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Beyond Relationships and *Guanxi*: An Introduction to the Research of Chinese Historical Networks

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Network research promises to bridge the divide between humanities, arts, and sciences, as well as to further our understanding of the past. This special issue sets out to bridge yet another gap, one that results from disciplinary divisions and language barriers. The rapid growth of Digital Humanities in general, and network science in particular, within the field of East Asian Studies has given rise to a thriving community of scholars with their own journals and conferences, which has gone mostly unnoticed in Anglophone circles. We thus seek to cross this divide by introducing the emerging field of network research in Chinese history to a broader audience. We hope to engage both experts on Chinese history who are not yet familiar with the theories and methods of network research, and network scholars specializing in other world regions who may draw inspiration from the way historians have applied network analysis to the study of Chinese history. This introduction thus serves to touch base with both groups and stimulate constructive dialogues across disciplinary boundaries. It sets out to explain network analysis as a modern *Kulturtechnik* and questions the ahistorical, culturalist assumptions, including the concept of *guanxi,* that cast a long shadow on previous studies of interpersonal relationships in Chinese society. It emphasizes this with a brief discussion of how interpersonal relationships evolved over the two millennia of imperial and modern Chinese history, followed by an overview of the state of Chinese historical network research as it moves beyond networks as metaphors for social histories to the reconstruction and structural analysis of social relationships. As the articles collected in this special issue demonstrate, research on Chinese networks is no longer confined to interpersonal ties but includes explorations of texts, bureaucratic practices, and material objects.[1] Today, Chinese historical network research has benefited from the development of databases that collect and synthesize biographical data from discrete historical sources as well as tools that facilitate text markup and data visualization. Therefore, a special section of this issue is designated to database projects that have elevated – and continue to elevate – the quantitative study of China's past to a new level. We conclude with a discussion of the future and potential of scholarship on Chinese historical networks.

1 In comparison to the European community of network scholars, in Chinese studies exchanges between historians and archaeologists employing the methodology of network analysis are still rare and leave much room for improvement. Despite an explicit reference to archaeological network research in the Call for Papers, we unfortunately received no submissions from this field.

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1. Network Analysis as a Modern *Kulturtechnik*

In this special issue, we ground our work in the assumption that relational thinking and an awareness of the self, others, objects, and nature as being interrelated is an anthropological constant. Past societies and individuals were acutely aware of how kinship ties, social affinity, geographical proximities and trade routes opened or limited their possibilities of action. However, even though human thinking has always been relational, the analytical exploration of networks in a narrower sense is a modern *Kulturtechnik,* a cultural technique that operates with network conceptualizations.[2] Relationships only become a network once they are aggregated and abstracted as a totality that is presumed to possess identifiable and describable structural characteristics. Networks are therefore products of a collective imagining, and can "gain social and cultural influence through their performative implementation as models of action and description."[3]

The German sociologist Georg Simmel (1858–1918) never used the term "social network," but his relational and formalist theory of society has foreshadowed many core ideas in the methodology of formal network analysis that we practice today. Simmel rejects the Durkheimian notion of society as a real, material entity or a thing-like substance. For Simmel, society exists only in and through "stable and patterned forms of reciprocal interaction between individuals," which he calls "sociation" *(Vergesellschaftung).*[4] "Society," he argues, "merely is the name for a number of individuals, connected by interaction," and "[t]he large systems and the super-individual organizations that customarily come to mind when we think of society, are nothing but immediate interactions that occur among men constantly…but that have become crystallized as permanent fields, as autonomous phenomena."[5] Simmel's conceptualization of society is relational, and his approach to analyzing society and sociation is formalist.[6] Drawing inspiration from geometry that abstracts spatial forms from concrete objects, Simmel argues that sociology must study the *forms* of sociation – e.g., domination and subordination, competition, inclusion and exclusion – that underlie the widely varying contents of actual social interactions. Simmel's ideas, although considered vague by many of his contemporaries, provide the conceptual apparatus for the sociograms and quantitative analysis of social networks that developed in the twentieth century.

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2 Sebastian Gießmann, *Netze und Netzwerke: Archäologie einer Kulturtechnik, 1740–1840,* Kultur- und Medientheorie (Bielefeld: transcript, 2006), 13.

3 Gießmann, *Netze und Netzwerke,* 18.

4 Alex Law, *Key Concepts in Classical Social Theory* (London: SAGE Publications Ltd, 2011), 181.

5 Kurt H. Wolff ed., *The Sociology of Georg Simmel* (New York: The Free Press, 1950), 10.

6 For an in-depth discussion of formalism and relationalism in social network research, see Emily Erikson, "Formalist and Relationalist Theory in Social Network Analysis," *Sociological Theory* 31, no. 3 (2013): 219–42.

As an analytical approach, network analysis has a strongly structuralist orientation. It asserts that relational ties between actors create a structural environment, i.e. "the network," which both empowers and constrains individual action. Accordingly, actors in a network are presumed to be interdependent, and the relative importance of each actor hinges on his or her position in the network. Therefore, relationships are not by themselves networks. To view them as networks is an analytical decision grounded in a structuralist worldview. It directs attention from each individual actor to a totality of interacting actors and their linkages. It is the structural properties and topological features of this totality, or network, that become the focus of analysis.

We should not assume that actors in a network possess the same God's eye view, as do network analysts, concerning the topology of that network.[7] However, it would be just as problematic to surmise that the network and its structural forces are purely the invention of modern theorists, of which historical actors were totally oblivious. We argue that the truth was somewhere in between. Historical actors often viewed a collection of crisscrossing relationships as forming a totality that both provided opportunities for and imposed constraints upon individual actors. Yet their view of this networked totality was usually simultaneously holistic and agnostic, characterized by a fatalistic acceptance of its complexities and ambiguities. Political writings from imperial China, for example, were replete with accusations against men whose personal relations – through marriage, political patronage, or else – allegedly enabled them to create alternative centers of power that solidified their own position in government at the expense of dynastic and public interests. These accusations, however, often vaguely described interpersonal relationships as forming a disorderly totality, comparing it to the root system of plants that was "entwined" and "entangled" (*pangen cuojie* 盤根錯節) beyond deciphering.[8] By contrast, modern network analysts presume that a network has structural features that can be teased out. By carefully defining the scope of analysis (e.g., selecting some nodes and ties while ignoring others) and employing graph-theoretical methods of analysis (e.g., partitioning a network into components and clusters, counting links and distances), they reduce networks to theoretical models in order to tame them and make them "manageable." In this sense, network analysis is a modern scientification of historical relationships and social structures.

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7 Usually they do not: people do not even know all the friends of their friends. That actors lack full knowledge of the topology of the network that they participate in is, for instance, a major issue in Stanley Milgram's famous small-world experiment. See Duncan J. Watts, *Six Degrees: The Science of a Connected Age* (New York and London: W. W. Norton and Company, 2004), 132–156.

8 For an example, see Chen Dong 陳東, "Dengwenjianyuan san shang Qinzong huangdi shu" 登聞檢院三上欽宗皇帝書 [Third Memorial Submitted to Emperor Qinzong through the Public Petition Review Bureau], in *Quan Song wen* 全宋文, ed. Zeng Zaozhuang 曾棗莊 and Liu Lin 劉琳 (Shanghai: Shanghai cishu chubanshe, 2006), 175: 3832.194.

