



GIS, Prosopography, and History

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GIS, Prosopography, and History

Abstract

This study of the early spread of Neo-Confucianism as an intellectual-social movement in southern China in the twelfth century, applies geospatial analysis to a prosopographical study of the social networks of leading figures. By analyzing the spatial distribution of intellectual networks we see that Neo-Confucianism was most successful in areas that had strong traditions of investment in education but that were generally marginal to the commercial economy of the times. The research draws on data from the China Biographical Database, which includes data on the social associations, kinship, careers and addresses of over 40,000 Song dynasty figures and the China Historical GIS, a times-series database of administrative units from 221 BCE to 1911 CE. Intellectual history traditionally has focused on the transmission of ideas; network and spatial analysis helps explain why some areas were more receptive to certain ideas than others.

During the mid-twelfth century a new kind of Confucianism, called the “Learning of the Way” (*Daoxue*) and referred to here as “Neo-Confucianism,” began to spread among local literati, despite a generally unsympathetic court. In contrast to earlier forms of Confucianism, the new movement had well-defined leaders such as Zhu Xi, Zhang Shi, and Lü Zuqian, who shared a vision focused on the cultivation of a common moral human nature, a new theory of learning and a new philosophical vocabulary, and who promoted new social institutions to put the teaching into practice. Neo-Confucianism was both an intellectual and a social movement among the elite. As will be shown below the social networks that marked its spread had obvious spatial characteristics, and this suggests that an explanation for its spread needs also to account for the spatial pattern revealed by mapping its networks.

Attention to the networks among thinkers has played an important role in the study of later imperial thought as intellectual history begins with Huang Zongxi’s study of Ming dynasty (1368-1644) Confucianism, followed by his study of Song (960-1279) and Yuan (1280-1367) scholarship as completed by Quan Zuwang and extensively supplemented by Wang Zicai and Feng Yunhao.¹ A case study in these texts takes a single person as the progenitor of a “school” and then lists students and intellectual associates. This turned out to be a persuasive way of organizing information about intellectual trends and still continues to influence our study of intellectual history.

¹ Huang Zongxi 黃宗羲, *Ming Ru Xue an* 明儒學案 (Beijing: Zhonghua shu ju, 2008), Huang Zongxi 黃宗羲 and Quan Zuwang 全祖望, *Song Yuan Xue an* 宋元學案 (Beijing: Zhonghua shu ju, 1986), Wang Zicai 王梓材 and Feng Yunhao 馮雲濠, *Song Yuan Xue an Bu Yi* 宋元學案補遺, Siming Cong Shu (China: Siming Zhang shi yue yuan 四明張氏約園, 1937).

There is some truth to the notion that students make the teacher, that is, an intellectual figure is important because he has students and the students make his reputation. But in the tradition of biographic writing it is also true that once a person becomes famous many people who had a only short encounter with him claim his as their teacher. This seems to me to explain why an analysis of 25,000 short biographies in Wang Deyi's index of Song biographical materials reveals that the one person who most often appears in the biography of others is Zhu Xi, about three times as often as all the runners up: Qin Kui, Su Shi, Wang Anshi, etc.² Even if we grant the claim to having been a student of Zhu, it does not necessarily follow that the individual in question ever, or continued to, share Zhu's views. This is evident from Chen Rongjie's (W. T. Chan's) identification of around 500 "disciples" of Zhu Xi, which does offer positive evidence that a person was at one point student, but rarely can show that there was the sort of continued relationship that Zhu had with his principle correspondents such as Lü Zuqian and Zhang Shi.³ Still, claims made for a connection to Zhu Xi can at least be taken as an indicator of Zhu's importance. Thomas Wilson has argued convincingly that Neo-Confucians favored a genealogical approach to intellectual affiliation, but also that they tended to retrospectively construct genealogies in defense of their own positions, an activity much in evidence in the late Ming but also one in which Zhu Xi himself engaged in defining the origins of Daoxue, in which he problematically credited Zhou Dunyi with being an inspiration for the Cheng brothers, the real philosophical founders of Neo-Confucian philosophy in the eleventh century.⁴

However, there is a second feature to Huang Zongxi's's studies, for not only did he identify an individual as the progenitor of a school he also frequently named the school by the place with which the progenitor was associated. It is this geographic approach to thinking about intellectual history and social networks that I wish to address. This is not a new idea. Over fifty years ago He Yousen wrote on the "Geographical Distribution of Intellectual Trends during the Northern and Southern Song" with a series of maps of intellectual affiliations.⁵ Based on the scholarly affiliations of major intellectuals and taking into account where they were teaching, He described the shift in the centers of

² "Song Ren Zhuan Ji Zi Liao Suo Yin Dian Zi Ban 宋人傳記資料索引電子版," As of 2005, 中央研究院史語所. The analysis was based on a text-mining procedure in which the co-occurrences of the 25,000 names of the biographical subjects were mined in the all 25,000 biographies. This missed those people who do not have biographies in this dataset but none of them would rival the numbers of the leading figures.

³ Chen Rongjie 陳榮捷, *Zhuzi Menren 朱子門人* (Taipei: Xuesheng shuju, 1982).

⁴ Thomas Wilson, *Genealogy of the Way: The Construction and Uses of the Confucian Tradition in Late Imperial China* (Stanford: Stanford University Press, 1995).

⁵ He Yousen 何佑森, "Liang Song Xuefeng De Dili Fenbu 兩宋學風的地理分佈," *Xinya xuebao* 1.1 (1955).

intellectual activity from the north to various regions in the south (Liangzhe, Fujian, and Sichuan) and pointed out that this shift began during the Shenzong reign (1067-1085), and thus cannot be attributed to the loss of the North China plain to the Jin. Yang Yuan, in an 1982 article on the spatial distribution of chief and vice councilors, found the same southward shift dating to the Shenzong reign.⁶ In short, the spatial distribution of political and intellectual leadership (in Northern Song the two were closely related, with all but a handful of political leaders being products of the examination system) tracks the demographic and economic growth of the south.

Both these studies were based on careful prosopographical research and dealt with limited, but not insignificant, numbers of people. He Yousen made extensive use of the *Song Yuan xue'an* and Yang Yuan had recourse to the table of councilors in the *Song History*. This study takes a different approach, it aims to maximize the number of people included and to look for patterns in larger trends. This approach, the value of which will be tested by what follows, depends upon having access to extensive data.

