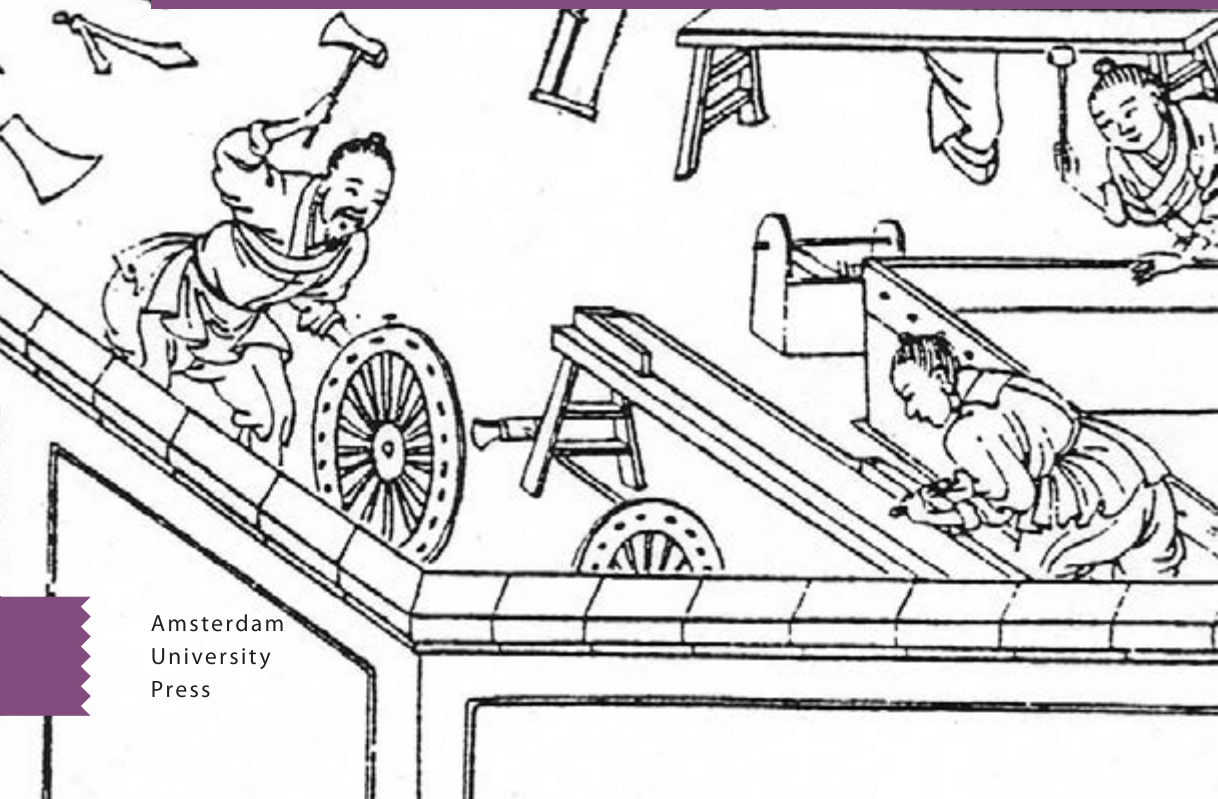




Christine Moll-Murata

State and Crafts in the Qing Dynasty (1644-1911)



Amsterdam
University
Press

State and Crafts in the Qing Dynasty (1644-1911)

Social Histories of Work in Asia

For centuries Asian workers provided their own societies and the world with manufactures, spices, rice and many other items. Recruitment, organization and control of sufficient amounts of labour have been essential to keep the Asian economies and societies going. This series aims at looking into these dynamics in depth, acknowledging the wide-ranging variety of social trajectories including labour values and cultural connotations, ecological constraints and different degrees of market orientations. The series aims to be a meeting place between experts from a variety of disciplines; from linguistics to history and social sciences. The core ambition of the series is to explain different types of labour (share cropping, wage labour, slavery, casual or precarious labour) within a wider cultural, economic and ecological context. Topics such as guilds, circulation of labour, gender stratifications, religious and ethnic identities or modes of labour control are all relevant to this approach. Other topics may be balancing these more structural considerations by departing from the workers' perspectives and their actions: ranging from collective action and daily resistance to life cycles and their relationship to labour. Geographically the series will cover the space from East Asia to West Asia; from Japan to Egypt.

Series Editors

Ulbe Bosma, International Institute of Social History and VU University, Amsterdam

Touraj Atabaki, International Institute of Social History and Leiden University
Claude Chevalerey, École des Haute Études en Sciences Sociales, Paris

State and Crafts in the Qing Dynasty (1644-1911)

Christine Moll-Murata

Amsterdam University Press

Cover illustration: Elements from 'You bei wu huan tu' 有備無患圖 (Illustration to 'Preparedness averts peril') in Qinding Shujing tushuo 欽定書經圖說 (Imperially endorsed illustrations and explanations to the Book of Documents), ed. by Sun Jia'nai 孫家鼐. Beijing 1905, chap. 17, fol. 22a. With friendly permission by Staatsbibliothek zu Berlin – Preußischer Kulturbesitz, East Asia Department, shelf number: Libri sin. N.S. 9214.

Cover design: Coördesign, Leiden

Lay-out: Crius Group, Hulshout

ISBN 978 94 6298 665 7

e-ISBN 978 90 4853 793 8 (pdf)

DOI 10.5117/9789462986657

NUR 692 | 696



Creative Commons License CC BY NC ND (<http://creativecommons.org/licenses/by-nc-nd/3.0>)

© All authors / Amsterdam University Press B.V., Amsterdam 2018

Some rights reserved. Without limiting the rights under copyright reserved above, any part of this book may be reproduced, stored in or introduced into a retrieval system, or transmitted, in any form or by any means (electronic, mechanical, photocopying, recording or otherwise).

Every effort has been made to obtain permission to use all copyrighted illustrations reproduced in this book. Nonetheless, whosoever believes to have rights to this material is advised to contact the publisher.

Table of Contents

Conventions for the notation of time, weights, and measures	11
Acknowledgements	15
Introduction	21
1. State Engagement in the Handicraft Sector	47
2. The Qing Central Government Institutions in Control of the Handicrafts	69
3. The Rise, Decline, and Reinforcement of the Crafts in the Service of the State	109
4. Government Shipbuilding	123
5. Private Shipbuilding, Private and Government Cooperation, and Procurement Prices	157
6. The Shipbuilding Workforce Employed by the State and Private Workshops and Enterprises	183
7. Printing in the Service of the State	213
8. Private Printing, Private and Government Cooperation, and the Printing Workforce	245
9. The Artisan's Place: The 'Four Occupational Groups' and the Social Position of Craftspeople	293
10. Merchant and Craft Guilds	321
Conclusion	349
References	359
Index	391

List of Tables and Illustrations

Tables

Table 1	Artisans and workers in the Song dynasty state workshops, manufactories, and mines	65
Table 2	Yuan dynasty artisans and workers in state workshops, manufactories, and mines	66
Table 3	Ming dynasty work obligation shifts of builders according to the 1393 regulations	67
Table 4	Registered artisans in the Ming dynasty	67
Table 5	Ming dynasty Peking resident artisan positions in 1567	68
Table 6	Estimated Chinese population figures, 960 to 1640	69
Table 7	A variant estimate for population figures in the Ming and the early Qing (million persons)	70
Table 8	Handicraft regulations compiled by the Ministry of Public Works	91
Table 9	Government craft and industry schools in Peking and the provinces, 1901-1909	102
Table 10	Official positions in the Ministry of Public Works and the other ministries of the central government	107
Table 11	The Workforce at the Office of Palace Construction of the Imperial Household Department <i>yingzao si</i> 營造司 in 1677	108
Table 12	Artisan workforce at the Grand Storage Office of the Imperial Household Department <i>guangchu si</i> 廣儲司 in 1677	109
Table 13	Artisan workforce at the Court of Imperial Armaments of the Imperial Household Department <i>wubei yuan</i> 武備院	109
Table 14	Government artisan positions in Peking	110
Table 15	Estimate of artisans in government manufactories outside Peking, eighteenth century	112
Table 16	The norm quotas of looms and artisans at the Three Silk Weaveries in the early and mid-Qing	118
Table 17	Volume of tribute grain shipment in the early nineteenth century	128
Table 18	Quotas for the number of grain transport ships in the grain-providing provinces	130
Table 19	Grain ship sizes	131

Table 20	Quotas for coastal and fluvial guard and patrol ships of all sizes	136
Table 21	List of documented state shipyards	153
Table 22	Arsenals established in China, 1860-1895	156
Table 23	Ships built at the Jiangnan Arsenal	161
Table 24	Government price quotas for shipbuilding	183
Table 25	Government procurement costs for ships built in Fujian	188
Table 26	Number of workers in the Jiangnan Arsenal in 1905	201
Table 27	Daily wage rates at the Jiangnan Arsenal in 1904	204
Table 28	Regular positions in the imperial Dragon River Shipyard, Nanjing, 1553	213
Table 29	Labour force required for the construction of a Big Imperial Ship On Permanent Duty <i>Yubei da huangchuan</i> 預備大黃船, 1503	214
Table 30	Shipping tonnage of the China Merchants' Steam Navigation Company and the China Navigation Company (founded in 1872 by Butterfield and Swire)	215
Table 31	Output of palace edition printings, in numbers of titles, since the foundation of the Wuying dian printery in 1680	226
Table 32	Estimate of the mass of cash coins to be retrieved from 250,000 copper types used in the printing project for the imperial encyclopedia <i>Gujin tushu jicheng</i> (1726-1728)	249
Table 33	Provincial printing offices established in the second half of the nineteenth century	250
Table 34	Statistics of handicraft sectors in Qingdao city, Shandong, 1931-1932	287
Table 35	Position of handicraft printing and character carving among all craft trades in Qingdao, 1931-32	291
Table 36	Government wage rates for block printing and binding, 1705	292
Table 37	Government wage rates for the production and setting of copper characters for the Imperial Encyclopedia <i>Gujin tushu jicheng</i> , 1726 and 1728	293
Table 38	Government wage rates for block printing, binding, and ornamentation of books and covers at the printer-ies for the emperor's personal writings, <i>yushu chu</i> , 1768	293
Table 39	Government wage rates for printing with wooden movable type for reprinting rare books of the 'Four Treasuries' project in the collectanea <i>Wuying dian juzhenban [cong]shu</i> , 1774	294

Table 40	Wage rates for block printing in the provincial printery of Zhili, 1807	294
Table 41	Government wage rates for copyists at the <i>yushu chu</i> , 1751 and 1795	295
Table 42	External, hired artisans' wages for block printing in the Wuying dian, 1861	295
Table 43	Wage rates for Wuying dian block printing projects of the 1870s/1880s	296
Table 44	Carving fees paid to the external printery Zhuanyun zhai in Peking, 1884	296
Table 45	Synopsis: Wages for copying 100 characters at the Wuying dian	297
Table 46	Synopsis: Wages for carving 100 characters (government wage rates)	297
Table 47	Synopsis: Wages for printing 1,000 sheets (government wage rates)	298
Table 48	Wage rates in commercial printing for carving 100 characters	299
Table 49	Collections of statecraft writings, 1826-1902	311

Illustrations

Map 1	The territory of the Qing dynasty, ca. 1820: Provinces	19
Figure 1	Grain transport ship, <i>Caofang chuan</i>	129
Figure 2	Sand ship, <i>Shachuan</i>	133
Figure 3	Big Fujian ship, <i>Da Fuchuan</i>	166
Figure 4	Guangdong ship, <i>Guangdong chuan</i>	168
Figure 5	Waterways in the Qing dynasty	181
Figure 6	Centres of shipbuilding in the Qing dynasty	182
Figure 7	Construction of wooden sailing ships in the 1970s, Hong Kong	209
Figure 8	Compartments within the hull construction	210
Figure 9	The caulking procedure	211
Figure 10	Number of sailing ships entered and cleared in Shanghai, 1902-1941	216
Figure 11	Number of steamships in Chinese possession, 1882-1921	216
Figure 12	Tonnage of steamships in Chinese possession, 1882-1921	217
Figure 13	Numbers of steamships and sailing ships on the Yangzi in Sichuan, 1891-1932	217
Figure 14	Tonnage of steamships and sailing ships on the Yangzi in Sichuan, 1891-1932	218

Figure 15	Number of steamships and sailing ships on the Yu River in Guangxi, 1922-1931	218
Figure 16	Tonnage of steamships and sailing ships on the Yu River in Guangxi, 1922-1931	219
Figure 17	Position of the Wuying dian Printery within the Imperial Palace in Peking	223
Figure 18	Entrance of the Main Hall of Wuying dian	224
Figure 19	Entrance to the Wuying dian compound	224
Figure 20	Sawing the wooden types	233
Figure 21	Carving the types	234
Figure 22	Type setting. This process includes selection of the types from the type cases, placing them on trays, arranging them in the right sequence, and proofing the set forms.	235
Figure 23	Individual wooden movable types in different sizes at the Gutenberg Museum, Mainz, dating about 1860	236
Figures 24 and 25	Types on the tray, Gutenberg Museum	238
Figure 26	Design of the Printing Office of the Ministry of Finance Duzhi bu yinshua ju	247
Figure 27	Toothpick cover, collected at the 'All-Shanxi huiguan' (Quan Jin huiguan) in Taiyuan, April 2006	355

