučevanju filozofije logike v zadnjih 70 letih je predstavljena predvsem v odnosu do pojma »filozofije logike«, logike kot splošne ideje ter družbeno-kulturne vloge logike. Pregled, ki ga avtorja podajata v tem članku, v glavnem vključuje tri vrste vprašanj. Namreč: Kako lahko razlikujemo filozofsko logiko od filozofije logike? Kakšna sta narava in obseg logike s stališča kitajskih strokovnjakov? In zakaj je družbeno-kulturna vloga logike poudarjena v kitajskem kontekstu? V zaključnem delu članka se avtorja posvetita še vprašanju prihodnosti preučevanja filozofije logike na Kitajskem.

Ključne besede: filozofija logike, kitajski kontekst, ekskluzivno/inkluzivno pojmovanje logike, družbeno-kulturna vloga logike

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We have two main reasons for telling the story of the philosophy of logic in post-1949 China. The first obviously concerns the language barrier, as since most of the mainland Chinese philosophers and logicians publish their works on the philosophy of logic exclusively in Chinese, they are unfortunately inaccessible to international colleagues. The second is about the time, and specifically 1949. When the People's Republic of China was established in 1949 by the Chinese Communist Party, Marxism took over the official philosophy. Marxist dialectical logic, together with the entrenched tradition of dialectics in the Chinese intellectual context, plays a clear role in contemporary discussions of the philosophy of logic on some specific issues,[1] which distinguishes current discussions from those in the past.[2] These two reasons provide us with an approach for marshalling and sifting what is to be reviewed among the nearly 70 years of material. First, our selected works mainly revolve around three key subjects of the field: the notion of the "philosophy of logic", the notion of "logic" and the social-cultural role of logic. Second, they reflect the enduring and varying effect of Marxist philosophy on contemporary discussions on the philosophy of logic in post-1949 China.

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1   More precisely, it was between 1949–1978 that Chinese Marxist dialectical logic exerted the greatest influence over philosophical activities in China. The opening of China occurred in 1978, and a wealth of studies on the philosophy of logic has been since then introduced to China from the West. China come to the second "uptake" period (see the next note about the first "uptake" period) in terms of the study of logic, which then began to be far more independent of the official Marxist philosophy.

2   "The past" here refers especially to the time of the Republic of China founded by Sun Yet-sen in 1912. During this period Chinese intellectuals had made a thorough criticism of the Chinese intellectual tradition due to its lack of "formal logic" and even "formal logical thinking", which compelled them to bring several works on formal logic from the West to China. China thus entered the first "uptake" period in her history of research on modern logic, and many significant intellectual events occurred. We give just three examples as follows. 1) Bertrand Russell visited China from October 1920 to July 1921 and gave 20 public speeches, one of which revolved around mathematical logic and analytic philosophy. His visit provided an important impetus for the formation of what was later called the "Tsinghua Neo-Realism School" which initiated China's modern logic research. 2) Zhang Shenfu 张申府 (1893–1986), one of the most famous Chinese experts on Russell's logic and philosophy, published the first Chinese version of Ludwig Wittgenstien's *Tractatus Logico-Philosophicus* ("TLP" hereafter) in 1927. Except for the German original, Zhang's Chinese version was the first non-English version of TLP in the world. Jin Yuelin 金岳霖 (1895–1984), the leading philosopher and logician in the Tsinghua Neo-Realism School, for the first time in the Chinese intellectual history systematically introduced modern logic to the country with his *Logic*, published as a handout in 1935 (see Vrhovski 2021). It is also worth noting that, besides the Tsinghua Neo-Realism School, there were another two intellectual schools, the Peking Idealism School and Yan'an Materialism School (see Yu 2012), which also significantly affected the Chinese study of philosophy before 1949. Though the three schools at that time faced the same political problem—where China to go given the national crisis during the two world wars—they differed in philosophical interests and approaches. However, none of them could then be intellectually dominant. Things changed in 1949, when the Yan'an Materialism School advocated by Chinese Communist Party came to the fore. Our story begins here.

Our story includes four parts. We begin with distinguishing "philosophical logic" from the "philosophy of logic". First, the ambiguity of "philosophical logic" is cleared up by the Chinese philosophers, and then the definition, main questions and the core theories of the philosophy of logic in the post-1949 Chinese context are specified. This part then ends with a sketch of post-1949 China's three research stages in this context. For the second part, we shall examine the two competing notions of logic, namely the inclusive and exclusive notions, to which many Chinese logic scholars have devoted a lot of attention. The last section of this part goes into the notion of logic of Jin Yuelin, one of the most distinguished philosophers of logic in modern China. Third part is an attempt to present Chinese philosophers' contemporary discussions of the social-cultural role of logic and the two important reasons for contemporary Chinese philosopher's focus on the issue, with several proposals to enhance such a role also given. Finally, in the fourth part we characterize the prospects for research on the philosophy of logic in China.

From Philosophical Logic to the Philosophy of Logic

Quine famously says in the preface of his *Method of Logic*: "Logic is an old subject, and since 1879 it has been a great one" (Quine 1959, vii). This often-quoted statement expresses the commonly held view that Gottlob Frege's *Begriffschrift* (literally meaning "concept script"), published in 1879, gave birth to modern logic and its impact on the study of this subject was revolutionary.

First, the "mathematization of logic" (Irvine 1996, 10) gets a definite method, and mathematical logic has an initial form. Wang Lu 王路 summarizes this far-reaching change in logic as "a change from subject/predicate structure to function structure".[3] Second, the relationship between logic and philosophy became intertwined and complicated. As Hu Zehong 胡泽洪 (2013, 1) writes,

> one of the most crucial features of 20th century's logic and philosophy lies in the fact that they mutually permeate and thus two trends happen: philosophy is logicalized and logic is philosophicalized. This correspondingly gives rise to philosophical logic and the philosophy of logic.

Moreover, philosophers such as Timothy Williamson and Dale Jacquette agree that it is necessary to focus on one of these to distinguish it from the other.

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3   This recapitulation comes from a Wang Lu's lecture, *Frege and Contemporary Philosophy*, given on the December 1, 2020 in the Department of Philosophy and Social Development at South China Normal University.

In *Questions and Answers on the Philosophy of Logic*, published in a Chinese journal, Timothy Williamson makes a point of explaining what the "philosophy of logic" is in order to situate his related work in the right disciplinary context, emphasizing that philosophical logic driven by philosophical concerns differs in principle from the philosophy of logic. However, he finds it hard in practice to draw a line of demarcation between the two (Williamson 2013). Likewise, Dale Jacquette thinks that "it is standard in works dedicated to topics in philosophy and logic to distinguish" one from the other (Jacquette 2007, 1). However, he admits that we lack a universally agreed distinction, and thus are inclined to conflate the two, something that Chen Bo 陈波 tries to address by clearing up the ambiguity of "philosophical logic", as explained below.

Clearing up the Ambiguity of "Philosophical Logic"

Chen Bo (2000) points out that we are inclined to conflate the two chiefly because the expression "philosophical logic" has long been ambiguous. His historical investigation clearly sheds light on three strands of its meaning.

Strand 1. "Philosophical logic" refers to a kind of philosophy. According to Chen Bo, the term "philosophical logic" was coined by Bertrand Russell in his essay "Logic as the Essence of Philosophy" (1914).[4] Russell identifies philosophical logic with "the beginnings"[5] of mathematical logic, and takes it to be a distinctive approach to philosophical study whose subject is the logical forms of propositions and inferences. Following Russell's preliminary account, Peter Strawson, in his edited volume *Philosophical Logic* (1967), "also regards philosophical logic as a certain form of philosophy, and further specifies that it is intended to explore a set of philosophical concepts and problems related with logic" (Chen Bo 2000, 11). Likewise, Chen thinks of the characterizations of the nature and scope of philosophical logic in both A. C. Grayling's *An Introduction to Philosophical Logic* (1982) and Sybil Wolfram's *Philosophical Logic: An Introduction* (1989) as classic examples of seeing philosophical logic as philosophy. Chen cites from Grayling to sum up this first strand, "philosophical logic is philosophy, philosophy logic-informed and logic-sensitive albeit, but philosophy notwithstanding" (Grayling 1990, 15).

Strand 2. "Philosophical logic" refers to a mix of philosophy and logic. It was in the wake of Gödel's completeness proof of first order logic (around the 1940s)

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4   Sansbury, R. M. (2008, 347) also says, "The first use of the phrase 'philosophical logic' known to me is in a semi-popular essay by Bertrand Russell called 'Logic as the essence of philosophy' (1914)."

5   The "beginnings of mathematical logic" amounts to what we now call "first order logic".

that logic began to ramify into many logics. Such ramifying is guided by either revisions or extensions of first order logic, most of which are in turn philosophically motivated. Therefore, philosophical logic comprises both philosophical work for making sense of those new logical systems (and their applications) in a non-formal way and logical work for making sense of traditional philosophical (or other kinds of) concepts in a formal way.[6] Generally, considering "philosophical logic" as a mix of philosophy and logic has been widely (and often implicitly) accepted by Western philosophical logicians. As Macfarlane argues with regard to a piece of good work on philosophical logic, "doing each well requires doing the other" (Macfarlane 2021, xv).[7]

Strand 3. "Philosophical logic" refers to a group of logics. Obviously, *Strand 3* results from narrowing *Strand 2* down to half. Chen accounts for this strand as follows: "philosophical logic refers to a group of logical systems resting on first order logic and taking as its subjects both traditional philosophical concepts and the applications of logic in some specific disciplines" (Chen Bo 2000, 13). This group of logics has two subgroups: alternative and extended systems. The former includes "deviant logics", such as relevance logic, intuitionist logic, free logic, many-valued logic, quantum logic, fuzzy logic, etc. These arise due to denial or revision of some basic assumptions of first order logic. The latter includes "applied logics", such as modal logic, deontic logic, tense logic, epistemic logic, inquisitive logic, preference logic and so on. They are due to applications of first order techniques to philosophical concepts or to the concepts of some specific disciplines.[8] In short, philosophical logic is logic, especially corresponding to the job of building philosophically informed logical systems.

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6   Chen Bo (2000, 12) gives the *Journal of Philosophical Logic* founded in 1972 and several works (such as Copi and Gould (1978); Mönnich (1981); von Wright (1983), and Engel (1989)) as the proponents of this view.

7   Another recent example of adopting the same attitude toward philosophical logic appears in Greg Restall and Gillian Russell (2012, 1–7). They suggest in its introduction that what count as the scope of philosophical logic includes not only "the work in logic which has application in philosophy", "a broader class of formal systems" (applied to, for example, game theory, decision theory and etc.), but also work in the philosophy of logic "including work on the semantics, metaphysics and epistemology of truth, logical truth and logical consequence, and work on the foundations of particular formal systems—including questions about what it is for something to be necessarily the case, or what a model is".

8   Evidently, Chen borrows from part of Susan Haack's account of the scope of logic in her seminal book *Philosophy of Logics* (1978, 4) except for some terminological differences. But it should be noted that what Chen focuses on is not the scope of "logic" but the scope of "philosophical logic".

The Definition, Main Questions and Core Theories of Philosophy of Logic in the Chinese Context

The last strand of "philosophical logic" is adopted by many Chinese logicians and philosophers of logic, reflecting a broadly shared view in the Chinese context that philosophical logic consists in exploiting the techniques of first order logic in order that the concepts having long been informally expounded can be characterized in formalized ways, and particularly in logical systems.[9] Wang Lu (2004) and Zhu Jianping 朱建平 (2013) highlight the application of techniques of first order logic as most characteristic of philosophical logics. Zheng Yuxin 郑毓信 (1989), Zhang Qingyu 张清宇 et al. (2007) and Hu Zehong (2008) take "philosophical logic" as the generic term for various non-classical logics. Given such a narrowed notion of philosophical logics, we thus have a considerably wider scope of the philosophy of logic in the Chinese context than we do in the West. Clearing up the meaning of "philosophical logic" paves the way for a definition of "philosophy of logic", and Chen's definition is representative:

> Philosophy of logic is a philosophical study of logic which attempts to reveal fundamental assumptions, background presuppositions or prerequisite underlying in the specific logical theories. (Chen Bo 2000, 16–17)

It involves three kinds of questions: 1) Philosophical analysis of logic as a whole: what is logic? What is its subject? What is characteristic of logic? What does logic differ from linguistics, mathematics, psychology, etc.? and the like. 2) Questions about the basic concepts of logic, such as logical form, logical constant, logical consequence, identity, the notion of implication, etc. Clarifying these concepts aims to establish a basic conceptual framework for the study of logic. 3) Traditional philosophical questions which have to do with propositions, truth, paradoxes, reference, the meaning of names, modalities, ontological commitment, and the challenges to the principle of bivalence, etc.

According to Zhang Jianjun 张建军 et al. (2014), the first two kinds of questions can be labelled as "local questions" for the philosophy of logic, since they arise almost from within the study of logic, and all the three kinds of questions taken together constitute what he calls "global questions" for the philosophy of logic in that they include questions overlapping with those we deal with in the philosophy of language, philosophy of mathematics, and metaphysics. Additionally,

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9   John Burgess (2009, 2) is one of the rare cases in the West that expresses a similar view, emphasizing that "Logic, whether classical or extra- or anti-classical, is concerned with form". And "What logical forms are, and how they are related to linguistic forms, are deep and difficult questions not of philosophical logic but of philosophy of logic."

by historically examining the research on the philosophy of logic in China over several decades, Zhang Jianjun observes that the Chinese philosophers of logic tend to put their focus on theories of truth, theories of meaning and theories of paradoxes,[10] and that a great deal of research on these three theories shows them as the "core theories" for the philosophy of logic in the Chinese context.

It is in this context that we have now isolated philosophical logic from the philosophy of logic and introduced a representative definition, the main questions, and the core theories of philosophy of logic. However, what is exactly "the Chinese context"?

A Sketch of Three Stages: The 1950s to the Mid-1960s, the Late 1970s to the Early 1990s, and since the Mid 1990s

The 1950s to the mid-1960s saw in the Chinese academic circles a great debate revolving around fundamental questions of logic. This debate, amid an intellectual atmosphere that was very different from what it had been before 1949, did not technically reflect the genuine tension between formal logic and Marxist dialectical logic as much as it claimed to,[11] but rather signalled the ideological divergence between the Old China (1912–1949) with its "analytical rationality" (see Sha, Zhang Xiaoyan, and Zhang Yanjing 2002) and the New China (post–1949) with its "dialectical rationality" (ibid.).

From the late 1970s to the early 1990s has been the second "uptake" period for research on the philosophy of logic in China. In the 1980s, W. V. Quine's *Philosophy of Logic* (1970), Susan Haack's *Philosophy of Logic* (1978), and A. C. Grayling's *An Introduction to Philosophical Logic* (1982) were all introduced to China in these years, the first group of seminal works from the West for Chinese philosophers of logic, playing a very helpful role in making them recognize the nature and scope of the philosophy of logic, the important philosophical questions raised by logic and the possible ways of answering them. Several other crucial Western works were also translated into Chinese at this time, including A. J. Ayer's *Language, Truth and Logic* (translated by Yin Dayi 尹大贻 and published in 1981), W. V.

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10   For the sake of space, we shall not in this paper examine any concrete examples of the three kinds of theories, but it must be noted that the recent series of works by Hsiung Ming 熊明 (Xiong Ming) on the revision theory of truth have had increasingly impact on the field of semantic paradoxes. In particular, Hsiung Ming (2017) is cited in the entry for "Self-Reference" that appears in the *The Stanford Encyclopedia of Philosophy* (Fall 2017 Edition).

11   As Zhang Jianjun (2014, 2) notes, "this debate is technically very limited in that most participants thereof were actually not very familiar with the technical details of modern logic."

Quine's *From a Logical Point of View* (translated by Jiang Tianyi 江天骥 and others, published in 1987), and S. A. Kripke's *Naming and Necessity* (translated by Mei Wen梅文 and published in 1988). We can thus see that, beyond translation, Chinese scholars began to give expression to their own voice through many treatises and collections, such as Chen Bo's (1990) *A Preface to the Philosophy of Logic* (*Luoji Zhexue Yinlun* 逻辑哲学引论); Gui Qiquan's 桂起权 (1991) *A Guide to the Contemporary Philosophy of Mathematics and Logic* (*Dangdai Shuxuezhexue yu Luojizhexue Rumen* 当代数学哲学与逻辑哲学入门); Feng Mian's 冯棉, Li Fuan's 李福安, and Ma Qinrong's 马钦荣 (1991) *Philosophical Logic and the Philosophy of Logic* (*Zhexue Luoji yu Luoji Zhexue* 哲学逻辑与逻辑哲学); *Philosophy of Logic* (*Luoji Zhexue* 逻辑哲学) edited by Zhang Shangshui 张尚水 (1996) in Volume 5 of *Contemporary Distinguished Western Philosophers* (*Dangdai Xifang Zhuming Zhexuejia Pingzhuan* 当代西方著名哲学家评传); *An Investigation of Marxist Philosophy of Logic* (*Makesi Zhuyi de Luoji Zhexue Tanxi* 马克思主义的逻辑哲学探析), edited by Ma Pei 马佩 (1992). As Hu Zehong (2008, 16) notes, "These monographs … initiated the research on philosophy of logic much more systematic than before in China."

Since the mid-1990s, research on the philosophy of logic in China has proceeded to another stage. Chinese philosophers of logic began to go beyond just translating or explicating Western research. Much of the study in China at this stage was an attempt not only to keep abreast of any developments in the field, but also to be distinctive and original on some specific issues, as seen in the following examples: Huang Bin's 黄斌 (1999) *The Philosophy of Language Logic: Puzzles and Solutions* (*Yuyan Luoji Zhexue: Nanti yu Jiexi* 语言逻辑哲学：难题与解析); Gong Zhaoxiang's 弓肇祥 (1999) *Theories of Truth: Historical and Critical Investigation of Western Theories of Truth* (*Zhenli Lilun: Dui Xifang Zhenli Lilun Lishidi Pipandi Kaocha* 真理理论：对西方真理理论历史地批判地考察); Wang Lu's (2000) *The Concept of Logic* (*Luoji de Guannian* 逻辑的观念); Zhang Jianjun's (2002b) *Introduction to Studies on Logical Paradoxes* (*Luoji Beilun Yanjiu Yinlun* 逻辑悖论研究引论); Zhang Jialong's 张家龙 (2003) *Modal Logic and Philosophy* (*Motai Luoji yu Zhexue* 模态逻辑与哲学); Hu Zehong's (2004) *Philosophical Studies on Logic: Issues in the Philosophy of Logic* (*Luoji de Zhexue Fansi: Luoji Zhexue Zhuanti Yanjiu* 逻辑的哲学反思：逻辑哲学专题研究); and Hsiung Ming's (Xiong 2016) *Arithmetic, Truth and Paradox* (*Suanshu, Zhen yu Beilun* 算术、真与悖论).

Overall, research on the philosophy of logic in post-1949 China began with nearly two decades of absence from the international academic community, because Chinese scholars were focused on a national level debate between formal logic and Marxist dialectical logic, then continued for a decade or so of recognizing, translating, and introducing a wealth of Western works to the country, and

finally reached today's growing integration into the global philosophical enterprise. Against such a Chinese context, we have outlined above one of the representative results of Chinese scholars' work on the philosophy of logic: by historically clearing up the ambiguity of the term "philosophical logic", the philosophy of logic as such is clarified. Next, we turn to one of the most important questions of philosophy of logic: what is logic?

The Notion of Logic: Exclusive vs Inclusive

When asked what logic is, we must be clear in the first place that "logic" is polysemous. Several authors (e.g. da Costa 1997; Bueno 2001; Priest 2006) write in favour of a distinction between logic-as-theory and logic-as-object-of-the-theory. According to Daniel Cohnitz and Luis Estrada-Gonzalez (2019), the former means a science or a discipline, just like "logic" in "logic studies valid inferences". The latter means what the science or the discipline is about, just like "logic" in "logic includes deductive and inductive inferences". This distinction is useful for many problems that are discussed in the philosophy of logic: when the revisability of logic is in question, "what is considered to be in need of revision? Is it a theory, or is it an application of the theory or rather the object studied by the theory?" (ibid., 14–15)

However, such polysemy of "logic" disappears in the Chinese context, because the two senses of "logic" correspond to different Chinese words: logic-as-theory is "*luojixue* 逻辑学" and logic-as-object-of-the-theory is "*luoji* 逻辑". When Chinese philosophers discuss the issue of what logic is, we can thus clearly know which of the two senses of "logic" is in question, and no ambiguity is involved. Given this linguistic context, most of the times in the following discussion of the notion of logic we shall not particularly distinguish the word "*luoji* 逻辑" from "*luojixue* 逻辑学" unless otherwise specified.

The Exclusive Notion of Logic: Logic is Only Deduction

As Quine claims, "logic, like any science, has as its business the pursuit of truth" (Quine 1956, xi). This notion of logic can be properly traced back to Frege's misleading analogy between logical systems and axiomatized theories. Michael Dummett criticizes this as having "highly deleterious effects both in logic and in philosophy" (Dummett 1973, 433) and thus champions the traditional notion that logic studies inference. To be sure, the gulf between the notion of "*logic studies inference*" and the notion of "*logic studies truth*" can indeed be technically bridged: the proof of logical equivalence between the validity of an inference from F to G

and the logical truth of (F ⊃ G) is available (see Hamilton 1978, 25), but more may be required for the former than the latter: "for instance, it may be required that the rule takes us from a way of verifying F to a way of verifying G" (Hintikka and Sandu 2007, 16).

Chinese philosophers of logic likewise recognize that an assertion of the logical truth of (F ⊃ G) can be effectively subsumed into a specification of the validity of an inference from F to G, and therefore generally in favour of "logic studies inference".[12] They are centrally concerned with what kind of inference can be claimed to be the object of logic. The philosophers subscribing to the exclusive notion contend that it must be deductive inference, as opposed to inductive or dialectical. The staunchest defenders of such an exclusive notion are Wang Lu and Li Xiaowu (李小五).

Wang Lu is a prolific philosopher with strong views and uncompromising positions. While his research on Aristotle and Frege has been much acclaimed in China, his notion of logic, which is enunciated in his bold treatise *The Concept of Logic*, has provoked considerable discussion and much controversy. This treatise argues that logic is defined by "necessarily follow from", "necessarily come about", or—put in a more modern way—the validity of inferences. Wang writes "logic is a science of 'inference by necessity', and especially such necessity of inference is determined not by matter but by form. Thus, 'necessarily follow from' is the inherent mechanics logic has" (Wang Lu 2000, 45). Overall, Wang's notion of logic squares with the informal conception of logical consequence captured by Tarski's definition. Here, we underline two aspects of his undertaking on this seemingly familiar notion of logic.

First, the exact problem Wang aims to address is not, given the intuitive idea of logic as a kind of consequence relation, how to theoretically specify such a relation, as most Western logicians and philosophers do, but rather how to justify this very intuitive idea: why can we say that logic is identified with the consequence relation, or with "necessarily follow from"? His approach consists in revealing "necessarily follow from" as the common denominator that underlies the epitomes of what is undoubtedly acknowledged as logic. According to Wang's analysis of *Organon*, it is admittedly obvious that Aristotle does not define or even mention what logic is, but "necessarily follow from" is characterized, particularly in *Topics*, *Prior Analysis*, and *De interpretation*, as something inherent in or common to what is now taken to be the content of studies of logic, such as the formal standard for the theory of four predicates, syllogism, and the claims about propositional form.

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12   This view is also endorsed by Stephane Read (1995, 38–39): "Consequence cannot be defined in terms of logical truth; but logical truth is a degenerate, or extremal, case of consequence."

In a similar vein, as Wang continues, both the inferential schemes developed in Stoic propositional logic and the first order calculus established since Frege are the manifestations of "necessarily follow from". Therefore, the spirit of "necessarily follow from" runs through all that are considered as the core content of logic from Aristotle's logic to first order logic. Moreover, only deduction, in contrast to other modes of reasoning such as induction, abduction or dialectics, accords to this spirit. Logic can thus exclusively correspond to deduction.

Along this line of thought, Li Xiaowu, further defines logic as "formal deductive systems which characterize formally valid inferences in terms of soundness and completeness" (Li 1997, 78) and puts forward a criterion of "logical integrity". The logical integrity relies on whether a form of logic includes the following elements: 1) a class of formulas expressed by a formal language; 2) model-theoretic logical consequences; 3) proof-theoretic logical consequences; 4) soundness proof; and 5) completeness proof. The more elements a logic has, the more integrity it gains.

> If both the fourth and the fifth elements of a logic are proven, it can be called a "realized logic", otherwise "potential logic". Not every rational man would admit its integrity without the soundness and completeness proofs, particularly without the latter one. (ibid. 78–79)

Obviously, Li Xiaowu attempts to characterize logic in a totally formalized way, and his advocacy of logical integrity exhibits a more exclusive notion of logic than Wang's notion of "necessarily follow from" since, according to Li's standard, first order logic appears to have higher integrity than Aristotle's logic does, a conclusion underivable from the Wang's notion.

The second point of Wang's exclusive notion of logic must be understood in the context of a significant debate among Chinese logicians, which endured off and on for nearly two decades from the late 1970s on.

As we have said before, modern logic had already begun to be taught to philosophy students at Chinese universities around the 1920s. The teaching materials culminated in publication of the textbook *Logic* (1935 [1961]) written by Jin Yuelin. It was after 1949 that the content of logic teaching had been completely revolutionized and quickly brought in line with textbooks from the Soviet Union. The most influential one, among others, was M. S. Strogovich's *Logic* published in 1944, and its Chinese version was published in 1950: "In this textbook full of irrelevant inculcation of epistemological views, modern logic was replaced with its criticisms" (Song 1995, 119). Then for more than 20 years after 1950 Chinese academics were absent from the international community. This was costly,

because the development of logic teaching in China was disrupted and modern logic was lost. Then, in 1978, many Chinese logicians come up with the slogan of the "modernization of logic", and what was meant by this was especially the "modernization of logic teaching". This reflected a consensus among most Chinese logicians that the teaching of logic should be totally revised and that the first and foremost step was to modernize logic textbooks. However, opinions diverged over the content of such a textbook between "*substitutionists* (*Qudai Lunzhe* 取代论者)" and "*absorptionists* (*Xishou Lunzhe* 吸收论者)".

Wang's exclusive notion of logic represents a classical substitutionist position: anything not in line with the principle of "necessarily follow from" must be excluded from the logic textbook (therefore, the content on induction, abduction and dialectics must be removed) and, more importantly, traditional logic should be replaced with modern logic. It is worth noting that, due to the twenty years' dominance of Soviet Union textbooks in Chinese teaching of logic, "traditional logic" has a very special meaning in the Chinese context. Though this "traditional logic" includes the syllogism and part of the propositional logic, the principle of "necessarily follow from" which, according to Wang, is characteristic of Aristotle's syllogism, and modern logic is ignored in these textbooks. The main problem here lies in the fact that the "traditional logic" in question defines logic as the laws and forms of thinking, and the "thinking" is epistemologically informed, which seems irrelevant to Wang's standard with regard to logic. This is the fundamental reason why Wang thinks that the "traditional logic" should be totally replaced by the modern form. In fact, this epistemologically informed definition of logic brings to the fore an inclusive notion of logic which is adopted by most of the absorptionists: logic can absorb the content of modern logic, but it does not mean that logic should be limited to deduction.

The Inclusive Notion of Logic: Logic is beyond Deduction

Clearly, defining logic as the laws and forms of thinking significantly differs from defining logic as "necessarily follow from". The former allows the study of logic to have a wider scope. It can thus be said that deduction, induction, and abduction represent different kinds of forms or ways of thinking and can all be subsumed into the scope of logic. Additionally, given the methodological role these kinds of inferences play in scientific research, the methodological import of logic for scientific research can likewise be the topic of the study of logic. Evidently, the inclusive notion of logic makes a significant change in terms of the object, scope, and methodological import of the study of logic.

As far as the absorptionists are concerned, the substitutionists defining logic as "necessarily follow from" show a narrow-minded attitude to logic, and more importantly, the substitutionists provide no convincing arguments that logic is just "necessarily follow from". Ma Pei harshly criticizes Wang's distortion of Aristotle's use of "necessarily follow from" in prior analyses (24b19-24b22). According to Ma, Aristotle uses it not to define logic but to define a kind of "inference". "Logic, inference and syllogism are different things … … it is obviously misleading to claim the definition of a kind of inference to be that of logic" (Ma 2001, 85). Wang Yutian 王宇田 observes that it is broadly recognized by contemporary scientists and philosophers that deduction and induction are complementary, and the exclusive notion of logic "is not only unjust to non-deductive logics but also a deviation from our age" (Wang Yutian 2002, 72). Zhang Jianjun admits, on the one hand, that the concept of "validity", or say, "necessarily follow from", can indeed be regarded as the core of logical inference, but on the other hand, that it is also necessary to distinguish two uses of "logical inference". The first is "the use of logical ontology" by which the logical inference only means formal truth-preservation and "has nothing to do with one's psychological process of inference. The second is 'the use of logical psychology' by which the logical inference represents the inference in one's actual mental process" (Zhang Jianjun 2011, 44). Again, Zhang thinks that, as the disciples of Frege's anti-psychologism, defenders of the exclusive notion of logic tend to deny that thought is the mental product of thinkers, and underscore the irrelevance of thinkers to the truth-preservation between thoughts. However, as Zhang argues, possible world semantics can play a very helpful role in connecting the logical content with the mental content, and the two uses of "logical inference" can thus be seen not as exclusive but as complementary.

In the debate between substitutionists and absorptionists, the latter gained much more popularity. And the inclusive notion of logic has growing impact on various aspects of the study of logic in China.

First, the absorptionists facilitated the birth of "General Logic" (*Putung Luojixue* 普通逻辑学) which was one of the most important results of the modernization of the teaching of logic. However, it should be noted that "General Logic" in the Chinese context does not correspond to a discipline but to the generic name of a kind of logic textbooks for a compulsory logic course for the humanities at Chinese universities.[13] On the one hand, "General Logic" is a term created to avoid the ambiguity of "formal logic", as the latter can be used to mean either a course

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13   After the mid-1990s, most Chinese universities ended their compulsory logic courses, though some of them kept logic as a selective course for students of the humanities.

or a discipline, and when it means a discipline sometimes it only refers to deductive logic, or more particularly, it only refers to first order logic. Sometimes it can also include inductive logic. Most of the Chinese logicians in post-1949 China thought (or think) that such ambiguity makes "formal logic" unsuitable for use in the name of logic textbooks. On the other hand, the definition, scope, and methodological role of logic explained in the term "General Logic" are in line with the inclusive notion of logic adopted by many of the absorptionists.

> The definition of logic (*luoji* 逻辑): Logic is the laws and forms of thinking.
>
> The scope of logic (*luojixue* 逻辑学): Logic studies the logical forms of thinking which have a strict formal structure (like deduction) and the ones which do not have (like induction and abduction).
>
> The methodological role of logic (*luojixue* 逻辑学): The various kinds of applications of logic offer the methods of thinking and scientific research (like falsifiability, hypothesis formation). (Guan 1999, 120–21)

The Third National Formal Logic Conference held in 1985 saw many proposed reforms to the syllabus of logic textbooks, and one of them backed by Wu Jiaguo 吴家国 is regarded as most representative (see ibid.). This reformed syllabus turned out to be an important reference for compiling logic textbooks for the humanities. Setting aside the minor differences between the logic textbooks published after that conference, we can see that the following are common to them: three basic laws of thinking (the law of identity, the law of excluded-middle and the law of non-contradiction), concepts (definition, relation and class), categorical propositions and syllogism, compound propositions and their validity, inductive methods, probability, analogical inference, scientific hypothesis, argumentation and logical fallacies. Since the mid-1990s, the content of modern logic has begun to be included in the "General Logic" textbooks. For example, *Introduction to Logic for Universities* (*Daxue Luoji Daolun* 大学逻辑导论), as one of the "General Logic" textbooks, edited by Guo Qiao 郭桥 and Zi Jianmin 资建民 (2003), has been widely used for the humanities at Chinese universities for many years. Besides the main content of "General Logic" specified above, it also introduces the axiomatic systems and natural deduction for propositional and predicate logic.

Second, Professor Zhou Liquan 周礼全, one of the most famous logicians in post-1949 China, exponent of the inclusive notion of logic, initially explored the application of modern logic to natural language analysis in his seminal paper "Formal Logic should Try to Analyse the Situated Meaning of Natural Language" (*Xingshi luoji ying changshi yanjiu ziran yuyan de juti yiyi* 形式逻辑应尝试研究

自然语言的具体意义 (1961)). This work opened Chinese studies on 'the logic of language', which includes the logical analysis of natural language. Additionally, Zhou gave a first systematic characterization of the inclusive notion of logic in his writing on the entry 'logic' of *The Encyclopedia of Logic* (*Luoji baike cidian* 逻辑百科辞典 (1994)). In this entry, the interaction between logic and other disciplines such as linguistics, mathematics, and computer science is "clearly enunciated" (Hu and Zhang 2013, 323). His contribution to new branches of the study of logic by making explicit the logical questions in the sciences has continued to broaden the territory of logic, and we can see that his inclusive notion of logic plays an important role therein.

Third, since the beginning of 21st century, based on the work of Zhou Liquan (1959; 1961; 1994), many Chinese logic scholars have started to focus on the two turns of the study of logic. Ju Shier sets forth a so-called "the cognitive turn of logic" in which the core of the study of logic is taken to be "the exploration of cognitive models for the acquisition, articulation and revision of knowledge in order to serve for computer science and artificial intelligence" (Hu and Zhang 2013, 323). Chen Muze 陈慕泽 puts forward the "informal turn of logic" in which the logical mechanism of critical thinking is claimed to be the essential of study of logic. "The logical mechanism is informal since critical thinking is in essence a non-formal ordinary logical thinking" (Chen Muze 2006, 24). According to Zhang Jianjun (2007), cognitive logic, informal logic as well as other recently well-developed logics (like pragmatic logic, logic of law, logic of games, etc.) can all be subsumed into a so-called "applicational logic discipline group", and in other words, they are the specific cases of "applicational logic". Zhang underscores that "applicational logic" differs not only from the "applied logic"—construed by many Western logicians as a group of non-classical logics—but also from the "logics applied" to philosophical or scientific research. It refers to "the methodology of application of logic" (Zhang Jianjun 2007, 6) to the effect that it studies "the role or the mechanism of logical elements in a specific research field and the interaction between non-logical elements and logical elements" (ibid.).

It can be clearly seen that the inclusive notion of logic extends the territory of the study of logic in China. Such an extension shows an increasingly broad way the Chinese logicians grasp the notion of logic.

A Notion of Logic Varying from the Early Jin Yuelin to the Late Jin Yuelin

In the intellectual history of modern China, Jin Yuelin plays a unique role in the teaching and study of logic. His teaching of mathematical logic from 1926

at National Tsinghua University as well as his monograph *Logic* published as a handout in 1935 [1961] made modern logic commonly recognized and widely spread in China. However, his notion of logic changed so markedly after 1949 that there seems to be two different phases.

The early Jin Yuelin (before 1949) favours an exclusive notion of logic, considering logic as "a necessary proposition (or judgement) sequence" (Jin Yuelin 1990, 463). There is no place for induction and Marxist dialectics in the original version of *Logic* (1935 [1961]). By contrast, the late Jin Yuelin (after 1949) advocates the inclusive notion of logic, thoroughly criticizing nearly all his early positions: induction and Marxist dialectics are thus rehabilitated as necessary parts of logic, logic studies not only the form but also the content, and there is, surprisingly, the difference in (bourgeois/proletarian) class between inferential forms, etc.[14]

No one doubts the role of the prevailing ideology in causing the change in Jin's notion of logic at the time, but it must be admitted that there is in fact no overwhelming and conclusive evidence for believing that his change was entirely involuntary or half-hearted, and the complexity of such a change has provoked considerable analysis and discussion in Chinese intellectual circle. Here are four representative points of view.

1) Jin's real notion of logic culminated with the exclusive one, and most of his post-1949 writings about the notion of logic might be explained away by non-academic reasons at the time. Wang Lu (2009)'s detailed analysis of Jin's major post-1949 texts as regards the notion of logic provides many cogent arguments in favour of the interpretation that we do not need to fully accept the late Jin wrote, and his notion of logic never genuinely changed after 1949 if we pay attention to his somewhat "esoteric writing".

2) Jin's change was then the result of the philosophical trends, but the late Jin Yuelin was genuine in his thought. To be sure, though, some of the late Jin's characterizations of logic are flawed. Zhuge Yintong 诸葛殷同 (1987), one of Jin Yuelin's students, believes that, according to his personal association with the man, the late Jin Yuelin was always truthful and sincere about his ideas of logic, such as the class character of inferential forms. Zhuge Yintong (2004) takes the late Jin's logical theories seriously and criticizes them thoroughly.

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14   All these theoretical positions are presented in Jin's following papers published after 1949: "On the Unification of Veracity and Correctness" (1959a); "Self-criticisms on my Old Book *Logic*" (1959b); "On 'Therefore'" (1960); "Certainty of the Objectives and Formal Logic's First Three Basic Laws of Thinking" (1962a), and "On the Class-Character and Necessity of Inferential Forms" (1962b). All these papers were published in one of the most important Chinese philosophy journals, *Philosophical Research*, founded in 1955.

3) There are obvious continuities between the early Jin and the late Jin. The late Jin provides his notion of logic with more solid and richer philosophical justifications, and it is thus a reflection of the continuous improvement of his notion of logic. Zhang Jianjun (2005) argues that the late Jin effectively explores many philosophical problems that remained unsolved at his early phase, such as that concerning the foundation of logical truth. The late Jin's exploration of this foundation problem is meaningful and thought-provoking.

4) The two phases of Jin Yuelin represent his different academic ideals: the early Jin studies philosophy for purely academic reasons, considering philosophy as a way of improving Chinese intellectual life; the late Jin takes philosophy to be a weapon of thought directly serving the nation's needs. They are both right and their combination is workable. This is the view of Wang Hao 王浩 (1987) expressed in his famous memorial essay *The Road of Mr. Jin Yuelin*. However, Wang Hao did not finish his research plan (mentioned therein) of "exploring how the combination of the two ideals is workable and can acquire a reliable result" (Wang Hao 1987, 49). Liu Xinwen 刘新文 tries to undertake the work Wang Hao left unfinished. According to Liu, the question of "logocentric predicament", or "the foundation of logic … run through all Jin's major work over his whole life, and his answer to this question is the real lasting ideal which straddles the two very different ones" (Liu 2020, 43).

The controversy over Jin's early and late notions of logic reveals not only one of the most crucial subjects in the post-1949 philosophy of logic in China, but also the collective reflection and soul-searching of Chinese philosophers trying to find out how to balance "the possibilities of thinking and its historical conditions" (ibid.). It is this very balance, as far as Liu (2020) is concerned, that Jin maintains in order to answer the question of what logic is ultimately based on.

The Social-Cultural Role of Logic

In the 1990s, one of the most pressing problems with which the Chinese philosophers of logic were concerned was the social-cultural role of logic in China. We have said before that the study and teaching of logic made much progress during nearly two decades of the modernization of logic after 1978, but the development of logic during the mid-1990s was hindered by the overall Chinese economic and political atmosphere: the pervasive economic and political neoliberalism spurred educational industrialization that was deeply uncongenial to the humanities. Accordingly,

the courses of logic in Chinese universities in those years diminished sharply, fewer departments or majors of universities taught logic, and even for some prestigious universities like Peking University, Renmin University of China and Beijing Normal University, there were progressively fewer applications for their master's program of logic, so that their admission plans could not be fulfilled. (Dong 1995, 145)

Logic was then in a slump, which compelled Chinese philosophers of logic to set out to analyse this situation.

Two Important Reasons for Considering the Social-cultural Role of Logic

Setting aside the economic and political aspects of the external environment at the time, Cheng Zhongtang 程仲棠 (1997) and Jin Rongdong 晋荣东 (2005) both offer reasons for the reduced status of logic. Cheng Zhongtang points out that "the academic status of logic is being seriously challenged by the popularity of Western postmodern philosophy in China" (Cheng Zhongtang 1997, 38). And the Chinese academic tradition, short of "formal thinking", is apt to accept the postmodernist defiance against the widely acknowledged role of logic in sciences and the humanities. Jin Rongdong claims that the main reason why logic has been in a slump in contemporary China is "the instrumental value of logic in sciences is overestimated, and we have no adequate discussion of its social-cultural role in the modernization of China" (Jin Rongdong 2005, 16).

Several Proposals

Zhang Jianjun propounds a notion of the "sociology of logic" which aims to study "the social functions of logic" (Zhang Jianjun 1997, 18). The social functions of logic include the role of logic in the various aspect of social life and activities such as social work, natural science research, educational practices, cultural customs and the rule of law. According to Zhang Jianjun (2002a), the most fundamental properties of logic (as one of the humanities) is its contribution to "social rationalization". "The 'Logical Mind' is not only the necessary elements of scientific spirit, but also the necessary elements of democracy and rule of laws." (Zhang Jianjun 2002a, 6)

Cui Qingtian's 崔清田 monograph, *A Comparative Analysis of Mohist Logic and Aristotelian Logic: A Thesis on Logic and Culture*, systematically reviews the influence of logic on the Chinese social change in the 20th century. Cui indicates that "logic provides the Chinese intellectuals of the 20th century with a weapon of

thought for criticizing and revolutionizing the traditional way of thinking" (Cui 2000, 286).

Another representative piece of work comes from Ju Shier's recently construed thesis of the "cultural relativism of logic" which generates his theory of generalized argumentation. Such a theory is intended to focus on the argumentations relative to cultural contexts, and though cultural contexts have a great impact on the method of argumentation, it is possible to set up a general framework for the cross-cultural logic (see Ju 2020). This work initiates a systematic approach to "culturalized logic".

As we can see, discussions of the social-cultural role of logic were initially motivated by Chinese logicians' attempt to save the teaching and study of logic from its poor situation in China. However, it turns out that such discussions, which have been active for some years now, also gave rise to some new theories.

The Prospects

The study on the philosophy of logic in post-1949 China always needs to cope with two general issues. The first concerns how to establish and develop the study of logic with a Chinese character while effectively taking part in the international academic community. The second concerns how to balance the academic independence of philosophical studies and the nation's official expectations for such work. On the one hand, the modernization of logic, as an outgrowth of the opening of China from 1978 on, has already made the second issue fade from Chinese philosophers' academic concerns. On the other, concerning the first issue, we may have some ideas of how it can be approached in the future.

First, it could be a useful way for Chinese philosophers of logic to introduce their work if we can establish an international multilingual specialized journal on the philosophy of logic. Currently, *Studies in Logic* (Luojixue Yanjiu 逻辑学研究), founded in 2008 by Sun Yat-Sen University and the Chinese Logic Association, is the only specialized journal in logic in China. *Studies in Logic* is a bilingual (Chinese and English) academic journal, and thus it has contributed a lot to publishing the work of philosophers and logicians from both China and abroad. However, it is broadly believed in China that a specialized platform of publication for the philosophy of logic is still needed for young Chinese logic scholars to publish their best work.

Second, Chinese philosophers of logic should be, in one way or another, encouraged to try to publish in international journals that have a double-blinded review

policy. Though they tend not to be very used to such double-blinded reviews, this situation is gradually changing in these years, and the significance of such publications is now at least fully recognized in China.

Third, if we intend to develop *the philosophy of logic with a Chinese character*, it is natural for us to adequately explore and employ Chinese traditional academic resources which are not just limited to the well-known and richly studied Mohist logic. We should unravel what is conceptually and inferentially assumed by "the modes of reasoning" implicitly used in various kinds of Chinese traditional theoretical texts. While making the modes of reasoning explicit, we can give an analysis of the underlying conceptual and inferential assumptions from a point of view of the contemporary philosophy of logic. This might be one of the plausible ways to ascribe a so-called "Chinese character" to the study of philosophy of logic.

Acknowledgements

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The History, Present and Future of the Study of Chinese Logic

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Abstract

The study of Chinese logic started as the second wave of Western traditional logic spread through China. Following Sun Yirang's initial work and Liu Shipei's development of it, this field was preliminarily established by Hu Shi, Zhang Shizhao and Guo Zhanbo. Since the 1980s, it became commonplace to systematize Chinese logic based on the Western system of logic. Since the 1990s, though, the Chinese academic community has begun to reflect on this research method, which has led to the trend of reverting to Chinese culture and its own logic.

Keywords: Chinese logic, Western logic, Chinese culture

Preteklost, sedanjost in prihodnost raziskav kitajske logike

Izvleček

Preučevanje kitajske logike se je začelo z drugim valom širjenja zahodne tradicionalne logike na Kitajskem. Zanimanje za področje je sprožil Sun Yirang, nadaljnji razvoj je doživelo z Liu Shipeijevim delom, vzpostavili pa so ga Hu Shi, Zhang Shizhao in Guo Zhanbo. Od 80. let 20. stoletja dalje se je na Kitajskem uveljavil pristop sistematizacije kitajske logike na podlagi zahodnih logičnih sistemov. Po drugi strani pa je v 90. letih 20. stoletja kitajska akademska skupnost začela premišljati tovrstno metodo raziskovanja, kar je vodilo k vzniku trenda povratka h kitajski kulturi in njeni lastni logiki.

Ključne besede: kitajska logika, zahodna logika, kitajska kultura

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"Chinese logic" in this paper mainly refers to the logical thought that originated and developed within the Chinese ideological and cultural tradition. By contrast, "the study of Chinese logic" roughly refers to the study of the Chinese logical thought developed from Western systems of logic introduced into China. It should be pointed out that "the study of Chinese logic" here refers to both Chinese and English research on Chinese logic.

This paper lays out the history of the study of Chinese logic from its origins to its full development, and then summarizes related achievements and deficits. Based on this, the author puts forward that the study of Chinese logic should take knowledge systems as the focus of study, and should search for Chinese logic within Chinese knowledge systems by referencing the relationship between Western traditional logic and Western knowledge systems, or the relationship between Indian logic and Indian knowledge systems.

The Origin of Chinese Logic Studies

The study of Chinese logic is a field that was established and developed in response to the introduction of Western logic to China. That transference can be separated into two stages. The first stage occurred during the end of the Ming dynasty and the beginning of the Qing dynasty, when the basic framework of traditional Western logic and part of medieval Western logic began to be introduced into China. The second stage took place during the late Qing dynasty and the early Republic of China, when Western traditional logic was thoroughly introduced and gradually became the mainstream method of studying Chinese logic.

Sun Yirang 孙诒让 (1848–1908) was the torchbearer of Chinese logic studies. After finishing the *Mozi jiangu* (*Critical Edition of the Mozi* 墨子间诂) in 1893, he read a lot of "recently translated Western books", and then anticipated that there could be many logical ideas in the *Mozi* equivalent to "Aristotle's deduction, Bacon's induction, and Indian *hetuvidyā*" (Sun 2010, 382). Chinese logic studies were thus initiated by Sun Yirang. It is worth noting that Kurtz noted in *The Discovery of Chinese Logic* that the Japanese translations of the two terms "deduction" and "induction" could not have appeared in Chinese literature before 1901, thus questioning the possibility of Sun Yigrang's use of "deduction" and "induction" (Kurtz 2011, 280). However, Sun Yirang did indeed have the possibility to come across these terms in Japanese translations. On the one hand, the word "induction" appeared in the *Riben shumu zhi* 日本书目志 (*Japanese Bibliography*) edited by Kang Youwei 康有为 (1858–1927) as early as 1897. For example, there are the *Guinafa lunli* 归纳法论理 (*The Theory of Induction*) and *Guina lunli* 归纳论理

(*The Theory of Induction*). On the other hand, Sun asked his disciple Huang Qing-cheng 黄庆澄 (1863–1904) to bring back a large number of books from Japan that introduced the relevant situation of "philosophy" and "philosophical society" in that country. Therefore, Sun had the opportunity to contact bibliographic materials and research on logic from Japan.

Liu Shipei 刘师培 (1884–1920) was a pioneer in Chinese logic studies. At the end of 1903, he completed *Rangshu* 攘书 (*Book of Expulsion*), including a chapter called "Zhengmingpian 正名篇 (Rectification of Names)". In this chapter, he first discussed some related problems of Chinese logic with reference to *Mule Mingxue* 穆勒名学 (Mill's *A System of Logic*). As he claimed, "Only *Zhengming pian* 正名篇 (*Rectification of Names*) in *Xunzi* (荀子) […] is similar to Mill's *A System of Logic*" (Li Miaogen 1996, 110). In his opinion, *Xunzi* contains rich and profound logical thought.

In the *Lun Zhongguo xueshu sixiang bianqian zhi dashi* 论中国学术思想变迁之大势 (*On General Tendencies in the Development of Chinese Academic Thought*) published in 1902, Liang Qichao 梁启超 (1873–1929) maintained that, compared with Greece and India, one deficit of Chinese pre-Qin scholarship is its lack of logical thought. As he wrote, "Please list the deficits of Chinese academia. One of the deficits is a lack of logic" (Liang 1999, 580). But in 1904 he radically changed his view and argued for the opposite in the chapter "Mozi zhi lunlixue 墨子之论理学 (Mozi's Study of the Rational Discourse)" in his *Mozi xueshuo* 子墨子学说 (*Doctrines of Mozi*). There he completely reinterprets *Mozi* according to Western traditional logic. As he saw it, "of all the masters, Mozi is the one who is the most steadfast in studying logic and that uses it most strictly." Liang highly praised Mozi, saying that "there is almost no place in his work where he does not apply the logical rules." "The whole book of *Mozi* applies logic" (ibid., 3186, 3191). Logic is the foundation of all Mohist doctrines, which constitute a rigorous logical system.

By interpreting Mozi through and comparing him with Western traditional logic, Liang Qichao showed that Mozi constructed Aristotelian logic. For example, Mozi's *bian* 辩 refers to "logic", *ming* 名 refers to "term", *ci* 辞 refers to "proposition", and *shi yi gu* 实意故 (one uses names to raise objects, uses sentences to transmit intentions, uses explanations to bring out reasons) refers to "conclusion" (Liang 1999, 3186f.). Liang believed that Mozi also used Baconian induction. As he claimed,

> Bacon's reputation as the founder of modern civilization is attribut-
> ed to this [induction]. During the past hundreds of years, academic

developments also have relied on it. However, as far as two thousand years ago in China, Mozi was already advocating this method and formed his own school. (ibid., 3193)

He regarded Mozi as "a great founding father of logic around the world". Liang's explanation of the *Mozi* by using Western traditional logic not only briefly introduced Aristotelian logic, but also fully affirmed the existence of logical thought in the *Mozi*. This was very significant for promoting the study of Chinese logic.

The Development of the Chinese Logic Studies

The preliminary studies of Chinese logic in the early 20th century laid a solid foundation for the development of Chinese logic as an independent academic field. By around the 1920s, a number of publications of relatively systematic studies on Chinese logical thought were being produced, including the first volume of Hu Shi's 胡适 (1891–1962) *Zhongguo zhexueshi dagang* 中国哲学史大纲 (*An Outline History of Chinese Philosophy*) and *Xian-Qin mingxueshi* 先秦名学史 (*The Development of the Logical Method in Ancient China*). When Hu Shi was studying in America, he finished his PhD dissertation in 1917, titled *The Development of the Logical Method in Ancient China*, which was published in 1922 by Shanghai Yadong Tushuguan.

Zhang Shizhao 章士钊 (1881–1973) learned logic during his studies in the United Kingdom, and taught logic at universities, including Peking University, after returning to China. His main work *Luoji zhiyao* 逻辑指要 (*Outline of Logic*), which was originally written in 1917 as lecture notes for his courses on logic at Peking University, was ultimately published in 1943. In this book, Zhang proposed that the laws of logic are the same everywhere: "Logic's name came from Europe, but logical principles apply everywhere" (Zhang 2000, 293). He further wrote that: "Pre-Qin *mingxue* and European logic are just like the two wheels of a barrow, running parallel with each other" (ibid.).

Chen Qitian 陈启天 (1893–1984), in *Zhongguo gudai mingxue lunlüe* 中国古代名学论略 (*A Brief Introduction To Ancient Chinese Logic*), clearly stated that ancient Chinese logic, Western logic and India's *yinming* 因明 were the three traditions of logic in the world. Chen changed the traditional classification of academic factions and advocated that logic is the basis for the formation and development of any academic system (Chen 1922). According to the different attitudes of scholars towards *ming* 名 (name), he divided Chinese logical thought into five major schools: Wuming Xuepai 无名学派 (nameless), Zhengming Xuepai 正名

学派 (the school of correct names), Shiyong Xuepai 实用学派 (the pragmatist school), Qilun Xuepai 齐论学派 (the school of the doctrine of equality), and Guibian Xuepai 诡辩学派 (the sophist school). The five schools have different attitudes towards *ming* and use different methods.

In 1932, *Xian-Qin bianxueshi* 先秦辩学史 (*A History of Chinese Logic in the Pre-Qin Period*) written by Guo Zhanbo 郭湛波 (1905–1990) was published. By then, the study of Chinese logical thought had attained some prominence and achieved notable results. Guo Zhanbo believed that "Gongsun Long is the master of *bianxue*". He pointed out that since Gongsun Long, every school has been influenced by "bianxue". Among them, the most successful and famous were *Mo Bian* and *Xunzi*. The studies by scholars like Hu Shi, Zhang Shizhao, and Guo Zhanbo represent the first systematic analyses of Chinese logical thought. They significantly impacted research during the 1940s, and even remain relevant today.

The Deepening of Chinese Logic Studies (1950s–1980s)

From the 1950s to the 1980s, the study of Chinese logic became more insightful. Scholars extensively and deeply discussed the research methods, objects and scope of Chinese logic that had developed in modern times. This led to the general construction and development of the history of Chinese logic as a discipline (Ju 2013, 396).

As for the issue of research methodology, the study of Chinese logic at this stage still followed the approach of using Western logic, which had been widely employed by the earlier pioneers. Thus, scholars compared theories of Western logic with ancient Chinese books to excavate similar ideas and theories. In *Mojia de xingshi luoji* 墨家的形式逻辑 (*The Formal Logic of Mohism*), for example, Zhan Jianfeng 詹剑锋 arranged the logical theories contained in the Mohist works completely in accordance with traditional Western logic (Zhan 1956, 7). In addition, some scholars believed that while doing research we should follow the principle of "Let[ting] the *Mojing* annotate itself" (Shen 1992, 300f.). Wang Dianji 汪奠基 also suggested we should understand the characteristics of the occurrence and development of ancient Chinese logical theories based on a general understanding of the history of logic, which will clarify the research scope of the history of Chinese logic (Wang Dianji 1957).

As for the object of study, most scholars agree that the history of Chinese logic is mainly the history of formal logic. For example, Zhan Jianfeng's *Mojia de xingshi luoji* clearly indicates that the object is the formal logic of Mohism. Wen Gongyi

温公颐 pointed out in the *Xian-Qin luojishi* 先秦逻辑史 (*The History of Pre-Qin Logic*) that "the history of Chinese logic should be dominated by the scope of common logic, that is, formal logic" (Wen 1996, 261). Zhou Wenying 周文英 made a similar comment:

> That 'logic' refers to the formal logic (or common logic) is commonplace. Therefore, it should be understandable that when speaking of the history of logic in general, we mean the occurrence and development of formal logic. (Zhou 1982, 9)

The preface of *The History of Chinese Logic* (five volumes), mainly edited by Li Kuangwu 李匡武, clearly expresses that

> This book is limited to the history of formal logic. Though it also involves some problems of the philosophy, language, and scientific methodology, which are directly related to the development of formal logic. We discuss them neither specially nor comprehensively. (Li et al. 1989, 1)

As for the scope of Chinese logic research, Ouyang Zhongshi 欧阳中石 stated that in this context "Chinese" has two distinctive meanings: one refers to the history of the creation and development of logic by the ancient Chinese people, with its distinct national characteristics; the other refers to the history of all forms of logic in China. He advocated the latter understanding, and pointed out:

> That is, all the logic that has occurred, developed, spread and had an influence on this land should be included. Even if it is imported from other countries, there must be a matter of importation, acceptance, transmission, and even integration and development, all of which should be incorporated in the research scope of the history of logic in our country. (Ouyang 1982, 118)

In addition, he criticized the idea of limiting "logic" to common logic. He advocated that logic should be understood by "the union of rules and forms that are general, primary, and universally valid to all human beings", which is necessary for understanding Aristotelian logic. He further suggested that this is "the real and main research object of the history of Chinese logic" (ibid., 119). Moreover, because of the lack of specialized logical treatises in ancient China, the study of the history of Chinese logic needs to draw logical ideas from the applications of logic, such as, the history of philosophy and the history of science (ibid., 120). In this regard, Ouyang Zhongshi's broadminded view expanded the scope of research on Chinese logic.

The focussed discussion on the research methods, objects and scope of Chinese logical thought at this stage profoundly influenced the subsequent research on Chinese logical thought, serving as an important foundation.

Reflection and Development (1990s–)

During the period of the study of Chinese logic since the 1990s, research surpassed the previous stages in both breadth and depth, giving rise to diverse topics of debate. The following paragraphs highlight three important cases.

First, there was further discussion on whether there is indeed such a thing as Chinese logic. Since the study of Chinese logic began in the early 20th century, there has been an unending debate about whether Chinese logic even exists. However, the criteria used in this debate is based on the system of Western traditional logic. In the *Luojixue de chuanru yu yanjiu* 逻辑学的传入与研究 (*Introduction and Study of Logic* (2005)), Song Wenjian 宋文坚 outlined the different viewpoints on the study of Chinese logic, especially those concerning the debate between the "affirmative theory" and the "negative theory". As he pointed out,

> Those who hold the affirmative theory would say that pre-Qin *mingbian* 名辩 is logic, if not formal logic. Surely the proponents of the negative logic would ask, would it not be better to start a new branch of study and promote it as a better *bianxue* 辩学? (Song 2005, 408)

Song Wenjian believes that this debate does not lead to anything. Zhai Jincheng 翟锦程 holds that in the study of Chinese logic we should start from the general characteristics of logic, examine the idea of proof in ancient Chinese literature with the concept of logic as a way to explore ancient Chinese logic theories and doctrines (Zhai 2007).

Second, there have been studies in general intellectual history that pay attention to Chinese logic. Research in this vein has explored the interactive relationship between Chinese thought and logic. It embodies the deepened study of the history of Chinese thought and also reflects on the trend of studying Chinese logic from a much broader perspective. The *Zhongguo xueshu shi* 中国学术史 (*Chinese Academic History* (2002)) by Zhang Guogang 张国刚 and Qiao Zhizhong 乔治忠, for instance, specifically discussed "the thought of *mingbian* and *mobian*." The first volume of *Xifang zhexue dongjian shi* 西方哲学东渐史 (*Western Philosophy Spreading to China* (2006)) by Huang Jiande 黄见德 explained how Western logic was introduced into China. *Zhongguo gudai sixiang shi* 中国古代思想史

(*The History of Ancient Chinese Thought* (2006), six volumes), edited by Zhu Dawei 朱大渭, also discussed problems related to Chinese logic. Finally, Ma Tianxiang 麻天祥, in the *Zhongguo jindai xueshu shi* 中国近代学术史 (*Academic History of Modern China* (2007)), discussed a series of important logical problems in modern China. Monographs on the history of thought published in recent years have attached immense importance to Chinese logical thought, which indicates that both the depth and breadth of the study of the history of thought have greatly expanded, and that the focal research issues have increasingly deepened. It also implies that the influence of Chinese logical thought on Chinese thought in general has been more and more thoroughly explored.

Third, in this period two tendencies of related to research perspective can be distinguished: one explains Chinese logical thought by means of Western theories, the other emphasizes the mutual relationship and interaction between logic and culture. The Western theories here refer to modern logic, semiotics, informal logic, etc. Wang Lu 王路, for instance, maintains that,

> Learning modern logic will not only enable us to master the methods of modern logic, but also broaden our vision of logic, so that we can better understand and grasp the object of logic as a discipline, and understand its nature more deeply. Only on this basis can the study of Chinese logic history achieve a higher level. (Wang Lu 2016, 232)

As for semiotics and Chinese logic, Li Xiankun 李先焜 argued that ancient Chinese logic, which features lots of pragmatics and semantics, falls in the scope of semiotics. He thus suggests that studying logic with semiotics benefits both topics (Li Xiankun 2017, 297–99).

The cultural characteristics of Chinese logic would inevitably be ignored if studied with traditional logic, modern logic or even semiotics. For this reason, some Chinese scholars recognize that ancient Chinese logic should be studied within the context of ancient Chinese history. For example, Cui Qingtian 崔清田 believes that,

> In studying *mingxue* (名学) and *bianxue* (辩学), we should note that they are part of ancient Chinese culture, and so analyze them historically and interpret them culturally. Only then can we correctly reveal the characteristics and intellectual history of naming and dialectics, and faithfully analyze the status, with explanations, of the existence and development of logic in ancient China. (Cui 1997)

The Study of Chinese Logic in English

Before 1950, some Western scholars began to produce studies related to Chinese logic. For example, Alfred Forke published, from 1901 to 1902, a series of articles that together were titled "The Chinese Sophists: Complete Translations of Teng Hsi-Tzu, Hui-tzu and Kungsun Lung-Tzu". This is the first time that a Western scholar translated the theories of the School of Names (*Mingjia* 名家) and made a preliminary analysis of their views. Although this series of articles were only oversimplified translations, they were a fine beginning to Western scholars' efforts to understand Chinese logic.

The period from 1950 to 1980 was the initial stage of the study of Chinese logic in the Western academic world, with *Baima Lun* 白马论 and *Zhiwu Lun* 指物论 as the main research objects. The research methods in these years showed a trend toward a diversification of ideas about Chinese logic.

The main works of this period include Graham's "Being in Western Philosophy Compared with Shih/Fei and Yu/Wu in Chinese Philosophy" (Graham 1951), Mei Yi-pao's "The Work of *Kung-sun Lung Tzu* (公孙龙子), with a Translation into English" (Mei 1953), and Cheng Chung-Ying's "Inquiries into Chinese Traditional Logic" (Cheng 1965). These efforts raised the questions of the methodology and the direction of the research on Chinese logic, formally establishing a framework for its study in the Western academic world and laying a solid foundation for the vigorous development of further research.

Other relevant publications include Cheng Chung-Ying and Richard H. Swain's "Logic and Ontology in the *Chih Wu Lun* of Kung-Sun Lung Tzu." (Cheng and Swain 1970), Cheng Chung-Ying's "Aspects of Classical Chinese Logic" (Cheng 1971), Chad Hansen's doctoral dissertation "Philosophy of Language and Logic in Ancient China" (Hansen 1973), Kao Kung-yi and Obenchain Diane's "Kung-Sun Lung's *Chih Wu Lun* and Semantics of Reference and Predication" (Kao and Obenchain 1975), Chad Hansen's "Mass Nouns and 'a White Horse is not a Horse'" (Hansen 1976), Anton Dumitriu's *History of Logic* (Dumitriu 1977), and Graham's *Later Mohist Logic, Ethics and Science* (Graham 1978).

The period from 1980 to 1995 was the developmental stage of the study of Chinese logic in the West. The main works of this period include Fred Rieman's "Kung-sun Lung, Designated Things, and Logic" (Rieman 1980), Chad Hansen's *Language and Logic in Ancient China* (Hansen 1983), Benjamin Isadore Schwartz's *The World of Thought in Ancient China* (Schwartz 1985), Graham's *Disputers of the Dao: Philosophical Argument in Ancient China* (Graham 1989), Christoph Harbsmeier's "The Mass Noun Hypothesis and the Part-Whole Analysis of the White

Horse Dialogue" (Harbsmeier 1991), and Lucas Thierry's "Hui Shih and Kung Sun Lung: An Approach from Contemporary Logic" (Thierry 1993).

The content of Hansen's *Language and Logic in Ancient China* covers almost all the main objects of research in Chinese logic, such as Gongsun Long, later Mohists, Confucianism, and so on. The major feature of the book is analysing ancient Chinese language and logic through a comparison of Chinese and Western methods of thought (Hansen 1983). Based on the arguments of ancient Chinese scholars, Graham's *Disputers of the Dao: Philosophical Argument in Ancient China* comprehensively explained the philosophical thought of various schools in the pre-Qin period from the standpoint of Western scholars (Graham 1989).

Since 1995 we have seen a deepening in the study of Chinese logic in the Western academic world. The main works of this period include Harbsmeier's "Language and Logic in Traditional China" (Harbsmeier 1998); the first part of the seventh volume of *Science and Civilisation in China* edited by Joseph Needham; David L. Hall and Roger T. Ames's *Thinking from the Han: Self, Truth, and Transcendence in Chinese and Western Culture* (Hall and Ames 1998); the collection of essays *New Terms for New Ideas: Western knowledge and lexical change in late imperial China* compiled by Michael Lackner, Iwo Amelung and Joachim Kurtz (2001); and Joachim Kurtz's *The Discovery of Chinese logic* (Kurtz 2011). All these studies represent a deepening of the research on Chinese logic that expands out from the old singular approach to explore the topic in light of multiple perspectives like history, philosophy, linguistics, and terminology.

It is worth mentioning that after the publication of the eleven-volume *Handbook of the History of Logic* co-edited by Dov Gabbay and John Woods (2004), Klaus Glashoff commented that the handbook is "the first book in a series of several large volumes on the history of logic" (Glashoff 2004, 579), but it "does not contain any information on the only logic which is based on a non-Indo-European language: Chinese logic" (ibid.). As Glashoff noted, "the absence of a chapter on Chinese logic in the *Handbook of the History of Logic* must be considered as a lost opportunity" (ibid., 583), and this opportunity, as with Indian logic, is an opportunity to reflect on Western logical concepts and traditions (Zhai 2007, 37).

Acknowledgement

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SPECIAL ISSUE
HISTORY OF LOGIC IN CONTEMPORARY CHINA

Theoretical Specializations and
Technological Applications

Ten-Year History of Social Network Logics in China

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Abstract

The paper presents a ten-year history of social network logics in China. It tells the story of how this new research area was started, how its research agenda was extended, and, in particular, how a focus on graph games developed. Important ideas and research results are summarized, with an emphasis on the connections between them. An important aspect of this history is the successful collaboration between Chinese and international researchers.

Keywords: social network logics, peer pressure, graph games, dynamics, consensus

Desetletna zgodovina logike družbenih omrežij na Kitajskem

Izvleček

Članek predstavlja desetletno zgodovino logike družbenih omrežij na Kitajskem. Pripoveduje zgodbo o tem, kako je to novo področje nastalo, kako se je potem širil njegov osnovni raziskovalni program in, še posebej, kako je znotraj področja vzniknil fokus na igre z grafi. Članek povzema pomembne ideje in rezultate raziskav, s posebnim poudarkom na povezavah, ki obstajajo med njimi. Pomemben vidik te zgodovine pa predstavlja uspešno sodelovanje med kitajskimi raziskovalci in njihovimi kolegi v mednarodnem prostoru.

Ključne besede: logika družbenih omrežij, vrstniški pritisk, igre grafov, dinamika, konsenz

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How Social Network Logics Got Started

In 2010 Jeremy Seligman, a logician at the University of Auckland, was spending two months of his sabbatical at Tsinghua University in Beijing, teaching a seminar on "situation theory and channel theory", and he had several research discussions with his host Fenrong Liu. Both of them were trained in modern logic, but they shared a strong interest in Chinese philosophy. The question they asked back then was: Can we develop a logic with features that are important to reasoning in the Chinese tradition? In other words, can we incorporate some interesting notions of Chinese philosophy in modern logic? For instance, Confucianism has profound ideas about social roles, relationships, and hierarchy that have influenced the nation and its people for many years. Certainly, they play a role in people's reasoning and social interactions. This led to their first joint paper "Logic in the Community", which was also written with Patrick Girard, a colleague of Seligman's at Auckland (Seligman, Liu and Girard 2011).

The paper "Logic in the Community" was written much like a research proposal, laying out the problems that the authors wanted to study in the following years. It started with a section "Reasoning About Social Relations" with a description of this project (ibid., 178):

> Communities consist of individuals bounds together by social relationships and roles. Within communities, individuals reason about each other's beliefs, knowledge and preferences. Knowledge, belief, preferences and even the social relationships are constantly changing, and yet our ability to keep track of these changes is an important part of what it means to belong to a community. In the past 50 years, our patterns of reasoning about knowledge, beliefs and preferences have been extensively studied by logicians, but the way in which we are influenced by social relationships has received little attention.

From the above, a rough picture of social network logic emerges. It is built up on the tradition of modal logic, but with a new focus on people and their social relationships. In addition to dynamic logics for reasoning about knowledge, beliefs and preferences, social network logic introduces a second dimension, social relation, to the framework. The paper highlighted many intriguing issues such as "Facebook friends", "deference to expert opinion", "peer pressure", "community norms", etc. It also gave the building blocks of a two-dimensional approach: one dimension standing for each person's epistemic space—the range of situations (or "worlds") that person considers possible; the second for each person's community—those other people with whom they may have closer or more remote social relationships.

An outline of social network logic, or, more specifically social *epistemic* logic, will be given in the next section. In third and fourth section and, we will review subsequent research on this logic. Fifth section will consider a number of closely related research directions, and the penultimate section introduces the main results of a newer direction inspired by the study of games. In the last section, we will briefly discuss research on social network logic internationally and then conclude this work.

Introducing a Social Dimension to Epistemic Logic

Epistemic logic involves the addition of a modal operator K to standard propositional logic, with the formula $K\varphi$ interpreted either as "I know that φ" or the more objective "it is known that φ". Growing from the work of the pioneering logicians of the early 20th century, such as Rudolph Carnap and Arthur Prior, the seminal paper on epistemic logic was by G. H. Von Wright (1951). It was first given book-length treatment in Jakko Hintikka's *Knowledge and Belief: An Introduction to the Logic of the Two Notions* (1962). Much of the early work focused on logical validities involving the K operator. Since knowledge implies truth, it was standard to regard $Kp \rightarrow p$ as valid, but the "introspective" principles that something known is known to be known ($Kp \rightarrow KKp$) or that something unknown is known to be unknown ($\neg Kp \rightarrow K\neg Kp$) were more contentious. The similar operator of belief, B, was naturally distinguished by different logical properties.