The Data

With one exception this study relies on the *China Biographical Database* (CBDB), a data collection project that began with the late Robert Hartwell and has grown considerably through the combined efforts of the Institute of History and Philology at Academia Sinica, an editorial group led by Deng Xiaonan at the Center for Research on Ancient Chinese History at Peking University, and text-mining and database management group at the Fairbank Center for Chinese Studies at Harvard University led by Peter Bol and Stuart Shieber with Michael A. Fuller at the University of California Irvine.⁷

CBDB is a relational database, searchable online and freely available for downloadable as a stand-alone database. It is constantly growing: as of June 2011 it had varying amounts of data on over 112,000 individuals, over 41,000 of whom were from the Song dynasty.⁸ In brief, the project harvests data from various sources, including biographical

⁶ Yang Yuan 楊遠, "Bei Song Zaifu Renwu De Dili Fenbu 北宋宰輔人物的地理分佈," 香港中文大學中國文化研究所學報 *The Journal of the Institute of Chinese Studies of the Chinese University of Hong Kong* 13 (1982).

⁷ A description an history of the project will be found at the CBDB website, <http://isites.harvard.edu/icb/icb.do?keyword=k16229>.

⁸ "The China Biographical Database," 2011, Harvard University Fairbank Center for Chinese Studies
Academia Sinica Institute of History and Philology
Peking University Center for Research on Ancient Chinese History, Harvard University Fairbank Center for Chinese Studies, Academia Sinica Institute of History and Philology, Peking University Center for Research on Ancient Chinese History, <http://59.124.34.70/cbdbc/ttsweb?@0:0:1:cbdbkm@@0.10566209097417267>. The version used in this study is 20110624CBDBw.mdb, available for download at the CBDB website.

indices such as Wang Deyi's revised electronic edition of the *Song Biographical Index*,⁹ funerary inscriptions, Li Zhiliang's compilations of prefectural officials,¹⁰ literary collections, etc. The crucial aspect of the database is that it organizes biographical data by category, making it possible for the user to query the database from many angles. The categories are:

- Basic biographical data: name, dates, and source
- Alternate names: courtesy names, studio names, etc.
- Biographical addresses: place of birth, actual residence, registered residence, burial, etc.
- Entry into office: examinations, protection privilege, etc.
- Offices: ranks and offices held and address of local offices
- Kinship: any kinship relation
- Association: intellectual, literary, political, and other associations between two people
- Writings: the titles of books, often with bibliographic classification, by an individual
- Social distinction: qualities that distinguished a person such as poet, monk, civil official, etc.

Organizing information in this fashion allows one to create sophisticated queries. For example, one could ask how many of the people from a certain place who entered office through protection privilege during a certain time period were related to each other through marriage. Moreover, database queries are not limited to the data gathered on an individual. Thus, for example, the database allows one to extend a social network from an individual to the associates of his associates or query kinship connections across as many

⁹ "Song Ren Zhuan Ji Zi Liao Suo Yin Dian Zi Ban 宋人傳記資料索引電子版."

¹⁰ Li Zhiliang 李之亮, Song Chuan Shan Da Jun Shou Chen Yi Ti Kao 宋川陝大郡守臣易替考 (Chengdu: Ba Shu shu she, 2001), Song Fujian Lu Jun Shou Nian Biao 宋福建路郡守年表 (Chengdu: Ba Shu shu she, 2001), Song Hebei Hedong Da Jun Shou Chen Yi Ti Kao 宋河北河東大郡守臣易替考, Song Liang Guang Da Jun Shou Chen Yi Ti Kao 宋兩廣大郡守臣易替考 (Chengdu: Ba Shu shu she, 2001), Song Liang Hu Da Jun Shou Chen Yi Ti Kao 宋兩湖大郡守臣易替考 (Chengdu: Ba Shu shu she, 2001), Song Liang Huai Da Jun Shou Chen Yi Ti Kao 宋兩淮大郡守臣易替考 (Chengdu: Ba Shu shu she, 2001), Song Liang Jiang Jun Shou Yi Ti Kao 宋兩江郡守易替考 (Chengdu: Ba Shu shu she, 2001), Li Zhiliang 李之亮, Song Liang Zhe Lu Jun Shou Nian Biao 宋兩浙路郡守年表 (Chengdu 成都: Ba Shu shu she 巴蜀書社, 2001), "Song Ren Zhuan Ji Zi Liao Suo Yin Dian Zi Ban 宋人傳記資料索引電子版."

generations as desired.¹¹ The only constraint is set by the existence of data and the extent to which it has been integrated into CBDB.

The way in which data is acquired has bearing on the contents. In 2008 the CBDB project switched from manually inputting data from individual biographies to the mining of as many as 25,000 biographies at once. Manual inputting meant that editors might discover suspect or conflicting accounts and resolve them by consulting the original sources. In contrast, the text-mining method produces thousands of data points by category (e.g., all 字 or courtesy names in the dataset) which, after editorial review, are loaded into the database. Although efforts have been made to avoid duplication, data that conflicts with existing data is accepted, as when different sources may offer different places of residence (CBDB in principle treats these as “alternates,” leaving only one place of residence for query purposes). The database thus reflects inconsistencies in the historical sources.