Conventions for the notation of time, weights, and measures

Chronology of dynasties and political rule

Shang	ca. 16 th -11 th century B.C.		
Zhou	1045(?) - 256 B.C.		
Western Zhou	1045(?) - 771 B.C.		
Eastern Zhou	771 - 256 B.C.		
Warring States	403 - 221 B.C.		
Qin	221 - 206 B.C.		
Han	206 B.C. - 220 A.D.		
Three Kingdoms	220 - 265		
Western Jin	265 - 316		
Eastern Jin	317 - 420		
Sixteen Kingdoms	304 - 439		
North-South Division	386 - 588		
Sui	581 - 617		
Tang	618 - 907		
Five Dynasties	907 - 960		
Song Dynasty	960 - 1276		
Northern Song	960 - 1126	Liao (Khitan)	907 - 1125
Southern Song	1127 - 1276	Jin (Jurchen)	1126 - 1234
Yuan (Mongol)	1276 - 1368		
Ming Dynasty	1368 - 1644		
Qing Dynasty	1644 - 1911		
Republic of China	1912 - 1949		
People's Republic of China	1949 -		
Republic of China (Taiwan)	1949 -		

Qing dynasty era names

Reign name of emperor	Date
Shunzhi	1644 - 1661
Kangxi	1662 - 1722
Yongzheng	1723 - 1735
Qianlong	1736 - 1795
Jiajing	1796 - 1820
Daoguang	1821 - 1850

Xianfeng	1851-1861
Tongzhi (regent and de facto ruler: Empress Dowager Cixi)	1862-1874
Guangxu (regent and de facto ruler: Empress Dowager Cixi)	1875-1908
Xuantong (Child emperor Puyi, regent: Zaifeng)	1909-1911

Weights and volume¹

1 <i>ge</i> 合	0.1035 l in the Qing, 0.0987 l in the Ming, 0.0836 l in the Yuan, 0.0585 l in the Song
1 <i>sheng</i> 升 (peck)	10 <i>ge</i> 合, 1.035 l (Qing), 0.987 l (Ming), 0.836 l (Yuan), 0.585 l (Song)
1 <i>dou</i> 斗 (pint)	10 <i>sheng</i> 升, 10.35 l (Qing), 9.87 l (Ming), 8.36 l (Yuan), 5.85 l (Song)
1 <i>qian</i> 錢 (mace)	3.73 g
1 <i>liang</i> 兩 (ounce)	10 <i>qian</i> , 37.3 g
1 <i>jin</i> 斤 (catty)	16 <i>liang</i> (in most, not all regions), 596.8 g (Qing), 590 g (Ming), 633 g (Yuan and Song)

shi 石 as a measure of volume

1 *shi* of rice = 138.75 catties (jin 斤) = 82.8 kg

shi 石 as a measure of weight

1 *shi* = 120 catties = 157.896 pounds = 71.5 kg [1 pound = 0.453 kg]

1 catty = 1.3158 pounds (*kuping* 庫平 or imperial standard)

1 ton = 2240 pounds = 1702.3863 catties

shi 石 as a measure for ship capacity, according to its quality as measure of weight

250 *shi* = 30,000 catties = 17.5 tons

500 *shi* = 60,000 catties = 35 tons

1,000 *shi* = 120,000 catties = 70 tons

1,500 *shi* = 180,000 catties = 105 tons

2,000 *shi* = 240,000 catties = 140 tons

3,000 *shi* = 360,000 catties = 210 tons

4,000 *shi* = 480,000 catties = 280 tons

5,000 *shi* = 600,000 catties = 350 tons

6,000 *shi* = 720,000 catties = 420 tons

7,000 *shi* = 840,000 catties = 490 tons

8,000 *shi* = 960,000 catties = 560 tons

1 Endymion Wilkinson, *Chinese History*, p. 238.

Currencies

tael: *liang* 兩 (ounce) of unminted silver, 100 percent purity (unless otherwise stated): 10 *qian* (mace)

Kuping liang 庫平兩: 37.31 grams, imperial standard set by the Board of Revenue, used for official accounts. Many other regional *liang* weights exist, such as the Customs ounce (*haiguan liang* 海關兩): 37.68 grams, adopted after the Maritime Customs was established in 1858, used for tariff.

Canton weight ounce (*Guangping liang* 廣平兩): 37.57 grams

Transport weight ounce (*caoping liang* 漕平兩): 36.54 grams, the standard for commuting tax in rice

cash: *wen* 文, brass coin, copper-lead-zinc-tin alloy, with standard exchange rate 1000 cash to one tael of silver. Many regional and local variances of conversion rates existed legally and illegally. The cash was bound in ten strings of hundred and is sometimes accounted in strings of thousands (千).

yuan 圓 (Chinese dollar): 10 *mao*. Exchange rate 0.75 *yuan* to one tael of silver.

British pound: Before 1871, fixed at 1 £ per 3 tael *haiguan liang*, or 6 shillings 7 pence per *haiguan liang*.²

² Peng Xinwei, *A Monetary History of China*, p. 762. For the exchange rates after 1891, see p. 763.

Acknowledgements

This book has been developed over a span of time and at several academic institutions where I had the opportunity to pursue my research. The idea originated from a DFG (German Research Council) project that I coordinated under the direction of Professor Hans Ulrich Vogel at the Institute of Chinese and Korean Studies of Tübingen University between 2000 and 2003. Our research focused on handicraft regulations (*jiangzuo zeli* 匠作則例), a type of source defined by the art historian and connoisseur Wang Shixiang 王世襄 (1914-2009). These regulations are made up of texts and lists of the parts of buildings and the products for official use, often with specifications and prices, sometimes with norms on the working times for objects or services. The project ended in a large workshop and the publication of a collected volume of articles that explored handicraft regulations for the issues of technical, monetary, administrative, and financial history, with comparative perspectives on the history of European craft production.¹ Personally, this was a most inspiring initiation into the world of technical administration from the seventeenth through the early twentieth centuries and into the scholarly company of technical and craft historians within China and abroad. In the course of that project, I was lucky enough to be introduced to the important Beijing groups of the Qinghua University Institute for Ancient Technical Texts (*Qinghua daxue Kejishi ji gu wenxian yanjiusuo* 清华大学科技史暨古文献研究所, 'Kegusuo') and to the Institute for the History of Natural Sciences of the Chinese Academy of Sciences, the (*Zhongguo kexueyuan Ziran kexueshi yanjiusuo* 中国科学院自然科学史研究所 'Keshisuo'). I learned a lot from the members of these groups of scholars, who also attended the Tübingen workshop in 2003.

Yet, as instructive as the explorations of handicraft regulations were, these sources require great effort to draw out a historical narrative. As tools for contemporary Qing administrators and technical supervisors of building or production projects, they were more often lists of ingredients rather than recipes, intended to serve the purposes of informed people and therefore rarely opening up a wider frame of knowledge on the objects they describe. What was their purpose? Who constructed or produced them, and under what conditions? Together with Song Jianze and Liu Qiang from the Qinghua University Kegusuo, and on the basis of Wang Shixiang's first

¹ Moll-Murata, Song Jianze, Hans Ulrich Vogel (eds.), *Chinese Handicraft Regulations of the Qing Dynasty*.

survey, I collected the titles of some two hundred handicraft regulations.² I used some of them for my research on imperial building projects and became curious about the larger frameworks, the institutions that employed the craftspeople, and about the craftspeople themselves.

My next research appointment led me to Utrecht University in the Netherlands, where Jan Luiten van Zanden and members of the Research Group Economic and Social History within the History Department are conducting global comparative research on issues of economic and social history. This unfolded a new academic field for me and enabled me to place Chinese craft history in a wider context. Not only were the regulations and precedents put to good use, since information on wage levels and the cost of transportation and materials could be gleaned from them, but I also had the chance to explore the field of private craft production from the perspective of the Chinese guilds in comparison to their European counterparts. My stay at Utrecht consisted of two years full of intellectual stimulation and challenges which initiated my turn towards comparative Eurasian history. Together with Jan Luiten van Zanden, I visited the eminent economic historian Li Bozhong 李伯重 at Qinghua University and the Department of Economics at the Chinese Academy of Social Sciences 中国社会科学院经济研究所, where I had the chance to meet Xu Jianqing 徐建青, to whose research on Chinese crafts in the Qing dynasty this study owes much inspiration and insight.

This study was thereafter accepted as a habilitation thesis by the Faculty of Cultural Studies at the Eberhard Karls University of Tübingen. Meanwhile, a further engagement in the Netherlands had opened the doors of the International Institute of Social History (IISH) for me, where I coordinated its newly founded research group known as the Global Collaboratory on the History of Labour Relations, 1500-2000 (the 'Collab') for one year. The then research director of the IISH, Marcel van der Linden, kindly suggested including this thesis in one of the Institute's series, *Social Histories of Work in Asia*, and I found a sharp-sighted and circumspect editor in Ulbe Bosma, who patiently steered me through the rewriting process. Harriet Zurndorfer from Leiden University read the entire manuscript and gave valuable advice on how to polish the arguments and restructure the presentation. My research at the IISH, in the framework of the methodical approach of the Collab, made me recalibrate and take a wider perspective on work and labour in the Ming and Qing, the Republic, and the People's Republic of China. From the Collab's steering group – which consists of Jan Lucassen, Marcel van der Linden,

2 'Union List of Handicraft Regulations of the Qing Dynasty'.

and Karin Hofmeester – and from its many participants, I learned much about the world of labour in space and time.³

Heiner Roetz gave me the opportunity to take up the position of Academic Reader at the Faculty of East Asian Studies at Ruhr-Universität Bochum. A period of intensive teaching ensued, with an interruption of a three-month respite for research in the summer of 2016 which enabled me to work on the manuscript in a concentrated manner. For this opportunity, I am grateful to the IISH's present research director, Leo Lucassen, and the vice research director, Karin Hofmeester, and for the support in Bochum by Jörn-Carsten Gottwald and Andrea Halbmeyer. At last, this book can be presented to the general public, edited under the guidance of Saskia Gieling from Amsterdam University Press.

I would like to thank the mentors who created the intellectual, institutional, and economic framework that made work on this study possible: Hans Ulrich Vogel (Tübingen), Jan Luiten van Zanden (Utrecht), Jan Lucassen and Marcel van der Linden (Amsterdam), and Heiner Roetz (Bochum). Furthermore, I am indebted to the habilitation committee, Hans Ulrich Vogel, Achim Mittag, and Robert Horres from Tübingen University, Jan Lucassen (Vrije Universiteit and IISH, Amsterdam), and Iwo Amelung (Goethe-Universität Frankfurt) for their critical reading and their encouragement to publish this manuscript.

I am deeply grateful to my friends and colleagues who read and discussed with me longer and shorter parts of the manuscript before the habilitation: Jessica Dijkman (Utrecht), who commented on the economic historical perspectives, and Monique Nagel-Angermann (Münster), who looked into the sinological issues. My colleagues in Utrecht, Erika Kuijpers and Tine De Moor, whose office I shared (together with Jessica Dijkman), gave me important advice on the chapter entitled 'The Artisan's Place', and I enjoyed De Moor and Maarten Prak's manifold suggestions for research perspectives on guilds in China.

The Chinese colleagues to whom I could turn for questions and issues about Qing craft and technical history were, most importantly, Song Jianze 宋建晔 as well as Liu Qiang 刘蔷, You Zhanhong 游战洪 and Dai Wusan 戴吾三 from Qinghua University, and the directors of Kegusuo, Gao Xuan 高琯 and Feng Lisheng 冯立昇. Moreover, I profited from conversations with the eminent architectural historian at Qinghua University, Guo Daiheng 郭黛姮. At the Institute for the History of Natural Sciences of the Chinese Academy of Sciences, my partners for scholarly exchange were Su Rongyu 苏荣誉 and Chen Chaoyong 陈朝勇. I am particularly grateful to Su Rongyu

3 See the list of participants, as of 2012: https://collab.iisg.nl/c/document_library/get_file?p_l_id=273223&folderId=277142&name=DLFE-144108.pdf

for introducing me to Wang Shixiang and his wife Yuan Quanyou 袁荃猷 (1920-2003) in their Beijing home. I greatly cherish the discussions with these fine scholars, both in Beijing and in Germany.

Among the several occasions I had for presenting aspects of my research, I would like to point out in particular the 2010 workshop at the Max Planck Institute for the History of Science in Berlin conducted by Dagmar Schäfer in her Workshop Discussion Series 'Technological Cultures: Themes and Methods in the History of Technology'. In a more intimate setting, I had a long and enlightening conversation with the technical and social historians of Japan, Erich Pauer and Regine Mathias, about the Japanese government shipyards at Yokosuka in the Meiji period and the feasibility and usefulness of China-Japan comparisons. Moreover, Wolfgang Behr's erudite explanations about the etymology of terms relating to crafts and craftspeople were extremely useful to me.