In the 1980s and 1990s interest in epistemic logic accelerated and expanded largely because of its relevance to computer science and the representation of "knowledge" in software. An important development was the indexing of the knowledge operator with the name of the knower: $K_a\varphi$ is then interpreted as "a knows that φ". Because of application to computer systems, the knowers were referred to more generally as "agents", and that is the terminology we will use here.

A formal semantics for epistemic logic can be given in the style of Kripke. A set W of points (usually called "worlds") represents the different ways the relevant facts could be, not only objective facts about objects and their properties, but also epistemic facts about who knows what. This representation is achieved through a function V mapping propositional variables to subsets of W and a binary relation R between the points of W. $V(p)$ is interpreted as the set of worlds in which p is true and Ruv is interpreted as meaning that in world u, the knower has not yet ruled out v as an epistemic possibility. In other words, the agent does not know whether she is in world u or world v (or any of the other worlds in the R relation to u). Together these elements comprise an *epistemic model* $M = \langle W, R, V \rangle$. Typically, further constraints are imposed on the R relation: reflexivity, transitivity

and sometimes symmetry. A recursive definition of a *satisfaction* relation between models, worlds and formulas is then defined as follows:

$M, w \vDash p$ iff $w \in V(p)$

$M, w \vDash \neg\varphi$ iff $M, w \nvDash \varphi$

$M, w \vDash (\varphi \wedge \psi)$ iff $M, w \vDash \varphi$ and $M, w \vDash \psi$

$M, w \vDash K\varphi$ iff $M, v \vDash \varphi$ for each v such that Rwv

Here $M, w \vDash \varphi$ is read "w satisfies φ in M" and this is interpreted to mean that φ expresses a proposition that would be true in the world represented by w in model M. So, for example, if $M, w \vDash (p \wedge \neg Kp)$ then w represents a world in which p is true but not known to be true. A formula is logically valid only in cases when it is satisfied by every world in every model. And that's where the restrictions on R come in. In order for $Kp \rightarrow p$ to be logically valid, the relation R must be reflexive. This is standard material in the study of modal logic, much of which will be assumed in what follows. (Readers unfamiliar with modal logic should consult a suitable textbook, such as Blackburn, de Rijke and Venema 2002).

The extension to "multi-agent" epistemic logic, with an operator K_a for each agent a of a given set A is straightforward. The models $M = \langle W, R, V \rangle$ now consist of a family of relations R_a, one for each agent a, and the satisfaction definition is almost identical:

$M, w \vDash K_a\varphi$ iff $M, v \vDash \varphi$ for each v such that $R_a wv$

Nonetheless, multi-agent epistemic logic is considerably more interesting than its single-agent ancestor. That's because it is possible to express "higher-order" epistemic facts: what one agent knows about what another agent knows, or doesn't know. For example, $K_a \neg K_b p$ represents a's knowing that b does not know that p. Moreover, extensions of the language allow reasoning about what is *commonly known* to a group of agents (Fagin et al. 2004) and the addition of a range of model-changing "dynamic" operators extends all this to the logic of how knowledge changes under various acts of communication (Baltag, Moss and Solecki 1998).

It is with this background of research in epistemic logic that the development of social network logic, and specifically the social epistemic logic of Seligman, Liu and Girard (2011) must be seen. The innovation of that paper was to add a new dimension to the models: the social dimension. Instead of evaluating formulas based on worlds, the new idea is to evaluate them on pairs (w, a) consisting of a world w and an agent a. In this new system, a formula expresses an "agent-indexical" proposition: the satisfaction of φ by the pair (w, a) is interpreted to mean that φ is true in w from the point of view of agent a. For example, take p to express

the agent-indexical proposition "I'm in danger". Then $M, w, a \vDash p$ is interpreted to mean that in world w, agent a is in danger. The definition of satisfaction given earlier is thus subtly modified to this two-dimensional setting:

$M, w, a \vDash p$ iff $(w, a) \in V(p)$

$M, w, a \vDash \neg\varphi$ iff $M, w, a \nvDash \varphi$

$M, w, a \vDash (\varphi \wedge \psi)$ iff $M, w, a \vDash \varphi$ and $M, w, a \vDash \psi$

$M, w, a \vDash K\varphi$ iff $M, v, a \vDash \varphi$ for each v such that $R_a wv$

Notice in particular the last clause, for K. There is now no need to index the K operator: the relation of knowledge to a knower is a consequence of using agent-indexical propositions.

This logical shift was accompanied by two main additions to the language. The first is an operator F which corresponds to a relation S between agents, that is, a *social* relation. As in Seligman, Liu and Girard (2011), we will interpret this as the "friendship" relation, although this stands as proxy for any number of social relationships, or indeed any relation between people. (Later applications involve taking F to be the "seeing" relation.) The interpretation of formulas using F is probably best understood by contrast: with p interpreted as above ("I'm in danger"), KFp means that I know that all my friends are in danger, whereas FKp means that all my friends know that they are in danger. The De Morgan dual of F (i.e., $\neg F\neg$) is written $\langle F \rangle$, so that $\langle F \rangle p$ is interpreted to mean that I have a friend who is in danger. The clause in the definition of satisfaction corresponding to F is the following:

$M, w, a \vDash F\varphi$ iff $M, w, b \vDash \varphi$ for each b such that $S_w ab$

As you can see, the "relation" S is in fact a family of relations, S_w, for each w in W. That's because social facts may vary between worlds, or, in other words, they may be known by some agents but not by others.

The second addition concerns the reference to agents. In standard epistemic logic, there is no need to distinguish between agents and their names. In fact, it cannot be done. The agents are only represented syntactically, as indices to the K operator. In the models of social epistemic logic, however, they are "in the model" and so a distinction can be made. The language is therefore enriched to contain a number of ways of managing references to agents:

(a) There are names n, m, etc. which refer to agents, but need not do so rigidly: they may refer to different agents in different worlds, so allowing for the ignorance about who is named what. In fact, no

distinction is made between the name *n* and the agent-indexical proposition "I am *n*", so, for example, ⟨*F*⟩*n* means that *n* is my friend.

(b) Names are also used to shift perspective, as indices to a new operator: @$_n$*φ* means that the agent-indexical proposition expressed by *φ* holds not of me but of the agent named *n*. So, for example, @$_n$*Kp* means that *n* knows that *p* (the same as K_n*p* in standard epistemic logic).

(c) Variables are also used to refer to agents, in a way that can be bound to the indexical subject of the proposition (just like the first-person pronoun in natural language). This is done with the "down-arrow" operator. ↓*x*.*φ* is interpreted just like *φ* but with any free variable *x* it contains acting as a name for the indexically determined agent.

All three of these referential devices are adaptations from hybrid logic (Blackburn and Seligman 1996), an extension of modal logic using ideas originally developed by Arthur Prior and later reinvented in many places. Together they determine a richly expressive language in which many propositions about the social and epistemic properties of agents can be stated.

There are a number of equivalent ways of implementing the semantics. Here we choose one that is hopefully easy to understand. Since the agent names are a special kind of propositional variable, we allow the valuation *V* to determine for each name *n* a set of world-agent pairs, with the interpretation that (*w*, *a*) is in *V*(*n*) just in case *n* refers to *a* in world *w*. (And so there is a restriction on *V* that there is a unique *a* such that (*w*, *a*) is in *V*(*n*).) With this in place, satisfaction for names and the @ operator is defined as follows:

$M, w, a \vDash n$ iff $(w, a) \in V(n)$

$M, w, a \vDash$ @$_n$*φ* iff $M, w, b \vDash φ$ for the unique *b* such that $(w, b) \in V(n)$

The handling of variables also presents alternatives, just as for predicate logic. Here, mainly for completeness of this introduction, we will follow the standard approach of using an *assignment function g* as a parameter to the definition of satisfaction. The assignment function assigns agents to variables, and can be altered using the ↓ binder:

$M, g, w, a \vDash x$ iff $g(x)=a$

$M, g, w, a \vDash$ ↓*x*.*φ* iff $M, g', w, a \vDash φ$ where $g'(y) = a$ if *y*=*x*; $g(y)$ otherwise.

(The *g* must of course be added as a parameter to all the above clauses.)

This completes the outline of social epistemic logic, as conceived in Seligman, Liu and Girard (2011). We have not covered details of the intended areas of

application, but many of them will be covered in what follows. In the next section we will focus on developments of this logic by the authors of that paper and their students, as a result of research collaborations mostly conducted in China, but also as a result of Chinese students studying overseas.

The Development of Social Epistemic Logic

Shortly after "Logic in the Community", Liu, Seligman and Girard turned to dynamic extensions of social epistemic logic. These has been sketched briefly in the 2011 paper, but received more attention at the 2013 TARK conference: "Facebook and the Epistemic Logic of Friendship". In dynamic epistemic logic (DEL), the then standard approach to the epistemic logic of communication, communicative actions are modelled as operations that change the structure of the epistemic models, typically by adding and removing worlds and links in the R relation. This captures both the effect of the communication on the epistemic states of the agents, updating those who receive it, as well as the additional uncertainty created for those agents who did not, or who have only partial knowledge of who did. The central concept of the TARK paper is the *social announcement*. This is an action that accommodates the agent-perspectival aspects of communication, from the points of view of both the sender and receiver. The 'friendship' relation is taken as the channel. For example, I might broadcast to my friends that I am in danger. This is indexical information about me (from my perspective), sent to my friends whose knowledge is thereby updated with non-indexical information about me ("he is in danger"). Various kinds of social announcement were defined in the paper, and these were modelled using a powerful extension of DEL developed by the authors elsewhere (Girard, Liu and Seligman "General Dynamic Dynamic Logic" (2012)). Operators for changing social relationships, such as dropping and adding friends, were also considered, as were indexicalized variants of the concept of common knowledge, and the dynamics of questions and answers.

Meanwhile, some of the basic work on social epistemic logic was yet to be done. In particular, there was no complete axiomatization. In early conversations in Beijing, Katsuhiko Sano, a researcher from Japan's Advanced Institute of Science and Technology, had indicated a strong connection with his own work on two-dimensional modal logic (Sano 2010). This led to his producing a proof system for social epistemic logic (without ↓) using an extension of Gentzen's sequent calculus called "hypersequents" and its decidability, which was published much later (Sano 2017). Christoff, Hansen, and Proietti (2016) also produced a proof system for a very similar logic using tableaux. But work on a standard axiomatization of the logic was

started by Zhen Liang, who moved from China's Southwest University to the University of Auckland for doctoral work under Seligman's supervision. He produced an axiomatization for the full language (including ↓) and a proof of its completeness, announced in Liang (2017) and with full details in his dissertation, Liang (2020).

We won't dwell on the technicalities of Liang's proof here, but it is worth giving a quick glimpse under the hood to reveal a further China connection. A standard approach to proving the completeness of axiomatizations of modal logic is to construct a single (huge) model for the language, within which every other model can be either found as a part, or extracted from a part. The huge model is called the "canonical model". For various interesting reasons explained in Liang's dissertation, construction of a canonical model for social epistemic logic was fraught with difficulty. Instead, he adapted a technique developed much earlier by a well-known Chinese logician, Ming Xu (1988). Xu's approach to proving the completeness of axiomatizations of certain temporal logics was to construct models in stages, step-by-step, and this technique also proved fruitful for Liang's axiomatization of social epistemic logic, although further complications arise in the case of ↓. A canonical model proof was eventually given by Saúl Fernández González (Balbiani and González 2020; González 2021).

Liang's dissertation also contains a new area of application of social epistemic logic, in which the social relation S is interpreted as the "seeing" relation. This allows the logical analysis of interesting problems and scenarios involving the interaction of knowledge and perception in a social setting. (One such example is the phenomenon of *pluralistic ignorance*.)

Meanwhile, further progress on the logic of social announcement was made by Zuojun Xiong, another former student of Southwest University. In a collaboration with Thomas Ågotnes, of the University of Bergen, Jeremy Seligman and Rui Zhu, another Chinese student then working on a PhD in Auckland, he studied the logic of an *arbitrary social announcement* operator $\langle a \rangle \varphi$, meaning that φ holds after agent a makes some announcement of something he believes to all of his "friends". The results were published as Xiong et al. (2017) and were later extended substantially in his doctoral dissertation (Xiong 2017), supervised by Ågotnes. Zhu also went on to develop this logic further in his dissertation (Zhu, forthcoming) supervised by Seligman.

From High- to Low-level Rationality

While the initial exploration of logics based on social relations concerned knowledge, the two-dimensional framework is only suitable for studying other cognitive

attitudes, such as belief and preference. Inspired by Liu's early work on the logic of preference change (Liu 2008; 2011), Zhen Liang adapted social epistemic logic to reason about preferences to help in understanding a well-recognised sociological phenomenon: peer pressure. This was while he was still a master's student in Southwest University, Chongqing, and thus before beginning his doctoral studies. During Seligman's visit to that university, they discussed his work and this led to a collaboration in which they modelled peer pressure using a preference-change operator that is sensitive to social relationships. Depending on the preferences of their "friends", an agent would be under stronger or weaker forms of suggestion. A weak suggestion of α over β would make them lose any preference for β, but a strong suggestion would make them prefer α. Although these changes were modelled as high-level deliberations (using a similar mechanism to the ones used in DEL for epistemic change), analysis of the models showed that the resulting dynamics could be modelled in a much simpler way, using *network automata*. A network automaton is a social network (the graph S) with a finite state machine running at each node. In "A Logical Model of the Dynamics of Peer Pressure", Liang and Seligman give the following network automaton responsible for their model of peer pressure (Liang and Seligman 2011, 282–83):

Y	$(\alpha > \beta)$	preference for α over β
N	$(\alpha < \beta)$	preference for β over α
I	$(\alpha = \beta)$	indifference concerning β and α
O	$(\alpha \neq \beta)$	conflicted preferences about β and α
SY	$F Y \wedge \langle F \rangle Y$	my friends strongly suggest Y
SN	$F N \wedge \langle F \rangle N$	my friends strongly suggest N
WY	$F(I \vee Y) \wedge \langle F \rangle Y \wedge \langle F \rangle I$	my friends only weakly suggest Y
WN	$F(I \vee N) \wedge \langle F \rangle N \wedge \langle F \rangle I$	my friends only weakly suggest N
Z	$\neg(SY \vee SN \vee WY \vee WN)$	my friends have no suggestion
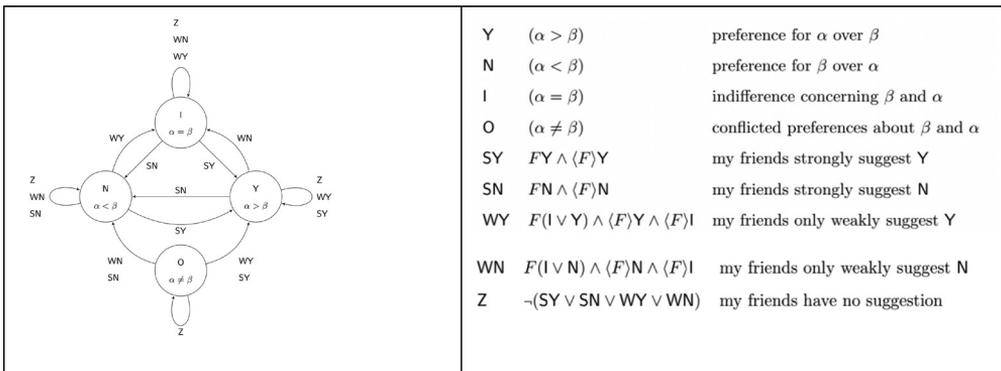
One nice consequence of a network automaton model of a social phenomenon is that it is often possible to analyse its asymptotic behaviour: whether preferences will eventually stabilize, fragment or enter some oscillating pattern. The paper provided examples of such an analysis.

Soon after, network automata were used directly to model the dynamics of belief change under a similarly structured but more abstract model of social influence. In "Logical Dynamics of Belief Change in the Community" (2014) Liu, Girard and Seligman used the following automaton to characterize the dynamics of strong and weak influence on belief. Here *Wp* means that the agent is being weakly

influenced to believe p, and Sp means that they are being strongly influenced. The arrows show under what conditions they will transit from believing that p (Bp) to being undecided about p (Up) to believing that p is false ($B\neg p$). Various kinds of influence are discussed, as is the impact of changes to the underlying social relation.
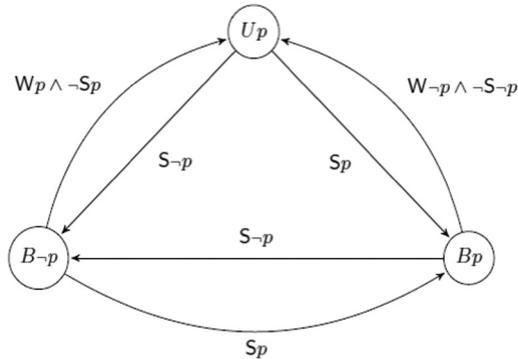
Another issue studied in the paper is the *object* of influence. At one extreme there is influence exerted on a specific opinion, such as the truth of a given proposition p. At the other is influence exerted on credence comparisons in general. It may be that a very small influence on one's relative credence judgements is sufficient to sway one toward or away from a particular belief; or, it may be that a very large influence is insufficient.

The use of network automata to model rational activity such as a change in belief is a little controversial among logicians. Logic is traditionally regarded as a purely normative discipline. We model the path of careful deliberation, aimed at truth. Models of social influence by network automata apparently lack this normative function. Or so the criticism goes. And yet we live in communities and are typically greatly influenced in our opinions by others. Not every decision we make is done so entirely on the weight of evidence available to us. And some mechanisms for propagating that influence are better than others—better in a normative sense. This contrast between the norms of individual deliberation and social mechanism are an example of what Brian Skyrms (2014) calls 'high' and 'low' rationality. At the level of personal psychology we have the capacity to respond to both, and it is the flexibility of humans to know when to deliberate and when not to that is one of our greatest strengths. Daniel Kahneman famously calls this the distinction between "thinking slow" and "thinking fast". For a more well-developed and extensive discussion of this issue, see van Benthem, Liu and Smets (2021).

An Expansion of the Research Agenda

Further work on social network logic in China was greatly assisted during the period 2017–2020 by a project funded by the Chinese Research Foundation for Philosophy and Social Sciences, whose principal investigators were Fenrong Liu, Johan van Benthem, Jeremy Seligman, Beishui Liao and Xinwen Liu. The project gathered about 25 Chinese and international researchers or students as participants tackling various issues in the area. In addition to following up on issues raised by previous research, new perspectives were developed, most notably that of game-playing by van Benthem. This will be reviewed in the next section. In what follows, we review a few of the other new topics.

Starting with the connection between evidence and belief in social settings, Fenrong Liu and Emiliano Lorini in their paper "Reasoning about Belief, Evidence and Trust in a Multi-agent Setting" (2017) studied how an agent accumulates evidence in support of a given fact φ from other agents, and how the body of evidence in support of φ can become a reason to *believe* φ. The paper provided a logic of the interplay between evidence and trust, and between evidence and belief. The new logic supports reasoning about an agent's belief formation and belief change due to new evidence. From this perspective, an agent is, by definition, social: she is connected to other agents and communicates by receiving information from them and passing information to them. *Trust* is a necessary condition for an agent to accept the information provided by another agent. A central assumption of the logic is that, to form a belief that a certain fact φ is true, an agent is sensitive to the following two aspects a) the *amount* of evidence in support of φ, and b) the *ratio* of evidence in support of φ to the total amount of evidence in support of either φ or its negation.

In standard multi-agent epistemic logic, agent names are implicitly assumed to be common knowledge. That's because the in the formula $K_a\varphi$, meaning that agent a knows that φ, the a is a *rigid designator*; it has the same denotation in every epistemic alternative. This is unreasonable in certain social settings. Yanjing Wang and Jeremy Seligman started their paper "When Names Are Not Commonly Known: Epistemic Logic with Assignments" with the following intriguing scenario (Wang and Seligman 2018, 611):

> One dark and stormy night, Adam was attacked and killed. His assailant, Bob, ran away, but was seen by a passer-by, Charles, who witnessed the crime from start to finish. This led quickly to Bob's arrest. Local news picked up the story, and that is how Dave heard it the next day, over breakfast. Now, in one sense we can say that both Charles and Dave

> know that Bob killed Adam. But there is a difference in what they know
> about just this fact. Although Charles witnessed the crime, and was able
> to identify the murderer and victim to the police, he might have no idea
> about their names. If asked "Did Bob kill Adam?" he may not know. Yet
> this is a question that Dave could easily answer, despite not knowing who
> Adam and Bob are, he is very unlikely to be able to identify them in a
> line-up.

The distinction between these *de re* and *de dicto* readings of 'Charles knows that Bob killed Adam' is hard to make in standard epistemic logic. The paper proposed an extension of epistemic logic using a combination of non-rigid names, rigid variables and assignment operators of the form $[x{:=}a]\varphi$, meaning that φ holds after x is assigned the agent named by 'a'. For example, $[x{:=}b]K_c\mathrm{kill}(x,a)$ attributes the knowledge that Bob killed Adam without the implication that Charles knows who Bob is. The main technical result is a complete axiomization of this logic over S5 models.

Chenwei Shi in his recent paper "Collective Opinion as Tendency towards Consensus" (2021) studied the formation of collective opinions on social networks. The paper highlighted social influence with a nice quote from the book *Propaganda* written by Edward L. Bernays in 1928, "We are governed, our minds are molded, our tastes formed, our ideas suggested, largely by men we have never heard of". The paper made a distinction between a global perspective on the diffusion of opinions as a group process and a local agent-driven one. The main ideas can be summarized below, again cited from the paper (Shi 2021, 594):

> First, collective opinion is a *tendency toward convergence*. The paper models this view of opinion diffusion as a Markov process and understand a group's collective opinion as a high chance of reaching consensus.

> Secondly, the *influence structure of a group*, more precisely, how each group member is influenced by others, is the only crucial determinant of long-term opinion behavior, whether toward convergence or otherwise.

The main technical result is the discovery of structural conditions under which group opinion converges.

In "Reasoning and Making Predictions about Agent's Behaviors in Social Networks", Liu and Seligman (2018, in Chinese) distinguished two modes of social influence: one-direction influence, and mutual influence. In the former setting, the paper shows that by derivations in a logical calculus we can foresee the diffusion of certain behaviours, hence a prediction can be made. In the latter setting,

two notions of stability are defined, which are of use when we want to make predictions on the spread of certain behaviours: an agent's behaviour is *stable* if she does not change her behaviour given any new influence; a network *stabilizes* if every agent is eventually stable.

In social psychology, there are many ways of analysing of social networks. One of those, Balance Theory, describes a signed network that has two relationships: positive ("friends") or negative ("enemies"). To connect such network analysis with research in logic, Zuojun Xiong and Thomas Ågotnes in their paper "On the Logic of Balance in Social Networks", developed a modal logic for reasoning about the structural properties of such social networks. The class of social networks is balanced to a certain degree *n* if there are no cycles of length up to *n* with an odd number of negative relationships. They completely axiomatized the class of all fully balanced complete signed social networks, i.e., networks where everyone is connected with everyone else (Xiong and Ågotnes 2020).

In the same direction, Yi Wang with his collaborators Wiebe van der Hoek and Louwe B. Kuijer studied social network logic and its connection with the balance theory. In their paper "Who Should Be My Friends? Social Balance from the Perspective of Game Theory" (2019) they defined *balance games*, which describe the formation of friendships and enmity in social networks. The interesting result they show is that if the agents give high priority to future profits over short term gains, all Pareto optimal strategies will eventually result in a balanced network, and if they prioritize short term gains over the long term, every Nash equilibrium eventually results in a stable network that might not be balanced (van der Hoek, Kuijer and Wang 2019). In a follow-up paper "Logics of Allies and Enemies: A Formal Approach to the Dynamics of Social Balance Theory", they combine social balance theory with temporal logic to obtain a Logic of Allies and Enemies (LAE), which can describe the dynamical changes of a social network due to social pressure, and they show that both model checking and validity checking of LAE are PSPACE-complete (van der Hoek, Kuijer and Wang 2020).

The Graph Game Logic Approach

In 2017, Johan van Benthem, Jeremy Seligman, Dag Westerståhl (Stockholm) and Martin Stokhof (Amsterdam) were appointed as Jin Yuelin Professors at Tsinghua. They share the same position, and each of them visits Tsinghua for 2–3 months every year, teaching courses and collaborating with colleagues. The purpose of such a position is to strengthen the logic research at Tsinghua and to carry

on the tradition that was started by Jin Yuelin, a pioneering philosopher and logi-
cian at the university. In the autumn, Johan van Benthem and Fenrong Liu hosted
a seminar to explore social interactions using *graph games*. One of the pioneering
ideas is the *sabotage game* studied in van Benthem (2014, 477–85):

> *Definition.* A *sabotage game* is played on a graph, representing the envi-
> ronment, with a starting-node and a goal-node or a goal-region: in each
> round, a player Remover first cuts a link anywhere in the graph, and then
> the other player Traveller moves along an edge that is still available where
> she stands. Traveller wins if she arrives at a node in the goal-region: if this
> does not happen, and no more moves are possible, Remover wins.

In the research discussed so far, social networks have been centre stage, explicitly
modelled as a set of agents, structured by one or more social relations. The graph
structure of these networks makes them amenable to study using modal logic.
So it is important to emphasize that the graphs of "graph games" are something
different. Any graph can be studied using modal logic, and operators can be
defined to correspond to actions that a player can take to change them. Indeed,
in 2005 van Benthem had already proposed sabotage modal logic (SML) in
his paper "An Essay on Sabotage and Obstruction". SML extends the standard
modal language with an edge-deletion modality ⬥: the standard modality $\diamondsuit \varphi$
means "Traveller is able to move to a node that is φ", while $⬥\varphi$ reads "there is
a link such that after Remover cuts it, φ is the case". Using this language, the
paper analysed sabotage games and studied reasoning about the graph change
for two players.

At the Tsinghua seminar, van Benthem and Liu introduced various new graph
games and made the first attempt to connect them with logic, in particular, modal
logic and dynamic logic. This became their joint paper "Graph Games and Logic
Design" (van Benthem and Liu 2020). The paper promotes a methodology of
using logic both as a formal tool for analysing games, and as inspiration for the
design of new games. It discusses a range of graph game types: travel games,
sabotage games, meet/avoid games, and occupation games. It also proposed some
parameters for the rules of game playing, organized into two levels: general game
structure (moves, turns, goals) and graph structure (the board on which the games
are played). Concerning moves, one can make the following distinction, for in-
stance in sabotage games (ibid., 136):

a)   Local versus global moves: whether players are localised in the graph
     (like Traveller in the sabotage game), or can range at random (like
     Remover in that game).

b) Arbitrary versus definable moves. Can Remover delete any links, or must he follow some explicit definition?

c) Stepwise versus uniform moves. In each round, does Remover cut one link, or more than one link, uniformly defined?

d) Players can stay within a graph, or jump to a changed graph.

Regarding the specification of conditions for winning and losing, there are also different possibilities (ibid.):

a) The goal-region is an area that the players must avoid or want to be in. This amounts to the specification of a unary property of nodes in the graph.

b) An entangled goal is defined by a binary relation between two player's positions, as in the meet/avoid games where one player loses (and the other wins) if she meets with the other player. In this case the binary relation is the identity relation.

c) Finally, there may even be higher-level procedural goals, sensitive not only to the players' positions but also to the way in which they travelled there.

Subsequently, these game types and design parameters have been studied by a number of researchers, including Dazhu Li at Tsinghua, and Chris Mierzewski and Francesca Zaffora at Stanford. In what follows, we will mainly review the work of Dazhu Li, who was a PhD student under the supervision of Fenrong Liu, Alexandru Baltag and Johan van Benthem at the Tsinghua University—University of Amsterdam Joint Research Centre for Logic.

Definable Link Cutting in Graph Games

In the sabotage games that we have seen, Remover cuts the link globally, each time an arbitrary link is chosen. These are two elements that one can change as parameters, to design a new game and study it. This was pursued in Dazhu Li's "Losing Connection: The Modal Logic of Definable Link Deletion" (2020). The paper studied those sabotage games in which links are removed in a local and definable way. A definable sabotage modal logic (S_dML) was proposed, which extends standard modal logic with a link deletion operator $[-\varphi]\psi$. $[-\varphi]\psi$ is read as "after Remover deletes the φ-links starting from the current position of Traveller, ψ holds". To illustrate, consider the following example (Li 2020, 718):
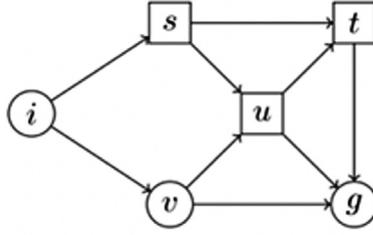
In the graph, the two kinds of shapes, square and circle, denote two different atomic properties of the nodes. The starting-node of Traveller is i, and her goal-nodes are t and g. Assume that the propositional atoms p and q refer to the properties denoted with circles and squares, respectively. Then we are able to express the facts of the game with formulas of the logic S_dML. For instance, that 'after Remover deletes the links from v to any circle points (here only g), Traveller still can move to a square node (here u)' and can be expressed as the truth at v of the formula $[-p]\Diamond q$. Moreover, S_dML-formulas can also describe the winning strategies for players. The formula $[-p]\Box[-q]\Box\bot$, for example, states that Remover can stop Traveller successfully by removing the links from the position of Traveller to the circle nodes in the first round and cutting the links pointing to the square nodes in the second round.

The new language can define many complex properties that are not definable in basic modal logic, but this leads to a drastic increase in computational complexity. The paper proves that S_dML does not have the tree model property or the finite model property, and its satisfiability problem is undecidable. Despite the relatively minor addition to basic modal logic, and in contrast with the decidability of the semantically similar dynamic epistemic logics of link deletion (van Benthem and Liu 2007), the high complexity of S_dML is surprising. Li (2020) identifies the locality of the updates as the culprit.

Locality also led to another problem. In DEL and its extensions, one can usually obtain a complete set of recursion axioms. These are equivalences of the form $AB\varphi \leftrightarrow BA\varphi$, where A is the dynamic operator and B is some other operator of the language. (One might also need some additional B-free components on the right-hand side). This generally allows a recursive removal of A from any formula, so showing that every formula with A is equivalent to one without it, and thereby showing the completeness of the axiomization, given the completeness of the logic without A. But consider the formula $[-\varphi]\Box\psi$: after pushing $[-\varphi]$ into the scope of $\Box$, the model change is *no longer* local, and reference to the node where the formula is evaluated is lost. One idea for fixing this is to extend the language with hybrid operators. Li showed that S_dML can be embedded into the hybrid logic

with nominals, the at-operator @ and the down-arrow operator ↓. The problem of finding a complete set of recursion axioms for the logic extending S_dML with hybrid operators was left open.

Supervised Learning Games

Graph games can be used to analyse the scenario of learning and teaching, as played by two agents Learner and Teacher. Typically, the learning process has game-like features, as the teacher wants to correct the student's mistakes, to make sure they avoid them in the future. This interactive feature was studied by Dazhu Li, Alexandru Baltag and Mina Young Pedersen in their LORI paper "On the Right Path: A Modal Logic for Supervised Learning" (2019). The paper was extended and included in Li's Dissertation "Formal Threads in Social Fabric: Studies in the Logical Dynamics of Multi-Agent Interaction" (2021). Consider the following dialogue between a teacher (T) and a learner (L) who is trying to learn a logical proof (Li 2021, 6–7):

> *Example.* After checking a proof written by Learner (*L*), Teacher (*T*) begins to talk:
>
>> T: You did not prove the theorem yet.
>> L: Why? I started with the axioms, showed intermediate lemmas step by step, and finally reached the statement of the theorem.
>> T: Your final step to show the theorem that is the goal is correct, but you in fact arrived there by accident, as the inference from lemma α to lemma β in your proof is wrong.
>> L: Oops! I see. Then, my steps after β do not make sense. But, how about a new lemma proving γ from α? Now I think I can get to the theorem.
>> T: Alas, γ cannot be inferred from α either, a potential mistake. But actually, you miss another lemma δ that can be derived from α. I believe you might be able to show the theorem with it.
>> L: Thanks! You are right! Now I am going to search for a correct proof with δ.

The short episode suggests several interesting aspects of the learning process. One is that there are *different kinds of mistakes*: actual mistakes made, and potential mistakes to be avoided. To distinguish them, we need to know how Learner arrived at the current position: *the history matters*. The removing by Teacher of mistakes that were actually made by Learner is an action that modifies the history of the Learner's inferential moves (and makes all further moves based on that history

suspect), while eliminating potential mistakes affects the future from the current point. Also, Teacher's pointing out an actual mistake removes the whole actual history after that step, resetting Learner to the last point before the mistake. Besides, Teacher may point Learner to facts that were ignored. In terms of abstract game design, this calls for a powerful Teacher: Teacher should be capable of *adding links to graphs*. Moreover, Learner may not win even though the goal-region is reached: the goal-region should be reached in the right way.

To capture these features of the interaction, the LORI paper (Baltag, Li and Pedersen 2019, 3) defined *supervised learning games* (SLG) as follows:

> *Supervised learning games.* The game is played on a graph with two relations R_L and R_T (representing the inferences conjectured by Learner and the correct inferences that are observed by Teacher, respectively), a starting-node s and a goal-node g. In each round, Learner moves along an R_L-link from her current position t to u, and meanwhile, the new history of her movements is obtained by replacing $(s, …, t)$, the history formed in the last round, with $(s, …, t, u)$. Teacher then does nothing or takes one of the three actions:
>
> (a) Add an R_T-link to R_L that has not been added to the latter relation yet,
>
> (b) Choose an R_L-link (a, b) that is not an R_T-link from the sequence $(s, …, t, u)$, and remove the whole actual history after that step, resetting Learner to the last point before the link (we use $(s, …, t, u)|_{(a, b)}$ for this action),
>
> (c) Remove an R_L-link that is not of R_T and does not occur in the sequence $(s, …, t, u)$.
>
> It ends if Learner arrives at g through an R_T-path $(s, …, g)$ (i.e., every link of the sequence is an R_T-link) or cannot make a move, with both players winning in the former and losing in the latter.

Note that the game is not zero-sum: both Learner and Teacher have the same goal. A logic of supervised learning (LSL) is developed in the paper. *A model* is a graph with two relations, R_L and R_T, and a valuation function. Formulas are evaluated at *sequences of nodes*, each of which stands for a learning process. Teacher's actions of type (b) and (c) are expressed by two operators: $\langle - \rangle_{on} \varphi$ is read as "φ is the case after deleting a mistake on the current sequence", and $\langle - \rangle_{off} \varphi$ is read as "after removing a mistake that is not on the path, φ holds". $\langle + \rangle \varphi$ is also used to express actions of type (a). From this semantics, one can see that the logic can define both the actions and winning positions of players in finite games. A

follow-up paper has more technical results on the properties of LSL (Baltag, Li and Pedersen 2022).

Logic of Hide and Seek Games

One of the games introduced in van Benthem and Liu (2020) is familiar from childhood: hide and seek. As a graph game it has the special feature that the goals of the two players are entangled. Here is a formal definition from the WoLLIC paper "On the Subtle Nature of a Simple Logic of the Hide and Seek Game" by Dazhu Li, Sujata Ghosh, Fenrong Liu and Yaxin Tu (2021, 201):

> *Definition (Hide and seek games).* Given a graph, two players Hider and Seeker are located at two different nodes. In each round, Hider and Seeker, in turn, move along an arrow. The goal of Seeker is to meet Hider, while the goal of Hider is to avoid Seeker. Also, a player wins immediately once the other gets stuck.

The *language* of LHS for studying these games is based on two disjoint sets P_H and P_S of propositional variables that refer to the properties of the Hider's and Seeker's current positions, respectively. The language also contains two modalities [H] and [S] to characterize the moves of Hider and Seeker, respectively. (And, as usual, ⟨H⟩ and ⟨S⟩ are the duals.) In addition, a crucial component of the language is a propositional constant I, expressing that "the two players are at the same position", namely, Seeker has already caught Hider.

Formulas are evaluated at a pair of graph nodes (h, s), representing the position of Hider and Seeker, respectively. Variables in P_H are evaluated at the left node (h) and those in P_S are evaluated at the right node (s). Constant I is satisfied only when the two points are identical ($h=s$). Some examples of valid formulas of the logic are the following:

$$\langle H \rangle (I \wedge \varphi) \rightarrow [H](I \rightarrow \varphi)$$

$$\langle R \rangle (I \wedge \varphi) \rightarrow [R](I \rightarrow \varphi)$$

$$I \rightarrow (\langle H \rangle \top \leftrightarrow \langle S \rangle \top)$$

$$I \rightarrow ([S]\langle H \rangle I \wedge [H]\langle S \rangle I)$$

One subtle feature of the semantics is that there is an "evaluation-gap" between the two points of an evaluation pair (s, t). When considering the atomic properties of s, the language can only use the variables in P_H, but not the ones in P_S. This leads to some interesting properties of LHS. Although syntactically similar to

basic model logic, it is essentially incomparable in terms of expressivity. (This is shown by giving a suitable variant to the notion of bisimulation.)

The constant I also has some logical properties that are not so obvious. First, the tree model property fails, as can easily be seen from the formula $I \wedge \langle H \rangle I$: any model satisfying it must contain a loop. The paper further showed that the logic LHS does not have the finite model property, and that its satisfiability problem is undecidable. The author commented that in this respect the complexity introduced by I is similar to that of equality operators in other logics, e.g., the Gödel class in Goldfarb (1984) and the logic of functional dependence of Baltag and van Benthem (2021).

Conclusion

Our present concern is the history of research in China, and so the focus has been on the work of people in China and their joint work with international collaborators, mostly in Auckland and Amsterdam. But the research community is open and ideas travel. There are constantly emerging new works in this field. For instance, in addition to the dissertations of Zhen Liang, Zuojun Xiong and Dazhu Li, two more PhD dissertations were recently produced: "Dynamics Logics of Networks: Information Flow and the Spread of Opinion" by Zoé Christoff at the ILLC in Amsterdam in 2016, and "In Search of Homo Sociologicus" by Yunqi Xue at the Graduate Center of CUNY in 2017. Sonja Smets and her group in Amsterdam have been a major force for the development of social network logic. She brought social network logic closer to social sciences by her research on important social phenomena: informational cascades in Baltag et al (2013), echo chambers in Pedersen et al (2019), and polarization in Pedersen et al (2020). The logical features of social group creation were studied in Smets and Velázquez-Quesada (2017, 2020), in which a threshold approach was proposed to model network creation, and the key idea was that an agent would add someone to her social network if and only if the distance between them is smaller or equal than the given threshold. Another earlier work that is worth mentioning is Ruan and Thielscher (2011), which extended DEL with new operators of "follow" and "unfollow" and applied it to analyse the well-known problem of "revolt or stay-at-home", where social networks play an important role in agents' knowledge acquisition and decision-making. Van Benthem (2015) discussed how fixed-point logics, both modal and first-order, can describe various kinds of dynamic limit behaviour in social networks, including convergence, oscillation and divergence. Christoff, Hansen and Proietti (2016) introduced a new notion of *reflective social influence*

and proposed a formal framework for reasoning about an individual's private opinions and public behaviour under the dynamics of social influence. Rendsvig (2017) showed the update mechanism in network automata can be emulated using action models in DEL and identified a class of action models that captures the best-response dynamics on a graph. Christoff and Grossi (2017) gave a characterization of the stabilization of diffusion in terms of neighbourhood structures, and showed how the monotone μ-calculus can express their relevant properties. Morrison and Naumov (2020) proposed a new logic system to study the situation in which an agent conforms to multiple social groups that she belongs to instead of one group of peers, and a topological structure of the network was proposed. In the area of graph games and logic, Grossi and Rey (2019) proposed a poison modal logic to describe winning positions in games and bridged it with notions of credulous admissibility sets in argumentation theory, and non-trivial semi-kernels in graph theory. Blando, Mierzewski and Areces (2020) studied poison games systematically using three variants of modal memory logics and compared their expressive power. Van Benthem, Mierzewski and Blando (2020) developed a logic for removing nodes from graphs and studied its logical properties. Declan Thompson applied a game-theoretic approach to network automata in Seligman and Thompson (2015), and extended this to the logical characterization of Nash equilibria in Thompson (2020). The area thus seems to be flourishing and there is even more happening than we are aware of.

By this brief survey of ten years' development of social network logics in China, we hope to have shown that a logical perspective on reasoning about the social aspects of our life is interesting and attractive to researchers and others. Going back to the Chinese philosophy that originally inspired this research direction, we feel that we are just beginning our journey, and only starting to get a clear picture of social relations and social interactions. No doubt this logical research has formed a solid foundation to analyse more complicated social phenomena. Looking into the future, introducing more concrete ideas from Chinese philosophy will definitely enrich the existing approaches to social network logic, and may eventually capture further subtleties of our reasoning about ourselves. We are on the road.

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New Developments in Chinese Studies of Contemporary Inductive Logic

REN Xiaoming*

Abstract

Contemporary Chinese studies in inductive logic have long revolved around the unfolding of a philosophical investigation into Hume's problem. Led by research in probabilistic logic, the principal content of contemporary Chinese logic consists of research into Pascalean and non-Pascalean probabilistic logic, precise and imprecise probabilistic logic, pure inductive logic and material inductive logic. A newly arisen trend in the development of Chinese inductive logic is represented by the research on causal inference, which came into vogue within the field of artificial intelligence (AI) in the last few years. Consequently, the future developmental tendency will probably gravitate towards the new paradigms that will emerge from the mutual contest and interactions between probabilistic logic and causal logic.

Keywords: inductive logic, Hume's problem, China, new developments

Nov razvoj v kitajskih raziskavah sodobne induktivne logike

Izvleček

Sodobne kitajske raziskave induktivne logike so dolgo potekale na področju pojasnjevanja filozofskih raziskav Humovega problema. Pod okriljem raziskav verjetnostne logike sestoji jedrna vsebina sodobne kitajske logike iz raziskav paskalovske in nepaskalovske verjetnostne logike, natančne in nenatančne verjetnostne logike, čiste induktivne logike ter materialne induktivne logike. Novonastalo smer v razvoju kitajske induktivne logike pa predstavljajo raziskave vzročnega sklepanja, ki so v zadnjih nekaj letih postale popularne na področju umetne inteligence (UI). Posledično se bodo prihodnji razvojni trendi verjetno nagibali proti novim paradigmam, ki bodo vzniknile iz medsebojnega tekmovanja ter interakcij med verjetnostno in vzročno logiko.

Ključne besede: induktivna logika, Humov problem, Kitajska, nov razvoj

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What is the main problem of concern in Chinese research on contemporary inductive logic, and what are the new trends and developmental tendencies? What is the current state of relationship between probabilistic inference and causal inference in research on inductive logic? Because these questions are related to the development of the present state of development of Chinese inductive logic, they are of critical importance for us.

Hume's Problem: The Central Problem of Chinese Philosophical Research into Inductive Logic

"Hume's problem" is a well-known issue in the history of philosophy, which in the vast majority of both Chinese and foreign literature is viewed as a problem of induction. In fact, Hume's problem can be subdivided into a problem relating to causality and problem of induction. However, as a causality-related problem, Hume's problem was never able to attract much scholarly attention. As already noted by Ayer, in Hume's philosophical thought no other issue has had a more profound or longer lasting impact than his theory of causality. Throughout its history, this theory was the object of constant attacks, as it was also constantly misinterpreted (Ayer 2000, 68). As a matter of fact, Chinese research on contemporary inductive logic started with this very problem, while its focus all along has been on rationality and the adequacy of the development of inductive logic. In this sense, Hume's problem represents the core problem of Chinese research on contemporary inductive logic, and it was exactly this kind of research, which has caused endless polemics amongst philosophers and logicians, that has been an enormous driving force behind the advancement of Chinese research in this context. Most importantly, Chinese scholars have provided their own solutions to this difficult problem. Thus, scholars like Jiang Tianji 江天骥, Ju Shier 鞠实儿, Chen Bo 陈波 and others have all performed relatively significant work with regard to this issue.

Jiang Tianji's Commentary on Proposed Solutions of Hume's Problem

One of the earliest Chinese scholars who provided his own commentary on psychological and evolutionary solutions to Hume's problem was Jiang Tianji. Amongst other things, he pointed out that, in a certain sense, Hume's solution to the problem of induction was correct: because inductive reasoning is not at all akin to deductive reasoning, the former cannot be the object of logical argumentation, while conclusions derived by induction are not deductively correct. However, in another sense, his solution was also completely flawed: since Hume

presupposed that the only form of rational inference is between mathematical proofs or conceptions, he hereby equated the scope of deductive inference with the scope of reason. In that way, Hume denied that empirical reasoning and scientific knowledge have got any rational basis, which further implies that one cannot present an argument for what he referred to as inductive inference, meaning that without rationality inductive conclusions are groundless (Jiang 1987, 93–94).

Jiang further maintains that unless we make a breakthrough in the conceptual architecture of Hume's thought, any attempts to argue for the inductive method, including deductive argument (i.e. logical argument), inductive argument as well as pragmatic argument, will all be bound to fail. Jiang's view is that inductive inference neither can nor must have a logical argumentation. Instead, what we have to do is to seek a persuasive yet at the same time non-logical argument. In other words, although our venture to prove or explain inductive conclusions are not necessarily true, they are still reasonable, and thus they possess a degree of probability or confidence level corresponding to the support degree of its evidence (including both empirical evidence as well as theoretical evidence) (ibid., 94–95). Evidently, both Jiang's commentary as well as his own views are well-founded.

Ju Shier's Localist Solution

Ju Shier's solution to the problem of induction follows Jiang Tianji's comparatively new and original solution to Hume's problem. In his book (Ju 1993a, 77–95), Ju expounded on and demonstrated the insolvability of Hume's problem and conducted a partial defence for the rationality of inductive inference. Moreover, in the process of proving the insolvability of Hume's problem, Ju not only endeavoured to provide a positive or negative answer to the question of "whether Hume's problem is solvable", but on the basis of criticizing Karl Popper's method of negative resolution also proved that the problem has got no logical solution. Ultimately, he also provided a partial method for justifying induction and the concept of logical rationality, thus providing an explanation for the possibility of partial justification, rejection or suspension of induction.

As indicated by Ju, it is logically impossible to provide a negative answer to Hume's problem. From this is follows that within the scope of logic Hume's problem can neither receive a positive nor negative solution, which, in other words, means that this problem is logically unsolvable. Looking from another perspective, however, Hume's problem is solvable philosophically, while inductive inference can only receive partial justification. In order to expound on the method of partial justification of induction, by enumerating indictive method as an example, Ju advanced

his own argumentation for its partial rationality (Ju 1993a, 77–96). This kind of partialist solution had a considerably large influence on the future Chinese research on the problem of induction.

Chen Bo's Defence of Hume's Problem and His Commentary on Jin Yuelin's Justification of Induction

In his work, Hume expressed scepticism about the objectiveness of causal relations and inevitability of the inductive method. Jin Yuelin 金岳霖 offered his own unique answer to this problem, but neither his nor any other solutions previously or subsequently raised by other Chinese or Western philosophers have been completely successful. Chen Bo maintains that the problem of induction as posed by Hume has no logical solution, due to the untenability of its three main presuppositions. Induction is a cognitive strategy which in in this boundless universe humanity is not only bound to adopt, but also represents the only strategy which we could adopt. Consequently, for humanity, induction possesses a practical inevitability. The cognitive strategy of induction helps us to establish a certain kind of certainty and regularity from repeated experience. In this regard, the establishment of inductive logic and ab inductive method possessing partial rationality is possible (Chen 2001, 3, 35–46).

Chen Bo further indicated that Jin Yuelin was greatly influenced by the philosophies of Hume and Bertrand Russell. He reconstructed Hume's sceptical argument about causal relationships and inductive inference, and in turn conducted an in-depth critical analysis of Russell's justification of induction from the perspective of scepticism, the law of causality, principle of induction, empirical postulates and other major subjects in Hume's philosophy. Subsequently, deriving from Hume's critique of epistemology, his notions of reliability of causal relations, the perpetual trueness and priority of the principle of induction, and so on, he investigated Jin Yuelin's justification of induction in detail. Finally, Chen offered a detailed comparison of the differences and similarities between Russell's and Jin Yuelin's research on the problem of induction, arriving at the following conclusion: they both failed to provide a tenable justification for induction (Chen 2011, 9, 4–25). Chen's commentary is both objective and unbiased, while its arguments abound in enlightening explanations.

Although the continuous research into Hume's problem has not yet yielded any commonly recognized conclusions, it has objectively promoted the forward development of Chinese research into contemporary inductive logic, and directly impacted the formation of new paradigms of "probabilitization" (*gailühua* 概率化)

and "causalization" (*yinguohua* 因果化) as the two main approaches to research on inductive logic and its varied development.

Scepticism Regarding Causal Inevitability and the Rise of Probabilistic Inductive Logic

Research on Hume's problem eliminated the firm beliefs about causal inevitability as established in traditional inductive logic. One of the central consequences of the problem raised by Hume is that since inductive inference cannot guarantee the necessary entailment, then guaranteeing a certain degree of confirmation and probabilistic inference only creates the alternative of necessity as a secondary choice. Hume's profound reflection on the problem of causality obliterated the attitude of blind optimism which underlay studies of causality in the academic world of his time. Because, at the time, it lacked further suitable mathematical instruments, research on causal logic gradually became marginalized. And it was in the context of the mathematical theory of probability, which became a mature subject at the same time, that Pascalean probabilistic logic arose and took the places of both causal logic and methodological research. By the end of the 20th century, studies in Pascalean probabilistic logic had already become the mainstream research direction in inductive logic. In this upsurge of research, the turn from research on Pascalean to non-Pascalean probabilistic logic, the opposition and the contest for supremacy between pure inductive logic and material inductive logic, and the antagonism and complementarity between research in precise and imprecise probability, turned into the new developmental trends in Chinese contemporary inductive logic.

The Rise of Pascalean Probabilistic Logic and the Difficulties it Encountered

Pascalean probability is a form of mathematical probability, which was founded by Blaise Pascal. The form of inductive logic which was established on the basis of principles of Pascalean probability is called Pascalean probabilistic logic. In the time of its foundation, it represented the main developmental trend in contemporary inductive logic. In the framework of Pascalean probabilistic logic, the research on the subjective Bayesian probability underwent a considerable advancement. The representative research regarding this aspect was conducted by Chen Xiaoping 陈晓平. In documents like "A 'Solution' to Hume's Problem in the Subjectivist Theory of Probability" (*Zhuguan zhuyi gailülun duiyu Xiumo wenti*

de 'jiejue' 主观主义概率论对于休谟问题的"解决"(1994)) and "A Solution to Hume's Problem" (*Guanyu Xiumo wenti de yige jiejue fang'an* 關於休谟问题的一个解决方案 (1995)) Chen pointed out that the so-called "Hume's problem" represented the 18th century British philosopher Hume's attempt at calling into question the rationality of the inductive method, which has also been referred to as "the problem of induction" or "the problem of rationality of induction". Although the "solution" of Hume's problem as presented by the subjective Bayesian probabilistic logic has been rather unsuccessful, it has nevertheless been quite revealing. In his view, the justification of the rationality of induction as given by the subjective Bayesian method is a form of partial justification, which needs to be founded on some sort of aprioristic hypotheses. This is the point from which derive both the investigations of Kant's aprioristic philosophy as well as Chen Xiaoping's transformation of Kant's philosophy. Lastly, Chen also moved on to major and immensely complicated problems related to inductive realism and scientific realism, such as the problems of analysis and synthesis, reduction and emergence, contrafactual conditionals and scientific laws, Duhem-Quine problem, and so on, to which he provided his own analysis and answers (Chen Xiaoping 1994, 1, 17–24; 1995, 2, 9–15).

Since the beginning of this century, Chinese research on inductive logic has unfolded mainly in the following directions: The first is research on pure inductive logic. In the text "Analogical Reasoning in the Framework of Pure Inductive Logic" (*Chuncui guina luoji kuangjia xia de leibi tuili* 纯粹归纳逻辑框架下的类比推理 (2019)), Liang Xianhua 梁贤华 indicated that pure inductive logic is a revival of the inductive logic advanced by Rudolf Carnap, whose basic goal was to research inductive logic by treating it as a branch of mathematical logic. Within the framework of pure inductive logic, analogical reasoning is established upon the foundations of first order logic, its theoretical nucleus uses distance function to convey resemblance, while, concurrently, treating the correlation function as its inferential basis. As a result, in this sense we could regard it as an instance of an extension of the correlation function, whereas, in a practical sense, it reflects the urge for formalization of analogical reasoning that arose in the sphere of AI. It is thus evident that the pure inductive method represents the continuation and development of Carnap's formalized inductive logic. On the one hand, it emphasizes the necessity of formalizing inductive logic, and in turn theoretically improving the Carnapian formalized inductive logic. On the other hand, this theory found its practical application in AI, in the context of the attempts to set up inductive logic in AI (Liang Xianhua 2019, 4, 17–37).

The second developmental trend is represented by research on material inductive logic. This theory was proposed by John Norton, the American philosopher of

science and logician. A relatively systematic commentary of Norton's theory was provided by Li Shuai 李帅 (2019, 5, 81–92). He explicitly proposed a new kind of theory of induction: a theory of material induction, which strives to resolve Hume's problem. He further maintained that the validity of the formal theory of induction originates from a universal model of inference. Moreover, in this theory of induction the validity of inductive inference depends on material facts. This has transformed the justification of the inductive model into a justification of material facts, subsequently also eliminating Hume's problem. On this very basis, Norton founded a kind of arch-structured non-hierarchical empiricist theory, advocating a form of the theory of induction without a universal model and rejecting previous systems of induction that involved universal rules. Deriving from his research background in the philosophy of science, Norton indicated that in all current models of inductive inference there exist particular flaws, which is what prompted him to propose a new kind of theory of inductive logic, in order to distinguish it from "theories of pure induction" that involve the principle of universal induction.

The third developmental trend consists of research in imprecise probabilistic logic. This theory propagates the development from probabilistic logic towards imprecise probability. It posits that, owing to the fact that all its meta-properties are generalized from meta-properties of propositional logic, imprecise probabilistic logic is an expansion of classical propositional logic—if a natural expansion generalized the deductive process of propositional logic, while the conception of coherence generalized the deductive closure and consistency of propositional logic. But in what way can imprecise probability be linked together with predicate logic, so as to form a kind of imprecise predicate logic? The answer is that in order to make probabilistic logic capable of expressing predicates, an entirely different approach must be taken. By means of introducing imprecise probability upon state description, one can in turn expand imprecise probability to QFSL, and subsequently extend it unto the SL by means of the natural expansion of the IP inference. In that way one has achieved the linking together of imprecise probability with predicate logic and obtained a system of imprecise probabilistic predicate logic. In other words, this result can be achieved by means of grafting subjectivism upon Carnap's positivism (Pan 2018, 3, 38–45). It is not difficult to recognize that the above-mentioned theories contain two common points. Firstly, they are all attempts at resolving Hume's problem, and, secondly, they all attach importance to their applications in AI and computer science.

The greatest challenge and the most controversial problem faced by the subjective Bayesian probabilistic logic is as follows: If we regard probability as a degree of confidence, then this kind of value of prior probability measuring the degree of confidence is actually freely chosen! In other words, it possesses a relatively large

degree of subjectiveness and possibly also inaccuracies, and the only restriction to these subjectiveness and inaccuracies is in its abiding by the axioms of the theory of probability. As a matter of fact, even if we set out to "dilute" the subjective ingredients or minimize inaccuracies through probabilistic updating, we will still be facing the perplexities of "the new riddle of induction" and censure of anti-inductionists like Karl Popper and others. To put things simply, it is precisely the defect of subjective Bayesian probabilistic logic of excessive arbitrariness of prior probabilistic assignments which became the main shortcoming hindering the further development of Pascalean probabilistic logic.

The Evolution from Pascalean to Non-Pascalean Probability

Non-Pascalean probabilistic logic emerged as an attempt to overcome the difficulties Pascalean probabilistic logic was confronted with. At the end of the last century, by introducing and commenting on J. Cohen's theory of non-Pascalean probabilistic logic, a group of Chinese scholars started to shift the focus of their research to non-Pascalean probabilistic logic and thus promoting Chinese research in the field. In his book *Studies in Non-Pascalean Inductive Probabilistic Logic* (*Fei-Basika guina gailü luoji yanjiu* 非巴斯卡归纳概率逻辑研究 (1993b)) Ju Shier both analysed and criticized Cohen's theory as well as advanced his own improvements and reconstruction of this theory. Ju discovered that in Cohen's theory existed inconsistencies and inadequacies with regard to its overall properties. The most notable is where Cohen offered two different interpretations of the measured results of correlated variables, namely as 1) pseudo-regularity and 2) inductive support, while the logical structures satisfied by these two kinds of interpretations are mutually uncoordinated. In connection with this, assumption 1) has got different logical foundations from assumptions 2) and 3), which directly resulted in the inner inconsistency and inadequacy of Cohen's system. More specifically, assumption 1) exceeded the scope of classical two-valued logic (if not false than necessarily true), since the postulation that H and non-H can at the same time both be false does not comply with the law of the excluded middle. At the same time, the exclusive induction of assumption 2) and the modal system of assumption 3) are both based on two-valued logic (cf. Gui, Ren and Zhu 1995, 170).

In addition to this, Ju Shier also provided a criticism of G. Shackle's theory, positing that his non-Pascalean privatist interpretive theory contains flaws and other difficulties. Expanding Shackle's theory of advantage functions, Ju proposed a method for measuring the degree of desirability, and ultimately established a

theory of decision-making based on an interpretation of non-Pascalean probabilistic logic (Ju 1993b, 115). Thenceforth, the research on non-Pascalean probabilistic logic in China gradually changed its direction toward research on the theory of decision making and gradually integrated together with game theory, forming a research paradigm of decision making and game theory in inductive logic. This has enormously broadened the research scope of inductive logic in this context.

Attaching Importance to Hume's Thought on Causation and the Revival of Causal Logic

We know that Hume's problem can be expounded on from many different aspects, of which at least two are worth paying closer attention to here. One is to regard Hume's problem as a problem of causation, and the second is to regard it as a problem of induction. In fact, throughout his work *Treatise of Human Nature* Hume mainly discussed the problem of causation and causal relations, almost without even mentioning the terms inductive method or inductive inference. Consequently, we could claim that Hume's problem is not only a problem of induction but also a problem of causation. In Chinese circles of logicians, however, Hume's problem as a problem of causation has been completely neglected, but now is the time to change this.

The logical result of researching Hume's problem of causation is causal logic with several ups and downs. Modern causal logic is represented mainly by the method for seeking causal relations as raised by Bacon and Mill. Following the rise of probabilistic logic and due to the challenges with regard to Hume's problem, it underwent a gradual abandonment by the academic community. Even though, by having been introduced into the logic of conditionals and modal logic, modern causal logic attained a certain degree of development, generating new formal systems of causal logic, like causal logic of declarative clauses, causal modal logic, etc., it is still facing difficulties and lacks developmental impetus in aspects like semantic interpretation and philosophy, and thus such work can resemble a flash in a pan and lacks sustainable development.

Studies in causal inference in reality represent an ascending type of causal logic. Causal calculus as a system of causal logic from the perspective of AI represents one of the points of special interest in such research in the past few years. The research on causal inference has driven the development of the causalization of contemporary inductive logic. In the last decade of the previous century, Chinese scholars started combining their research in the theory of inductive logic with applied research on AI, bringing about a combination of research on inductive

logic and applications of AI. The Chinese scholar who initiated and launched integrative research on probabilistic logic and AI was Wang Yutian 王雨田. He proposed a tentative plan for "grafting" modern inductive logic upon AI, and established a research group for cooperation between logicians and computer scientists. The main backbone of this research team was represented by scholars like Ju Shier, Chen Wei 陈炜, Xiong Liwen 熊立文 and others. After the founding of the research team, Ju Shier and others engaged in research on formal systems integrating causal networks and probability, spearheading the combined research in theories of causality and probability in the country. They collectively indicated that, under the conditions of incomplete knowledge, and when we are determining the cause of certain events using an inductive method based on randomized experiments, the not yet eliminated causal assumptions obtain their evidential support on two different levels: 1) They are supported by the statistical data provided by the randomized experiment founded on the design of the respective assumption. 2) By means of the evidential support obtained by eliminating false hypotheses. For that reason, they introduced the concepts of causal binary indeterminacy and causal networks of binary indeterminacy composed of causal statistical strength and degree of implausibility. Furthermore, they formulated a method for acquiring the measure of causal binary indeterminacy, and proposed a networking method for causal networks of binary indeterminacy based on the statistical method and exclusive induction (Ju and Luo 1997, 23–30). Evidently, the work of Ju Shier and others paved the way for Chinese research of theory and application of causal logic.

On the other hand, because of the difficulties encountered by research on machine learning in AI due to its exclusive focus on correlations and disregard for causality, a few erudite and experienced scholars eventually recognized that neglecting in-depth research on causality will have serious consequences for their field of studies. Subsequently, they hung out the banner of "causal revolution" (*yinguo geming* 因果革命) and initiated the rise of a kind of "new science of causation" (*yinguo xin kexue* 因果新科学). They acknowledged that the main lesson given to us by the difficulties encountered by research into probabilistic logic is that merely observing data and facts will not work, and it is difficult to resolve complex problems involving numerous intertwined elements by means of reflecting on probabilistic correlations alone. However, this kind of view, namely that one ought to only discuss correlations and put data at the centre of research, is still deeply rooted in contemporary academia, and its influence still lingers (Pearl and Mackenzie 2018, 3–6). As a consequence, the problem of the contemporary revival of causal logic appears to be especially significant. Causal logic, as proposed by Pearl's and Ju Shier's ideas on causal logic, represents merely two different means to achieve the

same end, which is also reflective of the fact that China's research into causal logic is more or less in line with foreign research.

Surprisingly, Hume's thought already contains abundant resources that can be used for breaking away from the problems of inductive logic. Hence, Hume's conception of causation has always been in line with the research on causal logic. In his *Treatise of Human Nature* (Chapter 3, "Of Knowledge and Probability"), Hume already probed into the constant conjunction which subsists between two objects, and also provided a definition of the "regularity" of causal relations. In his later work *An Enquiry Concerning Human Understanding*, however, Hume was already dissatisfied with this definition and provided a new one. He pointed out that:

> We may define a cause to be an object followed by another, and where all the object, similar to the first, are followed by objects similar to the second. Or, in other words, where, if the first object had not been, the second never had existed. (Pearl and Mackenzie 2018, 265)

This is Hume's contrafactual definition of causation, and it is clearly more profound than the definition of regularity. Because this kind of contrafactual thought can draw distinctions among human, animal, and machine intelligence, it has given rise to the pivotal question of whether we can achieve so-called "strong AI". This view of Hume's has also had a profound impact on research into causal logic.

At the present time, the research on causal logic conducted in Chinese academic circles of philosophers of science and logic is still at its initial stages of introducing the discipline and attempting to bring forth innovation. In his article "Artificial Intelligence and the Language of Cause and Effect" (*Rengong zhineng yu yinguo yuyan* 人工智能与因果语言 (2021)) and elsewhere, the young scholar Wu Xiaoan 吴小安 and Zhang Yu 张瑜 explained why we should make use of a causal language by comparing it with controlled experiments, thereby elucidating its theoretical significance and applicative value (Wu and Zhang 2021, 1, 30–38). Wu also investigated the logical mechanisms and philosophical problematics of the contrafactual theory of causation, thus making a notable contribution to the propagation of causal logic and philosophy of causality in China.

In recent years, experts in AI and philosophers of logic restarted the initiative to interconnect probabilistic inference with causal inference, giving rise to attempts to merge the two forms of inference within a unified system. At the same time, Chinese scholars have already become aware of the fact that the same rationale of fusing these kinds of inference was suggested in Pearl's thoughts on causal inference. This has had an additional stimulating effect on the development of integrated research into probability and causality in Chinese academia.

Research on Inductive Paradoxes and Research on the History of Inductive Logic

Hume's problem of induction and the "grue-bleen" paradoxes have been called by the scholars "the old riddle of induction" and "the new riddle of induction", respectively. In Dun Xinguo's 顿新国 opinion, inductive paradoxes represent a type of "inductive riddles" that have been the object of constant and persistent discussions and controversies in the academic world, and have yielded plentiful research results. Usually, these results would be used only to eliminate individual paradoxes, without having a grasp of inherent logical relations which exist between them or their intrinsic qualities. An investigation into the history of inductive paradoxes may reveal that its essence consists of a family of difficult problems encountered in the proof theory of reasonable belief, and that its "degree of difficulty" is just gradually increasing. Looking from the perspectives of the paradox structure and the gist of representative solutions, of the three major inductive paradoxes, the paradox of confirmation is a concrete outgrowth of the difficult problem of evidential coherence of confirmation; the "grue" paradox is a vivid exemplification of the difficult problem of projectability of confirmation; and the lottery paradox is a rigorous questioning of Hume's presuppositions for confirmation. In order to resolve these major problems of confirmation, we must learn from the related results from the philosophy of mind and linguistics, to accurately show that the hypotheses and evidence are in a relationship of aboutness, and this is the criterion of the identity of the subject under discussion. On these same grounds we can further investigate the relationship of content-related and formal "matching" between evidence and hypotheses, so as to construct the epistemological principles of connectivity bridging existence and mental states. Within these types of research, evidence is a crucial link which at the same time still has not aroused sufficient attention. As a consequence, multidimensional research on the nature of evidence, its metaphysics, logic, and perceptional ethics should be regarded as the highest priority of contemporary research on the inductive theory of proof (Dun 2019, 1, 44–45).

There are also some scholars who indicate that the lottery paradox represents a confirmation of an inductive paradox concerning knowledge and belief, which has swayed our philosophical principles that depend directly on trust, such as the principles of high probability, consistency, conjunction closure and others, and this has had a relatively significant impact on current academia. The customary neglect of the subject of belief has led to a misuse of the principle of conjunction closure with regard to belief, while this kind of misuse represents an important origin for the emergence of the lottery paradox. From this it follows that, under the

premise of the lottery paradox as a paradox of faith, we reintroduce the subject of belief into the perspective, and this will be of significance for the resolution of the lottery paradox. When the subject of belief has been restored, it will not be difficult to discover that the principle of conjunction closure is not applicable to the situation in which multiple belief subjects and the single belief subject are dealing with the lottery paradox, thus resolving this paradox from a cognitive perspective (Shi and Xu 2021, 5, 51–58).

As Chinese scholars are well-aware, Whewell's deductive logic-based hypothesis has always been neglected. But as the contemporary philosopher Norton has admitted, his conception of material induction has been enlightened by Whewell's work. Meng Lingfang 孟令芳 believes that Whewell has carried on Bacon's progressive thought on induction, insisting on a gradual yet continuous method. His invention of the "table of induction" made clear that the inferential process from particular facts to universal truth is a step by step procedure. On the other hand, with his antithetical epistemology he innovated Bacon's extremely empiricist theory of knowledge. Maintaining that rationality is of the same importance as one's experience, he emphasized the significance of "hypotheses" in inductive discovery. Naturally, this kind of epistemological innovation later also became the object of Mill's criticism. Their debate about the essence of inductive reasoning runs through the entire process of Western research on Whewell's philosophy of induction that started in the 1950s (Meng 2019, 2, 36–41).

To summarize: Chinese studies of contemporary inductive logic made new headway in three main respects. Firstly, definite advances have been made in the field of research on pure induction and material induction. Secondly, some preliminary advances have been made in the field of the causal inference in studies of AI and its philosophical questions, which set the foundations for in-depth interdisciplinary research on probabilistic logic and causal logic. If, however, we want to achieve breakthrough advances then much more work must still be done.

The important lessons which we can be surmised from the above survey are as follows: First, we have to strengthen interdisciplinary research on inductive logic. The desired achievements of Chinese research on inductive logic are inevitably linked to broad-field and multidisciplinary collaborative work, which stretches across disciplines such as logic, the philosophy of science, AI and computer science, and cognitive science. Future research will be able to follow along such a broad research route, prompting profound advances in research at the intersection of different sciences and disciplines. Secondly, we must preserve the necessary tension as well as an appropriate balance between antagonistic theories and concepts such as causation and probability, precise probability and imprecise probability, and

Pascalean-probability and non-Pascalean probability. For the developmental trend will likely lead towards a new paradigm of complementarity and mutual interaction between probabilistic logic and causal logic. And, finally, the research on Hume's problem will have a continued influence on Chinese studies of inductive logic.

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Chinese Studies on Informal Logic and Critical Thinking—An Overview

WU Hongzhi*

Abstract

This article traces the developmental trajectory of informal logic and critical thinking in mainland China. It surveys the current developmental situation relating to their curricula, the establishment of teaching material, translations of leading works in these fields, academic writings, dissertations, research organizations and so on. Furthermore, the present article particularly aims to cast some light on the important shifts of research trends in informal logic and critical thinking, from those being introduced from outside to those moving in the opposite direction. Finally, it will also address the currently existing inadequacies and expectations for the future development of these fields of study in China.

Keywords: informal logic, critical thinking, fallacies, arguments

Kitajske študije o neformalni logiki in kritičnem mišljenju – pregled

Izvleček

Članek sledi osrednji razvojni smernici neformalne logike in kritičnega mišljenja na geografskem območju celinske Kitajske. Članek tako preučuje trenutno stanje v razvoju z ozirom na učne načrte, ustvarjanje učnega gradiva, prevajanje vodilnih del na področju, objavljena znanstvena dela, disertacije, raziskovalne organizacije in tako naprej. Nadalje si prizadeva osvetliti najpomembnejše premike raziskovalnih trendov na področju neformalne logike in kritičnega mišljenja, od tistih, ki prihajajo od zunaj, do tistih, ki se gibljejo v nasprotni smeri. Nazadnje članek obravnava tudi trenutno obstoječe pomanjkljivosti ter pričakovanja o prihodnjem razvoju teh študijskih področij na Kitajskem.