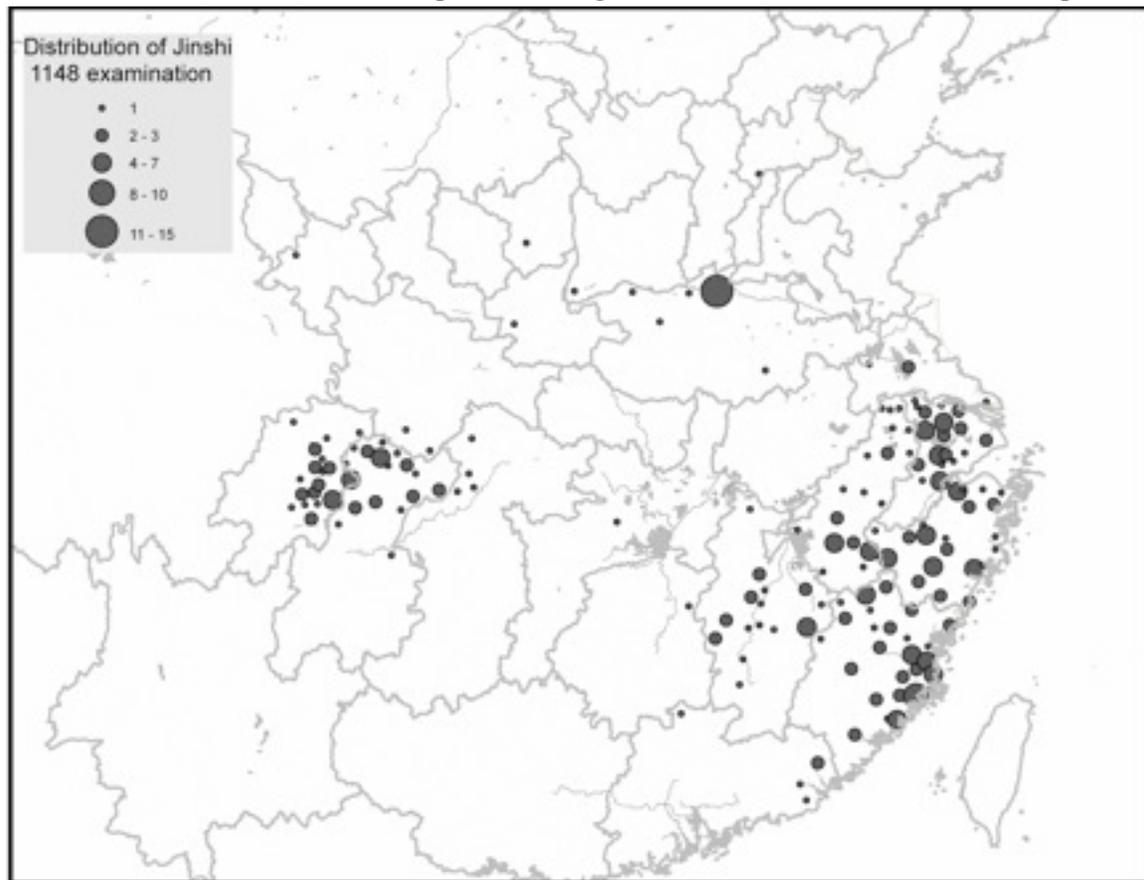
This approach aims at maximizing coverage rather than gathering data on individuals in depth. The assumption is that as new sources are mined over the years and more data is acquired the coverage of any individual will become ever more complete. This is already apparent in the number of social associations discovered for Song figures, which far exceeds what can be found in an individual’s biography but which would not exhaust what could be found by working through a person’s literary collection and the hundreds if not thousands of poems addressed to others. Maximizing coverage, at the expense of in-depth prosopographical studies of individuals, gives many more data points than individual researchers could discover by themselves. CBDB assumes that thousands of examples will give us a fair sampling, despite missing data and inconsistencies.

Locating intellectual centers

This study uses cumulative success of a given place in producing successful candidates for the highest civil service examination degree, the *jinshi* degree, as a proxy for the degree of investment in education in a given place. At the prefectural level a quota ensured that the number of successful candidates sent on to the capital would be proportionate to the number of applicants. I suppose further that although the metropolitan examinations were blind, the rate of success was likely to reflect the number of participants from a given place and to favor those places that offered the best educational opportunities. Although, as John Chaffee has shown, it is possible to reconstruct the origins of a majority of degree holders from local gazetteers, thus favoring

¹¹ For a more extensive account of the CBDB structure and query capabilities see Michael A. Fuller, *The Cbdb User’s Guide*, Second ed. (Cambridge: China Biographical Database Project, 2011). available from the CBDB website.

the southern provinces in Southern Song,¹² there are only complete degree rosters from 1148 and 1256. The counties that produced degree holder in 1148 are shown in Map 1.

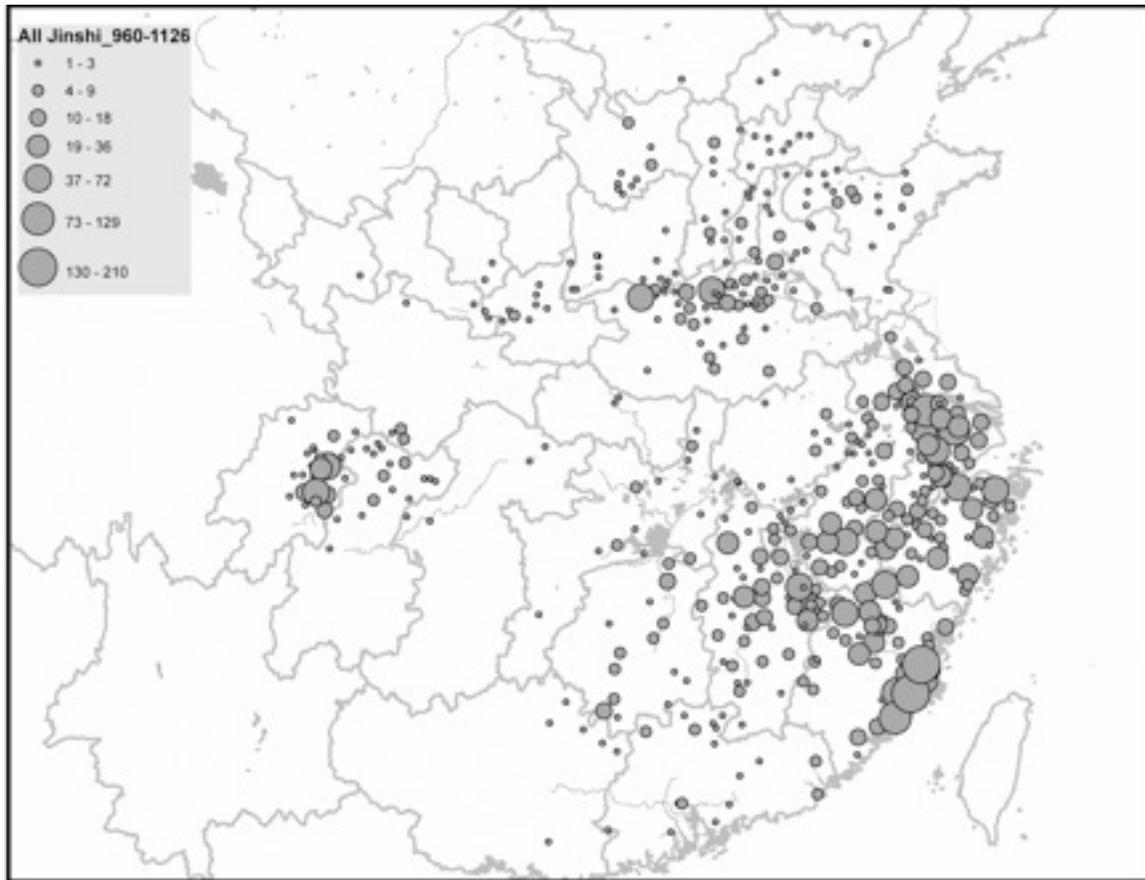


Map 1: Jinshi from the 1148 Examination

It is evident that in 1148, degree holders came from only a few circuits: Liangzhe East and West, Fujian, Jiangnan East and West, and western Sichuan. The largest single group, however, were refugees from the north who still listed Kaifeng as their household registration.