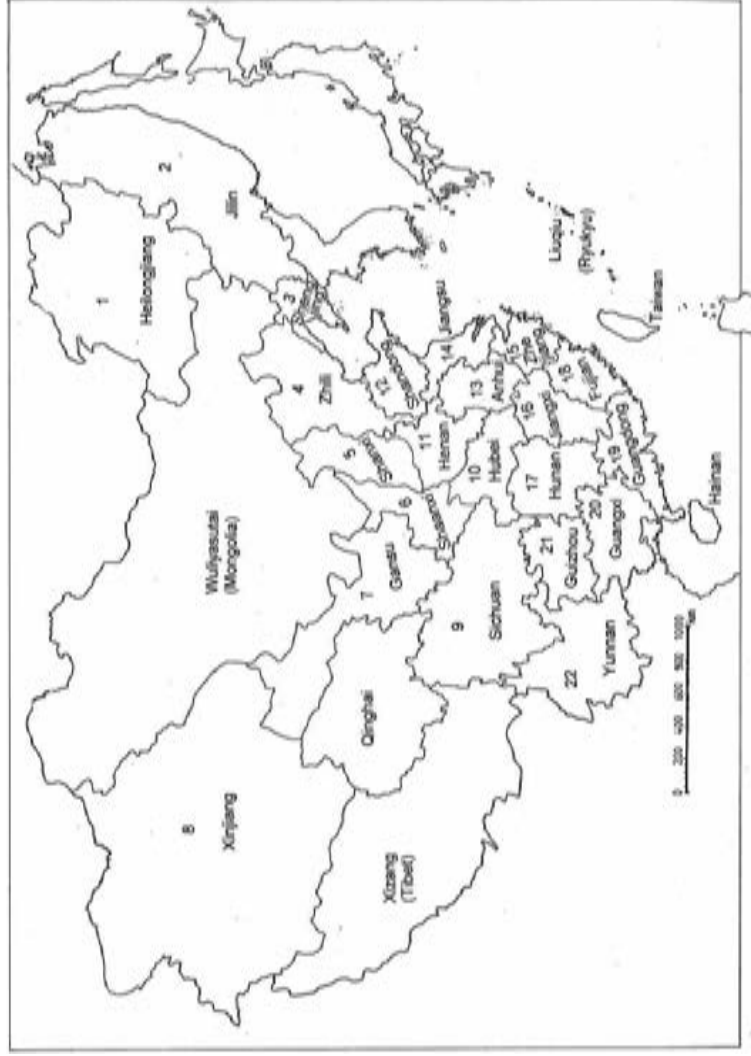
During the editorial process, Harriet Zurndorfer generously provided me with treasures from her storehouse of knowledge to structure, amend, and prune the text. Ulbe Bosma was a formidable editorial helmsman who helped me stay the course. Aad Blok gave good advice about the reproduction of tables and illustrations.

Moreover, I benefitted from the administrative support of Ilse Wiech and the research assistance provided by Juliane Kiefner in Tübingen, and I greatly appreciated the help offered by the librarians Thomas Gaiser (Tübingen) and Ilse Dilger (Bochum), and by the Bochum student assistants Huang Gufeng and Anja Bemnarek. I am obliged to Bettina Dilger (Gelsenkirchen), who accurately designed the maps. Stephen Thomas, a graduate from the University of Kansas, faithfully and continuously helped me to polish my expression of English in this book. Thanks also to Saskia Gieling and her team of able editors at Amsterdam University Press for their professional processing of the text: Jaap Wagenaar and Gioia Marini.

My family provided a safe haven of emotional, moral, and organizational support. Unforgettable are my mother's childminding and housekeeping missions during the Tübingen workshop and while I finished the habilitation manuscript. In addition, my sister Gertrud proofread the entire text in its first version for the habilitation committee. My husband Masato and son Leo tolerated the many weekends and holidays I spent in front of the computer, and Masato proofread the Chinese characters in the text. I am grateful for their kindness, patience, and encouragement.

Cheers and praise to all my companions in research and in life who saw the growth of this study and accompanied me for parts – or the entire process – of its development. Any errors that might remain in the book are my own.

Map 1 The territory of the Qing dynasty, ca. 1820: Provinces



Design: Bettina Dilger

Introduction

Since the People's Republic of China joined the World Trade Organization in 2001, its exports of manufactured goods have soared to a degree that earned it the label of the 'workbench of the world'.¹ This study offers a retrospective view from the early modern situation of handicraft manufacturing in China to the beginnings of industrialization, spanning the period from the seventeenth through the early twentieth centuries when China was ruled by the Qing dynasty. The perspective is on the interior organization and the efficiency of the state administration relevant to the sector of craft production.

Regarding internal social, political, and economic processes, some scholars argue that until about 1800, China stood on an equal level with those overseas powers that came to rise in the era of industrialization and imperialism. However, forty years later, the Chinese state was forced to cede absolute legal power over import and export decisions in subsequent warfare and treaties. Thus, the centuries between 1700 and 1900, when the Manchu Qing dynasty ruled China, witnessed decisive changes and turning points. This concerns the state economic policies as well as economic activities in the private sector. How did the government accomplish craft production, and what were the reactions of the private producers and distributors? How did industrialization set in, and how did it change government decisions and household strategies?

The author first studied the impact of the Qing state on handicrafts, with a special focus on public construction, in a research project on 'Staat, Handwerk und Gewerbe in Peking, 1700-1900'.² The main source materials for this project consisted of the so-called *jiangzuo zeli* or 'handicraft regulations', official documents and compilations that previously received little scholarly

1 In 2009, China ranked first in world merchandise exports, and in 2015 its manufactures made up 94.3 percent of its total exports. See World Trade Organization (ed.), *International Trade Statistics 2015*, p. 25, *World Trade Statistical Review 2016*, p. 44 ff., and 'Trade Profiles: China' for the 2015 data. Recently, some observers argue that Chinese manufacturing has already passed the stage of being a mere 'workbench'. See for instance Jennifer Hudson, *1000 New Designs*, p. 8 [2006]; Lin Chaoyi et al., 'Die 100 innovativsten Unternehmen aus China', p. 149 [2014]; Martin Woher, 'Explaining China's Buying Binge' (16 March 2016). The assertion is that Chinese producers not only execute given designs but also develop their own ones (Hudson), that their focus shifts to innovation and improvement of quality (Lin), and that Chinese investors increasingly acquire high-end production plants abroad (Woher).

2 'State and Handicrafts in Peking, 1700-1900', DFG project VO 472/10, Tübingen University, Institute for Chinese and Korean Studies.

attention but are now being increasingly appreciated. Between 1997 and 2007, these sources were reproduced in several large reprint series. Together with colleagues from Qinghua University, the author established an inventory of all known handicraft regulations.³ Up until the present, these administrative references, account books, and cost estimates have proved to be a valuable source of information, for instance in the hands of architects and historians of architecture who analyze and rebuild historical buildings in the course of initiatives for the preservation of Chinese cultural heritage. Handicraft regulations also contain information relevant to socioeconomic history concerning wage norms and structures of cooperation and supervision together with the rules of conduct within the palace precincts.

If seen as an integral group of texts, these handicraft regulations clearly show which productive sectors were of concern to the state administration, and they convey insights into the norms of accountability and quality control. Although similar compendia are known from periods prior to the Qing, their number and broad coverage of craft sectors are unique. However, so far they have not been widely taken into account. Before outlining the issues of relevance for the pertinence of state administration to craft production, it is necessary to consider the state of the field as regards the economic and technical history of the late imperial era.

Current Approaches to Chinese Economic History

Three influential paradigms have shaped the reception of the economic history of late imperial China since the foundation of the People's Republic in 1949.

In the first three decades of the People's Republic of China, Chinese Marxist economic historians concentrated on the question of why an indigenous industrial capitalism did not develop in China in the course of the period of commercialization of the sixteenth century, whereas in Western Europe similar developments prepared the ground for the emergence of capitalism. The theory of the so-called 'sprouts of capitalism' has engendered a great amount of valuable empirical research on Chinese craft production as well as the only overviews of craft history in Chinese up to this date. However, the question as to why full-fledged industrial capitalism had not set in before the advent of Western imperialism remains inconclusive. In view of the actual developmental path of the Chinese

3 'Union List of Handicraft Regulations of the Qing Dynasty'.

economy that includes moderate development under socialism and a subsequent trend to world market integration, the approach of identifying the characteristics of ‘sprouts of capitalism’ has subsided. As Timothy Brook observed in 1999, since the 1980s, ‘incorporation [of capitalism] rather than transcendence [is] the current concern’ for Chinese scholarly research in the social sciences.⁴

As economic reforms reopened Chinese markets to the capitalist world, and in consideration of the economic success of China’s neighbouring countries Japan and the four ‘small dragons’ South Korea, Taiwan, Hong Kong, and Singapore, certain traits of economic behaviour and social ethics of the merchant or entrepreneur class were ascribed to the common ‘Confucian’ heritage of these nations and polities.⁵ The theses of ‘New Confucianism’ or ‘Post-Confucianism’, formulated by the Chinese American-based scholars Yü Ying-shih and Tu Wei-ming, quite astonished researchers in the West, who were aware that throughout the twentieth century, Marxist and non-Marxist scholarship had blamed Confucianism, and especially its family values, as a hindrance to capitalism and modernity. The New Confucian about-turn away from the negative image of Confucianism to a positive and dynamic set of values (from the perspective of a capitalist and industrialized society), with a paradigmatic figure such as the ‘Confucian merchant’, gave a more optimistic view of Chinese history, especially for the nineteenth century, which according to the Marxist Party orthodoxy had merely been an era of stagnation.⁶ Now Confucianism was seen as a stimulus for capitalism similar to the Protestant ethic that Max Weber had identified as the driving force behind the rise of Western capitalism. Weber’s explanation of the question of why China had not developed an indigenous capitalism, which was attributed to a ‘religious inner-worldliness’ and the despotic power of Chinese officialdom, was thus ‘turned on its head’ (Zurndorfer) by Yu and Tu’s focus on the impact of Confucian merchant ethics for the commercialization that started in the sixteenth century.⁷

A third, historically revisionist theory on the position of China in the eighteenth-century global economy has been developed by the so-called ‘California School’, especially its representatives Roy Bin Wong and Kenneth

4 Timothy Brook, *Capitalism*, p. 156. Nevertheless, the concept is still being discussed and applied by certain researchers, such as for instance Ma Yong, ‘Xiandaihua qidian’ (2015) and/or Wang Haiming ‘Zibenzhuyi mengya gainian fenxi’ (2016).

5 For a perceptive analysis of the revision of the role of ‘Confucianism’ in Chinese politics, society, and economy, see Harriet Zurndorfer, ‘Confusing Confucianism with Capitalism’.

6 Brook, *Capitalism*, p. 154.

7 Zurndorfer, ‘Confusing Confucianism with Capitalism’, pp. 7-8.

Pomeranz.⁸ This school comes to the conclusion that with regard to a variety of crucial economic factors, such as demography, capital accumulation, labour systems, markets, rural production, consumption, and even technology, China and Europe were on a more or less equal level before a transitional phase of 1750-1800. According to this line of thought, until the mid-eighteenth century, Western Europe was not uniquely productive or economically efficient from a global perspective, and it seems most likely that until the middle of the eighteenth century, no part of the world was headed for an industrial breakthrough.⁹ It was more or less contingency, namely the convenient location of coal in England as well as the products of overseas colonies, especially American cotton, that enabled Great Britain to launch its industrial revolution.¹⁰ This view (as a whole or in its components) has caused much controversy in Europe, the U.S.A., and China. It has, for instance, triggered a debate between the representatives of the California School and those who see the traditional Chinese state as being inherently inefficient in promoting technological advances and responsible for continuous involution of the economy since the mid-eighteenth century. This opposition to the California School has found its most prominent representative in Philip C.C. Huang, who considers the situation in China during the eighteenth century as the beginning of an economic disaster that was overcome only in the last two decades or perhaps even continues to this day.¹¹ Experts of European economic and social history remain sceptical as to whether European and Chinese incomes and standards of living around 1800 in the most advanced Chinese and Western European regions were actually on a par.¹² Other historians not related to the California School have nuanced the idea that the imperial state acted as an impediment to economic development, claiming that it made positive or at least reasonable contributions in particular phases of the Qing dynasty.¹³

8 Pomeranz, *The Great Divergence*; Wong, *China Transformed*; Rosenthal and Wong, *Before and Beyond Divergence*.

9 Pomeranz, *The Great Divergence*, p. 206.

10 Pomeranz, *ibid.*, pp. 51-52 (coal), 54/55 (cotton), 66 (coal), 283-285 (cotton).

11 See Philip C.C. Huang 'Development or involution' and Pomeranz' reply, 'Beyond the East-West Binary'. For overviews regarding the state of the debate, see Peer Vries 'The California School and Beyond', Patrick O'Brien, 'Ten Years of Debate on the Origins of the Great Divergence', Robert Eng, 'From 'The West and the Rest' to Global Interconnectedness'.

12 Robert Allen et al., 'Wages, Prices, and Living Standards in China', pp. 9, 31.

13 See, for instance, Helen Dunstan's arguments for the basically good conditions for policymaking during the Qianlong period, despite the emperor's autocratic propensities, in her *State or Merchant*, p. 468 ff., or Jane Kate Leonard's study on the handling of the Grand Canal Crisis in the 1820s, *Controlling from Afar*, p. 251 ff.

The above three paradigms focus on agriculture, commerce, and manufacturing to varying degrees. Early Marxist historiography emphasized the rise of commercial capitalism; the study of Confucian merchants by itself sees commerce and merchants as the most important driving forces of the economy. The paradigm of the Great Divergence takes the entire economy into focus but in the case of manufacturing it stresses the rural and predominantly textile handicrafts, which constituted the biggest segment of craft production during the Qing dynasty.¹⁴ Yet the state interfered relatively little in that field. Consequently, economic history writing, especially that of the California School, hardly takes into account the state regulations on urban craft production from which the present study sets out.