Ključne besede: neformalna logika, kritično mišljenje, zmote, argumenti

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The Introduction of Informal Logic and Critical Thinking to China

The beginnings of the informal logic (IL) can be tracked back to the 1970s, when American and Canadian studies in informal logic developed as a result of critiques of baby logic. However, in the initial period of reinstatement of logical education, Chinese logicians still rarely had the opportunity to come in contact with Anglophone literature on IL. Instead, they derived their lessons about the notions of argument and fallacy from the parts on "logic and language" (including "fallacy") contained in introductions to standard logic (a model representative of baby logic). Because theory of fallacy is in fact an addition to the theory of proof, its two main characteristics—that is the diversification of types of argument and contextualization of argument assessment—easily leads scholars towards IL. Therefore, such research on the theory of fallacy naturally turned into the beginning of rise of IL in Chinese academia. In 1984, during his travels in China, John Nolt, a professor at the University of Tennessee, paid a brief visit to Nanjing Institute of Technology (Southeast University). When he was talking about "IL in China", this was in fact equivalent to speaking about "IL is *not* in China": although the Chinese philosophers who engaged in a conversation with Nolt were "surprisingly well-informed about recent Western developments", none of them "had yet heard of IL" (Nolt 1984, 45). Four years later, however, the situation in Chinese academia had already changed.

It is highly probable that the early use of the term "informal logic" in the Chinese literature can be traced back to the year 1988 (Ding and Wu 1988, 28). From this year onwards, for almost 20 years the theory of fallacy represented the heart of Chinese research on IL. In this period of time, more than one hundred research articles and popular essays were published in scientific periodicals. In addition to that, Chinese academia also saw the publication of four treatises on the theory of fallacy: *Fallacy: The Pitfall of Thinking* (*Miuwu: siwei de xianjing* 谬误：思维的陷阱, written by Ding Huang 丁煌 and Wu Hongzhi 武宏志 (1990)); *In Search for the Misty Regions: The Quintessence of the Science of Fallacies* (*Wuqu de xunmi: miuwuxue jinghua* 雾区的寻觅：谬误学精华, by Huang Huaxin 黄华新 and Tang Jun 汤军 (1990)); *On Fallacy* (*Miuwulun* 谬误论, by Huang Huaxin, Ding Huang and Wu Hongzhi (1993)), and *Studies on Fallacies* (*Miuwu yanjiu* 谬误研究, by Wu Hongzhi and Ma Yongxia 马永侠 (1996)). Between the years 1994 and 2010, Huang Zhanji 黄展骥[1] published almost 80 articles on the theory of

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1   Huang Zhanji carries on the scientific spirit of his teacher Yin Haiguang 殷海光. Since 1966 he has devoted himself to the public teaching of logic and the theory of fallacy. The five volumes of the best-selling Hong Kong published "Snail Series" (*Woniu congshu* 蜗牛丛书) represents an anthological collection of several hundred of his lectures, a course of popular lectures issued in the form of a television series, newspaper columns and articles, as well as scientific articles and essays.

fallacy in various Chinese scientific journals. By combining Chinese traditional culture and everyday life, Huang carried out an analysis of fallacies of argumentation in natural languages and established a link between this kind of research and research on logical paradoxes. At the same time, he also enthusiastically assisted younger scholars, in particular doctoral students, in their research on the theory of fallacy. Around 2002, the majority of scholars of in the field of theory of fallacy shifted their attention to research on the fundamental theory of IL, because they discovered that in order to solve the problem of fallacies they had to rely on a complete foundational theory of logic of argument.

The first specialized text that provided an introduction to IL as a new branch of logic emerged in 1990 (Wang Zuoli 1990). Soon afterwards, a special column "Lectures on Informal Logic" was established in the only specialized periodical on logic at the time, *Logic and Language Learning* (*Luoji yu yuyan xuexi* 逻辑与语言学习). For this column, Ruan Song 阮松 of Nankai University published a series of five consecutive articles introducing the rise of IL, argument evaluation, implicit premises, informal fallacy and argumentation construction.[2] Starting in 1991, Wu Hongzhi also published, either in cooperation with Ding Huang and Liu Chunjie 刘春杰 or on his own, several articles on IL, in which he provided a more exhaustive and profound discussion of the main topics in the field. Ultimately, Liu Chunjie's *Studies in Argument Logic* (*Lunzheng luoji yanjiu* 论证逻辑研究 (1999)) pushed research on IL forward towards its eventual rapid development. A decade later, Wu Hongzhi, Zhou Jianwu 周建武 and Tang Jian 唐坚 co-authored the monumental (more than 800,000 Chinese characters long) volume *Introduction to Informal Logic* (*Feixingshi luoji daolun* 非形式逻辑导论 (2009)), in which the authors provided a detailed and accurate description of the panorama of global studies of IL. Apart from being a clear representation of Chinese scholars' deep understanding and holistic grasp of this new branch of logic, this book also played an important role in attracting the interest of young scholars to enter the field of IL.

In the wake of the advances in research on the theory of fallacy and IL, the opportunities and means to learn from international experiences increased considerably. Through such experiences, Chinese scholars discovered that, regardless of whether critical thinking (CT) and IL were closely interrelated in their historical origins and theoretical foundations, in the final instance both of them focused on the common educational ideal. In this respect, the possibility emerged that

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Among these works, his manner of distinguishing between "argument x" and "fallacy x", or his analysis of linguistic fallacies, were not inferior to the theories advanced by the contemporary American and Canadian experts in the theory of fallacy.

2   Apart from that, Ruan Song also published three further articles on informal logic in other Chinese periodicals (Ruan 1991; 1993; 1996).

CL and IL represented a new way, path, and methodology conjoining logical education with pedagogics. In this way, quite expectedly, they became among the special points of interest of logical research and education science in 21st century. Although the term "critical thinking" appeared in China earlier than the term "informal logic", in around 1985, its full and exact introduction and research did not arrive until the 21st century. In the academic circle of logic, several important events occurred that contributed to the promotion of research in IL and CT. Thus, in 2000, "Informal Logic and Critical Thinking" was included in the "10th Five-Year Research Plan and Subject Guide for the Academic Discipline of Logic" published under the organization of the Ministry of Education and edited by Professor Cui Qingtian 崔清田. In December 2002, the Beijing Association of Logic held the "Scientific Symposium on Formal Logic and Informal logic and Critical Thinking", which was the first specialized academic meeting devoted to CT and IL in the country. The first Chinese textbook on CT, entitled *Critical Thinking* (*Pipanxing siwei* 批判性思维 (Luo 2004)) was produced by a group of logicians at Nankai University. This textbook, which gave prominence to informal argumentation rather than formal (deductive) argumentation, endeavoured to link argumentation with effective communication. Huang Shunji 黄顺基 and Su Yue 苏越 organized and completed the work *Logic and Knowledge Innovation* (*Luoji yu zhishi chuangxin* 逻辑与知识创新 (2002)), with the project financed by the National Social Science Fund of China. In their work, CT and IL are regarded as instruments of knowledge innovation. Subsequently, at the "Advanced Scientific Forum on Logic and Knowledge Innovation" (April 2004), hosted by Renmin University of China and Nanjing University, the *Logical and Theoretical Innovation* project was set in motion, which aimed to publish a series of books including a textbook on critical thinking (*pipanxing siwei* 批判性思维). In the following year, the textbook *Critical Thinking—With Argument Logic as an Instrument* (*Pipanxing siwei – yi lunzheng luoji wei gongju* 批判性思维——以论证逻辑为工具, Wu Hongzhi and Liu Chunshu (eds., 2005)) was published as a result of joint efforts of several professors at Chinese universities. Soon afterwards, the textbook *A Course in Critical Thinking* (*Pipanxing siwei jiaocheng* 批判性思维教程, Gu Zhenyi 谷振诣 and Liu Zhuanghu 刘壮虎 (2006)) was published as a part of the 10th Five-Year National Plan Textbooks for General Higher Education. In addition to this, an academic exchange group for "Critical Thinking and Informal Logic" was established at the seventh general assembly of the Chinese Association of Logic (May 2004), which further strengthened the momentum of CT and IL in Chinese circles. At the same conference the "First Awards for Excellent Achievements of the Chinese Association of Logic" were given to a few research works on informal logic. In this way the teaching and research directions of IL and CT also gained an important confirmation within Chinese academic

circles. Finally, the *State of Research in National Philosophy and Social Sciences of the 10th Five-Year Plan and Developmental Trends of the 11th Five-Year Plan* (*Guojia zhexue shehui kexue "shi wu" yanjiu zhuangkuang yu "shiyi wu" fazhan qushi* 国家哲学社会科学"十五"研究状况与"十一五"发展趋势) also provided an overview of research in logic in the framework of the 10th Five-Year Plan, as well as the new research trends as planned for the 11th Five-Year Plan, in which IL and CT together was "regarded as a young scientific branch, whose practical significance obtained a wide-ranged and ample attention", "in the following five years, the main focal directions ought to include … critical thinking", establishing "critical thinking and logic" as one of the main subjects of the developmental plan for the science of logic, and "research of the function and application of logic in critical thinking" (Quanguo zhexue shehui kexue guihua bangongshi 2006, 345). As things currently stand, the fact that IL and CT are the objects of intensive attention within national research plans has set the foundation for the rapid development of both fields in the near future.

Although the systemic theories of IL and CT are foreign creations, China also has its own native resources. With argumentation as its core, ancient Chinese logic emphasized a non-deductive style of argument and the context of argument. Regarding textbooks, there also exists a tradition of expositions on argument and the principle of sufficient reason. The article "On the Logical Analysis of Texts and the Question of Logical Teaching" (*Lun wenzhang de luoji fenxi yu luoji jiaoxue wenti* 论文章的逻辑分析与逻辑教学问题),[3] authored by the Logic Teaching and Research Section of Renmin University of China and published in the journal *Teaching and Research* (*Jiaoxue yu yanjiu* 教学与研究 (1958, No. 10)), voiced an appeal that teaching of logic should be connected to the "actual thinking practice" of humans, criticizing traditional logic for its use of artificial material to explain logical knowledge and the lack of logical analysis of levels of discourse. The article further indicated that in practice when using our knowledge of traditional formal logic we do not know where to start an analysis of narrative or expressive texts, while, as an alternative, it proposed a procedure for analysing the structure of thought, which would emphasize the formal diversity and richness of expression of inferences, judgments, concepts, and their relations. By observing grammar, rhetoric, and logic, as well as some forms of inference that exceed the analytical capacity of instruments of traditional logic, the article's intention was to open up "a new lively way of practice of logical teaching" or "a new direction in logical teaching" (Logic Teaching and Research Section 1958, 14). Twenty years

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3   More than two decades after its first publication, and "on the request of readers", the text was republished by the Information Centre for Social Science of Renmin University of China in its publication *B3 Logic* (*Luoji* B3 逻辑 B3, 4 Volumes, 1980).

later, these ideas from 1958 were implemented and advanced in the work *Logic of Speaking and Text Writing* (*Shuohua xie wenzhang de luoji* 说话写文章的逻辑), which expressed doubt about interpreting logic as formal logic, while explicitly suggesting that logic of spoken and written language should include both logic of reasoning and argument, as well as logic of description and narration (Wang, Zhang and Zhang 1980, 6–7). The research on narrative argument and narrative rationality, conducted in the international research on argumentation from 1989 onwards, confirmed the earlier views of Wang Fangming and others. Soon afterwards, certain treatises on discourse and textual logic (Wang and Zhao 1982; Sun Zupei 1986; Chen Zongming 1989) as well as the *Logical Application from Multiple Perspectives* book series (*Luoji yingyong duo shijiao congshu* 逻辑应用多视角丛书, Su Yue (1990, 10 volumes)), were all permeated with the essential connotations of IL. Unfortunately, such work did not explicitly relate to or integrate IL. Recently, arguing within the framework of argument logic, Zhou Jianwu's book *An Analysis of Argument Validity: A Guide to Logic and Critical Writing* (*Lunzheng youxiaoxing fenxi: luoji yu pipanxing xiezuo zhinan* 论证有效性分析：逻辑与批判性写作指南 (2016)) considered literary analysis from the practical perspective of critical thinking and writing, regarding critical writing as an extremely effective way of practicing logic and training one's capacity to perform critical thinking.

The Overall Situation of Research on IL and CT in China

Akin to the situation in the US and Canada, from the initial introduction of the elementary knowledge on symbolic logic into Chinese university textbooks questions like "what ought to be taught in the framework of university logic?" and "how does it have to be taught?" were always under consideration. At the turn of the century both IL and CT gained a foothold in mainland China, and "the third way" of reforms of logical teaching, that is a general curriculum consisting of CT as an objective and using IL as a means, was also promoted. The proposal to "polarize" logical teaching—educating experts in logic deals with deep learning and research of modern logic and the all-round education with intensively generalized education in CT—also followed suit (Zhou and Mao2003; Zhou 2014). Following in the same line, a profusion of different curricula and textbooks of the IL and CT type also emerged. Apart from these developments, since 1997 logic has been listed as an exam subject for MBA entrance exams (drawing from the methods of American GRE, GMAT and LSAT). While the content of this kind of exam in logic has got even closer to IL and CT over the years, the university curriculum in logic has not adapted to this kind of training. This produced an external stimulus for the reformation of logical teaching.

In his work *Argument and Analysis—The Practical Use of Logic* (*Lunzheng yu fenxi – luoji de yingyong* 论证与分析——逻辑的应用 (2000)), Gu Zhenyi linked together the knowledge of traditional logic with the practical training in argument analysis, providing the first systematic response to the new needs. Starting in 2003, he also took the initiative by establishing a course on "Logic and Critical Thinking" at the China Youth University of Political Studies and Peking University. Based on the lecture notes for this course, together with Liu Zhuanghu he co-authored the textbook *A Course in Critical Thinking* (*Pipanxing siwei jiaocheng* 批判性思维教程 (2006)). Almost at the same time, lecturers in logic at the China University of Political Science and Law, East China Normal University, Yan'an University and other institutions also started organizing elite courses on CT, in particular general elective courses on the subject. In the past few years, Huazhong University of Science and Technology hired the Canadian scholar Dr. Dong Yu 董毓 as a visiting lecturer, who started the first course on CT at the university, providing an impetus for the development of teaching CT within every academic discipline, which in turn brought about a very favourable demonstration effect at the national level. Shantou University, on the other hand, offered its integrative thinking program (creative thinking + critical thinking + systemic thinking) of "Comprehensive Training System for Thinking" to all of its students. Chinese education relating to IL and CT also has certain special characteristics. Due to the restrictions in specialized study programs at Chinese universities, according to which one is not allowed to alter the titles of courses already listed in individual programs, it is not so simple to completely replace the compulsory courses on logic with IL or CT. As a result of this, there emerged at Chinese universities numerous courses entitled "Logic and Critical Thinking". Sometimes it is even the case that lecturers are only allowed to fill occasional gaps which appear in the course of carrying out the general course on logic with content related to IL or CT. As regards the establishment of textbooks, IL has been blended into the content relating to CT. Led by a certain notion of CT, in their book *Critical Thinking* (*Pipanxing siwei* 批判性思维 (2010; 2016)), Wu Hongzhi and Zhou Jianwu constructed a relatively complete system of argument logic. The book *The Principles and Methods of Critical Thinking—Towards a New Cognition and Practice* (*Pipanxing siwei yuanli he fangfa – zouxiang xin de renzhi he shijian* 批判性思维原理和方法——走向新的认知和实践 (2010; 2017)), written by Dong Yu, provided a broader perspective on the transition from the consumer of knowledge to the producer of knowledge, creating a fusion between analytical, clear, real, adequate, optimal, in-depth thinking and dialectical thinking, which is not anymore limited to the scope of logic and corresponds to a form of general curriculum that oversteps the constraints of conventional logical curricula. Apart from such publications, recent years have also seen the publication of popular readers

on this topic (e.g. Xie (2017); Dong (2017)), while online courses on IL and CT have also been developing rapidly. One such textbook is Xiong Minghui's 熊明辉 *A Course in Critical and Creative Thinking* (*Pi-chuang siwei jiaocheng* 批创思维 教程 (2019)), which strives to bring forth courses in innovative entrepreneur-ship education, and combines critical thinking and creative thinking. Aside from Xiong's textbook we should also mention the university MOOC textbook by Wang Yanjun 王彦君 (2020). Subsequently, various textbooks or training man-uals on CT for elementary or secondary schools also emerged one after another (e.g. Zhao Guoqing 2016; 2019; Wang Jing 2017; Xu Fei 2019). Various books were also published embodying the spirit of CT and containing the contents of CT, on, for example, university-level foreign languages (Wen Qiufang 2012; Li Yingxin 2017), pedagogy (Rong Yanhong), medicine (Wang Weili), secondary school physics (Wang Changjiang 2015; Wang Ming 2021), linguistics (Yu and Zhang 2017;), and history (Zhou Hong 2020). Also noteworthy are the general teaching of CT launched at Nanjing Zhonghua High School and the primary school affiliated to Huazhong University of Science and Technology. Moreover, translations of important works on IL and CT have also been growing rapidly. Starting with the Chinese translation of John Chaffee's *Thinking Critically* from 1989, Chinese translations of similar works have only been continuing to emerge. In 1997, the Shanxi Education Press released the most extensive project of trans-lated and edited works on CT, which still continues to be published, namely the "Philosophy for Children Book Series" (*Ertong zhexue congshu* 儿童哲学丛书), in which 14 books of Matthew Lipman, a renowned expert in CT and the founder of philosophy for children (a well-known mode of CT), have been published. In 2013, the Mechanical Industry Press in Beijing started publishing a series of books on CT, which currently includes 14 individual works, while Xuelin Pub-lishing House and the Shanghai People's Publishing House jointly published the *Guanghua Self-Enlightenment—Critical Thinking Translation Series* (*Guanghua qidi – pipanxing siwei yicong* 光华启迪-批判性思维译丛; 5 Volumes). By and large, all well-established foreign textbooks on CT have been introduced to Chi-na, among which several editions of the same textbooks have also been translated and published in Chinese, while some of them have even obtained different Chi-nese translations. These include the following:

Neil Browne, and Stuart M. Keeley. *Asking the Right Questions: A Guide to Critical Thinking* (1994, 1st edition).

Brooke Noel Moore and Richard Parke. *Critical Thinking* (2009, 9th edition).

D. Alan Bensley. *Critical Thinking in Psychology* (1997, 1st edition).

Gerald M. Nosich. *Learning to Think Things Through: A Guide to Critical Thinking Across the Curriculum* (2011, 4th edition).

Peter A. Facione, and Carol Ann Gittens. *Think Critically* (2016, 3rd edition).

Theodore Schick, and Lewis Vaughn. *How to Think About Weird Things: Critical Thinking for a New Age* (2010, 6th edition).

Gary R. Kirby, and Jeffery R. Goodpaster. *Thinking: An Interdisciplinary Approach to Critical and Creative Thought* (2007, 4th edition).

Sharon Bailin, and Mark Battersby. *Reason in the Balance: An Inquiry Approach to Critical Thinking* (2016, 2nd edition).

Stephen D. Brookfield. *Teaching for Critical Thinking: Tools and Techniques to Help Students Question Their Assumptions* (2011, 1st edition).

Most interest has been given to the representative works of two schools of CT. Thus, from the school of Pragma-dialectics (established by Frans H. van Eemeren, who regarded critical discussion as a method of CT), five works have been translated into Chinese:

Frans H. van Eemeren, and Rob Grootendorst. *Argumentation, Communication, and Fallacies: A Pragma-dialectical Perspective* (1992, 1st edition).

Frans H. van Eemeren, and A. Francisca Snoeck Henkemans. *Argumentation: Analysis and Evaluation* (1996).

Frans H. van Eemeren, and Rob Grootendorst. *A Systematic Theory of Argumentation: The Pragma-dialectical Approach* (2003).

Frans H. van Eemeren, et al. *Handbook of Argumentation Theory* (2014).

Eveline T. Feteris. *Fundamentals of Legal Argumentation: A Survey of Theories on the Justification of JudicialDecisions* (2017).

Apart from these, there are also works like *Critical Thinking: Tools for Taking Charge of Your Professional and Personal Life* and *Critical Thinking: Tools for Taking Charge of Your Learning and Your Life* by Richard W. Paul and Linda Elder which have been translated into Chinese more than once. In 2016, the Foreign Language Teaching and Research Press introduced the 21 volumes of *The Thinker's Guide* by Linda Elder and Richard Paul. However, in Chinese translations of CT works there are two obvious problems: there exist major discrepancies between the manner of translation of some key terms (such as "argumentation" or "dialectics"), and the nonprofessional manner of translating logical terminology in some volumes.

For expertise-related reasons, naturally there only exist a few Chinese translations of research works on IL, amounting to the following four: Douglas Walton's *Legal Argumentation and Evidence* and *Character Evidence: An Abductive Theory*, James B. Freeman's *Argument Structure: Representation and Theory*, and Stephen E. Toulmin's *The Uses of Argument*.

The most representative research work in the fields of IL and CT is a series of studies issued by the 21st Century New Logic Institute at Yan'an University (established in 2008): apart from the above-mentioned *Introduction to Informal Logic* (2009), these also include the work *Argument Schemes* (*Lunzheng xingshi* 论证型式, written by Wu Hongzhi (2013)) which investigated the pivotal concepts of IL with several problems related to the argument scheme. A comprehensive in-depth discussion of elementary problems in CT was provided by the work *Preliminary Explorations into Critical Thinking* (*Pipanxing siwei chutan* 批判性思维初探 (Wu Hongzhi, Zhang Zhimin and Wu Xiaobei 2015)). The book series *Logic of Science* (*Kexue luoji* 科学逻辑) consists of works like *Scientific Inference—Logic and Methodology of Scientific Thought* (*Kexue tuili – luoji yu kexue siwei fangfa* 科学推理——逻辑与科学思维方法 (Zhou Jianwu 2017; 2020)); *Scientific Analysis—Logic and the Scientific Method of Deduction* (*Kexue fenxi – luoji yu kexue yanyi fangfa* 科学分析——逻辑与科学演绎方法 (Zhou Jianwu 2020a)), and *Scientific Argument—Logic and the Scientific Method of Evaluation* (*Kexue lunzheng – luoji yu kexue pingjia fangfa* 科学论证——逻辑与科学评价方法 (Zhou Jianwu 2020b)). Setting out from the concept of CT, these books combine an abundance of scientific cases, providing an analysis of logical inference and argument in the context of science. The book *Studies in Critical Thinking* (*Pipanxing siwei yanjiu* 批判性思维研究 (Wu Xiaobei 2018)) delved into the problem of translation of the English term "critical thinking" itself, trying to sort out the notion of CT within the context of critical rationalism and analysing the possibility of complementing Western-style CT with Chinese-style CT. Scholars from other scientific institutes also published a certain number of specialized treatises on CT. Thus, for instance, the book *Informal Logic and Critical Thinking* (*Feixingshi luoji yu pipanxing siwei* 非形式逻辑与批判性思维 (Wang Kexi 2007)) attempts to provide a clear explanation of the relationship between logic and CT from the theoretical perspective. The book *Litigational Argumentation: A Logical Perspective of Litigation Games* (*Susong lunzheng: susong boyi de luoji fenxi* 诉讼论证: 诉讼博弈的逻辑分析 (Xiong Minghui 2010)) uses the framework of IL to implement two transformations of research in legal inference: that is, the shift from legal argument to litigational argumentation, and the shift from various kinds of frameworks of litigational argumentation to a game-theoretical framework. In so doing, the work integrated the assessment standards of logical, dialectical, and rhetorical argument.

The book *Research on Tourmin's Idea of Argument Logic* (*Tuermin lunzheng luoji sixiang yanjiu* 图尔敏论证逻辑思想研究 (Yang Ningfang 2012)) systematically discussed the "logical turn" represented by Toulmin's "material logic" or "working logic". On the other hand, the book *Reason, Reasoning, and Reasonableness: On Stephen Toulmin's Theory of Argumentation* (*Liyou, tuili yu helixing—Tuermin de lunzheng lilun* 理由、推理与合理性——图尔敏的论证理论 (Song Xuguang 2015)) exploits several new sources of material to expand and deepen Toulmin's theory. The book *The Main Progenitors of Informal Logic* (*Fei-xingshi luoji sixiang yuanyuan* 非形式逻辑思想渊源 (Chen Wei 2017)) traces IL back to Aristotle's topics and rhetoric, Toulmin's material logic, Perelman's new rhetoric, Hamblin's theory of fallacy and similar. Taking Mencius and Socrates as models, the book *How to Conduct Criticism—Mencius' Fury and Socrates' Grief* (*Ruhe jinxing pipan—Mengzi de fennu yu Sugeladi de youshang* 如何进行批判——孟子的愤怒与苏格拉底的忧伤 (Gu Zhenyi 2017)) comares Chinese and Western styles of criticism and systems of logical argumentation. This work further tries to remodel and optimize certain elements from Chinese cultural tradition with the use of CT. The book *Argument of Case Facts—A Research Approach of Critical Thinking* (*Anjian shishi lunzheng—yi zhong pipanxing siwei de yanjiu jinlu* 案件事实论证——一种批判性思维的研究进路 (Yu Hui 2018)) focuses on legal reasoning, in particular on the CT of case and fact arguments as its main topic. By focusing on questions such as the three stages of questioning (to question or doubt), presenting alternative options (plurality of opinions), and forming judgments as its elementary structure, the work studies the awareness and skills of setting critical questions, conceiving alternative options and forming judgments required by the subject in the process of passing case- or fact-related arguments.

From 2007 onwards, the Chinese academic world experienced a rise of the number of doctoral dissertations on IL and CT, with research subjects including Walton's theory of fallacy (Li Yongcheng 2007), Toulmin's theory of argument (Yang Ningfang 2008), Johnson's informal logic (Xie Yun 2009), Woods' theory of fallacy (Chen Xinquan 2014; Shi Tianbiao 2015), Perelman's techniques of argumentation (Cai Guangchao 2017), argument scheme (Yu Shiyang 2019; Liao Yanlin 2020), ancient Chinese argumentation (Yan Linqiong 2020), and legal argument (Xu Mengxing 2015; Li Yang 2016; Huang Xianqing 2016). The number of doctoral dissertations on IL is not lower than and even surpasses the number of dissertations written at the same time in American or Canadian universities. In the field of CT, the doctoral dissertations started to appear earlier, such as a dissertation entitled "A Study in Theory of Critical Thinking and Its Evaluation Techniques (*Pipanxing siwei lilun jiqi ceping jishu yanjiu* 批判性思维理论及其测评技术研究" (Luo Qingxu 2002)). Afterwards, however, only a

few dissertations were published that researched topics such as fostering the CT skills of university students (Liu Yi 2010; Tian Dan, 2012; Huang Fang 2013), the relationship between CT and creative thinking (Zhu Rui 2017), designing courses on CT (Huang Cunliang 2019), and the use of CT in judicial practice (Yu Hui 2017).

Renowned Chinese research institutes for IL and CT include the Institute of Logic and Cognition at Sun Yat-sen University (1997) as the Social Sciences Research Base of the Ministry of Education, Institute for Modern Logic and Application of Logic of Nanjing University (2003), Centre for the Study of Language and Cognition at Zhejiang University (2005), 21st Century New Logic Institute at Yan'an University (2008), International Institute of Argumentation Studies at Jiangsu University (2016),[4] Centre for Research in Innovative Education and Critical Thinking at Huazhong University of Science and Technology (2017),[5] Institute of Reasoning, Argumentation and Communication at Southwestern University of Finance and Economics (2017), and so on. At the same time, IL and CT also started entering Chinese dictionaries and encyclopaedias. Thus, for instance, the *Comprehensive Dictionary of Logic* (*Luojixue da cidian* 逻辑学大词典 (Peng Yilian and Ma Qinrong 2004) already included terminology from IL and CT. The new edition of *Encyclopaedia of China—Philosophy* (*Zhongguo da baike quanshu – Zhexue* 中国大百科全书-哲学), which is currently in the making, will also include a certain number of new entries from IL and CT. Furthermore, the first (1990), third (2000) and sixth (2015) Jin Yuelin Awards were all given to studies on IL and CT. At the same time, quite a lot of research projects on IL and CT were subsidized by the National Social Science Fund of China. More importantly, in the same period of time a considerable number of impressive scientific articles on IL and CT were published in significant domestic periodicals, while outstanding works on IL and CT were also often reprinted in the *Logic* (*Luoji* 逻辑) full-text series published by the Information Centre for Social Science of Renmin University of China. The main annual conference on CT (which also includes teacher trainings) is "The National Discussion Forum on Critical Thinking and Innovative Education" (*Quanguo pipanxing siwei he chuangxin jiaoyu yantaohui* 全国批判性思维和创新教育研讨会), which has already been held nine times and has an extremely wide influence. Although national conferences specialized exclusively on IL are still few in number, major conferences on logic, such as the General Assembly of Chinese Association of Logic, conferences of the Branch for Formal Logic, conferences on legal logic, legal method and legal rhetoric, and

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4   The institute was originally established in 2009. In 2016 the institute moved to Jiangsu University.

5   This institution received a large subsidy from its alumnus Qu Xiangjun 屈向军, who has a profound understanding of the theory of CT.

so on, usually include special panels on IL and CT. The special committee for logical education, established in 2017 in the framework of Chinese Association of Logic, strives to advance a harmonious fusion between all-round education and logical thinking, actively promoting work related to education in CT in primary and secondary education. In cooperation with the Renmin University of China Press, the committee also released the "Critical Thinking and Foundational Education Curricula Book Series" (*Pipanxing siwei yu jichu jiaoyu kecheng jiaoxue congshu* 批判性思维与基础教育课程教学丛书, edited by Lin Shengqiang and Zhong Haixia 2019). Currently, there exists very favourable momentum for the use of IL and CT in fields like legal logic and legal methodology, as a consequence of which both have had significant impacts on these fields.

A major event in Chinese advances in CT, which is worth remembering for the future, is that in 2021, the Shanghai Education Publishing House started issuing China's first periodical specialized on CT, the *Journal of Critical Thinking Education* (*Pipanxing siwei jiaoyu yanjiu* 批判性思维教育研究, issued annually). This will inevitably become the frontline publication for research on CT in China, the central platform for disseminating essential information, the main window for presenting cutting-edge achievements in the field, and one of the most significant nodes in the development of the field in China.

Integrating into the International Academic Circles

In the last 10 years, the statistically significant standards of the development of Chinese research of IL and CT have undergone a gradual improvement from simple "introduction from the outside" to the concurrent undertaking of high-end import and export of ideas. This process has been manifesting itself in the following six aspects:

1. Inviting world-class experts on IL and CT to China for academic exchanges. From 2009 onwards, foreign scholars like Ralph H. Johnson, J. Anthony Blair, Douglas Walton, Christopher W. Tindale, Frans H. van Eemeren, James Freeman, John Woods, Hans V. Hansen, David Zarefsky, and Frank Zenker in the field of IL, and David Hitchcock, Mark Battersby and Peter Facione in the field of CT, have delivered a series of lectures or reports related to the general situation in the field at various conferences or Chinese institutes, such as the Research Institute for Logic and Cognition at Sun Yat-sen University.

2. An increasing number of Chinese researchers and PhD students visit major centres of research in the US, Canada and the Netherlands to engage in elementary and advanced studies or take part in cooperative research projects. At these leading institutions they are able to learn from the best scholars in the fields IL and CT, and advance in their studies in a straight line towards the very frontiers of these fields.

3. Frequent appearances of Chinese researchers at international conferences on IL and CT. The quadrennial international Conference of Argumentation organized by the International Society for the Study of Argumentation (ISSA), the annual meeting of the Canadian Association for Informal Logic and Critical Thinking (AILACT), as well as the biennial conference of Ontario Society for the Study of Argumentation (OSSA), are all often attended by Chinese scholars, who present their research reports and papers. Lastly, the 10th Conference of the ISSA will be held between June 28 and July 1, 2022, at Jiangsu University (Zhenjiang, China).

4. From 2007 on, more than 40 articles on IL and CT written by Chinese scholars have been published in international scientific journals and conference proceedings. Listed as the first authors (corresponding authors), Chinese scholars who have published their articles in the international journal *Argumentation* (indexed in SSCI and A&HCI) include: Liang Qingyin 梁庆寅 (2011), Xie Yun 谢耘 (2015, 2019), Xiong Minghui (2019), Yan Linqiong 闫林琼 (2019), Wu Peng 吴鹏 (2019), Zhang Chuanrui 张传睿 (2019), Yu Shiyang 于诗洋 (2018, 2020), Niu Zezhen 钮则圳 (2020), Wang Jianfeng 汪建峰 (2020), Ju Shier 鞠实儿 (2021), Liao Yanlin 廖彦霖 (2021), and Wang Bin 王彬 (2021). Moreover, Chinese authors who have published their works in the journal *Informal Logic* (indexed in A&HCI) include Xie Yun (2017) and Yu Shiyang (2019), while Xie Yun (2019; 2022) has published in the online journals *Argumentation* and *Argumentation and Advocacy*.[6] One of the signs of the international recognition of Chinese research in IL and CT is also the appointment of Xiong Minghui and Xie Yun as board members of the international journals *Argumentation* and *Informal Logic*, respectively. Current Chinese research on IL is not only closely connected with

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6   Naturally, there also exist minor articles related to IL and CT that were published in the journal *Argumentation* under the names of Chinese institutions. These include articles coauthored by Liu Yameng 刘亚猛 (2004), Feng Jieyun 冯捷蕴 and others (2021).

international academic circles, but is also able to contribute original views on the most pressing problems arising as part of the latest advances in science. Thus, for instance, in the past few years the problem of conductive argument became one of the focal points of current scientific advances. Regarding this problem Jin Rongdong 晋荣东 (2011), Xie Yun (2017)[7] and Yu Shiyang (2019) published important articles, which both had a certain impact on the field of IL. In the field of CT, contributions by Chinese scholars to international scientific journals have mainly been made in the domain of education research. Examples include the two articles by Ren Xuezhu 任学柱 (corresponding author) published in *Learning and Instruction* (SCI) and *Intelligence* (SCI) in 2020.

5. Participation in writing international handbooks and manuals. Such scholars are, for example, Xiong Minghui and Xie Yun who took part in creation of the *Handbook of Argumentation Theory* (2014), and Dong Yu who participated in the compilation of *The Palgrave Handbook of Critical Thinking in Higher Education* (2015).

6. Pursuing frontier research, interviewing world-class scholars in the fields of CT and IL. Having served as a driving force for the "turn towards argumentation" in Chinese rhetoric, Wang Jianfeng (2018; 2019) conducted interviews with Christopher W. Tindale, Douglas Walton, J. Anthony Blair, Ralph H. Johnson and Frans H. van Eemeren,[8] discussing the relationship between IL and rhetoric. Moreover, Liao Yanlin conducted interviews with Douglas Walton and Hans V. Hansen,[9] in which he set out to provide a general narrative on the most recent developments in IL and the theory of argumentation.

Concluding Remarks

As predicted more than 30 years ago by John Nolt, the teaching and research of IL has huge potential at Chinese universities—if more Chinese people were

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7   His paper "Conductive Argument as a Mode of Strategic Maneuvering" received the 2017 AILACT award for an academic article.

8   These interviews were published in *Contemporary Rhetoric* (*Dangdai xiucixue* 当代修辞学) (2018 (1); 2019 (1)).

9   These interviews were published separately in Philosophical Trends (*Zhexue dongtai* 哲学动态) (2021 (1)) and Philosophical Analysis (*Zhexue fenxi* 哲学分析) (2021 (1)).

to participate in the field of IL, they would undoubtedly bring about new ideas which would offer enormous enrichment for our branch of science (Nolt 1984, 45). The overview presented above shows that these predictions have actually come true. However, we must also remain clear-headed and recognize our own shortcomings (Chen Bo 2018, 679). Some authors simply "renamed" textbooks on traditional logic or introductory logic so that they appeared to be textbooks on IL and CT. Such textbooks, that made no real use of elementary concepts from IL and CT, revealed a poor grasp of the fundamental spirit of IL and CT. How to appropriately treat the relationship between logic, especially formal logic, on the one hand, and IL and CT on the other, has become the crucial point of CT teaching. At the same time, monographs systematically researching IL and CT are still very few in number, while there is an even greater lack of treatises written in English or translations of Chinese works into foreign languages. We still look forward to works similar to those created by renowned scholars such as Trudy Govier, Ralph H. Johnson, Douglas Walton, and James B. Freeman. Apart from that, research on the Chinese tradition of argumentation or developmental history of Chinese logic which would derive from the perspective of IL is worth attempting. On the other hand, the strength and intensity of research in IL and CT is still insufficient, for China still has no academic organization specializing in research on IL and CT. Among young scholars who have finished their doctoral dissertations on IL and CT, there are quite a few who, after their promotion, stop working in these fields. Observing from a more holistic perspective, unlike in many other countries the Chinese educational authorities still have not responded to the initiative raised by the United Nations, namely to institute CT as the objective of education and to put cultivating student's CT into the strategic plans for the development of national education and introduce it among the principal standards of education. We can only hope that, someday in the future, the requirements for CT will first be carried out within the K-12 education system. I firmly believe that, along with the drive to establish a law-based society in China, the research on IL and CT will also usher in a golden age of self-development.

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Chinese Studies on the Logic of Natural Language—A Survey from 1949 to 2019

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Abstract

This paper makes a historic review on the development of the Logic of Natural Language (LNL) in China, which can be roughly divided into three periods: the first period which spanned from the late 1950s to the late 1980s was the initial period of LNL in China; the second period, a transitional period from the preliminarily integrated mode of LNL to the deeply integrated mode of LNL, lasted for the whole decade of the 1990s; the third period was from 2000 on, and during this period the deeply integrated mode became the mainstream of LNL. In today's China, LNL is not only an important research field of logic, but has also exerted a great impact on linguistic studies and the studies in the field of natural language processing (NLP).

Keywords: logic of natural language (LNL), preliminarily integrated mode, deeply integrated mode

Kitajske raziskave logike naravnega jezika – pregled razvoja od 1949 do 2019

Izvleček

Članek podaja zgodovinski pregled razvoja logike naravnega jezika (LNJ) na Kitajskem, ki ga je mogoče v grobem razdeliti na tri obdobja: prvo, ki se razteza od konca 50. do 80. let 20. stoletja, predstavlja obdobje začetkov LNJ na Kitajskem; drugo, obdobje prehoda od preliminarno integrirane oblike LNJ h globoko integrirani LNJ, je trajalo skozi celotna 90. leta 20. stoletja; tretje, ki traja od leta 2000 dalje, pa predstavlja čas, ko je globoko integrirana LNJ postala osrednja struja raziskav LNJ na Kitajskem. Na tem mestu je treba tudi poudariti, da LNJ v današnji Kitajski ne predstavlja zgolj enega od pomembnih področij raziskovanja logike, ampak je to polje prav tako pomembno vplivalo na kitajske jezikoslovne raziskave in preučevanje obdelave naravnega jezika (ONJ).

Ključne besede: logika naravnega jezika (LNJ), preliminarno integrirani način, globoko integrirani način

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Introduction

Logic is defined as the theory of right thinking and successful communication in Zhou Liquan (1994), and the Logic of Natural Language (LNL) is generally understood as the study of logic problems of natural languages (Chen Daode 2005, 97). However, due to the complexity of natural language (NL) and the special relation between logic and language, it is far from enough to treat LNL as simply a matter of "logic plus NL". Since the understanding of NL itself is based on deduction under the guidelines of LNL, there are two types of deduction involved in LNL: extralinguistic and intralinguistic. The former refers to the deduction via NL while the latter refers to the deduction concerning the construction of NL, which makes it possible that the compositional expressions are syntactically and semantically derived/inferred from their constituents. Accordingly, there are two modes of LNL. One is to develop the logic theories aiming at the formal representation of some isolated phenomena of NL, say, presupposition and implicature, but the syntactic structure of NL is not the concern of the study. Typical examples of this mode include speech act theory and the cooperative principle of conversation. The other one is to develop the formal theories aiming at the formal representation of the syntactic generation and semantic composition of NL. The typical theories of this mode include various categorical grammars, Montague grammar, discourse representative theory, and so on (cf. van Benthem and ter Meulen 2011). In this paper, the former mode is called preliminarily integrated mode between logic and linguistics, while the latter is called deeply integrated mode.

Therefore, LNL can be understood either in its broadest sense or in its strictest sense. In its broadest sense, it covers both preliminarily integrated and deeply integrated modes. In its strictest sense, it only refers to the latter mode. In this paper, LNL is used in its broadest sense. In China, the preliminarily integrated mode of LNL was initiated as early as the late 1950s, which is marked by Zhou Liquan's proposal to develop the logic theory of thinking and communication via NL, a theory similar to Austin's speech act theory. However, his work was interrupted by the Cultural Revolution, the political catastrophe in China that lasted from 1966 to 1976, and it is not until the end of the 1970s that Zhou Liquan 周礼全 (1921–2008) and his fellow researchers restarted their preliminarily integrated studies of LNL. The other influential scholars in this field include Wang Weixian 王维贤 (1922–2017), Li Xiankun 李先琨 (1926–2017) and Chen Zongming 陈宗明 (1934–), known as the Triangle of the Pioneers of LNL in China, and Cai Shushan 蔡曙山 (1950–), a doctoral student of Zhou Liquan.

The deeply integrated mode of LNL was introduced into China in 1992. During this year, Zou Chongli 邹崇理 (1953–), another doctoral student of Zhou

Liquan, finished his doctoral dissertation *Montague Grammar and its Tentative Application in Semantic Analysis of Mandarin Chinese*, the first paper on the deeply integrated studies of LNL in China. Since the beginning of the 21st century, the deeply integrated mode of LNL has gradually become the mainstream of LNL in today's China.

Roughly speaking, the development of LNL in China can be divided into three major periods: 1) The period from the late 1950s to the late 1980s was the initial period of LNL in China, and during this period studies of LNL were mainly made in the preliminarily integrated mode. 2) The whole decade of the 1990s was a transitional period characterized by the parallel development of the preliminarily integrated mode and the deeply integrated mode. 3) The period from 2000 on has been the all-round development period, during which the deeply integrated mode has gradually become the mainstream mode of LNL, and LNL has also become one of the important interdisciplinary fields between logic, linguistics and NLP.

Initial Period (The Late 1950s–1980s)

The period from the late 1950s to the late 1980s can be viewed as the initial period of LNL in China. Due to the interruption of the Cultural Revolution, this initial period lasted for more than 40 years, and 1979 can be viewed as an epoch-making year for LNL in China. On March 4, 1979, there were 25 logicians from 21 initiative institutes across China gathering in the city of Guilin to announce the establishment of the China Association of Logic and Language (CALL). In August 1979, when the establishment of the Chinese Society of Logic (CSL) was announced during the First National Symposium on Logic held in Tongxian, Beijing, CALL was approved as a branch of CSL.

This initial period is characterized by the preliminarily integrated mode of LNL. Actually, during the late 1950s when Austin began to sketch the theoretical framework of speech act theory, Zhou Liquan, the father of LNL in China, put forward a similar theory independently (Zhou Liquan 1961, 2000). In 1958, Zhou Liquan proposed that "reasoning, under the usual conditions, always goes on in a NL. Therefore, the application of formal logic must be done in natural language with which more logic knowledge can be taught to students" (see Zhou Liquan 2000: Preface), and thus formal logic can be studied for and in NL. In 1961, Zhou Liquan published his paper "Formal Logic should be Applied in the Study of the Meaning of Natural Language" which can be viewed as the birth of LNL in China. In this paper, he proposed that: 1) There are three types of meaning of NL: declarative meaning which expresses what is in the world; attitude

meaning which expresses the speaker's attitude toward what is in the world, and causative meaning which causes the addressees to act. 2) Meaning is externalized in the specific context which consists of time, place, addressor/addressee, and what has been expressed previously and what are anticipated to be expressed. 3) It is important to include the grammar and rhetoric devices into the study of formal logic. 4) It is necessary to establish a new logic system, i.e., the logic system of NL, by enriching the basic logic terms. Looking at this list, 1) bears great similarity to Austin's speech act theory, while 2) and 3) are similar with the Gricean theory of implication (Cai 2002).

Under the influence of Zhou Liquan, the first group of Chinese scholars engaging in the studies on LNL came into being, represented by Wang Weixian, Li Xiankun and Chen Zongming. After nearly ten years of stasis due to the Cultural Revolution, the study on LNL in China lagged far behind. For this reason, when work on LNL restarted at the late 1970s, the main task of Chinese scholars during the 1980s was to introduce various theories of LNL into China and analyse Mandarin Chinese from point of view of logic in a non-formalized way.

During this period, most of the influential papers on LNL were published in *Logic and Language Learning* (*Luoji yu yuyan xuexi* 逻辑与语言学习), a bimonthly journal founded in 1980 by CALL, and four volumes of *Studies on Logic and Language* (*Luoji yu yuyan yanjiu* 逻辑与语言研究) edited by CALL successively from 1980 to 1989, as well as the symposiums of *Theses on Logic and Language* (*Luoji yu yuyan lunji* 逻辑与语言论集) and *New Theses on Logic and Language* (*Luoji yu yuyan xinlun* 逻辑与语言新论) edited by CALL in 1986 and 1989 respectively. The representative papers on LNL include "Brief Introduction to Tense Logic" (*Tantan shitai luoji* 谈谈时态逻辑, 1981) by Zhang Jialong 张家龙in *Studies on Logic and Language* (vol. 1); "On Contrast (*Lun zhuanzhe* 论转折, 1982) by Wang Weixian and "Relational Logic and Everyday Conversation" (*Guanxi luoji yu richang yuyan* 关系逻辑与日常语言, 1982) by Zhuge Yingtong 诸葛殷同in *Studies on Logic and Language* (vol. 2); "On the Object of Language Logic" (*Shilun yuyan luoji duixiang* 试论语言逻辑的对象, 1986) by Ma Pei 马佩 (1929–2014).

The most important monographs published during this period include *Introduction of Language Logic* (1989) co-authored by Wang Weixian, Chen Zongming and Li Xiankun, *Brief Studies on the Logic of Modern Chinese* (1979) and *Logic and Expressions of Language* (1984) by Chen Zongming. *Fundamentals of Language Logic* (1987) edited by Ma Pei, *Logical and Verbal Communication* by Sheng Xinhua 盛新华, and *Art of Language Communication: The Logic Function of Context* (1989) by Wang Jianping 王建平.

Transitional Period (1990s)

In the 1990s, the research on LNL entered a new stage of development. This period is characterized by the transition from the preliminarily integrated studies of LNL to the deeply integrated studies. On the one hand, Zhou Liquan finished his "four-layer" theory of meaning (Zhou Liquan 1993, 1994) which represents the summit of the preliminarily integrated studies of LNL in China. On the other hand, it is during this period that the deeply integrated mode of LNL was introduced into China and gradually accepted by Chinese scholars represented by Zou Chongli, a doctoral student of Zhou Liquan.

In the preliminarily integrated mode of LNL, logic theories such as truth conditional semantics, propositional logic, tense logic, first order logic, etc. are employed to give account of the deductions expressed or expressible in NL. Since the linguistic mechanism underlying NL is not the concern of LNL, the study of this mode usually could not give birth to new theories specifically for the logical account of NL. In contrast, the deeply integrated studies of LNL aims at the formalization of the working mechanism which accounts for the ways NL works, or more exactly, the study of this mode is to construct the formalized representation of the syntactic and/or semantic structure of NL. Since the "pure" logic theories are inadequate in accounting for semantically/syntactically/textually mechanism of NL due to the complexity of NL, logicians in the deeply integrated mode have to develop various new theories interdisciplinary between logic and linguistics to cope with the problems of NL, such as Montague Grammar (MG), Generalized Quantifier Theory (GQT), Discourse Representative Theory (DRT) and Categorical Type Logic (CTL). All of these were introduced into China during the 1990s.

Zhou Liquan and Cai Shushan: Preliminarily Integrated Studies of LNL

In 1993 Zhou Liquan published his paper "Formal Logic and Natural Language", which was a lecture delivered at China's First National Seminar on Logic in May 1978. In this paper, Zhou Liquan proposed that the sympathetic meaning is an important aspect of meaning in NL. Based on this point and following the insights of various meaning theories such as referential theory, ideational theory, behaviourist theory, and use theory, Zhou Liquan developed his "four-layer" theory of meaning, which is based on the basic concepts such as meaning, context, implicature and presupposition. His theory can be outlined as follows: there are four layers in the conventionally understood concept of meaning: *A* (standing for a proposition) expressed by an abstract sentence;

FA (representing "proposition + propositional attitude") expressed by a sentence[1]; $U(FA)$ expressed by the utterance of a sentence in which U represents the speaker's emotional attitude, and $C_R^*(U(FA))$ is what a speaker intends to express in a specific context C_R.

Zhou Liquan systematically presented his theory in *Logic: The Theory of Correct Thinking and Effective Communication*. This book, a landmark work in China's history of LNL, was edited by Zhou Liquan, with its contributors being the most distinguished Chinese scholars in LNL at that time. Apart from Zhou Liquan's theory of meaning which covers implicature, presupposition, context and speech act, this book gives a systematic introduction to the various formal logic theories involved in LNL. Even today, this book still exerts a great impact on LNL researchers in China.

Following the footsteps of Zhou Liquan, Cai Shushan, one of his doctoral students, devoted himself to the study of illocutionary logic. From 1996 to 2002, he developed his own formal theory of illocutionary logic (Cai 1996; 1997; 1999; 2002). In 1998, he published the monograph *Speech Act and Illocutionary Logic* in which he systematically presented his formal theory of illocutionary logic.

The other representative achievements of the generalized studies of LNL during this period include: *Pragmatic Logic and Semantics* (1994) edited by the Chinese Association of Logic, *Logic of Language and Verbal Communication* (1991) by Hu Zehong, and *Studies on General Expression in Mandarin Chinese* (1998) by Xu Songlie 徐颂列. In 1992, *Introduction to Chinese Logic* was published. It is one of the noteworthy fruits of the Salon of Language Logic. The Salon, its main topic being the logical aspect of NL, was initiated in 1987 in Hangzhou, with the participants mostly being young scholars from various universities in Zhejiang Province.

Zou Chongli: Deeply Integrated Studies of LNL

It is during the 1990s that the deeply integrated mode of LNL was introduced into China. In 1992, Zou Chongli, a pioneer of the deeply integrated studies of LNL in China, finished his doctoral dissertation *Montague Grammar and its Tentative Application in Semantic Analysis of Mandarin Chinese*, the first paper on this grammar in China. During the same year, *Studies on Logic Semantics* edited by Zhu Shuilin 朱水林 was published. This book, a collaborative work of nine

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1   Note that the term of "propositional attitude" is used in the sense of illocutionary force by Zhou Liquan (1994).

scholars from philosophy, logic, linguistics and computational science, was a comprehensive guide to the basic theories of logic semantics developed along the lines of G. Frege, A. Tarski, P. R. Carnap and R. Montague. In 1995, Zou Chongli published his first monograph, *Logic, Language and Montague Grammar*, the first Chinese book systematically introducing Montague Grammar.

Following the insights of categorical grammar and Montague Grammar, various formal theories that were interdisciplinary between logic and linguistics, represented by CTL, GQT, and DRT, among others, were developed to cope with compositional aspect of NL. Compared with those classic logic theories, these theories of natural language were more flexible and effective in formalizing the syntactically and semantically compositional mechanism of NL, as well as the pragmatic reasoning of NL. For instance, the principle of syntax-semantics correspondence, the rule of thumb in the formal treatment of NL, is theoretically captured in CTL. Generalized quantifier theory revolutionized the concept of quantifier in the studies of NL, and hence greatly improved the expressive power of logic theories to formalize the complex and multifarious quantificational phenomena of NL. DRT and the other theories of dynamic semantics aim at capturing the dynamic construction of meaning. Therefore, the deeply integrated theories of LNL are more applicable in NLP, and thus represent the trend of development of LNL.

However, due to the lost ten years of the Cultural Revolution, the deeply integrated studies of LNL in China lagged far behind. Towards the end of the 1990s there were only a few doctoral students who, under the influence of Zou Chongli, began to turn their interest to the deeply integrated studies of LNL, and the deeply integrated mode of LNL in China was still in its challenging early stage.

All-round Development Period (Since 2000)

Since the beginning of the 21st century, the study of LNL in China has entered a new period of all-round development. In today's China, the deeply integrated studies of LNL have gradually become the mainstream of LNL, and the gap between the research on LNL inside and outside of China has been greatly narrowed down. At present, there are two main circles of LNL: the Chinese Academy of Social Sciences (Zhongguo shehui kexueyuan 中国社会科学院, CASS) and Zheda (Zhejiang daxue 浙江大学 Zhejiang University). The CASS Circle is known for its deeply integrated studies of LNL, and its research is mainly on the syntactically and semantically compositional aspects of NL. In contrast, the research focus of LNL in the Zheda Circle is mainly on the logical aspects of

metaphor, presupposition, argumentation as well as the pragmatic reasoning of NL. Additionally, there are also some logicians in other universities (for example Sun Yat-sen University (Zhongshan daxue 中山大学) and Nanjing University (Nanjing daxue 南京大学)) whose research cover the field of LNL.

At present, LNL is one of the hottest fields in logic studies. Since 2010 when the National Social Science Fund of China (NSSFC) began to fund the Major Research Programs of Fundamental Sciences, Zou Chongli, Huang Huaxin 黄华新, Cai Shushan, Du Guoping 杜国平, and others have successively been approved to implement different Major Research Programs on LNL funded by the NSSFC. Additionally, every year there are always some special programs on LNL approved by NSSFC.

CASS Circle of LNL

The CASS Circle of LNL refers to a group of scholars most of whom finished their doctoral or post-doctoral studies in CASS. Zou Chongli, as the pioneer of the deeply integrated mode of LNL in China, is the leading scholar of the CASS Circle.

The studies produced by the CASS Circle cover MG, GQT, DRT, Situational Semantics and Event Semantics, among other topics. Since 2000, Zou Chongli has published the monographs *Studies in Natural Language Logic* (2000), *Logic, Language and Information: Studies in Logical Grammar* (2002) and *Categorial Type Logics* (2008). Additionally, he has authored or co-authored more than 100 papers on LNL. Stimulated by Zou Chongli's work, many young scholars are working in various fields of LNL, and remarkable achievements have been made over the past twenty years. Representative works include: Liu Xinwen's 刘新文 doctoral dissertation *Quantity Extension of System Z and its Treatment of DRT* (2002), Li Kesheng's 李可胜 doctoral dissertation *Model and Computation of Events* (2010), Zhang Xiaojun's 张晓君 doctoral dissertation *Studies on the Properties of Generalized Quantifiers* (2011), Gao Yun's 高芸 doctoral dissertation *Exploring the Rhetorical Form of Chinese Discourse Structure from the Angle of SDRT* (2011), Jia Guoheng's 贾国恒 monograph *A Research on Situational Semantics* (2012), and Chen Linlin's 陈琳琳 doctoral dissertation *A Research on Chinese Donkey Sentences Based on the Framework of DRT* (2013).

From around 2010, a team of researchers under Zou Chongli's leadership devoted themselves to studies on the application of CTL in NLP, especially the application of Combinatory Categorical Grammar (CCG) in analysing large-scale authentic texts of Mandarin Chinese. Accepted as one of the most efficiently

parseable and linguistically adequate grammars of NL, CCG is known for its theoretical parsimony and strong adequacy. Since 2010, Zou Chongli has been approved to implement two major research programs on LNL funded by NSSFC. Working collaboratively with computational linguists, the research team led by Zou Chongli has created an experimental CCG-based Chinese TreeBank. The relevant works can be found in *Logical Semantics on Natural Language Processing* (2018), as well as in Chen Peng's 陈鹏 postdoctoral report *Research on CCG and Construction of Treebank of Chinese* (2016).

The other notable achievements made by the CASS Circle in categorial grammar include: Wang Xin's 王欣 doctoral dissertation *Categorial Type Logics and "shi" and "de" in Mandarin Chinese* (2009), Zhang Lu's 张璐 doctoral dissertation *Category Grammar of Mandarin Chinese Structure of "Adjective + Noun"* (2013), Man Haixia's 满海霞 monograph *Typical Logic Studies on Anaphora and Ellipsis in Mandarin Chinese* (2014), Jia Qing's 贾青 monograph *Categorial Type Logics and Their Application in Anaphora of Pronoun in Mandarin Chinese* (2015), Shi Yunbao's 石云宝 doctoral dissertation *A Study on DRT Based on Compositionality* (2015) and Yao Congjun's 姚从军 paper "IT-oriented Analysis on Chinese Pronoun Anaphora Phenomenon from the Perspective of CCG" (2018).

Zheda Circle of LNL

In the south of China, Hangzhou 杭州 in Zhejiang Province has become another centre of LNL studies. Huang Huaxin, a distinguished professor at Zhejiang University, is the leading scholar of the Zheda Circle of LNL. Following the footsteps of Wang Weixian and Chen Zongming, the research on LNL in the Zheda Circle mainly covers the formalized studies of metaphor, presupposition, argumentation and pragmatic reasoning.

Since 2007, Huang Huaxin has been working as one of the chief-editors on *Library of Linguistics and Cognition* (in 16 volumes), *Studies in Linguistics and Cognition* (in six volumes), and *Translated Library of Linguistics and Cognition* (in 10 volumes). Additionally, he has authored or co-authored more than 60 papers on formalized studies of the semantics and/or pragmatics of NL. The most representative papers include: "Aspects of Pragmatic Referentiality" (2010, with Chen Jing), "Communicative Acts: Intentionality, Contextuality and Reciprocity" (2012, with Wu Yicheng), "An Ontology-Based Approach to Metaphor Cognitive Computation" (2013, with Huang Xiaoxi et al.), "Partial Semantics of Argumentation: Basic Properties and Empirical Results" (2013, with Liao Beishui et al.), "Metaphor Interpretation and Motivation in Relevance Theory" (2014, with Yang Xiaolong),

and "The Expression and Understanding of Metaphors from the Perspective of Cognitive Science" (2020).

Other representative achievements made by the Zheda Circle of LNL include the monographs of *Logical Analysis of Chinese Sentences* (2011) by Jin Li 金立, *Formal Analysis of the Meaning of Mandarin Chinese Sentences* (2011) by Chen Zongming and others, and Jia Gaiqin's 贾改琴 doctoral dissertation *Epistemic Predicate Logic System KSS+KBF* (2007).

Achievements of Other Scholars

The past twenty years have witnessed the rapid development of LNL in China. The scholars who engage in the study of LNL include not only those mentioned above, but also scholars whose research interest covers LNL. In Sun Yat-sen University, some scholars working at ILC (the Institute of Logic and Cognition) are also making remarkable achievements in studies of LNL. For instance, the book of *Logic of Natural Languages for Knowledge Representation and Reasoning* (2009) edited by Ju Shier 鞠实儿 can be viewed as one of the most important Chinese books on LNL. Other important works by the scholars in ILC include "Research of Flexible Word Order in Chinese Statements Based on Light Weight Semantic λ-calculus" by Liu Dongning 刘冬宁 et al. (2016), and "On Logical Analysis of Evaluating a Real Argument in Everyday Life" by Xiong Minghui (2006).

In Beijing, though Cai Shushan has turned his interest to the interdisciplinary field between LNL, cognitive studies and psychology, his work on LNL cannot be ignored. During the past two decades he has published more than 60 papers, and most of them are on LNL. His recent representative work on LNL is the book of *Formal Theories of Natural Languages* (2010, co-authored with Zou Chongli). Zhou Beihai 周北海, a professor at Beijing University, has been working on the properties of the generic sentence and the problems of its reasoning. His representative works include "Four Semantic Layers of Common Nouns" (2010, with Mao Yi), "A Tableau Algorithm for Term Logic of Generic Sentences" (2013, with Ma Li 马丽), and "A Formal Characterization of Referential Presupposition: Triggered by Proper Names as Existence" (2014, with Fu Qingfang 傅庆芳). Other noteworthy achievements made by scholars in Beijing include Liu Zhuanghu's 刘壮虎 paper "Entailment and Conditional Entailment, Among Others" (2004) and Du Guoping's paper "A 'not...but...'-Type Natural Deduction System Without Connectives" (2019).

Apart from those mentioned above, there are various other achievements in LNL made by Chinese scholars during the past two decades, such as the papers

"Connection from Mental Content to Meaning" (2018) and "The Problem of Predication in Russell's Philosophy and its Cognitive Significance" (2015) by Huo Shuquan 霍书全, "Two-dimensional Presuppositional Logic and The Projection of Presupposition in Compound Sentences" (2008) by Deng Xiongyan 邓雄雁 and Hu Zehong 胡泽洪, "The Logical Features of Metaphor" (2007) by An Jun 安军 and Guo Guichun 郭贵春, and "The Idealization in Metaphorical Modelling and its Logical Characteristics" (2018) by Yang Yeyang 杨烨阳 and Guo Guichun.

Interdisciplinary Studies of LNL

Following the trends in LNL around the world, LNL has not only become one of the important fields of logic studies in China, but also one of the important interdisciplinary fields between logic, linguistics and NLP. More specifically, there are an increasing number of scholars in linguistics and NLP who adopt the formal theories of LNL in their study of NL.

Due to the fact that Mandarin Chinese, as a typical language of parataxis, is poor in morphological markers, and the rules of expressions are highly sensitive to semantic and/or pragmatical factors, there is a tradition in Chinese linguistics to analyse Mandarin Chinese from the logical point of view. Actually, an older generation of linguists such as Wang Li 王力 (1900–1986), Lü Shuxiang 吕叔湘 (1904–1998), Zhu Dexi 朱德熙 (1920–1992), Guo Shaoyu 郭绍虞 (1893–1984), and Zhang Zhigong 张志公 (1918–1997), thought highly of logical approaches to linguistic studies. Among these scholars, Wang Weixian, a distinguished linguistic professor in Zhejiang University, is one of pioneers of LNL. The other representative scholars include Xin Fuyi 邢福义, a linguistics professor in Central China Normal University, and Yuan Yulin 袁毓林, a linguistics professor in Beijing University.

As early as 1984, *Logic in Linguistics*, a famous textbook of LNL written specially for linguists by J. Allwood et al., was translated into Chinese. However, the earlier study of LNL in linguistics was limited to the adoption of proposition logic or first-order logic in locally accounting for some semantic or pragmatic phenomena in Mandarin Chinese. It is under the influence of Chomsky's theory of transformational syntax and Montague Grammar that the logical aspect of the global mechanism of NL became the main concern of formal semantics for those linguists. In 1998 and 2000, *Introduction to Formal Semantics* by Jiang Yan 蒋严 and Pan Haihua 潘海华, two scholars from Hong Kong, and *Logic Semantics: An Introduction* by Fang Li 方立 (1942–2010), were both published. These are the

earliest Chinese books on formal semantics published by and for linguists, playing a very positive role in popularizing the formal semantics in China.

Since the beginning of the 21st century, more young scholars have entered the field of formal semantics. Representative publications on formal semantics from these years include Li Kesheng's paper "Generative Models of SVC's Semantics and Their Triggering Conditions" (2020), the article "On the Logical Nature of Pragmatic Inference" (2002) by Jiang Yan, *Research on Type-logical Grammar* (2007) by Zhang Qiucheng 张秋成, *Introduction to Event Semantics* (2017) by Wu Ping 吴平 and Hao Xiangli 郝向丽, and *Approaching Formal Pragmatics* (2011), edited by Jiang Yan. In particular, since Jiang Yan published his paper "On the Logical Nature of Pragmatic Inference" in 2002, studies on the scalar implicature brought about by the Mandarin Chinese words *dou* 都, *ye* 也, and others, have been one the hottest topics in Chinese linguistics, and there are a large number of papers on this theme. Among them, the most representative include "Focus-sensitive Constructions and the Interpretation of Focus (I/II)" (2003) by Lee Po-lun Peepina, and others, "*De*-construction, Modality and Counterfactual Reasoning" (2016) by Lin Jo-wang 林若望, and "Revisiting the semantics of *dou*" (2018) by Feng Yuli 冯予力 and others.

In recent years, a group of young scholars who obtained their doctorates in overseas universities published their research papers in international journals, which has greatly raised the reputation of China's formal semanticists. Representative papers among these include Lin Jo-wang's "Choice Functions and Scope of Existential Polarity WH-phrases in Mandarin Chinese" (2004) in *Linguistics and Philosophy*, "On the Semantics of Comparative Correlatives in Mandarin Chinese" (2007) in the *Journal of Semantics*, and Liu Mingming's 刘明明 paper "Varieties of Alternatives: Mandarin Focus Particles" in *Linguistics and Philosophy* (2016). Additionally, Liu Mingming also published his English monograph *Varieties of Alternatives: Focus Particles and wh-expressions in Mandarin* (2018).

In NLP, Feng Zhiwei 冯志伟, one of the most distinguished computational linguists in China, wrote a paper titled with "Categorial Grammar" to introduce the application of categorial grammar in NLP as early as 2001. Since them, categorial grammar and its variants (especially CCG) have been gradually introduced into the field of NLP.

In CCG, there is a completely transparent interface between surface syntax and underlying semantic representations including the predicate-argument, quantificational and informational structure of NL. The lexicon becomes the only resource for specifying language-specific information such as the order of constructions, and the syntactic projection of NL is defined by a small set of combinatory

rules. Thus it is viewed as one of most effective tools of modelling the close coupling between syntax and semantics envisaged in MG and its modern variants. The advantages of CCG make it easily adopted to the common practice of NLP, and thus it has been one of the most important logic theories applied in NLP. The same is true in China, and there is an increasing number of Chinese scholars of NLP who adopt CCG in NLP. A CCG treebank created from the Tsinghua treebank by a team led by Song Yan 宋彦 (Song Yan et al. 2012; Zhou Qiang 2016) can be viewed as the most influential work of this type in China during the last twenty years.

Other important work on of CCG in NLP can be found in papers such as "Study on the Formalization of Information Processing-oriented Context" (2004) by Li Dehua 李德华 and Liu Genhui 刘根辉, "Metaphor Literal Meaning Representation and Generation" (2009) by Wang Jinjing 王金锦 et al., "Measuring Word Abstractness for Metaphor Recognition" (2017) by Jia Yuxiang 贾玉祥, and Rekia Kadari's doctoral dissertation *CCG Supertagging Based on Deep Learning Models* (2018).

Conclusion

On the whole, LNL in China experienced an incredibly prolonged initial period from the end of the 1950s to the end of the 1980s, a very challenging period of development during the whole 1990s, and an accelerated and comprehensive development during the first twenty years of 21st century. After more than half a century's development, LNL in China has made great progress. Today, it has not only become one of important research fields of logic, but also an important interdisciplinary field linking logic, linguistics and NLP.

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SPECIAL ISSUE
HISTORY OF LOGIC IN
CONTEMPORARY CHINA

A Century of Mathematical Logic in China

Between Philosophy and Mathematics: General Trends in Dissemination, Teaching, and Research on Mathematical Logic in 1930s China

Jan VRHOVSKI*

Abstract

This article studies some central developments in the propagation and teaching of mathematical logic in 1930s China. Focusing on the emergence of a twofold disciplinary approach to mathematical logic, namely as a discipline studied and disseminated by Chinese philosophers on the one hand and mathematicians on the other, this paper explores one of the key turning points in the development of the academic notion of mathematical logic in China. Apart from casting some light on the teaching of mathematical logic in the framework of both philosophical as well as mathematical spheres of inquiry, this article also provides some preliminary insights into the circumstances surrounding the first systematic introduction of mathematical logic into the modern standardized system of education, which gradually took shape over the late-1920s and early 1930s in China.

Keywords: mathematical logic, mathematics, philosophy, China, Republican Period

Med filozofijo in matematiko: splošne težnje v širjenju, poučevanju in raziskovanju matematične logike na Kitajskem v 30. letih 20. stoletja

Izvleček

Članek preučuje osrednje razvojne smernice v širjenju in poučevanju matematične logike na Kitajskem v 30. letih 20. stoletja. Osredotočen na pojav dveh različnih znanstvenih pristopov k matematični logiki – namreč kot disciplini, ki so jo preučevali in širili kitajski filozofi na eni strani ter kitajski matematiki na drugi – nadalje preučuje eno izmed osrednjih točk obrata v razvoju matematične logike kot akademske discipline na Kitajskem. Poleg tega, da pojasnjuje, kako se je predmet poučevalo v sklopu tako filozofskih kot tudi matematičnih raziskav, članek prav tako podaja nekaj preliminarnih vpogledov v okoliščine, ki so obdajale prvi sistematični poskus vključitve matematične logike v moderni standardizirani sistem izobrazbe, ki je postopoma nastajal na Kitajskem v 20. in 30. letih 20. stoletja.

Ključne besede: matematična logika, matematika, filozofija, Kitajska, republikansko obdobje

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Introduction

By the early 1930s, mathematical logic as a notion and field of study became an integral element of the efforts of nationalist government to modernize Chinese education both at the higher as well as the secondary levels. Catalysed by the efforts of a group of Chinese philosophers, educated either at foreign institutions or Chinese universities in the centre of intellectual modernization in the 1920s, mathematical logic as a subject of teaching and research became established as one of the central pillars of modern philosophical studies as early as in the late 1920s. By the early 1930s, as a widely renowned paragon of university-level curricular reformation, the Department of Philosophy at the reformed National Qinghua University (*Guoli Qinghua daxue* 國立清華大學, official English name Tsinghua University) became the first centre of teaching and research in mathematical logic nationwide, prompting the start of a new wave of dissemination and advancement of mathematical logic in Chinese academia.