Historians usually point to two factors to explain this conceptual shift: the changing understanding of the human body, and the growing transregional integration through transportation and communication in the nineteenth century.[9] "The network-term is one of the concepts that produce what they recognize and also recognize where nothing was produced but emerged evolutionarily."[10] Indeed, the use of the term "network" in English-language publications increased after 1920 and then gained in frequency again after 1980. Ahnert et al. note that "the word for network in certain other [European] languages carries the same lineage from the word for the material act of weaving nets.... The etymology of 'network' in both Germanic and Romance languages, therefore, contains a set of assumptions about structure, pattern, order, and distribution. In many cases, a maker or designer is implied."[11]

In Chinese history, we can observe similar etymologies. The term "network" gained popularity as a technical term for electrical networks (*dian wangluo* 電網絡) in the first half of the twentieth century.[12] As in the European context, the characters *wang* 網 and *luo* 絡 are both associated with weaving, such as nets for fishing or catching birds. *Wangluo* is today generally used for the internet and serves as a standard translation for "network analysis" (*wangluo fenxi* 網絡分析). The character *luo* is also part of the vocabulary of traditional Chinese medicine and describes the meridians through which fluids are said to circulate in the body.[13] And as the Dunhuang star charts demonstrate, we can already find visualizations of imagined networks in Tang-dynasty (618–907 CE) manuscripts, where stars are recorded as nodes in different colors, connected by lines forming constellations.[14] Yet such pre-modern notions of circulation and connectivity, or conversely of "blocked" channels of exchange, differ substantially from the structuralist approaches of present-day network analysis. Even though charts of star signs or the meridians in a human body can be seen as precursors to network graphs, they function as maps, similar to maps of a metro network. They help vi-

9 Jürgen Osterhammel, *The Transformation of the World: A Global History of the Nineteenth Century,* America in the World (Princeton: Princeton University Press, 2014), 711.

10 Hartmut Böhme, "Netzwerke. Zur Theorie und Geschichte einer Konstruktion," in *Netzwerke: eine Kulturtechnik der Moderne,* ed. Jürgen Barkhoff (Köln: Böhlau, 2004), 27.

11 Ruth Ahnert et al., *The Network Turn: Changing Perspectives in the Humanities,* 1st ed. (Cambridge: Cambridge University Press, 2020), 14–16.

12 For example, see Zishan 紫珊, "Dianwangluo (NETWORK) de jiefa" 電網絡 (NETWORK) 的解法 [Solutions to Electric Networks], *Kangzhan kexue* 抗戰科學, no. 3 (1939): 36–37.

13 Chen Qiao 陳峭 et al., "Guanyu goujian Zhongyi 'jingluo tizhi' xueshuo de shexiang" 關於構建中醫 "經絡體制" 學說的設想 [The Construction of a Theory of "Meridian System" in Chinese Medicine], *Zhonghua Zhongyiyao zazhi* 中華中醫藥雜誌 33, no. 6 (2018): 2448–51.

14 Jean-Marc Bonnet-Bidaud, Francoise Praderie, and Susan Whitfield, "The Dunhuang Chinese Sky: A Comprehensive Study of the Oldest Known Star Atlas," *Journal of Astronomical History and Heritage,* no. 12 (2009): 39–59.

sualize spatial or conceptual connectedness, but they do not subscribe to the holistic, structuralist, and statistical aspirations of present-day network research, which features new analytical perspectives, such as clustering, reachability, and centrality.

2. Questioning the Otherness of Chinese Networks

This special issue does not set out to depict the "otherness" of Chinese networks, nor argue in an Orientalist vein that Chinese networks (whether past or present) differ substantially from those of other cultures or world regions. In the preceding section, we argued that Chinese historical etymologies, conceptualizations, and visualizations of connectedness do not show any qualitative difference from, for example, European counterparts. Despite all the regional differences, one central theme in the project of modernization, shared across cultures, is the "awareness of a great variety of roles existing beyond narrow, fixed, local, and familial ones."[15] Some scholars maintain, however, that there is something peculiar about networks in Chinese culture and our motives to study them. Fröhlich and Heinrich argue that "the network approach in China studies was born as a counter-narrative to explain in what respect Chinese society *differed* from that of the western world."[16] In the eyes of some twentieth-century sociologists, like Fei Xiaotong, the difference between China and the West lies in their pattern of organization. That is, as Fröhlich and Heinrich have neatly summarized, "[w]here in the West there were formal hierarchies, China was built on informal networks."[17] This belief gave rise to *guanxi* as a catchword in social sciences and business management, which is used by some observers not merely as a Chinese wording for personal connections that are found in all societies, but to signify "an essential and defining element of Chinese culture, handed down relatively unchanged through time and space."[18] *Guanxi* carrying these connotations is not only adopted as an Orientalist label, but also as a Chinese self-fashioning. For instance, some Chinese scholars maintain that a certain type of networking has shaped Chinese social interactions since the time of Confucius.

> I believe that self-organization, the network-like structure and guanxi management are the main keys to understanding the nature of Chinese management. And

15 Shmuel N. Eisenstadt, "Multiple Modernities," *Daedalus* 129, no. 1 (2000): 4.
16 Hajo Fröhlich and Mathias Heinrich, "China – A Network Society? The Network Concept in Research on Chinese History and Society," in *China Networks,* ed. Jens Damm, Berliner China-Hefte 35 (Berlin: LIT-Verl, 2009), 3.
17 Fröhlich and Heinrich, "China – A Network Society?," 4.
18 Thomas Gold, Doug Guthrie, and David Wank, "An Introduction to the Study of *Guanxi,*" in *Social Connections in China: Institutions, Culture, and the Changing Nature of Guanxi,* ed. Thomas Gold, Doug Guthrie, and David Wank (Cambridge: Cambridge University Press, 2002), 3.

> they can all be traced to Zhongyong, or the doctrine of dynamic balance, developed by Ziji [sic], the grandson of Confucius, more than two thousand years ago.[19]

This agentless, ahistorical view of *guanxi* as a millennia-old "Chinese" cultural trait is established as a counter-narrative to Euro-American claims to cultural hegemony and the related assumption that all countries will eventually "reach" a Western standard of civil society and governance. With that said, this infatuation with *guanxi* is – at least to some extent – also the result of a research environment where the study of culture and habits is seen as politically less conspicuous than formal studies of institutionalized structures and systemic inequalities. In other words, the generalization of Chinese society made up of informal ties was, in part, a result of the difficulty to study formal hierarchies in contemporary China. Andrew Kipnis, for example, admitted that he "found it convenient to hide my own interest in the sensitive politics of gender, age, and state regulation behind the innocuous label of 'customs and habits' (*fengsu xiguan* 風俗習慣)."[20] Yet, is there really a perennial "Chinese" mode of networking? Does the concept of *guanxi* hold any explanatory potential? Or, in other words, is *guanxi* in the Straussian sense, "good to think with"?

This use of *guanxi* as an analytical concept to capture a presumably unique feature of Chinese society reflects an uneasy tension that scholars of networks more generally (whether past or present, European or non-European) find themselves caught in: Network analysis promises a level of objectivity and comparability that extricates measurable structures from the thicket of cultural ambiguities, but explanations of the emergence and utilization of the observed structures often revert to culturalist assumptions, for which the use of *guanxi* is only one example. Network research along these lines takes social interactions and relationships in a society out of their historical context. It falls back on a static and essentialist view of the so-called "Chinese" or some other culture, while downplaying the agency of historical actors and paying no heed to how social relationships are shaped by, and in turn shape, the evolving institutional environment and social structures.

This leaves a theoretical void in network research, which Emirbayer and Goodwin already observed in the 1990s and that remains unresolved:

> Network analysis all too often denies in practice the crucial notion that social structure, culture, and human agency presuppose one another; it either neglects or inadequately conceptualizes the crucial dimension of subjective meaning and

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19 Jiade Luo and Yong Zhou, *Social Networking and Chinese Indigenous Management* (Reading, UK: Paths International Ltd, 2014), 6.