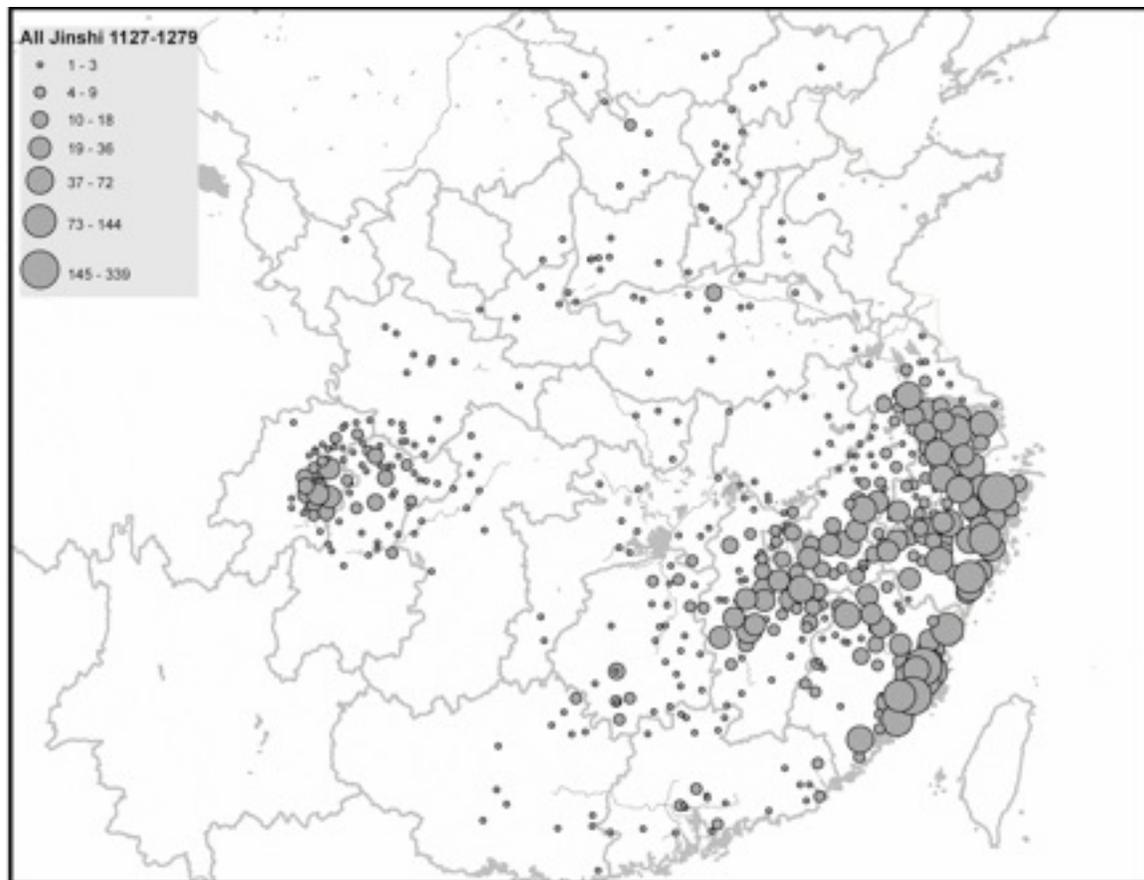
Southern Song did not have regional quotas, and the spatial distribution in Map 1 is not commensurate with the distribution of population or the placement of prefectural and county seats. But was 1148 an aberration? We can test this by generating two other datasets from CBDB. The first is a list of 4073 Northern Song (960-1126) *jinsi* in the database. This is not a record of all those who passed the examinations. It is instead a record of all those who passed the examination who entered the historical record. Thus even if we suppose a different spatial distribution of degree holders, it would still be the case that what we are seeing in Map 2 are the locations of those among them who in some way or another came to be recorded in historical sources.

¹² John W. Chaffee, *The Thorny Gates of Learning in Sung China: A Social History of Examinations* (Cambridge: Cambridge University Press, 1985).



Map 2: 4073 Northern Song *Jinshi*

If we exclude north China from consideration, the Northern Song map affirms the spatial distribution of 1148, with the exception that Northern Song included more men from the Middle Yangzi and the far south. Map 3 is based on 6150 Southern Song degree holders in CBDB.



Map 3: 6150 Southern Song *Jinshi* (northern locations include Jin dynasty *jinshi*)

Now the clustering is even more pronounced. Mapping the location of Southern Song authors and academies, both of which are available in CBDB but not shown here, confirms the same pattern. This tells us that from a geographical perspective the intellectual history of the period unfolded in the southeastern and western Sichuan circuits. If we want to look at intellectual movements in local society we now know which prefectures and counties we should pay attention to.

Social networks

Social network analysis has become highly sophisticated and mathematically challenging, but is supported by a number of software packages. The challenge is to gather data on the associations between individuals. In contrast to work on contemporary networks, where data can be gathered from surveys and observation, such as in the study of friendship networks in a classroom of students, the analysis of social networks in historical studies comes up against the fact that although individuals meet many people during their lives, biographers typically cite only those they judge to be of consequence. However, historical network analysis can go beyond biographical records and find evidence of associations from other sources, such as lists of those purged for opposition to the court,

coterminous membership in leading political organs, and evidence of literary exchanges. Even limited data can provide insights into the relative centrality of those involved.¹³

This study is concerned with the geography of social connections: where the associates of an individual come from. The data in CBDB rarely tells us where and when a tie between two people is formed, but it does cite the evidence for a tie between them. Much of this evidence comes in the form of the writings one person composed for another, such as sacrificial prayers (祭文) and prefaces for books (序). The relationship can be described in two ways—if X wrote a sacrificial prayer for Y then we can say that Y had a sacrificial prayer written for him by X—with one side being the sender and the other side the receiver. This can be deceptive. The writer of a sacrificial prayer does so after the death of the subject, but the writer of a book preface may do so long after the death of the book author or he may do so at the behest of the author during his or her lifetime. In either case we can suppose that X had a tie to Y, although it might be a post-mortem tie.