This article represents a follow-up to one of my previous publications entitled "'Qinghua School of Logic': Mathematical Logic at Qinghua University in Peking, 1926–1945" (Vrhovski 2021a), which surveyed the development of teaching and research of mathematical logic at Qinghua University in the late-Republican period. The main aim of this article is to supplement the results of this earlier article by presenting a more general overview of the development of mathematical logic as a subject of teaching and research in 1930s China. In the course of following discussion, these developments will be presented through the prism of two contending currents of approach towards studying and teaching mathematical logic that formed by the early-1930s: that is, mathematical logic as a part of Chinese academic philosophy on the one hand, and mathematics on the other. With regard to their conceptual extensions—i.e. as the constituents of broader theoretical discourses of both respective disciplines—the distinction between these two currents shall be referred to as the philosophical and mathematical "notions" of mathematical logic. The main reason behind introducing such a distinction resides in the fact that, for the most part, the advancement of the latter had been conducted in the context of the wave of popularization of mathematics in the 1930s. More importantly, the application of a conceptual disparity of this kind can serve as an ample explanation for the relatively rapid "mathematization" of mathematical logic which took place in Chinese academia in the early 1950s. Thus, in the broadest sense, in line with the above-mentioned article on the so-called "Qinghua School of Logic", this study will provide a background for the subsequent surveys on the development of mathematical logic in the People's Republic of China (1949–). Aside from a brief overview presented by Rafael Suter

(2020) in his contribution to the *Dao Companion to Chinese Philosophy of Logic* and specific sections of Xu Yibao's doctoral dissertation from 2005, this study will be one of the first such contributions to the Western scholarship on the history of logic in Republican China. Furthermore, it will be first study highlighting the parallel development of mathematical and philosophical notions of mathematical logic in this context.

The Ariadne's thread of the following discussion will interconnect three main parts: In the first chapter I will take a closer look at teaching and research in mathematical logic in the context of philosophical departments at Chinese universities. Because the main features, directions, and achievements of the Qinghua School have already been discussed in detail in the above-mentioned article, only a brief summary of the developments at Qinghua will be given, while the main focus of the chapter will reside with the developments at other universities of similar status, including Peking University and the reformed National Wuhan University, and finally also the gradual introduction of essentials of mathematical logic in the modernized and standardized textbooks for higher secondary schools, normal schools and universities. Correspondingly, the second chapter will closely examine the development of mathematical logic in the context of Chinese mathematicians' research and efforts at popularizing mathematical logic in the 1930s. Finally, the third and the last section will be reserved for concluding remarks and a brief analysis of the value of the main findings of this survey for our understanding of the following period of mathematical logic.

Mathematical Logic as Part of Academic Philosophy: From Qinghua to Wuhan University

As already mentioned in the introduction, mathematical logic as a part of academic discipline of philosophy reached its full bloom in the progressive environment of the Department of Philosophy at Qinghua University. In the framework of the flourishing of modern Western philosophy at the department, mathematical logic became one of the pillars of both undergraduate and later also graduate studies of philosophy. As such, mathematical logic as formulated in the works of Bertrand Russell and his and Whitehead's monumental *Principia Mathematica* was taught as part of the basic and advanced courses on logic both at the level of the institute of humanities and specialized studies in philosophy. Apart from its early inclusion into the mandatory and selective courses on logic, from the late-1920s on mathematical logic was also one of the main

research foci of the leading senior members of the department, such as Jin Yuelin 金岳霖 and Zhang Shenfu 張申府. Concurrently with the formation of the first generations of graduates specialized in logic, mathematical logic also became one of the leading specializations of those alumni of the department who either continued their studies at Western universities or upon graduation joined the department as junior lecturers—such as, for instance, Shen Youding 沈有鼎 and Wang Xianjun 王憲鈞. While at the earliest stage the style and content of teaching of mathematical logic at Qinghua University was more or less epitomized in Jin Yuelin's renowned textbook *Logic* (*Luoji* 邏輯), the later generation of Qinghua-trained logicians ushered in a wider selection of contents from contemporary advances in European circles of modern logicians. Thus, by the mid-1930s the range of content relating to mathematical logic taught at the department included: the system of *Principia*, advances of the "Harvard School" of symbolic logic, symbolic logic as advanced by the members of the Vienna Circle—from Carnap to Gödel, down to theories of many-valued logic of the Polish Circle of modern logicians. In line with the general trends in the field, as still extant in Western academia in the 1920s and 30s, mathematical logic at Qinghua was taught in strict cohesion with analytic philosophy, in particular, and in direct connection with traditional and modern Western philosophy, in general. In other words, mathematical logic was more or less considered as an advanced form of traditional formal logic, which still shared the same disciplinary framework with its predecessor. (See Vrhovski 2021a)

From the early 1930s on, the influence of the Qinghua School of Logic and its slowly growing circle of analytic philosophers extended far beyond the university. After the former student and propagator of Russell's philosophy Fu Tong 傅銅 rejoined the reopened Peking University as the head of the Department of Philosophy in 1929, interest in modern logic and analytic philosophy was gradually rekindled at the department. Consequently, in addition to the advancement of a special study group for logic (*lunlixue zu* 論理學組) in the framework of the Philosophical Research Society (*Zhexue yanjiuhui* 哲學研究會) (see Guoli Beijing daxue 1929, 68), his strong inclination towards modern Western philosophy probably also prompted a new wave of integration of courses on analytic philosophy and mathematical logic into the basic curriculum at the department. Subsequently, in the early 1930s, the undergraduate and graduate students of philosophy at Peking University were able to attend a series of lessons given by professors from the neighbouring Qinghua University, from Zhang Shenfu's introductory course on mathematical logic and Russell, to Jin Yuelin's specialized lectures on Mill, epistemology and so on. In this regard, the developments relating to the teaching of mathematical logic at Beijing's most prestigious universities had their

epicentre at the early studies of Western modern logic and philosophy at Qinghua University.[1]

The second important wave of spreading the Qinghua-type of teaching of mathematical logic at Chinese universities came with the first generations of graduates of the Qinghua philosophical department, or in rarer cases through the work of scholars who had in any way been affiliated or in touch with the developments at Qinghua. Naturally, in parallel with the spread of the Qinghua Circle's influence by means of personal ties and fostering a new generation of outstanding Chinese scholars, the dissemination of the notion of mathematical logic as taught and researched at the department was to a much larger degree conducted by means of publications, which included research treatises and propaedeutic articles on one side, and the dissemination of certain types of textbooks on the other. Apart from Peking University, another instance of the introduction of content related to mathematical logic by an alumnus of the Qinghua school was the reformed National Wuhan University (*Guoli Wuhan daxue* 國立武漢大學).

National Wuhan University was officially established in 1928. It was founded as an attempt to combine a number of smaller institutions of higher education from Hubei, including the recently established (1926) National Wuchang University (*Guoli Wuchang daxue* 國立武昌大學), into one major and modernized university. Owing to its relatively late establishment, and through the influence of a the newly rising tide of modernization of Chinese academic philosophy, the earlier National Wuchang University already boasted a relatively theoretically pertinent and updated curriculum for logic. In the framework of the Wuhan University's Department of Philosophy, the first major advance towards a modernized course in logic came in the year with the appointment of Tu Xiaoshi 屠孝實 (courtesy name Zhengshu 正叔, 1898–1932) as a lecturer of logic (Guoli Wuhan daxue 1931, 73, 82). Tu was a graduate of Waseda University in Tokyo and a former professor of philosophy at Peking University, who in 1926 wrote and published the highly influential textbook *Logic Primer* (*Mingxue gangyao* 名學綱要), which also encompassed a short introduction to early algebraic logic (Boole and De Morgan) based on Jevons' *Elementary Lessons on Logic*.

In 1932, Tu was replaced by Wan Zhuoheng 萬卓恆 (1902–1948), a graduate of philosophy from Qinghua and Harvard Universities. Prior to his tenure at Wuhan University, Wan taught philosophy at the North-Eastern University. During his professorship at Wuhan, between 1931 and 1948, Wan was generally known

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1   On the earlier developments in teaching and propagating modern logic at Peking University, see Vrhovski (2021b). On development of the academic discipline of Chinese philosophy at Chinese universities in the 1920s and 1930s, see Lin (2012), etc.

as a lecturer of logic who specialized on mathematical logic.[2] Wan's reputation as a professor of philosophy who understood mathematical logic and lectured about *Principia Mathematica* extended beyond the circle of professors and students at the university. Even though Wan did not produce any writings related to mathematical logic or even logic, he is mentioned in some contemporary Chinese histories of modern logic in China as one of those philosophers from Republican China who were engaged in teaching and spread of mathematical logic.[3] Beside logic (*lunlixue*), Wan also taught other courses related to contemporary Western philosophy and epistemology. The official overview of courses and programs at the National Wuhan University from 1932 reveals that the first course on logic organized by Wan had already assumed a modern outlook. The content of Wan's lectures from 1932 covered the following topics: various problems in formal logic, forms of deduction and contemporary logic (Guoli Wuhan daxue 1932, 23). In the following years, apart from an elementary course Wan also organized an advanced course on logic (called "Logic 2, Lunlixue er 論理學二"), which was offered as an elective course for students of philosophy. In 1934, the elementary course was devoted exclusively to an overview of Aristotelian logic and aimed at presenting a general outline of the principles of human thought and the idea of correct thinking. The advanced course, on the other hand, consisted of three main parts: Aristotelian logic, symbolic logic (mathematical logic) and theory of induction (Guoli Wuhan daxue 1934, 26–27, 33). According to the reminiscences of Wan's former student Xiao Shafu (蕭箑父, ?), the part of the lectures related to symbolic logic revolved exclusively around the *Principia Mathematica*, covering the parts about the basic principles and logical calculi (Xiangren 2017, 26). The content of the elementary course changed again in 1936, when it was reorganized to include 1) formal logic and 2) the scientific method, while the content of the advanced course remained unchanged (Guoli Wuhan daxue 1936, 33, 40). In the same year, two elementary textbooks were prescribed: beside the by then already standard textbook *Essentials of Logic* by Wolf, there was also *Logic* (*Lunlixue* 論理學 (1931)), written by Fan Shoukang 範壽康 (1895–1983), another professor of philosophy at Wuhan.[4]

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2   Beside He Lin's mention of Wan as one of the leading contemporary Chinese philosophers who specialized in mathematical logic, there are also accounts and reminiscences of his former students, most notably the philosopher Xiao Shafu. See Li Mianyuan (2016); Li Weiwu (2009); Xiangren (2017).

3   See, for example, Shi and Zeng (1998, 29–33).

4   The textbook was published as a part of *Kaiming Pedagogical Textbooks* (*Kaiming shifan jiaoben* 開明師範教本). It was designed in accordance with a psychological approach to logic (logical psychologism), which favoured the experimental logic of American pragmatists above other types of modern logic. As a matter of fact, even though in his historical introduction Fan did mention

Mathematical Logic as a Mathematical Field of Research: The Wuhan Circle of Mathematicians

As indicated in the introduction, before the 1930s mathematical logic was still generally understood as a field of studies researched by, so to say, "philosophers-logicians". This also meant that the predominant notion of mathematical logic in the Chinese intellectual world was still understood in the context of modern Western philosophy. However, this understanding underwent significant changes in the early 1930s, when a few young mathematicians who returned from their studies in Europe decided to engage in research of the foundations of mathematics and mathematical logic. One of the most important centres for the concentration of such interest in mathematical logic was the aforementioned Wuhan University. After Fu Zhongsun's 傅種孫 and Zhang Bangming's 張邦銘 translation of Russell's *Introduction to Mathematical Philosophy* in the early 1920s (see Russell 1922), the following developments represented the first major shift of identity of mathematical logic in China, which in the 1930s started its twofold evolutionary path. One of the young scholars who was at the forefront of this transformative process was the mathematician Tang Zaozhen 湯璪真 (Tang Tsao-Chen, 1898–1951). Tang, who completed his graduate studies in mathematical logic at the Universities of Berlin and Göttingen, became the main driving force behind the research on mathematical logic at the mathematical department of Wuhan University. The importance of Tang Zaozhen and the circle younger mathematicians at Wuhan University has already been noticed by Xu Yibao (2005), who briefly mentioned Tang in his doctoral dissertation *Concepts of Infinity in Chinese Mathematics*. He wrote:

> After graduating from Department of Mathematics of Beijing Teachers College in 1919, TANG taught mathematics at Beijing Teachers College for Girls. In late of 1923, he went to Germany to pursuit his further study in mathematics. During the next two and a half years, Tang studied

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mathematical logic or symbolic logic of Boole as one of the mainstream currents in contemporary logic, it was only a brief mention, ignoring all its main contributors who succeeded Boole. Moreover, he treated mathematical logic as a less important branch of the formalist school in philosophical logic, and instead devoted more attention to idealist conceptions of logic. Fan also regarded the pragmatist logic of Dewey as one of the most important logical schools of the time, which contented against logic formalism, as manifested in mathematical or symbolic logic (Fan 1931, 1–26). One of the immediate consequences of his view of logic led Fan to exclude the most important contemporary contributions to theory of deduction from the textbook. Instead, Fan's outline of the science of reasoning derived its broadness from the inclusion of a great number of metaphysical and phenomenological meditations on logic. Thus, for example, beside deductive and inductive reasoning, he also discussed the notion of analogical reasoning (*leibi tuilun* 類比推論) etc. The textbook also maintained a notion of Chinese logic as reflected in traditional Chinese philosophy.

primarily differential geometry and mathematical logic at University of Berlin and University of Göttingen. When he returned in 1926, he was appointed as Professor of mathematics at National Wuchang University (the predecessor of Wuhan University). At the University, he used Wilhelm J. E. Blaschke's textbook for teaching his course on differential geometry. Mathematical logic was not on the curriculum of the University, but TANG did not lose his interest in it. Although his focus was on Clarence Irving Lewis's calculus of strict implication, and was not directly related to aspects of the infinite, it does show how quickly Chinese mathematicians began to respond to this new area for their own research. TANG published three articles on the subject in the *Bulletin of the American Mathematical Society*. In the first of these, "The Theorem $p - 3q = pq = p$ and Huntington's Relation Between Lewis's Strict Implication and Boolean Algebra," he shows that the theorem "$p - 3q = pq = p$" holds true in Lewis's system, and that it strengthens a previous result of Edward Huntington. Based on this result, TANG went on to show that where any implication "$p - 3q$" is asserted, then "$p - 3q = i$," from which it follows that any two asserted implications are strictly equivalent, and, in particular, that any two of Lewis's first eight postulates can be deduced from each other. TANG also studied algebraic postulates for Boolean rings. (Xu 2005, 189–90)

As pointed out by Xu, Tang's main contribution to mathematical logic consisted in his treatment of Huntington's discussion of Lewis's theory of strict implication and the theorem "$p \dashv q \,.=.\, pq = p$". Although Xu's account of Tang's main contributions to mathematical logic is close to complete, some additional points related to Tang's work must still be added. Firstly, we need to point out that Blaschke's differential geometry was one of the central subjects of Tang's studies in Germany. Apart from mathematical logic, in the early 1930s Tang also focused on other branches of mathematics, such as for example, Levi-Civita's absolute differential calculus, which he also translated into Chinese (Cheng Minde 1994 I, 60–71). Tang's translations also included Hans Hahn's "Set-Theoretical Geometry", which was first published in 1930 in the *Quarterly Journal of Science of the National Wuhan University* (*Guoli Wuhan daxue like jikan* 國立武漢大學理科季刊). Secondly, according to the biography composed by his son Tang Xiangsen 湯湘森, Tang researched mathematical logic throughout the entire wartime period. If this is true, the same or similar could also apply to the research activities of the group of mathematicians working closely with Tang (ibid., 68). Unfortunately, no textual evidence is preserved to confirm these claims. Finally, Tang was also one of the founding members of the Chinese Mathematical Society. From

its official inauguration in 1935, Tang assumed a series of important positions in the society—he was one of its 21 council members elected in 1935 and a member of the society's executive council in 1936 (Ren and Zhang 1994, 30, 52). At the second annual meeting of the society, which took place at Qinghua Science Museum in 1936, Tang also read his two articles on strict implication, published in the same year in the *Bulletin of American Mathematical Society*. Thus, together with Zhu Gongjin—about whom we shall say more in the next section—Tang was one of two most important members of the society, who maintained an interest in contemporary mathematical logic and contributed to its advancement in Chinese mathematical circles. Interestingly, both Zhu and Tang had studied mathematics at Göttingen University in Germany, although only the latter contributed scientifically to the field. Furthermore, in the 1930s both participated in activities related to science education. Tang was also invited to take part in the 1933 consultative symposium on astronomy, mathematics and physics organized by the Ministry of Education.

Another Wuhan mathematician, who (probably under the influence of Tang Zaozhen) engaged in research on topics related to mathematical logic, was Xiao Wencan 蕭文燦 (1898–1963), an assistant professor of mathematics at Wuhan.[5] Xiao started his path in higher education at the Guizhou Province Normal College in Guiyang (graduating in 1916). In 1921, he enrolled in Wuchang Higher Normal College (predecessor of Wuhan University), majoring in mathematics. Upon graduation in 1925 he joined the university as a lecturer in mathematics. Concurrently, he also worked as a lecturer of mathematics at the China University. Later, in 1937, he went on a scholarly exchange to Germany, where he studied consecutively at the Universities of Berlin and Leipzig. Xiao returned to China in 1940, after he was awarded a doctoral degree in mathematics from University of Leipzig. Working under Tang Zaozhen, back in the early 1930s, Xiao Wencan also devoted a part of his work to problems related to mathematical logic, more precisely to Cantor's transfinite set theory.[6] Between 1933 and 1934, Xiao published a series of articles entitled "Set Theory (Jihelun 集合論)" in the university's *Quarterly Journal of Science*, in which he delivered a systematic introduction to Cantorian set theory. The collection of Xiao's four articles on set theory was reprinted in the form of a monograph (*Jihelun chubu* 集合論初步 (*Elementary Set Theory*)) in 1939. In the same journal Xiao also published a Chinese translation

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5   For a condensed biographical account on Xiao Wencan, see Li and Xiao (2005).

6   Xu Yibao and his doctoral supervisor Joseph Dauben claim that Xiao was the first Chinese mathematician to have provided a systematic overview of Cantor's set theory (Xu 2005, 200; Dauben 2002, 267).

of Hardy's work "Orders of Infinity (Wuqiongda zhi jie 無窮大之階)".[7] In his dissertation, Xu Yibao commented on Xiao Wencan's and Zhu Gongjin's contributions to the propagation and spread of mathematical logic in the following way:

> Xiao's and Zhu's articles, together with Chinese translations of Russell's work, kindled further interests in mathematical logic in China. As a result, in the 1930s a number of Chinese students of mathematical logic were able to carry out their own research. By the time TANG Zaozhen's third article was published in America, another Chinese student had written his dissertation on mathematical philosophy and the theory of sets at the University of Paris. This was ZENG Dinghe 曾鼎龢, also known as TSENG Ting-Ho.[8] The major parts of ZENG's thesis dealt with set theory and transfinite numbers. In retrospect, one may regard ZENG's thesis as superficial and sketchy.[9] It nevertheless represents the beginning of serious and important work that Chinese logicians would soon make to mathematical logic. (Xu 2005, 200–1)

Although Xu's summarization of Xiao's contributions is somewhat biased, he might have made a pertinent remark regarding mathematical logic as a subject studied by Chinese mathematicians. Furthermore, the contributions by Xiao and Zhu, which must be regarded as introductory works or attempts at the popularization of mathematical logic and set theory as one of its constitutive branches, could indeed have been pivotal for kindling the Chinese mathematician's interest for the above-named fields of studies, especially because they both purported to convey their mathematical content rather than philosophy-related categories.

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7   Xu (2005, 200) mistakenly believed that Xiao's two articles were authored by Xiao himself. In truth, they were a translation of above-named work of the British mathematician Hardy. In addition to that, Xu also noted that the notion of infinity was of great interest to Chinese mathematicians of the time (see Hardy 1932; 1933).

8   His name was also written 曾鼎龢 (Zeng Dinghe). In 1938 Zeng was awarded a PhD degree for a doctoral dissertation entitled "La philosophie mathématique et la théorie des ensembles (Mathematical Philosophy and Set Theory)"; see Tseng 1938.

9   This were the exact words of Frederic B. Fitch, who reviewed Zeng's doctorate in 1943 (*The Journal of Symbolic Logic* 8 (2) (June 1943): 56–57). Fitch said: "This is a philosophical and historical survey of various topics in modern mathematics, such as set theory, probability, transfinite numbers, and mathematical logic. The treatment is somewhat sketchy and often superficial. In discussing mathematical logic no mention is made of Gödel, although literature as later as 1936 is referred to." (Fitch 1943, 56) Zeng's doctorate was listed in the bibliography of Bernays's and Fraenkel's 1958 book *Axiomatic Set Theory* (although the latter wrote only the introductory parts and provided some bibliographical data). Consequently, in his letter to Bernays from March 14th, 1958, Gödel inquired about the content of Zeng's work: "Ich habe bemerkt, dass Sie in Ihrem neuen Buch über Mengenlehre einen gewissen Tseng[g] Ting-Ho zitieren. Ist diese Arbeit interessant? (I noticed that in your new book on set theory you cite a certain Tsen[g] Ting-Ho. Is that paper interesting?)" (Gödel and Solomon 2014, 152)

Mathematical Logic and the Popularization of Mathematics: Zhu Gongjin and Hilbertian Foundations of Mathematics and Mathematical Logic

Another important Chinese mathematician, who to some extent contributed to the introduction and propagation of mathematical logic as a branch of mathematics in China, was the well-known educator and popularizer of mathematics Zhu Gongjin 朱公謹 (also known as Zhu Yanjun 朱言鈞, 1902–1961). Zhu started his pursuit of mathematical knowledge at Qinghua College, where he completed the basic preparatory course. In 1921, he was awarded a scholarship for undergraduate studies at the renowned Göttingen University in Germany. In the years he subsequently spent in Göttingen, Zhu eventually specialized in applied mathematics and was in 1927 awarded a doctoral degree in mathematics for his thesis on the theory of differential equations, entitled *On Existence Proofs of Certain Types of Single-Variable Functional Equations*. After he returned to China in 1927, he worked as a professor of mathematics at Guanghua University, Central University, Shanghai Medical School, Normal Faculty of Zhejiang University, Datong University and Shanghai Jiaotong University. With the establishment of Chinese Mathematical Society in 1935, Zhu became one of its permanent council members and one of the most productive contributors to its periodical publications the *Shuxue tongbao* 數學通報 (*Bulletin of Mathematics* or *Bulletin des Sciences Mathematics*) and the *Shuxue zazhi* 數學雜志 (*Mathematical Review*) (Zhang Youyu 1991, 2).

Although Zhu spent almost seven years at the University of Göttingen in Germany and obtained a PhD in mathematics studying under two of the most famous and well-established mathematicians of the time, David Hilbert and Richard Courant, upon his return to China he ended up working at relatively marginal universities, such as Guanghua University and Jiaotong in Shanghai, although also at some more prominent universities, such the Central University in Nanjing. Although his direct influence on the theoretical development of mathematics in China seems to be (at least in when it comes to documentation) somewhat obscured by the marginality of the institutes of his employment, in the late 1920s and 1930s Chinese intellectual world his voice was loud and clear. Zhu was probably the most prolific popularizer of general and specific aspects of mathematics in early 1930s China. His numerous articles introducing different aspects and problems of advanced mathematics (especially analysis), philosophy of mathematics and finally also his translations of writings by important mathematicians like Dedekind or Hilbert, were not only published in university-affiliated periodicals, such as the *Shuxue zazhi* 數學雜志, but also in magazines devoted to

popularization of Western science.[10] It was especially the latter that established his role as a popularizer of applied mathematics in China.

Among Zhu's articles introducing various topics, theories or branches of mathematics, there were also some that explicitly or implicitly involved the principles of contemporary mathematical logic. Two of the most influential such articles were "An Introduction to Mathematical Logic (Shuli luoji daolun 數理邏輯導論)" from 1936 and "Essentials of Mathematical Logic (Shuli luoji gangyao 數理邏輯綱要)" published in two parts in 1933 and 1934. Although the articles only expounded on a rather elementary notion of mathematical logic, their significance lay in another aspect: because Zhu was introduced to mathematical logic as a mathematician, he regarded its content to be primarily a part of mathematics. Consequently, his articles usually implicitly indicated that the research on mathematical logic ought to be reserved exclusively for mathematicians. As such, introductions to mathematical logic or set theory done by mathematicians were of a different value to those done by philosophers, for they each derived from different theoretical or practical contexts and ultimately also influenced separate academic spheres of discourse.

As an ardent popularizer of mathematics who also maintained a considerable interest in mathematical logic and the foundations of mathematics, Zhu often also wrote articles commenting upon the relationship between mathematics and logic on one side, and modern philosophy on the other.[11] More importantly, a

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10   For the general significance of translations—and for highlighting some general problems linked to translations of Western vocabulary—see for instance Ciaudo (2021, 36).

11   Zhu's earliest publications on philosophy of mathematics were a series of articles written in response to contemporary misinterpretations of the nature of mathematics, proposed by Chinese adherents of pragmatism who propagated Dewey's experimentalist theory of logic and science. In 1928, in an article entitled "A Refutation of Experimentalism (Bo shiyan zhuyi 駁實驗主義)", Zhu emphasized that mathematical knowledge is *a priori* and as such a formal expression of the unchanging principles of the universe. What Zhu argued against was the experimentalist position that the universe is subjected to constant change and that the main task of science is to constantly realign itself with the current state of the universe. In order to corroborate his position, Zhu used the example of ontologically positive concept of logical laws, which are manifested in axiomatic systems of mathematics. As examples thereof he listed three axiomatic (*jiben yuanli* 基本原理) systems of geometry as developed by Euclid, Riemann, and Lobachevski. Having expounded on the concepts of consistency and non-contradiction as concrete examples of the application of logical laws in mathematics, he explained the difference between different kinds of judgments as defined by Kant, shedding some light on the epistemic value and sufficient conditions of the truth of mathematical axioms. In short, Zhu's principal aim was to portray the objectiveness of logic, as the main condition of mathematical truth, through a system of laws reflecting the *a priori* structure of reality. This implies that mathematical judgements and inferences are beyond experimental inquiry and that mathematical judgments were *a priori* synthetic judgments. In a sequel to the article, Zhu directed his criticism against the philosophical viewpoints of Hu Shi and Dewey. Similar was

closer reading of his philosophical writings on mathematics and modern logic reveals that one of his principal sources was the teaching of the leading mathematical formalist of the time, David Hilbert. As noted above, Zhu's connection to Hilbert's mathematical and logical formalism can be traced back to the former's studies in Göttingen. Consequently, one of the main parts of Zhu's popularization of modern mathematical logic also consisted of introducing the work of Hilbert. Thus, for example, in an article published as early as 1929 Zhu discussed the differences between Brouwer's intuitionist "theory of sets" (*tuanlun* 團論) and Hilbert's formalist idea of contradiction (*ziweiyu* 自違語) in the same theory. Interestingly, Zhu discussed both schools as offshoots of two currents in mathematics, analogous to those in modern cosmologies which derive from advances in modern physics (see Zhu Yanjun 1929b). In another article from 1932, Zhu gave a lengthier exposition on Hilbert's life and his theory of axiomatics (*yuanlishuo* 原理說), axiomatization of arithmetic, as well as other aspects of Hilbert's views on questions related to the fundaments of mathematics, some of which were also intrinsically linked to mathematical logic (see Zhu Yanjun 1932, 2–8). Finally, in 1935 Zhu published an updated version of his evaluation of intuitionism and formalism. In this sequel to his first such mediation from 1929, Zhu focused both on set theory and theories of inference in mathematics, covering three main topics: Poincare's view on mathematical inference and set theoretical questions, the rise of intuitionism and Russell's mathematical logic. The main topic of Zhu's second survey was still Hilbert's views on axiomatization of mathematics. Zhu's writings on the foundations of mathematics from this period reveal that his views on the subject remained within the constraints of Hilbertian theory, which he came into contact with during his studies in Germany. He did not discuss, for instance, the developments in the Polish School of Logic or, most importantly, Gödel's results related to the above-mentioned problems and topics. Even in his "Critiques of Mathematical Axiomatics (Shuxue yuanlixue zhi piping 數學原理學之批評)" from 1937, the primary aim of which was to outline criticisms raised against Hilbert's project of axiomatization of mathematics, Zhu made no mention of these important contemporary contributions.

In the early 1930s, Zhu edited a series of short discussions on practical or purely theoretical curiosities of mathematics, which was regularly published in the *Guanghua daxue banyuekan* 光華大學半月刊 (*Guanghua University Fortnightly*).

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intended also in Zhu's other writings from the late 1920s, such as, for example, "New Geometry and Philosophy (Xin jihexue yu zhexue 新幾何學與哲學)"; "From Theory of Knowledge to Critical Theory (Cong renshilun dao pipinglun 從認識論到批評論)"; "On the Relationship Between Metaphysics and Natural Science (Xuanxue yu ziran kexue de guanxi 玄學與自然科學的關係)", and "Socrates and Leonard Nelson (Sugeladi yu Na'ersong 蘇格臘底與納爾松)", which were all published in 1929.

These discussions were subsumed under a common title "Shuli congtan 數理叢談 (Mathematical Discussions)", and by the year 1934 the number of individual discussions already reached twenty.[12] Furthermore, in 1936 Zhu published yet another series of writings introducing the advances in foundations of mathematics and mathematical logic in the above-mentioned periodical. The series bore the title "Casual Conversations on Set Theory (Jilun xiaotan 集論小談)", and was written in form of a dialogue between Zhu and a colleague of his, who was also a professor of mathematics (see Zhu 1936c; 1937b (first and last part)). Through dialogues Zhu touched upon various questions related to the recent advances in foundations of mathematics. Perhaps the most important feature of these conversations was that they were written from the mathematical perspective—treating set-theoretical problems and mathematical logic as an integral part of mathematics, which, as also pointed out by Zhu himself, had been often entirely neglected (see Zhu 1936c, 28). Even though the title of the conversations implies a sense of casualness and elementariness, the dialogues also touched upon more advanced topics in set theory, mathematical logic and even number theory, all of which were bound together in meta-mathematics of Hilbert. The conversations were published in ten parts between 1936 and 1937.

In 1935 and 1936, Zhu also published a series of other propaedeutic articles on topics related to the foundations of mathematics and mathematical logic. Such were, for example, the series of articles entitled "Methods of Inference in Mathematics (Shuxue zhong zhi tuili fangfa 數學中之推理方法)". Other relevant articles from the same period were "The Origins of Mathematical Knowledge (Shuxue renshi zhi benyuan 數學認識之本源)", "Topological Geometry and Our Views on Space (Dingxing jihexue yu wuren zhi kongjian guan 定性幾何學與吾人之空間觀)" and so on. The common thread interconnecting the majority of his writings from 1930s was again Hilbert's theory of foundations of mathematics (axiomatics, geometry, arithmetic, set theory). Whenever Zhu required the assistance of more philosophical views on mathematical principles he resorted to philosophy of Leonard Nelson, one of his former professors at university in Göttingen and a close friend of Hilbert's. In 1928, one year after he had returned to China, Zhu even published a short booklet commemorating Nelson's life and work.[13]

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12   Eight of these chapters were also published in form of a book in 1947.

13   Nelson passed away in 1927. The mentioned booklet bore the title *Nelson—A Philosopher of Critical Rationalism (His Life and Teaching)* (1928c).

Introduction of Mathematical Logic of Hilbert and Ackermann, 1933–1936

Zhu's pivotal contribution to the introduction of Hilbertian symbolic logic in China took form in two lengthier articles outlining the essential concepts of mathematical logic. The first article, entitled "Essentials of Mathematical Logic (Shuli luoji gangyao 數理邏輯綱要)", was published in 1933 in the *Zhexue pinglun* journal. Here, Zhu's approach to mathematical logic was similar to his other publications: he essentially described mathematical logic as a version of formal logic which assimilated the most advanced knowledge from mathematics. Moreover, Zhu mainly ascribed its advantages to the advances in modern mathematics; in particular, its use of symbols and formulae, which endowed logic with a capacity to attain completeness, consistency, and a greater analytical capacity. Even though his short overview of the history of mathematical logic mentioned all the important contributors to the field, from Leibniz to Russell, Zhu's focus remained with Hilbert, who, according to Zhu, was able to include the most advanced principles of mathematics into his logic. While Zhu did not explicitly indicate this, the content of the article derived heavily from Hilbert's and Ackermann's *Grundzüge der theoretischen Logik* (1928).[14] As a matter of fact, some parts of Zhu's "Essentials of Mathematical Logic" correspond entirely to individual sections of the 1928 edition of Hilbert's and Ackermann's *Grundzüge der theoretischen Logik*. Thus, Zhu's introduction to mathematical logic was in fact an introduction to the early Hilbert-Ackermann system of mathematical logic.

Zhu's article from 1933 covered the following aspects of the Hilbert-Ackermann system of logic: Propositional logic (*lunduan luoji* 論斷邏輯),[15] which included: a) the definition of proposition; b) methods of elementary connectives (*jiben jiehe* 基本結合);[16] c) equivalence (*dengshi* 等式); d) a further discussion on the elementary connective methods (including the Sheffer stroke, Russell, etc.); e) elementary forms (of logical expressions) (*jiben xingshi* 基本形式);[17] f) tautological (always true)

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14 The first (1928) and second (1938) editions of the book differ considerably from each other. The first book builds upon Hilbert's formalistic first-order logic and still included the *Entsheidungsproblem* and the question of completeness of logic as a system, which were ultimately left out of the later edition. The second edition was also translated into English and given the title *Principles of Mathematical Logic* (1950).

15 Here the term *lunduan* 論斷, otherwise meaning "inference" or "judgment", stands for "proposition" or German *Aussage*, as in Hilbert's *Aussagenkalkül*.

16 Zhu's term *jiehe* 結合 is semantically motivated after the original German term *Verknüpfung* as in "logische Grundverknüpfungen" as used in Hilbert's and Ackermann's mathematical logic.

17 The original title of the section was "Normalform für die logischen Ausdrücke" (i.e. Section 1, Chapter 3 of the 1928 edition).

connections of propositions (*yongzhen zhi jiehe* 永真之結合);[18] g) the theorem of reciprocity (*huyixing zhi dingli* 互易性之定理);[19] h) the ever-false connections of propositions (*yongmiu zhi jiehe* 永謬之結合);[20] i) special elementary propositions (*teshu zhi jiben xingshi* 特殊之基本形式);[21] j) a further discussion on the question of conjunction (always true) and disjunction (always false); k) the problem of how to draw conclusions (*ruhe xia duan'an zhi wenti* 如何下斷案之問題).

As indicated above, the structure and content of Zhu's presentation of the essential features of mathematical logic corresponds to that of Hilbert's and Ackermann's book from 1928. As Zhu himself also noted in the 1933 version of the article, his source material was his notes from Hilbert's lectures, taken when he was still a student at Göttingen. Maybe the only parts of the text which Zhu decided to modify were the examples of propositions, which Zhu adapted to fit the Chinese socio-political context. The same article was reprinted in 1934 in the *Quarterly Journal of Science of the National Wuhan University* (*Guoli Wuhan daxue like jikan* 國立武漢大學理科季刊), which also happened to be one of the central means through which the group of mathematicians at Wuhan University promulgated their research, which in 1934 also encompassed set theory and the foundational, mathematical, and mathematico-logical theories of David Hilbert.[22]

Two years later, in 1936, Zhu published another article, "An Introduction to Mathematical Logic (Shuli luoji daolun 數理邏輯導論)", which represented a continuation of the article from 1933, where Zhu introduced the content of the remaining few chapters of the book by Hilbert and Ackermann. In this new article, however, Zhu's attitude towards logic changed slightly, at least in his manner of expression. This time, he compared mathematical logic to the method of "exhausting the principles" or "*qiongli* 窮理", a Neo-Confucian term which used to be linked to the Western concept of science. Zhu claimed that through logic one can extend already known laws to individual physical entities and distil the most fundamental principles of nature from known facts. In this context, mathematical logic represented the most advanced such method. He also remarked that mathematical logic takes the most elementary laws of science and translates them into relations between subjects and predicates, and between propositions.

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18   Originally: "Charakterisierung der immer richtigen Aussagenverbindungen."

19   The original title of the section was "Das Prinzip der Dualität [The Principle of Duality]".

20   Originally "Die disjunktive Normalform für logische Ausdrücke."

21   This section appears to summarize chapter 7 of the first section in the original book, "Mannigfaltigkeit der Aussagenverbindungen, die aus gegebene Grundaussagen gebildet werden können."

22   Volumes 4 and 5 of the above-mentioned journal saw the publications of a Chinese translation of Hilbert's *The Theory of Algebraic Number Fields* by Hua Luogeng, a series of articles on "Set Theory" (Jihelun 集合論) by Xiao Wencan etc.

The 1936 sequel introduced two new chapters from Hilbert's and Ackermann's book. It was divided into two main chapters: "The Axioms of Propositional Logic (Lunduan luoji zhi yuanli 論斷邏輯之原理)" and "Main Ideas of Predicate Logic (Weici luoji zhong zhi zhuyao sixiang 謂詞邏輯中之主要思想)". In the first chapter Zhu summarized the content of chapters 10 and 11 of the first part of Hilbert's and Ackermann's *Grundlagen*.[23] At the same time, Zhu seems to have slightly departed from their original line of thought, for in his description the axioms from the *Principia Mathematica* are given the main role. He even added his own thoughts about the relationship between axioms of other branches of science and mathematical logic, where he maintained that mathematical logic represented a meta-scientific view of the axiomatic system, for it takes logical method as its main subject of enquiry. By being a meta-systemic science, it would thus be exempt from the rest of sciences, which must adhere strictly to the principles of the logical method and depend upon the consistency of their axiomatic fundaments (Zhu Yanjun 1936b, 85). The second part of Zhu's article summarized the introductory parts of the second section of Hilbert's and Ackermann's *Grundlagen* (1928).[24]

Gao Xingjian—"ABC of Mathematical Logic"

Significant contributions to the popularization of mathematical logic in 1930s China were also made by Gao Xingjian 高行健, a graduate in chemistry from the Central University (*Zhongyang daxue* 中央大學), a member of the National Institute for Compilation and Translation (*Guoli bianyi guan* 國立編譯館), and a professor of mathematics at Guiyang Medical University (–1948). As a prolific contributor to the journal *World of Science* (*Kexue shijie* 科學世界) he composed a series of articles on different topics from mathematics, mathematical games (*youxi shuxue* 游戲數學), interesting mathematical problems (*shuxue wenti* 數學問題), and new records of the most recent developments in mathematics (*jinnian shuxue zhi xin jilu* 近年數學之新紀錄), to more specific topics from the most fashionable branches of mathematics, such as mathematical logic. Gao also contributed a few articles to the famous *Kexue* journal, such as a short article on the Goldbach conjecture and some shorter articles on number theory.

For the present discussion, the most relevant of Gao's articles from the 1930s was his "ABC of Mathematical Logic (Shuli luoji ABC 數理邏輯ABC)" from 1936. The article aims to introduce the main concepts from mathematical logic to a

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23   "Die Axiome des Aussagenkalküls" and "Beispiele für die Ableitung von Formeln aus den Axiomen."

24   Such as, for example, "Methodische Grundgedanken des Funktionenkalküls" etc.

more general readership. Most importantly, it attempts to do so by treating mathematical logic as a branch of mathematics. Gao was well-aware of previous introductions to Hilbert's and Ackermann's mathematical logic made by Zhu Yanjun. The main source of Gao's guide to the principles of mathematical logic was probably J. S. Turner's *Mathematical Logic* from 1928. A further interesting feature of the above-mentioned article was Gao's notion of mathematical logic, which he called the science of sciences, and science as such as an example of materialized logic. And a rather natural corollary to that position was that mathematical logic was the most advanced and modern example of this method. As the most important contemporary mathematical logicians Gao listed Russell and Hilbert, and enumerated the numerous synonyms for mathematical logic which were in use at the time. Otherwise, Gao's article was extremely concise and simple. The first part[25] covered three main topics: 1) Elementary Symbols, 2) Elementary Equations, and 3) Proofs of Elementary Equations.

Introduction of the Principles of Mathematical Logic into the National System of Education

Another important aspect of the establishment of mathematical logic in Republican China, and one of the most substantial direct outcomes of the developments described above, was its gradual inclusion into the new standardized secondary school, normal school, and university curricula. The beginnings of this inclusion can be traced back to the first bundle of reforms of the national system of education promulgated by the Nationalist government, whose aim was to unify and standardize education at Chinese schools and universities. Not long after the central government had moved to Nanjing (April 1927), the new Nationalist Ministry of Education began devising new plans for large-scale reforms of the national system of education. In so doing, it consulted various Western models, from the American "pragmatic" model of education, propagated by Hu Shi and his adherents, to French and German models of education. Subsequently, the first drafts of reforms were issued in the aftermath of the first national congress on questions of education in May 1928. The collection of documents issued following the National Congress on Education was epitomized in one titled "Reorganization of School System of the Republic of China (Zhengli Zhonghua renmin xuexiao xitong an 整理中華人民學校系統案)". In 1929, further documents stipulating new sets of regulations for institutes of higher education were issued—such as the

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25   According to its title, Gao also planned to publish further parts of the article in the *Kexue shijie*. However, I was not able to ascertain the existence of any sequels to the 1936 article.

"Regulations for Universities (Daxue guicheng 大學規程)", "Organizational Law for Universities (Daxue zuzhifa 大學組織法)" and so on. These plans were revised at the Second National Congress on Education in 1930. Finally, new school laws for secondary, normal, and vocational education were promulgated again in 1932. The education system reforms in the Nanjing period of the Republic were not the first enterprise of this kind. In some respects, the first set of reforms, promulgated in 1922, were only continuing previous plans for modernization and standardization of the Chinese system of education[26] (see Pepper 1996).

Curricular changes, proposed in the framework of the National Congresses on Education of 1929 and 1930, were outlined in the *Curricular Standards for Junior and Senior Secondary Schools* (*Chuji gaoji zhongxue kecheng biaozhun* 初級高級中學課程標準 (1932)), and *Curricular Standards for Normal Colleges* (*Shifan xuexiao kecheng biaozhun* 師範學校課程標準 (1934)). These were published in several consecutive publications from 1932 on, and the manuals were revised in the early 1940s. For university curricula, there further existed a series of documents issued by the Ministry of Education entitled *List of University Courses* (*Daxue kemu biao* 大學科目表 (1940)). These started to appear in 1933, when an original draft version of the publication was published by the Commercial Press in Shanghai (Daxue kemu caoan 大學科目草案 (A Draft of University Courses)). In this draft document, the list of proposed standard courses at universities was supplemented by a list of prescribed literature.

Mathematical Logic in Senior Secondary Schools

The *Curricular Standards for Junior and Senior Secondary Schools* from 1932, which were based on the reform plans drafted and ratified by the Ministry of Education in 1929, stipulate that an introductory course on logic was to be taught in the final years of the senior secondary schools.[27] The prescribed content of the course "Logic (Lunli 論理)" covered the following topics:

- The Scope of Logic (essential characteristics, classification of logic, the relationship between logic and "other sciences").

- Analysis of Human Thought (the relationship between thought and life, the origin and development of thinking, organization of

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26   For developments related to teaching of logic, see, for example, Zhai 2016, 59–63; He 1989, 75–106.

27   The chapter of the manual, entitled "Gaoji zhongxue lunli kecheng biaozhun 高級中學論理課程標準 (Standard Curriculum in Logic for Senior Secondary Schools)", was later also issued as an independent document.

thought, the difference between true and false thought, the difference between simple and complex thinking, the relationship between thought and writing).

- Essentials of Scientific Method (comparison between common sense and science, the aims and attributes of science, etc.).

- Induction (the concept of causality and critical review of the simple "five methods of induction", observation, analysis, conjecture, experiment and probability, the meaning and effect of scientific laws).

- Deduction (the new and old fields of induction ("old" refers to Aristotelian logic (*lunlixue* 論理學) and "new" refers to mathematical logic (*luoji* 邏輯), propositions (*ci* 辭) and propositional forms, relationships between propositions (kinds of immediate inferences and mediate inferences, syllogism), criticism of the old method of deduction, an exposition of the new method of deduction (analytical structure of thought, symbolist reformation of thought, strict form of thinking).

- System of Science (empirical science and pure science, natural science and social science, science and art, science, and philosophy).

As we can observe in the above outline of the content of the course on logic, at least in relation to the field of logic, the curricular reforms of the late 1930s embodied an extremely ambitious attempt to equip future university level students with basic knowledge about the scientific method on the one hand, and science of logic on the other. Furthermore, the new standard curriculum, which was drafted in the late 1920s and promulgated in the 1930s, was devised in a manner similar to the propaedeutic writings of Wang Dianji 汪奠基 which had been published in the first two years of the Nanjing period. As a matter of fact, the introduction of "new" mathematical logic into the curriculum might also have been indirectly facilitated by Wang's contributions to logic education and his ideas about how logic and the scientific method ought to be taught at different levels of education in China. Aside from that, the secondary school course on logic, as stipulated by the new standardized curriculum, conveys a certain evolutionary image of Western logic, where mathematical logic was not only treated as the only extant upgrade of the classic Aristotelian logic, but also a new version of logic, which ought to be used in everyday life. Because, through the relationship between old and new, the significance and usefulness of logic was not believed to shift from the quotidian to the scientific sphere, but rather to retain the same sense of universality throughout

the entire process. This implied a view that knowledge about the patterns of the universe was also seen as pertaining to the sphere of its practical use in everyday life. Maybe the only feature of the curriculum which was critically aligned to the native discourse on the relationship between Western and Eastern thought was its strong emphasis on providing a clear delimitation between rational thought and the view on life.

The standard curriculum described above remained unaltered throughout the following decade,[28] until in the *Revised Curricular Standards for Junior and Senior Middle Schools* from 1942, when for some unknown reason the course "Logic" for senior middle schools was abolished in favour of more extensive courses on physics and chemistry (Ministry of Education 1942). Following the curricular reforms at secondary level of education, from 1928 on, a series of new standardized textbooks on logic started to emerge. In accordance with the new model, these textbooks apportioned a considerable part of their content to mathematical logic—usually referred to as *shuxue (de) lunlixue* 數學(的)論理學. The first such secondary school textbook emerged in 1925. The book *Logic* (*Lunlixue* 論理學) was written by Wang Zhenxuan 王振瑄 (1928), a teacher at Peking Women's Higher Normal College (*Beijing nüzi gaodeng shifan xuexiao* 北京女子高等師範學校). It was included in the semi-official series *New Education System Senior Secondary School Textbooks* (*Xin xuezhi gaozhong jiaokeshu* 新學制高中教科書), published by the Commercial Press. At this stage, the textbook had not yet offered an overview of the content mathematical logic, nor did it mention any results of Russell's mathematical logic in the section on deduction. Nevertheless, mathematical logic had already been included in the historical overview of development of both Western and Eastern logics (Chinese and Indian logic). A substantial step forward was made in the standardized secondary school textbooks in the early 1930s. Thus, in 1935, Zhang Xizhi's (張希之, ?) book *Essentials of Logic* (*Lunlixue gangyao* 論理學綱要) from 1932 was abridged and upgraded into a textbook, *Senior Secondary School Logic* (*Gaozhong lunlixue* 高中論理學). In 1935 it was reissued under the title *Gaozhong xin biaozhun lunlixue* 高中新標準論理學 (*New Standard Logic for Senior Secondary Schools*). Although Zhang's earlier book had only briefly mentioned mathematical logic, the new one, published just three years later, already included an entire chapter devoted to the "contributions of new deductive method". Aside from a historical introduction to the concept of mathematical logic, Zhang's textbook also introduced the elementary concepts from Russell's *Introduction to Mathematical Philosophy* and *Principia Mathematica*, in particular a few elementary notions from relational and propositional calculi, propositional functions, the Sheffer stroke and so on (Zhang Xizhi 1935, 198–221). Apart from

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28   In the 1933, 1936, and 1937 editions the structure and content of the course remained unaltered.

these concepts and principles, Zhang also extensively introduced Shen Youqian's 沈有乾 interpretation of Ladd-Franklin's theory of syllogism together with his *bagua*-based notation. Zhang's book was published in the *New Standard Senior Secondary School Textbooks* series with the Wenhua xueshe 文化學社 in Peking. Zhang's introduction to mathematical logic for secondary schools was not superseded by any new generation of Chinese textbooks. As a matter of fact, in the following years the trend to introduce mathematical logic slowly declined. In the new generation of textbooks, starting with Zhu Zhangbao's 朱章寶 *New Edition Senior Secondary School Logic* (*Xinbian gaozhong lunlixue* 新編高中論理學) from 1940, even though mathematical logic was still mentioned in the historical overview of logic, the section on "new deductive method" (*yanyi xin fa* 演繹新法) was reduced to a less technical introduction of contemporary symbolic logic.

Normal Colleges and Universities

The implementation of early education system reforms in early 1930s brought similar curricular modifications to the general course on logic in the framework of national normal colleges. The document *Curricular Standards for Normal Colleges* from 1934[29] provides the following outline of the prescribed content of the course on logic (called "*Lunlixue* 論理學"): a) Analysis of Thought (with an emphasis on the ability to identify fallacies and the so-called truth-standards etc.); b) Essentials of the Scientific Method; c) Induction; d) Deduction: i) Deductive Systems; ii) Terms and Classes; iii) Propositions and Propositional Forms; iv) Exposition of Formal Deduction: 1) Aristotelian Logic and 2) New Method of Mathematical Logic (*shuxue luoji* 數學邏輯): (Calculus of Classes, Calculus of Propositions, Calculus of Propositional Functions (*ci zhi hanshu* 辭之函數). The course on logic was also cancelled from the basic curriculum for normal colleges, only a few years after it was removed from the secondary school curricula in 1946. In the early 1930s, introductory courses on logic (usually called "*Lunlixue* 論理學") became a common component of the general curriculum for the first-year undergraduate students. Initially, these were elective courses, usually conducted by members of the departments of philosophy. As in the case of Qinghua University, the course of logic was offered as a part of a bundle of elective courses in science or humanities. Later, the status of logic at universities rose, as it became an independent mandatory course for all first-year students at national universities.

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29   See the Editorial Committee for Elementary and Secondary School Curricular Standards of the Ministry of Education (1934).

Consequently, logic also became a topic of entrance exams, as well as general exams at the end of each academic year. The growing presence of logic in university curricula also entailed a growing need for standard elementary and advanced textbooks on the subject. Following the reforms of the late 1920s, there was also an increase in the number of translations of Western textbooks on logic as well as textbooks written by various Chinese authors. Moreover, because mathematical logic became a synonym for contemporary logic, in the 1930s there was also a growing need for Chinese textbooks which would include mathematical or contemporary symbolic logic. Beside the most important textbooks, such as those written by Wang Dianji and Jin Yuelin, the late 1930s and early 1940s saw the publication of further textbooks written by young Chinese philosophers, which included at least a section devoted to modern logic. The first such noteworthy book was Shen Youqian's short overview of *Modern Logic* (*Xiandai luoji* 現代邏輯) from 1933, and the other was Mou Zongsan's *Logical Paradigms* (*Luoji dianfan* 邏輯典範) from 1940.[30] Throughout the 1920s and 1930s, translations of foreign works in modern logic kept emerging at a relatively steady pace. Even though already from the 1920s on a relative abundance of new Chinese publications on modern logic was available to Chinese readers and scholars, the evolution of standard material prescribed for elementary courses in logic at Chinese universities seems not to have followed the same developmental trajectory. Instead, lecturers in logic at more marginal universities kept prescribing already outdated Western textbooks, which did not include symbolic or mathematical logic at all. Often these universities tended to retain the earlier pragmatist approach towards teaching logic. Even at Qinghua, in 1933 the textbook on logic, which was prescribed for the entrance examination and the general exam at the end of the year, was Wolf's *Essentials of Logic* from 1926.[31]

On the other hand, the content of basic university courses on logic depended largely on the lecturers. A general view of Chinese universities in early 1930s reveals that sometimes the modern outlook of the course on logic was correlated to the lecturer's affiliation with the Qinghua School of Philosophy. A solid example of this would be Peking University, where Zhang Shenfu lectured on mathematical logic. Another example was the newly founded Wuhan University, where contemporary logic was taught by Wan Zhuoheng 萬卓恆 a former student of Qinghua College (class of 1923) and the holder of a master's in philosophy from Harvard. In 1930s and 1940s Wuhan University was known as one of the few Chinese universities where mathematical logic was taught both in the framework of the general course on logic and as a specialized course (advanced logic) at

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30   On Mou Zongsan's early work related to modern logic, see Suter (2017); Vrhovski (2020).

31   See Qinghua daxue (1933).

the Department of Philosophy.[32] Sometimes, however, the most important factor behind the development of more advanced courses on logic was, quite naturally, the lecturer's familiarity with the subject, mostly through first-hand experience gained at Western universities.

The educational background of lecturers also greatly influenced the selection of specialized elective courses, both at undergraduate and graduate levels, within the curricula at departments of philosophy across the country. Thus, for example, Qinghua's status as the centre for mathematical logic in China was inextricably linked to Jin Yuelin's pedagogical and scientific work as well as Zhang Shenfu's intensive propagation of the notion of mathematical logic. In other words: a broad selection of lectures on logic was the first condition of development of the discipline of modern logic at the department, and more than on anything else this depended on the pedagogical effort of the lecturers and their efforts at the broader dissemination or popularization of this new subject of learning.

According to documentary evidence and biographical material, by the early 1930s Chinese logicians' efforts to popularize the notion of mathematical logic in China were extremely fruitful. Various indications speak in favour of this assumption, the most important of which was, of course, the inclusion of mathematical logic into secondary and normal curricula. At the university level, the education system reforms of the early 1930s materialized mainly in the establishment of a mandatory general course in logic for all freshmen at universities. Apart from that mathematical logic became gradually recognized as an integral part of curricula at national philosophy departments. Although the levels of inclusion varied between historical overviews and concrete theoretical introductions, mathematical logic also became a specialized, selective course at some philosophical departments.

However, this change did not occur overnight, because in the early 1930s mathematical logic was actually taught only at an extremely small number of Chinese universities, considerable efforts were needed to achieve its broader presence in Chinese academia. Thus the draft version of the document *University Courses* (*Daxue kemu* 大學科目) from 1933, which enumerated the basic mandatory courses, still mentioned only the course "Logic" (*Lunlixue*).[33] The original content

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32   Wan Zhuoheng is also mentioned in He Lin's book *Modern Chinese Philosophy* (1947) as one of only a handful of Chinese experts in the field of mathematical logic. He's recognizing Fan as a mathematical logician probably rested on his reputation as one of only few professors of logic, who attached great importance to the mathematical logic of Russell's *Principia Mathematica* (see He Lin 1947, 31).

33   The booklet *Draft of the University Courses* (*Daxue kemu caoan* 大學科目草案), issued by the Chinese Ministry of Education in 1933, also prescribed the basic literature for the course, namely the following two books: Josiah Royce's "The Principles of Logic" (1913) and J. E. Creighton's

was extended and upgraded in the revised version of the *List of University Courses* from 1940, which provided a list of both obligatory and selective courses. In this document (or possibly even earlier) "Mathematical Logic" was listed as the standard selective course for undergraduate programs in philosophy, prescribed to be taught in the fourth year of study (Ministry of Education 1940, 48).

Concluding Remarks

The above analysis reveals that the advances in Chinese studies of mathematical logic were represented, above all, by the so-called "Qinghua School of (Mathematical) Logic". In its earliest years, as the central Chinese platform for research on Russell's philosophy and his *Principia Mathematica*, the Department of Philosophy at Qinghua University defined the state of Chinese knowledge of the topic and at the same time assumed the role of the main disseminator of the Russellian notion of mathematical logic. To a certain degree, this early period of mathematical logic at Qinghua was epitomized by Jin Yuelin's work *Logic*, while at the same time it also marked an important transition of the research interest of the members of the school towards developments in the framework of the Harvard School of Logic on one side, and trends in European mathematical logic on the other. Similarly, in the late 1930s the new generation of logicians at Qinghua University also assumed the leading role in raising Chinese research into the discipline to a new level. This final chapter of mathematical logic at Qinghua was defined by the introduction of more recent advances in European mathematical logic into the curriculum at the department.

However, in the framework of the school of logic at Qinghua University mathematical logic was still deeply immersed in the context of philosophical studies, and consequently also generally explicated in a profoundly philosophical manner. Secondly, as a school of thought, the development of the Qinghua School was also strongly inclined towards particular theories and currents in mathematical logic, and therewith also more or less disassociated from specific other such theories. Thus, one example of a theory which was not at the centre of inquiries at Qinghua was Hilbert's formalist project, which also offered its own solution to the foundations of mathematical logic. The task of introducing Hilbertian formalism, Cantorian set theory and other topics from mathematical logic to Chinese scholars was later assumed by a group of Chinese mathematicians headed by Tang Zaozhen, a professor at Wuhan University, and Zhu Gongjin, a mathematician

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An Introductory Logic (1919 edition). Both were also available in Chinese, and the translators were Tang Bohuang 唐擘黃 (Tang Yue 唐鉞, 1891–1987) and Liu Qi 劉奇, respectively.

who studied under Hilbert. The related developments which took place at Wuhan University and in the framework of the popularization and introduction of mathematical logic in mathematical journals can be described as a step in the direction of the mathematization of the notion of mathematical logic in China. Moreover, the research conducted by the leading figures in this movement, such as Tang Zaozhen and Xiao Wencan at Wuhan University, was profoundly different from the that conducted at Qinghua School, since the notion of mathematical logic as well as its content were regarded within the context of mathematics, and as a branch of mathematics closely related to the problems of its foundations. Based on its different conceptualization, the notion of mathematical logic produced through this important turn can be described as the current of the "mathematical notion" of mathematical logic.

Finally, the degree of the establishment of the notion of mathematical logic in the more general intellectual discourse in late 1920s and 1930s China is further attested by the inclusion of its content into the new, standardized secondary school and university curricula. In the context of the standardization and modernization of the logical curricula, the integration of content from mathematical logic as a most highly developed form of deductive logic reached its peak in the first half of the 1930s, when several new standard textbooks for secondary schools already included elementary concepts from *Principia Mathematica* and related works by Russell and others. Together with the rise of the notion of mathematical logic as the newest form of deductive logic a new terminology started to form, which possessed a strongly modern undertone. Although this distinction originated in the earliest introduction of the notion in the early 1920s, by the 1930s the difference between traditional and modern logic became expressed more uniformly in the terminology used to describe these two developmental stages in Western logic. On the other hand, the use of terminology in the 1930s also revealed an indirect influence of broader philosophical and political trends on logical terminology. An important influence was that of cultural relativism, which created the urge to differentiate the universal idea of logic from "culturally conditioned" evolutionary versions of logic, such as Indian, Chinese or Greek Aristotelian logic. When this first concerted attempt at standardizing logical terminology was completed in 1939, some of these distinctions were still retained, while in the actual literature the terminological gaps remained considerable. For these as well as other reasons, a focused study of the shifts and changes in Chinese logical terminology in the 1920s and 1930s is needed.

Unfortunately, the development of mathematical logic in the years following the outbreak of the Sino-Japanese war is, due to circumstances of the time, very poorly documented. As a consequence, there is a wide and unsurmountable gap

in our understanding of the later parts of the trends and developments described above. In the end, however, with the profound changes that took place at the establishment of the PRC in 1949 the majority of these developments were brought to an abrupt end. In this way, our treatment of these early developments will serve as a basis for assessing the degree of discontinuity and change rather than the main basis for describing a general continuity in Chinese studies of mathematical logic. Moreover, a deeper insight into the developments of mathematical logic at Chinese universities during wartime, which probably brought the foremost experts in the field closer together than ever before and thus provided very favourable circumstances for the development of a more unitary or even interdisciplinary developmental trajectory, would also provide the missing narrative link between the period under examination in this article and the profoundly disparate developments in the late 1940s and early 1950s. Since we are still unable to provide an adequate insight into the development in mathematical logic that took part under the fog of war which enveloped China between 1937 and 1945, the present study represents the last still historically attainable fraction of its developmental path.

Last but not least, perhaps the most indisputable dimension of continuity was retained through the key agents who contributed to the re-formation of mathematical logic in the first decade of the PRC, such as Hu Shihua, who obtained their basic training in the milieu of the Qinghua School (in the late 1920s and early 1930s its members lectured at all other leading Chinese universities), and whose work in mathematical logic was not sanctioned in the framework of the ideological transition that took place in Chinese academia in the early 1950s.

Acknowledgment

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Chinese Research on Mathematical Logic and the Foundations of Mathematics

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Abstract

This paper outlines the Chinese research on mathematical logic and the foundations of mathematics. Firstly, it presents the introduction and spread of mathematical logic in China, especially the teaching and translation of mathematical logic initiated by Bertrand Russell's lectures in the country. Secondly, it outlines the Chinese research on mathematical logic after the founding of the People's Republic of China. The research in this period experienced a short revival under the criticism of the Soviet Union, explorations under the heavy influence of the Cultural Revolution, and the vigorous development of mathematical logic teaching and research after the period of "Reform and Opening Up" that started in the late 1970s, and the full integration of Chinese mathematical logic research into the international academic circle in the new century after 2000. In the third part, it focuses on the unique and original results of the Chinese mathematical logic research teams from the following three aspects: medium logic, lattice implication algebras and their lattice-valued systems of logic, and Chinese notation of logical constants, which can be used as a substantive supplement to the relevant literature on the history of mathematical logic in China. The last part is a reflection on the shortcomings of contemporary Chinese research on mathematical logic and the foundations of mathematics.

Keywords: Chinese logical research, mathematical logic, medium logic, lattice implication algebra, Chinese notation

Kitajske raziskave na področju matematične logike in osnov matematike

Izvleček

Članek povzema kitajske raziskave na področju matematične logike in osnov matematike. V uvodnem delu ponuja vpogled v predstavitev in širjenje matematične logike na Kitajskem. Še posebej pa se posveča poučevanju in prevajanju matematične logike, ki so ju

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spodbudila predavanja Bertranda Russella na Kitajskem. Nadalje povzema raziskave matematične logike po ustanovitvi Ljudske republike Kitajske. Področje je v tem času doživelo hitri razcvet pod vplivom kritik matematične logike v Sovjetski zvezi, temu je sledilo raziskovanje, na katerega je močno vplivala kulturna revolucija, živahen razvoj poučevanja in preučevanja pa sta se začela konec 70. let po obdobju »reform in odpiranja svetu« in se po letu 2000 nadaljevala v popolno vključitev kitajskih raziskav na področju matematične logike v mednarodne akademske kroge. Tretji del članka se osredotoča na edinstvene in izvirne dosežke kitajskih skupin, ki se posvečajo raziskavam matematične logike, in sicer s stališč: medialne logike, mrežne implikacijske algebre in njihovih mrežno-vrednostnih sistemov logike ter kitajske notacije logičnih konstant, ki jo lahko uporabljamo kot konkretno dopolnilo k relevantni literaturi o zgodovini matematične logike na Kitajskem. Zadnji del članka predstavlja razmislek o pomanjkljivostih v sodobnih kitajskih raziskavah matematične logike in osnov matematike.

Ključne besede: kitajske logične raziskave, matematična logika, medialna logika, algebra mrežne implikacije, kitajska notacija

Introduction

The present paper is an overview of the Chinese research on mathematical logic and the foundations of mathematics. It mainly consists of four parts: The first part briefly presents the introduction and spread of mathematical logic in China, especially the teaching and translation of mathematical logic during the Republic of China (ROC) period initiated by Bertrand Russell's lectures in the country. The second part is an outline of Chinese research on mathematical logic after the founding of People's Republic of China (PRC). The research in this period had experienced a short revival under the criticism of the Soviet Union, explorations under the heavy influence of the Cultural Revolution (*Wenhua da geming* 文化大革命), and the vigorous development of mathematical logic teaching and research after the "Reform and Opening Up" (*Gaige Kaifang* 改革开放) that began in the late 1970s, and the full integration of Chinese mathematical logic research into the international academic circle in the new century after 2000. The third part focuses on the unique and original results of the Chinese mathematical logic research teams from the following three aspects: medium logic, lattice implication algebras and their lattice-valued systems of logic, and the Chinese notation of logical constants. The last part is a reflection on the shortcomings of contemporary Chinese research on mathematical logic and the foundations of mathematics.

There have been several earlier works on the history of mathematical logic in China. Lin Xiashui 林夏水 and Zhang Shangshui 张尚水 (1983) and Song Wenjian

宋文坚 (2000) all outline the contributions of Jin Yuelin 金岳霖and others to the introduction of mathematical logic into China since the 1920s, as well as the work of Chinese scholars in the fields of logical calculus, set theory, recursion theory, modal theory and proof theory. Chen Bo 陈波 (2019) gives a comprehensive introduction to the international publications and the main research progress of Chinese logic scholars in the fields of the history of logic (especially the history of Chinese logic), inductive and probabilistic logic, natural language logic, philosophy of logic, informal logic and critical thinking, legal logic, and so on, the establishment and rapid development of logic research institutions in the PRC is also introduced. Su Rina's 苏日娜 doctoral dissertation (2020), "History of Mathematical Logic in China (1920–1966)" (*Shuli luoji zai Zhongguo de fazhanshi yanjiu* (1920-1966) 数理逻辑在中国的发展史研究 (1920–1966)) presents the introduction of mathematical logic by Chinese scholars in the first half of the 20th century, reviews and summarizes the history and characteristics of mathematical logic during its initial foundation in China (1920–1949) and during the founding and development of the "new China" (1949–1966). Jan Vrhovski's paper (2021a) examines the work of Jin Yuelin and others in the Department of Philosophy of Tsinghua University, and the characteristics and main progress of the teaching and research of mathematical logic in this context from 1926 to 1945 are summarized. Du Guoping and Wang Hongguang (2020) also provide an overview of the introduction and research on logic in mainland China from the ROC to PRC, in particular, the achievements of contemporary Chinese mainland scholars in the fields of mathematical logic (modal logic, recursion theory, set theory, formalized methods and automatic reasoning, etc.) as well as philosophical logic (modal logic, many-valued logic, lattice-valued logic based on lattice implication algebras, paraconsistent logic, etc.).

This paper mainly focuses on the research in the period after the founding of PRC, especially the original work introduced in the third part, which can be used as a substantive supplement to the above-mentioned relevant literature.

The Beginning of Mathematical Logic in China

The science of logic was first introduced to China in the late Ming dynasty (early 17th century). Among the earliest works was the book *Mingli tan* 名理探 (*De logica*) translated by Li Zhizao 李之藻 and Francisco Furtado. This book was a translation of teaching materials on logic used by the members of the Jesuit order at Coimbra University in Portugal. Its original title was *In Universam Dialecticam Aristotelis Stagiritae*. By the early 20th century, scholars like Yan Fu 严复, Wang

Guowei 王国维, Hu Maoru 胡茂如 and others, one after another, translated the most important works on Western logic into Chinese.

In 1920, the renowned British scholar Bertrand Russell was invited to lecture in China for one year, in the framework of which he carried out five major series of lectures at Peking University, one of which was a series of lectures on "Mathematical Logic" (*Shuli luoji* 数理逻辑). Subsequently, in October 1921, the anthology *Five Great Lectures by Bertrand Russell* (*Luosu wu da yanjiang* 罗素五大演讲) was published by the New Knowledge Publishing House of Peking University, a publication which marked the start of dissemination of mathematical logic in China. In 1922, Fu Zhongsun 傅种孙 and Zhang Bangming 张邦铭 translated and published the book *Introduction to Mathematical Philosophy* (*Luosu suanli zhexue* 罗素算理哲学) by Russell. Later, some scholars gradually introduced mathematical logic into Chinese academic world: Zhang Shenfu 张申府 introduced the notion of mathematical logic related to Russell's philosophy[1] and his *Principia Mathematica*, Tang Zaozhen 汤璪真 as a mathematician introduced set theory in the context of mathematics, and Zhu Gongjin 朱公瑾 introduced Hilbert's conception of "symbolic logic". In 1926, Jin Yuelin started a course on logic at Tsinghua University in Beijing, in the framework of which he also taught content related to mathematical logic. One year later, in 1927, Wang Dianji 汪奠基 published a book entitled *Logic and Mathematical Logic* (*Luoji he shuxue luoji lun* 逻辑和数学逻辑论), which is the first monograph as a systematic introduction on mathematical logic and its history in China. In 1935, Tsinghua University published Jin Yuelin's textbook *Logic* (*Luoji* 逻辑), in which he provided an overview of Russell's systems of mathematical logic. Xiao Wencan 肖文灿 published a series of articles on set theory during 1933–1934, which were later collected and published in a volume entitled *A Primer on Set Theory* (*Jihelun chubu* 集合论初步) by The Commercial Press in 1939. From the early 20th century on, Chinese scholars like Yu Dawei 俞大维, Shen Youding 沈有鼎, Wang Xianjun 王宪钧, Hu Shihua 胡世华, Mo Shaokui 莫绍揆 (Moh Shaw-kwei) and others in succession travelled abroad to study mathematical logic at foreign universities, and later also returned to China. In this way, mathematical logic in China underwent a gradual development (also see Lin and Zhang 1983 for the development of mathematical logic in the Republican period).

Because research on the foundations of mathematics and mathematical logic is inextricably linked, in the following discussion it will be referred to research on mathematical logic.

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1   For a detailed analysis of Zhang's critical introduction of Russell's logic, see Vrhovski (2021b, 229ff).

An Outline of Chinese Studies of Mathematical Logic

Mathematical Logic in the Foundation Period of the People's Republic of China (PRC)

In the time of foundation of the PRC, Chinese research on mathematical logic was influenced by the Soviet criticism of mathematical logic. However, at a dinner which took place in 1956, Mao Zedong told Jin Yuelin that mathematical logic was important, and needed to be taken care of. After it received this support from Mao, Chinese research into mathematical logic gradually became more active.