20 Andrew Kipnis, "Practices of *Guanxi* Production and Practices of *Ganqing* Avoidance," in *Social Connections in China: Institutions, Culture, and the Changing Nature of Guanxi,* 22.

> motivation – including the normative commitments of actors – and thereby fails to show exactly how it is that intentional, creative human action serves in part to constitute those very social networks that so powerfully constrain actors in turn.[21]

One possible way out of this trap, and to bring human agency back in, is not to study social networks as fixed structures but as practices of establishing or maintaining relationships in specific institutional, social, and cultural contexts, as demonstrated by Andrew Kipnis in his study of a North China village from the 1940s to the 1990s.[22] By studying not only the cultural logic of *guanxi* practices, but also how modern institutions and politics shaped the rules and meaning of these practices and how individuals actively manipulated and interpreted the rules to which they were subject, Kipnis challenges the view that some sort of essential Chineseness could provide an adequate explanation for *guanxi* practices. He thus avoids Orientalist fallacies of defining *guanxi* in contrast to non-Chinese types of social relations and manages to include critical theories of culture like Bourdieu's practice theory.[23]

A study of social relationships, therefore, must pay due attention to the social meaning of a relationship in its specific historical context. Historians, with their sensitivity to historical change, their training in the critical reading of sources, and the necessary awareness of their own potential misreading of historical "facts," are well equipped to engage with questions of biased network data, the dialectics between social practice and social structure, the role of individual agency, or revolutionary tipping points. Hence, historical network research enables us to trace the transformation of social networks as a result of evolving practices of developing and sustaining social relationships, which were both responses to and constitutive of dynamic institutional, social, and cultural environments. It therefore gives new impetus to the critical engagement with the conceptualization of social relationships in Chinese society and the concept of *guanxi* in particular, which is still dominated by social science research on post-1980s mainland China.

In brief, we argue that relational thinking is powerful in coming to terms with past and present phenomena, but we reject the idea that there are relationships "with Chinese characteristics" that take up functions or forms unmatched in any other time or culture. The following section offers an overview of the changing nature of elite networks from imperial to modern China, thus providing an entry point to the research articles.

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21 Mustafa Emirbayer and Jeff Goodwin, "Network Analysis, Culture and the Problem of Agency," *American Journal of Sociology* 99, no. 6 (1994): 1413.

22 Andrew B. Kipnis, *Producing Guanxi: Sentiment, Self, and Subculture in a North China Village* (Durham, NC: Duke University Press, 1997).

23 Kipnis, "Practices of *Guanxi* Production and Practices of *Ganqing* Avoidance," 23–25.

3. Interpersonal Relationships

Contributions in this issue underscore that throughout Chinese history, both large historical processes (e.g., the rise and fall of centralized states and technological revolutions) and short-term episodes (e.g., foreign invasions, migration, and dynastic change) had constantly shaped the nature and scope of interpersonal relationships that were integral to the evolving structures of power in Chinese society. These studies show that throughout Chinese history, informal networks of the elite shaped institutionalized systems of government and, conversely, that the continuous changing of institutions also left its mark on China's social fabric. They also demonstrate that the mutually constitutive relationship between formal institutions and informal social ties was always mediated by ever-changing cultural notions of the historical actors. These studies dismantle the misconception of an immobile social order in imperial China (221 BCE–1912 CE) and a static, essentialist view of "Chinese" culture. They demonstrate that cultural notions were always in flux and that the decision to build what relationships, with whom, and by what means were also apt to change in response to the times. These works call into question any attempt that takes informal interpersonal ties, or *guanxi,* as a perennial and unique cultural trait of Chinese society while ignoring the specific form of social relationship that was valued and developed under specific institutional, social, and cultural conditions.

In the past decades, social historians have challenged narratives of a Chinese society awoken by foreign intrusion in the mid-nineteenth century from its millennia of slumber, and paid more attention to social relationships than bureaucratic institutions. They find that the imperial bureaucracy not only operated according to the meticulous rules laid out in the administrative codifications, but was also permeated by a myriad of private ties of loyalty and obligations. The Later Han (25–220 CE) officials were enmeshed in a web of patron-client relations that tied disciples to their teachers and subordinates in office to their former superiors. These hierarchical relations carried demanding social and political obligations on the clients, who were expected to support their patrons in political struggles and mourn for them if they died. Although ties of locality underlay most patron-client relations, high-ranking officials sometimes attracted clients from all over the country. As Patricia Ebrey has observed, "[p]atron-client ties could be extended beyond the two individuals involved to form networks of men linked to common patrons, and to the patrons of their patrons."[24] These ties, therefore, brought together elite men from widely separated places and fostered among them a common identity that transcended their geographic origins.[25] In

24 Patricia Ebrey, "Patron-Client Relations in the Later Han," *Journal of the American Oriental Society* 103, no. 3 (1983): 533.

25 Ebrey, "Patron-Client Relations in the Later Han," 541.

Later Han, the desire of elite males to enter this web of connections, which was inseparable from holding office and participating in the metropolitan culture, were counterbalanced by a persistent effort to consolidate their social station in the provinces, where they owned landed estates and headed large descent groups with a retinue of dependents and retainers. This effort became extremely rewarding at the turn of the second century when domestic rebellions, foreign invasions, and bloody political strife ripped apart the Han imperial order. The elite men's solid local position provided the necessary social and economic resources to tide them over the crisis.

In the four centuries that followed, foreign conquerors and military dynasts seeking to establish effective control eagerly sought support from these elites by appointing them to offices. The most influential elite families (the so-called "great clans") intermarried with each other and with the imperial clan and enjoyed, in effect, hereditary and exclusive access to high office. They constituted a distinctive and privileged superelite that modern historians have conveniently referred to as the "aristocracy." Unlike nobility in many parts of medieval Europe, aristocracy in China was not a legally defined status but a *de facto* social category growing out of an elite culture that claimed talent and character were prerequisites for holding office, but were also fundamentally inborn and thus hereditary. The superelite arrogated to itself the power of evaluating any candidate's talent and character, which they asserted were subtle and mysterious and could only be discerned by men of extraordinary perception.[26] In the new "Nine-Rank" system of bureaucratic recruitment, men from the superelite families monopolized the office of the Impartial Judge (*zhongzheng* 中正), who ranked each candidate based on his deportment and pedigree; the candidate's rank, in turn, determined the level of office for which he was eligible. These superelite families thus formed a status group, closed to itself, that was both the arbiter of its own culture and the master of its own political fate. The social prestige of the superelite and its political privileges hinged upon its purity, which the constituent families guarded jealously by associating only with one another and marrying exclusively among themselves. In this altered environment, patron-client ties lost their social meaning and function, while horizontal ties of marriage and affinity within the status group played a key role in defining the aristocracy's social distinctiveness and solidifying its high status (see SHANG in this issue).