CBDB codes many different kinds of association, but as the Table 1 shows, the bulk of the data refers to writings.

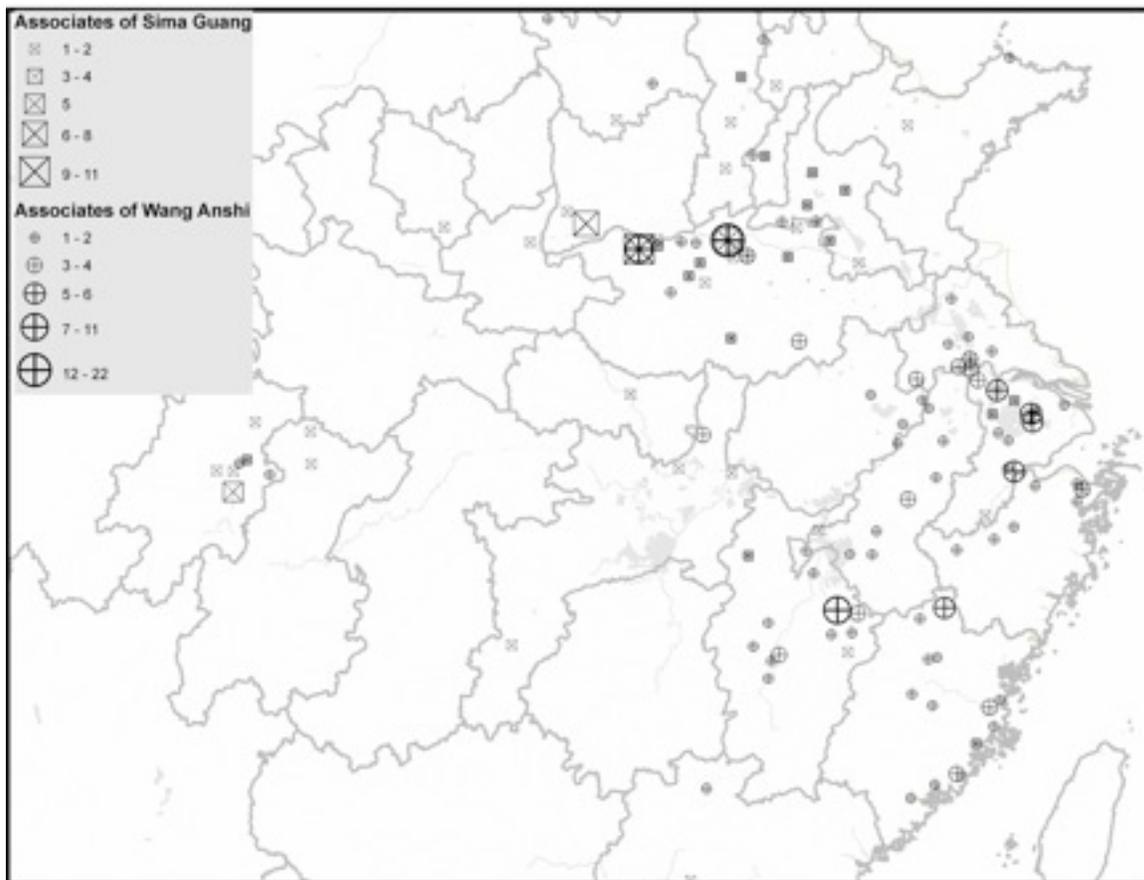
Number of Records in CBDB	Social Association	社會關係
8039	Epitaph written for	為Y作墓誌銘
3936	Postface written for book by	為Y所著書作跋
3815	Prefaced book by	為Y所著書作序
2471	Sacrificial prayer written for	為Y作祭文
2235	Departure note sent to	為Y作臨別贈言(送別詩、序)
2034	Building inscription composed for	為Y之建築物題詠、記、命名
1366	Presented literary composition as gift to	贈詩、文
1366	Received literary composition as gift from	收到Y的贈詩、文
1011	wrote colophon to the writings of	為Y之詩文作跋
987	Friend of	友
928	Recommended	推薦
868	Tomb stone (mubiao) written for	為Y作墓表
811	Biographer of	為Y作傳
772	Postscripted calligraphy or painting of	為Y之書、畫作跋

¹³ For a brief discussion of the historical network analysis see Charles Wetherhall, "Historical Social Network Analysis," *New Methods for Social History*, eds. Larry J. Griffin and Marcel van der Linden, *International Review of Social History*; V. 43. Supplement 6 (Cambridge; New York: Cambridge University Press, 1998). Important examples of historical network analysis, both of which offer insights for Chinese history are Padgett's account of how Cosmo d'Medici provided the link between distinct groups, see John F. Padgett and Christopher K. Ansell, "Robust Action and the Rise of the Medici, 1400-1434," *American Journal of Sociology* 98 (1993), and Peter S. Bearman, *Relations into Rhetorics: Local Elite Social Structure in Norfolk, England, 1540-1640*, The Arnold and Caroline Rose Monograph Series of the American Sociological Association (New Brunswick, N.J.: Rutgers University Press, 1993).

626	Menren of	為Y之門人
586	Funerary stele written for	為Y作神道碑
564	Biographical sketch (xingzhuang) written for	為Y作行狀
556	Duets composed with	相唱和
546	Student of	為Y之學生
503	Portrait eulogy written for	為Y作畫贊(畫像記)
491	Buddhist temple stele written for	為Y作佛寺記
433	Explanation of capping name (zixu or zishuo) composed for	為Y作字說、名述
430	Elegy written for	為Y作挽詩、詞
407	Lamentation prayer written for	為Y作哀辭
401	School stele written by	學記(書院記)由Y所作
400	School stele written for	為Y作學記(書院記)
370	Shrine inscription written for	為Y作祠記
370	Shrine inscription written by	祠記由Y所作
355	followed	從Y遊
350	Praised or admired	欣賞/器重
317	Personnel administration (CJ)	(暫時保留, 待刪除: 吏部供職)
254	Studied with	從Y學
237	Ancestral stele or records written for	為Y作世系碑記
231	Served in the same bureau with	同僚
226	Impeached	彈劾
223	Congratulatory note sent to	向Y致賀
217	Yuanfu coalition member	元符上書入籍者
217	Friend in the same graduating class	同年友
203	wrote preface for the literary works of	為Y所作詩文作序
203	preface to literary works was written by	詩文序由Y所作
188	Discussed scholarship with	論學
176	Opposed or attacked	反對/攻訐
172	Purged	排擠
167	Tongxue was	同學、同門
164	Posthumous name essay written for	為Y作諡議
146	Retainer of	為Y之門客
132	Disciple (dizi) of	為Y之弟子
127	praised the political accomplishments of	稱道Y之政績
125	Sent letter to	致書Y
120	Listed in Yuanyou coalition register	入元祐黨籍者
119	Member of the school of	為Y學派的成員
117	Study motto for	為Y作齋、堂銘
112	Officer under command of	為Y之部將
112	Patron of (= Client was)	是Y的恩主
104	proceeded with (friendship)	與Y遊