In this early period Shen Youding published two important articles, in 1953 and 1955, in which he investigated the paradox of the class of all grounded classes and semantical paradoxes, respectively. In 1950, Mo Shaokui constructed two new logical systems that could effectively prevent "paradoxes of implication". In 1954, Mo proved that in a many-valued system of logic, if we do not apply any restrictions on the use of principle of comprehension, by the same token we can also construct a theory of paradox analogous to that existing in two-valued logic. In 1957, after a one-year long campaign by the members of the IMCAS (Institute of Mathematics at Chinese Academy of Science), mathematical logic returned to Chinese universities. Hu Shihua conducted valuable research on recursive functions and recursive structures in the field of recursion theory around 1960s. He defined a kind of kernel function class in a very concise but powerful way and used it to construct a universal algorithm for normal algorithms and universal computers, like a Turing machine. He also extended the theory of recursive functions on natural number sets to sets of formulas, and established a computability theory, that is, the theory of recursive algorithms (Hu 1960a; 1960b; Hu and Lu 1960). In 1963, the 3rd National Experience-Sharing Conference on Computer Technology was convened in Xi'an. At the conference a special group for mathematical logic was organized, which was presided over by Hu Shihua. This was the first nationwide conference on mathematical logic held in China. Contributions submitted and presented at the conference involved topics such as many-valued logics, theory of algorithms, proof theory, the foundations of mathematics and the theory of automatization.

The Period of Twists and Turns (1966–1976)

Although in the ten years of the Cultural Revolution (*Wenhua da geming* 文化大革命) Chinese research on mathematical logic was greatly influenced by the related political developments, many Chinese researchers on mathematical logic still

managed to work despite the adversities of the time and carry on with their studies and research in the field. Subsequently, in the year 1972, the American-Chinese logician Wang Hao returned to China and was received by Prime Minister Zhou Enlai. After that, Wang kept returning to China for several more times to present scientific reports to the Chinese scientific community. His visits and lectures brought a fresh wind into the Chinese academic world of mathematical logic, which gave an enormous boost to scholars in the field. However, under the heavy influence of the contemporary political circumstances, in this period Chinese scholars' research achievements in the field of mathematical logic were still rather limited.

The Last Quarter of the 20th Century (1977–1999)

After the conclusion of the Cultural Revolution, Chinese scientific research gradually returned to normal. In 1977, Wang Hao returned to China once again to deliver a series of six scientific reports which were later collated and published under the title *Popular Lectures on Mathematical Logic* (*Shuli luoji tongsu jianghua* 数理逻辑通俗讲话; Wang 1981). These lectures were of enormous help to Chinese scholars by enabling them to obtain a timely understanding of the current developmental situation in the international research on mathematical logic.

It was especially after China's 1978 reforms and opening up to the world, when the long-suppressed research enthusiasm of Chinese intellectuals experienced an unprecedented growth, and Chinese science finally obtained a series of significant results in mathematical logic. Thus, for instance, in the two years of 1979 and 1980 alone, Mo Shaokui published six scientific articles related to set theory and the theory of recursion, Zhang Jinwen 张锦文 published seven scientific articles about axiomatic set theory of weak predicate calculus and non-standard analysis, and Hong Jiawei 洪家威 published two articles on computational complexity. In the same period, some high-quality articles were even published in renowned international scientific periodicals. These included works covering Luo Libo's 罗里波 (also known as Lo Libo) achievements in model theory and decidability of free groups, published in the prestigious Western periodical *The Journal of Symbolic Logic* (Lo 1983a; 1983b), as well as Hong Jiawei's results on the theory of computational complexity, published in various international journals (Hong 1982a; 1982b; 1984).

Following 1978, Chinese universities and research institutes started recruiting graduate students in mathematical logic. These developments caused Chinese mathematical logic to enter a stage of overall and comprehensive development,

which saw the emergence of an uninterrupted series of high-standard research achievements in the field. These included works like Wang Shiqiang's 王世强 article on the elementary concepts, methodology and theorems of lattice-valued model theory (Wang 1986); Feng Qi's 冯琦 study on the hierarchy of Ramsey cardinals (Feng 1990); Yi Bo's 伊波 and Xu Jiafu's 徐家福 article on analogy calculus (Yi and Xu 1993); Li Wei's 李未 theory of the limits of formal theory of sequencing—open logic (Li 1993); and Ying Mingsheng's 应明生 article on a logical system for approximate reasoning (Ying 1994).

The New Century (2000—)

Since the begin of the new century, China's community of independently educated as well as foreign-educated researchers in the field of mathematical logic has been constantly expanding. At present, Chinese scholars who are engaged in research of mathematical logic have already become an internationally influential and significant group of researchers, while Chinese research in the field has been completely integrated into the international developments in mathematical logic.

At the same time, a great number of Chinese scholars, such as Ding Decheng 丁德成, Feng Qi and others, have been actively engaged in the international circles of mathematical logicians. More specifically, in the recent years Ying Mingsheng's monograph *Topology in Process Calculus: Approximate Correctness and Infinite Evolution of Concurrent Programs* has been published by the Springer publishing house. Moreover, the Chinese logician Zhang Yi 张羿 assumed the role of the editor-in-chief of the international journal *Logic and Algebra*, while Zhao Xishun 赵希顺 was named a member of the editorial board of the international *Journal of Satisfiability, Modeling and Computation*.

Apart from this, in the last two decades a great number of international conferences related to mathematical logic were initiated and convened in China, such as a conference on the theory and application of models of computation, and a 2008 conference on computability, complexity and randomness.

At the same time, China's achievements in the international academic world of mathematical logic are also expanding, to a degree that it's impossible to offer a complete listing of these results here.

At present, there already exist close to 100 different Chinese textbooks on mathematical logic, while at the same time a considerable amount of the latest teaching materials on mathematical logic from the rest of the world is being continuously

translated into Chinese. Courses on mathematical logic are offered at departments of philosophy and computer science at many Chinese universities, while at several comprehensive universities they also educate master's and doctoral students specialized in the field of mathematical logic. At relevant universities or research institutes undergraduate students are generally taught propositional calculus and first-order predicate calculus, while at the level of graduate studies they are taught set theory and modal logic. Finally at the level of doctoral studies they are taught subjects such as model theory, proof theory, theory of recursion and so on. Quite a few research institutions even make direct use of well-established foreign textbooks on mathematical logic.

A Few Comparatively Central Topics

Chinese research into mathematical logic consists of a few academic groups which have, focusing on a specific topic in one or the other domains of study, created comparatively central original achievements, rich in distinguishing features and qualities. These are summarized as follows in the following subsections.

Medium Logic

Chinese studies on medium logic were established in the 1980s as a result of the long-term cooperation between Zhu Wujia 朱梧槚 and Xiao Xi'an 肖奚安 (Zhu and Xiao 1984), while in the last four decades a group of young and middle-aged scholars engaged in research on the topic. Nowadays, medium logic has already evolved into a theory of logic all aspects of which, from its theory to application, are extremely rich in content.

The fundamental idea which gave rise to the establishment of medium logic was the so-called "intermediate principle". From Aristotle onwards, a distinction has been made between intermediate opposite opposition and non-intermediate contradictory opposition. The principle of non-intermediacy posits that all antinomies are non-intermediate contradictory oppositions, while the principle of intermediacy maintains that not all antinomies are non-intermediate contradictory oppositions. The principle of intermediacy recognizes that under certain circumstances there exists the state of "both A and B". Its philosophical basis rest on the intermediary state of transition that abounds in the process of transformation between two sides of an antinomy; its real basis, on the other hand, is in the intermediary states of various kinds of objective existence, such as, for example, dusk, which represents the intermediate state in the change of daytime into night-time,

or the condition of being middle-aged, which is the intermediary stage between youth and old age, or semiconductors, which represent the intermediaries between conductors and isolators.

In medium logic we use P and $⅂ P$ to express contrary antithetical notions, while the symbol $\sim$ is used to designate a fuzzy negator, which is to be interpreted and read as "partially". If an object x satisfies $\sim P(x) \wedge \sim ⅂ P(x)$, i.e. that it partially possesses the property P and at the same time also possesses the property $⅂ P$, then x is referred to as the intermediary object of opposite antinomy $(P, ⅂ P)$.

The system of medium propositional logic MP consists of two single-variable conjunctions: $⅂$ (opposite negator), $\sim$ (intermediary); and one binary conjunction $\to$ (implication). It further defines the single variable conjunction: $\neg A =_{df} A \to \sim A$.

The inference rules of MP consist of:

(∈) $A_1, A_2, \ldots, A_n \vdash A_i \, (i=1, 2, \ldots, n)$;

(τ)   If $\Gamma \vdash \Delta$, $\Delta \vdash A$, then $\Gamma \vdash A$;

($\neg$)   If $\Gamma, \neg A \vdash B$, $\Gamma, \neg A \vdash \neg B$, then $\Gamma \vdash A$;

($\to_-$) $A \to B, A \vdash B$; $A \to B, \sim A \vdash B$;

($\to_+$)   If $\Gamma, A \vdash B$, and $\Gamma, \sim A \vdash B$, then $\Gamma \vdash A \to B$;

(Y) $A \dashv\vdash \neg ⅂ A, \neg \sim A$;

(Y$\sim$) $\sim A \dashv\vdash \neg ⅂ A, \neg A$;

(Y⅂) $⅂ A \dashv\vdash \neg A, \neg \sim A$;

(⅂⅂$_+$) $A \vdash ⅂⅂ A$;

(⅂⅂$_-$) $⅂⅂ A \vdash A$;

(⅂$_\to$) $A, ⅂ B \dashv\vdash ⅂ (A \to B)$;

($\sim\sim$) $A \to A \dashv\vdash \sim\sim A$.

The system of medium propositional logic MP* represents the system of medium propositional logic MP expanded by the binary connective "$<$", which is called a "truth degree operator" and read as "the degree of truth-value is not stronger than". In addition, it is also enlarged by the following three inference rules:

($<$) $A < B \dashv\vdash (A \to B) \vee (\sim A \wedge \sim B)$

($\sim<$) $\sim(A<B) \dashv\vdash (\sim A \wedge ⅂ B) \vee (A \wedge \sim B)$

(⅂$<$) $⅂ (A<B) \dashv\vdash A \wedge ⅂ B$

The elementary semantic of conjunctions in the system of medium propositional logic MP* is:

A	$\sim A$	$\daleth A$	$\neg A$
0	1	2	2
1	2	1	2
2	1	0	1

$A \to B$ \ B	0	1	2
0	2	2	2
1	1	1	2
2	0	1	2

$A \square B$ \ B	0	1	2
0	2	2	2
1	1	2	2
2	0	1	2

Apart from the above-described system of medium propositional logic MP*, the system of medium logical calculus ML also includes the system of medium propositional logic MP, the systems of medium predicate logic MF and MF*, systems of medium predicate logic with identity ME and ME* (Xiao and Zhu 1985a–1985e; Zhu and Xiao 1985a; 1985b).

Today, medium logic has already developed into a very broad field of research, which consists mainly of the following already established and advanced research contents or directions:

(1) Medium system of algebra (Wu and Pan 1990);

(2) Medium system of modal logic (Zhang and Zhu 1995, etc.);

(3) Medium system of axiomatic set theory (Zhu and Xiao 1988, etc.);

(4) Medium proof theory (Zou 1988);

(5) Medium theory of forcing (Zhu et al. 1996);

(6) Medium system of reasoning with incomplete information (Deng 1994);

(7) Medium programming language MILL and its interpretation system (Song and Zhu 1994);

(8) Medium systems of theory and practice of automatic reasoning (Zhang and Zhu 1994a–1994c, etc.);

(9) Numeralization of medium truth-degree operators and their applications in computers (Hong et al. 2006; Hong et al. 2007).

Lattice Implication Algebras and Their Lattice-Valued Systems of Logic

Nonclassical logic constitutes one of the foundations of artificial intelligence. The lattice-valued system of logic based on lattice implication algebra is a kind of nonclassical logic. Since 1993, Xu Yang 徐扬 and other Chinese logicians have been conducting research on lattice implication algebras, lattice-valued systems of logic based on lattice implication algebras, and imprecise inference and automatic inference based on these systems of logic.

Lattice Implication Algebra

To set up a new system of logic, Xu Yang proposed a lattice implication algebra (Xu 1993), which represented a kind of nonclassical logical algebra combining lattices and implication algebra.

Definition 1. Lattice implication algebra is an algebraic system $\mathcal{L} = (L, \vee, \wedge, ', \rightarrow, O, I)$, where

(1) $(L, \vee, \wedge, O, I)$ is a bounded lattice, while O and I represent its least and greatest elements, respectively;

(2) $': L \rightarrow L$ is an inverted order involutory mapping;

(3) $\rightarrow: L \times L \rightarrow L$ is a binary operation and for any $x, y, z \in L$, there exist

① $x \rightarrow (y \rightarrow z) = y \rightarrow (x \rightarrow z)$;

② $x \rightarrow x = I$;

③ $x \rightarrow y = y' \rightarrow x'$;

④ If $x \rightarrow y = y \rightarrow x = I$, then $x = y$;

⑤ $(x \rightarrow y) \rightarrow y = (y \rightarrow x) \rightarrow x$;

⑥ $(x \vee y) \rightarrow z = (x \rightarrow z) \wedge (y \rightarrow z)$;

⑦ $(x \wedge y) \rightarrow z = (x \rightarrow z) \vee (y \rightarrow z)$.

All lattice implication algebras make up a proper class, which possesses many favourable properties, such as:

(1) $(L, \vee, \wedge)$ is a distributive lattice;

(2) $x \le y$ iff $x \rightarrow y = I$;

(3) $x \rightarrow 0 = x', I \rightarrow x = x$;

(4) If $x \le y$, then $z \rightarrow x \le z \rightarrow y, y \rightarrow z \le x \rightarrow z$;

(5) $x \to y \geq x' \vee y$;

(6) If $\forall x \in L, x \vee x' = I$, then $(L, \vee, \wedge, ')$ is a Boolean algebra;

(7) $(x \to y) \vee (y \to x) = I$;

(8) $(x \to y) \to y = x \vee y$;

(9) $z \to (x \to y) \geq (z \to x) \to (z \to y)$;

(10) $(x \to y) \to (z \to y) = (y \to x) \to (z \to x)$;

(11) $x \vee y = I$ iff $x \to y = y$.

If L is a finite chain, then there exists in L only one such implication →, so that it can become lattice implication algebra. Finite lattice implication algebra can be decomposed into a Cartesian product of finite chains. Over the interval [0, 1] we can define infinitely many kinds of lattice inference algebras.

A subset J of lattice inference algebra L is called its filter. If $I \in J$ and at the same time $x, x \to y \in J$, there are $y \in J$. A filter of L can be generated from a subset of L. It can also be used to define implicative filters, generated filters, prime filters, ultra filters, I-filters, associative filters (Jun 2001), fantastic filters, involution filters, obstinate filters and so on. Filters of lattice implication algebra can be mutually defined with congruence modulo relations. Apart from that, there also exist many results in filter-related methods of fuzzification, dual structures of filters (LI-ideal, ILI-ideal (Liu et al. 2003), WLI-ideal), constitutive categories of lattice inference algebras, and relations between lattice and other non-classical logical algebras.

Lattice-Valued Systems of Logic Based on Lattice Inference Algebras (Xu 1993)

Based on lattice inference algebra, Xu Yang and others established a lattice-valued system of propositional logic $LP(X)$ with lattice inference algebra as its truth-value range (Qin and Xu 1994; Xu and Qin 1993) and lattice-valued first-order system of logic $LF(X)$ (Xu et al. 1997), and on the basis of these further established a lattice-valued system of propositional logic L_{vpl} (Xu et al. 1999) and lattice-valued first-order system of logic L_{vfl} (Xu et al. 2000). For these systems of logic, they further researched their semantics, grammatical structures, and correlation properties, and presented their reliability, completeness, compatibility, deduction theorems as well as other important conclusions. Below, we will describe the main concepts and conclusions using the example of L_{vpl}.

The formulae of L_{vpl} are based on propositional variables and constant formulae by means of logical connectives, while the set of all its formulae F_p also constitutes the lattice inference algebra (briefly referred to as F_p). An assignment is a homomorphic mapping of F_p onto a lattice inference algebra. n-valued inference rules have the form (r_n, t_n), in which r_n is a n-valued partial operation on F_p, and t_n is an n-valued truth-value operation within $\mathcal{L}$. The domain of r_n is marked as $D_n(r_n)$, whereas R_n is subset of the set of all rules of n-valued inferce, $R = \bigcup_{n=0}^{+\infty} R_n$. L-type of fuzzy power set defined over F_p is $F_L(F_p)$.

Definition 2. Let X be any element of $F_L(F_p)$, let (r, t) be n-valued inference rule in R_n, and let a be any random element in the valuation field L.

(1) In $D_n(r)$, if, $X \circ r \supseteq \alpha \otimes (t \circ \prod^n X)$ then we refer to X of (r, t) as α - I type closed.

(2) In $D_n(r)$, if, $X \circ r \supseteq t \circ \prod^n (\alpha \otimes X)$ then we refer to in X of (r, t) as α - II-type closed.

If for any rule (r, t) in R, X of (r, t) is α - I (α - II) type closed, then we call X of R as α - I (α - II) type closed.

Definition 3. Let $T \subseteq F_L(F_p)$, and α represent any element in the valuation field L. If for any element T in T, T of R is α - i type closed, then R of T is α - I type reliable, in which $i =$ I, II.

Definition 4. Let X be any element in $F_L(F_p)$, $T \subseteq F_L(F_p)$, let p be a formula in F_p, and let α, β, θ be any element in the valuation field L.

(1) The semantic of definition of X entails two different forms of p:

　① $C_T^X(p) = \bigwedge_{T \in T} (\bigwedge_{q \in F_p} (X(q) \rightarrow T(q)) \rightarrow T(p))$

　② $C_{(C_T^\phi, R(\alpha-i))}^{\beta, X}(p) = \wedge\{(Y(p) \,|\, Y \supseteq \beta \otimes (C_T^\phi \cup X)$, Y of R is α-i type closed$\}$,

　　$i =$ I, II.

(2) If we map P^{I} (P^{II}): $(n) \longrightarrow F_p \times L$ ($(n)=\{1, 2, …, n\}$)

　$i \,|\rightarrow (p_i, \theta_i)$

　fulfilling the following conditions:

　① $(p_n, \theta_n) = (p, \theta)$

　② $\theta_i = \beta \otimes C_T^\phi(p_i)$ or

　③ $\theta_i = \beta \otimes X(p_i)$ or

　④ there exist $i_1,…,i_k \le i$ and the rule (r, t) of R_k, so that if we make

$(p_i, \theta_i) = (r(p_{i_1}, ..., p_{i_k}), \alpha \otimes t(\theta_{i_1}, ..., \theta_{i_k}))$ $((p_i, \theta_i) = (r(p_{i_1}, ..., p_{i_k}), t(\alpha \otimes \theta_{i_1}, ..., \alpha \otimes \theta_{i_k})))$,
then we call $(P^i, (n), X, (p, \theta) - (\alpha, \beta))$ to be a (α, α) - I type proof of value degree θ from X to p, i = I, II.

Theorem 1. (Reliability – completeness) If truth-value operations of R satisfy bounded semi-continuity, then for any formula p and i = I, II, there is

$$C_T^{\beta \otimes X}(p) = C_{(C_{T, R(\alpha-i)}^\phi)}^{\beta, X}(p) = \vee \left\{ \theta \,|\, there\ exist\ (P^i, (n), X, (p, \theta) - (\alpha, \beta)) \right\}.$$

Definition 5. Let δ be any element in the valuation field L, let T be an element of $\mathcal{T}$, let p be a formula in F_p. If $T(p') = (T(p))'$, $X(p) \rightarrow T(p) \geq \delta$, then we say that T satifies X in the type δ - i, at the same time we also call X as satisfiable of the type δ - i, i = I, II.

Definition 6. Let τ be any element in the valuation field L. If

$$\vee \{ C_{(C_{T, R(\alpha-i)}^\phi)}^{\beta, X}(p) \otimes C_{(C_{T, R(\alpha-i)}^\phi)}^{\beta, X}(p') \,|\, p \in F_p \} \leq t \ ,$$

then we call X as τ' - I type compatible of $(\alpha, \alpha, \mathcal{T})$, i = I, II.

Theorem 2. (Compatibility) If X is satisfiable of the type δ - i, then X of $(\alpha, \alpha, \mathcal{T})$ is compatible of type $\delta \otimes \delta$ - i, i = I, II.

Theorem 3. (Deductive theorem) Let (r_2^0, t_2) be an inference rule if $\mathcal{R}$, let p and q be any two formulae within F_p, and σ and θ be any elements within the valuation field L.

(1) If i = I, $C_T^{\beta \otimes X}(p \rightarrow q) \geq \sigma$, then $C_T^{\beta \otimes (X \cup \{\theta/p\})}(q) \geq \alpha \otimes t_2(\beta \otimes \theta, \sigma)$;

(2) If i = II, $C_T^{\beta \otimes X}(p \rightarrow q) \geq \sigma$, then $C_T^{\beta \otimes (X \cup \{\theta/p\})}(q) \geq t_2(\alpha \otimes \beta \otimes \theta, \alpha \otimes \sigma)$;

(3) If $\mathcal{T}_h \subseteq \mathcal{T}_H$, then $C_{T_h}^{\beta \otimes (X \cup \{\theta/p\})}(q) \leq C_{T_h}^{\beta \otimes X}(p \rightarrow q)$.

Where, $r_2^0(p, p \rightarrow q) = q$, $\mathcal{T}_H = \{T \,|\, T$ is a homomorphic mapping of F_p into $L\}$.

Basing their work in lattice inference algebra, they also researched the corresponding imprecise inference (Xu et al. 2000) and resolution automatic reasoning (Xu et al. 2000; Xu et al. 2001; Xu et al. 2003; Xu et al. 2011) of the lattice-valued system of logic.

Chinese Notation

An appropriate symbolic notation can enable us to express logical thought in a clearer and more efficient manner, and subsequently to construct tools of inference. When it comes to logical constants (propositional connectives, quantifiers,

modal operators etc.) in formal languages in particular, which constitute the core content of research on inference, constructing appropriate methods of symbolic notation can enable clearer and more precise expression, and subsequently also the expression of inference rules for logical constants.

The Chinese method of notation represents a kind of symbolic notation for logical constants as proposed by Du Guoping 杜国平 and others. In this kind of notation, by using only a pair of parentheses "( )" we can express each and every kind of logical constant (Du 2019a, 2022).

The most commonly used notation methods for logical constants include the infix expression method, Polish notation and reverse Polish notation.

The infix expression method places binary propositional conjunctions "disjunction", "conjunction", "entailment" and "equality" between their two linking symbols p and q, so that corresponding expressions are formed as "$p \lor q$", "$p \land q$", "$p \rightarrow q$" and "$p \leftrightarrow q$". In that regard, the infix method is identical to the common use of mathematical symbols +, -, ×, and ÷. When formulae become complex enough, the infix method must draw support from symbols such as parenthesis and others to express the priority of different combinations between symbols, all in order to avoid ambiguity. For example, with the use of parenthesis, the formulae $(p \lor q) \rightarrow r$ and $p \lor (q \rightarrow r)$ are able to express different meanings.

The Polish notation is an independent form of symbolic notation invented by the Polish logician Jan Łukasiewicz, which uses different capital letters to express logical connectives, placing these connectives in front of the propositions which they are connecting. For this reason, this notation method is also known as prefix expression method. Its concrete working method resides in using expressions like "Np", "Cpq", "Kpq", "Apq", "Epq" to express "negation", "entailment", "conjunction", "disjunction" and "equality", respectively (Łukasiewicz 1966, 22–30). One of the special advantages of Polish notation resides in the fact that it does not have to use parenthesis nor is it able to produce ambiguities. Its expressive efficiency is higher than that of the infix expression method.

The reverse Polish notation is also referred to as the suffix expression method. Its working method is similar to that of Polish notation, with the only difference being that the connective is placed behind the proposition that it is connecting.

Chinese notation is different from the above three notations. In contrast to the Polish notation, it uses other kinds of symbols, while it only uses a pair of parentheses to express each and every kind of logical constant. Thus, for example, it treats parenthesis "( )" as a ternary symbol. "$(ABCx)$" can thus be used to express all propositional connectives and the quantifiers $\forall$ or $\exists$. Furthermore, parenthesis

"( )" can also be regarded as a quaternary symbol. Thus, by using "$(ABCxD)$" we can express all propositional connectives, quantifiers $\forall$ or $\exists$, and modal operators $\square$ or $\diamondsuit$.

For example, if we define $(ABCx)$ as $[\neg A \lor \neg B] \land \forall x[B \rightarrow C]$, then $(ABBx)$ is $[\neg A \lor \neg B] \land \forall x[B \rightarrow B]$. This is further equivalent to $[\neg A \lor \neg B]$, which is one of Sheffer functions, and can therefore define all propositional connectives including negation "$\neg$", disjunction "$\lor$", etc. In addition to that, $(C \neg CCx)$ is $[\neg C \lor \neg \neg C] \land \forall x [\neg C \rightarrow C]$, which is further equivalent to $\forall x C$, which in this way defines the universal quantifier.

Secondly, if $(ABCxD)$ is defined as $[\neg A \land \neg B] \land \exists x[B \rightarrow C] \land \square [C \rightarrow D]$, then $(ABBxB)$ is $[\neg A \land \neg B] \land \exists x[B \rightarrow B] \land \square[B \rightarrow B]$, this is equivalent to $[\neg A \land \neg B]$, which is a Sheffer function, as a result of which it can be used to give the definition of all propositional connectives, including the negation "$\neg$", conjunction "$\land$", and so on. Aside from that, $(C \neg CCxC)$ is equal to $[\neg C \land \neg \neg C] \land \exists x[\neg C \rightarrow C] \land \square[C \rightarrow C]$. This is equivalent to $\exists x C$, by which we have defined the existential quantifier. Moreover, $(C \neg C \neg CxC)$ is $[\neg C \land \neg \neg C] \land \exists x[\neg C \rightarrow \neg C] \land \square[\neg C \rightarrow C]$, which is equivalent to $\square C$, by which a definition was given for the "necessary" modal operator (Du 2019b; 2019c; 2020; 2021a; 2021b).

Chinese notation is inspired by Sheffer functions and the related ideas by Zhang Qingyu 张清宇. Sheffer functions employ a simple symbol, | or ↓, to denote the logical functions $\neg C \lor \neg D$ or $\neg C \land \neg D$, which specifies the propositional connectives as one symbol (Mendelson 2015, S21–23). On the basis of Sheffer functions, we have presented our specifications of the common logical constants. Apart from that, Chinese notation method is also greatly inspired by Zhang Qingyu's proposal of not using propositional connectives and instead using only parentheses and the nullary connective "T" to express the ideas of propositional connectives and quantifiers (Zhang 1995; 1996; 1997).

Chinese notation is an integral notation method. Because the left and right parentheses are used in pairs, their scope is clearly defined. Within themselves both parentheses have the capacity to express logical constants as well as the capacity to express the linking priority of symbols.

Some Reflections on Past Developments

Today, the development undergone by Chinese mathematical logic and foundations of mathematics in the last 100 years has already become an important and integral part of Chinese research on foundational theories. In its major

developmental plans for science and technology, such as "Outline of the 14th Five-Year Plan for the Development of National Economic and Social Development and 2035 Long-Term Objectives of the People's Republic of China", the Chinese state places significant emphasis on research into foundational theories, which also includes mathematical logic, and has put forward numerous major research topics which are related to mathematical logic. In that way, Chinese research on mathematical logic has entered a time of favourable circumstances and great opportunities in the context of national strategic development.

On the other hand, looking back at the developmental trajectory of the past 100 years, Chinese mathematical logic encountered the following problems which are worth taking into further consideration:

(1) One of the comparatively central problems is the still pending progress in establishing influential scientific institutions. Thus, institutions like the Research Laboratory for Mathematical Logic at the Chinese Academy of Sciences, the Department of Mathematics at Nanjing University as well as the Institute of Logic and Cognition at Sun Yat-sen University have been in the past or still are China's most important research institutes for research into mathematical logic. If China wants to become a technological and scientific superpower, then it must accelerate the move to make mathematical logic an integral part of national research into foundation theories, by founding more internationally influential centres of scientific research that would specialize in this important scientific discipline.

(2) The problem of the relatively diffuse nature of research areas, and the still pending strengthening of scientific teams focusing on specific fields of research. As a field of theoretical research, mathematical logic is still basically in the state of having to struggle on its own. While Chinese mathematical logic is characterized by relatively focused research based on teacher-student relationships, Chinese academia still has not seen the formation of a group of experts that would garner international acclaim and influence in one specific area of such studies.

(3) Individual scholars tend to struggle on their own, and the number of academic exchanges is still insufficient. Therefore, China needs to work at establishing its own internationally influential scientific journal for mathematical logic, in order to advance and increase the academic exchanges among Chinese researchers in the field.

(4) Exchanges with the international academic world also need to be increased. China requires a substantial increase in the organization of international conferences related to mathematical logic, so as to boost young scholars' engagement in international academic exchanges.

(5) The problem of insufficient interdisciplinary research in science. Because of the disparities that exist among the humanities, natural sciences, and technology, different research groups for mathematical logic were formed in the areas of philosophy, mathematics, and computer science and artificial intelligence. Since these three groups of researchers still lack mutual exchanges and cooperation, there is an urgent need to address this issue in order to give rise to an atmosphere where the humanistic direction of research would receive equal attention as the scientific research in the field.

(6) The lack of significant, original results. Looking at the overall state of Chinese research on mathematical logic, we can notice that there is a profusion of results in secondary, follow-up research but at the same time, a great scarcity of ground-breaking original results, especially major, internationally leading scientific achievements. However, we are firmly convinced that soon after the promulgation of China's strategy emphasizing interdisciplinary scientific research, this situation will greatly improve!

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SPECIAL ISSUE
HISTORY OF LOGIC IN
CONTEMPORARY CHINA

Classical Chinese Logic and Rhetoric

Critique of "Judgment" in Gongsun Long's "Zhiwu lun"—A Comparative Reading in the Light of Hölderlin's "Judgment and Being"

SHE Shiqin*

Abstract

This paper has attempted to characterize "Zhiwu lun" as the presentation of the incapacity of object-oriented knowledge to represent the realm of "things", highlighting Gongsun Long's epistemological and ontological value beyond a logical one. This paper proposes that only based upon this assumption does "Zhiwu lun" allow a thorough interpretation of "Mingshi lun", whereby the intuitive function of "names" provides a better solution to the cognitive limits imposed by object-oriented (self-)consciousness. Methodologically, this paper mainly considers the Heidelberg School's interpretation of Hölderlin's critique of judgment in "Judgment and Being" to be both a complementary justification and reconstruction of the implicit structures of Gongsun Long's view. This paper has presupposed the interpretation of Gongsun Long's key concept of 指 as "judgment" in Hölderlin's sense, in contrast to "things" (物) and "name" (名), then verified this hypothesis, as well as the relationships amongst these translations, by a close textual analysis and new translation of "Zhiwu lun".

Keywords: Gongsun Long, the Heidelberg School, Hölderlin, critique of judgment, pre-reflectivity

Kritika »presoje« v Gongsun Longovem delu »Zhiwu lun« – primerjalno branje v luči Hölderlinovega dela »Presoja in bivanje«

Izvleček

Članek poskuša opredeliti delo »Zhiwu lun« kot prikaz nezmožnosti na objekt osredotočenega znanja, da bi predstavljal svet »stvari«, pri čemer osvetli Gongsun Longovo epistemološko in ontološko vrednost kot takšno, ki presega zgolj logično vrednost. Članek nadalje predpostavlja, da je samo na ta način mogoče interpretirati besedilo »Mingshi lun« s pomočjo razumevanja besedila »Zhiwu lun«, pri čemer intuitivna vloga »imen« ponuja boljšo rešitev za kognitivne omejitve, ki jih povzroča na objekt osredotočeno (samo) zavedanje. Na metodološki ravni članek večinoma obravnava interpretacijo Hölderlinove

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kritike presoje v »Presoji in bivanju«, ki jo je podala heidelberška šola, ne samo kot komplementarno upravičenje ampak tudi kot rekonstrukcijo implicitnih struktur Gongsun Longovega pogleda. V članku najprej podam razlago Gongsun Longovega ključnega koncepta *zhi* 指 kot »presojo« v Hölderlinovem pomenu, v nasprotju s »stvarmi« (*wu* 物) in »imenom« (*ming* 名), v nadaljevanju pa s pomočjo podrobne besedilne analize in novega prevoda besedila »Zhiwu lun« preverim ter potrdim to podmeno kot tudi odnose med temi prevodi.

Ključne besede: Gongsun Long, heidelberška šola, Hölderlin, kritika presoje, predreflektivnost

To this day, Gongsun Long 公孫龍 remains one of the most controversial figures in the history of Chinese thought. The reason why his thought attracts such special attention not only from Chinese scholars but also from Western sinologists, even though it is expressly divorced from such mainstream thought as Confucianism, is that most of his texts demonstrate a strong logical connotation, an interest shared by the Western tradition. The Jesuit Matteo Ricci (1552–1610), the first Westerner to have studied Chinese thought in general, initially examined Gongsun Long's text from a Western perspective comparing him with Aristotle (Zhang 2019). Ricci, who wished to convert the Chinese through natural reason and Christianity, believed that Gongsun Long's *white horse paradox* (白馬論) could be found resolved in the Aristotelian notions of substance and accident (ibid., 4). His interpretation of the *Gongsun Longzi* in the light of a rationalistic dialogue with the West is seen as promising by most contemporary scholars, but in fact such an interpretation is profoundly misleading. The majority of subsequent research followed this *rationalistic, logical–linguistic* perspective.

Amongst contemporary scholars, derived from Emil Benveniste's comparative linguistic approach, Zhang concluded that the justification for Gongsun Long's claim "A white horse is not a horse" is a result of the different syntaxes of Chinese and Western languages. Since there is no copula "is" in the Chinese language which calls for predication, 白馬非馬 can only be read as inclusion and not identity (Zhang 2019). There is also the difficulty which Zhang recognized herself, which is that this claim cannot explain the remainder of or the integrity of the "Baima lun" ("White horse treatise"), as the linguistic approach based on the specificity of Chinese language is misleading. The authors[1] of the *Zhuangzi* (莊子),

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1   There were no properly organized schools of thought during the Warring States, except for Confucianism and Mohism. Moreover, early Chinese philosophical "Masters" were not necessarily actual existing authors, and that their texts have almost not been compiled by them, in most cases these

the *Xunzi* (荀子), and so on, all criticized the *GSLZ* (公孫龍子) for "playing with words", without regarding their corresponding reality in the "Baima lun", and they of course spoke the same Chinese language as the author of the *GSLZ*. This fact leads to the claim that the linguistic perspective outlining the influence of the Chinese language, if indeed playing an important role due to its grammatic and semantical divergence from Western languages in the interpretation of ancient texts, cannot be counted as decisive. Apart from the perspective of language, this claim also led us to the perspective of self-consciousness, which is a phenomenon with a greater universality amongst different cultural settings.

Although studies from a logical, rationalistic and linguistic perspective did contribute to the presentation of early Chinese logic, they also fragmented and missed Gongsun Long's point as a theoretical whole. As a matter of fact, the apparent logical approach in his dialogues serves only as a method of demonstration, a rhetorical play for exhibiting his more fundamental epistemological and ontological ideas. Thus Gongsun Long's main idea should be considered diametrically opposed to the Aristotelian logic of non-contradiction and the law of identity (A=A).

Nevertheless, from an anti-rationalistic perspective, Rieman (1977) related Gongsun Long to Wittgenstein on linguistic scepticism, interpreting Gongsun Long as playing with words, sceptical about linguistic designation while favourable about its practical use. Thompson (1995) developed a similar idea that the apparent *white horse paradox* comes from communicative functions, instead of logical and judgmental functions. The practical side of the "language use" only seems to be an interesting path, since neither Rieman nor Thompson has drawn any further conclusions which enable the interpretation of the remaining chapters of the *GSLZ*.

In two successive papers (1980, 1981), Rieman further developed the idea of "language use" in Gongsun Long, relating it to the Confucian political "rectification of names", subsequently claiming it to be the key idea of Gongsun Long. However, within the whole work, the textual suggestion for political interpretation can only be found in the last proposition of "Mingshi lun" (名實論),

> How perfect were the ancient farsighted kings! They examined names and their corresponding realities and were careful about their designations! (Perleberg 1952, 123)

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figures are more fictitious characters than actual historical people (Csikszentmihalyi and Nylan 2003). However, in this paper Gongsun Long is referred to as the author of the text for the sake of convenience and simplicity.

The interpretation clearly has a narrower scope than what Gongsun Long intended. Instead, this proposition should be considered as an illustrative segue of the epistemological ideas of "Mingshi lun".

Pang Pu argued that 指 in "Zhiwu lun" (指物論) should be interpreted as "mind" or "consciousness" in contrast to "matter" in the Western sense. Zhu Qianhong and Zeng Xiangyun understand it from the perspective of Western semiotics. While those threads of analysis are in close alignment to the perspective adopted by this paper, their definitions of the meaning of 指 often lack textual evidence (Liu 2020, 252). Therefore, this paper hopes to provide a thorough textual analysis of "Zhiwu lun" as it relates to "Mingshi lun" and other issues.

Bo Mou distinguished between a semantic referent, "A white horse is a horse", and a pragmatic referent, "A white horse is not a horse" ("double reference account", Mou 2007). In order to avoid dualism within the principles of explication as well as propose a solution to "Baima lun", Bo Mou claims that the two perspectives should be complementary to one another. However, while this distinction does exist and is important for "Baima lun" and the *GSLZ*, there is no sign of Gongsun Long having assigned equal value to the semantic referent and the pragmatic referent, as his conclusion in "Baima lun", "A white horse is *not* a horse", attests to. Rather, his attitude towards the linguistic and logical (or "semantic" as according to Mou) explication is *a clear refutation*. This refutation is confirmed through the key proposition of "Zhiwu lun" (4[2]) which radically separates the apparent linguistic and logical sphere from that of "things" ("Judgments/designations/pointings (指) are what do not exist in the world; things are what exist in the world. To identify what exists in the world with what does not exist in the world, this is not right (指也者/天下之所無也/物也者/天下之所有也/以天下之所有為天下之所無/未可)"). Failing to recognize this distinction, Mou claimed that Gongsun's "pre-theoretical" solution of "due place actuality" in "Mingshi lun" was not to be found in the *GSLZ*, but instead in the philosophy of Xunzi (Mou 2020, 42). However, it is precisely this deconstruction of the rational, logical sphere (指), which not only constitutes the central topic of "Zhiwu lun" but equally functions as the starting-point of Gongsun Long's holistic reflection that allows for the elaboration of "names" in "Mingshi lun" as the epistemological counterpart of 指, thereby rendering it *possible to deduce* all the qualities of "name" (名) as opposed to the ones of 指 listed in "Zhiwu lun". Therefore, only after the elucidation of this crucial distinction does it become tenable to thoroughly interpret "Mingshi lun" in relation to "Zhiwu lun".

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2   The words or propositions are numbered throughout the article according to their initial numbers given by the 1952 version of *The works of Kong-Sun Lung-Tzu* (Perleberg 1952). Therefore, readers can refer to the original Chinese text where these words or propositions are located.

There are more rival interpretations of the "Zhiwu lun" than of any other document in early Chinese philosophical literature, not to mention the sheer amount of competing translations. The diversity of interpretations can be partly attributed to Ricci's false suggestion of interpreting Gongsun Long under a rationalistic framework and linguistically, from the difficulty of translation of Gongsun Long's texts both for Chinese and western scholars.

I will attempt to propose a new reading of "Zhiwu lun", mainly based upon the theoretical framework of the Heidelberg School's interpretation of Hölderlin's critique of self-consciousness and its judgmental form in German idealism in the fragment "Being and Judgment". In equal parts a critique of Fichte's absolute principle of self-consciousness ("I am I") as well as building upon Kant's identification of thinking and judging (Frank 2004, 97–126), Hölderlin understands "judgment" not only emphatically in the semantic sense as "making a judgment about something", but *in the broadest sense of the term*, and thereby as the "original separation" (*Ur-theil*) between subject and object in (self-)consciousness. This *separation* functions as the basis of all our object-oriented, predicative and conceptual knowledge in opposition to that which is "separated" by judgment, *ergo* "Being".

For this reason, I will attempt to translate Gongsun Long's key term 指, *which also seems to encompass a wide range of mental activities*, as "judgment" *in this sense* and interpret "Zhiwu lun" against this framework as the radical critique of judgment in a pre-rationalistic and pre-logic way. Methodologically, I will *presuppose* to interpret 指 as judgment in Hölderlin's sense in contrast to things (物) and name (名), then verify the feasibility of this hypothesis as well as the relationships among these translations through a close textual analysis.

Although Gongsun Long of course did not use Western terms such as pre-reflectivity, Being or self-consciousness, the reasons why I consider this approach to be better than the rest are as follows. First, "Being and Judgment" and "Zhiwu lun" textually demonstrate common points of view; second, while almost all the other interpretations remain fragmentary and even contradictory until now, "Being and Judgment" would allow the interpretation of "Zhiwu lun" in relation with "Mingshi lun" and "Baima lun", as well as opening the possibility of interpreting "Tongbian lun" and "Jianbai lun" in line with the first two fragments, as I will attempt to show the key features of these parallels. Thus, I consider the Heidelberg School's interpretation of Hölderlin to not only be a complementary justification, but also a valid reconstruction of the implicit structures of Gongsun Long's view. This is not saying that I will impose a Western view and concepts upon the Chinese thinker, which is the most criticized aspect in these debates, nor that Hölderlin would be the only appropriate reference in the Western tradition. As

the author of the *GSLZ* sometimes defended his thesis on the grounds of logical demonstration, its epistemological and ontological value, which exceed its mere logical value, became veiled to modern readers by this cynical game of logic. Thus, in order to enable the Heidelberg School's interpretation of Hölderlin to explain what Gongsun Long means, the main methodology is to examine how he arrives at said meaning where the two texts indeed demonstrate common theses.

As the *GSLZ* has found consensus neither in translation nor interpretation, I will retranslate, subdivide and comment on each proposition cited in this paper.[3]

Critique of Judgment in the Heidelberg School's Interpretation of Hölderlin's "Judgment and Being"

The less than 400 word fragment entitled "Judgment and Being" ("Urtheil und Seyn") was only published for the first time in the 1960s after the philosophical significance of its linguistic obscureness had been rediscovered and restructured by Dieter Henrich. At that point, it became a paradigm shifting critique of and breakthrough to the theoretical impasse presented by the problem of self-consciousness in early German idealism. Ever since, this interpretation has not only achieved scholastic consensus within the field of study of German idealism, but "Judgment and Being" has also profoundly redefined the interpretation of Hölderlin's works, especially his philosophical contributions.

Judgment and Being, traditionally concepts of knowledge, are unconventionally opposed one to another. "Judgment" (*Urtheil*) is the "original separation" (*Ur-theil*)[4] of subject and object, while being, their seamless unity. We should distinguish between the object of knowledge (*Objekt des Wissens*) and "Being". "Being", as this original unity between subject and object, is what precedes their relation, and therefore can never be identified with an object of knowledge. Consequently, Being can only be depicted by a boundary concept "intellectual intuition", where subject and object are in such absolute unity. In contrast, the form of knowledge

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3   The Chinese original text used in this article is *The works of Kong-Sun Lung-Tzu* (Perleberg 1952). Although a new edition (*The Mingjia & Related Texts* (2019)) is available, however, both the Daozang and the modern version are provided with suggested subdivisions of propositions which do not entirely suit my interpretation of the text. Thus, I have rather chosen the 1952 version which does not contain any subdivision and have provided my original subdivision in correspondence with my own translation and interpretation.

4   Waibel discovered a direct precursor of Hölderlin's interpretation of judgment in Fichte himself, who claimed that: "Judging (*Urtheilen*), is to originally divide (*ur-sprünglich teilen*)". The idea of this division innately involves the notion of the reciprocal relation of subject and object to one another, and presupposes a whole of which subject and object are only constituent parts (Frank 2004, 104).

provided by self-consciousness is different, for there, subject and object are still separated (Henrich 1997, 75–76; 2004, 40–48).

This text is an intervention by Hölderlin in an ongoing philosophical argument of his time, namely, in his critique of the early Fichte and Schelling. Semantically, if our self-consciousness (as well as consciousness of external objects) is described on the basis of the *dual* form of judgment of A=A (in the case of consciousness of external objects, A=B) or a first principle of self-identity ("I am I") as the early Idealists did, it cannot provide this seamless ground for its own existence, and thus needs to presuppose a "Being" that can no longer be characterized by means of self-consciousness and judgment:

> Yet this Being must not be confused with identity. If I say: I am I, the subject ('I') and the object ('I') are not united in such a way that no separation could be performed without violating the essence of what is to be separated; on the contrary, the I is only possible by means of this separation of the I from the I. How can I say: 'I'! without self-consciousness? Yet how is self-consciousness possible? In opposing myself to myself, separating myself from myself, yet in recognizing myself as the same in the opposed regardless of this separation…Hence identity is not a union of object and subject which simply occurred, hence identity is not = to absolute Being. (Hölderlin 1988, 37–38)

In other words, according to Hölderlin Being characterizes an *absolute, seamless unity*; Judgment conversely, *only* introduces an "original division" of Being into a subject and an object (even if the object is the subject itself in the case of self-consciousness) *and* the formal reunification of them into a *logical* identity, which is only secondary and relative, in contrast to its pretended absoluteness. Thus, judgment is finite and dualist by its structure and can never represent Being in its unity and totality.

Frank followed and expanded Henrich's interpretation, reading the word "*Objekt*" in "*Subjekt und Objekt*" not only as object-oriented knowledge in the broad sense, but also analytically as *predicate*, emphasizing the semantic understanding of the separating essence of judgment. First, the dual *form* of judgment, which divides the expression into a subject and a predicate, contradicts its *content*—for with respect to content, it is supposed to be the absolute unity of subject and object which is named "Being" with infinite possibilities of predicates. Second, in the judgment, the predicate only provides a *partial* "image" of the subject. It picks out only one characteristic among the infinity of characteristics that the subject possesses. For example, "Socrates is an Athenian". "Athenian" is not sufficient to describe the

integrity or the "Being" of Socrates, because it is only one quality among the infinite qualities that Socrates possessed. In this sense, judgment reveals and conceals Being. Thus, in the relation of subject and predicate, the meaning of judging is the relativizing of, the original Absolute position which we express through the term "Being", or stated simply, the separation of the inseparable. Even in the particular case of the self-consciousness articulated in the judgment "I am I", there is also differentiation; an original division separates the I as subject and the I as predicate, for otherwise any self-consciousness would be impossible. However, what is expressed in the judgment is precisely the non-distinctness of subject and object—their absolute fusion; the form of the judgment consists, however, in distinguishing these non-distinct terms (Frank 2004, 104).

Hölderlin draws the following conclusion: If, on the one hand, I can gain no knowledge about a state of affairs unless I make a judgment about it, depriving it of its absolute identity and if, on the other hand, a judgment must refer to and depend on an underlying, non-relative unity in order to be a relation of something to something, then the synthesis that takes place in judgment, must be distinguished *fundamentally* from this pre-judgmental, pre-predicative, non-relative unity—Being. Judgment remains a logical, relative and empty identity, while Being should be an absolute, seamless and pre-reflective unity. It cannot be thought of or grasped conceptually, for to think is to judge (following Kant), and to judge is to differentiate (Frank 1997, 705).

The distinction between the unified Being and the originally dividing act of apprehension, forces us to distinguish between the objectifying act of (self-)consciousness and the non-objective intuition in which *Being is self-evident*. Hölderlin calls this latter "intellectual intuition". As intuition it is immediate, therefore placing no distance between itself and what it is conscious of, even if of itself. Awareness of this originally unified Being is thus neither conceptual nor pre-predicative, for what is known through predicates and concepts is grasped only mediately (according to Kantian terminology) in a fundamental separation. I will particularly rely on some of the basic characteristics of the "intellectual intuition" to elucidate Gongsun Long's key idea of "names".

Although the respective interpretations of "Judgment and Being" by Henrich and Frank emphasize different epistemological aspects of the text, they are complementary to one another and are both widely accepted in the studies of German Idealism and of Hölderlin. As a result, I will make use of both perspectives as a reference for the elucidation of Gongsun Long.

However, what the Heidelberg School has not expressly highlighted is the fact that since "Judgment and Being" belongs to one of Hölderlin's earlier texts, its

critique is deepened and, in various forms, extended to an *existential* dimension in his later theoretical and poetic works. For example, the separation of self-consciousness from Being is also described as "The Beautiful" (*das Schönheit*) of *life* as degradation from its origin in the "divine nature" in "Hyperion", as well as "The Tragic" (*Das Tragische*) of human subjectivity in challenging fate in vain in his "Remarks on Sophocles' Oedipus and Antigone" (She 2016). These themes draw the practical dimension of action into the scope of Hölderlin's critique of self-consciousness, and thus add an ontological aspect to the epistemological interpretation of the Heidelberg School.

Moreover, as the intellectual intuition of the absolute union of subject and object can last but only an instant and is "too unconscious of itself", Hölderlin complemented it with "feeling" and "intellect" in the concept of "transcendental sensation" (*transzendentale Empfindung*) in "On the operation of the poetic spirit" ("Über die Verfahrensweise des poetischen Geistes") (Hölderlin 1988, 135).

A similar analysis of the limit of our object-oriented cognition and its solution was presented some 2,000 years earlier in China.

Textual Analysis of "Zhiwu lun" (《指物論》 "Theory on Judging Things")[5]

> Guest: Things are all about judgments, but judgments are not what they judge /judgments are non-judgments.
>
> 物莫非指/而指非指. (1)[6]

Although the author does not give a definition of "things" here, there is a possible answer in "Mingshi lun" ("Theory on names and their corresponding realities"): "Things are Heaven and Earth and what they produce 天地與其所產焉/物也" ("Mingshi lun", 1); "A thing is a thing and does not exceed what it is. This should

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5   The words or propositions are numbered throughout the article according to their initial numbers given by the Perleberg's 1952 version of *The Works of Kong-Sun Lung-Tzu*. Therefore, readers can refer to the original Chinese text where these words or propositions are precisely located.

6   非指 (non-judgment) is apparently a concept created by Gongsun since it appears throughout *Zhiwulun*. However, 物莫非指 should be broken into 物/莫非/指 (instead of 物莫/非指) to mean: Nothing is not about judgments (double negation with 莫 and 非). 而指非指 should be broken into 而指/非指 with the concept of 非指. Some translations are based on 物莫/非指, 而指/非指, taking the first 非指 as a fixed concept just as the second, and thus fell into Gongsun's playful language trap.

be reality 物以物其所物/而不過焉⁷/實也" ("Mingshi lun", 2). "Mingshi lun" views "things" in terms of nature, since they are, "Heaven and Earth and what they produce", and "do not exceed what it is". Namely, they remain in their state of nature as products of "Heaven and Earth" ("A thing is a thing", 物其所物⁸), in opposition to the products of human mind. This is the proper "place" (位 "Mingshi lun", 4) of things and why only "things" can be called "reality" (實 "Mingshi lun", 2) or "existence" (天下之所有, "Zhiwu lun" 4), as an antonym of emptiness or absence (曠).

What is in *opposition* to "things" and described as "absent" (曠 "Mingshi lun", 3), non-"real" (實 "Mingshi lun", 2), "out of its place" (所位非位 "Mingshi lun", 4)⁹ and should thus be "rectified" (正 "Mingshi lun", 4)? Gongsun Long did not name it directly in "Mingshi lun". However, we can find the answer in 指. Precisely in "Zhiwu lun", the spheres of 指 and 物 (nature or things in themselves) are mutually *radically opposed to each other*, and only things are considered as belonging to the realm of reality (existence, substance), just as in "Mingshi lun". In contrast, 指 belongs to the realm of fiction (abstraction) or absence (non-existence): "Guest: 指 (presupposed *for now* to be the "original separation" of subject and object in self-consciousness, it can encompass object-oriented knowledge in general, such as judgments, conceptualizations, designations, pointings and pointers, syntheses, associations, signs, signifiers, symbols … etc., namely, all perceptual and conceptual references) are what do not exist in the world; things are what exist in the world. "To identify what exists in the world with what does not exist in the world, this is not right (指也者/天下之所無也/物也者/天下之所有也/以天下之所有為天下之所無/未可)" ("Zhiwu lun", 4).

If we borrow Hölderlin's and Schelling's interpretation of the various ways of positing of the absolute self-consciousness to different modes of being, i.e. possibility, reality and necessity (Frank 2004, 105), it would comparatively strengthen the

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7   焉 appears from 1-4 ("Mingshi lun") according to a parallel structure as " …. 焉, …也". Since it appears each time at the end of the semi-clause, thus as a final clause marker (天地與其所產焉/物也 1; ……而不過焉/實也 2; ……不曠焉/位也 3; ……位其所位焉/正也 4), I have translated it accordingly as affirmation instead of questions or other significations which would require 焉 to appear at other places of the clause.

8   物以物其所物: literally, the first 物 is a noun and the subject, the second 物 is the main verb of the expression, the third 物 is the verb of the subordinate clause. Literally, "A thing 'denotes' what it 'denotes' (the third 物)". Thus, I've translated it as "A thing is a thing", standing in radical opposition to what does not "denotes" what it "denotes" and "exceeds itself"—the mind or the judgment. This translation is confirmed by "Zhiwu lun" (4). ("Guest: Judgments are what does not exist in the world; things are what exists in the world. To identify what exists in the world with what does not exist in the world, this is not right".)

9   In 所位非位, the first 位 is a verb, the second 位 is a noun—"to occupy" the "wrong position". 出其所位非位/正也, leaving the "wrong place" that it "occupies" equals being "rectified".

thesis in "Zhiwu lun" and reconstruct its implicit structures, while also aiding me in partially explaining my attempt at translating 指 as "judgment" *in the epistemological sense*, aligning with Hölderlin's sense of the term as the "original separation" of (self-)consciousness from Being. This separation finds its semantic expression in the dual form of judgment.

According to Schelling, Being, or the original positing act of the absolute self-consciousness, does not correspond to pre-reflective "reality", but instead exists in contrast to what is "real" and thus, corresponds to a "logical, objective possibility" which acts as the foundation of all other categories. Absolute Being then becomes absolute position of self-consciousness expressed in the fundamental judgment "I am I". For Hölderlin, in contrast, Being in the existential sense is not a logical possibility of self-consciousness to posit itself intentionally in a judgmental form. Instead, similar to "things" for Gongsun Long, Being is reality only, and it essentially transcends all forms of reflectivity, conceptuality, object-oriented cognition, categories. Reality cannot be mediately grasped by dualist judgments based on the various activities of (self-)consciousness in its reflective, predicative expression, but only by non-dualistic intuition. Being transcends the act of dualistically positing or not (thus, possibility) of (self-)consciousness and its judgmental form. In other words, the sphere of reality logically and ontologically precedes that of possibility and inherently enables the latter, since (self-)consciousness is nothing but the secondary, one-sided "segmentation" of the initially seamless unity of reality.

Consequently, within this cognitive framework, everything encompassed within Gongsun Long's term of 指 is comparable to the Western category of possibility corresponding to (self-)consciousness in the widest sense as separation between the knowing subject and the object known, and 物 (things, "Mingshi lun", 1, 2; "Zhiwu lun", 4) to Being. Thus, I will first list some possible reasons for translating 指 as judgment within Hölderlin's cognitive framework.

First, 指 designates "what does not exist in the world" ("Zhiwu lun", 4), namely, it is ontologically secondary to "things", for things are "what (does) exist in the world" ("Zhiwu lun", 4), namely, only things are realities. In terms of Hölderlin, Gongsun expresses the ontological priority of Being over (self-)consciousness as the characterization of things as existence/fullness/realities (不曠, "Mingshi lun", 3) and that of 指 as non-existence/absence/illusion ("Zhiwu lun", 4).

Second, 指 is radically separated from things or nature ("Zhiwu lun", 4). It is unreal—"non-existent". Therefore, it can be said to be a "fiction", a mere "possibility" of our (self-)consciousness, and thus includes all possible orders of object-oriented cognitive activities—judgments, syntheses, designations, pointers, signs, symbols, etc. These activities can be categorized under the banner of "(self-)consciousness"

in Hölderlin's sense, a basic term designating the most fundamental epistemological act and which finds its basic expression in the form of "judgment".

Third, in the common sense, the character "指", which means "pointing at something which is *not* contained in itself", attests to the dual structure of judgment as according to Hölderlin, i.e. the intentionality of (self-)consciousness to step out of "Being" or the nature to which it belongs (its "position" 位, "Mingshi lun", 4) to reach for a "goal", an object *outside of* its initial state of being.

Fourth, for Hölderlin, the fallacies of early Idealism were firstly to have confused judgment with Being, and consequently to deduce reality (Being as such) from the thetical judgment of self-consciousness as possibility, and the false determination of the superiority of the category of possibility over reality (Frank 2004, 104). However, only pre-dualist, pre-reflective and pre-categorical Being is reality, since it enables self-consciousness as well as its judgmental form as possibility. Similarly to Hölderlin, Gongsun Long makes the same *radical* distinction between the spheres of "things" and that of 指 ("To identify what exists in the world with what does not exist in the world, this is not right". "Zhiwu lun", 4). Thus, we can deduce that Gongsun Long also characterizes things as *pre-dualist, pre-predicative, pre-conceptual and pre-reflective*, transcending the fictional construction of human (self-)consciousness, *ergo* the realm of knowledge.

Fifth, "A thing is a thing and does not exceed what it is" (物其所物而不過, "Mingshi lun", 2), this is its reality (實). This confirms that for Gongsun Long, things are pre-conceptual and pre-predicative. When a thing is judged/attributed to/designated in whatever way, it "exceeds" (過) its reality or nature. Since the thing judged is inferred by human reflectivity, predication and conceptuality, it is consequently pulled from the "place" (位) of its initial state (its pre-reflective being or nature) to an object (a concept) outside of itself and thus, "exceeds" its nature. This is best described by the dual structure of judgment.

Sixth, we can relate "Baima lun" to "Zhiwu lun" via *a theoretical continuity* if we consider this debate on the *judgment* "A white horse is not a horse" as confirmative of the theorization of 指 as critique of judgment ("Guest: If you only require a horse, then yellow and black ones all can meet the requirement. If what you require is a white horse, yellow and black ones cannot (曰/求馬/黃黑馬皆可致/求白馬/黃黑馬不可致)", "Baima lun", 5).

Within this framework, we can first presuppose that Gongsun defines things (物) by relegating them to reality (實) which corresponds to the realm of Being (Hölderlin) and lies beyond the category of possibility incarnated in the dualist (self-)consciousness and its judgmental expression (指). Things in themselves, or

"Being" as such, are those which do not "exceed" themselves, namely, those which are not yet inferred through judgments (predication, conceptuality, objectivation and their semantic references). The proposed translation should be a logical hypothesis, and its feasibility and coherence must stand the rigors of a detailed examination of all the propositions of "Zhiwu lun".

"Zhiwu lun" begins with the statement: "Things are all about judgments". It is an empirical fact that we make judgments about things all the time. This proposition demonstrates a helpless paradox of human consciousness and language. Nonetheless, judgment (object-oriented knowledge or (self-)consciousness in a general sense) and things can never be identified with each other ("Zhiwu lun", 4). However, we are generally unable to gain any knowledge about a state of affairs unless we make a judgment about it, namely, by objectifying it through consciousness. This is nothing less than the cognitive effort of human consciousness, attempting the impossible.

Semantically, judging is the act of attributing a *predicate/concept*, in some cases by means of a copula, to a subject of *intuition* in the dualist form. Although the copula "be" is mostly bypassed in a judgment in Chinese due to the syntax of the language, the separation between subject and object and the minimal intentionality of the speaker as reflectivity and (self-)consciousness exist, albeit to a weaker degree, in the signification of judgment, as for example in the claim, "A white horse (is) a horse" (白馬/馬也). In this sense, judgment in the both Chinese language and consciousness shares the basic features of judgment in Western languages and constitutes a fact in the cognition of the Chinese.

"But judgments are not what they judge/are non-judgments/fail" ("而指非指"). What judgments refer to through the use of a predicate (or general object-oriented knowledge) can never be what they *meant* to refer to, namely, things considered in themselves. The knowledge provided by an object-based (self-)consciousness is in no way what it aims to render—"things". This leads to "Zhiwu lun" (4). Gongsun Long makes this radical distinction between things in themselves and the general object-oriented knowledge we obtain from them or judgments we make about them, and further develops this idea throughout "Zhiwu lun".

To clarify this claim of Gongsun Long, Frank's interpretation of "Judgment and Being" would provide a critique of judgments understood as concepts/predicates. What a judgment intends to refer to, namely in its content, is the subject considered in its absolute, seamless unity, its "Being" or the integrity of its existence ("things" in Gongsun Long's term), without separation between itself and its object. However, in its constitutive structure and form, judging a thing means depriving the thing of its original identity, separating it into a subject and an

object and only *afterwards* formally reuniting the two. Thus, judgment represents only a split-second segmentation, a partial capturing of what was an inseparable unity of Being. For example, in the judgment "Socrates is an Athenian", although "Athenian" does belong to the various identities of Socrates and has been correctly attributed to its subject, however Socrates as a living being is not *only* an Athenian, but also a man, a philosopher, a citizen, etc. Thus, the concept of "Athenian" never exhausts the totality of Socrates' identities, his whole existence as a person identified by the "name" of Socrates, *ergo* his thoughts, the meaning of his life, the incessant change that he underwent at every instant of his life, even ineffable mysteries about his life. In short, since the content of "All that is Socrates" is the aggregate of an *infinity* of characteristics and potential "judgments/predicates", it is bound to undergo perpetual change and *the radical unknown* when viewed from the perspective and narrative of a single-sided judgment. Similarly to the film *Citizen Kane*, the greatness of which is not derived from a rational and thorough understanding of the complex life of Kane, but instead from the idea surrounding the mystery of his life, epitomized by his last words "Rosebud", an act that we can never be completely judgmental about.

Consequently, the necessarily partial, static truth, captured by the judgment through its formal claim of true knowledge about Socrates in a logical bond between subject and predicate, becomes a dogmatic distortion and intentional ignorance of the reality underlying it, "non-judgment". Judgment belongs to the realm of knowledge, not to that of Being.

If we adopt the same approach with the Chinese example, in a Chinese judgment, with the absence of the copula, for example, "is" in "White horse (is) horse" (白馬/馬也), what the integrity and individuality that the "White horse" judgment designates as such—its "Being"—cannot be completely endered by its logical bond with the concept of the horse. It is, therefore, destined to be segmented by the latter, since the infinite amount of characteristics contained in the intuition of the existence of "white horse" can never be completely rendered by the single aspect provided by the concept of the horse. Thus, the identity in this claim is valid only in a logical sense of inclusion and partially, not *existentially and absolutely*.

How about the judgment "Horse (is) horse" (馬/馬也)? For Hölderlin, based on the Idealist judgment of self-consciousness "I am I", a horse as conceived by the speaker in the subject of a judgment cannot be identical with the concept of the horse in the predicate, since the self-consciousness and individuality of the speaker changes at every instant and can never retain a logical identity with itself ("In opposing myself to myself, separating myself from myself, yet in recognizing myself as the same in the opposed regardless of this separation. Yet to what

extent as the same?" (Hölderlin 1988, 38)). Moreover, the being of the horse also changes incessantly during the time of the enunciation of the judgment based on consciousness of the speaker. Thus, from the moment of enunciation, the speaker views the horse at time T1 of the enunciation of the subject already in a different manner from the horse at time T2 of the object. Therefore, due to the nature of the structure of judgment and consciousness, this identity is only logically—and, more precisely, tautologically—valid, as there still exists a separation between the subject and the object *due to this time interval*. This in turn results in the formation of an empty logical relationship through the doubling of the same concept (A is A), which is inherently not an existential one in the sense of depicting the inseparable, living integrity of the "thing"—the horseness in its pre-reflective and pre-predicative existence or "Being". In this sense, it is not different from the judgment "A white horse is a horse".

Taking judgmental tautology for Gongsun Long's last word is a perspective shared by various modern commentators. However, it is a serious misunderstanding which not only hindered the development of novel insight on Gongsun Long's interpretation, but is one which can also be easily avoided based on "Baima lun":

> Guest: The claim that "having a white horse is not having no horse" is a claim which separates whiteness (from white horse). If not separated, you would claim that having a white horse does not mean having a horse. So, if you take a horse (for a white horse), you only take a horse for a horse and not the white horse for a horse. As a result, we cannot say that "A white horse is a horse". Instead, we should call a horse "horse" and nothing more.

> 曰/有白馬不可為謂無馬者/離白之謂也/不離者/有白馬不可謂有馬也/故所以為有馬者/獨以馬為有馬耳/非有白馬為有馬/故其為有馬也不可/以謂馬/馬也. ("Baima lun", 15)

"You only take a horse for a horse" does not equal to "We should call a horse 'horse' and nothing more". To call a "horse" "horse" via names (the latter case) *does not mean* the reconstruction of the tautological judgment "A horse is a horse" (the former case), even in such a judgment, subject and object are the same. To call a horse "horse" by its "name" implies *intuiting all the possible qualities* of the horse whilst being open to the possibility of being exposed to yet unknown qualities. In contrast to the semantic emptiness of the tautological judgment or the corresponding object-oriented knowledge, this semantic richness provided by intuition implies that to apprehend a horse in its totality one should not "separate" oneself from the horse through a *dualist* form of consciousness, and semantically, to judge it. In order to be able to gather all the possible attributes of a thing (its "fullness", 不曠,

"Mingshi lun", 3), it is of paramount importance to first avoid any act of judging, as in a judgment only a single attribute is designated at each time. Only the broader apprehension of a thing transmitted through its "name" corresponds to its "reality", "place" and "fullness": "實以實其所實[10]/不曠焉/位也" ("Reality is reality, not an illusion/absence. This is its place." "Mingshi lun", 3); "其正者/正其所實也/正其所實者/正其名也" ("To rectify (the expression of) a thing, is to rectify it by its reality; to rectify it by its reality, is to rectify its name", "Mingshi lun", 6).

Moreover, in "Mingshi lun" Gongsun Long clearly states that if we wish to have true apprehension about the reality of things and avoid the "chaos" (亂 10) of judging, we should avoid *any* attempt at combining "names" one with another, namely in this framework, relegating one of them to the role of subject and the other to the role of predicate in the form of judgment: "Calling 'that' and 'that' is not limited at 'that', this is not the right way of calling 'that'" ("謂彼/而彼不唯乎彼/則彼謂不行", 8). Namely, "Calling 'that'" by its name must stop at the holistic feeling or intuition transmitted through the "calling" of its name, and nothing more—without adding any additional concepts to its name to designate or further qualify it (even if it is the same concept as its name) within a judgment. *Any* object-oriented, predicative and conceptual referent to the reality of the thing "exceeds" the pure intuition of said "thing", thus, exceeding our pre-dualist, pre-reflective awareness of the integrity of the thing.

Likewise, in "Zhiwu lun", Gongsun Long radically separates the spheres of judgment and things ("… and things cannot be named judgments" "Zhiwu lun", 5), denying all possibility for judgmental (thus including tautological judgment) and object-oriented knowledge to gain access to the true apprehension of things.

However, how to explain that Gongsun Long's conclusion in "Baima lun" still left a judgment "White horse (is) not horse" (白馬非馬)? Although this is indeed a judgment, and thus a separation of the absolute identity and integrity, the Being of "whiteness-horseness" through the concept of the horse, it might be a better claim than "White horse (is) horse" with its extra negation. The structural fallacy of the judgment "White horse (is) horse" is partly resolved by the negation of the mere logical bond between subject and object, and exists as the distortion of the distortion of reality, or more precisely, as ironical and rhetorical self-relativization of the initial, partial and dogmatic perspective provided by "White horse (is) horse". Ironically, "White horse (is) not horse" transcends the one-sided

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10   實以實其所實: the same structure as 物以物其所物 and 所位非位, see footnote 8 and 9. The first 實 is a noun and the subject (the "reality"), the second 實 is the main verb of the expression, the third 實 is the verb of the subordinate clause. Literally, "Reality realizes what it realizes". So, I've translated it as "Reality is reality".

reflectivity and knowledge represented in the single judgment of "White horse (is) horse", thus becoming dialectical.

Novalis might be of help here. The essence of reflection (*Spiegelung*) is an *ordo inversus*, for as the name "reflection" indicates, thinking is like reflecting in a mirror, it renders the left side of its object on the right and its right side on the left. The way of dealing with this unavoidable paradox of our thought and self-consciousness is to once again overturn this inversion in a second and opposite reflection, re-establishing the right relation between judgment and Being in an act of "unknowing of the known" (Frank 1989, 257), "displacing" (所位非位 "Mingshi lun", 4) the "displaced" judgment in order to "rectify" (正 "Mingshi lun", 4) it. Therefore, the famous "White horse (is) not horse" is most likely an ironical critique of judgment by a judgment, a self-negation rather than affirmation.

> Host: If there are no judgments in the world, things cannot be named things.
>
> 天下無指/物無可以謂物. (2)

> Host: If the world is full of non-judgments, then, can things be named judgments at all?
>
> 非指者天下/而物可謂指乎 (3)

Most of human experience is essentially articulated through language and (self-) consciousness. In this sense, except in rare, artistic or even mystic states of mind, we usually obtain the totality of our apprehension of things from a conscious, reflective, dualist and conceptual state of mind, namely, by attributing concepts to things, by objectifying and judging them (2). The fact that our access to things is generally conditioned by our objectifications and judgments of them echoes the statement in the *Gongsun Longzi* that claims that "Things are all about judgments" (1). In this case however, when the guest simultaneously claimed that these unavoidable "judgments" and object-oriented knowledge all failed in rendering reality ("If the world is full of non-judgments"), the host asked this incisive question, which caused the guest to announce the thesis central to the whole dialogue (4): can things be named/identified with/depicted by judgments after all? (3)

> Guest: Judgments are what does not exist in the world; things are what exists in the world. To identify what exists in the world with what does not exist in the world, this is not right.
>
> 指也者/天下之所無也/物也者/天下之所有也/以天下之所有為天下之所無/未可. (4)

Both Hölderlin and Gongsun Long agree on the fundamental Kantian distinction between things in themselves and their phenomenal appearances to our understanding. Thus, Being or things in their integral existences are meant to be pre-predicative and pre-conceptual realities, radically transcending the object-oriented cognitive sphere, which could be subsumed under the basic form of judgment. For Hölderlin, this is because judgments are nothing more than the original act of the separation of the representation of Being, and thus, they can encapsulate the latter in only a partial way, and should never be identified with Being. We cannot gain any object-oriented knowledge of Being without separating it in two reciprocally referring *relata* in the form of judgment and intentionality of (self-) consciousness.