The Chinese aristocracy was thus, from the very beginning, entwined with imperial power. Pedigree and officeholding reinforced each other: proof of an illustrious pedigree was a *sine qua non* for holding high office, but only a pedigree replete with ancestors in high office were considered illustrious. Consequently,

26 Mark Edward Lewis, *China between Empires: The Northern and Southern Dynasties* (Cambridge, MA: Belknap Press of Harvard University Press, 2009), 39–40.

during the centuries at the peak of their power, one after another the aristocratic families left their provincial estates to live in the capital, where they kept company with social equals, stayed close to the court, and molded their temperament in highbrow culture. By the early seventh century, when the Tang founders successfully rebuilt a strong centralized authority, aristocratic families constituted an endogamous, semi-hereditary officeholding elite that resided mostly in the dynasty's capital region.[27]

This superelite maintained political dominance well into the ninth century, but the foundations of its dominance were seriously undermined as early as the sixth century, when dynastic rulers abolished the Nine-Rank system and instituted, in its place, the civil service examinations as a new way of recruiting state bureaucrats. The aristocratic families successfully adapted themselves to this challenge, and until the late ninth century the majority of those who passed the examinations and held office were men of aristocratic descent. In spite of this success, the aristocracy's acceptance of the new rules sowed the seed of its ultimate demise. Having acknowledged the need to compete among themselves and prove their worth in the examinations, the aristocrats were shattering the cultural premises of their social position: that talent was hereditary, that high office was a prerogative of those of good ancestry, and that the superelite was the arbiter of its own social worth and its eligibility for government service.[28] Under the new rules, the privileged status of the aristocracy perched precariously on its ability to monopolize the cultural and social resources that were necessary to sustain its examination success.

By the early years of the Song (960–1279 CE), a series of changes brought this monopoly to an end. The spread of printing technology made books widely available at lower prices. State-sponsored schools were established across the country, equipped with student dorms and libraries, run by salaried instructors, and financed by ringfenced resources. Reforms of the civil service examinations, such as the introduction of regional quotas and the enforcement of anonymity, ensured a degree of fairness for candidates of diverse geographical and family origins. By the mid-eleventh century, it was clear that capital residence and status-group endogamy were no longer requisites for political eminence. The cultural premises and social practices underpinning the status of the aristocracy thus became ancient history. Officials, as well as those whose classical education prepared them for the examinations and government service, now constituted a distinctive social stratum that encompassed a much broader segment of society than the aris-

27 Nicolas Tackett, *The Destruction of the Medieval Chinese Aristocracy* (Cambridge, MA: Harvard University Asia Center, 2014), chapters 2–3.

28 David G. Johnson, *The Medieval Chinese Oligarchy* (Boulder, Colorado: Westview Press, 1977), 149–52.

tocracy of earlier times. These men, the self-styled literati, were scattered all over the country and defined themselves by learning, not pedigree. But who decided upon learning? The court and the literati offered different arguments. To those who embarked on a bureaucratic career, the court's argument meant a great deal. It was generally accepted that a good government was a government run by good men, but the imperial administration of Song times operated on the premise that talent and character were neither inborn nor hereditary and therefore ancestry was irrelevant. Instead, men had to demonstrate their talent in the examinations and nourish it by serving in the academic institutes at the imperial court (see XIONG in this issue).

Learning, however, was also flourishing without state sponsorship and outside its control. Scholars shared their interpretations of classical texts by writing and publishing commentaries. They spread their views by building academies and taking on students. Teachers were invited to lecture in different places, and students traveled to study under different masters. Intellectuals of different persuasions debated in letters and at face-to-face meetings.[29] Activities like these created a vibrant community of learned men, or literati, in which membership was a matter of mutual recognition and outside the purview of state authority. Underpinning this community were teacher-disciple relations and crisscrossing horizontal ties of literary and intellectual exchanges that were geographically extensive. Thus, when kinship networks were more localized, as in the thirteenth and fourteenth centuries, these ties of learning played an instrumental role in sustaining a supralocal literati identity (see BOL in this issue).

The late nineteenth and early twentieth century witnessed an acceleration of social change. The rule of the Qing dynasty (1644–1912 CE) was gradually hollowed out and remained a mere symbolic reference point for continuity in a spiral of reform and revolution, until it finally collapsed in 1912. Industrialization, tied to increasing urbanization, regional connectedness through new means of communication and travel, the abolition of the examination system for recruiting state bureaucrats, and the accumulation of political power by local elites, all contributed to a reconfiguration of existing social structures. Causal as well as symptomatic of change, "the emergence of a private sphere and of interest groups to represent it both reflected and contributed to the breakdown of traditional authority."[30]

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29 For an incisive discussion of the rise of the *shi*-oriented culture that competed with the court-oriented culture, see Robert Hymes, "Sung Society and Social Change," in *Cambridge History of China,* Volume 5, Part Two, ed. John W. Chaffee and Denis Twitchett (Cambridge: Cambridge University Press, 2015), 631–32.

30 Joseph Fewsmith, "From Guild to Interest Group: The Transformation of Public and Private in Late Qing China," *Comparative Studies in Society and History* 25, no. 4 (1983): 618.

These challengers to traditional authority included previously marginalized groups, such as women or workers, who organized themselves to become political forces, as well as an increasingly self-confident urban elite. In part, the new intelligentsia recruited itself from the traditional literati families now struggling to find their place in a modern nation-state, as well as from a young, less affluent generation that embraced the possibilities of educational expansion and state-sponsored foreign studies programs. "New learning" (*xinxue* 新學), which included, for example, the mastery of one or more foreign languages, knowledge of natural and social sciences, engineering, and law, as well as practical industrial skills, emerged as a new source of cultural capital.[31] Guilds, professional organizations, and native-place associations mobilized and structured civil society and offered anchorage in turbulent times by integrating premodern and modern social fabrics. In Beijing, for example, "native-place ties served to facilitate a multidirectional flow of information and influence between center and region."[32]

The mobility of China's young elites increased even on a global scale. They travelled the world in search of new knowledge and returned not only with the latest scientific news, but also with a head full of utopian visions for a new China. Especially in urban centers like Shanghai, schools and study societies formed new nodes in the highly politicized networks.[33] The personal ties that had been forged abroad now became a framework for political activism, from anarchist circles to the first Communist party cells (see LEVINE in this issue). In many of the newly emerging social organizations, however, traditional hierarchical patron-client networks continued to exist. Personal loyalty was a glue that tied troops to their leaders, political activists to their mentors, and even within the Leninist-style party organizations of the Nationalists and Communists, family ties, seniority in party membership, and shared biographical experiences continued to shape social networks. Therefore, amidst the growing importance of modern institutions, like an expanding state bureaucracy, courts and parliaments, public schools and universities, a deeper understanding of interpersonal relationships remains crucial in uncovering the social history of twentieth-century China. These institutions not only framed social interaction, they also opened the pathways of social mobility, opportunities for exchange, and the forging of new alliances.

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31 Barbara Schulte, "Webs of Borrowing and Lending: Social Networks in Vocational Education in Republican China," in *World Yearbook of Education 2012,* ed. Gita Steiner-Khamsi and Florian Waldow (London: Routledge, 2012), 115–38.

32 Richard Belsky, "Placing the Hundred Days: Native-Place Ties and Urban Space," in *Rethinking the 1898 Reform Period: Political and Cultural Change in Late Qing China,* ed. Rebecca E. Karl and Peter Gue Zarrow (Cambridge, MA: Harvard University Press, 2002), 132.

33 Stephen Averill, "The Cultural Politics of Local Education in Early Twentieth-Century China," *Twentieth-Century China* 32, no. 2 (2007): 22–23.