In their overview of the economic situation in the early Qing, Wang Yeh-chien and Ramon Myers define three distinct fields of the economy: the state sector or 'command economy'; the subsistence sector or the 'natural', 'customary' economy; and a small, urban 'private' or 'commercial' sector that produced for the market.¹⁵ In quantitative terms, they estimate that about three-quarters of the production of China's ca. 272 million rural population in the mid-1780s was bound for the self-supplying or 'customary' economy, and the remainder for the market economy. These two sectors were closely interrelated and expanded together.¹⁶ According to Myers and Wang, the early Qing state intervened in the market economy in order 'to win the allegiance of the people, prevent local power holders from becoming too wealthy and influential, and ensure social order.'¹⁷

Approaching the situation from the perspective of the Qing government, its economic policies were aimed at keeping an increasing population fed and were occupied by methods that were labour and yield-intensive but not capital-intensive. The state promoted agriculture in combination with handicraft production in a system of small-sized, independent producers, where the household farm formed the principal unit for taxation. The most basic pattern was that of the tilling man and the weaving woman, respectively producing grains and textiles.¹⁸ Protoindustrial household production for the market was deemed tolerable for the representatives of the state, yet specialization in artisan activities was regarded as undesirable,

14 Pomeranz, *The Great Divergence*, p. 86.

15 Wang and Myers, 'Economic Development, 1644-1800', p. 645.

16 *Ibid.*, p. 643, 644. According to these authors (p. 536, with reference to John Hicks, *An Outline of Economic History*), the customary economy relates to traditionally established practices and conventions, as opposed to the market economy and the command economy.

17 *Ibid.*, p. 591.

18 Francesca Bray, 'Towards a Critical History of Non-Western Technology', pp. 168-190.

especially if the gendered division of labour eroded in the process. The Confucian state doctrine in general also expressed a disdain for commerce. However, merchants held an important position as distributors and brokers, and the importance of their cooperation with the state and its officials was perfectly clear to the central government. In the expanding commercialization of the sixteenth century, merchants gained increasing political and social influence. The most successful among them could afford to have their children schooled in the Confucian scriptures, and to have them participate in the official examinations with the possibility of entering officialdom. This might allow their descendants to rise to higher social positions and cross the demarcation between the two opposing social and functional groups.¹⁹

In Western historical research, state and merchant elites are often pitted against each other. This is clearly expressed in the title of Helen Dunstan's study on the eighteenth-century Chinese grain trade, *State or Merchant?* (2006). The same dichotomy can be found in Susan Mann's *Local Merchants and the Chinese Bureaucracy, 1750-1950* (1987), which focuses on tax farming, a 'liturgical' service in Max Weber's sense that the merchants provided the government, and Wellington Chan's *Merchants, Mandarins and Modern Enterprise in Late Ch'ing China* (1977). The study field that aimed at defining the 'Confucian merchant ethics' in the 1980s and 1990s focused on the role of the merchants in the Chinese state and society. Much less research is available on manufacture, handicrafts, and the position of artisans. Thus, the present study intends to provide insights into why the social status of the crafts and craftspeople remained lower than that of commerce and merchants throughout the Qing dynasty.

The Perspective of Technical History

Chinese craft history pertains not only to the socio-economic field but also to technical history. In the framework of the history of science and technology, the main impulse for a huge, comparative overview came from the West and must be credited to Joseph Needham (1900-1995). Many of the volumes of the series *Science and Civilisation in China*, which he commenced in 1954, deal with craft technologies such as construction in wood, earth, and

19 Esherick and Rankin in *Chinese Local Elites and Patterns of Dominance*, p. 12, include merchants as an important element of their 'elite' concept next to the gentry, who are defined by examination degrees and potential access to positions in the bureaucracy.

stone;²⁰ shipbuilding;²¹ paper making and printing;²² military technologies;²³ textile technologies;²⁴ the processing of food and beverages;²⁵ and ceramic production²⁶. Volumes on mining and salt production have appeared recently or are in preparation.²⁷ In Japan, a chronological series on the history of Chinese science and technology has been edited by Yabuuchi Kiyoshi at the Research Institute for Humanities (Jimbun kagaku kenkyūjo 人文科学研究所) of Kyōto University. After some of the volumes of *Science and Civilisation in China* were translated into Chinese, a comparable Chinese project was launched and is nearing its completion.²⁸ The volumes of another series recently edited by Lu Yongxiang are more focused on handicrafts and traditional arts and crafts.²⁹

Some of the contributions to *Science and Civilisation in China* contain information on the living and working conditions of the artisans and also distinguish between their work in the service of the state and their private production for the market.³⁰ In the volume on *Mechanical Engineering*, for instance, Joseph Needham gave a concise historical overview of the social

20 Vol. IV: *Physics and Physical Technology*, Part 3: *Civil Engineering and Nautics* (1971), especially pp. 38-58 'Walls, and the Wall' and pp. 58-145 'Building Technology'.

21 Ibid., 'Nautical Technology', pp. 379-699.

22 Vol. V: *Chemistry and Chemical Technology*, Part 1: *Paper and Printing*, by Tsien Tsuen-Hsuei (1985).

23 Vol. V, Part 6: *Military Technology: Missiles and Sieges*, by Joseph Needham, Robin D.S. Yates, Krzysztof Gawlikowski, Edward McEwen, and Wang Ling (1994); Part 7: *Military Technology: The Gunpowder Epic*, by Joseph Needham, Ho Ping-Yu, Lu Gwei-djen, and Wang Ling (1987).

24 Vol. V, Part 9: *Textile Technology: Spinning and Reeling*, by Dieter Kuhn (1986).

25 Vol. VI: *Biology and Biological Technology*, Part 3: *Agroindustries and Forestry*, by Christian A. Daniels and Nicholas K. Menzies (1996); Part 5: *Fermentations and Food Science*, by H.T. Huang (2000).

26 Vol. V, Part 12: *Ceramic Technology*, by Rose Kerr and Nigel Wood, with Ts'ai Mei-fen and Zhang Fukang (2004).

27 Vol. V, Part 13: *Mining*, by Peter Golas (1999) and Vol. V, section 37, *The Salt Industry*, by Hans Ulrich Vogel, with Luo Jungpang and Zhang Xuejun (in preparation).

28 *Zhongguo kexue jishu shi* (History of Science and Technology in China), general editors Lu Jiaxi (1915-2001), Guo Shuchun, and Li Jiaming. Beijing: Kexue chubanshe, since 1991. 30 volumes are planned, of which 27 were recorded in the electronic catalogue of the National Library of China (Beijing) as of September 2017. The volumes that pertain to technical subjects concern Mechanics, Architecture, Bridge-building, Mining, Textile Technology, Ceramics, Paper and Printing, Traffic, Military Technology, and Metrology.

29 *Zhongguo chuantong gongyi quanji*, with volumes on folk handicrafts (2007); research on traditional machines (2006); papermaking and printing (2006); carving (2005); silk weaving and dyeing (2005); gold, silver, and fine gold crafts and cloisonné (2004-2005); ceramics (2004); Chinese *materia medica*; and fireworks (2004).

30 Most notably Vol. V, Part 12: *Ceramic Technology*, pp. 184-239, 'Chinese porcelain and the city of Ching-te-chen', especially pp. 209-213, 'Labour relations'.

backgrounds of engineers and artisans in the imperial workshops and in household or small-scale family workshop production up until the Ming dynasty.³¹ Thus, although the main concern of the works in this series is not primarily on social or economic issues, they nevertheless serve as indispensable guides to technical questions and Western and Chinese comparative perspectives.

Recently, studies that combine technical, cultural, and socio-economic approaches have shown in ever greater depth and detail the wide range of Chinese material culture and work organization during the late imperial era.³² In addition to the series *Science and Civilisation in China* mentioned above, Schäfer (1998), Piontek-Ma (1999), and Kuhn and Schäfer (2002) have published studies on the imperial manufactories for silk processing, while Harriet Zurndorfer researched the cotton sector (2009 and 2011). Francesca Bray has examined more broadly women's work and handicraft in her work *Technology and Gender: Fabrics of Power in Late Imperial China*. For building, next to Ruitenbeek's classical study on carpentry (1993) and Knapp's multiple volumes on popular housing (1986, 1993, 1994), Bodolec's work on the architecture of cave dwellings and vault construction constitutes outstanding and original research. Money casting technologies are one of the aspects of the Tübingen research group 'Monies, Markets, and Finance in China and East Asia' based at the Tübingen University Institute for Chinese and Korean Studies, and have been researched by Burger (1976, 2005), Vogel (1983, 2005), and Hartill (2003). Publications on the printing sector have become a most prolific field in recent years. Important contributions that combine technical, sociological, and economic aspects have been brought forth by Brokaw (2007), McDermott (2006), Reed (2004), Chow (2004), and Chia (2002).

Chinese Craft History

Research on Chinese craft history in the framework of social and economic history is from a fairly recent date. After early studies from the 1920s and 1930s, notably the investigations on artisans in the service of the state by Ju Qingyuan,³³ or the pioneering work on the Chinese guilds by Quan

31 *Science and Civilisation in China*, Vol. IV, Part 2: Mechanical Engineering (1965), pp. 10-50.

32 The social history of craftspeople in early imperial China has been researched in the masterful book by Anthony J. Barbieri-Low, *Artisans in Early Imperial China* (2007).

33 Ju Qingyuan, 'Handai de guanfu gongye' (1934), *Tang Song guan si gongye* (1934), 'Yuandai xiguan jianghu yanjiu', 'Yuandai xiguan jianghu yanjiu buyi' (1935).

Hansheng,³⁴ which could also draw on early American social survey approaches by John Stewart Burgess and Sidney Gamble, a lapse in scholarship ensued due to war and revolution.

Book-length analyses of Chinese handicrafts from the first decade of the People's Republic of China are rare. One notable exception is Chen Shiqi's study on the Ming dynasty crafts.³⁵ The early 1950s were a time of collecting and editing source materials, such as the series on the transition to mechanized production by Yan Zhongping and Peng Zeyi. In the next phase of research, starting around 1955, economic and social historians arranged research on the crafts within the framework of the five-stage model of development from the slaveholder society to communism that had been formulated by Guo Moruo and slightly altered by Lü Zhenyu on the basis of Marx and Stalin's historical periodizations.³⁶ The discussion on the beginnings of capitalism was an attempt to justify the existence of socialism in China, which according to the five-stage model should have been preceded by a phase of capitalism. Because an indigenous industrial capitalism did not arise in China without the intervention of the imperialist powers, Chinese researchers explored the phenomena of commercialization and commercial capital since the sixteenth century. They concentrated on the marketing structures in the commercial sector and also on labour relations and the issue of free wage labour as an indicator of proletarianization and thus capitalism. The combined research efforts in this line of thought appeared in essay collections on crafts, commerce, and social relations from the Song to the Ming and Qing periods.³⁷ The last of these, *Zhongguo zibenzhuyi de mengya* (The sprouts of Chinese capitalism), was edited by Xu Dixin and Wu Chengming and published in 1985, at a time when the debate had once more gained momentum and then slowly faded out.³⁸ It has been translated into English and constitutes to date the most detailed craft history of Ming and Qing China in that language, even if its main research interest was not crafts but capitalism.

The Cultural Revolution caused a standstill in academic pursuits in the field that lasted more than a decade. Since the 1980s, in the process of the

34 *Zhongguo hanghui zhidu shi* (1934).

35 Chen Shiqi, *Mingdai guan shougongye de yanjiu* (1955).

36 Brook *Capitalism*, pp. 134, 150.

37 *Zhongguo ziben zhuyi mengya wenti taolun ji* (1957), *Zhongguo ziben zhuyi mengya wenti taolunji xubian* (1960), *Zhongguo ziben zhuyi mengya wenti lunwen ji* (1983).

38 Although the model is nowadays frequently criticized for the inherent expectation that China should have developed a European type of capitalism, variant opinions that do not downright reject this paradigm can be found also in the more recent discourse, for instance Cao Shouliang, 'Zhongguo zibenzhuyi mengya yanjiu lilun jichu bianxi' (2011), p. 255.

shift from the socialist command economy to a 'socialist market economy', the field of economic studies and economic history has broadened and the number of scholars increased. Since the beginnings of academic research in economic history in the People's Republic of China, the focus had been on agricultural production and landownership. Currently, more and more scholars have extended their research to topics in the commercial and financial sectors like markets, commodity circulation, banking, and credit in the past and present.

The research on handicrafts since the 1980s has brought forth monographs and theses that have specialized on the craft landscape of particular regions such as Jiangnan,³⁹ Suzhou,⁴⁰ Fujian,⁴¹ and Huizhou in Anhui,⁴² and on particular eras such as the Yuan dynasty,⁴³ or on particular craft branches such as cotton spinning and weaving.⁴⁴ Topical issues such as the transition from 'traditional' to 'modern' artisans and crafts have been addressed in the theses and monographs by Kong Jingyuan, who also reflects upon the role of handicrafts and manufacturing in socialist China;⁴⁵ by Yu Tongyuan,⁴⁶ who stresses the transformation of the artisans' skills; and by Peng Nansheng, one of the most important and productive craft historians who takes particular interest in socio-economic change, having published a comprehensive study on the Chinese guilds of the late nineteenth and early twentieth century.⁴⁷ At present, research is increasingly concentrating on the modern social, economic, and technical history related to traditional craft production in the twentieth century, on craft production by the different ethnic groups in China, and on the skills of contemporary craftspeople who have preserved the knowledge of traditional techniques. This is connected to the activities to safeguard the Intangible Cultural Heritage, which, as defined by the UNESCO, includes 'traditional craftsmanship' (*chuantong shougongyi*).⁴⁸

39 Li Bozhong, *Jiangnan de zaoqi gongyehua* (2000); Yu Haiping, *Songdai Jiangnan shougongye fazhan yanjiu*, Ph.D. Diss. (2005).