Contrary to what Bo Mou claimed (2007), together with "Zhiwu lun" (4) and "Mingshi lun" (13), there is *no possible way* for semantic and judgmental knowledge to have *any* access to the actual knowledge of things. By their very nature, "Judgments are non-judgments", and will always remain non-judgments—they are not judging any "thing", as demonstrated by Gongsun Long, who provided a logical justification for the priority of things over 指 in "Zhiwu lun" (17–18).

Another explanation for judgment's absent, illusory ("non-existent", "what do not exist in the world", non-"real"/實 "Mingshi lun", 2) character is that, as the first part of this paper showed, being only a partial rendering of the reality that it aims to grasp, it nevertheless *claims* to be an integral depiction of reality. In the act of judging, the copula/intentionality of consciousness separates the original unity of the being of the thing in question into a subject and a predicate/an object and only formally, partially and logically rebinds them. Judgment takes the part (one single perspective of the thing concerned—a predicate or a concept which represents only one characteristic of the thing) for the totality of the thing. The integrity of the thing in question actually possesses an infinity of characteristics. For example, "This horse is white". This separation in consciousness takes the originally inseparable unity of the horse, and through a dualist construction divides it by the concept of whiteness. Consequently, the judgment one-sidedly takes the characteristic of whiteness to stand for the infinity of the characteristics of a horse.

> Host: There are indeed no judgments in the world, and things cannot be called judgments.
>
> 天下無指/而物不可謂指也. (5)
>
> Host: What cannot be called judgments are non-judgments.
>
> 不可謂指者/非指也 (6)

Now, the host had no choice but to agree with the guest and finally grasped the answer to his question in (3). Things in themselves are 非指 (non-judgments), a concept created by Gongsun Long which appeared several times throughout "Zhiwu lun". Things are non-judged/non-judgeable entities in themselves and should be separated from the judgments that we make of them. Only things in themselves can be conceived as "existent" and "real" beings ("Zhiwu lun" 4 echoes "Mingshi lun" 2, "A thing is a thing and does not exceed what it is. This should be reality (物以物其所物/而不過焉/實也)"). Judgments are "non-judgments", because they are only object-oriented, reflective and fictional claims about things from the human mind, while things should be understood as pre-reflective ("Things cannot be named judgments") due to the separating structure of the judgment (Hölderlin 1988).

Moreover, as Novalis stated, in German reflection means *Spiegelung*, "reflecting in a mirror", so everything that (self-)consciousness as thought provides us with would be a reversed, and consequently unreal image of Being, just as the reversed image of things that we see in a mirror (Frank 1989, 257). This is another explanation for Gongsun Long's "non-existent" nature of judgment. Things in themselves (物) transcend any intentional, predicative, conceptual and theoretical means of comprehension. For both Gongsun and Hölderlin, this is a harsh critique of the cognitive capacities of rationality and (self-)consciousness, as well as the thoughts and language articulated in it.

> Guest: (Although they are) non-judged (in themselves), things are all about judgments.
>
> 非指者/物莫非指也. (7)

> Guest: There are no judgments in the world and things cannot be named judgments, however, there is nothing which is not judged.
>
> 天下無指/而物不可謂指者/非有非指也. (8)

> Guest: There is nothing which is not judged, things are all about judgments. Things are all about judgments, but judgments are not what they judge.
>
> 非有非指者/物莫非指也/物莫非指者/而指非指也. (9)

After establishing this distinction between things and judgments, the guest continued to explore the nature of judgment, and again revealed its contradictory nature. He provided a further explanation for his claim in (1). Although things (Gongsun Long) or Being (Hölderlin) cannot be described entirely by conceptual

means and should be radically separated from them ("Although things are not judged in themselves"), however, we seem to have no other method of accessing knowledge of them, except by judging them. They are "all about judgments". This is an empirical fact both in China and in the West. Although things in themselves and judgments about them are theoretically non-commensurable one with the other ("There are no judgments in the world and things cannot be named judgments"), it must be noted that in most situations we have no other relation to things except via the way of objectifying and thus, of judging them ("There is nothing which is not judged"). (9) resumed (7), (8) and returned them to (1).

> Host: Judgments do not exist in the world. This arises from the idea that things have their own names and cannot be judged.
>
> 天下無指者/生於物之各有名/不為指也. (10)

Together with (4), this is another central claim of "Zhiwu lun". "Judgments do not exist in the world", namely, judgments through which we believed that we may have accessed knowledge about things are only fictions of human thought. They are, existentially speaking, unreal and "do not exist" as "things" exist. The reason why things could not be judged, is that each thing has its own "name". That is to say, a name is neither a predicate/concept nor is it determined by a predicate/concept, since things "cannot be judged". Although Gongsun Long does not yet specify the nature of names here, he already distinguishes them *radically* from concepts, proposing names as the epistemological solution to the paradoxical nature and impotence of judgment, as well as the finitude of (self-) consciousness.

Gongsun Long further developed this idea in "Mingshi lun" and posited a detailed description of the nature of names. In a different paper, I have brought forth the hypothesis of interpreting "names" as *the vehicle, or a new system of language for pre-conceptual, pre-reflective, pre-judgmental, non-dualist mental activities of different orders, such as pre-reflective awareness, feeling or intuition, etc.*, which transcend both the logical and practical spheres, as I will later show. I have tested the thorough feasibility of this hypothesis through a close textual examination and new translation of "Mingshi lun", of which I will provide several reasons for this parallel here.

First, Gongsun Long can make legitimate and direct claims about a thing's characteristics in contrast to judgment, such as it never "exceeds" (過) its "place" (位) ("Mingshi lun", 2), etc. Thus, he seems to believe that we can have direct intuition of things independent from conceptual means.

Second, when things possess all the opposite characteristics of judgments as reflectivity, as he claimed in "Zhiwu lun" (4), our knowledge of things belongs necessarily to the general realm of pre-reflectivity.

Third, a comparison between Hölderlin's concept of intuition and the key propositions of "Mingshi lun" lends theoretical support to specifying Gongsun Long's characterization of the qualities of "name". In Hölderlin's concept of intuition, the intuiting subject and its object intuited are intimately fused, so the object is not separated from the intuition of the subject. Thus, we can say that the intuition of a thing as such is not "separated" from the initial unity or integral existence of the thing in itself (its "Being"), which functions as an original "place" (位). Therefore, intuition fulfils the function of rendering the integrity and singularity of a thing, because it is not "pulled" to a secondary "place"—that of its "predicate" or "object", as in a judgment. As such, intuition as unity without dualist separation never "exceeds" (過 "Mingshi lun", 2) the original "place" of the initial unity of the thing. Only this original unity of the thing as it is (its "Being", in Hölderlin) rendered by intuition, or its original "place", in the form of its "name" (Gongsun Long), is "reality" ("Mingshi lun", 2), "what exists in the world" ("Zhiwu lun", 4). In contrast, judgment (指) is illusion or emptiness, absence (曠, "Mingshi lun", 3). In its separating and free act of "pointing", 指 is "absent" from the "fullness" (不曠), the original position and the unity of its being and occupies a secondary "place" of the object. According to Gongsun Long, it "exceeds" (過, "Mingshi lun", 2) its place and is "out of place" (所位非位, "Mingshi lun", 4). Within Hölderlin's framework, this can be explained as follows: by the very structure of a judgment, the intuition of the thing as it is, is detached and "pulled out" from the original position of the unseparated, integral unity of itself to the secondary position of the object as predicate (being "separated" by the object of thought/predicate from *itself*).

"此此當乎此/則唯乎此/其謂行此/其以當而當也/以當而當/正也 (Taking this for this, this is limiting oneself at this (唯乎此) and partaking (行) in this. Taking what it is for what it is, this is rectification)". ("Mingshi lun", 11) "此此止於此/可 (Taking this for this and stop at this (止乎此), this is admissible)". ("Mingshi lun", 12) We should not associate our holistic intuition of whiteness-horseness to the concept of horse ("Baima lun"), the intuition of stoneness to the concept of hard and white ["物白焉/不定其所白/物堅焉/不定其所堅/不定者/兼 (White does not (integrally) determine the thing (the stone) it qualifies, hard does not (integrally) determine the thing it qualifies, the thing that is undetermined, is shared (by other determinations than white and hard") "Jianbai lun", 10], the intuition of the person of Socrates to the concept of philosopher, etc. in the form of judgment. In this way, our intuitive or pre-reflective apprehension of each thing would occupy exactly its original "place" in the sense of having not yet become contaminated

by a concept/a qualification (another "name") which only "pulls" this intuition out of its unique place to the alien place of a single predicate which cannot render the integrity of the features of the thing. Judgment is not an absolute identity, but can only be a *logical identity* (synthesis).

A thing, either considered as material existence (i.e. a horse) or "immaterial" quality (i.e. whiteness), are all products of nature opposed to the products of human mind 指 ("Mingshi lun", 1). Considered in itself, a thing has infinite characteristics (Horseness has infinite attributes; Whiteness has infinite shades). Only intuition, which does not separate the intuiting subject from the object intuited by a linear focus on only one characteristic, can encompass this cognitive infinity and integrity which is *unique* in each thing (existence or quality). The intuition of the coexistence of these infinite and infinitely differentiated characteristics precisely constitutes the unexchangeable *singularity* of the existence/quality and transcends the single *abstract* characteristic (a concept) provided by judgmental cognition.

In intuition, we would be able to distinguish the respective, concrete singularities of things one from another and apprehend ox/ram/fowl as ox/ram/fowl [acknowledging the specific colour, species, shape, etc. of each animal in its singularity and as distinguished from one another ("牛合羊非雞 (Ox with ram does not make fowl")", "Tongbian lun", 通變論, 8)], whiteness/blueness/greenness as whiteness/blueness/greenness [acknowledging each colour in its singularity and not as associated one to another as its predicate ("青以白非黃 (Blue and white does not make yellow)", "Tongbian lun", 16), since in nature we can detect an infinity of different nuances of whiteness/blueness/greenness], the respective qualities of stoneness/hardness/whiteness as stoneness/hardness/whiteness [acknowledging each thing/quality in its singularity and as distinguished (離 "Jianbai lun", 堅白論, 12) from one another ("堅未與石為堅/而物兼 (Hardness is not a mere attribute, an abstract predicate of the stone. As a specific kind of touch, it is also shared by many other hard things and is thus concrete in itself")", "Jianbai lun", 14. Thus, hardness is "concealed" 藏 from the focus of human consciousness and judgments)), instead of attributing them one to another in judgments by our consciousness (神 "Jianbai lun", 18)] and Socrates as Socrates pre-reflectively and pre-conceptually, so that they "each occupy their respective places" ("各當其所", "Tongbian lun", 19).

Only our intuition or pre-judgmental, pre-reflective awareness of things could render the totality of their "realities", presenting the linguistically indescribable mysteries about their existence, without intentionally fragmenting and fixing them in consciousness with extra conditions, qualities and predicates, arbitrarily judging—and thereby necessarily narrowing and associating their beings as such

with a determined predicate, consequently confusing their singularities one with the other, such as "A white horse is a horse"; "This stone is white and hard"; "Blue and white makes green"; "Socrates is a philosopher", etc. In essence, we can have a more holistic understanding of things and a better grasp of their existence in its entirety as compared to what a dogmatic judgment could one-sidedly provide.

In other words, to have true apprehension of the individuality and singularity of each thing is to pierce directly, without the mediation of predicates and concepts, into the whole existence of it, intuiting it pre-reflectively by means of its name, "limiting oneself at" ("Mingshi lun", 11) or "stopping at" ("Mingshi lun", 12) the pure intuition or the pre-judgmental awareness of its integrity, without the interference of predicates which only freeze the eternal movement of the pre-reflective realm of life of the thing in itself. "Rectification" can only be achieved pre-reflectively, for only pre-reflectively can we be in fusion with the integrity of the thing, participating in its changing process across ages and spaces, "partaking in" ("Mingshi lun", 11) it, whereas in a judgment, the concept already separates us as knowing and contemplating consciousness/subject from our object—the thing in question—so that we can only partake "outside of" it or "towards" it, namely, dualistically.

This dimension might also nullify the consideration of the pragmatic referent as the "absolute principle". Interpreting Gongsun Long pragmatically is a view shared by various commentators (Rieman 1977; Thompson 1995; Bo Mou 2007, etc.). However, in the realm of action, the separation between subject and object is still present (in the form of the agent who only *strives* to be in fusion with an "object" *outside* of him), and thus, it is difficult to totally "partake" in the flux of the thing.

To be in this state, a pre-reflective, almost meditative intuition behind the "calling" of the name of each thing ("To call a horse 'horse' and nothing more (以謂馬/馬也＂)", "Baima lun", 15) is needed. First, in non-dualist, pre-reflective intuition, we can encompass the integrity of the infinite elements which constitutes the individuality of a thing/quality, transcending judgmental cognition. Second, this state of intuition could both be an *absolute* union of subject and object similar to the unconscious "intellectual intuition" as proposed by the early Hölderlin, or a *relative* one, namely, a kind of non-objectifying, correlative awareness with *a lesser degree of subject/object opposition than in judgment*, allowing one to be tentatively non-dualistically and pre-reflectively "aware" of the singularity of the object, without surpassing the threshold where one enters in fusion with it subsequently rendering one's self completely unconscious of it and of one's self. Gongsun Long's fragments seem to be more in line with the second interpretation, since assigning names to things nevertheless requires a certain degree of intellectual engagement.

The wrong way is "彼此/而彼且此/此彼/而此且彼/不可 (Taking this for that, and taking that and this, taking that for this, and taking this and that, this is not admissible)" ("Mingshi lun", 13). This can be proven through Hölderlin's theory of judgment: it is wrong when we take the predicate "horse" ("this"), which is only one characteristic among the infinite characteristics of the intuition "white horse" occupying the "subject" position (namely, the intuitive "whiteness-horseness", including the predicates "white" and "horse", but *not excluding* other possible, implicit predicates, such "height", "weight", "temperament", "pearl white", "ivory", etc.), for the infinite characteristics of the intuition "white horse" constituting a singular existence ("that") in the judgement "A white horse is a horse". This is taking "white horse" and "horse" together ("taking that and this"), one ("white horse") intuitively (as whiteness-horseness) and the other one in the conceptual, predicative form ("horse"), mingling their initially individual, respective intuitions "whiteness", "horseness", "whiteness-horseness" one with the other, instead of intuiting without concepts horseness for horseness ("taking this for this, this is limiting oneself at this", "Mingshi lun", 11), and whiteness-horseness for whiteness-horseness ("taking that for that, this is limiting oneself at that", "Mingshi lun", 11).

A "name" should be distinguished from a concept as logical identity of the noun with itself, free from its reference to experience, or a predicate, when it is semantically applied in a judgment. In both cases, a concept belongs to the realm of cognitive reflection and abstraction, such as in the case of the early Idealism's central claim of "I am I". In contrast, a "name" is the concrete, intuitive and pre-reflective apprehension of each thing in its integrity and singularity. This unity with the thing, the participation in the infinity of its ever-changing reality of the initially finite (self-)consciousness consequently gives rise to the pre-reflective, pre-dualist, pre-conceptual overcoming of the judgmental expression and object-oriented thought.

> Host: (Things) cannot be judged. However, if we still identify them with judgments, this is doubling (兼) the unjudgeable nature of things.
>
> 不為指/而謂之指/是兼不為指. (11)

Things can never be entirely grasped by means of the dualistic form of judgments: what has been said about the subject intuited in the dual form of judgment is nothing but *one aspect* of the infinity of characteristics that the thing possesses in its total being. What happens in the judgment is the unavoidable separating activity of human intellect, by which the inseparable Being in the original sense with the infinity of its qualities is separated, narrowed down, and only one-sidedly understood.

For Gongsun Long, in this case, if we confuse things with judgments about things and if we do not tentatively consider judgments as just for themselves, this is "doubling the unjudgeable nature of things". First, things in themselves are already non-judgeable, veiled to our theoretical access. Then, in comparison to the non-theoretical means of approaching Being, which according to Hölderlin (via artistic and poetic expressions) and Gongsun Long (via names) would better articulate reality in a non-judgmental way, judgmental and object-oriented knowledge represents the unjudgeable nature of Being through an internal paradox. According to Frank's interpretation (2004), this is because judgment attempts (since judgment due to its constitutive form promises to represent truth or the absolute reality) to represent the non-representable (while its content is destined to render only partially what it aims to achieve). This is an essential feature of judgment. In their attempt to reach for the impossible, the finitude of judgment and the human (self-)consciousness articulated within it again demonstrate the unjudgeable nature of things.

> Host: To correspond the non-judgeable to the all-encompassing act of judging, this is not admissible.
>
> 以有不為指/之無不為指/未可. (12)

Repetition of (4). Consciousness articulated by judgments is finite by its internal structure, and should be fully separated from Being or things ("the non-judgeable"), which transcend the grasping of all object-oriented knowledge via the unavoidable form of judgments constituting the most common cognitive form in our acquaintance with things. The tension between these two poles arises from the paradox of the activity of human (self-)consciousness itself and its judgmental form, not from things in themselves. Both Hölderlin and Gongsun Long ("Judgment entails already in itself its own deconstruction, does it need to relate itself to things in order to be judgment at all?" 19) agree on this claim.

> Host: Moreover, judgment is that which is common in the world.
>
> 且指者/天下之所兼. (13)

> Guest: Judgments are non-existent in the world, yet things cannot be called non-judged. Because they cannot be called non-judged, there are none which are not judged.
>
> 天下無指者/物不可謂無指也/不可謂無指者/非有非指也. (14)

> Guest: There is nothing which is not judged, things are all about judgments.
>
> 非有非指者/物莫非指. (15)

This is a repetition of some of the previous arguments (1–3) on the unavoidability of judging in our cognitive acquaintance with things and the inner paradox of human thought. The affirmation of this unavoidability is expressed through a double negation.

> Guest: Judgment is not (in itself) non-judgment, however, when a judgment is considered as judging things, it becomes non-judgment.
>
> 指非非指也/指與物/非指也. (16)

"Non-judgment" means all the possible fallacies of a judgment: non-"real" (實 "Mingshi lun", 2), absent (曠 "Mingshi lun", 3), "out of its place" (所位非位 "Mingshi lun", 4). Following Hölderlin, we can say that the act of judging is essentially subjective and only provides a rationalistically single-sided perspective on the reality it tries to grasp, as its one-sidedness is unavoidable by its very structure. Nevertheless, the content that we obtain from judgmental claims is not absolutely false, not "non-judgment" (非指) in the strict sense, if we consider the one part of truth it renders *only as one part* and not the integrity of truth. Namely, it *nevertheless* renders one individual, particular perspective of the thing. Its "fiction", "absence", the fact that it is "out of place" might be necessary and even helpful for our apprehension of things. That's why Gongsun Long says it should be "rectified" (正 "Mingshi lun", 4) by "names", and not absolutely *negated*.

But in which sense does it become truly false ("non-judgment" in itself) then? When it is considered as judging *things*. In the moment in which a judgment is considered to be made about a thing in its integrity, namely, considered in its formal vocation—providing an absolute knowledge about the thing, the content it renders becomes false, because it is incomplete. Thus, the moment in which a judgment, due to its very form, claims to provide the absoluteness or truth about its object, its content simultaneously demolishes its own formal validity, contradicting what its form claims to have achieved.

This dilemma reveals a problematic characteristic of human subjectivity, namely that there is an intrinsic paradox in the vocation and essence of the judgment. When judgment is considered in its positing for the all-encompassing, absolute knowledge of Being, which constitutes the essential objective of its pursuit, it encounters the pre-dualist transcendence of Being, and consequently obtains the exact opposite of what it wished to attain in the first place: finitude, dualism and separation.[11] Gongsun Long's claim throughout "Zhiwu lun" is based precisely on the non-commensurability of the spheres of things and judgments (4).

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11   Kant provided a demonstration of this thesis by the antinomies of pure reason.

Host: If there were no things to be judged in the world, who would claim that things were non-judged? If there were no things in the world, who would call them judged?

使天下無物指/誰徑謂非指/天下無物/誰徑謂指. (17)

Guest: If there were judgments in the world and things to be judged did not exist, who would claim that things were non-judged? There were in fact no things for anyone to claim to be non-judged.

天下有指/無物指/誰徑謂非指/徑謂無物非指. (18)

In Hölderlin's terms, Being, or in Gongsun Long's terms, things, both understood as a pre-reflective sphere, are essentially the hidden condition for the legitimacy of the unconditional positing of judgment.

According to the Heidelberg School, Fichte and Schelling attempted to deduce Being from the logical identity of the fundamental judgment of "I am I". Hölderlin instead took the inverse initiative and demonstrated the ontological priority of Being over self-consciousness and judgment. This is also his contribution to the critique of the absolute self-consciousness by the early Fichte and Schelling (Frank 2004, 97).

For Gongsun Long, the central thesis of (4) is demonstrated both ontologically and logically: ontologically, "what does not exist" naturally should be "rectified" (6) according to "what exists": "To rectify (the expression of) a thing, is to rectify it by its reality (其正者/正其所實也)", "Mingshi lun", 6). Being or things, are not only the conditions of possibility for all our conscious activities about said things but are also the only criteria for measuring the correctness of these activities.

Logically, Gongsun Long demonstrated (4) with a paradox. Without "things" or pre-reflective reality ("If there were no things to be judged in the world"), any attempt at judging ("who would call them judged?") or not ("who would claim that things were non-judged?") becomes meaningless and is even non-existent. Without presupposing the "existence" or "reality" of things, any judgment about them becomes nonsensical, from both the logical and semantic point of view. This is demonstrated by first assuming the opposite of his thesis, then demonstrating that it is logically invalid, eventually validating his thesis.

Guest: Moreover, judgment entails already in itself its own deconstruction (its own "non-judgment"), does it (judgment) need to relate itself to things in order to be judgment at all?

且夫指/固自為非指/奚待於物/而乃與為指? (19)

The nature of judgment finally reveals itself. Although it is through its formal claim for the absoluteness of things that judgment unveils its inner paradox, this paradox by no means comes from things, since things "cannot be judged" as things, taken in themselves, are not attributed to or inferred through object-oriented human intellect. It is instead derived from the dualist judgment itself, and its subsequent inadequacy to represent the seamless unity of Being or things without objectifying them. This unavoidable contradiction simultaneously constitutes the essence of judgment and its self-destructive force ("固自為非指"), and thus shares no commonalities with things (4).

Concluding Remarks

This paper has attempted to characterize "Zhiwu lun" as the presentation of the inability of reflectivity and object-oriented knowledge to represent the realm of "things". Only if understood in this way could "Zhiwu lun" prepare the way for discussion on the pre-reflective function of "name" in "Mingshi lun" as a better solution to the cognitive limits of reflectivity and objectification. I would thus characterize it, together with "Mingshi lun", as the core chapters in contrast to other dialogues with more logical and rhetorical connotations, which are rhetorical confirmations to the ontological and epistemological ideas of "Zhiwu lun" and "Mingshi lun".

Acknowledgements

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Comparing Logical Paradoxes through the Method of Sublation: Hui Shi, Zeno and the "Flying Arrow Problem"

*Jana S. ROŠKER**

Abstract

This article addresses some basic methodological problems in the field of transcultural post-comparative studies of ancient logic by comparing the famous flying arrow paradox of Hui Shi (370–c. 310 BCE) with an apparently similar paradox attributed to Zeno of Elea (495–430 BCE). The article proceeds from a general introduction to the basic framework of semantically determined classical Chinese logic, to an illumination of Hui Shi's specific contributions to the field, and finally to a preliminary explanation that emerges from a contrastive analysis of Zeno's and Hui Shi's respective views on the problem of motion and stasis as manifested in their corresponding paradoxes. The contrastive analysis, based on an exposition of some basic problems in the field of transcultural methodology and a description of the so-called sublation method, points to the importance of considering different paradigms and frames of reference in identifying differences between apparently similar theses.

Keywords: Hui Shi, Zeno, transcultural sublation, frameworks of reference, form and potential, the flying arrow paradox

Primerjava logičnih paradoksov z metodo sublacije: Hui Shi, Zenon in »problem leteče puščice«

Izvleček

Pričujoči članek obravnava nekatere osnovne metodološke probleme na področju transkulturnih postprimerjalnih študij antične logike skozi optiko kontrastivne analize »paradoksa leteče puščice«, ki ga – na navidezno podoben način – interpretirata tako kitajski logik Hui Shi (370–ok. 310 pr. n. št.) kot tudi predsokratik Zenon iz Eleje (495–430 pr. n. št). Avtorica začne diskusijo s splošno predstavitvijo osnovnega okvira semantično opredeljene klasične kitajske logike, nadaljuje z osvetlitvijo Hui Shijevih doprinosov k tej disciplini in se nato loti preliminarne razlage tega paradoksa, do katere pride postopno s pomočjo kontrastne analize Zenonovih oziroma Hui Shijevih pogledov na problem gibanja in mirovanja, kot

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se prikazuje v njunih topoglednih paradoksih. Kontrastna analiza, ki je osnovana na prikazu določenih problemov področja transkulturne metodologije in uporabi tako imenovane metode sublacije, izpostavi pomembnost upoštevanja različnih paradigem in referenčnih okvirov pri identifikaciji razlik med navidezno podobnimi tezami.

Ključne besede: Hui Shi, Zenon, transkulturna sublacija, referenčni okviri, forma in potencial, paradoks leteče puščice

Introduction: Classical Chinese Logic and the Nomenalist School (*Ming jia* 名家)[1]

In the pre-Qin China, logical reasoning was closely connected to language, especially with respect to semantic issues, and was determined by its tight relation to ethics (e.g. *Mozi* s.d., Jing xia, 155). However, this does not mean that in classical texts which are not immediately identifiable with metaphysical and ethical discourses there were not also forms of logical and methodological thought (Cui 2021, 105). Although Chinese philosophy developed in connection with ethical ideas and metaphysical concepts, there was a close relationship between moral and metaphysical thought on the one hand, and logical reasoning on the other.[2]

The origins of Chinese logic can be traced back to the earliest known works, such as the *Book of Changes* (*Yi jing*), while its main development took place during the so-called golden age of Chinese philosophy, in the Warring States (*Zhan guo*) period (475–221 BC). This period saw the emergence of the "Hundred Schools of Thought", which include the most influential philosophical discourses, namely Confucianism, Mohism, Daoism, and Legalism. It was a time of extraordinary intellectual development due to political chaos and constant armed conflict between warring states. This period ended with the first unification of China and the rise of the totalitarian Qin Dynasty (221–206 BC).

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1   This school of thought (in Chinese: *Ming jia* 名家) is usually translated in English as "The School of Names". However, to facilitate their use in the adjective form, I prefer to translate them with a single term, similar to the Mohist, Confucian, Daoist, etc. Schools. Since this school was mainly concerned with the problems of names or concepts, the term "Nominalist School" would actually be most appropriate for this purpose. However, the term nominalism has already been adopted by European philosophy, in the context of which it denotes a stream of thought which holds that universal or abstract concepts do not exist in the same way as physical, tangible material. Since this position has nothing to do with the ideas and theories of the School of Names, I have therefore decided to translate *Ming jia* 名家 by the terms Nomenalist School or Nomenalism.

2   The reasons for the decline of the latter in early medieval China are multiple and linked mainly to complex historical events and processes that shaped specific social conditions that proved to be unfavourable for the evolution of scientific thought and methodologies.

Traditional or classical Chinese logic generally refers to the logical thought developed in this era (Chmelewski 1965, 88), and these discourses were established without outside influences. However, Chinese logicians were part of a small subculture, while logicians in India and Europe were part of the mainstream of intellectual development (Harbsmeier 1998, 7).

Classical Chinese logical thought never elaborated an explicitly systematic and comprehensive formulation of the laws of reason, nor did it produce a coherent system of symbols for abstract thought. Before the 18th and early 19th centuries, Chinese thinkers had rarely encountered a systematic and well-formulated logical work. But as Cheng Chung-Ying (1965, 196) points out, this does not mean that classical Chinese thought lacked logical depth or consistency.

Logical ideas, concepts and methods were developed mainly within the framework of two intellectual schools, namely the Mohist and the Nomenalist schools of thought. During this period, issues such as the relationship between concepts or names (*ming* 名) and realities or objects (*shi* 實), the criteria of identity (*tong* 同) and difference (*yi* 異), or the standards of right/true (*shi* 是) and wrong/false (*fei* 非) formed the objects of inquiry across the philosophical spectrum regardless of ideological orientation (Kurtz 2011, 3). Chinese interest in logical problems grew out of the methodology of debates or disputations. The earliest evidence of this interest can be found among the so-called dialecticians or debaters (*bianzhe* 辯者), whose discourses were primarily concerned with theories of names (*mingxue* 名學), which led them to become known as the "School of Names" (*Ming jia* 名家). The leading figures of this heterogeneous current were Hui Shi 惠施 (ca. 370–310 BCE), who is the main subject of this paper, and Gongsun Long 公孫龍 (ca. 320–250 BCE), who was famous for the logical defence of his white horse paradox, which claimed that "white horses were not horses" (*Bai ma fei ma* 白馬非馬).

These discourses made important contributions to logic, together with the works of the "later Mohists" (*Houqi Mojia* 後期墨家), who—among other issues—elaborated theories of argumentation (*bianxue* 辯學). They represented a current of the school of Mo Di 墨翟, whose teachings were collected in the *Mozi* 墨子 which includes a series of brief definitions and explanations outlining procedures for determining the validity of conflicting assertions, a theory of description, and an inventory of "acceptable" (*ke* 可) links between consecutive statements.

Hui Shi, his Life and Work, and his Transcultural Significance

As mentioned earlier, I will focus here on the work of Hui Shi 惠施 (ca. 370–310 BCE), who is one of the most important representatives of the Nomenalist

current. This article provides both a general introduction to his philosophical ideas and concepts and a more detailed analysis and interpretation of his theory of the unity of identity and difference. The present interpretation takes as its starting point Hui Shi's view of allegedly paradoxical nature of this unity. But before we plunge into the deep currents of his logical thought, let us introduce the fundamental features and the social, as well as ideational contexts of his life and work.

Hui Shi was a contemporary and friend of Zhuangzi and a minister in the government of the Song State. He was one of the most famous Nomenalists, and was best known for his allegedly sophistical paradoxes, by which he attempted to express the absolute relativity of existence appearing in the mutual relations and shared contexts of absoluteness and relativeness. In general, we can say that Hui Shi's teaching, which bears some similarity to Daoist philosophy, is rooted in a theory of relativity that extends a fundamentally atomistic view of space and time. However, if we consider its embeddedness in the dynamic frame of reference of Chinese philosophy and logic, this plurality of relative aspects of reality can be seen as part of an all-encompassing, unified absoluteness of existence. For similar reasons, he also valorized the then definition of identity and difference by placing the two concepts within a dynamic, unified framework. In this paper, we will explore, among other things, the structural connection between these two forms of unity.

Hui Shi must have been a prolific writer, for Zhuangzi remembers him as "very versatile, as his works could fill five carts[3]" (Zhuangzi s.d. Tianxia, Za pian, 7). Unfortunately, most of the works have been lost; at the time of the Han dynasty (206 BC–220), according to the commentary in Liu Xin's 劉歆 encyclopaedia *Han shu* 漢書, only one chapter of the work bearing Hui Shi's name had survived. Today, only some fragments of his philosophical positions remain. The historiography of reception and interpretation of this undoubtedly extremely interesting philosopher is limited to his well-known "Ten Postulates of all that exists" (*Wanwu shi shi* 萬物十事) and a few individual sentences (mostly paradoxically constructed) without explicit context, which are preserved in the various commentaries of his contemporaries and successors (especially in the works of Zhuangzi and Xunzi).

From a transcultural perspective, it is most interesting that many of these fragments are strongly reminiscent of the sayings of Zeno from the Eleatic school. This makes Hui Shi an interesting thinker not only in the context of classical Chinese logic, but also in terms of cross-cultural comparisons, especially—as we will see later—when we analyse the similarities between Zeno and Hui Shi from the perspective of transcultural studies.

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3   惠施多方, 其書五車.

It is clear from his "Postulates" that Hui Shi derives his theorems from the assumption of the organic and structural interconnectedness of everything that exists. Within the framework of the holistic worldview already defined in the proto-philosophical classics and thus shared by most classical, especially Daoist, philosophers, Hui Shi focuses, among other things, on the relationship between time and space as an expression of the relativistic structured whole, for example:

> If we take a stick one chi's length and cut off half of it every day, we shall never come to the end of it. (ibid.)
>
> 一尺之棰, 日取其半, 萬世不竭.

We find the same thought in Zeno of Elea's story of Achilles and "the slower"[4]:

> The slower runner will never be overtaken by the swiftest, since the pursuer must first reach the point from which the pursued started, and so the slower must always be ahead. (cf. Lee 1967, 51)

Achilles can never reach the slower runner, because every time he reaches the place where the slower stood a moment before, it has already moved a little further. This proposition is based upon the presumption that the real inseparability of pure time and space includes the assumption about the impossibility of real motion. Indeed, if there would be motion, it should actually be possible to traverse an infinity of positions in a finite time (Philoponus, cf. Lee 1967, 47)

The apparent similarity of the two theses lies in the fact that the two arguments above are both based on the assumption that spatial length is not reducible to minimal units, but is infinitely reducible. However, as we will see later, Zeno and Hui Shi wanted to prove different ideas by emphasizing such a relationship between finiteness and infinity.

From his "Ten Postulates of all that exists" (*Wanwu shi shi* 萬物十事), it is clear that Hui Shi derives his theorems from the assumption of the organic and structural connection of all that exists. Zeno also assumes the inseparable interconnectedness of everything that exists. But unlike Hui Shi, he sees this existential interconnectedness as the expression of an undivided and unchanging wholeness. This fundamental difference between the basic paradigms and the corresponding viewpoints advocated by these two ancient thinkers can be demonstrated by a contrasting analysis of their respective views on the so-called "problem of the flying arrow". In what follows, I will attempt to conduct such an analysis by applying

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4   The "slower" was in later antiquity renamed as a turtle, and thus Zeno's story is mainly known as the story about Achilles and the turtle.

the method of transcultural sublation. Since this is a new method, not yet well known in international academia, I will first present its theoretical background, its main features, its function and the main principles of its application.

Post-comparative Approaches and the Method of Transcultural Sublation

Let us begin by clarifying the terms cross-cultural, intercultural, and transcultural. Cross-cultural studies refer to different cultures or the comparison between them in a very general sense, i.e., crossing the boundaries of one culture and entering discourses shaped by another. Interculturality is a more specific type of communication or interaction between different intellectual, linguistic, and cognitive traditions, where the differences in cultures and the corresponding linguistic structures have a decisive influence on the formation of meaning. In this sense, intercultural interactions certainly involve the process of transferring meanings, implications, and connotations between different cultures. Nevertheless, numerous current theorists criticize the very notion of cross- or interculturality with its problematic embedding in a static and one-dimensional understanding of cultures as fixed "realms", "spheres", or "islands". In such a view, the very idea of culture is defined by a separatist, essentialist, and isolating character. Therefore, many contemporary scholars argue instead for a transcultural approach, because the prefix "trans-" contained in the concept of transculturality suggests that it is capable of transcending the boundaries and limitations of a fixed and static concept of culture. In this sense, it suggests the possibility of going beyond the fragmentation and separation of different cultures and philosophies (Silius 2020, 276) to create a more comprehensive and enriching approach to philosophy.

Transcultural approaches therefore aim at overcoming the outdated, static and immobile concept of culture. This does not mean, however, that there is no culture. It is still a real thing, like language, for example. Both are dynamic, historically grown and constantly changing entities without fixed borders. Therefore, the ontological assumption underlying the concept of culture does not necessarily refer to a metaphysics of an abstract substantial being. Here, the concept of culture is understood to be based on a metaphysics of relations.

Now, on the basis of this reflection, let us return to our basic question, which is linked to problems encountered by Western—or Western-trained—scholars who are dealing with Chinese philosophy and logic. From the transcultural point of view, working in Chinese logic and interpreting classical Chinese texts has much to do with transferring meanings across different languages and patterns of

understanding. But as we all know, concepts and categories cannot be simply and directly transferred from one socio-cultural context into another. The semantic connotations by which they are defined often simply do not overlap. Therefore, we must consider the referential frameworks into which they are embedded.[5]

Knowledge of the specific frame of reference that has emerged in the historical development of Chinese philosophy is of paramount importance in order to interpret certain concepts and transfer them into the framework of global philosophy. In this context, the methods of discursive translations are of utmost importance. For translations are necessarily also interpretations of the multiple connotations of concepts and categories embedded in different semantic and referential networks. Moreover, translations of different logical systems that belong to different semantic frameworks, different linguistic structures and different methodological paradigms, can never be limited to merely translating one language into another. They must also involve the "translation" or transposition of different discourses, as well as interpretations of individual textual and linguistic structures, categories, concepts, and evaluation criteria that differ according to the corresponding sociocultural contexts.

The problem of transferring meanings, however, goes even further and also concerns the concept of transcultural philosophical comparisons.[6] Many scholars see

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5   Theories that have been historically developed in different socio-political traditions and linguistic areas also produce different referential frameworks, which are, on the other hand, linked to different methodologies applied in the process of perceiving, understanding and interpreting reality. A referential framework in this sense can be defined as a relational structure of concepts, categories, terms, and ideas, which are applied in the cognitive processing of the objects of comprehension. It also includes paradigms and perspectives that influence and define the comprehension and evaluation of particular semantic elements within this structure, as well as the structure as a whole. In other words, it defines every concept applied in the theory, and determines its specific semantic connotations. And in the same way, it defines the relations between concrete notions, as well as the entire network of these relations as such. Here, we start from the assumption that using different languages and different patterns of thought associated with their individual grammatical structures, different cultures continuously create different frames of reference that assume an influential role in human understanding and interpretation of a given reality. Thus, frames of reference are comprehensive instruments that filter perceptions and create meanings. Different reference frames can lead to different descriptions and interpretations of one and the same objective reality. For a more detailed explanation of the notion see Rošker (2021).

6   Comparative methods are especially important to Western researchers of Chinese philosophy. These scholars have been educated and socialized in cultures that have shaped philosophical discourses embedded in frames of reference that differ from those developed in Chinese cultural-linguistic circles. Thus, when we study and examine Chinese philosophical discourses, we are constantly confronted with the need to compare certain concepts and categories developed in the Chinese tradition with certain ideas, methods, and categories prevalent in our own traditions of thought. Although most of the resulting comparisons are made on an unconscious level, it is precisely the method of comparison still has a decisive influence on our work.

the main problem of such comparisons in the fact that we have a "unifying methodology and one single philosophical language, and apply it on culturally concrete, different materials". In my view, however the core problem is much deeper and much more complex, because the methodology in question is a system underlying one of the philosophies under comparison, namely the Western one. There is no third, "objective" methodology. The *tertium comparationis* is thus determined by one of the two *comparanda*, which commonly belongs to the methodology and terminology of Western philosophy.

Based on thorough reflection and analysis of such issues inherent in traditional comparative procedures, many scholars have elaborated new methodological tools that could overcome such problematic approaches. Such experimentalisms and new models of transcultural philosophizing have been termed post-comparative philosophies. These methods aim to develop new modes of transcultural philosophizing rather than doing traditional comparative philosophy. In other words, they are based upon procedures of "conceptual comparing" rather than merely "comparing concepts". This challenging idea is based upon a self-critical account of comparative philosophy that has been long overdue. Two of the most widely known methods of such post-comparative approaches are denoted the philosophy of fusion and philosophy of synthesis, respectively. In my view, each of them has certain flaws, but due to space limitations I will not elaborate on this critique in this paper.[7] Instead, I will propose another method that can be implemented in the framework of post-comparative approaches, i.e. the method of transcultural sublation.

Although similar to the term synthesis, "sublation" also forms a part of Hegelian lines of thought and could hence be problematic, it is still much less deflated than the concept of synthesis. On the other hand, its Latin origin encompasses all three notions that are of crucial importance for any process of creating something new from interactions between two or more different objects or phenomena. In this philosophical sense it has the three connotations of eliminating, preserving and arising. Besides, in contrast to "synthesis", or "fusion", the notion of "sublation" refers to a process rather than a stage.

This approach is not only about identifying differences and similarities between two or more philosophical discourses. With this method, certain aspects derived from philosophies of different cultures can be used contrastively as inspirations for our own philosophizing. In this sense, the tension between those contrastive aspects of philosophical perception and interpretation of reality can help us raise

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7   My critical evaluation of both fusion and synthesis philosophy can be found in my recent book on the methodology of Chinese philosophy (see Rošker 2021).

our ideas to a new level and provide new insights by preserving certain elements of both aspects and eliminating others. In this way, it is possible to transcend the static notions of cultures in which the philosophies under comparison were embedded.

The basic structure of the sublation process is based on the following five steps or stages:

- *Step 1: Similarities* – first we identify the similarities of the two *comparanda*.

- *Step 2: Differences* – then we identify the differences between them by considering the main paradigms of the respective frames of reference to which they belong.

- *Step 3: Dialectic of eliminating and preserving* – in the next step we eliminate certain aspects of the two *comparanda* and preserve certain other elements. This decision does not arise automatically from the internal structure of dialectical thinking (as, for example, in Hegelian dialectics), but is the result of a conscious choice made on the basis of inspiration arising from the tension between the differences identified in Step 2.

- *Step 4: Sublation* – the process established in steps 1–3 leads us to a cognitive shift that is the condition for the possibility of the realization of step 5.

- *Step 5: New insight* – this new insight is the result of the shift accomplished in step 4. This new insight can manifest itself in one or more new ideas, propositions or theses.

In the following I will demonstrate the operation of this method by means of a contrastive analysis of two *comparanda* belonging to different cultures, namely Zeno's and Hui Shi's theses on the flying arrow problem.

Zeno's and Hui Shi's View of the Flying Arrow Problem

Let us now thus take a closer look at two other famous theorems of Zeno and Hui Shi, which at first sight are also very similar, although the two scholars were separated by great distances. Both are concerned with the observation and mechanics of flying arrows, i.e. with the question whether they move or not.

Step 1: We will proceed from similarities. The two similar theses to be compared are, first, Zeno's assumption that a flying arrow does not move, and, second, Hui

Shi's assertion that—at a given time—a flying arrow does not move but does not stand still either. Let us begin with Zeno. His assumption that there can be no motion also led him to believe that the "flying arrow is at rest" (Philoponus, cf. Lee 1967, 53).

Hui Shi discovered something that is, at first glance, quite similar:

> The problem with the tip of the flying arrow is that there is a time when it does not move, nor does it stand still. (Zhuangzi s.t. Tianxia, Za pian, 7)
>
> 鏃矢之疾,而有不行不止之時.

Actually, the similarity of the two statements is quite superficial, for it only rests on the fact that both scholars aim to investigate the spatial, temporal and mechanical state of a flying arrow, and on the fact that their arguments differ from what we commonly assume about the state of flying arrows. But if the similarity is only apparent, where are the differences?

Step 2: The differences between the two arguments can be identified and explained by considering the referential framework in which each is embedded. Let us now take a look at the differences between the two propositions, from such a perspective.

Zeno starts from a referential framework whose basic paradigm is the unchanging, i.e. static, nature of being. Hui Shi's paradox, on the other hand, is embedded in the dynamic framework of change.

Zeno thoughts that since every object or entity is a form of being identical with itself, they are all necessarily immutable and static. Zeno was a faithful disciple of Parmenides, who thus sought to confirm his teacher's theory that reality is one, indivisible, and immovable. With this view Zeno explained the impossibility of change and motion. Thus, for any form of being in this totality, there can be neither a change in space nor a change in time. Therefore, the motion of the flying arrow is in reality the sum of innumerable static sections of space; it is not motion. In this way, Zeno actually denies the continuity of motion by dividing it into a series of successive, mutually isolated sequences of static space.

For Hui Shi, on the other hand, every object or entity has a multifaceted nature and can change depending on the point of observance, which is always relative. Hui Shi's presumption is relativistic, which means that his basic paradigm, i.e. the paradigm of change and motion, is also not absolute. It can only exist in a dialectical relation with stasis. According to the commentaries of Sima Biao (249–306) from the Jin dynasty, Hui Shi here proceeds from the two basic properties of the

arrow, namely its form (*xing* 形) and its potential (*shi* 势)[8]. While the form is fixed and unchangeable, and thus unmovable in the time and space of the flying arrow, its potential causes its movement. Hence, there is a time in which the flying arrow is at rest and, simultaneously, in motion.[9]

Step 3: Now we proceed to the next phase of our reasoning, i.e. to the dialectic of eliminating and preserving particular aspects or views included in the two *comparanda*. In this sense, Hui Shi's proposition includes and expands on Zeno's argument, but due to its insufficiency it also negates it. Zeno argues the flying arrow stands still. In Hui Shi's view, it does not stand still, (although it also doesn't move). What do we preserve and what do we eliminate in this dialectic of conflicting statements?

Indeed, from the viewpoint of form and potential, the flying arrow is at rest. However, it is also not at rest, because it is moving. In order to make room for a new understanding of the fundamental question of the existence and nature of motion, we decide to start from the processual view, which is closer to Hui Shi's theory. The reason for this decision is that dynamic flow is wider and leaves us more space for identifying new aspects of the basic question. The processual view can include both static and moving phases, whereas the unmovable and unchangeable being cannot include any motion. In other words, the dynamic can include the static, but not *vice versa*. Thus, we eliminate Zeno's basic presumption, according

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8   Sima Biao wrote: "形分止，势分行；形分明者行迟，势分明者行疾。目明无形，分无所止，则其疾无间。矢疾而有间者，中有止也，质薄而可离，中有无及者也." (Form denotes standstill, and force (tendency) denotes movement. When we cannot perceive the form of the arrow with our eyes because individual static sequences cannot be differentiated from one another, there is a problem of an absence of intermediacy. The problem with the intermediacy with the flying arrow is, again, that there are sequences of standing still in-between, which it can be isolated despite of their tiny duration. And this in-between is endless. (Sima Biao, cf Wang Jisheng 2021, 1)) This form and potential argument is reminiscent of Jin Yuelin's (1895–1984) ontology, because his interpretation of the ultimate cosmic principle *dao* 道 is likewise based upon a differentiation between form and potential, although he denotes the two terms with different terms: While Sima calls form *xing* 形 and potential *shi* 势, Jin denotes form *shi* 势 and potential *neng* 能 (see Jin 1997, 186–239).

9   However, Sima Biao's form and potential argument is not the only valid interpretation that can be made in consideration of Hui Shi's relativist view. In a private correspondence, Dan Lusthaus, for instance, has pointed out another possible explanation, which proceeds from the tip (or the head) of the flying arrow. It is not coincidental that the relativist Hui Shi speaks about the arrowhead and not simply about the arrow. The reason the arrowhead (*zushi* 鏃矢)—and not just the arrow—is at the same time not moving and not at rest, is because of what it is relative to: "Relative to the rest of the arrow, it is fixed and not moving from its position on the arrow; in terms of it being on an arrow that is in flight, it is moving. His claim could be expressed in its inverse as well—the arrow head is both moving and at rest. There is nothing metaphysical about his observation. It is entirely practical and concrete." (Dan Lusthaus, Academia.edu. message to author, January 20, 2022)

to which there can be no movement, because entities of being that are identifiable with themselves cannot occupy different spaces. Instead, we preserve the processual presumption, according to which a flying arrow is—from the perspective of its potential—moving, but from the perspective of its form, it simultaneously stands still.

Step 4: The sublation phase starts from the viewpoint that the above-stated perspective is not an exhaustive explanation of Hui Shi's flying arrow proposition, because he does not say that there is a time in which the flying arrow is simultaneously moving and at a standstill. Actually, he claims the opposite, namely that there is a time in which a flying arrow is simultaneously not moving and not standing still. There is tension between these opposing notions, and this tension can lead us to a shift, a sublation of the two arguments.

Thus, according to the form and potential argument, the flying arrow moves and stands still at the same time. However, as mentioned above, this is not what Hui Shi explicitly says, for he states the opposite. But it is clear that we might see a new perspective in Hui Shi's flying arrow argument if we could explicitly connect the two perspectives.

Therefore, we will sublate the argument of simultaneous movement and stasis in order to arrive at Hui Shi's opposite statement. This can be done when we place the first argument in the framework of Mohist philosophy, or, more concretely, in its explanation of the concept of antinomy using the example of a herd containing two kinds of animals, namely oxen and horses. A herd which simultaneously includes oxen and horses cannot be called a herd of oxen, nor a herd of horses. Considering and re-applying this formal type of antinomy, the following can analogously be claimed: if there is a time in which there is simultaneously movement and stasis, this is also a time which is not determined by (pure) movement and neither by (pure) stasis. In other words, the reason because of which such time is a moment in which the flying arrow is not in movement nor standing still is precisely because that very same moment comprises both movement and stasis, and can thus not be reduced to either of them. It is a moment in time in which there is no movement and no stasis.

Step 5: In this way, the use of the sublation method has led us to a new re-interpretation of Hui Shi's flying arrow paradox. This re-interpretation is based upon a threefold insight. This threefold insight is structured in the following way:

A) The apparent similarity of Zeno's and Hui Shi's flying arrow arguments is only superficial, because they are both embedded in different referential frameworks.

B) The processual nature of Hui Shi's framework of reference leads us to the form and potential argument, which allows for simultaneous movement and stasis.

C) Simultaneous movement and stasis can be transferred into simultaneous non-movement and non-stasis by consideration of the Mohist concept of antinomy.

Conclusion

I hope this demonstration has helped us to understand the meaning and process of the so-called sublation method. The similarities identified went beyond the boundaries of the respective cultural contexts in which they were originally developed. The identification of the differences did not proceed from the search for differences in the cultural backgrounds, but from different paradigms determined by the two frames of reference in which the respective sentences were developed. In this way, it is possible to overcome the static notions of cultures in which the philosophies being compared were embedded. In other words, the sublation method can help us overcome the time and space that determine certain notions shaped by different cultural discourses.

In addition, this paper has also shown that Hui Shi was a kind of logician concerned mainly with the metaphysical foundations of logical discourses rather than with their purely formal principles.[10] In this sense, it is clear that his contribution to the specific character of classical Chinese logical thought was of paramount importance. Indeed, he showed that none of the seemingly isolated propositions such as form and potential—any more than the notions of stillstand and motion—can function as independent or isolated concepts in the immanence of real, concrete life, which is inherently relational and governed by ceaseless change.

Acknowledgements

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10 These metaphysical foundations were often incompatible with formal logic, in which antagonisms such as that between static and dynamic qualities are not valid (see Vrhovski 2021, 87).

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History as Parable. Indirect Persuasion in the *Lüshi Chunqiu*

*Marcin JACOBY**

Abstract

The paper presents an analysis of the persuasive use of the narrative in the *Lüshi Chunqiu* using approaches of rhetoric narratology and rhetorical criticism. Twenty-one narratives are identified as vehicles of indirect persuasion and put on the mimetic and thematic scales to show how their relation to reality and history corresponds to their rhetorical use in discourse. Three of those narratives, exhibiting typical traits of historical anecdotes, are analysed in detail in their original context, to prove their parabolic function. The author argues that parabolic use of the narrative, including fables and parables, but also anecdotes and historical anecdotes, forms an important part of the Warring States period tradition of political and philosophical discourse. The author further proposes to use the term "parabolic narrative" to describe all such instances of using narratives in indirect persuasion. These can be found not only in the *Lüshi Chunqiu*, but also in other important works of the period, such as *Zhuangzi*, *Zhanguoce*, or *Han Feizi*.

Keywords: *Lüshi Chunqiu*, *yuyan*, anecdote, parable, fable

Zgodovina kot parabola: posredno prepričevanje v delu *Lüshi Chunqiu*

Izvleček

Prispevek podaja analizo prepričljive rabe pripovedi v delu *Lüshi Chunqiu* s pomočjo pristopov retoričnega pripovedništva ter retorične kritike. V sklopu te študije bo avtor enaindvajset zgodb iz omenjene knjige obravnaval kot sredstva posrednega prepričevanja ter jih umestil v mimetično in tematično lestvico, da bi pokazal, na kak način se njihov odnos z resničnostjo in zgodovino sklada z njihovo retorično rabo znotraj diskurza. Tri od teh pripovedi, ki kažejo značilne lastnosti zgodovinskih anekdot, bodo podrobneje razčlenjene znotraj njihovega izvornega konteksta, z namenom dokazati njihovo parabolično vlogo. Avtor zagovarja trditev, da je parabolična raba pripovedi, vključno s fabulami in parabolami kot tudi anekdotami in zgodovinskimi anekdotami, predstavljala pomemben del tradicije političnih in filozofskih razprav obdobja vojskujočih se držav. Avtor nadalje predlaga rabo izraza »parabolična pripoved« za opisovanje prav takšnih primerov rabe pripovedi za posredno prepričevanje. Teh namreč ni mogoče najti samo v delu

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Lüshi Chunqiu, ampak tudi v drugih pomembnih delih iz istega obdobja, kot so *Zhuangzi*, *Zhangguoce* ali *Han Feizi*.

Ključne besede: *Lüshi Chunqiu*, *yuyan*, anekdota, parabola, fabula

Introduction

Much has been written in recent years about the preponderant use of the narrative in persuasive discourse of the Warring States period in China. Most attention has been paid to how anecdotes, mostly historical, are used in these texts to convey meaning or illustrate a certain point (see Schaberg 2001; van Els and Queen 2017; Goldin 2020). What seems to be missing is a closer look at the use of various types of narratives in indirect persuasion. The phenomenon concerns not only fables and parables, but also historical anecdotes, and is an integral, not marginal, part of the rich and complex persuasive tradition of pre-Qin China.

The purpose of the paper is to show that persuasion in the political and philosophical discourse of the Warring States period is not all about using history as *exemplum*, but is as much about parabolic communication. Examples of this can be found not only in the *Zhuangzi* 莊子, but also in such texts as the *Zhanguoce* 戰國策, *Han Feizi* 韓非子, and the *Lüshi Chunqiu* 呂氏春秋. My analysis focusses on this last work.

Method

The texts which are subject of this analysis are short, conversational narratives (Fludernik 2009, 47). A narrative can be defined as: a *semiotic representation of a series of events meaningfully connected in a temporal and causal way* (Onega and Landa 1996, 3). The approach adopted in the present paper, however, focuses not on genre analysis of the narrative or its use of rhetoric tropes, but rather on the study of its function in rhetorical discourse. In order to do that, I borrow from the toolboxes of rhetoric narratology (see esp. Fludernik 2009; Phelan 2020) and rhetorical criticism (Rowland 2009; Iversen 2014; Sternberg 1982), especially Close Textual Analysis (CTA). I view the anecdotes in *Lüshi Chunqiu* as instances of deliberative discourse, recognizing the instrumental function of the narrative (Jasinski 2001, 430). Using James Phelan's MST model (the Mimetic–Synthetic–Thematic aspects of the narrative), I am interested principally in the mimetic and thematic aspects of the narrative (Phelan 2020), in other words, firstly in how it mirrors the real world and relates

to real life experiences of the listeners/readers, and secondly, in what the anecdote does in the communicative framework of the text in which it is embedded.

For the present paper, all 298 narratives present in the *Lüshi Chunqiu* were analysed in their original context, twenty one of them were chosen for CTA, and three of those further selected for a detailed presentation in the paper.

The *Lüshi Chunqiu*

Lüshi Chunqiu was written by a group of scholars under the auspices of Lü Buwei 呂不韋 (?–235 BCE), a merchant and powerful statesman of the state of Qin 秦, sometime between 241 and 238 BCE. It is a vast compendium of knowledge on how to be a successful ruler and leader, combining elements of different schools and traditions of thought, mostly Confucian, Daoist, and Yinyang. Most probably, the book was created as an argument in the ideological power struggle between Lü Buwei and King Zheng of Qin 秦王政 (Ying Zheng 嬴政, the later First Emperor of Qin 秦始皇), during the first years of his independent, adult reign.[1] The king exiled Lü in 237, and two years later the politician committed suicide while in exile, presumably to avoid persecution by the king.

Lüshi Chunqiu is a unique text in the heritage of pre-Qin literature, and as such was until recently neglected in mainstream research, both in China[2] and abroad[3]. However, there are several reasons why I consider *Lüshi Chunqiu* the best text to show parabolic use of the narrative in pre-Qin discourse.

First of all, unlike almost all pre-Qin classics (*Analects* 論語, *Mengzi* 孟子, *Zhuangzi*, *Mozi* 墨子, *Xunzi* 荀子, *Han Feizi*, etc.) the *Lüshi Chunqiu* is not a compilation of Warring States and later fragments of texts, but an original piece of work preserved almost as it was written some 2,250 years ago. This is proven by its regular and highly coherent structure, which sets it apart from the bulk of extant texts of the period. The work is divided into three parts: *Records* (*Ji* 紀), *Views* (*Lan* 覽), *Comments* (*Lun* 論).[4] *Records* are devoted to the "Way of Heaven"

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1   See publications by authors included in Wang Qicai's 2015 collection of Chinese scholarship on the *Lüshi Chunqiu*, especially: Miao Yue 繆鉞 (Wang Qicai 2015, 227–31), Wang Fanzhi 王笵之 (ibid., 24–25), Guo Moruo 郭沫若 (ibid., 172), and Xiu Jianjun 修建軍 (ibid., 468–70).

2   See Wang Qicai's introduction to his 2007 monograph for a summary of 20th century publications (Wang Qicai 2007, 1–6).

3   *Lüshi Chunqiu* was first translated into English only in 2000 by John Knoblock and Jeffrey Riegel, and the first English-language monograph devoted to the *Lüshi Chunqiu* is Sellmann (2002).

4   All English language translations of *Lüshi Chunqiu* in this paper are after Tang Bowen's translation (Tang 2010).

(*tiandao* 天道) and the obligations of the ruler aiming at preserving the harmony bestowed by Heaven. The part is composed of twelve books (*juan* 卷), with five chapters in each. *Views*, which explores the intricacies of human relations, shows the realm of Man (*ren* 人). This part consists of eight books, with eight chapters in each. Finally, *Comments*, focusing on the significance of the Earth (*di* 地), is composed of six books, with six chapters in each.[5] The Heaven—Man—Earth triad[6] creates the cognitive framework of the whole text. As discussed by Lü Yi 呂藝 (Wang Qicai 2015, 446), the book and chapter numbers of each part are also significant, as they carry a wealth of symbolic meanings connected with each of the three notions: 12 and five are the numbers of Heaven, eight is associated with the Eight Trigrams (*bagua* 八卦) and their role in shaping the affairs of Man, while six symbolizes the Earth. Such a regular and carefully conceived structure attests to the originality of the bulk of the text as we know it today.

Each book and chapter have a title which corresponds closely to its content (unlike most other pre-Qin works), and the content usually consists of an opening exposition (statement), followed by several narratives to illustrate the point, and sometimes a brief conclusion. No other known text of the period exhibits such coherence and regularity.[7]

This is important in the present study, as it creates high probability that the narratives embedded in the discussions in each chapter function in their original, intended communicative framework. And this in turn makes it possible to determine their most probable intended meaning. As rhetorical devices, their meaning is determined by the context in which they are embedded. And only if the context is known can we offer a plausible interpretation of what they were intended to do as symbolic sites of action in the discourse.

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5   Slight discrepancies from this model in extant version of the text include the addition of the "Postscript" (*Xuyi* 序意) at the end of the last book of *Records*, so that it is composed of six and not five chapters, and the lack of one chapter in the first book of *Views* (*Youshilan* 有始覽), so that there are seven, not eight chapters in this book.

6   Note that the order of the three parts is different from the sequence of the three essences (*sancai* 三才) as described in "Shuogua" 說卦 of the *Book of Changes* (*Yijing* 易經), and generally present in ancient Chinese thought: Heaven – Earth – Man. Knoblock and Riegel in the *Introduction* to their 2000 translation of the work (Knoblock and Riegel 2000, 33) propose to pair *Views* with the Earth, and *Comments* with Man, thus preserving the Heaven—Earth—Man order. However, this does not seem to correspond with the content of the work (especially the last four chapters of the last book, devoted entirely to farming), and is not supported by Chinese scholarship, see Lü Yi 呂藝 and Hong Jiayi 洪家義 in Wang Qicai (2015, 394, 444–46).

7   Several later works borrow from the structure from *Lüshi Chunqiu*, most visibly the *Huainanzi* (which also duplicates a sizeable part its content), see Xu Fuguan 徐復觀 and Mu Zhongjian 牟鍾鑑 in Wang Qicai (2015, 56–59, 290).

Many of the very same anecdotes are present in other works, such as the *Zhuang-zi*, *Han Feizi*, *Huainanzi* 淮南子 or *Liezi* 列子. Sometimes, the context in which they are embedded is markedly different from *Lüshi Chunqiu*, often quite unclear, and sometimes, especially in *Liezi*,[8] they function as stand-alone texts which are thus very difficult to interpret. *Lüshi Chunqiu* offers today's researcher the comfort of a coherent work in which interpretative markers of the narratives are very clearly communicated in the text.

Secondly, the *Lüshi Chunqiu* is not an echo of oral persuasive tradition. David Schaberg in his famous study of the *Zuozhuan* 左傳 and the *Guoyu* 國語 (Schaberg 2001) shows how far the received oeuvre of pre-Qin authors stems from the tradition of oral transmission. But this is not the case with *Lüshi Chunqiu*, which did not function in any oral form before it was written down. *Lüshi Chunqiu* was the effect of conscious effort of a team of scholars who wrote it for their intended audience of future rulers and statesmen,[9] and published it, exposed to public view in the capital of Qin. It was a book, not an oral tradition, and as such, we can analyse the rhetorical devices it employs with confidence that they reflect strategies intended for coherent, written texts of political and philosophical persuasion.

Fables, Parables, Historical Anecdotes, and *Yuyan*

Chinese scholarship on the use of the narrative in the Warring States period centres around the rather troublesome term *yuyan* 寓言, which in popular discourse usually denotes the literary genre of fable,[10] and more rarely, parable. If for the moment we look at the narrative from the perspective of genre analysis, however, there are not so many fables in the preserved literature of the period at all. Among

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8   See esp. chapter eight *Shuifu* 說符 of *Liezi*.

9   See Wang Qicai (2007, 85). Knoblock and Riegel (2000, 54) even suggest that the work was "inspired by a vision of a universal empire".

10   It is important to distinguish between the modern and traditional understanding of *yuyan*. In 1902 the term was used by Lin Shu 林紓 to render the Western notion of a fable in his translation of Aesop's fables as *Yisuo yuyan* 索寓言. From then on the connection between *yuyan* and the literary genre of fable was firmly established. However, *yuyan*, as first used in Chapters 27 and 33 of the *Zhuangzi* and in its commentaries in pre-modern Chinese literature, denotes indirect communication in far more vague terms, in no way linked to a specific literary genre. *Yuyan* in *Zhuangzi* commentaries is explained by Guo Xiang 郭象 as "borrowing from the outside" (*jiewai* 借外), by Cheng Xuanying 成玄英 as "transferring to others" (*ji zhi ta ren* 寄之他人), and by Guo Qingfan 郭慶潘 as "entrusting others with something" (*tuo zhi ta ren* 託之他人). The term was sporadically used in later centuries, especially in Tang dynasty poetry, but did not gain much significance outside the context of the *Zhuangzi* until modern times.

the four texts with the highest number of narratives, the *Zhanguoce*, *Zhuangzi*, *Han Feizi* and *Lüshi Chunqiu*, fables (understood as narratives in which the main protagonists are personified animals, objects or mythical creatures, and which carry a certain moral or philosophical lesson) are only present in the first two. I found four in *Zhanguoce*,[11] eight in *Zhuangzi*,[12] and none in *Han Feizi* and *Lüshi Chunqiu*.

Classical Chinese literature offers us far more parables. This genre is generally understood as a narrative which communicates a certain moral of philosophical lesson in an indirect way. Its main difference with fable is that its protagonists are humans, and that the narrative itself is rooted in common experience of the listeners. Instead of a fantastic story about talking animals, gods or mythical creatures, a parable offers a narrative much closer to common human experience, a story which could be considered plausible. A good definition of parable from the point of view of Gospel research is offered by a German theologian Ruben Zimmermann:

> A parable is a short narrative (1) fictional (2) text that is related in the narrated world to known reality (3) but, by way of implicit or explicit transfer signals, makes it understood that the meaning of the narration must be differentiated from the literal words of the text (4). In its appeal structure (5) it challenges the reader to carry out a metaphoric transfer of meaning that is steered by co-text and context information (6). (Zimmermann 2009, 5.2)

It is difficult to estimate exactly how many parables are included in *Zhuangzi*, *Zhanguoce*, *Han Feizi* and *Lüshi Chunqiu*, as many of them hover on the fringes

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11   These are: the tiger and the fox (狐假虎威), the mussel, the heron and the fisherman (蚌鷸相爭), the hound Lu and the hare Qun (韓子盧與東郭逡), and the lesser-known on the image of wood and the image of clay (土梗與木梗). All four narratives can be found in James Irving Crump's translation of *Zhanguoce* (Crump 1996) on pages: 226, 496, 170, and 303–04.

12   These are: the Peng, the cicada, and the dovelet (鵬, 蜩與學鳩); a second version of the same fable with Peng and a marsh sparrow (鵬與斥鴳); "Penumbra and Shadow" (罔兩問景); boring holes in Wonton (儵, 忽與渾沌); Cloud General and Vast Obscurity (雲將與鴻蒙); the Amorphus (Xiangwang 象罔) finding the Yellow Emperor's lost pearl of mystery (玄珠); Overlord of the North Sea and the Earl of the River (北海若與河伯); "the unipede and the millipede" (夔謂蚿); "the frog in the broken-down well" (埳井之鼃). For the fables listed above, I provide Chinese names of protagonists (without quotations) or quotes from passage openings (with quotation marks). The fables can be found in the translation of *Zhuangzi* by Victor H. Mair (1998), under the following *Zhuangzi* chapter/passage numbers and page numbers: Zhuangzi 1.1 and Mair, 4–5; Zhuangzi 2.13 and Mair, 24; Zhuangzi 7.7 and Mair, 71; Zhuangzi 11.5 and Mair, 97–100; Zhuangzi 12.4 and Mair, 105; Zhuangzi 17.1 and Mair, 152–59; Zhuangzi 17.2 and Mair, 159–60; Zhuangzi 17.4 and Mair, 161–63.

of historicity, and therefore do not fulfil the second of Zimmermann's conditions. My own findings give fifteen parable-like narratives in *Han Feizi*, twenty eight in *Zhanguoce*, twenty one in *Lüshi Chunqiu*, and about 110 in *Zhuangzi*—a text unmatched for its rich use of the parable in pre-Qin literature. This gives a pool of 174 parables in total, across the four texts.

If we compared these statistics with various counts of *yuyan* presented in Chinese publications on the subject, the difference would be quite striking. Chen Puqing (1987, 17) estimates pre-Qin *yuyan* at more than one thousand, including more than 300 in *Han Feizi* alone. Gong Mu (1984, 155) mentions that there are more than 200 *yuyan* in *Lüshi Chunqiu*. Ning Xi (1992, 53, 82), who uses much stricter criteria, identifies 160 *yuyan* in *Zhuangzi*, and more than fifty in *Zhanguoce*, still notably more than in my own count of fables and parables.

The cause of such discrepancies lies in the fact that most researchers publishing in Chinese treat *yuyan* in much wider terms than just fables and parables, using the term to denote various narratives used persuasively, or more specifically, to describe instances of indirect, parabolic use of the narrative in persuasive contexts (Jacoby 2018, 79–87). There are more such instances in pre-Qin texts than there are fables and parables. *Yuyan* in this broader meaning corresponds closely to how it is originally defined in the *Zhuangzi* and its commentary tradition, and at the same time fits in with the "metaphoric transfer of meaning that is steered by co-text and context information" as defined by Zimmermann above. This takes us away from literary genre analysis and moves us in the direction of rhetorical analysis of the narrative in persuasive discourse.

Parables and "Quasi-parables" in *Lüshi Chunqiu*

Just 21 one out of 298 narratives present in *Lüshi Chunqiu* can be called indirect, i.e. are vehicles of meaning other than the surface meaning of the plot. In order to create cognitive coherence between the surface plot of these narratives and the context in which they are embedded, the reader is challenged to interpret them beyond the surface meaning, and discover the message intended by the authors. For reasons of space, only three of these narratives will be discussed here in detail to show fully how the effect of indirect persuasion is achieved.

Ten of the 21 narratives can be classified as quite generic parables. They are fictional, and their protagonists are unnamed. The plot is imaginative and entertaining (several are humorous), and the context makes it absolutely clear that they are used as tools of persuasion. These are: two warriors who eat their own flesh

(j. 11.4 *Dangwu* 當務), a man who lost an axe (j. 13.3 *Quyou* 去尤), a woman who hides her belongings from her parents-in-law (j. 14.7 *Yuhe* 遇合), a man who loses his sword on a boat (j. 15.8 *Chajin* 察今), a child who can't swim (j. 15.8 *Chajin* 察今), a Rong barbarian (j. 16.3 *Zhijie* 知接), a man from Qi coveting gold (j. 16.7 *Quyou* 去宥), a man who likes dragonflies (j. 18.3 *Jingyu* 精諭), a man who loots a bell from Fan (j. 24.3 *Zizhi* 自知), and a lofty dog and its owner (j. 26.1 *Shirong* 士容). The setting (time, place) of the narratives doesn't really matter, nor does the identity of the protagonists. We could even imagine that some of these stories might have been considered true, but this again does not influence the function of the narratives in their persuasive context.