In sum, social relationships must be studied as practices that are grounded in historically specific institutional, social, and cultural contexts. Social relationships are developed and maintained by individual actors who constantly interpret the structures and circumstances of the institutional environment they are in and, on the basis of these interpretations, appreciate the meaning and value of different types of social relationships. In other words, social networks are always embedded in culture, but culture is dynamic and evolves in tandem with social conditions and political institutions. The shifting views of talent, pedigree, and learning in Chinese history, which profoundly shaped the scope and nature of elite networks from one period to another, were but one example. Therefore, any study of informal ties, or *guanxi,* in Chinese society must dispel the specter of cultural essentialism, which not only overlooks individual agency but, in the final analysis, also denies the causal power of culture itself. By studying social networks as evolving practices and by integrating cultural and institutional perspectives, historical network research gives due attention to human agency and holds the promise of reaching more meaningful interpretations of social network structures. Moreover, to understand how exactly individual agency – as an expression of cultural, religious, or political convictions or as a strategic choice – was possible within these sets of social and institutional boundaries is a challenge for historians of any period or world region. Therefore, the diversification of the field of historical network research hopefully further challenges our assumptions about "standard" (i.e. Euro-American) development paths and increases our awareness of multifaceted modes of establishing and exploiting social ties.

4. Network Analysis and Prosopography

Social historians have studied interpersonal relationships in Chinese history for a long time, but only recently have they begun to adopt the concepts and tools of network analysis. This is nevertheless an unsurprising outcome of their enduring efforts to understand how the character of China's dominant elite changed over the two millennia of imperial history. Many scholars working on this topic in the twentieth century embraced the traditional approach of prosopography.[34] They collected data on a well-defined population (e.g., officials who were sufficiently prominent to warrant a biography in dynastic histories) and investigated their common characteristics (e.g., ancestry and regional origin).[35] Research along these lines led them to also look at the different ways in which elite men

34 Lawrence Stone, "Prosopography," *Daedalus* 100, no. 1 (1971), 46.

35 Sun Guodong 孫國棟, "Tang Song zhi ji shehui mendi zhi xiaorong: Tang Song zhi ji shehui zhuanbian yanjiu zhiyi" 唐宋之際社會門第之消融——唐宋之際社會轉變研究之一 [The Dissipation of Prominent Families in the Society of Tang and Song Times: A Study of Social Transformations in Tang and Song Times], *Xinya xuebao* 新亞學報 4, no. 1 (1959): 211–304.

and women interacted and made connections with one another. Some scholars collected data on elite marriages, teacher-disciple ties, and literary exchanges; others published case studies on individual clans. Until the recent adoption of formal network analysis, however, historians lacked the wherewithal to analyze the structural pattern in elite networks. Several prosopographical studies published in the last quarter of the twentieth century, for instance, took on elite marriages in Tang (618–907 CE) and Song (960–1279 CE) times as a central subject of investigation.[36] These works typically study marriage practices from a spatial perspective and ask, for example, whether elite families married within or across prefectural borders. They fail to consider the possibility that through marriage, elite families at different moments of history may have formed networks that were markedly different *in structure.* For instance, these studies show that official families in the Tang and early Song preferred to live in the capital region and arranged marriages mainly among themselves, but they have not explored whether these marriages constituted a network that centered on any particular family or fragmented into several clique-like subgroups. To ask questions like this requires a conceptual leap that views interpersonal relationships, such as marriage, as constitutive of a network with structural properties that can be discovered and described.

As in the field of ancient European history, the adoption of formal network analysis among scholars of imperial China is a "logical extension of traditional prosopographical research."[37] Network analysis offers enticing conceptual and operational tools for analyzing a historical phenomenon that has long enamored prosopographers. A recent study by Nicolas Tackett, for example, reveals the structural properties of the ninth-century capital elite's marriage network, which partitioned into two distinct clusters. One cluster was organized around the Tang imperial family and included many eminent clans of northwestern origin. The other cluster, in contrast, was composed almost entirely of prestigious families that resided in the Tang Eastern Capital, which had a more egalitarian structure and was not dominated by any single descent group.[38] A similar study by Song Chen compares prefectural governors' marriage networks in the mid-eleventh and early thirteenth centuries. It shows that mid-eleventh-century prefects were intricately connected, by consanguinity and marriage, in a dense and expan-

36 Robert M. Hartwell, "Demographic, Political, and Social Transformations of China, 750–1550," *Harvard Journal of Asiatic Studies* 42, no. 2 (1982): 365–442. Robert P. Hymes, *Statesmen and Gentlemen: The Elite of Fu-chou, Chiang-hsi, in Northern and Southern Sung* (Cambridge: Cambridge University Press, 1986). Beverly Bossler, *Powerful Relations: Kinship, Status, and the State in Sung China (960–1279)* (Cambridge, MA: Harvard University Asia Center, 1998).

37 Christian Rollinger, "Prolegomena. Problems and Perspectives of Historical Network Research and Ancient History," *Journal of Historical Network Research* 4 (2020): 7.

38 Tackett, *The Destruction of the Medieval Chinese Aristocracy,* 125–26.

sive network that centered on the capital elite, but those in the early thirteenth century only formed small regional clusters, each spanning a few adjacent prefectures.[39]

The union between network analysis and prosopography is cemented by their shared methodological outlook. Both approaches look beyond the individual historical actor and explore patterns at the group level, which makes network analysis an easy sell to social historians who have already embraced prosopography in their research. Nevertheless, the difference between these two approaches is equally pronounced. Whereas traditional prosopography focuses on the shared characteristics of the study population (e.g., family and educational background, economic status, careers, and religious affiliations), network analysis concentrates on the interactions and relationships between and among historical actors.[40] By bringing the practices of interaction and relationships into focus, network analysis provides an alternative means of conceptualizing social stratification. Twentieth-century studies of the imperial Chinese elite, having flourished under Marxist and Weberian influences, often defined social status on the basis of personal and familial attributes, such as landownership, ancestry, and educational achievements. By contrast, the new-style prosopography inspired by network analysis operates from the premise that a person's social standing was not merely an outcome of their individual characteristics, but also of their interactions with others. Seeking and gaining recognition from social peers was essential for establishing a person's social position, and the boundaries of social classes were demarcated by the decisions of historical actors to interact with some but not others.

Two articles in this issue have pursued this line of enquiry. They explore the character and identity of elite families in Chinese history by studying the pattern of their interactions. SHANG Wenyi and SANG Zizhou focus on aristocratic life in the fourth century, when war in northern China forced the Jin court (266–420) and some northern aristocratic families to flee southward across the Yangzi River. Throughout the fourth century, the northern émigrés fought bitterly among themselves for domination at court, while leaving only the power in the provinces to the prominent southern families. Using a fifth-century collection that provides snippets of aristocratic life in this era, SHANG and SANG show that the patterns

39 Song Chen, "Governing a Multicentered Empire: Prefects and Their Networks in the 1040s and 1210s," in *State Power in China, 900–1325,* ed. Patricia Buckley Ebrey and Paul Jakov Smith (Seattle: University of Washington Press, 2016), 101–52.

40 Dion Smythe makes a distinction between "old" prosopography, which explores each person's external characteristics, and "new-style" prosopography that is equally concerned with the relationships between individuals that enmesh them in overlapping social networks. Dion Smythe, "Prosopography," in *The Oxford Handbook of Byzantine Studies,* ed. Robin Cormack, John F. Haldon, and Elizabeth Jeffreys (New York: Oxford University Press, 2008), 176–81.

of their daily interactions reflect the social distance between different aristocratic families and the gap in their political status. The five most powerful families, all of northern origin, which once dominated court politics also rank highest by all centrality measures. Men from these families were also central figures in seven of the nine major clusters detected by the Louvain method. Moreover, the persistent social chasm that separated the northern émigrés from the southerners is also evident in the much higher intensity of interaction within either group than between the two groups. Nonetheless, the authors argue that close interactions among the aristocrats – despite differences in their political leaning and regional origin – indicate their willingness to recognize each other as social equals, which fostered a degree of cohesion that sustained the aristocracy's privileged social status and its century-long political dominance.