40 Duan Benluo and Zhang Qifu, *Suzhou shougongye shi* (1986).

41 Zeng Ling, *Ming Qing Fujian shougongye jingji yanjiu*, Ph.D. Diss. (1991).

42 Bao Yilai, *Huizhou gongyi* (2005).

43 Liu Liya, *Yuandai shougongye yanjiu*, Ph.D. Diss. (2004).

44 Xu Xinwu, *Yapian zhanzheng qian Zhongguo mianfangzhi shougongye* (1981).

45 Kong Jingyuan, *Shougongye yu Zhongguo jingji bianqian*, Ph.D. Diss. (1987).

46 Yu Tongyuan, *Chuantong gongjiang* (2012).

47 Peng Nansheng, *Zhongjian jingji* (2002), *Hanghui zhidu de jindai mingyun* (2003), *Ban gongyehua* (2007).

48 UNESCO, 'Text of the Convention for the Safeguarding of the Intangible Cultural Heritage' ('Baohu fei wuzhi wenhua yichan gongyue'), Art. 2, Sect. 2e. The list of crafts acknowledged by the UNESCO since 2008 as 'Elements on the Lists of Intangible Cultural Heritage' in China

In the Republic of China on Taiwan, outstanding research on sixteenth and seventeenth-century craft production has been formulated by Luo Lixing.⁴⁹ Billy Kee-long So from the Chinese University of Hong Kong has published studies about the Song export ceramics industry in South Fujian in the framework of his research on Chinese economic institutions and spatial patterns.⁵⁰

No scholarly overviews of Chinese craft history appeared in Mainland China prior to 1981. Since then, representative works by Tong Shuye (1981), Zhu Cishou (1988-1990), Liu Guoliang (1990-2003), Ji Ruxun (1998), Zheng Xuemeng (2002), Wei Mingkong (ed.) (2004-2005), and Liu Yongcheng (2000) have appeared. Moreover, about a dozen material collections on guilds have been published, and Peng Zeyi's important source collection *Zhongguo jindai shougongye shi ziliao 1840-1949* has been reprinted, which despite its title contains valuable materials from the Qing dynasty prior to 1840.

The relation of state and crafts is discussed in these volumes from a long-term perspective. Looking at the three most important of these overviews, several changes in the research perspectives in the course of more than forty years emerge.

The first of these histories, Tong Shuye's *Zhongguo shougongye shangye fazhan shi* (History of the development of Chinese crafts and commerce), was published posthumously. Tong Shuye (1908-1968) was a specialist in ancient and early modern Chinese history, historical geography, and art history. His scope of research was very broad and included topics such as painting, ceramics, and porcelain. In his early years, Tong taught at several universities and colleges in Shanghai. Between 1945 and 1949, he worked as the section head of the Historical Department of the Shanghai Museum, and in 1949 he became a professor of history at Shandong University.⁵¹ Tong's work, the first continuous Chinese narrative on craft history, represents a typical view from the first decade of the People's Republic of China. As such, he was obliged to discuss the elements of incipient capitalism in the Qing

includes eleven items, for instance, specific types of architectural and naval carpentry, printing, and textile crafts (see UNESCO, 'Elements on the Lists of Intangible Cultural Heritage'), while the National List of 'Representative Cultural Heritage' in China proclaimed by the State Council between 2006 and 2014 comprises more than 200 crafts (see *Zhonghua renmin gongheguo Wenhua bu*, 'Guojiaji fei wuzhi wenhua yichan daibiaoxing xiangmu').

49 Luo Lixing, *Shiliu shiqi shiji shougongye de shengchan fazhan* (1997).

50 Billy So, 'The Trade Ceramics Industry' (1994), 'Liang Song Minnan' (1997), 'Regional Economic Integration: A Case Study of Export Ceramics in South Fukien', in *Prosperity, Region, and Institutions in Maritime China*, pp. 186-203.

51 Zhao Zhongwen, *Zhongguo lishixue da cidian*, p. 522; Wang Xinghua, 'Tong Shuye xiansheng er san shi'.

dynasty. Tong explains the rise of capitalism in conjunction with the decline of registration of artisans in the mid-sixteenth century, but he emphasized that until the First Opium War (1839-1842), these 'sprouts' were not very robust.⁵² He presents the Qing period as a time of 'long-lasting stagnation', which was mainly due to the fact that the Manchu Qing, 'a backward tribe' (*luohou buzhu* 落后部族), invaded and ruled the Middle Plains (i.e. China proper). Tong charges that great damage was brought about by the Jurchen (the ancestors of the Manchu and rulers of the Jin dynasty, 1115-1234) in North China and the Mongols (rulers of the Yuan dynasty, 1279-1368) to all of China, causing 'a setback of the Chinese feudal economy for two hundred to three hundred years'.⁵³ The early Qing rulers, particularly the Yongzheng emperor (reg. 1723-1735), a 'dictatorial prince of evil' (*zhuanzhi mowang* 专制魔王),⁵⁴ crushed the tender sprouts of capitalism by promoting agriculture and disregarding contemporary 'democratic' calls that the crafts and commerce should also be treated and esteemed as fundamental economic pursuits. According to Tong, the Manchus carried out this economic policy since they feared capitalism as a danger to their 'tribal, feudalistic rule'. This had consequences for domestic and foreign capitalism, so that the Qing restrained foreign commerce *not* because of 'nationalist' sentiments but in order to ward off foreign capitalism.⁵⁵ Guilds were principally mutual aid 'citizens' organizations' (*shimin zuzhi* 市民組織) for resistance against the oppression and exploitation by the government and, as such, a continuation of the Ming citizens' movement.

How did the government allegedly exploit the artisans? Tong stated that although the artisan corvée labour system of the preceding Ming dynasty was formally abolished by the first Qing rulers, in fact local authorities still drafted artisans to execute labour obligations. Wage levels were quite varied within and between craft branches, with the best salaries in the silk and cotton-weaving sector. Tong believed that the remuneration in state manufactories was lower than in the private sector but did not elaborate on this point.⁵⁶

Tong's sweeping statements about 'tribal feudalism', which are no longer politically correct in today's China, also stand in contrast to present-day knowledge of the achievements of the Qing and the Yongzheng emperor in

52 Tong Shuye, *Zhongguo shougongye shangye fazhan shi*, p. 317.

53 *Ibid.*, p. 282.

54 *Ibid.*, p. 283.

55 *Ibid.*

56 *Ibid.*, pp. 316-318.

particular, whose administrative efficiency is praised in recent scholarship both in China and abroad. This does not deny the problems caused by his autocratic government style.⁵⁷ Like all his colleagues, Tong Shuye was working under extreme political pressure, and the views on political and economic causalities expressed in his work conform to the exigencies of the times.⁵⁸ It is remarkable, though, that capitalism is presented here as desirable and that its presumed crushing is portrayed as a grave error of the strong state, and even that the guilds were described as an anti-government citizens' movement. The emphasis on these points is so distinct that one may speculate that Tong was making an underlying historical analogy at a time of the most intensive state and party control of all intellectual pursuits.⁵⁹

Zhu Cishou's *Zhongguo gudai gongye shi* (History of Chinese traditional industries) superseded Tong Shuye's account in length and depth. Born in 1922, the author received his Bachelor's degree in economics at the Chongqing Central University in 1946, and in 1949 he graduated from the Department for Industrial Economy of Qinghua University in Peking. From 1950 to 1952, he worked as an editor of the journals *Zhongguo gongye* (Chinese industry) and *Shengchan yu jishu* (Production and technology). He started his academic career at the Department of Economics at Fudan University and was assigned to teach labour organization and wage payment in industrial enterprises at the Department for Industrial Management of the Shanghai College of Finance and Economics (*Shanghai caijing xueyuan*). In August 1958, he was once again transferred to an editorial position at the Economics Department of Shanghai renmin chubanshe (Shanghai People's Publishers). In November 1978, he returned to a professorship at the Shanghai College of Finance and Economics.⁶⁰

57 Pierre-Etienne Will, *Nourishing the people*. See Rowe for the Yongzheng emperor's relationship with his high-ranking officials (William T. Rowe, *Saving the World*, pp. 50-52); Spence for the tolerance shown by the emperor in an attempted anti-Qing rebellion (Jonathan Spence, *Treason by the Book*); and Madeleine Zelin, 'The Yung-cheng Reign', pp. 190-191, p. 229 for his activist administrative style.

58 A website that is dedicated to his relationship with his teacher Gu Jiegang mentions that in the initial 'movement for the remodelling of intellectuals' thought' (*zhishifenzi sixiang gaizao yundong*) 知识分子思想改造运动 [in 1954], he was forced to commit self-criticism, but his declarations were refused nine times, until he finally renounced Gu Jiegang's School of Historical Criticism, 'Discriminations of Ancient History' *gushibian pai* 古史辨派. See 'Tong Shuye'. Further information on Tong's relationship to Gu Jiegang and on the political pressure he was exposed to is given in his biography authored by his daughter Tong Jiaoying, *Cong lianyu zhong shenghua*, Chapters 3, 5, and 6.

59 Tong Shuye, *Zhongguo shougongye shangye fazhan shi*, p. 372.

60 All information from the frontispiece of *Zhongguo gudai gongye shi* and the postface, pp. 987-989.

Zhu's book is the first of a three-volume series on ancient and early modern crafts and on industrialization published between 1988 and 1990. He started research for this work in the 1940s and included the latest archaeological findings for the prehistorical and early historical periods.

For the Qing period, the choice of sources does not diverge so markedly from Tong Shuye's account, but due to the more relaxed political circumstances, Zhu Cishou could offer a more nuanced and full account of the crafts during the Qing. Taking a chronological approach, the work introduces 'state crafts' and 'private crafts' in separate sections. Zhu Cishou sees a peak of government-run manufactories in comparison to private crafts in the Yuan.⁶¹ From the Ming period on, he perceived a gradual decline of the state and a simultaneous rise of the private commercial sector, together with the decline – or rather 'destruction' – of the natural, self-sustaining subsistence economy.⁶² According to Zhu Cishou, capitalism arose especially in the mining and smelting, ceramics, and spinning and weaving sectors. He attributes this to the fact that the government sector was corrupt and the private sector active and productive. The elements of capitalist production present in the Chinese economy during the Ming and Qing were a transition from private handicraft workshops to craft manufactories, which no longer supplied end users but used contractors and distributors to trade China-wide and overseas. According to this narrative, commercialization brought the natural subsistence economy to an end.⁶³

In its harsh criticism of the overall performance of the Qing dynasty, Zhu's work stands in the tradition of the 1950s and 1960s economic historiography. Since the existence of hired labour is an important indicator of capitalism, Zhu took great care to quantify the number of people employed in large-scale manufactories, salt wells, and mines.⁶⁴

The most recent series of Chinese craft history, *Zhongguo shougongye jingji tongshi* (General economic history of the Chinese crafts), published in four volumes between May 2004 and May 2005, was edited by Wei Mingkong (born 1956). The section on the Qing was written by Xu Jianqing (born 1951). Wei and Xu are colleagues at the Department of Economics of the Chinese Academy of Social Sciences in Peking. Since this work was written by a group of authors who all are experts of the specific periods they treat and who had newly revealed materials at their disposition, the work was extended to more

61 Zhu Cishou, *Zhongguo gudai gongye shi*, p. 7.

62 *Ibid.*, p. 44.

63 *Ibid.*, p. 43.

64 *Ibid.*, pp. 798-801.

than twice the length of Zhu Cishou's history. While the structure resembles that of its precursor, with a presentation in chronological, dynastic order; separate treatment of 'official crafts' and 'private crafts'; and subsequent sections with industrial monographs; there has been a great improvement in depth and detail.

For these authors, 'sprouts of capitalism' no longer constitute a research objective for the Chinese economy. The term does not occur in Xu Jianqing's account. Instead, she studies the 'development' or 'growth' of the handicraft sector. In her analysis, during the Qing, the official sector with its imperial manufactories, palace workshops, and monopoly industries like salt and iron production shrank compared to earlier periods. However, rather than heaping blame on the Qing rulers or bureaucracy, as most studies in the first three decades of the People's Republic of China do, she presents this tendency as an inevitable consequence of the expansion of the commercial market. It can be considered as a kind of 'decline', but she also discusses the advantages that the shift from production under control of the state bureaucracy to production in 'free' enterprises entailed for both the suppliers and for the government as a customer.⁶⁵ Thus, she arrives at a more balanced evaluation of the function of the state and the stimuli it gave to craft production by concentrating the most skilled craftspeople in its manufactories and by controlling the quality of their products. When these technical and administrative skills spread to the civilian craft branches, they could surpass the state sector in which, due to the specific problems of bureaucratic recruitment and remuneration, corruption was widespread, especially in the nineteenth century. The author also looks beyond the mid-nineteenth century divide but finds the state largely lacking the vigour to revive its former handicraft manufactories that had been destroyed in the Taiping rebellion.⁶⁶

Approach and Research Questions

This overview of Chinese craft historiography – especially the growing appreciation of (or rather the diminishing blame directed at) the Qing administration for its policies towards craft production – brings up several questions that will be addressed in the present study.

The first concerns the efficiency of the Qing state in its direct and indirect control of the crafts and industries during its entire rule. The

⁶⁵ Xu Jianqing, *Qingdai qianqi*, pp. 334-335.