Another eight narratives are anecdotes in which the protagonists are well-known, historical or legendary figures. These narratives are: Mozi observing a man dyeing raw silk (j. 9.4 *Shenji* 審己), Liezi arrow shooting (j. 9. 4 *Shenji* 審己), King Tang of Shang teaching hunters to set trapping nets only on one side not to kill all animals (j. 10. 5 *Yiyong* 異用), Zhuangzi commenting on a "useless" tree and a dumb goose (j. 14.8 *Biji* 必己), Niu Que killed by robbers (j. 14.8 *Biji* 必己), a peasant detaining Confucius's horse (j. 14.8 *Biji* 必己), Dongye Ji demonstrating chariot-driving skills in front of Duke Zhuang (j. 19.5 *Shiwei* 適威), and Tang Shang who is doubted by a peasant (j. 26.1 *Shirong* 士容). These narratives are typically anecdotal, but not historical. Their setting is as vague as in the case of the previous set of parables. Similarly to them, the context makes it clear that rather than merely telling a funny or interesting story, the narratives are used indirectly in persuasive context to stimulate the readers and strengthen the message. Therefore, functionally we could call them "quasi-parables", as they are used in the discourse persuasively in much the same way as the ten "generic parables" discussed before.

The last three narratives present a true challenge to our understanding of how history was used in persuasive discourse of the Warring States period. They are neither parables, nor "quasi-parables" with historical/legendary protagonists. They can be classified as historical anecdotes, and still, they are used not as *exemplae* of what to do or not to do, but indirectly, with a "metaphoric transfer of meaning".

Three Historical Anecdotes and Their Parabolic Use

The first of the three narratives is found in the *Views on Caution Against Greatness* (*Shenda* 慎大覽第三) in the second chapter: "Weighing the Advantages" (j. 15.2 *Quanxun* 權勳). The main message of this chapter can be summed up in its opening paragraph:

…Without giving up a small gain, a great gain cannot be obtained. Without discarding small loyalty, great loyalty cannot be sustained. Therefore, a small gain is a curse to a great gain, and small loyalty, the curse to great loyalty. A sage therefore discards the small and takes the great. (Tang 2010, 162)

不去小利則大利不得，不去小忠則大忠不至。故小利，大利之殘也；小忠，大忠之賊也。聖人去小取大。 (Zhu and Su 1995, 533)

The chapter consists of four narratives which are intended to illustrate the point made in the opening paragraph. The first narrative is set in the year 575 BCE when King Gong of Chu 楚 (in the text: Jing King Gong 荊龔王) is defeated by the Jin 晉 army at the battle of Yanling (鄢陵). The plot is built around the commander of the Chu army, Zi Fan 子反, who evidently had an alcohol problem. Right before the battle he asks his servant Yang Gu 陽穀 to serve him something to drink, and is given alcohol. He refuses it at first, but after repeated assurance of the servant that it's not really alcohol, begins to drink and can't make himself stop before becoming intoxicated. After the battle is lost, the king visits him in his tent despite Zi Fan's efforts to hide away, and discovers the state he is in. Disgusted and disappointed, he orders the withdrawal of the army, and upon its return has Zi Fan punished by death, and his corpse displayed publicly (Tang 2010, 162; Zhu and Su 1995, 534).

Read as a stand-alone anecdote, it could be interpreted in a variety of ways. The most straight-forward reading would be a warning against the pitfalls of addiction, or against drinking irresponsibly, or generally, against acting irresponsibly before an important task. If the reader focusses not on Zi Fan, but on the king, the reading could be that a leader cannot succeed without responsible members of the team.

The authors of the *Lüshi Chunqiu* however, chose to use the narrative in a far more sophisticated way. It's neither Zi Fan nor the king who are the true protagonists of the story, but the servant Yang Gu. The message is that he made a grave mistake, incurring a great loss through a small gain. The small gain was hoping to satisfy Zi Fan by serving him the alcohol that he loved. The big loss, of course, was the defeat in battle, the disgrace and ultimate execution of Zi Fan.

The anecdote does not communicate this content through its surface meaning. We would fail to interpret it correctly if we were to use it as an historical *exemplum*, even though the characters are historical, and the battle was recorded in historical sources.[13] The plot functions not on an informative level of recounting

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13   The battle at Yanling is mentioned in *Zuozhuan*, *Shiji* 史記, and in *Han Feizi*.

history, but as a powerful vehicle for a message of the chapter "Weighing the Advantages". Its function is to strengthen the message; the reader should be shocked by the reckless and irresponsible behaviour of Zi Fan, and identify with the king who is enraged by the failure of his commander. The little, white lie of an overzealous servant starts a whole chain of events which ends in tragedy. The contrast between the small action of serving a drink and the huge disaster of a lost battle is underlined. The narrative amplifies the warning of the chapter: if you go for small gains instead of concentrating on the main target, the consequences might be far-reaching and grave.

The second example of a historical anecdote used parabolically can be found in the last chapter of the same book—"Studying the Present" (j. 15.8 *Chajin* 察今). Again, it is a war story involving the Chu army, but this time on its war expedition to the Song 宋. Scouts are sent to gauge the depth of the Yongshui 澭水 river which the army needs to cross. A ford is found and marked by the scouts. At night, the army arrives and crosses the river at the designated place. It turns out, however, that in the meantime the waters rose, and more than a thousand soldiers drown.

The story shows either negligence on the side of the commanders (shouldn't they order checking the depth of the river again before crossing?), or a tragic mistake (things like this could always happen) or, perhaps, bad luck (what are the chances of such an unfortunate timing between the reconnaissance of the scouts and the arrival of the army?). In any case, the reader would naturally think about the reasons for the tragedy and the responsibility for the mistake. In the *Lüshi Chunqiu*, however, this narrative communicates an unexpected message: do not cling blindly to the rules set in the past.

We know this because of the context in which the narrative is placed. The chapter "Studying the Present" consists of two, longer theoretical expositions and three narratives. The one on the drowning Chu soldiers is embedded within the expository text, while the other two narratives are placed at the end of the chapter.

"Studying the Present" opens with the following statement: *Why are there rulers who do not follow the rules of the early kings? This is not because these rulers are unvirtuous but because the rules cannot be copied* 上胡不法先王之法，非不賢也，為其不可得而法 (Tang 2010, 177; Zhu and Su 1995, 580). The main massage of the chapter can be summed up in two further quotes from the paragraph which follows the narrative on the Chu army:

> When the world and the times change, it is time to change the rules …
> It is therefore necessary to follow rules in whatever one undertakes and

to change the rules with the times. If this is understood, mistakes can be avoided. (Tang 2010, 178–79)

世易時移，變法宜矣。。。。故凡舉事必循法以動，變法者因時而化。 若此論則無過務矣。(Zhu and Su 1995, 581)

We are guided by this context to interpret the narrative as a warning against conforming blindly to rules that were set in the past, when the circumstances were different to the present situation. The authors of the *Lüshi Chunqiu* chose to strengthen this message indirectly with the narrative on the Chu army commanders who believe that the water in the ford is as shallow as it was when the scouts checked it. If we were to remove the narrative from its historical context, replace the Chu army on their way to attack the Song with "army A traveling to country B", the narrative would become a typical parable. Its historicity makes it more credible, and thus more convincing, but from the rhetorical CTA point of view, whether a parable or a historical anecdote, the narrative in this particular context is the site of the same symbolic action.

The third and last example analysed in this paper comes from "Discretion"—the first chapter of book 24, *Comments on Discretion* (j. 24.1 不苟論第四·不苟). The narrative is set at a key time in history. The would-be founder of the Zhou dynasty, King Wu, is standing with his commanders on the outskirts of Yin, the capital of the Shang dynasty, preparing for the decisive battle. The attack will change the history of All Under Heaven. And here is what happens:

> When King Wu brought his army to the outskirts of the Yin capital, the lace of one of his socks came loose. His five assistants were by his side, but none of them would tie the sock lace for him. They said, "We are here to assist the ruler and not to tie the sock lace for him." King Wu had to lay down the flag of white feathers in his left hand and the golden battle-axe in his right to tie the lace with much effort. (Tang 2010, 318)

> 武王至殷郊，係墮。五人御於前，莫肯之為，曰：「吾所以事君者非係也。」武王左釋白羽，右釋黃鉞，勉而自為係。(Zhu and Su 1995, 1005)

Juxtaposing a momentous historical event and a story of a loose sock and no-one to tie it might sound humorous or even grotesque to the modern reader. We don't know if this was the intent of the authors of *Lüshi Chunqiu*, especially as they follow the narrative with quite a serious-sounding section quoted below:

> Upon hearing what had happened, Confucius later commented, "This was why the five men became assistants to the king and what an unworthy ruler would not tolerate." Therefore, the king is sometimes no better than a commoner, and a man who owns the world is no better than the ruler of an ordinary state. (Tang 2010, 318)
>
> 孔子聞之曰：「此五人者之所以為王者佐也，不肖主之所弗安也。」故天子有不勝細民者，天下有不勝千乘者。(Zhu   and   Su 1995, 1005)

It is not as easy to understand the persuasive use of this narrative as is the case with the two previous examples. The "Discretion" chapter is composed of a one-paragraph exposition and four historical anecdotes. The remaining three tell different stories of the relations between rulers and their officials. The common denominator for all four narratives is the theme of professional responsibilities at a given, official post. The subjects, but above all the ruler, should never go beyond what is in the "job description". The second idea presented in the exposition is that the ruler should not only listen to the advice of loyal subjects but most of all show through his deeds that he puts the advice to effect. These two ideas seem to form the interpretative framework in which the narrative of King Wu is placed.

King Wu chose the right persons to be his five assistants—their refusal to help him with the sock shows that they understood their mission correctly. King Wu not only accepted their refusal, but also humbly did what was the right thing to do: he laid down "the flag of white feathers in his left hand and the golden battle-axe in his right" and tied the sock himself, "with much effort", as is underlined in the text.

The narrative without this context seems to present a surprising or even shocking story of how devoid of empathy were King Wu's five assistants and how humble the king himself was. The authors of *Lüshi Chunqiu* invite us to interpret it differently, however, as a critique of leaders who demand of their subordinates what they shouldn't, and who forget that they themselves are sometimes "no better than a commoner". Understood in these terms, rather than showing King Wu's merits, the narrative presents a critique of the king, with the conclusion that the firm stance of his assistants helped him correct his mistake in time. And maybe this is exactly why he managed to defeat the Shang and establish his benevolent rule based on the principles of *li* 禮 and *yi* 義.

The narrative challenges our understanding of propriety and duty. Through this, it strengthens the force of the warning communicated in the "Discretion" chapter.

The Parabolic Narrative Model

There are four types of narratives used indirectly in a persuasive context that were mentioned in this paper: fables, parables, anecdotes, and historic anecdotes. How these narratives differ from each other is their mimetic aspect, i.e. relation to real world and real experiences. A fable represents what in literary studies can be called an unnatural narrative,[14] while on the other end of the unreal–real scale we can find historical anecdote, which is firmly based in historical context. If we placed all of these narrative types on a thematic scale, fables and parables would occupy one end of the scale, as texts used in indirect persuasive communication, while the bulk of extant historic anecdotes would need to be placed on the "direct communication" end of the scale, as *exemplae* strengthening the message through straight-forward analogy. Presented in graphic form, the positioning of various types of narratives on the mimetic and thematic scales could appear as below:
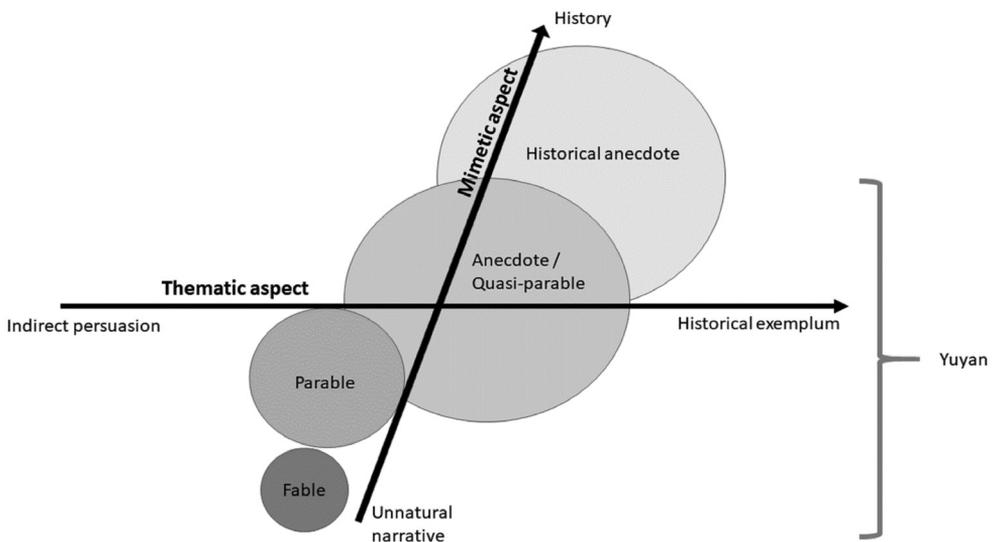
Fig. 1. The Parabolic narrative model.

Most historical anecdotes and many anecdotes with historical protagonists are used directly in persuasive contexts in both the *Lüshi Chunqiu* and in other texts

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14   For an in-depth discussion on unnatural narratives in premodern literature, see von Contzen (2017).

of the period. However, what the eight "quasi-parables" and the three historical anecdotes from *Lüshi Chunqiu* demonstrate is that not only are the boundaries between fiction and history blurred, but also those between parabolic communication and direct persuasion.

This fact has not been widely recognized in modern scholarship on late Warring States period literature. Those scholars who take on the analysis of the anecdotal tradition, such as authors of the aforementioned, important publication *Between History and Philosophy: Anecdotes in Early China*, edited by Paul van Els and Sarah A. Queen, usually concentrate on the mimetic aspect of the narratives, failing to recognize their parabolic use in much of the discourse of the period. This results in pushing parabolic communication in *Lüshi Chunqiu*, *Zhuangzi*, *Han Feizi*, *Zhanguoce*, and several other texts to the margins of research, while in truth it forms an important, if not central part of late Warring States period political and philosophical discourse. At this point it might be useful to bring back the Chinese term *yuyan* yet again, as it shows recognition of the thematic dimension, i.e. the parabolic use of various narratives.

I propose that all narratives used indirectly in persuasive contexts in the thematic dimension, regardless of their identification in the mimetic aspect as fables, parables, anecdotes or historical anecdotes, should be called parabolic narratives. In this way, the pitfalls of using terms relating to literary genres in rhetoric analysis of persuasive discourse can be avoided.

Conclusion

The aim of the paper was to show the use of different types of narratives in indirect persuasion of the Warring States period. I consider *Lüshi Chunqiu* as the best text for such an analysis, due to its well-preserved, coherent structure of persuasive content in which various types of narratives are embedded.

The analysis of narratives present in the *Lüshi Chunqiu* in their original communicative framework shows that they occupy different positions across the mimetic and thematic dimensions. Three historic anecdotes used parabolically, and to a lesser extent eight further anecdotes used as "quasi-parables", prove the fact that in the political and philosophical discourse of the Warring States period, history was being used in indirect persuasion similarly to the fantasy and literary fiction of fables and parables.

Therefore, in research into pre-Qin narratives I consider it insufficient to focus solely on anecdotal narratives interpreted through the lens of "continuum of

historicity".[15] This would result in disregarding the parabolic function that many narratives clearly demonstrate, especially in texts such as *Zhuangzi*, *Han Feizi*, *Zhanguoce*, and, of course, the *Lüshi Chunqiu*.

It is thus necessary to broaden the understanding of Chinese pre-Qin anecdotal tradition to include the term parabolic narrative, to cover all types of narratives used instrumentally in indirect persuasion, whether they are fables, parables or historic anecdotes. They should be evaluated in their thematic dimension, as deliberative discourse in which form and content "collaborate to create meaning and effect persuasion" (Browne 2009, 76).

The parabolic use of narratives is not a niche phenomenon, but an important one representative of persuasive discourse in the Warring States period. As such, it should not be omitted from discussions of the literary and rhetorical traditions of this period of Chinese history.

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15 This term is used by van Els and Queen in "Anecdotes in Early China" in their edited volume *Between History and Philosophy: Anecdotes in Early China*, (van Els and Queen 2017, 10); by Paul R. Goldin in his chapter "Non-deductive Argumentation in Early Chinese Philosophy" in the same volume (van Els and Queen 2017, 50–51), and again by Goldin in Goldin (2020, 23).

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OTHER TOPICS

In the Beginning Was Observing: Shao Yong on the Sagely Self, Observing and "Poeting"

Sophia KATZ*

Abstract

The article explores the connection between observing, poetic creation, and sagely perception of reality, as expressed in the writings of the Song dynasty scholar, Shao Yong 邵雍 (1012–1077). Shao, most famous for his fourfold classification of all existing things, claimed that observing things according to structure (*li* 理) was the most direct path to cultivating the sagely state of mind. In addition to being a thinker, Shao was a prolific poet. His poetry collection, titled *Striking the Earth at the Yi River* (*Yichuan jirangji* 伊川擊壤集), contains approximately 1,500 poems written in a distinct poetic style. Basing my inquiry on the *Inner Chapters on Observing Things* (*Guanwu neipian* 觀物內篇) and on the *Striking the Earth at the Yi River*, two authentic works written by Shao, I describe the procedure of the "mirrored observing" (*fanguan* 反觀) which, as Shao claimed, allows the observer's mind to comprehend the object of observing in its wholeness. I further concentrate on the connection between observing and poetic writing, and claim that Shao perceived these activities as mutually connected: Writing poetry assists the process of observing, while gradual development of the right perspective in observing results in a more effortless poetic creation. Both observing and poetic writing assist and sustain one's search for sageliness. For Shao Yong, poetry was not just a medium for expressing one's ideas, but also a sagely language enabling one to communicate with the ultimate reality, described by the term "Heaven" (*tian* 天).

Keywords: Shao Yong, observing, structure (*li*), poetry, sageliness

Na začetku je bilo opazovanje: Shao Yong o modrem sebstvu, opazovanju in »pesnikovanju«

Izvleček

Članek preučuje povezavo med opazovanjem, poetično stvaritvijo ter modrečevim dojemanjem resničnosti, kot jo opisujejo dela songškega učenjaka Shao Yonga 邵雍 (1012 – 1077). Shao, ki je najbolj poznan po svoji štiridelni klasifikaciji vseh obstoječih stvari, je trdil, da je opazovanje stvari na podlagi strukture (*li* 理) najbolj neposredna pot do gojenja razuma modreca. Ob tem, da je bil mislec, je bil Shao tudi zelo plodovit pesnik.

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Njegova zbirka pesmi z naslovom *Teptati zemljo ob reki Yi* (*Yichuan jirangji* 伊川擊壤集) vsebuje približno 1500 pesmi, napisanih v posebnem pesniškem stilu. Na podlagi del *Notranja poglavja o opazovanju stvari* (*Guanwu neipian* 觀物內篇) in *Teptati zemljo ob reki Yi*, dveh pristnih del izpod Shaotovega peresa, bom v svoji raziskavi opisala proces »zrcaljenega opazovanja« (*fanguan* 反觀), ki, kot je trdil Shao, omogoča opazovalčevemu umu dojeti predmet opazovanja v njegovi celosti. Nadalje se bom osredotočila na povezavo med opazovanjem in pesniškim ustvarjanjem, v zvezi s katero bom trdila, da je Shao dojemal ti dejavnosti kot medsebojno povezani: pisanje poezije namreč pomaga pri procesu opazovanja, medtem ko postopen razvoj prave perspektive z opazovanjem pripomore k lahkotnejšim pesniškim stvaritvam. Tako opazovanje kot pesniško ustvarjanje nam pomagata pri iskanju modrosti in ga tudi napajata. Za Shao Yonga pesništvo ni bilo samo nekakšen medij za izražanje svojih idej, ampak tudi neke vrste jezik modreca, ki je človeku omogočal komunikacijo z najvišjo resničnostjo, ki so jo opisovali s pojmom »Nebo« (*tian* 天).

Ključne besede: Shao Yong, opazovanje, struktura (*li*), poezija, biti modrec

Introduction

One of the salient characteristics of the Chinese worldview is the perception of ultimate reality, designated by the term Heaven (*tian* 天), as silent.[1] Thus Confucius, justifying his wish to imitate Heaven exclaims: "Does Heaven speak? The four seasons pursue their courses, and all things are continually being produced. Does Heaven say anything?" (*Analects* 17:19; Legge 1893). While the *Analects* (*Lunyu* 論語) and many other early literary sources do not conceive of Heaven as a creator, it is often understood as an ultimate moral authority influencing the lives of humans. Heaven does have a will and intentions; however, they are not communicated to humans verbally. To understand the will of Heaven, humans do not need to wait for revelation, but rather take the initiative and try to interpret the reality they encounter, the "four seasons pursuing their course". Unlocking the messages encoded in visible nature is a process requiring time and patience, but most importantly it requires skills, among them performing mathematical calculations widely used in agriculture as well as in divination. The laws of nature encoded in signs and numbers of the *Book of Changes* (*Yijing* 易經), which in pre-modern China was considered equally rational and magic, could be decoded with the help of that very book. It was believed that the *Book of Changes* provided humans with knowledge unavailable through other sources. This knowledge, profound and far-reaching, was based on observing (*guan* 觀). It was observing that

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1   For a discussion of Heaven (*tian* 天) as ultimate reality, see Yan (2009). See also Taylor (1998).

enabled the creation of the *Book* itself, and that became the most important methodological tool in the process of philosophical and scientific enquiry of the world. Thus, *Commentary on the Appended Statements* (*Xicizhuan* 繫辭傳) describes observing as a sagely activity that enabled the sage emperor Fu Xi 伏羲 to design the eight trigrams (*Xicizhuan* II: 2). Moreover, it is observing that empowers the sage "to know reasons and causes of the dark and the bright", and to comprehend the future, for "the one who knows to observe the judgments of a *gua*, he would think through over half a way" (*Xicizhuan* II: 9; *Cheng* 1995, 159). As Cheng Chung-ying notes, observing

> as both discovery of forms and invention of images is the infinite source of meaning, inspiration, and motivation for all important cultural and civilizational activities. It is what gives meaning to the sage's quest for his own place and pole and status in the world. In fact, it is the *guan* and its profound uses which only a sage is capable of cultivating and, in this sense, makes a sage a sage. (*Cheng* 1995, 161)[2]

This article explores the connection between observing, poetic creation, and sagely perception of reality, as expressed in the writings of the Song dynasty scholar, Shao Yong 邵雍 (1012–1077). Shao, famous for his fourfold classification of all existing things[3] and his reported ability to calculate and predict future events, was considered by later Chinese scholars a founder of the so-called "school of images and numbers" (*xiangshu xuepai* 象數學派). Despite the occasional critique of the philosophical school associated with Shao,[4] his intellectual abilities and personal qualities made him one of the most popular personalities in the secondary capital city of the Northern Song dynasty, Luoyang. A true luminary of his time, Shao, deemed one of the five founders of Neo-Confucianism,[5] is most famous for his views on observing things and for his novel approach to poetry.[6] In what follows, I concentrate on the often-neglected connection between observing and poetic writing and claim that Shao perceived both these activities as a process that

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2   Summarizing the meanings of comprehensive observation in the *Book of Changes*, Cheng Chung-ying defines it as follows: "It is totalistic or integrative seeing"; "It is a dynamical and processwise seeing"; "It is positional or organic-contextual seeing"; "It is temporal or transformative seeing"; "It is interactive seeing"; "It is valuational and inventive seeing"; "It is ontocosmological seeing", "It is ontohermeneutical seeing" (*Cheng* 1995, 162–63).

3   For the description of Shao Yong's fourfold classification, see Bol (2013, 287–99); Katz (2020).

4   This philosophical school was not established by Shao, but rather connected to his name by later scholars.

5   For details of Shao Yong's life, see Birdwhistell (1989); Wyatt (1996); Arrault (2002).

6   For details of Shao's poetry collection, *Striking the Earth at the Yi River* (*Yichuan jirangji* 伊川擊壤集), see Katz (2013); Deng (2005); Zheng (1998).

facilitates and, at the same time, expresses one's search for sageliness. The analysis of Shao's writings manifests that the connections between observing, poeting,[7] and the search for sageliness are bidirectional: Writing poetry assists the process of observing, while the gradual development of the right perspective in observing results in a more effortless and richer poetic creation. Both observing and poetic writing assist and sustain one's search for sageliness, while one's growing understanding and intellectual/spiritual progress simultaneously allow a more thorough and all-embracing observing and a freer poetic writing. For Shao Yong, poetry was not just a medium for expressing one's ideas, but also a sagely language enabling one to communicate with "silent" Heaven.

Part 1: Mirrored Observing as a Way of Sagely Perception of Reality

The connection between observing and sagely perception of reality is most solidly established in Shao Yong's Magnum Opus, *Inner Chapters on Observing Things* (*Guanwu neipian* 觀物內篇).[8] In Chapter 2 of this work, Shao claims that the primary characteristic of the sage, the very feature that makes him unique in comparison with other humans, is the ability of the sage

> to observe ten thousand hearts/minds on the basis of one heart/mind, to observe ten thousand selves [on the basis] of one self, to observe ten thousand things [on the basis] of one thing, to observe ten thousand generations [on the basis] of one generation
>
> 以一心觀萬心,一身觀萬身,一物觀萬物,一世觀萬世 (Shao 2010, 7)

This sagely ability, according to Shao, is not entirely inaccessible to other humans, since the sage is a human being. Yet, as much as obtaining sageliness is extremely rare,[9] the ability to acquire ultimate sagely knowledge by means of observing is hardly reachable. However, practicing observing and developing the right

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7   The term "poeting", signifying a process of poetic creation both as an integral part of a poet's life and a living poetic dialogue with the audience, is used by a number of poets. See, for example, Knight and Pinsker (2017, 711); Collins (2008, 581); Fletcher (2006).

8   *Inner Chapters on Observing Things* and *Outer Chapters on Observing Things* (*Guanwu waipian* 觀物 外篇) are sections of Shao's *Book of August Boundary Ordering the World* (*Huangji jingshi shu* 皇極經 世書), which also includes chronological and linguistic tables. Modern scholars agree that the *Inner Chapters* were written by Shao Yong himself, whereas the *Outer Chapters* were most likely compiled by his followers. Shao Yong's poetry collection, *Striking the Earth at the Yi River* (*Yichuan jirangji* 伊川擊壤集) is considered authentic.

9   Shao further claims that sages do not appear in every generation and that he, himself, has not been able to see an actual sage (Shao 2010, 8).

perspective on things is the gateway to one's intellectual/spiritual progress toward the sagely state of mind.

Discussing ontological reality, Shao contends that similar to trees and animals, human beings are things. Yet, he explains that humans are the most refined among things in terms of their intellectual and spiritual abilities. According to Shao, a human being is the "utmost thing" (*zhiwu* 至物). Similarly, the sage is a human being; yet, he is the "utmost human being" (*zhiren* 至人):

> If so, a human being is also a thing, the sage is also a human being.
>
> There are things [that can be considered as] one of one, there are things [that can be considered] one of ten, there are things [that can be considered one] of a hundred, there are things [that can be considered one] of a thousand, there are things [that can be considered one] of ten thousand, there are things [that can be considered one] of a hundred thousand, there are things [that can be considered one] of a million. That thing [which is one] of a million, is this not a human being? There are human beings [that can be considered as one] of one, there are human beings [that can be considered one] of ten, there are human beings [that can be considered one] of a hundred, there are human beings [that can be considered one] of a thousand, there are human beings [that can be considered one] of ten thousand, there are human beings [that can be considered one] of a hundred thousand, there are human beings [that can be considered one] of a million. That human being [which is one] of a million, is this not a sage? We should know that the human being is the utmost of things. The sage is the utmost human being. The utmost among things deserves to be called the thing of things. The utmost among humans deserves to be called the human of humans. And so, the thing of things, is called the utmost thing. The human of humans is called the utmost human. From utmost thing becoming the utmost human, if this is not the sage, who then? If someone calls him not the sage, I will not believe it. How is it? It is said [because of] his ability on the basis of one heart to observe ten thousand hearts, [on the basis of] one body/self to observe ten thousand bodies/selves, [on the basis of] one thing to observe ten thousand things, [on the basis of] one generation to observe ten thousand generations.
>
> 然則人亦物也，聖亦人也。有一物之物，有十物之物，有百物之物，有千物之物，有萬物之物，有億物之物，有兆物之物。為兆物之物，豈非人乎！

有一人之人，有十人之人，有百人之人，有千人之人，有萬人之
人，有億人之人，有兆人之人。為兆人之人，豈非聖乎！

是知人也者，物之至者也。聖也者，人之至者也。物之至者始得
謂之物之物也。人之至者始得謂之人之人也。夫物之物者，至物
之謂也。人之人者，至人之謂也。以一至物而當一至人，則非聖
人而何？人謂之不聖，則吾不信也。何哉？謂其能以一心觀萬
心，一身觀萬身，一物觀萬物，一世觀萬世者焉。(ibid.)

In Chapter 12, Shao further clarifies the meaning of the sagely observing of many
through the one. According to Shao, sagely observing of things is "not observing
them on the basis of [what is seen by] the eye", nor is it "observing them [on the
basis of] [what is perceived by] the heart/mind", but rather "observing them on
the basis of the structure" (非觀之以目而觀之以心也，非觀之以心而觀之以
理也) (ibid., 49).[10] This structure/principle (*li* 理) is an integral part of all things.[11]
Therefore, by "exhausting structure" (*qiongli* 窮理), one can reach ultimate sagely
knowledge. As Shao explains, "exhausting structure", "bringing inborn nature to
the utmost" (*jinxing* 盡性) and "arriving at one's destiny" (*zhiming* 至命)[12] grant
humans access to three kinds of true knowledge (*zhenzhi* 真知):

> That which is called "observing things" is not observing them with the
> eyes. Not observing them with the eyes, but observing them with the
> heart/mind. Not observing them with the heart/mind, but observing
> them with/according to the structure. [Among] the things under Heav-
> en, there is not one that has no structure (*li* 理), there is not one that has
> no innate nature (*xing* 性), there is not one that has no destiny (*ming*
> 命). That which is called structure, to exhaust it, and then it will be pos-
> sible to know it. That which is called innate nature, to expand it to the
> limit, and then it will be possible to know it. That which is called destiny,
> to bring it to the utmost and then it will be possible to know it. These
> three kinds of knowledge are the real knowledge under Heaven. Even

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10   The *Zhuangzi* 莊子 employs a similar linguistic formula with regard to listening: "Not listening
to it with the ears, but listening to it with the heart/mind, not listening to it with the heart/mind,
but listening to it with the breath/spirit 无聽之以耳而聽之以心，无聽之以心而聽之以氣."
(*Zhuangzi*, chap. 4) The idea of observing "x" on the basis of/with (*yi* 以) "x" was introduced in the
Daodejing, chap. 54: "Observing [one's] self on the basis of the self, observing [one's] family on the
basis of the family, observing [one's] village on the basis of the village, observing [one's] state on
the basis of the state, observing all under Heaven on the basis of all under Heaven 以身觀身，以
家觀家，以鄉觀鄉，以邦觀邦，以天下觀天下."

11   For an insightful study on the idea of structure, see Rošker (2012). On *li*-as-structure in Shao
Yong's thought, see Katz (2020).

12   Reference to the *Book of Changes*, "Treatise of Remarks on the Trigrams" (*Shuogua* 說掛, chap. 1).

the sage has no means to go beyond it, and that which goes beyond it is not the sage.

夫所以謂之觀物者，非以目觀之也。非觀之以目而觀之以心也，非觀之以心而觀之以理也。天下之物莫不有理焉，莫不有性焉，莫不有命焉。所以謂之理者，窮之而後可知也。所以謂之性者，盡之而後可知也。所以謂之命者，至之而後可知也。此三知者，天下之真知也。雖聖人無以過之也，而過之者非所以謂之聖人也。(ibid., 49)

Explaining further the meaning of observing, Shao discerns a sagely ability that he calls "mirrored" observing or "observing in the opposite direction" (*fanguan* 反觀), when the mind of the observer, much like a mirror or water, reflects the observed things/objects.[13] The essence of this observing consists in neutralizing one's "I" and developing perspective which is not "I-dependent".[14] "Mirrored" observing means that once the observer sends his sight to a "thing" (*wu* 物) that is the object of his observing, the "thingness" of that object is reflected back to the observer, who is able to perceive the "thingness" or "objectness" of the thing/object independent of the observer's own "I", identity or subjective perspective while being aware of the interconnectedness and interdependence between all things in the world:

> That which is called "mirrored observing", is not observing things on the basis of one's "I". Not observing things on the basis of one's "I", is called

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13   The term *fanguan* has been translated as "reflective observation" by several scholars. See Birdwhistell (1989); Chu (1998, 247). I prefer the term "mirrored" because the term "reflective" can be misinterpreted due to the common understanding of the English term "reflection" as "thinking", and of "reflective observation" as associated with modern theories of experiential learning (see Kolb 1984). Within the Chinese philosophical tradition, the idea of *fan* 反 as "turning back" or "returning" was articulated by Mengzi 孟子, who suggested that "turning back/returning to one's self (*fanshen* 反身) and achieving sincerity is the greatest joy (*fanshen er cheng, le mo da yan* 反身而誠, 樂莫大焉)" (Mengzi 2A:4). See also Mengzi 2A:7, emphasizing the necessity "to turn back and to search within one's self (*fanqiu zhuji* 反求諸己)". For reference to the connection between *fanguan* and *fanshen*, see Arrault (2002, 394). On the metaphor of the "mirror" in Chinese philosophical traditions, see Ching (1983).

14   As Shao writes, "The reason why the mirror can be clear, is [due to] its ability of not hiding [in itself] the forms of ten thousand things. Even though the mirror is capable of not hiding [in itself] the forms of ten thousand things, it is not as good as the water [that] is able to unite the forms of ten thousand things. Even though the water is able to unite the forms of ten thousand things, it is, in turn, not as good as the sage [who] is able to unite feelings/emotional inclinations of ten thousand things. The reason why the sage is able to unite feelings/emotional inclinations of ten thousand things, is [due to] the sage's ability to observe in the opposite direction. What is called 'observing in the opposite direction', is not observing things on the basis of one's 'I'."
夫鑒之所以能為明者，謂其能不隱萬物之形也。雖然鑒之能不隱萬物之形，未若水之能一萬物之形也。雖然水之能一萬物之形，又未若聖人之能一萬物之情也。聖人之所以能一萬物之情者，謂其聖人之能反觀也。所以謂之反觀者，不以我觀物也. (Shao 2010, 49)

"observing things on the basis of things." When one is able to observe things on the basis of things, how can there be the "I"/self in between. If so, one knows that "I" is also a human being, a human being is also an "I". I and humans are all things.

所以謂之反觀者，不以我觀物也。不以我觀物者，以物觀物之謂也。既能以物觀物，又安有我于其間哉！是知我亦人也，人亦我也。我與人皆物也。(ibid.)

"Mirrored observing" allows the observer to comprehend the object of observing in its wholeness and "objectness", and therefore to observe objectively.[15] This sagely objective observing is possible because humans are not unique in their essence; they differ from other things only in degree of their intellectual and spiritual refinedness (*ling* 靈) (ibid., 6). Human beings are also things. The shared "thingness" of humans and other things makes possible the observing on the basis of things. And it is precisely this shared "thingness" that makes sagely knowledge possible, since the sage is not essentially different from other humans, but only the most intelligent and refined among them. Both a human and a thing, the sage can grasp the deepest mysteries of existence. Developing the all-embracing sagely perspective, according to Shao, is possible only by recognizing the existence of the structure within visible reality and by observing the world according to this structure. Such observing requires one to step outside of one's own private concerns and preoccupations.

Part 2: Observing the Game, Contemplating Reality, Poeting: The Technique of "Mirrored Observing"

To explain the technique of an all-embracing sagely mirrored observing, Shao employs the analogy of the *weiqi* 圍棋 game, mentioned several times in his poetry collection, *Striking the Earth at the Yi River*. In one poem, Shao compares the world observed from a high mountain to a *weiqi*-board (Shao 2010, 244). In another, he describes the concept of time with a similar image, "ancient and modern times can be summarized on the *weiqi*-board (今古都歸一局棋)" (ibid., 229).[16] Yet, the most thorough and interesting treatment of the theme of observing is

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15   On objectivity in Shao's thought, see Wyatt (2013).

16   In this line, Shao uses the term *gui* 歸 ("to return"), which resonates with the idea of *fan* 反 ("to turn around"): "mirrored observing" of the *weiqi* game, a process that implies a "turning around" (*fan*) of the observer's perspective, allows one to gain knowledge as all historical happenings "return to" (*gui*) and can be seen on the *weiqi*-board.

found in the long five-syllabic, old-style (*gushi* 古詩) poem, titled "A Great Ditty on Observing a *Weiqi* [game] (*guanqi dayin* 觀棋大吟)" (ibid., 181–85).[17]

In the opening lines of the poem, Shao states that the goal of observing the *weiqi* game is to "know creative transformations beyond calculation of gaming chips, and to see the [slightest/invisible] portents outside of [players'] moves (算余知 造化，著外見幾微)" (ibid., 181).[18] Phenomenological happenings in the *weiqi* game, such as the moves of chips and different types of calculations made by players, represent only one empirical level of reality. To move "outside" and "beyond" this level means to be sensitive not only to the "visible" developments of the game, but to understand the psychological and philosophical dimensions that are "hidden" and "invisible" at first glance. Beginning his observing with comments on players' behaviour, Shao describes the process of psychological change initiated by the choice to be involved in the game:

> [Even though] their love for victory knows no limits,
> Before the competition begins, intentions are not [yet] not-honorable.
> [But after] the players complete the duties of guests and hosts,
> They treat each other as if they are barbarians.
> [Desires for] wealth and profit are welcomed inside [their hearts],
> Happiness and anger can be seen from [movements] of their cheek-bones.
> Life and death are in their power,
> [Their intentions of] giving and taking are seen in [the wrinkles of] their foreheads.

> 好勝心無已，爭先意不低。
> 當人盡賓主，對面如蠻夷。
> 財利激于衷，喜怒見于頄。
> 生殺在于手，與奪指于頤。(ibid.)

The players' desire to win and to profit rapidly overcomes the socially appropriate: Even though players keep the rules of appropriate behaviour externally, their facial expressions reveal hostility in their hearts, accentuating the disharmony between external behaviour and internal motivations:

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17 This poem contains 360 lines and 1800 characters. Zu-yan Chen estimates that the poem was written between 1060 and 1077. See Chen (2006, 199, 200n7). For the full English translation of this poem, see Chen (2006, 200–16).

18 For an alternative translation of these lines, see Chen (2006, 201). This section of the article is based on the discussion in my PhD dissertation, see Katz (2009a, 116–31). For an analysis of "The Great Ditty on Observing a *Weiqi* [game]" in the context of Shao Yong's philosophical thinking, see Patt-Shamir (2021, 111–168).

Tears are not unique for [enemies who are intolerable like] ice and coal,
Harmony does not dwell between [brothers, who should be like] *xun*
    and *chi*.[19]
Righteousness is not extended to friends,
Feelings do not reach husbands and wives.
Pearls and jades are drawn from the pockets,
But dragons and snakes enter into one's bosom.

戾不殊冰炭，和不侔塤箎。
義不及朋友，情不通夫妻。
珠玉出懷袖，龍蛇走肝脾。(ibid.)

Due to the psychological motivations involving players' desire to win, the game becomes a battle of ambitions, unavoidably bringing pain and destruction:

The wise are hurt by cunning,
The trustworthy are lost in dullness.
Genuine and artificial are mixed,
Names and reality are all destroyed.

智者傷于詐，信者失于椎。
真偽之相雜，名實之都隳。(ibid.)

The selfish desires for profit and achievement of victory affect the game, so that it loses its original meaning and authenticity. In this way, "achieving [becomes] a source of losing (得者失之本)" (ibid.). Such subtle and invisible changes, according to Shao, underlie every dimension of reality: Good fortune can, within seconds, turn into adversity, just as hexagram 11 *Tai* 泰 ("Peace/Prosperity") can be changed into hexagram 6 *Song* 訟 ("Conflict") through "overturn" (*fan* 反) and the change of only one line (ibid.).[20]

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19   *Xun* 塤 is a wind instrument, originally made of clay and shaped like an egg. *Chi* 箎 is a bamboo flute. These two instruments are meant to be played together harmoniously, and are often used as a metaphor for brotherly love.

20   "*Qian* and *Kun* move toward *Song* (*Qian Kun* zhi zuo *Song* 乾坤支作訟)." Hexagram 11 (*Tai*) is composed from the trigrams *Qian* (bottom position) and *Kun* (top position), while hexagram 6 (*Song*) is composed from trigrams *Kan* 坎 (bottom position) and *Qian* (top position). The movement from *Tai* to *Song* involves "overturning" (*fan* 反) of the hexagram and a change of one line. For an explanation of "overturned hexagrams" (*fangua* 反卦), see Nielsen (2003, 57–58). The expression "overturned hexagram" resonates with the concept of "mirrored" observing (*fanguan* 反觀). The use of the character 支 (*zhi*, "branch") in this line is not entirely clear. It may be that it is used in place of 之 (*zhi*, "moving").

The alternation of rise and fall, based on the principle of change, characterizes not only the dynamics of the game, but also historical reality. Consequently, standards applicable to prior historical periods are not necessarily valid in the present. As Shao writes, "What was correct in the former days,/ Is perhaps incorrect today (前日之所是，今日之或非)" (ibid.). To demonstrate this changeability of values, Shao presents numerous historical examples of sage emperors and tyrannous rulers, epic battles and court intrigues, philosophical currents and government reforms. From these events in Chinese history, Shao concludes that in the process of inquiry of the world, observing a *weiqi* game may be as useful as learning from Confucian scriptures, for "among the books of the past few are reliable (前書略可依)" (ibid., 185). Therefore, "in comparison to them, observing a *weiqi* game is not in any degree less [efficient] (比觀之博弈，不差乎毫釐)" (ibid.).

When emphasizing the value of observing the *weiqi* game as a methodological tool for accessing profound, objective knowledge, Shao did not intend to discredit Confucian scriptures. What harms the process of gaining objective understanding of reality is a narrow vision limited by one's personal perspective. This perspective of a player involved in the "game" of their historic time and place can be broadened only through stepping out of one's role as an engaged player by overcoming one's personal, self-centred needs. The first step toward mirrored observing, therefore, is overcoming one's self-centred perspective. Shao establishes this point in the "Preface to the *Striking the Earth at the Yi River* (*Yichuan jirangji xu* 伊川擊壤集序)". Shao testifies that after years of rigorous study, which brought him intellectual satisfaction, he came to experience a deeper joy, the joy of observing. He achieved the level of sincerity (*cheng* 誠) needed for observing things on the basis of things. As a result, he gained the ability to transcend the emotional burdens often connected with one's personal situation:

> From the time of my youth I was engaged with Confucian teaching and experienced only rare moments of what is called "the joy of the people of the world". Yet, what is called "the joy of the [Confucian] teaching on morality and ethics" was from the beginning [known to me] in its fullness. Moreover, [in comparison to it] the fullness of joy of observing things is doubled! Even though life and death, flourishing and decay, alternate and struggle before [my eyes], as long as they still did not enter into my bosom, what is the difference [between these signs of instability and pain and the signs of joy, like] wind, flowers, snow and moon of the four seasons, [all] passing away in a moment? [I reached the level of] sincerity when [I was] able to observe things [on the basis of] things, so

that [these things] did not harm one another in this [process],[21] and I was able to forget and shed all the emotional burdens in-between.[22]

予自壯歲業于儒術，謂人世之樂何嘗有萬之一二，而謂名教之樂
固有萬萬焉。況觀物之樂複有萬萬者焉。雖死生榮辱轉戰于前，
曾未入于胸中，則何異四時風花雪月一過乎眼也？誠為能以物觀
物，而兩不相傷者焉，蓋其間情累都忘去爾。(ibid., 180)

"Observing things on the basis of things" is the process through which visible and invisible reality are considered according to categories or, as Shao emphasized, "according to structure" (*guanzhi yili* 觀之以理).[23] Such observing is possible only by means of cancelling one's self-centred perspective and gaining a transformed, sagely vision of the self.

Shao believed that it is precisely the lack of self-centredness that allows the sage to gain an all-embracing perspective, comprehending "the many through the one", and enables the sage to represent Heaven, speaking on its behalf, for he can "use the mouths of [all] under Heaven as his own mouth and there would be nothing that his mouth would not say" (ibid., 49). The same ability that enables the sage "[on the basis/by means of] one heart to observe ten thousand hearts", enables him "by means of his heart/mind to represent Heavenly intentions, by means of his mouth to represent Heavenly speech" (以心代天意，口代天言) (ibid., 7). Yet, as Shao claims, since Confucian scriptures, although relevant in their day, could not fully transmit sagely insights, there was a need for an alternative linguistic medium: For Shao, this medium was his special style of poetic writing.

Part 3: Mirrored Poeting as Companion to Mirrored Observing

Continuing his personal testimony in the preface to his poetry collection, Shao explains that reaching the state of sincerity and selflessness that allows "observing things on the basis of things" implies an element of "forgetting" and attaining a state of mind emotionally detached from the immediate circumstances of one's

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21   Earlier in the preface, Shao makes it clear that "observing things on the basis of things", or observing each realm with reference to itself, will guarantee that things will not harm one another (Shao 2010, 179–80). For a translation of this passage, see Chu (1998, 247–48).

22   See also Katz (2009a, 53–55).

23   "Observing things according to structure" means considering them according to the categories they belong to within the framework of the fourfold classification, explained by Shao in his *Inner Chapters on Observing Things* (see Katz 2020, 21–22).

life.[24] "Observing things on the basis of things" in its directness is a simple "mirroring" of reality independent of a specific perspective or words. The only activity that accompanied Shao's practice of observing was his poetry, because like observing it did not follow rules or a premeditated agenda, but rather was "mirrored", simply reflecting things and situations that Shao encountered:

> The only thing that I did not forget was poetry, and even though I say that I did not forget it, in reality it was as if I was forgetting. What does it mean? What [I] do is different from what others do. What [I] do is not restricted to rules and tones, and does not follow [what is] loved and [what is] hated; it is not established on the firm and the necessary, nor does it seek reputation. [It is] like a mirror that reflects the form, like a bell that echoes the sound.

> 所未忘者獨有詩在焉，然而雖曰未忘，其實亦若忘之矣。何者？
> 謂其所作異乎人之所作也。所作不限聲律，不沿愛惡，不立固
> 必，不希名譽，如鑒之應形，如鍾之應聲。(ibid., 180)

Written in a distinctive, simple style, Shao's poems were not "composed" or "created" (*zuoshi* 作詩), but rather "chanted" (*yin* 吟). Shao believed that his "chanting" or "poeting" was a natural outcome of a life based on the practice of observing.[25] In a long poem entitled "A Ditty of Head-and-Tale" (*shouweiyin* 首尾吟), Shao explicitly states that he does not write poems intentionally. Poetry appears naturally as a result of his experience of observing:

> It is not that Yaofu likes poeting,
> It is poetry when Yaofu awakes from a sleep.
> After a dream old pleasures at first seem all alike,
> [When] I sober up after wine, all previous affairs seem barely notable.
> Relying on scriptures in life and death the heart does not change,
> Although separated [from the world, a person] of rivers and lakes, I do
>   not lose the path.
> This is why [it is possible to look] into this and observe the utmost
>   structure,
> It is not that Yaofu likes poeting.

> 堯夫非是愛吟詩，詩是堯夫睡覺時。
> 夢後舊歡初髣髴，酒醒前事略依稀。

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24   For the idea of forgetting (*wang* 忘), see *Zhuangzi* (chap. 6).

25   Many poems in Shao Yong's poetry collection refer to his practice of observing things. See, for example, Shao (2010, 405, 409, 410, 416–21, 423, 435, 438, 442, 453, 456, 467, 470, 479, 510).

任經生死心無異，雖隔江湖路不迷。
因向此中觀至理，堯夫非是愛吟詩。(ibid., 532)

Several poems in "A Ditty of Head-And-Tail", each of 134 stanzas starting and ending with the phrase "It is not that Yaofu [Shao Yong] likes poeting", mention the profound silent knowledge from which his poetry arises: "it is not that Yaofu likes poeting,/ It is poetry when Yaofu attains knowledge in silence" (堯夫非是愛吟詩，詩是堯夫默識時) (ibid., 517). In one poem of this cycle, Shao reminds the reader once again that the world is ever changing; therefore, the perspective of the observer should be flexible:

> It is not that Yaofu likes poeting,
> It is poetry when Yaofu [attains] knowledge in silence.
> The sun and the moon go out and come back,
> Forests and gardens flourish and wither again.
> Although climbing the mountain one can see from above,
> Getting close to the water, one does not know whether it is deep or
>   shallow.
> In the world, the matters of profound [depth] have no limits,
> It is not that Yaofu likes poeting.
>
> 堯夫非是愛吟詩，詩是堯夫默識時。
> 日月既來還卻往，園林纔盛又成衰。
> 登山高下雖然見，臨水淺深那不知。
> 世上高深事無限，堯夫非是愛吟詩。(ibid., 536)

In another poem, Shao reveals that the practice of observing allows him to discern the most subtle mysteries of existence, so that he can "grasp the meaning" (*deyi* 得意):

> It is not that Yaofu likes poeting,
> It is poetry when Yaofu grasps the meaning.
> Things [look] into things and observe the mystery of great importance,
> Humans within humans see the most subtle signs.
> The mystery of great importance in things is seen by my eyes,
> The most subtle signs in humans are known in the heart/mind.
> Even if there is gold all these [insights] cannot be bought anywhere,
> It is not that Yaofu likes poeting.
>
> 堯夫非是愛吟詩，詩是堯夫得意時。
> 物向物中觀要妙，人於人上看幾微。

物中要妙眼前見，人上幾微心裏知。
且是有金無處買，堯夫非是愛吟詩。(ibid., 539)

The deepest mysteries and the most subtle signs can only be discerned and understood in one's heart/mind, in silence, through mirrored observing. Heaven does not speak and therefore Shao, like Confucius, proclaims that he "would not like to speak". Yet, precisely at that moment when the silent understanding occurs, one's creativity, no longer bound to self-reliant ambitions, gushes like a waterfall, resulting in abundant poems:

It is not that Yaofu likes poeting,
It is poetry when Yaofu grasps the meaning.
At the moment of grasping meaning I rise up and dance,
At the point of wielding a brush I am often able to fly.
In the dark sea of the South, ten thousand miles away,
the Peng-bird first rises up,[26]
In the Liao Sea, a thousand years old, the crane first comes back.[27]
How can I stop at writing only one poem?
It is not that Yaofu likes poeting.

堯夫非是愛吟詩，詩是堯夫得意時。
正得意時嘗起舞，到麾毫處輒能飛。
南溟萬里鵬初舉，遼海千年鶴乍歸。
豈止一詩而已矣，堯夫非是愛吟詩。(ibid., 518)

The fact that Heaven does not speak does not leave humans speechless. Sagely humans able to overcome their private self and gain an all-embracing perspective can speak in the name of Heaven:

All things have structure, what about myself?
Although Heaven does not speak, humans act on behalf of it.[28]
Acting on behalf of Heavenly effort, there is no limit to speaking.
It is not that Yaofu likes poeting.

物皆有理我何者，天且不言人代之。
代了天工無限說，堯夫非是愛吟詩。(ibid., 529)

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26   Reference to the *Zhuangzi* 莊子, chap 1.

27   Reference to the crane of Liaodong (Liaodong he 辽东鹤), an immortal who was homesick. See *Classified Collection Based on the Classics and Other Literature* (*Yiwen leiju* 藝文類聚), *juan* 78.

28   Reference to the *Book of Documents*, "Counsels of Gaoyao" (*Shangshu* 尚書, "Gaoyao mo" 皋陶謨): "The effort is Heaven's, humans act on behalf of it (*tiangong ren qi dai zhi* 天工人其代之)".

Shao Yong's "limitless" and "unrestrained" poetic words, generated naturally in a process of observing, were the medium for transferring sagely teaching and articulating what is intended by silent Heaven. At the same time, Shao's disciplined engagement with poetic writing assisted his practice of observing. Observing and poeting complemented each other. In this, Shao Yong's approach to poetic writing was revolutionary: Like observing, it was perceived as a process of poeting that allowed one to step into the realm of the beyond,[29] advancing in the way of becoming a sage. As the Ming dynasty scholar Chen Xianzhang 陳獻章 (1428–1500), who greatly appreciated Shao's personality and poetry, poignantly pointed out, "Before *Striking the Earth* there was still no poetry,/ After *Striking the Earth* [what is considered poetry] can be doubted (擊壤之前未有詩，擊壤之後詩堪疑)" (Chen Xianzhang 1987, 625).

Conclusion

For pre-Song and Song dynasty Confucian thinkers, achieving sageliness was the ultimate goal of self-cultivation. However, whereas many of them believed that one cultivated moral conduct studying Confucian scriptures, Shao claimed that observing was the most direct path to cultivating the sagely state of mind.[30] While Shao did not deny the wisdom revealed in Confucian texts, he claimed that these sagely insights are mere "traces" left by the sagely mind.[31] Therefore, learning from scriptures, although beneficial, could have only a partial effect: Observing was much more efficient, since it was a technique that granted direct access to a sagely way of perception. Sagely perception, based on the ability to be thoroughly impartial, is possible due to the shared "thingness" of all things: Humans, although the most refined and intelligent, are in their essence things, and even the sage, the most refined and intelligent among humans, is a thing. The recognition of this shared "thingness" is the recognition of the fact that within the multitude of things and phenomena in the world there exists an interpenetrating structure (*li* 理). Observing things

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29   The idea of reaching into "beyond" and "outside" of the visible reality was mentioned in the opening lines of "A Great Ditty on Observing a *Weiqi* [game]" (Shao 2010, 181). Philosophically, this realm was signified by Shao as the "before-Heaven" (*xiantian* 先天). For an explanation of this idea in Shao's thought, see Wyatt (1996, 195–207); Wang (2003).

30   On possible philosophical connections between Shao Yong's thought and Ming dynasty Confucian scholar Chen Xianzhang, considered as one of the representatives of the school of heart/mind (*xinxue* 心學), see Katz (2009b).

31   In one of his poems, Shao writes that while sagely persons rely on their heart/mind, worthy persons rely on "traces": "The sage understands heart/mind,/ the worthy understands traces./ Understanding heart/mind one has no limits,/ understanding traces one does not reach the ultimate. (聖人了心，賢人了跡。了心無窮，了跡無極。)" (Shao 2010, 408).

according to this structure means observing them "on the basis" of their "thingness", according to categories, and therefore observing objectively. According to Shao, this kind of observing is "mirrored": Instead of making judgments, the mind of an observer, like a mirror, merely reflects in itself the observed things.

Absence of deliberate judgment allows the observer to perceive a greater picture: Like the spectator of the *weiqi* game who can simultaneously see the moves on the board and discern the players' mindset, something impossible for the player engaged in the game, the sagely observer who "observes things on the basis of things" is able to perceive reality in its fullness. Such sagely observing makes it possible, in Shao Yong's words, "to perceive many through the one" and, even more importantly, to represent Heaven, speaking on its behalf.

That representing Heaven, which does not speak, is the responsibility of the sage was accepted by many Confucian scholars who considered Confucian scriptures as transmitting sagely knowledge and ultimate truths. While Shao Yong accepted this basic premise, he suggested that words recorded in Confucian scriptures cannot fully transmit the sagely mind and grant access to sageliness, because Confucian scriptures only capture fragments of sagely sayings, and therefore do not allow direct access to sagely perception. The directness needed for communicating sagely insights was found by Shao in the poetic word, chanted and written in his special style. Unlike the language of regular Chinese poetic writing, informed by centuries of tradition and regulated by a set of strict rules, Shao's poetic language was intentionally simple, almost colloquial: While the majority of his poems adhered to a clear structure, he avoided using sophisticated metaphors, allusions and other features that characterize Chinese poetry. He even refused to call his poetic creations "writing" or "composing" poetry, using instead the term "chanting". Spontaneous and presumably effortless "chanting" or poeting was intended as a direct medium for communicating sagely insights gained in the process of observing and, at the same time, for assisting in this process. Shao's poeting constituted a new sagely language, most suited for transmitting the sagely mind and representing the otherwise silent Heaven. "Heaven does not speak." Yet, observing and a poetic impulse, in their inclusiveness, immediacy, and directness, do allow the sagely person to communicate with the ultimate reality, representing it in words. It was observing and poeting perceived simultaneously in their immediacy and in continuity that allowed the Chinese seeker of sageliness to be attentive to the silent voice of Heaven.[32]

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32   The perception of Heaven (*tian* 天), considered as the ultimate reality in Chinese settings, as silent differs from the perception of the ultimate reality accepted in the worldview influenced by Abrahamic religions, where God is perceived as speaking. Yet, although the Chinese mode of sagely

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communication with Heaven differs from that of the Hebrew prophets to whom divine will is revealed through the spoken word, poetic vision made possible by means of observing and poeting played an important role in both traditions. For the perception of God as speaking, see for example *The Book of Numbers* 12:6. For examples of scholarly discussion on the topic, see Wolterstorff (1995); Levine (1998); Quinn (2001). For the importance of poetic vision as an element of prophetic inspiration, see Kalir (1974). On connections between prophecy and poetry, see Grierson (1937); Rowland (2005). See also Rowley (1956); Strickmann (2005); Yao (2016).

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Chilean Asian Studies on Art: Subject, Museum, and Collecting

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> *Literature is that which constitutes the outside of any work; that which underlies all written language and leaves on any text the empty mark of a rubric.*
>
> Michel Foucault

> *What is the experience of living as a consciousness among things? Human beings are constantly drifting apart from the present, and it is in that disengagement under which they are returned repeatedly onto themselves.*
>
> Sergio Rojas

Abstract

The following article seeks to inquire further into the rules of formation upon which Asia—or that which is considered *Asian*—is represented in Art, and particularly, in Chilean museal collections. In this delimitation, the Museum is described as a regime of subjectivation of the experience of *otherness*. Starting from this working thesis and distancing the matter from the category of Asian Studies—if understood as a network of objectifying enunciations on Asia emerging from academia and the state—the museum's regime is conceptualized as the place of production of a universal subject that is linked to otherness from the perspective of *sameness*. Our investigation argues that museum subjectification is defined by the experience of that which is real (objects) as both text and context: in other words, *curatorial documents*. At its core, the present article proposes an alternate manner in which to approach Asian objects—both material and cultural—from the second half of the nineteenth century outside of the Museum's regime (and museal studies) in Chile, focusing the interest of study particularly on Asian Collecting.

Keywords: museal studies, art theory, Asian Studies, Asian collecting, collections, transculturality

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Čilske azijske raziskave o umetnosti: predmet, muzej in zbirateljstvo

Izvleček

Pričujoči članek poskuša raziskati pravila formacije, na podlagi katerih se Azijo – ali to, kar se šteje za *azijsko* – predstavlja v umetnosti, še posebej v čilskih muzejskih zbirkah. V tej razmejitvi je muzej opisan kot sistem subjektivacije izkušnje *drugosti*. Izhajajoč iz te delovne teze in oddaljujoč zadevo od kategorije azijskih študij – če le-te razumemo kot mrežo objektivirajočih artikulacij, ki prihajajo iz akademske skupnosti in države – konceptualiziram muzejski režim kot prostor produkcije univerzalnega subjekta, ki je povezan z drugačnostjo s perspektive *enakosti*. Naša študija zagovarja pogled, po katerem muzejsko subjektivacijo določa izkušnja tistega, kar je resnično kot tekst in kot kontekst; z drugimi besedami, *kuratorskih dokumentov*. V svojem jedru članek podaja alternativni pristop k azijskim predmetom – tako stvarnim kot kulturnim – iz druge polovice 19. stoletja, onkraj muzejskega režima (in muzeoloških študij) v Čilu, pri čemer pa se osredotoča predvsem na azijsko zbirateljstvo.

Ključne besede: muzeološke študije, teorija umetnosti, azijske študije, azijsko zbirateljstvo, zbirke, transkulturnost

Introduction

Studies on the Asian phenomenon emerged strongly in Chile in the second half of the 20th century. This is mainly due to an effort to describe and give continuity to the conditions for the objectification of Asia as a region of projection for the Chilean state (Calvo 2017, 5). As such, most analyses regarding Asia in Chile's contemporary history have mainly centred on its *displacement* of intelligibility (how it is thought) and its *recurrence* in certain fields (from *where* it is thought): Then, Asia would not simply portray a unitary, immobile, and exhaustive geographical or cultural zone, but the upgradable irruption of a particular object—that *which is Asian*—within a set of fields of knowledge, in the sense of the disposition of a *contingency*.

Asia, as interpreted by orientalist discourses and imaginaries (Blanco 2003, 172; Smith 2006, 369; Baros 2011, 4), traveller's chronicles and testimonies (Subercaseaux 2001, 365; Ramírez 2010, 3), irruptions of religious crises and local secularization processes (Ramírez 2017, 151), commercial regionalisms (Aratza 2012, 713; Prieto and Ladino 2016, 252; Legler, Garelli-Ríos and González 2018, 149) or forms of economic integration and globalization (Armanet 1992, 41; Rodríguez 2006, 59; Ross 2007, 112; Toloza 2014, 14) are only mosaics in which that which is *"Asian"* is—through historical-disciplinary accounts—discovered and given to thought by both academia and the state.

The production of aspects of Asia, through the historical desirability it had for the Chilean state—and which have been collected in the academic tradition—constitutes a complex network of discourses and rules of enunciation, i.e., the category of Asian Studies in Chile (Maire 2021, 128).

On first careful reading it may be noticed that Asian Studies do not organize a balanced series of desirability about Asia, nor a fully articulated or absolute speech. Rather, this enunciative *corpus* designates a dislocation—or dispersion—of Asia into heterogeneous and, to some extent, mutually exclusive or opposing strata of interest and attention. Nowadays, the general decibility, or that which can be said or explained, of Asian Studies in Chile is mainly based on the fields of Economics and Political Science (Geopolitics and International Relations) (Maire 2021, 132). These areas do not define or prescribe the total field of development of Asian Studies in Chile on either an academic level or of the interest to the state they represent—that is, what *they are*—but rather they convey the predominant degrees of accentuation—and help glimpse the margins—in the processes of formation of the Asian object. That is, *when* there would exist something like an "Asian Study" and from *what laws* it sprung forth (Foucault 2017a, 55).

As a starting point: the attention on Asia has been, for the most part, on its construction as an object of study (Asia deployed *as the object*), something that is given to thought within certain disciplinary fields and, therefore, is distinguished from the very particular description of relations, properties, and forms of occurrence within knowledge.

Main Problematic: Asia can also be breached as the instance of a subjectivation, where the *Asian* poses the formalization of a type of historical subject, determined by specific rationality on knowing (Foucault 1988, 4). One of the places in which society has developed a rationality—a subjectivity or, in other words, a way of thinking—about that *which is Asian*, is the Museum.

The purpose of the following article is to characterize how the Museum is subjectivized in relation to Asian collections of the second half of the 19th century in Chile; to describe what rules configure a subject that experiences the *Asian* on the plane of a regime of museal pieces of knowledge (Lyotard 2019, 41). This paper also aims to differentiate the Museum as a place of subjectification of Asia, from the forms of objectification that Asian Studies have experienced both from academia and the state.

The main thesis that this article sets out to defend is that there is no such a thing as Asian Studies in the field of the Museum when thought of as an objectivation of Asia itself (a problem distinguishable in disciplinary or state interest). On the

contrary, for the Museum the problem of Asia lies in conceiving a universal subjectivity that appropriates the *Asian* as a *sameness*.

Finally, this paper offers a route for opening "the Asian" from the Museum regime towards the collector. This work is based on the axes of Transdisciplinarity, Philosophy, Museum Studies, and Transculturality.

Asian Studies as a Place of Asian Objectivation

Asian Studies, whether in its acceptance as an academic genre, a type of literature, or a site of splicing of enunciations on Asia emanated from the Chilean state, is defined by its ability to *give a necessary appearance*—a necessity—to an object of study. At the risk of stating something obvious, Asian Studies is defined by its object and the validity of the decibility that is poured and oriented on it.

The category of Asian Studies in Chile assumes, minimally, the occurrence of three acts of objectification: a) the degree of desirability of Asia; b) that its object of production (the Asian) always possesses something improper, that is to say, that it lies outside the presently decipherable and, therefore, is the discovery of a new enunciative threshold; c) that, despite the latter, the object Asia is not a purely unprecedented event of thought, without a minimum inscription in an already existing speech, for:

> One cannot speak of anything at any time; it is not easy to say something new [...] the object does not wait in limbo the order that will liberate it [...] it does not pre-exist itself [...] It exists in the positive conditions of a complex set of relations. (Foucault 2017a, 63)[1]

This armature—the surface in which the object *Asia* emerges—must be accommodated, in turn, on a new and double requirement: on the one hand, enforcing discursive principles of the disciplinary fields in which it is situated, in relation to a "truth" (to place the decibility of Asia *in the disciplinary truth*); on the other, to provoke an epistemic opening, by virtue of the fact that a "new object calls for new conceptual tools and new theoretical foundations" (Foucault 2015, 37).[2]

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1   "No se puede hablar en cualquier época de cualquier cosa; no es fácil decir algo nuevo [...] el objeto no aguarda en los limbos el orden que va a liberarlo [..] no se preexiste a sí mismo [...] Existe en las condiciones positivas de un complejo haz de relaciones." (Foucault 2011a, 63)

2   "Un nuevo objeto pide nuevos instrumentos conceptuales y nuevos fundamentos teóricos." (Foucault 2015, 37)

To enunciate something about Asia is to position it in thought as a distribution within the possibilities of a legitimized and reproducible speech. Thus, the fields of Economics or Political Science, we insist, are neither an ontologizing of Asia nor a margin of calibration of statements, propositions, and ideas; from these discursive systems or grids of specification (Foucault 2017a, 60), the object-Asia is placed in truth:

> By truth, I do not refer to a species of general norms or propositions. By truth, I mean the whole of the procedures which allow at each moment and to each person to pronounce statements that will be considered as true. It doesn't have a superior, supreme instance. (Foucault 1994a, 407)[3]

Moreover,

> Truth is of this world; it is produced there thanks to multiple limitations. And it has established effects of power. Each society has its regime of truth, its "general policy" of truth: that is, the types of discourse that it welcomes and makes function as true; the mechanisms and instances that make it possible to distinguish true or false statements, the way in which one sanctions the one and the other; the techniques and procedures that are valued to obtain the truth. (Foucault 1994c, 112)[4]

Contingent speech about Asia is a delimitation, that allows "a discontinuous unity to constitute and unfold" (Holzapfel 2012, 16).[5] As such, that which is uttered is a point of repetition and validation—and of prohibition and exclusion (ibid., 20)—within agreed thresholds, a state of mooring and intertwining between a will to know and the (historical) modalities that fields and discourses adopt in the production of a decibility. In the category of Asian Studies in Chile, the most important rule of putting Asia inside its truth is similarity.

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3   "Par vérité, je n'entende pas une espèce de norme générale, une série de propositions. J'e entendes par vérité l'ensemble des procédures qui permettent à chaque instant et à chacun de prononcer des énoncés qui seront considérés comme vrais. Il n'y a absolument pas d'instance suprême." (Foucault 1994a, 407)

4   "La vérité es de ce monde; elle y est produite grâce à de multiples contraintes. Et elle y détient des effets réglés de pouvoir. Chaque société a son régime de vérité, sa 'politique générale' de la vérité: c'est-à-dire les types de discours qu'elle accueille et fait fonctionner comme vrais; les mécanismes et les instances qui permettent de distinguer les énoncés vrais ou faux, la manière dont on sanctionne les uns et les autres; les techniques et les procédures qui sont valorisés pour l'obtention de la vérité." (Foucault 1994c, 112)

5   "Una unidad discontinua se constituya y desenvuelva." (Holzapfel 2012, 16)

Similarity expresses two meanings, directly associated with the desirability of Asia. First, similarity is the principle of *translation* and derivation of different phenomena on a plane of association. It is a question regarding the meaning of the meaning (Holzapfel 2005, 37). *Similarity* is the support of meaning, by which, for example, the Asian or state regional economic situation can be related to discipline *as if* it were a unique object, common and transferable to a local way of thinking: the thought put in truth expresses a closeness of language, through the different tactics of analysis, strategies of legibility and horizons of prescription that reformulate the frontiers and logics of meaning, as possibilities of linking the Asian and that which is ours. On that note, let's read the following statement from an ECLAC study on Chilean economic policy on Asia:

> *Using the Computable General Equilibrium (CGE) model and the Global Trade Analysis Project (GTAP) database* [emphasis is ours], this paper evaluates the trade liberalization effects of FTAs with both Japan and China, as well as the last four bilateral agreements with Asia. (Schuschny, Durán and de Miguel 2008, 7)[6]

Similarity then breaks into the specific *background* that informs vocabulary, concepts, methods, descriptions, and points which control a particular enunciative circuit. That is to say, the commercial phenomenon is formalized as an exemplarity (Kuhn 2004), i.e., knowledge takes place where the rule or norm acquires legality as practice and effect on its object (Foucault 2017b, 30). Thus, we can posit that *similarity* articulates itself as a concomitance field over Asia:

> These enunciates concern other very different domains of objects and belong to totally different types of discourse, but act among the statements studied, whether they serve as analogical confirmation, or serve as general principles and accepted premises for reasoning, or as models that can be transferred to other contents, or function as a higher instance with which to confront and to which at least some of the propositions that are asserted must be submitted. (Foucault 2017a, 78)[7]

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6   "*Utilizando el modelo de Equilibrio General Computable (EGC) y la base de datos del Global Trade Analysis Project (GTAP)* [énfasis es mío], este trabajo evalúa los efectos de la liberalización comercial de la suscripción de TLC tanto con Japón, como con China, así como de los cuatro últimos acuerdos bilaterales vigentes con Asia." (Schuschny, Durán y de Miguel 2008, 7)

7   "Enunciados que conciernen a otros muy distintos dominios de objetos y que pertenecen a tipos de discurso totalmente diferentes, pero que actúan entre los enunciados estudiados, ya sirvan de confirmación analógica, ya sirvan de principio general y de premisas aceptadas para un razonamiento, ya sirvan de modelos que se pueden transferir a otros contenidos, o ya funcionen como instancia

In the second place, it can be stated that *similarity* is that which constitutes the archival micro-world of Chilean Asian Studies. It is inherent in the rules and conditions under which what is said is recorded, as the possibility of *continuing to be said*: "By archive I mean, in the first place, the mass of things said, preserved, valued, reused, repeated and transformed in a culture" (Foucault 1994a, 786).[8] That is to say, *similarity* is the nucleus of a discursive practice that can be found in the Asian Studies category. The micro-world of archives belonging to Asian Studies does not simply equate to the sum of that which has (or has not) been said about Asia. Rather, it is composed of recurring historical forms that are matched by shared speech: citation regimes, bibliographic strategies, analysis or reference models, institutional spaces, a will of achieving rationality (Foucault 1994b, 284). Common patterns of speech become entwined and entangled as "knowledge", in clear opposition to "not-knowledge" (Trias 2019), represented by everything outside this micro-world's archival verification.