Table 1 Social Associations in CBDB with over 100 instances, showing only one direction

To illustrate this approach, and prepare a contrast for what we shall see in Southern Song, consider Map 4, which compares the social networks of the two leading politicians and political thinkers, and opponents, of the latter half of the eleventh century, Wang Anshi 王安石 (1021-1086) and Sima Guang 司馬光 (1018-1086). For both I have included associates who 1) were not known to be opponents and 2) reached their sixtieth year sometime between 1035 and 1115. Only unique persons are mapped to their places of residence; the map does not reflect the strengths of ties as indicated by number of documented associations between any two persons although this information is available from the database.

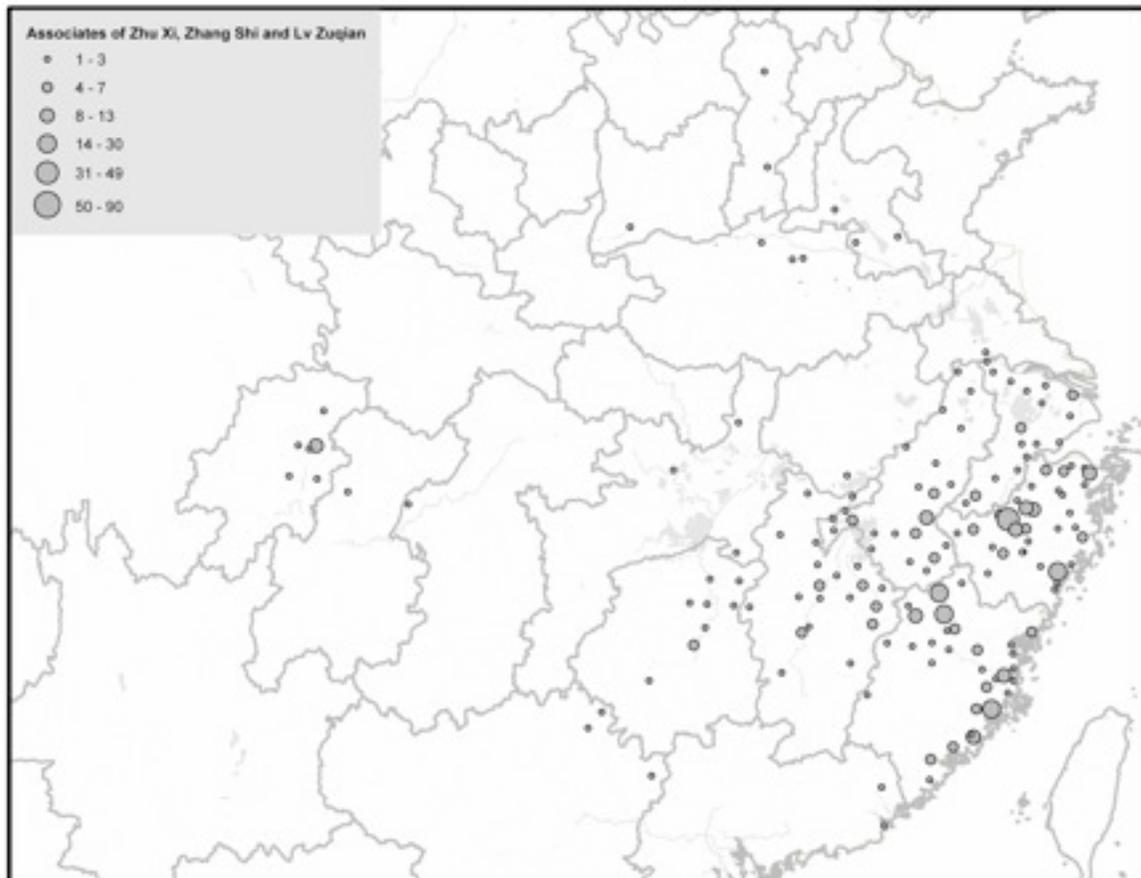


Map 4 Places of Residence of Associates of Wang Anshi and Sima Guang, for associates reaching 60 *sui* between 1035 and 1110, excluding their respective opponents

Scholars have pointed out that it is too simple to see Wang as representing the south and Sima Guang the north, and it is evident here that both had numerous associates in Kaifeng and Luoyang, residential centers for bureaucratic families. We can see that both men had national networks, but it is also obvious (and a density analysis proves this) that their respective centers of gravity are distinctly southern and northern, and in fact among the hundreds of men associated with them there is only once case of overlap between their respective associates (Fan Zhongyan).

Daoxue Leaders and Their Networks in the Late Twelfth Century

Zhu Xi 朱熹 (1130-1200), Zhang Shi 張栻 (1133-1180), and Lü Zuqian 呂祖謙 played important roles in the spread of the Learning of the Way (Daoxue) or Neo-Confucianism during the latter half of the twelfth century. They knew each other well, were in frequent correspondence with each other and collaborated on scholarly projects. At first glance, the distribution of their associates (excluding their critics) in Map 5 resembles the distribution of *jinshi* degree holders, as we might expect.



Map 5 Distribution of Associates of Zhu Xi, Zhang Shi and Lü Zuqian

Turning to the southeast in greater detail, however, we see that the distribution through the southeast is not uniform.



Map 6 Associates of Zhu, Zhang, and Lü in the Southeastern Circuits. Prefectural boundaries from the China Historical GIS v. 5.0

When we break this down into three separate maps, we see that that the associates of Lü Zuqian, residing in Wu zhou, Zhang Shi residing in Heng zhou, and Zhu Xi in Jianning fu were more tightly clustered than Map 6 at first suggests.