⁶⁶ *Ibid.*, p. 336.

Chinese craft histories that focus on the early and mid-Qing state portray in a somewhat strident tone the decline of handicraft manufacturing that was directly managed by the Qing. Zhu Cishou, for instance, generalized that

The commercial sector was active, whereas in the government production, graft was practiced and money embezzled; therefore the corrupt official crafts could not continue. The official crafts of that time harassed the population in an extreme manner: What is called a 'fair estimate of prices' is actually cruel extortion, what is nominally 'cash payment in mutual agreement' is actually seizing for free.⁶⁷

Zhu claimed that since the government sector in the Qing dynasty was much reduced in size and in the branches it covered, it satisfied its demand of goods by purchase and requisition at regulated prices below the market level. With regard to wages, he conceded that clear regulations for wage payment existed and that the wages in the regulated sector were not lower than on the free market, yet he maintained that the positions of the workers were not absolutely free.⁶⁸

Even in the later historiography that takes a more appreciative view of the achievements of the Qing official crafts, the qualification of their demise still bears negative nuances, such as 'in the latter half of the Qing, the official crafts lingered on, and under the combined pressure from the commercial sector and modern mechanization faced their last days.'⁶⁹

The present study argues that even if the government did not always comply with market prices and wages, and even if complaints about graft, embezzlement, and arbitrary wage deductions were common throughout the Qing dynasty, there are records of regulations pertaining to prices and wages that stipulate keeping to the market quotas as well as the usage of extra subsidies (*jintie*) if the regulated prices did not meet actual expenses. Emperors and the central administration were well aware of the misallocation of government funds and worked toward greater accountability of all echelons of officials, of which the 'regulations and precedents' (*zeli*) yield clear proof. Norms and practice correlated more in the early and mid-Qing period and began diverging more and more in the course of the nineteenth

67 Zhu Cishou, *Zhongguo gudai gongye shi*, p. 43. The quotation is from a Ming dynasty gazetteer of Zhangzhou in Fujian, but Zhu implicitly extends the criticism to the Qing dynasty.

68 Zhu Cishou, *Zhongguo gudai gongye shi*, pp. 787-788.

69 Xu Jianqing, 'Qingdai qianqi', p. 555, also in *Zhongguo shougongye jingji tongshi*, vol. 4, p. 336.

century, although phases of more energetic attempts at regulation can be discerned at this time as well.⁷⁰

As for the demise of the official crafts, these did not end with the Taiping rebellion and the Opium Wars, and even if the state was no longer engaging in handicraft production on a large scale thereafter, the end of the official handicraft manufactories came gradually and was not in the first place due to corruption and mismanagement. Rather, the state maintained its role in promoting new technologies and was the leading force in the early stages of Chinese industrialization. Therefore, while looking at the phasing out of traditional craft methods, this study will also look into the promotion of mechanized production by the Qing state, which took place at the same time.

In addition, the question of the impact of foreign technology transfer will be considered. New technology and imperialism in the form of encroachments on Qing territory came hand in hand. However, how strong were the inroads that foreign capital made on the Chinese handicrafts? It has been pointed out by Bramall and Nolan that in Chinese Marxist economic historiography, if the pre-Opium War economy is perceived as stagnant, the impact of the West and Japan functioned as a necessary challenge and stimulus for economic progress, whereas if the view of the pre-1840s economy is dynamic, the growth between 1840 and 1940 could be seen as a result of proto-industrialization rather than stimulation from outside. In short, the foreign challenge in one view becomes a liability in the other.⁷¹ In concrete terms, Albert Feuerwerker has repeatedly refuted the view that foreign technology and capital crushed the Chinese handicraft industries altogether, arguing that although this applied to the important sectors of handicraft cotton spinning and ginning, other crafts like oil pressing, rice milling, mining by traditional methods, and silk weaving or minor handicrafts like the production of firecrackers, fans, bamboo furniture, and agricultural tools were much less or not at all influenced.⁷² The present study explores this viewpoint with a focus on shipbuilding and printing.

The problem of the performance of the state is closely related to the cyclical conception of the rise, flourishing, and decline of dynasties. The model has been called into question because it cannot explain long-term socioeconomic trends that cover phases extending over several dynasties.⁷³ Its explanatory power for broad social and economic processes is limited

70 Leonard, *Controlling from Afar* and 'Timeliness and Innovation'.

71 Bramall and Nolan, 'Introduction', p. xiv.

72 Feuerwerker, 'Economic trends in the late Ch'ing empire', pp. 26-28.

73 Zurndorfer, 'A Guide to the "New" Chinese History', p. 184.

due to its fixation on the activities of the central government. However, applying it in an extended version which takes into account the impact of local counterparts of the central government – the provincial elites and administrations – this study asks how we can account for the ‘decline’ of the Qing in consideration of Esherick and Rankin’s statement that in the first decade of the twentieth century not only local elites but also the state was re-organizing and increasing its resources.⁷⁴

The second field of inquiry concerns the position of the craftspeople in Qing society. A millennia-old concept of the role of the artisans ranks them in the third position after the scholar-officials and farmers, and before the merchants. How does this concept relate to what is known about the lot of the artisans in the Qing period? The historical record is full of the emancipation of the merchants during the Qing, the rise of their status, and the ‘blurring of boundaries’ between the scholars and the merchants. This tendency obviously did not include the artisans, whose position according to the Confucian orthodoxy was not lower than that of the merchants or even slightly higher, but who in real life had fewer chances than merchants to attain social esteem. The present study argues that only the artisan who became a merchant by marketing his products and by hiring labour could aspire to reach social respectability and recognition beyond his own circles. Until the very last years of the Qing, the esteem of the political elite could be acquired by passing official examinations, or, since the early nineteenth century, by purchasing an official title. Much capital was necessary for this costly procedure, which could hardly be earned by a small individual workshop, and certainly not with hired labour or agricultural subsidiary craft production. If there was a way to bypass official examinations, it applied only for a very small part of those artisans who either were closely associated with the court or to those who produced luxury items – but even then, it was the items they produced rather than the producers that were appreciated by the cultural elites.⁷⁵

In view of this distinction between artisans and merchants, this study also examines the Chinese guilds as professional associations of these two groups. Can the subordinate status of the artisans be recognized in guild structures? The British historian James Farr defines the power relations

74 Esherick and Rankin, *Chinese Local Elites*, p. 341.

75 For a parallel trend as shown in the case of the sixteenth-century German city of Nürnberg, where even a successful family of painters could not enter the ranks of the urban political elites, see Rainer S. Elkar, ‘Fragen und Probleme einer interdisziplinären Handwerksgegeschichte’, pp. 10-11.

within the European guilds as a 'trend towards oligarchy within the guilds and in urban politics. Wealthier artisans would dominate the guilds, and the artisans would be increasingly excluded from the constitutional political community.'⁷⁶ Can similar tendencies be discerned in the Chinese guilds?

Finally, to come to an assessment of the Qing state's treatment of the artisans, a look is taken at the interdependence of the guilds and local politics. In his studies on Hankou, William Rowe showed how guilds took over many of the previous tasks of the government in municipal administration and the organization of welfare activities.⁷⁷ Did this endure until the end of the Qing, or did the government try to gain back lost ground, as the statement by Esherick and Rankin suggests?

The present study, in sum, aims to come to terms with earlier Marxist Chinese historiography which claims that the Qing dynasty lacked the efficiency to promote manufacturing and eventually bring about indigenous capitalism.⁷⁸ It also strives to show that, on the contrary, the Qing administration operated rationally in many respects and that the agents in the private market were relatively free from government coercion.

Methodically, this study explores normative sources as well as archival material with a more immediate and less historiographical functions. It draws on the economic historians Peng Zeyi (1916-1994) and Chen Zhen's collections of historical materials on the crafts and guilds⁷⁹ as well as the Qing dynasty regulatory guidelines, *zeli* and *Huidian* (Collected Statutes). For the aspects of both shipbuilding and printing, the records of Western eyewitnesses in nineteenth-century China and, especially for printing, recently published interviews with veteran craftspeople are also considered.

76 Farr, *Artisans in Europe*, p. 188.

77 Rowe, *Hankow*, p. 299 ff., for 'corporate functions' like education, common finances, and cemeteries, and p. 317 ff. for 'community service functions' like firefighting, maintaining the infrastructure, security services, and armed forces.

78 See for instance Fang Xing, 'The Retarded Development of Capitalism', with comments on the basic state policy of favouring agriculture at the expense of commerce (p. 392), on the policy of 'neither encouraging nor banning commerce', and stating that the attitude of the Qing court for more lenience towards protoindustrial enterprises such as mining and smelting was motivated by political aims rather than by 'the desire to develop the economy and enrich the country' (p. 395). This all pertains to the period before the Opium War and applies to commerce and, by extension, to craft production for the market. For an earlier (c. 1960), less nuanced argumentation than Fang Xing's, see Tong Shuye, *Zhongguo shougongye shangye fazhan shi*, p. 283, with the assertion that the Qing aimed at warding off capitalist elements 'in order to cement their tribal feudalistic rule'.

79 Peng Zeyi (ed.), *Zhongguo jindai shougongye shi ziliao, 1840-1949*, 4 vols., 1962; Chen Zhen (ed.), *Zhongguo jindai gongyeshi ziliao. Di san ji: Qing zhengfu, Beiyang zhengfu he Guomindang guanliao ziben chuangan he longduan de gongye*, 1961.

Among the Chinese studies on the sector of craft production, the present research draws mainly on Zhu Cishou's *Zhongguo gudai gongye shi* (History of Chinese traditional industries) ; the series edited by Wei Mingkong, *Zhongguo shougongye jingji tongshi* (General economic history of the Chinese crafts), especially the section on the Qing written by Xu Jianqing; as well as relevant Chinese studies translated into English in the volume *Chinese Capitalism, 1522-1840*, edited by Xu Dixin and Wu Chengming .

In various respects, the argumentation developed in the present study pertains to questions raised in the debate on the Great Divergence.⁸⁰ As will become clear in the ensuing chapters, this study does not take global or Eurasian comparison as its first objective. Instead, it sets out from the Chinese perspective and for that reason concentrates on Chinese institutions and Chinese political economy. Nevertheless it connects with the approach of the California School in considering the basis of the Qing political economy as one of relatively light taxation and exigencies on the population in the way of corvée services. Moreover, this study shows that merchants' involvement in shipbuilding and 'donations' or loans to the state for the upkeep of its marine forces constituted a reverse side of this formally moderate taxation. State administration plays no great role in Kenneth Pomeranz's work *The Great Divergence*, yet R. Bin Wong convincingly discusses the impact of political economy and the imperial institutions of the Qing.⁸¹ Wong has recently repeated and enlarged, together with Jean-Laurent Rosenthal, an appreciative view of the state administration of public goods, especially granaries and infrastructure.⁸² The present study endorses the view of the Qing administration during the eighteenth century as quite efficient in these respects as well as in its attempt to keep expenses under control. The argument extends to government efforts of the nineteenth and especially the early twentieth century, initiatives that can qualify as useful attempts at modernization, although the Qing could not reap the rewards of their endeavours. Concerning the social position of artisans, this study contributes both concrete data and information on cultural beliefs and convictions that can offer a more focused outlook in time and space than theories that encompass the entire economies of Europe and Asia.

80 For an insightful analysis of the ideas of the main proponents of the California School and the respective critiques, see Peer Vries, 'The California School and beyond: how to study the Great Divergence?' as well as the 2015 special issue of the *Low Countries Journal of Social and Economic History* (TSEG), 2015/2 with a debate on Vries' 2013 book *Escaping Poverty. The Origins of Modern Economic Growth* and various critical voices on the paradigm of the 'Great Divergence'.

81 R. Bin Wong, 'The political economy of an agrarian empire' and *China Transformed*.

82 Rosenthal and Wong, *Before and Beyond Divergence*, pp. 205, 231.

The present study also has links with the research field of the 'Confucian merchants' or 'merchant-gentlemen', as formulated in Yü Ying-shih's seminal study on the merchant spirit which also discusses new conceptions of the four occupational groups in society.⁸³ However, it expands on the craftspeople and their possibilities for study and advancement in official careers and does not follow Yü in his attempt to show, in Weberian terms, parallels between Protestant and Confucian merchant ethics.

The most recent Chinese historiography on the first decade of the twentieth century revises earlier convictions about the decline and utter dysfunction of the government. These new approaches inspired the outlook of the present study, which portrays a dynamic re-organization of the bodies that had controlled craft production and their attempts to launch industrial, mechanized production not only in private enterprises but also in the service of the state.

Contents of the Present Volume

With a view to outlining the state engagement in the handicraft sector in historical perspective, chapter one starts from the turn of the second millennium and gives overviews on the Song, Yuan, and Ming dynasty systems of allocation of materials and labour, and in particular the remuneration of work and the processes of production and distribution. The comparison shows that the degree of coercion to perform actual work services varied between the dynasties, with arrangements including the substitution of *corvée* for tax payment more important and typical in the Song, and coercive measures more typical for the first phases of the Yuan and Ming dynasties. Consequently, the number of people continuously enrolled in the service of the state decreased from the Song to the Ming, with a high peak in the Yuan. During the Ming period, the initially strong control of craftspeople receded in the course of the dynasty, and the private sector started to overtake the state economy.