Similarly, who was and was not a literatus in Yuan times (1279–1368 CE) was also a matter of mutual recognition that was evidenced by literary exchanges. In his case study of Wuzhou (a prefecture in southeast China), Peter K. BOL shows that in the Southern Song (1127–1279 CE), participation in civil service examinations provided a state-sanctioned way for local men to claim themselves as "literati" *(shi),* while marriages between literati families in different counties held them together across the prefecture. In the Yuan, however, the examination system was first abolished and then restored at a far diminished scale and marriages, driven by a growing desire to build alliances with surrounding descent groups, became strictly confined to within county borders. Under these new circumstances, argues BOL, local men in the Yuan relied heavily on learning to build connections with each other that provided the necessary recognition to bolster their claims to literati status.[41] By combining spatial and centrality analyses, BOL further reveals that the literati learning networks in the Southern Song and Yuan differed substantially in size, intensity, and leadership. The Yuan network was larger, more active, and also centered on local men in Wuzhou, instead of influential national figures outside the prefecture. Unlike traditional prosopographical studies of the elite that focus mostly on what they were (e.g., descendants of which clan, natives of which place, whether degree- or office-holders), these articles turn the spotlight on what they did. In other words, these articles look not merely at the elite's social attributes but also their networking practices – i.e., how they interacted with each other and cultivated close relationships among themselves. These studies share the view, explicitly or not, that the pattern of these interactions and relationships was an outcome of the choices made by the elites, and thus an expression of how they viewed themselves and each other.

41 Hilde De Weerdt makes a similar argument about how literati identity was constructed interactively through networks of information exchange during the Southern Song. Hilde De Weerdt, *Information, Territory, and Networks: The Crisis and Maintenance of Empire in Song China* (Cambridge, MA: Harvard University Press, 2015), 392.

This is certainly not to say that the social attributes of historical actors were irrelevant to the pattern of their interactions and relationships. Both articles discussed above have fruitfully explored the interrelation between social attributes and network structures. SHANG and SANG show that aristocratic families in the Eastern Jin clustered by regional origin in their daily interactions, whereas BOL demonstrates that the central figures in the Wuzhou literati learning network had, by Yuan times, become local scholars instead of national celebrities from outside the prefecture. The article by Cécile ARMAND and Christian HENRIOT provides another excellent example, invoking the background characteristics of historical actors to explain observed structural properties in the networks. With the education reforms in early twentieth-century China, the social category of "literati" gradually vanished. China's most educated men and women now drew on a more diverse set of self-denominations. On closer inspection, however, professionals, bureaucrats, cadres, educators, industrialists, and many other groups did form a diverse, though not segmented, elite. As part of a larger endeavor to reconsider the networks of Republican elites, ARMAND and HENRIOT examine the depiction of eminent men and women in Boorman's *Biographical Dictionary of Republican China.* They employ Natural Language Processing to trace the co-occurrence of names as textual links between historical actors. Critically engaging with the dictionary's known biases, they asked what level of elite connectivity can be gleaned from such co-occurrences and whether they reflect historical reality in its full complexity. The results show that in some instances, the editors chose individuals as representatives of social groups, isolating them from other circles. At the same time, besides such smaller ego-networks, a highly connected main component emerged. Centrality measures and clustering methods revealed subgroups within this polycentric network. Even though network research focuses on relationships, this study demonstrates that the exploration of shared attributes should not be neglected in the analysis. To test whether these subgroups shared common traits, the data was further enriched with individual traits, such as provincial origin, military background, foreign education, and party affiliation. The findings show that clusters represent combinations of attributes, supporting the above-mentioned assumption of multiplex elite structures in Republican China.

5. Beyond Interpersonal Relationships

We have argued that relationships are not by themselves networks, and that to construe them as such is a modern *Kulturtechnik,* which operates on the premise that relationships constitute a totality with identifiable structural properties and aims to reveal, interpret, and explain these properties. As an analytical approach, therefore, network analysis holds great promise for a wide range of research questions, beyond the reconstruction of social interactions and interpersonal relationships, and may be used to explore the structure of any totality of connections. The first graph-theoretical analysis of networks concerned movement in space. This

was Leonhard Euler's rumination on the Seven Bridges of Königsberg, where each node was a landmass and each edge was a bridge. In the past decades, sociologists and archeologists have also routinely adopted network models to study the relationships between countries, organizations, excavation sites, and even cultural notions and relief practices.[42] Several articles in this issue provide a snapshot of how China historians have used network analysis to investigate a diverse range of topics in institutional and intellectual history. XIONG Huei-Lan studies the career trajectory of Southern Song officials who had an appointment in the Imperial Library. Instead of looking at interpersonal relationships, she constructed a directed network where each node is a government position and each edge represents a transfer between positions.[43] Using modularity analysis and current-flow betweenness centrality, among other algorithms, and drawing on her erudition in the Song institutional history to interpret the results, XIONG argues that appointment to the Imperial Library served as an important stepping stone to high office in the twelfth century, although this practice encountered a brief setback between 1140 and 1155 when Qin Gui 秦檜 (1091–1155), a powerful grand councilor, monopolized power at the Song court. Network analysis on a rich data set that is systematically harvested from diverse historical sources provides solid quantitative evidence for XIONG to evaluate the dynasty's declared policy of using scholarly institutes as the grooming ground for top administrators.

Marilyn LEVINE combines network analysis and prosopographical studies in a different way, exploring the network of persons but constructing connections based on node attributes. Her study focuses on a group that we already know to be highly exclusive and interconnected, namely the leaders of the Chinese Communist Party who received training in the Soviet Union during the early twentieth century ("Soviet Returned Leader," SRL). From archives in France to interviews in Beijing, LEVINE collected an impressive abundance of biographical data on each leader, such as their educational background, careers, political affiliations, and the major events in which they participated. She used these data to construct a network of Chinese revolutionary leaders, where edges represent not interpersonal relationships but the degree of similarity between each pair of persons in their background characteristics. To put this in more technical terms, her one-mode network data are similarity matrices computed from node

42 John W. Mohr and Vincent Duquenne, "The Duality of Culture and Practice: Poverty Relief in New York City, 1888–1917," *Theory and Society* 26, no. 2/3 (1997): 305–56. Søren Michael Sindbæk, "The Small World of the Vikings: Networks in Early Medieval Communication and Exchange," *Norwegian Archaeological Review* 40, no. 1 (2007): 59–74.

43 For a study of bureaucracy that employs a similar methodology, see the brief discussion in Franziska Barbara Keller, "Analyses of Elite Networks," *The Palgrave Handbook of Political Elites,* ed. Heinrich Best and John Higley (London: Palgrave Macmillan, 2018), 142–143.

attributes. Using the Louvain algorithm, LEVINE finds that this network partitions neatly into clusters that, with some important exceptions, separate those leaders who traveled only to the Soviet Union (the Soviet group) from others who had also spent some years in Western Europe (the Euro-Soviet group). She shows that leaders in the Euro-Soviet group were on average a few years older than those in the Soviet group. Many of those in the Euro-Soviet group died at the very beginning of China's communist revolution, but of those who survived, many played important roles in the subsequent decades and therefore rank high on nearly all centrality measures. After the founding of the People's Republic of China in 1949, they reemerged as the central figures of a new society and cut ties with those that fled the mainland for Taiwan, creating a schism that has persisted until this day.