The Museum as a Subjectivation Space

This foreword was necessary due to the following: while Asian Studies in Chile have been *delineated* by rules and disciplinary areas of objectification, the Museum is an autonomous subjectivation space for Asia. By that, we mean that which is *given a necessary appearance* constitutes a mode of rationality which defines the experience of *that which is* Asian, based on principles of subjectivation of time-space, objects and their possible relations.

In other words, while Asian Studies wonder about *what* Asia is, the Museum asks itself what the conditions of possibility necessary for a subject to experience it are.

Dating back to the 19th century, the modern Museum is the institution that dealt with the proliferation of national and private collections resulting from European imperialism in Africa and Asia (Poulot 2005, 52; Duthie 2011, 17; Ocampo 2011, 85; Wintle 2013, 185). The modern Museum established a transcendental problem that, nowadays, is usually forgotten: the pretension of unity of a multiplicity, the incompatible, and that which is *foreign* (Podgorny 2010, 59; Lee 2021, 51).

At first glance, it could be posited that the individualization of the museum space, through disciplinary fields such as Museology and Museography, is the

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superior con la que hay que confrontar y a la que hay que someter al menos algunas de las proposiciones que se afirman." (Foucault 2017a, 78)

8   "Par archive, j'entends d'abord la masse des choses dites dans une culture, conservées, valorisées, réutilisées, répétées et transformées." (Foucault 1994a, 786)

expression of this kind of mandate on its extremely miscellaneous object. The museal space—as a matter of principle—circumscribes a regime of governance over material forms that were discontinued and redistributed by collecting.

The Museum is a surface *in media res*, with foreign objects, a place that establishes a network of enunciative relations, signs, descriptions, organizations, and the ways in which objects manifest themselves (Bennet 1995, 94; Padró 2003, 52). However, the Museum is not defined only by the distribution of a *museal-object,* that is, by the domain of its discovery or the analysis of its evidence. Overall, it is defined by *positivity* (Foucault, 2017a). The Museum's *positivity* is *museality* (Hernández 2006, 199), which is at the same time both the condition of guarantee for the emergence of an enunciative field in the museal space and its rationale.

Museality brings forth at least three enunciative dimensions: a) the interweaving of multiple temporalities over a single space (thus gifting the Museum with a *heterotopic* characteristic in which time folds in over itself); b) a dispersion-insertion system, with respect to an object's spheres of existence, coexistence, and contingency; c) the transformation—or revocation—of the *devices of the gaze* (the ideology of watching in which objects are invested and articulated within different visual traditions).

An example to synthesize what has been postulated: the Andrés Bello Archive of the University of Chile has a collection of *ukiyo-e* titled *Classical Japanese Prints Collection*. The collection, in turn, belongs to a larger, extremely dissimilar museum ensemble: the Iconographic Collection, which has watercolours, drawings and illustrations by travelling artists such as José del Pozo, Fernando Bambrilla and Juan Ravenet, engravings by the Chilean artist Nemesio Antúnez and illustrations from Claudio Gay's *Atlas of the Physical and Political History of Chile*.

As such, it becomes imperative to ask the following question: Is it the Museum elaborating a kind of objectification of these Japanese pieces by placing them inside the iconographic as a place of enunciation? Or, on the contrary, is the iconographic an expression of the conditions of possibility of the subject who experiences the *Asian*?

This article considers that the second is more plausible. The end goal of *museality* is not to formulate a unitary mode of occurrence of the object—to define and govern it, based on its rules of analysis and conceptualization—but rather to produce a singular subject of the experience of the Museum's *foreignness*.

The subject "Museum" is a universality whose need to exist finds its justification in the *limitation* of that which *foreign* (Holzapfel 2012, 21). This in the sense of an effect of the prohibition of the scattered, the discontinuous, the other, of that which

is different. Byung-Chul Han declared that "otherness" had disappeared; the other, the different, has been replaced by its negativity, the affirmation of *sameness*.

Such a reflection—anchored on the experience of the world's *alienness*—can only come about with the emergence of a subjectivity which, rather than being totalitarian in character, is on the plane of the unlimited possibility of communication:

> The Other as a secret, the Other as temptation, the Other as eros, the Other as desire, the Other as hell, and the Other as pain disappear. The negativity of the Other now gives way to the positivity of the Same […] It is made sick not by denial and prohibition, but by over-communication and over-consumption. (Han 2019, 9)[9]

The subject of the Museum is not the censorship of the *truth* of the object (What is that? What can—or cannot—be enunciated about it? And what validity can that which has already proliferated have?). Rather, it is its neutralization by a *truth* that precedes, and at the same time defines all experiences. Asia is neither an object nor a problem for the rationality of the Museum to take over: the underlying question is what kind of subject should experience that which *is Asian*, and according to what rules of formation is it configured as a legitimized decibility?

Asia, Orientalism, and the Museum

Following Han's view, if *otherness* has disappeared as a force for the presentation of the *foreign*, neither should the *Asian* as a fact of museum representation exist. However, this would also imply that there are no such things as Asian collections in museums or curatorial themes associated with Asia. To defend this would be absurd.

Rather, we argue the following: the Museum is a system that (re)produces *equalizations* (Han 2019, 23) in its pieces, where the original otherness of the objects—in temporal, cultural, geographic, visual, aesthetic, imagistic, formal, usage or other terms—is replaced by a sense of *familiarity*, becoming comparable, complicit, and translatable on a logic of community (Stoichita 2016, 20). This logic also serves as a basis for a subject that becomes accessible to certain analogies, and this question, as Jean-François Lyotard has pointed out (2019, 15), reveals a postmodern condition of knowledge.

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9   "El otro como misterio, el otro como seducción, el otro como eros, el otro como deseo, el otro como infierno, el otro como dolor va desapareciendo. Hoy, la negatividad del otro deja paso a la positividad de lo igual […] Lo que enferma no es la retirada ni la prohibición, sino el exceso de comunicación y consumo." (Han 2019, 9)

To return to the previous example and question: how is it possible that an *ukiyo-e* can coexist with an illustration by Claudio Gay inside the same space and decibility regime? The issue is not simply one of space management—physically putting these two works together—but of erecting a subject that perceives these objects against a common *background*. In the Classic Japanese Prints Collection (*ukiyo-e*) that which is *iconographic* is not a formal feature of the Museum, but a feature that links the objects with others of different provenance. Rather, it constitutes the way in which the subjectification of the Museum is founded. The images are conceived, *a priori*, as representations; that is to say, the heterogeneous is experienced as the sameness of the illustration: the Museum subject originates from a representational idea of the world.

Another example: Pedro de Río Zañartu's *Chinese Collection*.

The interplay of relations between the Asian objects and the subject put to their experience in the Museum can be studied as a sort of neo-orientalism. Using this expression does not mean a direct reference or a debate of the criticisms made with regard to Edward Said's work, mainly because a) the relationship that Said intends to develop with the East—and by extension with Asia—stems directly from the point of view of Europe's geopolitical and economic interests (Said 2008, 20), in whose image of the world Latin America is a peripheral region and does not stand out (ibid., 22; Said 2018, 366); b) precisely because of its geographical location, Latin America's ways of neighbouring with the East or Asia since the 19th century varies between forms of reference-dependence on European literary sources and travelogues (Carmagnani 2015, 14; Gasquet 2015, 17; Gasquet and Lommé 2018, 9), or specific contact contingencies (González 2006, 13) that go far beyond the thought of Edward Said (MacKenzie 1995, 21).

There is only one "Saidian" postulate which has been integrated into the present article and which we consider to be fundamental to it: the historical contact that Europe has maintained with the East, through a set of institutions and spaces which produce knowledge, supposes, to some extent, an *ontologizing*:

> Orientalism, then, is not a fantasy that Europe created about the Orient, but a body of theory and practice in which—over many generations—considerable investment has been made. Because of this continuous investment, Orientalism has become a system for knowing the Orient, an accepted filter that it passes through to penetrate Western consciousness. (Said 2008, 26)[10]

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10 "El orientalismo, pues, no es una fantasía que creó Europa acerca de Oriente, sino un cuerpo de teoría y práctica en el que, durante muchas generaciones, se ha realizado una inversión considerable.

In Chile, the Museum is an institution with a marked European inheritance which can be seen in two instances: The first, is a certain public role that expresses itself in the training of artists and construction of a national cultural reservoir (Drien 2018, 4); the second, is an enunciative structure which ontologizes the *foreign*, that which is not European, the *otherness* of Art (Zamorano and Herrera 2015, 24) in terms of a universal subject.

There exist two rules for "reading" the *Asian* that we wish to touch upon, as they construct themselves around the (re)production of the neo-orientalist museal subject: experience as text, and truth as a sub-context.

As has been indicated, the point of anchor for this is that the subjectification of the Museum arises from a representational conception of the world.

The Museum's First Subjectivizing Principle: The *Asian* as a Text Ready to Be Read

A summary survey of the last decade in Chile allows us to glimpse a proliferation of studies associated with *Asia* in the field of the Museum: a) these are inquiries about museum collections which, for the most part, used to be from private collectors; b) its effect is to situate objects within the conceptuality of Art, in the sense of supplying the condition of their experience and legibility. All in all, these attempts tend to be "valorizations" (documentation, recording, and conservation exercises) or temporary exhibitions. For example, research on the *Classical Japanese Prints Collection* in the Andrés Bello Central Archive of the University of Chile (Maire 2011; 2017a), studies on the *Chinese Collection* of the Museo Pedro del Río Zañartu in Hualpén (Ulloa 2016), research on the *Oriental Collection* of the Museo de Artes Decorativas de Santiago (MAD) (Alvarado 2014a; Maire 2017b; Uldry 2017) and work conducted on the *Asian Collection* of the Museo Nacional de Bellas Artes between 2011 and 2018 (Keller et. al 2018). These cases do not exhaust all production linked to the Asian artistic phenomenon in Chile, but they are at least indicative of a certain recurrence on the topic.

Certainly, the possibility of studying objects that are historically outside the tradition of Art (European or Western) is in direct line with the universality acquired by the concept of Art since the second half of the 20th century: the pensiveness that is inaugurated with its *in-definition* (Tatarkiewicz 2001, 29; Oliveras 2004, 64), the *un-limitation* of all conceptualizations. Despite what has been indicated,

Debido a esta continua inversión, el orientalismo ha llegado a ser un sistema para conocer Oriente, un filtro aceptado que Oriente atraviesa para penetrar en la conciencia occidental." (Said 2008, 26)

the question we wish to debate is not whether something fits within the concept of Art or whether it concerns its current institutionalism, but rather how that pensiveness unfolds an enunciative possibility, around the foreign or the improper as selfhood or ontology.

For clarification:

> How to manage the heterogeneity of significations, origins, and conceptions that the works carry; how to generate their neighbourhoods and associations? There is a problem about Meaning, related not to a definition of what the objects "are" (a sort of function or *telos*), but to an interpellation of the itineraries of categorization of the museum space. That is, how the horizons of reading the collections as an "experience of looking" are made. (Maire 2017b, 2)[11]

The Museum's first subjectivizing principle: the subject of experience is defined as a subject placed in the textuality of a narrative, by virtue of a meaning that always precedes it.

The Museum's subject is defined by a hermeneutic capacity of the world, as an experience of the real can only be obtained from its reading as a text. Jean-François Lyotard (2014) offers us two essential elements to refer to the matter. The first is the positioning of the concept of "symbol" as the otherness not articulated by discourse; the second, the attitude of the gaze as a totalizing hermeneutic.

For Lyotard, a symbol is an object that is given to us inside thought. In other words, its existence generates resistance to thought, as its essentiality withdraws into itself and language—in terms of meaning—faces its own limitations. Similarly, *otherness* is almost always a sort of background *noise*, understanding it as that which opposes—which is foreign to—the communicativeness of the *sameness*. However, this does not imply enunciating an unknowable condition of the other's object-symbol; rather, Lyotard (2014, 15) points to the need for a dissociation between word, language, and gesture, or, if you will, between the experience of looking and the discourse that intrudes on what is seen. If, for the French author, what is true of Art is its condition of figure, that "which is not signified, this function being *around* and even *inside* the discourse" (ibid.,

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11   "¿Cómo administrar la heterogeneidad de significaciones, procedencias y concepciones que acarrean las obras?; ¿cómo generar sus vecindades y asociaciones? Hay allí un problema sobre el Sentido, relacionado no con una definición de lo que los objetos 'son' (una suerte de función o telos), sino con una interpelación a los itinerarios de categorización del espacio museal, esto es, los modos en que se confeccionan los horizontes de lectura de las colecciones como una 'experiencia del mirar'." (Maire 2017b, 2)

17),[12] the symbol is that which cannot establish a subject of language that appropriates it when given to the experience of the gaze: the *otherness* as a symbol implies a "spatial manifestation that the linguistic space cannot incorporate without being shaken" (ibid.).[13]

The structure of the Museum devaluates the *Asian* as a symbol. This loss of value is the symbol's opening to *familiarity*, through the installation of the shared enunciative; Johan Idema characterized this as "the jargon of Art" (Idema 2016, 12). The subject's place *in media res* is configured by language, and in relation to the *Asian* is the "valorization" of a discourse device. By "valorization" we refer to the act of communication with the other. This act has the violence of turning a symbol into a sign implied (Lyotard 2014, 19). As it can be read in the catalogue of the *Chinese Collection* of the Hualpén Museum[14]:

> Since 1938, the Pedro del Río Zañartu Museum has exhibited objects from the collection that show the cultural and artistic richness of the five continents. The visitors […] get the chance of discovering new worlds […] by the representation of an Egyptian mummy […] and a samurai armour [sic] […].
>
> *We can understand the art of the collection shown in this book as a bridge between the Chileans of the region and the cultures of the world* [emphasis is ours], especially China, Japan, and Southeast Asia. (Ulloa 2016, 24)[15]

Consequently, the Museum's subject perceives its own experience as a text; that is to say, the *foreign* part of the *Asian* expresses itself from a hermeneutic imperative of its *otherness*. The question is not simply that the enunciation of an object demands a word, but that the place of the subject in that relation—or mediation—is stipulated by discourse. As Lyotard once said: "The painting is not to be read, as semioticians say; Klee said it is to make people vibrate; it allows us to see; it is offered to the eye as something exemplary" (2014, 19).[16]

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12   "Que no es significada, siendo esta función en *torno a* e incluso *en* el discurso." (Lyotard 2014, 17)

13   "Una manifestación espacial que el espacio lingüístico no puede incorporar sin verse sacudido." (Lyotard 2014, 17)

14   For more information refer to: https://issuu.com/faceaucsc/docs/catalogo_con_rpi/1?ff=true

15   "Desde 1938 el Museo Pedro del Río Zañartu, viene exponiendo objetos de la colección que dan cuenta de la riqueza cultural y artística de los cinco continentes […]
Los visitantes […] tienen la posibilidad de descubrir nuevos mundos […] representando la momia de Egipto […] y la armadura samurai [sic] […]El arte de la colección que se muestra en este libro, lo podemos entender como un puente entre los chilenos de la región y las culturas del mundo [énfasis es mío], en especial China, Japón y Sud Este Asiático." (Ulloa 2016, 24)

16   "El cuadro no es para ser leído, como dicen los semiólogos; Klee decía que es para hacer vibrar;

What constitutes *Japanese* Art? Or, better yet, what makes up the description of how it is experienced? To ask this question does not entail a tautology and is not an idle endeavour. However, it is indeed an interrogation that can produce an illusory answer (ibid., 20), unless the subject—he or she who reads—accepts the referral of the gaze deep within its speech—of the object which is thought of as a text—as *truth*.

In other words, the subjectification of the Museum implies two things: first, that the subject must accept that his or her experience is a process of reading—a deciphering of—objects from a shared language (Art's); and second, that the textuality on which he bases his experience in the Museum's space is universal (applicable to any object) and true (as a norm and verisimilitude).

Two examples of this: regarding a set of *netsuke* housed in Santiago's Museo de Artes Decorativas (MAD)[17] it can be discussed, explained—even textualized—that "Japanese creations are, in general, characterized by a profound awareness of feeling, of the subtlety of shapes, love for simplicity, a preference for textures, shapes, and colours" (Alvarado 2014b, 5), and this is further touched upon by what was stated in the Museum's exposition of the *Oriental Collection*:

> The ornamental designs […] give an account of a wide iconographic repertoire, thus gaining access to the symbolism of each figure and, therefore, learning, understanding, and thus enjoying oriental culture. *The objects diffusion also instates an explicative museography that goes in-depth into the iconographic repertoire present in the objects in an informative and enlightening manner. This in turn facilitates the visitor's approach to these pieces.* (Museo de Artes Decorativas 2017, 1) [emphasis is ours][18]

The Museum's Second Subjectivizing Principle: The *Asian* as the Experience of a Context

The basis of the subjectification of the Museum (the representational conception of the world) implies that the experience of the other—the foreignness—can

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aquel permite ver; se ofrece al ojo como algo ejemplar." (2014, 19)

17   For mor information refer to: https://www.artdec.gob.cl/publicaciones/netsuke-arte-sobre-marfil.

18   "Los diseños ornamentales […] dan cuenta de un amplio repertorio iconográfico, accediendo así al simbolismo de cada figura y, por ende, aprender, entender y disfrutar la cultura oriental. *La difusión de estos objetos, instala también una museografía explicativa que da cuenta en detalle del repertorio iconográfico presente en los objetos de manera ilustrativa e informativa, facilitando la aproximación del visitante a estas piezas* [el énfasis es mío]." (Museo de Artes Decorativas 2017, 1)

occur as a substitution for the non-present or a manifestation of the non-evident (Rancière 2011a, 122–23; 2011b, 16). The textual principle of the museal subject is the unlimited capacity to represent in everything the same thing; in other words, that everything can be readable, communicable, and interchangeable at the discursive level:

> The dialogue of "civilizations" is, at best, nothing more than a convenient alibi for the "dominant" civilization. [...] So what is there to talk about in these "dialogue" sessions where hypocritical kindnesses rival each other? The texts? But the texts, as we have already seen, only say what we want them to say. (Claire 2011, 91)[19]

The Chilean Museum has elaborated a subject that experiences more of a speech (the capacity to read and sign the world), than a subject that is found in the heterogeneity that arises from the gaze.

Consequence: in the deployment of the Chilean Museum's regime, the improper—the non-European, the foreign—is devoid or separated from the gaze as a sense of novelty.

Byung Chul Han, revisiting Lacan and Sartre, states that that which is essential to the object is its *foreignness* in experience, in other words, its event is always an opposition—a reservation, negativity, a strangeness—to the subject. Thus, the object always summons the gaze, as it is "the completely different, unaffordable to any foresight, which is not subject to any calculation, and which instils fear" (Han 2019, 73).[20] In its radical negativity, the object *is* the otherness; in its condition of absolute surrender or conquest, it has become a commodity.

The Museum does not engage in a subjectification of the object (Asian or otherwise) as an otherness. Neither does it fabricate commodities: it tends to produce curatorial documents.

The *curatorial document* animates a sophisticated mediality, derived from the textualization of the subject, in which the object, having lost its character of symbol and otherness (devoid of being looked at or seen), becomes a narrative structure: its significance is driven by the discourses that fix the object to a fictitious unit, the epochal context.

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19   "El diálogo de «civilizaciones» no es, en el mejor de los casos, más que una cómoda coartada para la civilización 'dominante' [...] pues, ¿de qué se puede hablar en estas sesiones de 'diálogo' donde se rivaliza en hipócritas amabilidades? ¿De los textos? Pero los textos, ya lo hemos visto, no dicen más que aquello que queremos que digan." (Claire 2011, 91)

20   "Lo *completamente distinto*, inasequible a toda previsión, que no se somete a ningún calculo y que infunde miedo." (Han 2019, 73)

A radical example: the exhibition of the Museo Nacional de Bellas Artes'(MNBA) Asian Collection held in 2018 was designed in such a way that the meaning—the horizon of interpretation—of the pieces could only be located in the (re)construction of their context; in other words, the objects in the collection generated an experience, insofar as the subject accessed them as a representation:

> In order to contextualise this interesting period, it has been decided to complement this exhibition with pieces from the collection of the National Historical Museum (MHN) and the Museum of Decorative Arts (MAD) [...] Incorporating [...] objects that formed part [...] of the everyday life of Japanese society between the 17th and mid-19th century. (Keller et. al 2018, 7)[21]

The said *curatorial document* can also describe an artefact, a methodologic product. The object, once divested of its condition as a device of the gaze (Aumont 1992, 15) with respect to its own ideology about visuality, becomes a device about time. However, said time exists exclusively for the museal subject. This last statement has the impact of reordering the possible points of analysis of the object. What is important here is not the mutation (objectivation) of the object, but the order of subjectivation, which is how this transformation is gestated.

The subject which has been produced by—and inside—the textuality of the Museum, has spatialized Time as a question-foundation of objects, and the meaning of experience within discourse. It is not simply a question of *when* are the objects from, but rather it encompasses a transcendental horizon: where are they *inscribed, as curatorial documents*? This is a claim to its context—how its objectivity is read—and its location within (Art) History—the simulacrum of a Universal Time that taxonomizes the temporalities of the *curatorial document* and its form/content. (Jiménez-Blanco 2021, 82).

Inside the Pedro del Río Zañartu Museum's museal project, which brings together objects from different parts of the world, such as Japan and China (Cartes 2010, 100), it can be read:

> The types of objects collected by Pedro del Río such as folkloric, exotic, new, and antique objects, are, according to Baudrillard (2003), neither entirely functional nor simply decorative but fulfill the function of

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signifying time within the *system of said objects*. (Castañeda and Soffia 2012, 45)[22]

The *Asian* in Chile's museal scene is not the affirmation of an object itself, but a *temporal dispersion* (the *curatorial document*) that must be (re)located within another Time, a borrowed one, in the measure of a conciliation, namely, from the contingency of the discourse in which the subject is disposed and supported: they are included into museal guidelines. Wondering about the context of an object, then, is not an attempt at conquering its own specificity, or attempting to meet *the other* as a thought exercise or as an experience. The context, then, is the place of expression of the discourse of the subject of the experience. It is the project of consciousness—a minimum truth or legibility—about the *foreign*, the other, which in turn allows for the realization of History's unicity. A narrative, then, is "the paper sheet inside the subject [which registers] the sum of dispersing and concordant truths" (Ricoeur 2015, 55).[23]

The relationship between subject and context is manifested in the experience of a *semanticized time* represented through the *curatorial document*; the Museum places the subject in the meaning of the world, provided that the manifestation of the object and the context are understood as the "purpose in the society that produces them and the meaning given to them by their authors and users" (Claire 2011, 80) and, in this, a common registration horizon.[24]

Otherwise, the Asian is an alien-real that renounces its object-form, an otherness that is discounted in thought, an event without a gaze. *Asia* thus becomes merely a place which is used in the Museum; a margin of the network of possible statements in the museum that is restituted as textuality, in relation to History as a sign, speech, and the space of transit between room and room:

> *Floating World of the Edo period* [the name given in 2018 to the exhibition of the Asian Collection of the MNBA] seeks to create zones in which the visitor expands their curiosity and learning, connecting with the exhibition through a script associated with narratives about daily life in Japan [...] The museography seeks to give accessibility to the objects and

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22   "Los tipos de objeto [sic] coleccionados […] por Pedro del Río, tales como objetos folclóricos, exóticos, nuevos y antiguos, no son, según Baudrillard (2003), enteramente funcionales ni simplemente decorativos sino que cumplen la función en el marco del *sistema de los objetos*, de significar el tiempo." (Castañeda and Soffia 2012, 45)

23   "La hoja de papel en el sujeto [que registra] la adición de las verdades dispersas y concordantes." (Ricoeur 2015, 55)

24   "Finalidad en la sociedad que las produce y el sentido que les dan sus autores y usuarios." (Claire 2011, 80)

present them already contextualized, along with suggesting spaces for interpretation. (Keller et. al 2018, 12)[25]

Founding Asian Studies in Art: From the Institutionalized Subject to the Collector Subject in Chile

Is there any hope of overcoming the current "Museum" subject regarding the *Asian* and, by derivation, an opening towards a new field of problematization of the object?

We believe that it is necessary to rethink the object Asia within the Museum, starting by differentiating two phenomena of study: Asia as a museum collection—which is how it has been mostly investigated – and private collecting. This should be our first task.

If the Museum's subjectivation brings forth a behavioural pattern stemmed from Modernity (Malraux 2017, 3)—by this we refer to the issue of the *aspecting* and legibilization of the sensible-real as Language and Time—we must then use a post-modern sensibility in opposition to it, an "attempt to dismantle the modern image of a self-transparent and indissoluble identity [subjectivity]" (Vásquez 2015, 42).[26] We must, then, criticize *museality* when it takes its form of "communicability of the same thing."

Consequently, separating the Museum from private collecting is to resituate the subject in the otherness, where the problem is "no longer to think of the other, but to understand oneself in the different and the fruitful in which we live and, from which, concrete articulations of different senses of being are born" (Vallega 2018, 124).[27] Jorge Luis Borges provides a good counterpoint to clarify this issue, which summarizes a way of being in the other, inside the *otherness*. In *What is Buddhism?* (1976), an unpublished work, he commented:

> It would have been absurd for me to present on a doctrine to which I have devoted so many years—and of which I have understood little—in

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25   "Mundo flotante del período Edo busca crear zonas en las que el visitante expanda su curiosidad, aprendizaje y se conecte con la muestra a través de un guion asociado a narrativas sobre la vida cotidiana de Japón […] La museografía busca dar accesibilidad a los objetos y presentarlos contextualizados, junto con sugerir espacios de interpretación." (Barra 2018, 12)

26   "Un intento de desmontar la imagen moderna de una identidad [subjetividad] autotransparente e indisoluble." (Vásquez 2015, 42)

27   "No es pensar al otro, sino entenderse en lo distinto y lo fecundo en que estamos viviendo y, a partir de lo cual, nacen articulaciones concretas de sentidos de ser." (Vallega 2018, 124)

the spirit of displaying a museum piece. For me, Buddhism is not a museum piece. (Borges in Betancort 2018, 236)[28]

In Borges's text, Buddhism is conceived from the reserve of the *noise* and the *abyss*: it is an object sustained *by* that which is foreign, *from* the negativity of *the improper*. The object "Buddhism" is given to thought without being clarified by language or, better yet, in a way in which communicability fails and the—rather elusive—experience never ends up being fully textualized. The subject publicized by Borges is decentred from its possibilities of knowledge (of the economy of the sign) and thus, is not totalized—or intercepted—by the discourses that propitiate setting the object "Buddhism" inside *a truth*. As an object grounded in experience and as a word, Buddhism does not give rise to categories (due to its translations), but the *abyss*; to the production of a continuous displacement of its signification that does not consummate in experience.

Following Hayek's line of thought, we could say that museum subjectivity is institutional. In other words, it is where the possibilities of "experiencing" or "gaining experience" are *underlined* by the Museum's—coercive—discourses and agendas. The Museum's rules of formation articulate a non-autonomous subject (Hayek 2020a, 76–77); consequently, museality comes to the subject as an anticipatory, distributive order, which conjures up three co-substantial attributes: a) it defines the rules of its conduct; b) prescribes specific outcomes and, c) is mandated by a telos (the Museum's curatorial project) (Hayek 2020a, 41). As such, we can confidently say that:

> *Art is a language that allows us to communicate beyond language and cultural differences* [emphasis mine]. The traveler's vision of the museum's potential as an agent of diffusion of other peoples and customs is the conviction that motivates to propose this view from art. (Ulloa 2016, 30)[29]

Collecting Asian items in Chile is not an object brought forth by a rule of formation; it responds, in all its complex variety, to the *instability* of the *deinstitutionalized* subject proposed by Hayek. Studying such collecting would allow us to explore a new field, to deepen and emphasize the *muteness* of the subject-object bond as a dispersed phenomenon, irreducible to a single rule of formation and mediation with otherness.

28　"Hubiese sido absurdo que yo expusiera una doctrina a la cual he dedicado tantos años—y de la que he entendido poco, realmente—con ánimo de mostrar una pieza de museo. Para mí el budismo no es una pieza de museo." (Borges in Betancort 2018, 236)

29　"*El arte es un lenguaje que permite comunicar más allá de diferencias idiomáticas y culturales* [énfasis es mío]. La visión del viajero sobre el potencial del museo como agente de difusión de otros pueblos y costumbres, es la convicción que motiva a plantear esta mirada desde el arte." (Ulloa 2016, 30)

Such a deployment can only be allowed on the precedent of an *unpredictable* subject of collecting (Hayek 2020b, 106), or on condition of a subjectivity of contingency. We shall use the next example as a minimal starting point.

The current Asian Collection of the MNBA—made up of twenty-two *ukiyo-e* and five monochrome paintings on paper—was donated in 1930 by Luisa Lynch del Solar (1864–1937), a Chilean aristocrat (Figueroa 1925, 127) married to Carlos Morla Vicuña (1846–1901), politician and diplomat.

Considering the 2018 catalogue of the Asian Collection, Lynch's private collection produced two approaches: the first one, its public display (MNBA 1910, 4; Vidor 1930, 7), and the second one had to do with the "relationship to the sociocultural context of its time and place of origin, [which was] an impetus for the division of curatorship according to its iconography" (Keller et. al 2018, 18–19).[30] This installed, as a pivot, the orientalist phenomenon in the formation of Asian collections.

In that investigation, however, there was no approach to the rules of formation which informed Lynch's collecting (ibid., 48), of the constitution of the subject "collecting" where the other is installed from a peculiar performativity.

Glimpses of how the collected object formed in Luisa Lynch's collection can be unravelled, tangentially, from the diaries of her daughters Carmen and Ximena (*Chimène*) Morla.

The bond of affinity upon which the "Lynch subject" is founded with the object of *otherness* is not aprioristic (already captured by discourse) as it tends to resolve itself as a *subjectivity in the contingency of otherness*.

Luisa Lynch's collecting was developed between 1898 and 1899, when Carlos Morla Vicuña became Chile's Plenipotentiary Minister to Japan and the US. Thus, the first reference to Asia ("Japanese art") is found, anecdotally, in Carmen's diary, dated April 1898:

> A collector of Japanese vases brought mom a very delicate vase. It was a *cloisonné* [...] Dad also admired it and I was happy to hear Monsieur Morgan say: "Japan is a real art museum! [...]" I see my dear mom's golden eyes again, full of light, delighted to go there, and dad with his old book finder's manias, has discovered a book by Edmond de Goncourt on "Japanese Art". (Diaz 2016, 398)[31]

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30   "Relación con el contexto sociocultural de su época y lugar de origen, [que fue] un impulso para la división de la curatoría según su iconografía." (Keller et. al 2018, 18–19)

31   "Un señor coleccionista de jarrones japoneses le llevó a mamá un vaso muy delicado. Era un *cloisonné*

Except for Goncourt's book, it is not possible to appeal—if only in a residual way—to an orientalist discourse as a formation of the collector subject in Lynch. In fact, the subject of orientalism can only be suggested briefly in April 1902 in Paris, three years after the family left Japan:

> We went with mom and Blanca to a Japanese exhibition advertised with a lot of publicity. It is unbelievable that in Paris there is so much rubbish on display. There was not a kakemono worth its salt, not a Utamaro print [...], not even a Hiroshige [...] ... the lacquers were poorly made, *pour l'exportation*. I see that mama has wonders. (Diaz 2016, 323–24)[32]

In the diaries one notices in Lynch a "sign" for the unplanned acquisition of her pieces: they burst in as an act of the *unprecedented*, they cross the subject in question for a look from the *otherness*, which is both an arbitrary and unrepresentable exercise of that which *is* "*other*". In other words, the *noise* which objects irradiate and the *muteness* of the subject when it encounters otherness:

> Carlos [Author's note: she is referring to her brother] is crazy with admiration; he has seen Javier Larrain's vases [Author's note: Chilean diplomat in Japan], the collections of bronzes, gilded lacquers, etc., and pushes mom to go see them [...] Mom and dad are not thinking about settling down [...] They will leave with Javier Larrain immediately, in artistic research. From that moment on, they became caught up in a real collecting craze. (Díaz 2016, 399)[33]

An obvious note: in all collecting subjectivity there is an inseparable link between desire and will (Cano de Gardoqui 2001, 18; Díaz 2006, 33); here, however, the question is the rule that defines this transcendental juncture as the formation of a type of interest—a subjectivity—of purchase. For the Morla-Lynch's, *that which*

[...] Papá también lo admiró y m sentí feliz al escuchar a *monsieur* Morgan: 'Japón es un verdadero museo del arte! [...]' Vuelvo a ver los ojos dorados de mi querida mamá, llenos de luz, encantada de ir allá, y papá con sus manías de buscador de libros viejos, ha descubierto un libro de Edmond de Goncourt sobre 'el Arte Japonés'." (Díaz 2016, 398)

32   "Fuimos con mamá y blanca a una exposición japonesa anunciada con mucho bombo. Es increíble que en París se exponga tanta pacotilla. No había un kakemono que valiera la pena, ni una estampa de Utamaro [...], ni siquiera un Hiroshige [...] ...las lacas eran hechizas, *pour l'exportation*. Veo que mamá tiene maravillas." (Díaz 2016, 323–24)

33   "Carlos [Nota del autor: se refiere a su hermano] está loco de admiración; ha visto los floreros de Javier Larraín [Nota del autor: diplomático de Chile en Japón], las colecciones de bronce, de laca dorada, etc., e impulsa a mamá para que vaya a ver eso [...] Mamá y papá no piensan en instalarse [...] salen con Javier Larraín de inmediato, en investigación artística. Desde ese momento, los coge una verdadera locura coleccionista." (Díaz 2016, 399)

is Japanese is inherently contingent upon their stay in Japan: it implies that when an object happens, it is unmanageable as a sense of what is seen. The imperative subjectivity which reigns over the object is not resolved by the usual museum textuality: it is a matter of a subject *inanticipable* to the object:

> Curiosity sellers have come to bring rare things for the new travellers. We took them in our hands: they brought ivories, small "nestés" […] We were all enchanted, taken by the charm of the miniatures. (Díaz 2016, 399)[34]

Lynch's collection is then derived, regarding its rules of formation, from the conjunctural logics of offer and demand. Its subject is found in the act of materially—rather than intellectually—collecting and its efforts to bring distinction the collector:

> When mom and dad return, they find us installed in front of a collection of objects that they examine very seriously and choose some pieces. Among others, a rock crystal bunny with red eyes, to the despair of Javier Larraín, who wanted it for his collection. Collectors are true rivals among themselves; and so it was that he, jealous that someone else possessed it, broke the ears of the glass bunny with a blow of his cane. (Díaz 2016, 399–400)[35]

Carmen Morla will also call these sellers as *kuriosmen* (Díaz 2016, 411).

One last note: owning and doing, in this case, would juxtapose in a paradigmatic way, by reason of another rule that would have to be developed more loosely in future research. In the current *Asian Collection* there are four works of Chinese ink on paper without authorship (no stamps, signatures, or inscriptions have been found on them), and whose formal execution is different from the other objects.[36]

In the girls' diaries it is briefly mentioned that both Carmen and Ximena had practiced drawing with Chinese ink with a Japanese artist at the Sacred Heart Nunnery in Tōkyō:

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34   "Venderos de curiosidades han llegado a traer cosas raras para los nuevos viajeros. Las tomamos en nuestras manos: traen marfiles, pequeñas 'nestés' […] Estábamos todos lodos, tomados por el encanto de las miniaturas." (Díaz 2016, 399)

35   "Cuando regresan mamá y papá, nos encuentran instalados delante de una verdadera colección que ellos examinan con mucha seriedad y escogen algunas piezas, entre otras, un conejito en cristal de roca y de ojos rojos, frente a la desesperación de Javier Larraín, quien lo quería para su colección. Los coleccionistas son verdaderos rivales entre ellos; y así fue como él, de un golpe de bastón, quebró las orejas del conejito de cristal, celoso que otro lo poseyera." (Díaz 2016, 399–400)

36   For more information, refer to the catalogue of the *Mundo Flotante del Periodo Edo* exposition, pages 55, 95, 96 y 97: https://www.mnba.gob.cl/sites/www.mnba.gob.cl/files/images/articles-91415_archivo_01.pdf.

Only one thing amused me: the painting and design lessons that an old Japanese artist gave us. A roll of rice paper in my hand, a long brush made of rabbit hair, a stone of Chinese ink rubbed in water, and that was all we needed to begin [...] They entertained me enormously and I looked forward to those lessons, for which I accepted so many sad and monotonous hours in the convent. (Diaz 2016, 404)[37]

Are those unidentified pieces the work of Ximena Morla Lynch?

The dating of the paper of the objects corresponds at least to the second half of the 19th century, as stated in the catalogue. Also, according to other testimonies, Ximena Morla maintained a constant artistic production during her life, especially in painting (Díaz 2014, 202–20).

The matter of the authorship of the pieces not only has value for their identification, but also establishes an internal principle of connection as a donated collection, of referral with other objects (without ignoring a possible premeditated intention of Luisa Lynch to pass off Ximena's pieces as Japanese).

It seems to us—and this could constitute a thesis for future work—that the sense of continuity of the pieces obeys, above all, to the needs of Luisa Lynch's private exhibition circuit: the literary salon and social gatherings. If within the Museum the object is given as a *curatorial document* and, therefore, as a problematic about its inscription in the narrative of History, in Lynch's collecting it possesses a unity in the *imitative*, in the intimate construction of singular correlations of her private space. And here we can see more than the attempt to give formal kinship to the objects, and interpretation of homogeneity made *a posteriori*, namely, from the dimension of decorum or social use in the art of *salon* conversation.

Conclusions

This article is mainly interested in analysing the way in which the *Asian* is given to existence inside Art, particularly in the Chilean museal order, and in relationship to the current category known as Asian Studies. This implies a twofold critical approach: On the one hand, because it means questioning the conditions of possibility of the experience of Asia within the Museum (to debate how that which

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37   "Sólo una cosa me divertía: era la lección de pintura y diseño que nos daba un viejo artista japonés: un rollo de papel de arroz en la mano, un largo pincel de pelo de conejo, una piedra de tinta china que se frota en el agua, ¡y eso era todo para comenzar! […] Eso me entretenía enormemente y yo espera con impaciencia el momento de ese aprendizaje, por el cual aceptaba tantas horas tristes y monótonas en el convento." (Díaz 2016, 404)

is *foreign* becomes *familiar*); and, on the other, to wonder if providing Asia with a "*necessary appearance*" implies its *capitalization* inside Chilean Asian Studies.

To the question do Asian Studies on Art exist in Chilean museums? We must answer with a firm *no*.

The "Asian" object is not essentially different—it offers no counterforce or supremacy—to other corpora in the Museum: a Japanese or Chinese piece's heuristics are not *sui generis*, as any object, whether "pre-Hispanic", "European" or "modern", is clarified within a parentage (Hernández 2006, 113). The non-objectification of *Asia* within the field of the Museum in Chile is also the principle that subtracts it from Asian Studies.

Asia is no more than a topic, a label inside Museal Studies, and not an already resolved or singular enunciative field.

The heart of the issue is that in the Chilean Museum the *Asian* does not rest on a problematic over the formation of the object—the study of the *Unheard Of*—rather, it is constituted by the totalization of a subjectivation, the experience of a subject of the museal space.

The Museum's subjectivation is consistent with the apparition and repetition of an institutional experience—speech. The museal subject is articulated through an enunciation field, whose laws of formation correspond to a textual-contextual conception of that which is real, that is experience is compatible with one's own experience.

First consequence: through the surface of the Museum, the otherness, the polyvalence of objects, the temporalities, and dispersions of that which is *foreign* can be transcribed—or translated—towards an absolute subject of perception. The object "Museum" transforms into a curatorial document. That *which is Asian* becomes stuck to the set of relationships (the *realization of the truth*) which make up Museal Studies.

The subjectivation of the Museum, in which the *foreign* becomes a textualization and hegemony of context as narrative, tends to exempt a phenomenon intimately related to the formation of museum collections: private collections. In fact, a brief history of the relationship between the Museum and private collecting in Chile shows a sustained dynamic in which the private sector becomes dispossessed of its collections—via donation—while the public sector reappropriates them.

This article postulates that the separation—and differentiated discovery—between the Museum and collecting will redefine the positioning of the *Asian* and its necessity as a field of study.

The second consequence is of a more projective kind: to open the exploration of Asian collecting in Chile is to inaugurate Asia as a particular object of study within the Humanities, especially in the field of Art: Not because it allows for the possibility of the emergence of a new set of contents that can be proliferated, but because it gives a visible place to the *inconceivable* in the experience of the other. In other words, it brings to light that which is *foreign*, strange, the *noise* its apparition makes in the perception of it as a novelty, regarding the limits of that which is decible about objects and that which articulates them into a sense of unity.

To inaugurate the *locus* of Asian collecting in Chile is to make it enter a specificity: centring itself around a certain experience as a problem and, in turn, founded on a necessity, the analytical study of its condition as a phenomenon. Both issues would bring Asian collecting research under the jurisdiction of Asian Studies—thus extirpating them from the domain of Museal Studies—on condition, however, of facilitating a *decentring of the museal subject*.

Acknowledgements

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REPORTS AND DISCUSSIONS

Heritagization of Chinese Migration: From Binaries to Connections

*Martina BOFULIN**

Abstract

In the last few decades, migrants' past experiences and memories have become increasingly recognized as a heritage. While this can be seen as a positive shift towards a more inclusive evaluation of the past, migration heritage is still overwhelmingly portrayed through a binary between the country of origin and country of settlement. This tendency obscures the multiple transnational connections migrants sustain with different locations along the migration process. Drawing on examples of Chinese migration to Europe, this article argues in favour of forgoing the national(istic) approach to heritagization and instead focusing on the connections formed during a century of Chinese migration to Europe.

Keywords: migrants' heritage, heritagization of migration, Chinese migration, Chinese diaspora, Chinatown

Dediščinjenje kitajskih migracij: od binarnosti do povezav

Izvleček

Pretekle izkušnje in spomini migrantov so v zadnjih desetletjih vse pogosteje razglašeni za dediščino. Medtem ko lahko ta trend prepoznamo kot pozitivni premik k vključujočemu prepoznavanju preteklosti, pa je dediščina migracij običajno predstavljena skozi lečo binarnega nasprotja med državo izvora in državo naselitve. Tovrstni pristop k dediščinjenju zastira številne transnacionalne povezave, ki jih migranti vzdržujejo z različnimi lokacijami vzdolž migracijskega procesa. Na temelju različnih primerov dediščinjenja migracij iz Kitajske v Evropo članek poziva k opustitvi nacionalnega modela dediščinjenja in k osrediščenju na povezave, ki so se vzpostavile skozi stoletje kitajskih migracij v Evropo.

Ključne besede: migrantska dediščina, dediščinjenje migracij, kitajske migracije, kitajska diaspora, kitajska četrt

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Introduction

The increased movements of people, goods, ideas, and information supported by new communication tools and infrastructures on the one hand, and the breakdown of the fixed and sedentary narratives of social identities on the other, are transforming societies in the direction of multiple and diverse membership and belonging. The "autochthonous" heritage or interpretations of the past are progressively challenged by the contributions of past and present movements to the heritage and culture of a specific locality or nation. Consequently, questions regarding the modes of identity-making and representations of migrant and mobile groups and their understanding and uses of the past have proliferated in recent years, as have projects and initiatives addressing these questions. How do newcomers and their descendants become part of the cultural canon of the new societies? When are collective and individual memories of migrants included in the public discourse? How do localities and cultural institutions display (or not) the minorities' experiences with the past (Dellios and Henrich 2020)?

These questions, now being addressed by a nascent field at the cross-section of migration and heritage research, were enabled by advances in critical heritage approaches, which treat heritage as a discursive and relational process where groups are constantly re-made through negotiations. The critical heritage approach also sees heritage as constructed in the present and not as something waiting to be unearthed from the past. In other words, to quote Tunbridge and Ashworth (1996, 6), heritage is thus "a product of the present, purposefully developed in response to current needs or demands for it, and shaped by those requirements". In the same vein, heritagization is understood as a process of transforming objects, places, and practices into heritage by attaching cultural values to them (Sjoholm 2016, 26). This approach challenged the prevailing "patrimonial regimes" (Hafstein 2018), resting on the nation-state matrix that bounds heritage with state borders. Various concepts have adopted the "beyond national borders" approach—transcultural heritage (Macdonald 2013), transnational heritage (Byrne 2016a), migrant heritage (Dellios and Henrich 2020), or diasporic heritage (Ang 2011; Reed 2015). They all, despite their different focuses, subject matters or intellectual origins, share a commitment to highlighting processes, or aspects of processes, that have been mostly overlooked by the mainstream national heritage industries.

In the case of migrants and their descendants, the movement (or inability to move) across national borders is often at the core of their lived realities, and as such it may also be a vital part of individual and collective memories. The recognition of these memories and past experiences in the last few decades may be attributed to the multiculturalist turn in the light of contemporary societies'

increasing diversity and subsequent search for greater social cohesion under the slogan "unity in diversity", especially in societies with substantial and prolonged immigration (e.g., the USA, Australia, Canada, and members of the EU). While this is often a top-down initiative, it can also be a grassroots effort of groups struggling for social, cultural, or political recognition (Dellios 2015; Nikielska-Sekula 2019). These shifts nevertheless mostly result in skewed and partial representations of the migrants' lived realities, as their pasts and memories are overwhelmingly framed in a binary between the country of origin and country of settlement. In this view, they are either perceived as "emigrants" and as such deemed as a loss for the "homeland", or "immigrants" with their (often) contentious contribution to the "hostland". The heritagization of migration thus very much mimics the dominant explanatory framework of migration (Glick Schiller 2015) which, despite calls for a transnational and mobility research perspective, is still largely understood as a dichotomy between exit and reception. Heritage is thus like many other fields of social sciences under a particular but usually unreflected spell of methodological nationalism (Byrne 2016a), where nation-states are presumed to be natural units of analysis, and the borders of nation states are equated with those of society (Wimmer and Glick Schiller 2003). This tendency neglects the multiple transnational connections migrants maintain with places of origin, places of settlement, and other locations that are part of their transnational social spaces. Drawing on the examples from the past migrations from China, this article thus argues one should forgo the national(istic) approach to the heritage of migration and instead focus on understanding migrants' pasts in their complexity and move towards more inclusive spatial and temporal examinations of heritage processes. In what follows, I present some of the examples of the heritagization of Chinese migration to Europe from my own and other related research that highlight the binary approach in the heritagization of Chinese migration. I then discuss the possibilities for a more transnational understanding of migration legacies, one that can show not only the complexities of migrants' lives but also the entanglements between China and multiple other locations of Chinese migration.

Heritagization of Chinese Migration to Europe through a Binary Lens

David Byrne (2016b, 2361), in his study of the heritage of Chinese in Australia, laments the West's heritage conservation ethics that has privileged the national over the transnational, especially in treating the migration heritage through narratives of arrival in, adaptation to, and settlement in the destination country rather than those of return, transnational circulatory flows and cross-border connectivity. The same can also be claimed for the heritage of migration between China

and Europe, where not only is the European side focusing on immigration, but where China's focus is solely on emigration. Thus, despite more than 100 years of migration connectivity, the legacies of these flows are neatly compartmentalized into representations of a Chinese immigration heritage in Europe and Overseas Chinese—a euphemism for Chinese emigrants—heritage in China.

The Chinese are among smaller migrant/minority groups in Europe, although their numbers are relatively high in some countries (e.g., the UK, Italy, Spain). Despite the wide variety of migration flows from China throughout the 20th century (seafarers, armed forces' hires, factory workers, entrepreneurs, students, professionals, etc.), the representations of past and present experiences and memories of these groups are mostly non-existent in the public space. One exception, albeit not unproblematic, are the "Chinatowns", parts of a city where Chinese migrants congregated either because of work or accommodation. Chinatowns are the most persistent image of Chinese presence in the countries of destination[1], and also a symbolic place of marginalization and racism, making these spaces a contentious heritage. Chinatowns initially came into existence as the spatial manifestations of a particular identity, where migrants transplanted hometown streetscapes and institutions, most often due to racial exclusion and social marginality (Liu 2020). They were associated with vice and crime, and essentialized as inferior spaces. But around the 1970s, these places started to attract visitors who were interested in a voyeuristic gaze at an exotic other. Soon city governments recognized the potential of these heterotopias and were keen on reconstructing Chinatowns as sanitized and safe versions of local "internal exoticism" to boost tourism and consumerism. Rath and colleagues (2018, 15) argue that modern-day Chinatowns are largely "themed economic spaces", where Chinese and other entrepreneurs compete for a share of the market and, through this, also to the right to claim the area's identity. Still, beyond just urban transformation and consumerism, in line with the omnipresent discourse and practice of integration and inclusion as part of an orderly and modern city, ethnocultural diversity is increasingly seen as an asset crucial for modern city branding (Schmiz 2016). To this end, overzealous city officials and local ethnic entrepreneurs may "stage" Chinatowns to market the city as diverse and modern (ibid.). In short, Chinatowns today are contested heritage sites, where older diasporic understandings of Chineseness, racial exclusion, and ethnic bonding are unsettled by newer neoliberal interpretations of cultural diversity and urban renewal (Ang 2020).

The material heritage of Chinatowns is often accompanied by the intangible heritage of selected Chinese festivities (e.g., Chinese New Year) and cultural activities

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1   In Slovenia, for example, the main preoccupation of print media concerning Chinese migrants around the year 2000 was the possible emergence of Chinatown in the country (Bofulin 2016). Chinatowns also regularly feature in the cities' guidebooks as part of the "mainstream" heritage sites.

(e.g., lion dances, classical Chinese dances, martial arts, dragon boat racing, etc.). While this can be a grassroots initiative by migrant associations, an important role can be played by the representatives of the Chinese state (e.g., Chinese embassies and Confucius Institutes). People participating in such activities may not have had prior experiences with them, and have only been familiarized with them through active participation in Chinese migrant associations and cultural initiatives after they migrated to Europe. Apart from Chinatowns and Chinese festivities, only a handful of heritage projects represent migration from China to Europe. These most often take the form of photo exhibition halls or virtual exhibitions (mainly in the UK and France).

In China, on the other hand, the last two decades have seen a boom in heritage institutions and initiatives dedicated to the memory and role of the Overseas Chinese. The last significant period of emigration from China commenced in 1985, with the adoption of the law liberalizing travel abroad. As a result, a large number of Chinese joined existing communities of Chinese abroad or formed new ones in the countries of settlement, including in Europe. In this new era, Chinese emigrants turned from ideologically suspicious to patriotic, actively participating in the state's modernization goal (Nyiri 2005). Subsequently, the Chinese state put considerable effort into building numerous museums dedicated to the history of the Overseas Chinese. According to some estimates, there were at least 20 such museums across China, including in major metropolises (Beijing, Shanghai, Guangzhou) and smaller towns with strong traditions of emigration in Fujian, Zhejiang, and Guangdong (Wang 2019, 2). Wang Cangbai (ibid.) observes that these museums may differ in style and size, but their monolithic patriotic discourse is very much alike. It emphasizes the contribution of the Overseas Chinese to China's Revolution (especially their contribution in the struggle against Japanese aggression) as well as subsequent modernization. It so portrays the Overseas Chinese as a highly unified "patriotic subject", who had suffered as victims of Western colonialism and imperialism (ibid., 3). This depiction overlooks the complex lived realities of Chinese migrants in their countries of settlement, the diversity of migrant groups, and the modes and periods of migration. What is more, the more "unsettled" memories (ibid., 4) of past persecutions and political denunciations of Overseas Chinese are downplayed in order to promote "transnational nationalism" (Ang 2004, 81) of a one, united Chinese diaspora.

While at the national level, the heritagization of Chinese emigration is highly ideological and does not depart from the prescribed forms of the state's metanarrative of the great revival of Chinese civilization under the Chinese Communist Party (CCP), the heritagization of Chinese migration at the local level pursues many more complex aims, including modernization, urban transformation and town branding

for touristic purposes (Oakes 2013). Localities with prolonged and extensive emigration, primarily situated in the southeastern provinces of Zhejiang, Fujian, and Guangdong, thus engage in diasporic place-making (Liu 2020), strategic action by local actors aimed at constructing the internationality and modernity of urban space by introducing foreign architectural and decorative elements as well as foreign lifestyle habits, such as wine-drinking, coffee bars, and Western restaurants as an authentic part of the emigration legacies. However, the diasporic place-making does not stop here; the local governments also partake in "heritage theatre" (Wang 2017, 197) with the construction of local level Overseas Chinese museums and memorial halls, parks with emigration-related sculptures, landmarks, and the organization of festivals dedicated to the Overseas Chinese. The city of Jingmen in Guangdong province, known for the strong emigration to Taiwan and Hong Kong, has built a new Jingmen Wuyi Overseas Chinese Museum, the Stark Park and Scholar Street, with more than 150 statues of famous Taiwanese or Hong Kong scholars, pop singers, and film stars, all thought to be connected to Jingmen by birth or place of origin (ibid., 203). In Qingtian county in the province of Zhejiang, a similar Overseas Chinese museum has recently been established, while the newly constructed Longjin Park with statues of Johann Strauss, Columbus, Napoleon, Michelangelo, Hercules, and the Manneken Pis is to express the century-long connection to Europe through sustained emigration (Bofulin 2020).

The heritagization of the migration from China at the local and national levels is thus limited to emigration without delving into immigration in the countries of settlement or the manifold transnational connections these movements entail. As such, it primarily serves national goals of patriotism and great revival under the CCP as well as the more mundane goals of (local) modernization and development. Examining the heritagization of the migration from China to Europe, a pattern of binary representations of the migration process emerges that could be attributed to methodological nationalism inherent in national models of heritagization both in China and Europe. What then are the alternatives for more inclusive and comprehensive accounts of the migration legacies which transcend the division between emigration and immigration?

Focus on Connections: Can the Legacies of Emigration and Immigration be Brought Together?

In her influential book *Memorylands*, the anthropologist Sharon Macdonald asks whether it is possible to replicate national-scale models of heritage at another, transnational, scale as this would break the usually assumed consonance between

past, people, location, and culture (Macdonald 2013, 162). This is a crucial question for migration heritage, as this type of heritage can only meaningfully operate in a transnational space where national borders are part of the structural condition within which the migration process takes place, but are not the limits of the actors' social worlds. As David Byrne (2016b, 2361) emphasizes, migration heritage is not merely distributed or situated transnationally, but is rather *oriented* [emphasis in the original] that way. He thus proposes a focus on heritage corridors to conceptualize transnational connectivity between migrants' locations along the migration process as well as the bi-directional flows of ideas and capital within it (ibid., 2360), or even better—multi-directional flows. His approach builds on the earlier work of researchers of transnational movements, such as on Appadurai's ethnoscapes (1996) or Caglar's focus on connections (1997). To escape the limits of geographical borders, the constraints of "communities", and the isomorphism of culture, place, and people, the latter suggests focusing on "person-object" relations as these exist in space and time (Caglar 1997, 180). This approach is hardly novel, as researchers into world histories have shown the complex and often surprising mass of connections behind the migration of objects of ritual or everyday use among the world's centres (Pomeranz and Topik 1999; Brook 2008; Tythacott 2011) and peripheries (Vampelj Suhadolnik 2021; Grčar 2021; Visočnik Gerželj 2021; Veselič forthcoming). The people behind these objects—now evaluated as heritage—have been highly mobile but were considered as individual *travellers* (or adventurers, emissaries or recruits) to China rather than *migrants*, reflecting mainstream perceptions of migrants based on their class, ethnicity and even direction of migration.

But when discussing migration from China to Europe, the current process of heritagization does not allow for many examples of such heritage corridors or connections, despite the relatively rich material and intangible remnants of multiple connectivities in the last 100 years. Nonetheless, a few beacons of change have appeared recently, indicating new possibilities in the field of Chinese migration heritage in Europe. One example is the ongoing research and art project by Daniele Brigadoi Cologna of the University of Padova and artists Ciaj Rocchi and Matteo Demonte (Pearls from China 2020). Following Caglar (1997), this project focuses on the "person-object" relations—the commerce in fake pearls by traders from eastern Zhejiang in the mid-1920s and its importance for sustaining the earliest Chinese migration to Europe. Their early research reveals the global connections of this trade as well as the local consequences at various locations of the migration process. Furthermore, it highlights the infrastructure necessary for such connectivity (e.g., Trans-Siberian Railroad, Suez Canal) and the unexpected and surprising facts about the complexity of trade at the beginning

of the 20th century. Namely, the migration to Europe starts with the abrupt and tragic halt of the migration of Zhejiangese traders from China to Japan due to the aftermath of the 1923 Kanto earthquake. The migrants' return to China offered them opportunities to travel to Europe with the help of banking agencies sponsoring these journeys. This resulted in several hundred Zhejiangese traders appearing on the streets of Berlin, Milan, Madrid, Paris, and other European cities, joining their pioneering predecessors who had arrived in Europe two decades earlier (Thunø 1999; Beltrán 2003; Bofulin 2016). They engaged in street hawking of fake pearls as well as other, miscellaneous items. While these pearls were often passed off as made in Japan or China, Cologna's research suggests the pearls might have been manufactured in Central Europe, thus adding a layer to the complexities of the intersection between human and object flows between China and Europe (Pearls from China 2020). As one of the aims of Cologna and colleagues' project is to disseminate the findings in the form of graphic novels and animated documentaries to wider audiences, it has the potential to intervene in the heritage field of migration from China to Europe and transcend the existing binary representations of Chinese migrants either as a new (and often curious) element of European societies or as a victimized patriotic subject of the Chinese nation.

The volume and endurance of Zhejiangese migration to Europe and beyond provide us with great potential with regard to researching heritage corridors. One such example from my own work is the existence of the Chinese restaurants in the countries of settlement (Bofulin 2016). Drawing on the long-term and detailed ethnography among Chinese in Slovenia, I have shown how Chinese restaurants have emerged as the key material and symbolic spaces that have enabled and shaped early Zhejiangese migration to Slovenia. Long the default economic activity of newcomers, restaurants are a total social phenomenon, where "sensual and local, symbolic and global meet" and "where exchange of culture and practices of social distinction take place" (Beriss and Sutton 2007, 1). In that sense, Chinese restaurants in Slovenia have functioned as institutions that through work and living practices conditioned the inclusion of Chinese people into Slovenian society, constructed an image of China and provided space for translations of (culinary) tastes, practices and values between China and Slovenia. Through this, Chinese restaurants can be seen as a tool for alternative heritage-making highlighting the histories of "contact zones"[2] (Pratt 2008).

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2   Mary Louise Pratt (2008, 7) emphasizes exchange and encounters at "contact zones". She suggests that contact zones, set up as a powerful postcolonial tool of critique, highlight "complex processes of meaning-making that occurred as a result of the spatial and temporary co-presence of subjects previously separated by geographic and historical disjunctures".

Both examples entail using Chinese sources as well as sources in the countries of settlement and/or collaborating with Chinese researchers, which is one of the prerequisites for transnational methodology (Faist 2012) that can address the methodological nationalism and essentialism of migration and heritage research. In this methodology lies the future of more inclusive representations of migrant and migration heritage as it must confront and negotiate different understandings and interpretations of the past. It may turn out that many of these negotiations and resulting representations of the "connections" will be an unsettling or even a "difficult heritage", to use Sharon Macdonald's term (2009), due to the uneven power relations framing movements from China in the 20th century (for a case study of the difficult heritage of Japanese occupation of China's northeast amid contemporary Sino-Japanese mobilities, see Bofulin (2017)).

This article reflects on the current state of the heritagization of migration from China to Europe highlighting the existing modes of heritagization that either emphasize the "Chinese immigrant heritage" or "Overseas Chinese (i.e., emigrant) heritage" without attempting to go beyond these binaries in the direction of a more inclusive, transnational approach. This approach would need to focus on connections or corridors, that is the transnational spaces within which distinctive practices and representations have evolved on the basis of the constant exchange of ideas, people and objects. The recent shifts in the understanding of heritage towards more pluralistic notions of heritagization provide new opportunities to highlight the multiple connectivities in the migration heritage. The examples presented here signal the beginning of these changes that will eventually facilitate a broader understanding of heritage that does not just belong to one group but is shared, as was the past of the people and objects remembered.

Acknowledgements

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BOOK REVIEW

Robert E. Allinson: *The Philosophical Influences of Mao Zedong. Notations, Reflections and Insights*

Reviewed by *Selusi AMBROGIO**

This book is not merely a history of Mao's thought, as it presents a philosophical inquest on its development. It is also a philosophical reflection on the state of contemporary Chinese society and culture employing Mao's philosophical keys. What Allinson provides is a completely new narrative of the so-called Great Helmsman's intellectual profile and all of 20th Chinese culture. This is the right book at the right moment for understanding China's incredible growth and deep contradictions, but also the new Chinese diplomatic impatience towards unequal treatment on the international stage. Mao's most unacceptable and dramatic decisions find a new coherency that, in this case, contradicts the thesis of the "banality of evil". Allinson shows an excellent capacity to freely reflect with the thinker without lessening the tragic consequences of his political decisions. As the author states: "Mao represents a unique mixture between Plato's philosopher king and Plato's tyrant of the Republic" (p. 100).

The author is a well-known comparative philosopher who researched and taught for decades at the Chinese University of Hong Kong. He is currently a Professor at the Soka University of America (California), and has continuously published on both Chinese authors (see his *Chuang-Tzu for Spiritual Transformation: An Analysis of the Inner Chapters (1989)*) and global philosophy, maintaining a coherent interest in intercultural dialogue and human life. This monograph is equally inserted in his personal philosophical journey. Mao is indeed an intercultural philosopher, thoroughly educated in Western and Chinese philosophies, able to create his own view thanks to extremely diverse sources.

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The Philosophical Influences of Mao Zedong is divided into eight chapters that create an argumentative spiral reminiscent of Heidegger's writing method. The first is an introduction where the theses that will guide the whole book are explained. Here the author emphasizes the role of the early training of Mao in both Western and Chinese philosophies at university, and the impact of these studies on his later writings, which are improperly classified as simply Marxist. Allinson suggests that Mao's thought "was a break with both traditional Chinese philosophy and Western philosophy and went beyond doctrinaire Marxism" (p. 19). Secondly, the author claims that the capitalist turn of post-Mao China and contemporary individualistic and paternalistic use and abuse of Confucianism should be understood through Mao's philosophy. In the second chapter, we can see Mao engaged with classical Western philosophers and 20th century figures who strongly impacted Chinese philosophy, such as Bertrand Russell, R. H. Tawney, and John Dewey. The third chapter is devoted to the impact of Paulsen's *A System of Ethics*, a critical interpretation of Western ethics from the perspective of voluntarist philosophy. Mao carefully annotated his own copy, and the author closely analysed these notes which are rich in profound cross-cultural reflections. In the fourth chapter, Allinson returns circularly to the question of sources. Mao is engaged with the ethical discourses of Aristotle, Confucius, Mencius, Zhuangzi, and Nietzsche. However, the central argument is included in the fifth and sixth chapters, where the logic behind Mao's view of human destiny is exposed. Allinson convincingly argues that the dialectic system of Mao's thought is not derived from Hegelianism and Marxism, but the dialectic of the complementary opposites of the *Yijing*. The seventh chapter situates Mao at the crossroad of Western and Chinese philosophies, and insists on the unavoidable impact of Chinese classical thought and literature on Mao throughout his life. The last chapter closes the spiral and adopts Mao's philosophical dialectic to interpret contemporary Chinese contradictions.

This book clearly shows the limits of Western understanding of Mao's intellectual depth, which is well beyond that of an ideologue or dictator. This limited vision not only does injustice to Mao Zedong, something that could be of considerable importance in our era, but, most importantly, prevents us from a correct understanding of the role he still plays in contemporary culture. The omnipresence of his image is not only an unavoidable reliquary ritual of socialist China, but a door that we can open to understanding the Chinese political vision better. The return to the classics and the capitalist conversion of China could be understood through his philosophical perspective.

During his studies at university, Mao created his own philosophy of individualism. "The only goal of human being is to realize the self. Self-realization means to develop fully both our physical and spiritual capabilities to the highest" (p. 48).

In this view, centred on the individual, what is the place of society? Society exists for the sake of the individual that exists first. The individual actualizes the self in moral actions because this brings happiness. Mao finds parallels in Aristotle's ethics and in a forced interpretation of Confucius. As he states: "I think that the theories of our Confucian scholars are based on egoism, as … can be seen in 'He who first cultivates himself may afterward bring peace to the world'" (p. 70). Allinson well explains that the distance between the understanding of the self of Confucius and that of Mao is considerable. Mao sees the self as the ego (i.e., the overall potential of the human being), while for Confucius the self is the moral self, formed through sincere reflection and self-rectification. For the latter, the love of society beyond filial piety is a natural moral development, not the actualization of the full potential of an individual human being. If this egoistic understanding of Confucius is evidently a misinterpretation, it is equally pivotal in establishing Mao's philosophy of the self and his relationship with classical thought. He does more or less the same with Mencius and Zhuangzi. Allinson remarks that "it was Mao's amalgamation of Chinese Confucianism and Paulsen's voluntarism that paved the way, not only for Mao's thought, but also for Mao's personal development" (p. 98). This path between East and West produced his view of the will as the key aspect of human behaviour, and drove his political mission.

A further element inherited from Chinese philosophy, which likely constitutes the most original aspect of Mao's thought, is the dialectical system of the *Yijing*. While Hegelian dialectics is based on opposites that are antagonists (each is absorbed by its opposite), Chinese dialectics of the *yin* and *yang* is based on their interrelation and integration that creates movement, the only effective principle of change. This is life. Allinson argues that one of Mao's most famous Marxist texts, "On Contradiction", is intrinsically based on the *yin–yang* model, because the opposition never dissolves. There is no synthesis. Therefore, there is an endless struggle in the realization of a communist society. The struggle is rooted in the relationship between individualism and society. The interior struggle between the actualization of my potential and the limits imposed from outside is unsolvable. In this respect, Mao distances himself from Chinese philosophy. He proposes a philosophy of disharmony, of endless struggle. While traditional Chinese dialectics is a quest for a utopic harmony (that does not last long), he asserts the inefficacity of such harmony. Mao is neither traditionally Chinese nor Hegelian (or post-Hegelian), and this is also one of the points of discord with Stalin. In opposition to the threefold dialectic system derived from Hegel and inherited by Marx and Engels, Stalin proposed a fourfold dialectic of contradiction. Mao replied: "I think there is only one basic law—the law of contradiction" (p. 130) that is both affirmation and negation. No synthesis, only struggle.

Allinson is correct in claiming that Mao's dialectics of struggle provides a helpful instrument to understand contemporary China. As he argues: "Mao did not consider that communism would become the final victor. In this regard, he would not have been surprised by the current victory of capitalism, (in his eyes), in the form of SCC [i.e., Socialism with Chinese Characteristics] over pure communism in his native China" (p. 137). Individualism, Confucianism, and capitalism (as a moment of struggle), which are categories of today's Chinese identity, can thus be traced back to the philosophy of the founder of the PRC.

In this book Allinson provides an excellent and compelling investigation that enriches our understanding of both Mao Zedong and China. However, in our opinion the author should have explained the complete marginalization of the influence of Marx and Engel's philosophy on Mao within this work. Of all the philosophers with whom Mao engaged, the fathers of communism are absent. We find two fascinating paths from Aristotle to Paulsen, from Confucius to Zhuangzi, which are narrated in a scholarly manner. However, we might ask what about the Marxist depiction of the individual and society? It is undoubtedly true that Mao projected his youthful vision on his mature Marxist philosophy, but this line seems underrepresented in chapter 6. Allinson focuses his attention on what is less known of Mao's philosophy and on his non-political thought, and, perhaps, this is a possible answer to this marginalization.

This monograph also has the merit of providing a vivid portrait of a young Chinese educated man of the 1920s, full of contradictions and ambitions. In that regard, it contributes to breaking the classical description of the simplistic opposition between the May 4 modernists and the "traditionalist" thinkers. The intellectual barricades are thus dissolved. What emerges is an epoch full of fascinating contradictions and constant struggle. Mao is neither a Chinese traditionalist nor a Westernized thinker. If this is true for him, it is also true for each of the thinkers of that period. Western thought was certainly an unavoidable standard, but it was put in dialogue with Chinese thought and criticized by most of such thinkers. Mao's intellectual endeavour is less different from that of contemporary thinkers such as Mou Zongsan, Tang Junyi, Lu Xun, etc., than we might think. They all made use of Western thought to complete their visions of what China was and should become. While the results were clearly different, each of them bents Western thought to their own purposes, and Western thinkers and politicians are often unaware of this. Therefore, this book provides another valuable key for understanding contemporary China. Today, the country presents a mixture of Western free market capitalism and controlled capitalism with socialist rhetoric, urban hedonistic individualism and a Confucian revival of Chinese values, exploitation of natural resources next to holistic ecologism, and so on. The paternalistic view of

the actual irrationality and incapability of a country still in the process of modernization, democratization, and Westernization (reminiscent of Hegel's dialectics) is completely outdated. Mao was perhaps right: the only effective hermeneutic key (at least for understanding China) is the law of contradiction that entails endless struggle.

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