Chapter two examines the transition from the Ming to the Qing in the second half of the seventeenth century, describing an initial expansion of the bureaucracies in charge of artisan production but thereafter a downsizing and increasing reliance on the market for most branches of handicraft production in the course of the latter dynasty. Yet this does not apply to craft branches concerned with core necessities of the state: the production

83 Yu Yingshi (Yü Ying-shih), *Zhongguo jinshi zongjiao lunli*, pp. 104-121.

of weapons, military infrastructure, monetary production, and to a certain extent printing remained under close state control throughout.

After the first decades of the Qing, craftspeople were accommodated by not compelling them to corvée service. The great majority of the artisans in the service of the state worked as remunerated, hired labourers. Focusing on the institutions of the central government that controlled the crafts, this section considers administrative and technical tasks as well as the increase and decrease in personnel and responsibilities, especially in the Ministry of Public Works and the Imperial Household Department. As ideas of modernization and industrialization were first realized in China, the Imperial Household Department maintained the organizational modes of the Manchu monarchy, while the Ministry of Public Works became a 'modern' institution during the transition from the monarchy to a republic. Contact with industrialization and Western principles of work organization led to more formalized training, most prominently in shipbuilding, but apprentice training in mechanized textile production was also introduced.

Chapters three to eight consider the government-artisan relationship by studying specific sectors. Chapter three concentrates on building, porcelain, and textiles, which largely served representative purposes for the central government. The reasons the state withdrew from or maintained the organization of craft production are also outlined.

Chapter four analyzes in greater detail the perspective of production and the institutions involved in state and private naval construction. Chapters five and six consider the perspective of the workforce in the same period, with a retrospective look at the late Ming imperial shipyards. This is particularly enlightening in view of the control of the workforce on the one hand and, on the other, the options given to the government-registered craftspeople of this wharf to select their employment.

In a parallel structure, chapter seven looks at printing in the government and private sectors, again focusing on institutions and production, while chapter eight explores the workforce in both sectors, their remuneration, skills, and training.

Chapter nine, 'The Artisan's Place', examines the role of the artisans in society, with a review of the earliest statements which, seen on the basis of Confucian statecraft writings, seem to have remained more or less stationary during much of Imperial China. However, the perspective on the products of the artisans' and workers' labour *did* change with the onset of industrialization. It will be argued that although craftspeople ranked above the merchants in the traditional ranking of the 'four occupational

groups', in actual life they needed to acquire merchant status if they hoped to improve their position.

The tenth chapter explores the activities of the relatively autonomous institution of Chinese guilds as opposed to the state institutions. Taking an evolutionary point of view, the development of craftsmen's associations from merchant guilds is shown, and the point is reconfirmed that craftspeople were, in everyday practice, subordinate to merchants. Organizations that had great influence in municipal governments in the later nineteenth century were merchant guilds that could afford to finance the 'liturgical service' of charity, maintain infrastructure, and raise local militia, as opposed to the less affluent craft guilds.

The hierarchy within the craftshops was reflected in the guilds too, to which journeymen were supposed to belong but where they had less impact than the masters. In the late nineteenth century, a sustained trend of emancipation set in with the establishment of journeymen's guilds. This tendency can be placed alongside the first traces of industrial proletarianization and worker self-consciousness, thus marking a gradual departure from tradition.

Designations and Definitions of Crafts and Craftwork

In present-day usage of Chinese, the closest equivalent to 'handicrafts' is the term *shougongye*. This is not a classical designation but instead dates from the early twentieth century. The most voluminous Chinese dictionaries, *Zhongwen da cidian*⁸⁴ and *Hanyu da cidian*⁸⁵ only give definitions of the term but no earliest occurrences. Since many translations of Western political, economic, and social science terminology originate from Japan and were adopted by Chinese intellectuals staying in Japan for shorter or longer study terms from the last decade of the nineteenth century onwards, a look at Japanese dictionaries may help to limit the time range as to when the word was probably adapted. An early reference to a dictionary entry is mentioned in the largest Japanese dictionary *Nihon kokugo daijiten*. It points to an English-Japanese commercial dictionary from 1904, which renders 'handicraft' as *shukōgyō* 手工業 and defines it as 'production solely by

84 *Zhongwen da cidian*, vol. 13, no. 12050..4 in its definition expressly mentions the term 'handicrafts' in English, thus implying, if not stating expressly, that it is a translation. The *Zhongwen da cidian* (first edition 1955-1960, revised 1966-1968) is mainly based on the dictionary compiled by Morohashi Tetsuji and his team, *Dai Kan-Wa jiten*, the first draft of which was first published in 1943, but Morohashi's work does not contain the term *shougongye/shukōgyō*.

85 *Hanyu da cidian*, vol. 6, p. 293.

hand, without using any machinery'.⁸⁶ An early Japanese-English dictionary reference of the year 1911 includes, in addition to the entry 'shukugyō', the term *shukōgyōsha* 手工業者 as 'handicraftman'.⁸⁷

An occurrence of the Chinese term *shougongye* can be found in one of the earliest modern Chinese encyclopedias, Huang Moxi's monolingual and explanatory *Putong baike xin da cidian* of 1911. The definition says that this term was used in opposition to 'mechanized industry' as well as to both 'household production' and 'manufactory production'. In the first sense, this implies craft production with simple tools. The second sense signifies artisan production with the assistance of a few family members and apprentices. The products are directly sold to the consumer for one's personal profit.⁸⁸

'Handicraft' is rendered as *shouyi* 手藝 in Hemeling's 1915 English-Chinese dictionary,⁸⁹ and starting from 1892, the equivalent of *shougong* 手工 or *shouyi* is given as 'craft' or 'handicraft'.⁹⁰ Apart from dictionaries, full text databases of Chinese newspapers and articles reveal the earliest occurrences of the term – one article in 1904 and two in 1906 in the journal *Dongfang zazhi* (Eastern Miscellany), and entries from 1906 in the daily newspaper *Shenbao* – but full text search results in the *1833-1949 Chinese Periodical Full-text Databases* start only in 1920.⁹¹ From this evidence, it can be concluded that the term was certainly established in the social and economic sciences by the third decade of the twentieth century and that it was probably adopted earlier in Japan.⁹²

The term *shougong* was preferred in reference to 'handicraft' or 'craft' in China, while Japanese dictionaries suggest the word *tewaza* 手業, or *shigoto* 仕事 (present-day 'work', 'employment', 'occupation'), *tezaiku* 手細工 ('handicraft', 'handiwork', 'handmade goods'), and *shoku* 職 ('employment',

86 *Nihon kokugo dai jiten*, 'Jukōgyō', with reference to Tanaka, Nakagawa, and Itami's *Ei-Wa shōgyō shinji*, which renders the term as equivalent for 'handicraft'.

87 Nitobe and Takakusu, *Shinshiki Nichi-Ei jiten (Seventh edition)* (A new-style Japanese-English Dictionary). The first edition dates from 1905.

88 Thanks to Iwo Amelung for this information. The reference is in Huang Moxi, *Putong baike xin da cidian*, vol. 2, no. 312.

89 Karl Hemeling, *English-Chinese Dictionary*, which was based on the dictionary by G.C. Stent published in 1905 by the Maritime Customs.

90 Herbert Giles, *Chinese-English Dictionary* (1892), F.W. Baller, *Analytical Chinese-English Dictionary* (1900), G.C. Stent, *Chinese and English Vocabulary* (1898). Samuel Wells Williams' *A Syllabic Dictionary of the Chinese Language* (1903, first ed. 1874) has none of these terms.

91 1833-1949 Chinese Periodical Full-text Databases; *Shenbao* database, 1874-1949; *Dongfang zazhi* (The Eastern Miscellany) database, 1904-1948. The Chinese Periodical Full-text databases include journals and newspaper other than *Shenbao* and *Dongfang zazhi*.

92 The first article in the full text database of the daily newspaper *Yomiuri shimbun* with an occurrence of the term is from 20 May 1898, p. 6, in a job advertisement for artisans wanted for arts and crafts production by a shop in Tokyo.

'work', 'job', 'office'), and for crafts, *shokugyo* 職業 ('occupation', 'business', 'trade', 'vocation', 'profession'), *shugeiwaza* 手藝巧 ('skilful manual techniques'), or *kagyō* 家業 ('family occupation'). Among these, some have at present acquired much more general meanings, such as *shokugyō* or *shigoto*, while others have remained in use for 'handicrafts'. However, in Japan as in China, the established scholarly term in social and economic history remains *shukōgyō/shougongye*.

Which was then the traditional term for craft occupations? From the technical point of view, craftspeople were first and foremost associated with the *gong* and *jiang*. According to Joseph Needham, the character *gong* 工, used for technical as opposed to agricultural work, shows a tool, probably a carpenter's square,⁹³ and the character *jiang* 匠 or 匠 for 'master-artisan' indicates an axe or the 'technical work' character in a box or in a carpenter's square (*ju*). Needham, following Karlgren, claims that in one of its oracle bone forms, the character is interpreted as a man holding a tool,⁹⁴ but according to more recent paleolinguistic research, *gong* and *jiang* are probably etymologically unrelated.⁹⁵

The semantic field for *gong* according to the dictionaries *Zhongwen da cidian* (No. 8911) and *Hanyu da cidian* (vol. 2, p. 951) includes various or all types of skilled work, notably musicians and shamans. It also refers to female workers and in texts during the first millennium B.C., it was interchanged with 'official' *guan*, perhaps referring to the officials in charge of the workers.

'Craftwork' in the sense closest to its European counterpart, is *shougong*, which refers to manual labour or to artisans,⁹⁶ and *gongyi*,⁹⁷ associated with

93 He Jinsong, *Hanzi xingyi kaoyuan*, p. 179-180, claims that the tool could be a rammer used for the construction of stamped earth walls. Cf. also Barbieri-Low, *Artisans in Early Imperial China*, p. 36.

94 Needham, *Science and Civilisation in China*, Vol. 4, Physics and Physical Technology. Part II: Mechanical Engineering, p. 9.

95 Thanks to Wolfgang Behr for this information and the reference to He Jinsong.

96 *Zhongwen da cidian* and *Hanyu da cidian* do not agree on this point and cite the same *locus classicus* (*Chronicle of the Three Kingdoms*, *Chronicle of Wu*, 'Biography of Sun Xiu') as reference for 'manual skill' or 'manual techniques' (*Zhongwen da cidian*, vol. 13, no. 12050.3) or for 'artisans' (*Hanyu da cidian*, vol. 6, p. 293). *Hanyu da cidian* also notes the meaning 'manual skill' (*shouyi*), 'work achieved with the hands', 'to create with the hands', 'subject taught at elementary and junior high schools', but for the latter four definitions the dictionary gives twentieth-century references.

97 Both *Zhongwen da cidian*, vol. 11, no. 8911.98 and *Hanyu da cidian*, vol. 2, p. 958 define it as 'technical' or 'manual' skill and refer to the *Xin Tangshu* (New dynastic history of the Tang), compiled between 1043 and 1060, but *Hanyu da cidian* in addition quotes an occurrence from ca. 800 in Feng Yan, *Fengshi wenjian ji* (Records of things heard by Mr. Feng) and one from Wang Zhen's *Nongshu* (Agricultural treatise, chap. 21), dating from 1313.

'technical skills', which was also part of the official designations like *gongyi ju* (craft office), *gongyi zhuanxi suo* (craft training bureau), and *gongyi chang* (craft manufacture) given as a designation to the technical and vocational schools established after 1902. In present-day usage, *gongyi* has remained more idiomatic than the rather synthetic *shougongye*.

'Artisans' as a social and status group are the *gong* and occur as such in the categorization of the four occupational groups. If seen from the perspective of their organizational structure, craft and commercial branches but also individual shops or trade enterprises are designated as *hang* (business lines or proto-guilds). State administrations insisted on referring to the duties of the artisans as *jiangyi* or *gongyi* (master artisan corvée and artisan/labour corvée), even in the late Qing when such corvée obligations were formally abolished.

The new Chinese term was obviously adapted from Japan, where it had been coined after contact with Western concepts. The definitions in the early modern dictionaries and encyclopedias show how in the late nineteenth and early twentieth century, due to the growing importance of mechanized production, the economic branch and business form of handicraft production was terminologically distinguished from the mechanized, industrial production in factories by expressly stressing its manual quality.

Finally, as an explanation of the title of this book, both 'state' and 'crafts' are meant literally. Although 'statecraft' writings are presented in chapter nine, this study's main focus is on the administration of the Qing and its direct and indirect control of craft production both in the service of the dynasty and in the private sector. The English term 'statecraft' was used for the Chinese literature generated by concerned officials and intellectuals who intended to improve, and sometimes reproach, the government policies of their times. The Chinese term for this literature, *jingshi wenbian*, does not express exactly the same metaphor but still points to writings wishing to 'set in order the times like the threads on the woof of the loom'. This may show the affinity of the terms for political management and for the production of material goods in both the English and the Chinese languages.

1. State Engagement in the Handicraft Sector

Textual and material evidence shows that since the Shang dynasty (ca. sixteenth to eleventh century B.C.), workshops for manufacturing and construction existed. They provided weapons and objects for ceremonial and everyday use for the court and the ruling elite and planned and executed great central building projects like palaces, city walls, and funerary monuments. A great number of bronze vessels were produced for the ceremonial use of the rulers. Archeologists have calculated that it would have taken 18 years – if 10,000 earth pounders were engaged for 330 days per year – to complete the stamped-earth city walls of an early Shang city located in the vicinity of modern Zhengzhou in Henan.¹ Both cases suggest that the work organization lay in the hands of specialized groups who could command great and, in the case of the bronze casters, highly skilled manpower. These workers and artisans most probably stood in the immediate service of the rulers and were supervised by their officials.²

Production and construction for the service of the state have been incorporated in various ways into the institutional frameworks of the ruling dynasties from that time onward. Between the third century B.C. and the tenth century A.D., government and civilian crafts and industries co-existed, and more state activist and more laissez-faire periods alternated in the longer dynasties of the Han and Tang. The short precursor dynasties Qin and Sui maintained a high degree of state activism, which was one of the reasons for their premature end.