Anne CHAO et al. analyze texts, not persons. They also employ network analysis not as a tool of verification but as a device of exploration. This guides CHAO et al. throughout the extensive literature of the twentieth century and alerts them to passages that deserve close reading. To compare the political views of two leading intellectuals in the early twentieth century (Liang Qichao 梁啟超 [1873–1929] and Chen Duxiu 陳獨秀 [1879–1942]) and trace the evolution of their ideas, CHAO et al. constructed several networks where nodes represent words and edges indicate their co-occurrences in Liang's and Chen's writings. Using the Louvain method, they partitioned each network into several clusters, where each cluster signifies a specific topic. Next, they used centrality measures to identify the key terms in each cluster, which they then used as guides for interpreting Liang's and Chen's writings. A comparison of these co-occurrence networks of terms shows that Liang employed a much "richer and more varied vocabulary" in his writings than Chen. This led CHAO et al. to the discovery that although both thinkers were occupied with national salvage, Liang and Chen had different views on nation-building and also adopted different rhetorical strategies. For Liang, nation-building was a great enterprise that encompassed a diversity of interconnected issues, ranging from citizens' responsibilities to institutional checks on governmental power. These issues were tied together in Liang's writings by notions of constitutional rule and popular sovereignty. By contrast, Chen was an avowed adherent of social Darwinism and Marxism and placed emphasis on evolution and class revolution. Unlike Liang, he charted a more specific course of action and drove home his point by repeatedly invoking the same key terms.

6. Databases and Tools

Whether to investigate the pattern of interpersonal relationships or explore the structure of any other type of connections, historical network analyses have to be grounded in solid empirical data. Contributions in this issue demonstrate two markedly different approaches that scholars take in building their datasets. Some collect data from a single source. SHANG and SANG rely exclusively on *A New Account of the Tales of the World* (*Shishuo xinyu* 世說新語), a fifth-century collection of historical anecdotes and character sketches, to build their dataset on the interaction among fourth-century aristocrats. Likewise, ARMAND and HENRIOT use only Howard L. Boorman's *Biographical Dictionary of Republican China* when reconstructing the elite networks of twentieth-century China. Other contributors to this special issue, in contrast, glean and synthesize data from a multitude of historical sources. BOL investigates kinship relations and literary exchanges that are evidenced in a variety of literary writings and aggregated into the gigantic China Biographical Database (CBDB). XIONG starts out with service records in the twelfth century and supplements them with an extensive survey of biographical information that is preserved in a plethora of historical texts and databases. The work of LEVINE draws on archival materials in China and Europe, as well as a series of transcribed interviews that she conducted in 1985 and 1990.

Either approach to data collection has its benefits and drawbacks. To combat the danger of cherry-picking sources, Giovanni R. Ruffini argues that a historical network analyst must use data from all sources or data from only one.[44] Any constructed network inevitably reproduces whatever selection bias exists in the source itself, and the historian who relies exclusively on a single source has to face an almost insurmountable challenge to give a convincing argument about whether any structural pattern observed in the constructed network pertains to actual historical relationships or merely the representation of history in the chosen source. Moreover, a single source often fails to provide adequate data for addressing many historical questions. For instance, to investigate the structural and spatial features of Wuzhou men's kinship and intellectual networks, BOL needs data on ancestry, marriage, literary exchanges, and so forth. These data are scattered throughout large numbers of biographies, letters, and other literati writings, and to assemble data from these diverse sources is not a choice but a necessity.

Nonetheless, to collect and synthesize data from a wide range of sources is not without its own methodological challenges. Historians who adopt this approach may find it difficult to assess how the constructed network is distorted by the ensemble of biases embedded in the diverse body of source materials. Do these

44 Giovanni R. Ruffini, "An Epilogue. Social Network Analysis and Greco-Roman Politics," *Journal of Historical Network Research* 4 (2020): 335.

biases cancel each other out? Or do they amplify each other? There is no easy answer to these questions. Yet one has to recognize that these are perennially nagging issues that confront all historians, and that they are not unique to those who practice formal network analysis. In traditional historical research, these thorny issues have not led historians to confine themselves to a single source. Rather, a historian's work has typically benefited from piecing together anecdotal information from different sources and from studying a person's life from multiple angles, each of which is often accentuated in a particular genre of historical texts.

Therefore, instead of limiting the range of sources one uses to reconstruct the network, it is perhaps more sensible for historians to do what we have always been good at doing: to stay intellectually vigilant at every step of the analysis and make our decisions transparent. Historical network analysis is an assiduous practice. The analyst starts with defining nodes and edges and converting historical records into datasets. They move on to graph the network, measure its structural properties, and then develop a historical interpretation based on the graphs and metrics. Every step in this process involves judgment. Constant intellectual vigilance requires that the analysts make choices at every step that are informed by their knowledge of possible source biases. They must be fully transparent with these choices and make their dataset available to readers who may want to reevaluate its quality, or use it to test alternative hypotheses and assess the robustness of the findings (e.g., by weighting the ties differently and using different parameter values).

Ruffini dreams of historical network research that uses "data from *all* sources" but implores that this is often "a practical impossibility." He envisions that one day someone will create a "platform…capable of reading any literary, documentary or epigraphic data and generating standardized data-sets of connections customized in response to user-controlled criteria."[45] Many scholars in the China field share his visions and have set out to turn them into reality. The Historical Social Network of Chinese Buddhism project, which Marcus BINGENHEIMER introduces in this special issue, is a large dataset consisting of approximately 17,500 actors and 25,000 links, spanning from the late third century to the early twentieth century. The data was based on thoroughly marked-up biographical literature of Chinese Buddhism and the Buddhist Studies Authority Database.[46] The undisputedly largest and most comprehensive database for Chinese history is the China Biographical Database (CBDB) project discussed by Michael FULLER and WANG Hongsu in this issue. The long-term goal of the CBDB is to collect all significant biographical information from all sources of Chinese history before the twentieth century. As of May 2021, it already contains biographical data

45 Ruffini, "An Epilogue. Social Network Analysis and Greco-Roman Politics," 335.

46 On the Buddhist Studies Authority Database, see Buddhist Studies Authority Database Project, "Introduction," https://authority.dila.edu.tw/ (accessed August 21, 2021).

for approximately 491,000 individuals, spanning from the seventh through nineteenth centuries. By systematically collecting diverse categories of biographical data from different sources and integrating them into a single relational database, the CBDB offers a treasure trove where everyone can set their own querying parameters according to their individual research needs and quickly "check out" a subset of structured data for academic use. More importantly, as it attracts more users and contributors, the CBDB coding practices (e.g., how to code kinship and non-kin social relations) will likely gain greater influence and help build consensus among China historians. In this sense, the CBDB is on its way towards setting a gold standard in the global community of China studies for transforming historical narratives into structured data. Today, the CBDB has been an integral part of a burgeoning digital humanities ecosystem for Chinese studies. Its API bridges the CBDB and more specialized databases (e.g., Ming-Qing Women's Writings Database[47]); its code tables for offices, places, persons, and so forth are used in online text markup platforms (MARKUS[48] and DocuSky[49]); it exports query results in several formats that can be directly imported into different spatial and network analysis programs; its data are integrated, along with data from several other systems, into the knowledge graph of the Chinese Text Project Data Wiki[50]; and the CBDB has enabled many innovative studies of Chinese history[51] and become a source of inspiration for a growing list of linked open data projects[52], online data visualization projects, and pedagogical platforms[53] that train the next generation of digital humanists.

For twentieth-century China, however, no equivalent of the CBDB exists. Even though historians can draw on an abundance of published sources from the Republican period (1912–1949 CE) and the People's Republic of China (since 1949), no comprehensive database has yet emerged. Funding logics favoring the digiti-

47 "Mingqing funü zhuzuo" 明清婦女著作 [Ming-Qing Women's Writings Database], https://digital.library.mcgill.ca/mingqing/chinese/index.php (accessed August 21, 2021).