Map 8 Associates of Zhang Shi

Map 9 Associates of Zhu Xi

Although in their own lifetimes Zhu and Lü were well known figures and travelled to court in Linan Fu (Hangzhou), their networks are narrower than what we saw for Wang Anshi and Sima Guang. But even within their own areas they did not have associates everywhere.

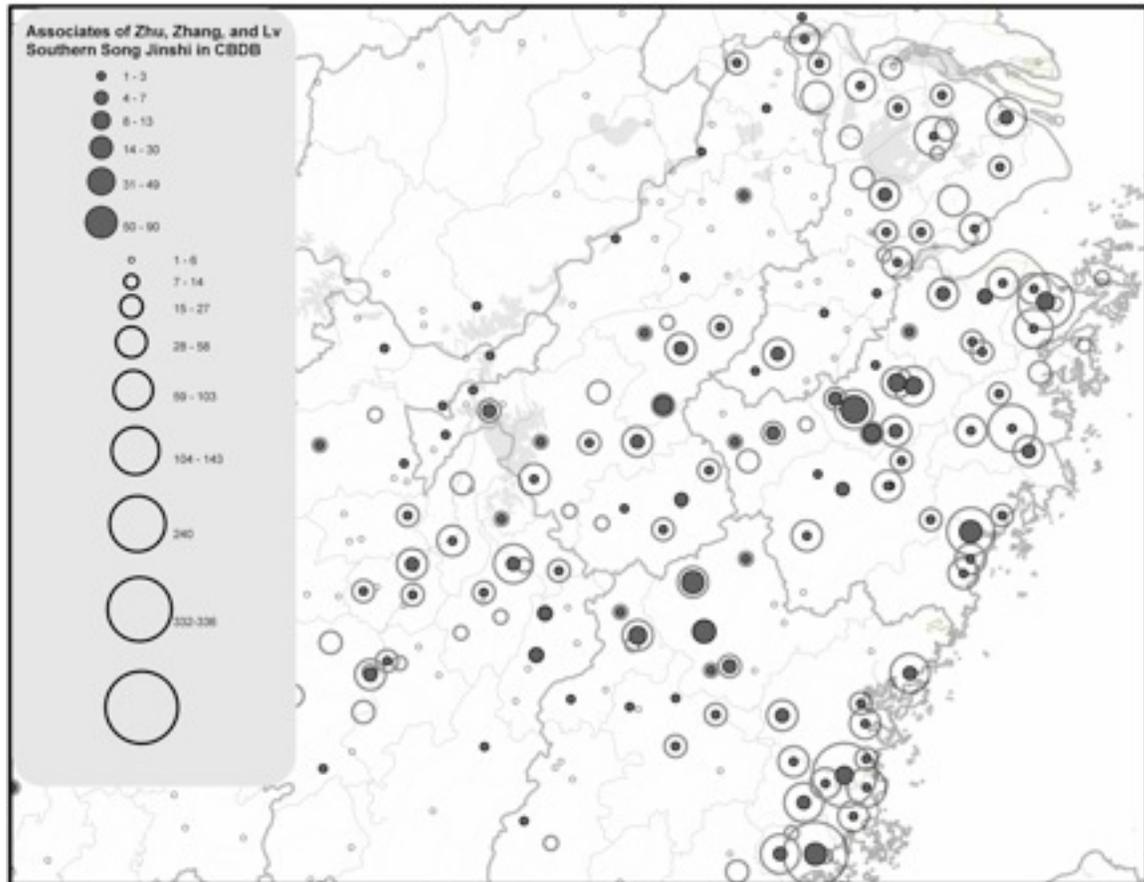
Daoxue, Education, and Commerce

The change in the scope of social networks can be accounted for by drawing on the conclusions of social historians: that as the number of men who regarded themselves as literati and participated in the examination system continued to grow in Southern Song, but the size of government did not, families had ever less hope of placing males in office. At the same time the number of literati families in a given locale with histories of government service inevitably increased over time. The shift away from the court toward engagement with local society – founding private academies, instituting private welfare organizations, organizing lineages and composing genealogies, producing local histories – encouraged building horizontal relationships. Local fame was a way of being nationally significant.¹⁴ Both Zhu and Lü gathered students from the surrounding area around them

¹⁴ Robert P. Hymes, Statesmen and Gentlemen: The Elite of Fu-Chou, Chiang-Hsi, in Northern and Southern Sung. (Cambridge: Cambridge University Press, 1986), Beverley Bossler, Powerful Relations: Kinship, Status, and the State in Sung China (960-1279) (Cambridge, Ma.: Harvard University, Council on East Asian Studies, 1998), Chaffee, The Thorny Gates of Learning in Sung China: A Social History of Examinations, Robert Hartwell, "Demographic, Political, and Social Transformation of China, 750-1550," Harvard Journal of Asiatic Studies 42.2 (1982), Peter K. Bol, "Neo-Confucianism and Local Society, Twelfth to Sixteenth Century: A Case Study," The Song-Yuan-Ming Transition in Chinese History, eds. Paul Smith and Richard von Glahn (Cambridge: Harvard University Asia Center, 2003), Peter Kees Bol, Neo-Confucianism in History, Harvard East Asian Monographs ; 307 (Cambridge, Mass.: Harvard University Asia Center : Distributed by Harvard University Press, 2008), Peter K. Bol, ""The Sung Examination System and the Shih" " Asia Major 3rd ser. 3.2 (1990). Chen Wenyi, "Networks, Communities, and Identities : On the Discursive Practices of Yuan Literati," Ph.D., Harvard University, 2007.

while at home and taught occasionally elsewhere during their careers; this would account for the clustering in Maps 7-9.

But they did not draw uniformly on the surrounding counties and prefectures. One possible explanation is to be found by comparing their networks with the distribution of Southern Song *jinshi* degree holders as shown in Map 10.



Map 10 Southern *Jinshi* ○ and Associates of Zhu, Zhang and Lü ●

Map 10 shows that these Daoxue leaders were most successful in making ties in those places which there had been higher investments in education and more literati, as indicated by the larger number of examination degrees. This stands to reason, I think, given that Neo-Confucians presented themselves in the first place as teachers of a way of learning that was more true to the sages and better for the individual than the examination oriented education system they criticized.

