

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

Izvilleček

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 Wittgenstein'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 *Begriffsschrift* (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.

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)

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.

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,

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.

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 Zhaxue 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 Luoji Zhaxue Rumun* 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 Zhaxue* 哲学逻辑与逻辑哲学); *Philosophy of Logic* (*Luoji Zhaxue* 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 Zhaxue 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 Zhaxue: 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 Zhaxue* 模态逻辑与哲学); Hu Zehong's (2004) *Philosophical Studies on Logic: Issues in the Philosophy of Logic* (*Luoji de Zhaxue Fansi: Luoji Zhaxue Zhuan-ti 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 $(F \supset G)$ 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 $(F \supset G)$ 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 interpretatione*, 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.

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 Luoji xue* 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

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 absorptonists.

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 Jiguang 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 Liqun 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* 逻辑百科全书 (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.

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* (Luoji xue 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.

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