48 Hou Ieong Brent Ho and Hilde De Weerdt, "MARKUS. Text Analysis and Reading Platform," https://dh.chinese-empires.eu/markus/beta/ (accessed August 21, 2021).

49 "Shuwei renwen xueshu yanjiu pingtai" 數位人文學術研究平台 [DocuSky Collaboration Platform], https://docusky.org.tw/ (accessed August 21, 2021).

50 Chinese Text Project, "Linked Open Data and the Semantic Web" https://ctext.org/tools/linked-open-data (accessed August 21, 2021).

51 For a list of publications that use CBDB data, see China Biographical Database Project, "Publications that Use CBDB Data," https://projects.iq.harvard.edu/cbdb/publications-use-cbdb-data (accessed August 21, 2021).

52 For CBDB Linked Open Data developed by Shanghai Library, see China Biographical Database Project, "SPARQL Editor," https://cbdb.library.sh.cn/sparqled (accessed August 21, 2021).

53 For example, see Tsinghua University's Digital Humanities Teaching and Research Platform "Tsinghua daxue shuzi renwen jiaoxue yu yanjiu pingtai" 清華大學數字人文教學與研究平臺 [Tsinghua Digital Humanities Teaching and Research Platform], http://qh.nqcx.net/ (accessed August 21, 2021).

zation of clearly demarcated source bodies and project timeframes have resulted in a number of smaller yet noteworthy projects. One of the pathbreakers in creating biographical databases for the political elites of twentieth-century China is Marilyn LEVINE, who combined data collected from archival and published sources with insights gained from interviewing cadres to form the "Chinese Biographical Database" (CBD). Two projects have produced datasets focusing on progressive women of the first half of the twentieth century. One is Academia Sinica's (Taiwan) "Authorship of Chinese Women's Periodicals" (ACWP) database, which has already allowed users to download the data of ego networks.[54] The second project on "Chinese Women's Magazines in the Late Qing and Early Republican Period" is based at Heidelberg University and has now expanded to include relational data linking not only persons and texts, but also signifying interpersonal social relationships (see Matthias ARNOLD and Henrike RUDOLPH in this issue). Christian Henriot and his team at Aix-Marseille University have started a renewed attempt to create a more comprehensive "Modern China Biographical Database" (MCBD) with an integrated "Modern China Geospatial Database."[55] These databases will greatly facilitate geospatial analysis of modern Chinese history, which has been impeded by the repeated restructuring of administrative units, changing place names, and urbanization.

Baptiste BLOUIN, Nora van den BOSCH, and Pierre MAGISTRY show in their contribution how they addressed the challenges of processing Chinese-language sources and applied named-entity recognition techniques, which are particularly challenging for Chinese as a logographic system. The resulting lists of named entities, whether of persons, places, or institutions, will facilitate text encoding in future projects that make use of digitized Chinese sources.

7. Challenges and Potentials

As a nascent field, the study of Chinese historical networks still faces many challenges. Instead of seeing them as an indication of methodological or theoretical flaws of the network approach, we believe that these challenges demonstrate the potential in this bourgeoning field of research and that they call for further intellectual innovation and collaboration.

54 Institute of Modern History, Academia Sinica, "Funü qikan zuozhe yanjiu pingtai" 婦女期刊作者研究平臺 [Authorship of Chinese Women's Periodicals], http://mhdb.mh.sinica.edu.tw/ACWP/index.php (accessed September 1, 2021).

55 ENP China, "Modern China Biographical Database," https://heurist.huma-num.fr/h6-alpha/?db=ModernChinaBiographicalDatabase&website&id=109237&pageid=109242 (accessed September 1, 2021).

We are yet to realize the full explanatory potential of network analysis in historical research. First, the majority of the present scholarship on Chinese historical networks remains descriptive and static in nature. A great deal of work is devoted to describing the structural features of historical networks at a given moment of history and comparing network structures between different historical periods. These structural features are typically treated as *outcomes* that need to be explained by other historical factors, such as war and migration, institutional arrangements, technological innovations, and cultural shifts. We are yet to fully explore how historical networks may have constrained or empowered individual actors and thereby could provide *explanations for* historical change. Second, we have not adequately explored the dynamic and evolution of historical networks. Few studies discuss how historical actors strategically shaped the network in which they participated or how they mobilized resources in the network to achieve their ends. In brief, the temporal dynamics of historical networks and the explanatory potential of these networks for historical change[56] remain largely uncharted territory in the field of Chinese studies.

Also, we have only started to explore how to best operationalize network concepts in historical studies. When we apply network analysis to historical relationships that are not between natural persons, the question arises as to how we define a "node." In the network of bureaucratic offices, should we code the magistracy of each county as a node, or should we code the position of magistracy as a node regardless of its geographic jurisdiction? When we take a network approach to intellectual writings, should we code each word as a node, or should we code each concept – which historical writers may have expressed using different terms – as a node? We need to mull over what social theory, empirical studies, and historical research exist to justify the way we classify and weight different kinds of social interactions and relationships (e.g., any theoretical and empirical grounds for weighting kinship relations, teacher-disciple ties, and letter exchanges similarly or differently). Some authors in this issue have begun to address these methodological concerns. They have been forthright about their choices, and many have tested the robustness of their conclusions under alternative definitions and weightings of nodes and edges.

Theory provides more than justification. As XIONG shows with the "four-continent theory," abstract models are a source of inspiration for historical work. Like Weberian ideal types, they provide useful analytical constructs for conceptualizing historical networks. Yet using theoretical models as a guide for exploring historical networks often poses challenges, not only because historical sources are

56 For an example of a historical study that nicely handles some of these issues, see Padgett and Ansell's work on the Medici family. John F. Padgett and Christopher K. Ansell, "Robust Action and the Rise of the Medici, 1400–1434," *American Journal of Sociology* 98, no. 6 (1993): 1259–319.

often fragmentary but also because many models were originally constructed as mathematical representations of materially different network phenomena, such as connectivity in the World Wide Web. Moreover, some algorithms for measuring network properties (e.g., Google's PageRank) were first developed to accomplish specific tasks in a very specific type of networks (e.g., to rank web pages discovered by the search engine). Although they are included in some network analysis programs for general use, it is still up for discussion whether these algorithms are meaningful for historical networks and how we should interpret their outputs. These challenges suggest that it may not be adequate to simply "borrow" existing theories and tools for historical analysis. These inadequacies underscore the need for a more constructive dialogue between historians, sociologists, mathematicians, and computer scientists who work on past and present networks, graph theory, and network analysis algorithms.

Interdisciplinary collaboration has been particularly fruitful in increasing the digital availability of Chinese sources. In the past two decades, computer scientists and humanities scholars have made concerted efforts to resolve issues of character recognition, word and sentence segmentation, the detection of reading directions, text markup, and data extraction (for example, see FULLER and WANG in this issue). Although solutions to these issues still leave much room for improvement, historians of China can now delve into vast digital resources and employ digital tools that would surely have made previous generations of scholars envious. For archival sources from the People's Republic of China, however, the picture is somewhat mixed. Here, digitization efforts had adverse effects. The systematic cataloging and scanning of archival sources facilitated state censorship, especially regarding documents that might challenge official narratives of twentieth-century history. Yet even here, network analysis offers new perspectives as it allows scholars to make full use of the available published sources while combining them with the archival sources that remain accessible because they were deemed not worthy of censorship, such as economic statistics or inventories.

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