But there were some counties and prefectures with very successful records of examination success where they were less successful, both relatively and absolutely. These were the coastal cities of Fujian and Liangzhe and the heart of Jiangnan, from Hangzhou through Suzhou and Yangzhou to the Yangzi. CBDB has 635 unique persons

associated with Zhu, Zhang and Lü, ninety of whom cannot be located. But of the remaining 545 only 38 resided in Liangzhe West. Why should this be?

A possible answer emerges when we combine the distribution of associates with the new, and much higher, commercial tax quota promulgated in 1077. Map 11 shows the result.



Map 11 Commercial tax quotas as of 1077 for Prefectural and Country seats and Market Towns in Liangzhe East and West and the Associates of Zhu, Zhang and Lü. Source for tax data : *Song huiyao jigao: shihuo 16-17*

I take it as given that the commercial development of Jiangnan continued into Southern Song, and that the Hang-Su region was the heartland of commercial activity. This suggests a second conclusion: Neo-Confucians did well in places with higher levels of investment in education but less well in places where wealth was related to the private commercial economy. On reflection this fits well with what we know about Neo-Confucian social-economic views. In the Southern Song they turned away from ideas of land redistribution and state intervention while promoting the idea of literati elite leadership in local society. But they were not interested in the idea, advanced by statecraft thinkers such as Ye Shi 葉適 from the coastal city of Wen zhou, that government should

invest in infrastructure in support of the commercial economy.¹⁵ They sided with, and drew support from, elite families that depended on the agrarian economy, families that were interested in both the social stability of their locale and in so their own continued (morally-responsible) dominance. Lü Zuqian's Wu zhou was on the border of this commercial region. Lü, from a family of émigré officials, was not a local landowner but he had marriage alliances with one of them and drew students from well-to-do local families. In contrast, Chen Liang from Yongkang in Wuzhou allied himself with commercially oriented statecraft thinkers.

Conclusion: Some Implications for Historical Methodology

Geospatial analysis allows us to see quickly that there are spatial patterns that we might not otherwise think to look for, although if we had we could also have used statistical methods to reach the same conclusion. However, when we use GIS to analyze the prosopographical data that CBDB provides we can aggregate data without giving up access to information on each individual in the dataset. This is not apparent from the maps that are generated using a GIS program, which freeze a view, combine layers of different kinds of data, and are limited in color and size by the costs and technology of printing. In a GIS program the user/reader can add and drop layers, call up the data on individuals that the map has aggregated, and change the symbology.

Certainly reaching the audience through online full-color maps is an improvement over the publication on paper of grayscale versions. Online publication does not, however, offer the capabilities of a GIS program. For some readers a solution will be to provide the GIS files as part of an online publication, although given my experience in using GIS in teaching I am not confident that the audiences we wish to reach will acquire this skill. An alternative is to make a scholarly investment in the use of online mapping platforms as the vehicle for the dissemination of research. At Harvard we have been developing one such platform, WorldMap™, built on open-source programming, which allows users to upload all the layers necessary for their own maps, create stable views or allow users to make changes, control access to their work, and share it with others. Its "ChinaMap" is an

¹⁵ Peter K. Bol, "Reconceptualizing the Nation in Southern Song - Some Implications of Ye Shi's Statecraft Learning," Thought, Political Power, and Social Forces, ed. Ko-wu Huang (Taipei: Institute of Modern History, Academia Sinica, 2002), Ye Shi 葉適, Ye Shi Ji 葉適集 (Beijing 北京: Zhonghua shuju 中華書局, 1961), Zhou Mengjiang 周夢江, Ye Shi Yu Yongjia Xue Pai 叶适与永嘉学派 (Hangzhou: Zhejiang gu ji, 2005).

example of what is possible at the moment.¹⁶ Ultimately the use of geospatial analysis in historical studies will grow as we learn how to share the datasets that we build as part of our research. The China Historical GIS project, on which Harvard and the Center for Chinese Historical Geography at Fudan have collaborated since 2001, through its time-series of the administrative structure from 221 BC to 1911, provides the fundamental GIS necessary for the spatial analysis of historical data.¹⁷ The challenge is create sustainable links online between the dissemination of research narratives, the data we use in that research, and the analytic and visualization tools that we employ in our research.

¹⁶ <http://worldmap.harvard.edu/> “WorldMap is an experimental platform designed for viewing and interpreting maps collaboratively. Today maps come from many sources and take many forms, from paper atlases to digital satellite images to census files. WorldMap aims to pull these and other hard-to-find maps together and make them available to researchers to explore, share, annotate, and remix. WorldMap combines modeling capabilities of Geographic Information Systems (GIS) with current web technologies, and is made available as [Open Source](#) software. Use the hosted version of WorldMap here or [download](#) and run the application on your own server. WorldMap stands on the shoulders of other Open Source projects including AfricaMap, [GeoNode](#), [OpenLayers](#), [PostGIS](#), and [GEOS](#). WorldMap is licensed under Version 3 of the [GNU General Public License \(GPL\)](#).”

¹⁷ To consult the online gazetteer or download the CHGIS GIS files go to <http://www.fas.harvard.edu/~chgis/>. “The main task of the CHGIS relational database is to create unique records for all of the administrative units down to the county (xian) level that were part of the historical dynasties of China from the time of unification (222 BCE) to the end of the dynastic period (1911 CE), and to provide documentation of the sources used to create each record. At the same time records will be created for the various states and confederations independent of those empires, referred to as “Regimes.” The purpose is to create a basic database to contain all the aforementioned administrative units which can be queried and linked to digital geographic objects. In addition, settlements below the county seat level are included for some areas and periods. Settlement data will be further expanded once the basic administrative structure is established.

Queries to the database must allow users to select out the valid administrative units for any date covered by the database, or to find particular historical places by name and by feature type. Each administrative unit record in the database will also define its relationship to the hierarchical organization of the territory of the Dynasty or Regime. For example, a related table will show that a particular prefecture record was part of a particular province for a specific period of time. The hierarchical relationships can be queried repetitively to determine the administrative parent jurisdiction or subordinate jurisdictions, from the Dynasty level down to the county level.

In addition to working directly within the relational database, the users must be able to link each record to a geographic object in GIS. In other words, for a particular prefecture record, the user must be able to find a spatial object to represent the prefecture as a digital map. For prefectures, provinces, regimes, and dynasties CHGIS will digitize both polygons (to represent the area of jurisdiction) and points (to represent the location of the administrative seat). Counties and all other settlement types below the county will be digitized as point features.”

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