The labour force especially for building, but also in the workshops, often had to serve the state in *corvée* obligations or in slavery, but the level of unfree labour apparently diminished after having reached its apex in the Northern and Southern Dynasties and the Sui. In 494 A.D., permanent work obligations were first reported to have been replaced by work shifts from the Liu-Song of the Southern Dynasties.³ The shift system was used time and again in subsequent dynasties until the first years of the Qing. A

1 Robert Bagley, 'Shang Archeology', p. 167. According to Bagley, the original length of the wall was about 7 km, '[t]he overall thickness at the base is about 22 m, and the greatest surviving height is 9 m.'

2 David Keightley, 'The Shang: China's First Historical Dynasty', especially 'Dependant Labour', pp. 282-284.

3 Zhu Cishou, *Zhongguo gudai gongye shi*, p. 291.

parallel trend consisted in the option to convert labour duty into monetary payment.⁴ These two trends often appeared simultaneously in the middle and late phases of dynasties. They suggest a more indirect and rational relationship between professional artisans and the state. The rise of the guilds as intermediaries between the government on the one hand and the artisan and merchant households on the other during the Tang period can also be interpreted in this light.

Historical Overview: Official Crafts from the Song to the Ming

In Chinese craft historiography, the transition from labour obligations for artisan households to a system of hired labour in the official sector between the fifteenth and seventeenth centuries is generally considered to be an important institutional and legal change. An overview of the methods of recruiting artisan labour for the dynasties and public work projects may show whether the break of the Qing government with previous practices was a radical rupture or can be understood as part of a more gradual process.

Marxist historiography in the tradition of the search of incipient capitalism in China assumes that dynastic economic policies created 'a closed and self-sufficient part of the feudal economy, which was ultimately incompatible with private handicraft industry'.⁵ How far does this characterization apply for the Song, Yuan, and Ming periods? When did the official and the civilian sector start to become mutually permeable, so that artisans could find employment in either of them? To answer these questions, the institutions, sizes of the artisan workforce, and the levels of coercion will be compared.

The Song System, 960 to 1276

For several reasons, the Song dynasty represents a major historical turning point in Chinese history. From the tenth century onwards, the bureaucratic state with an officialdom that was recruited in (theoretically) impartial and equal examinations among the free males prevailed until the end of the nineteenth century. The economy expanded and the population increased at an unprecedented rate, from around 55 million to 100 million from the

4 Heinz Friese, *Dienstleistungs-System*, pp. 15-23, 126-130.

5 Wang Shixin, 'State Workshops', p. 65

mid-tenth to the late thirteenth century.⁶ Inventions such as the compass, porcelain, and gunpowder originate from this dynasty; and block printing and printing with movable types were developed commercially. The Song possessed a fully monetized commercial economy in which paper money was issued by the government in order to secure liquidity in the expanding commodity markets. Copper cash, the small denomination money for everyday use, was cast in amounts that were never again reached in Chinese history.⁷ However, on the military field, the Song gradually lost out to North Asian invaders. In 1126, a Jurchen tribe from northern Manchuria, which had assumed the dynastic name Jin, conquered the northern part of the Song empire and forced the rulers out of their capital Kaifeng. The Song established another, 'temporary' capital in Hangzhou/Lin'an south of the Yangzi delta and in 1142 officially ceded the northern part of their territory to the Jin. They ruled in the south until their ultimate defeat by the Mongols in 1276.

Historians of China, and of the Song period in particular, in many respects see the Song as the apex of the Chinese bureaucratic state and of its cultural and economic achievements.⁸ But variant views have also been formulated. Kent Deng, for instance, comes to a quite negative evaluation of the economic and administrative performance of the Song government. He argues that the Song could not prevent large landholding and high rates of tenancy and had to finance an overpaid officialdom and an expensive military that was ultimately ineffective. Therefore, it profitably engaged in commercial activities. This trend, which had started in the Northern Song, intensified in the Southern Song when almost half of the territory and revenue sources were lost. Moreover, wealth was not spread evenly. Deng has hypothesized that migrational shifts – first south, out of the direct reach of the government of the Northern Song, and during the Southern Song probably back north towards the Jin territory – as well as uprisings in the Southern Song showed popular discontent with the strong emphasis on the market economy and the breaking away from agrarian traditions.⁹

6 Maddison, *Chinese economic performance*, pp. 24, 169.

7 The peak was 5 million strings of copper cash and 1.4 million strings of iron cash in the Yuanfeng era (978-1085), cf. Peng Xinwei, *Monetary History*, p. 438, n. 11. The highest average production figures reported in the Qing dynasty were at around 3.5 million per year between 1761 and 1765; see Burger, 'Minting during the Qianlong Period', p. 392.

8 Cf. e.g. John King Fairbank, *China. A New History*, pp. 88-107, 'China's Greatest Age: Northern and Southern Song'. See also the discussion in Maddison, *Chinese economic performance*, pp. 24-25 on various characterizations of Song growth and dynamism which Maddison believes to be exaggerated.

9 Kent Deng, *Premodern Chinese Economy*, pp. 301-310, 318-320.

While judgments about the benefits of commercialization during the Song dynasty may vary,¹⁰ historians agree that state involvement in the non-agricultural part of the economy was intense and that the state sector surpassed the private economy.¹¹ Craft products were bought up by the state at fixed prices. This was the so-called *hemai* system (acquisition by [mutual] agreement) that included a wide product range of textiles, porcelain, lacquers, and other luxury goods. Moreover, the provinces were required to deliver a fixed quota of manufactured and other commercial goods to the state as 'tribute'. State monopolies were handled either directly or through merchant intermediaries.¹²

Scope and Size of the Official and Private Artisan Workforce

Artisan labour was allocated by the state in two ways: the craftspeople could be employed (*mujiang*) on a long-term but not necessarily permanent basis; this system was also referred to as *hegu* (consensual employment). These persons formed the main force of the state workshops. 'Conscripted [people] from the guilds' (*danghang*) or 'artisans on shift' (*fanjiang*>) were summoned to fulfil labour duties for more ad hoc work. Over time, the Song guilds developed from instruments of state control to influential bodies of self-organization.¹³ Throughout the Song, they formed the interface between the individual artisan households and the state and were responsible for supplying labour to the government. For example, the guilds decided whose turn it was to serve the state in temporary work assignments.

There are no systematic overviews of the size of the workforce that the state could command. One estimate by Ju Qingyuan¹⁴ gives figures of 7,000 to 9,000 artisans in the armament manufactories of the central government, 18,000 ironsmiths in one military prefecture, and more than 10,000 workers in government mints (see Table 1). However, these calculations only show a fragment of the actual employment in government offices. Other

10 For a recent revision of the view that the Song state levied excessive taxes, see Liu Guanglin and Andrew Wareham, 'China and England Compared', p. 80.

11 Günter Lewin, *Die ersten fünfzig Jahre der Song-Dynastie*, p. 117.

12 Cf. Deng, *Premodern Chinese Economy*, p. 307 on changing state policies regarding monopolies. Salt, wine, and iron monopolies were given to merchants when they became less profitable, but the more profitable monopoly on imported medicines was permanently handled by the state.

13 Ju Qingyuan, *Tō Sō kōgyōshi*, pp. 138-142.

14 *Ibid.*, pp. 31-32.

historians have added to these data. Zhu Cishou lists all workshops of the Palace and the Central Government quoted in the 'Collected Statutes of the Song'.¹⁵ In the Northern Song, these were the Palace Domestic Service (*nei shisheng*) and the Directorate for Imperial Manufactories (*shaofu jian*), which in total was made up of 144 sections and subsections. Some of these shared their workforce, but if duplications are subtracted, 105 individual units remain.

The institutions subordinate to the Palace Domestic Service were the Manufactory of the Rear Palace Quarters (*houyuan zaozuo suo*), the Brewery of the Court of National Granaries (*sinong si du quyuan*), the Water Mill Office (*shuimo wu*), and the Charcoal Yard (*tanchang*). The most important central government workshops and manufactories that belonged to the Directorate for Imperial Manufactories were the Office for Arts and Crafts (*wensi yuan*), where ceremonial and ornamental objects for court use were produced; the silk weaving manufactory Silk Brocade Office (*lingjin yuan*); and the Embroidery Office (*wenxiu yuan*).¹⁶ The numbers of artisans employed here may have ranged from a few dozen to in the hundreds, such as the six hundred in the Silk Brocade Office.¹⁷

At the same level as the Directorate for Imperial Manufactories and also concerned with craft production were the Directorate for Construction (*jiangzuo jian*), the Directorate for Armaments (*junqi jian*), and the Directorate of Waterways (*dushui jian*).

After the Jin conquered North China, the Song established imperial manufactories in their southern capital Lin'an. Institutions were slightly reshuffled, so that now the manufactories of the central government were all put under the control of the Ministry of Public Works. Zhu Cishou considers the four main sectors of craft production in the capital to have been armament, construction, printing, and the production of objects for official and court use. He suggests that immediately after the transfer to the south, the size of the manufactories was cut down, but in the course of time they expanded again.¹⁸ State manufactories that were not stationed exclusively in the capital consisted of porcelain kilns, iron foundries, mints, armament and gunpowder manufactories, shipyards (which were of particular importance during the Southern Song), and paper manufactories.

15 Zhu Cishou, *Zhongguo gudai gongye shi*, p. 428 ff., referring to *Song huiyao jigao* 宋會要輯稿 (Editorial draft of the Collected Statutes of the Song), 'Zhiguan' (Official positions), chap. 29-1.

16 Founded in 1104 with 300 artisans; see Kuhn, *Die Song-Dynastie*, p. 121.

17 Gao Xuan, *Songdai chuantong gongyi*, p. 12.

18 Zhu Cishou, *Zhongguo gudai gongye shi*, p. 430.

The non-state sector consisted of private workshops, individual craft-people, and smaller-scale manufactories as well as workshops in Buddhist temples. Kuhn identifies, for instance, 21 private versus nine state manufactories for weaving silk with complicated patterns and points out that apart from these, an enormous number of smaller, private manufactories for plain silk weaving existed.¹⁹

A recent study by Qi Xia comes to the conclusion that in 1068, there were between 800,000 and one million artisan households (both private and in the service of the state), which in his calculation made up five to seven percent of all households.²⁰ As to estimates of the figure of artisans in the service of the state during the Southern Song, Hu Xiaopeng estimates a total of 50,000 permanent positions and about 300,000 that were hired on a more temporary basis for work in mines, salt production, iron smelting, and other trades.²¹ On the basis of Angus Maddison's population estimates for the early Song (Table 6), the permanent workforce amounted to 0.09 percent of the entire population of 55 million and 0.05 percent of the population by the end of the dynasty. The entire workforce recruited ad hoc by the state was 0.6 percent at the beginning and 0.35 percent at the end of the Song dynasty.

Remuneration

Work in government manufactories was remunerated and thus not 'real' corvée labour. However, there is evidence that it was not popular and was evaded if possible.

Reports of corruption point to officials that appropriated the production of artisans for their own use or disposal, as well as arbitrary wage cuts by officials, which were especially rampant during the Southern Song.²² In this light, the rule that 'whoever can double his workload will be especially rewarded'²³ may not have been very attractive.²⁴ However, in contrast to

19 Kuhn, *Die Song-Dynastie*, pp. 379-381.

20 Qi Xia, *Songdai jingjishi*, p. 726, also cited in Gao Xuan, 'Songdai chuantong gongyi', p. 14. For comparison: Wilfried Reininghaus, 'Stadt und Handwerk', p. 6, quotes the figure of ten to twelve percent as the percentage of artisans in the cities at the end of the Holy Roman Empire (1806).

21 Hu Xiaopeng, *Zhongguo shougongye jingji tongshi*, pp. 36-37.

22 Zhu Cishou, *Zhongguo gudai gongye shi*, p. 432.

23 *Ibid.*, p. 432, quoting *Jinshi cuibian* 金石萃編, chap. 14, 'Xuanren houshan ling caishi ji' 宣仁後山陵採石記.

24 Guo Daiheng, 'Yuanming yuan neigong zeli pingshu', p. 169, attaches a positive connotation to this phrase, pointing to the fact that the option to earn an efficiency wage under fair conditions

this, the late Southern Song source *Meng liang lu* states that 'In the case of work obligations, although this is [the unpopular] 'consensual employment', if the authorities give out cash and rice for it, [and if] that wage is higher than that paid by private employers, then those who are obliged to work gladly will do so.'²⁵

Song wage data for artisan labour are not systematically presented in government documents but appear in scattered sources. A remuneration of two *sheng* (ca. 1.17 liters) of rice or other grains per day plus a money allowance of between 10 and 100 cash coins seems to have been a standard wage for low-skill handicrafts but also for military and service sector occupations. Assuming an average daily consumption of about one liter of rice per person each day,²⁶ such wages were adequate to feed one person but did not suffice to support families. The director of the arms manufactory 'Ten Thousand Perfections' complained in 1166 that the Ministry of Revenue gave out only 55 *sheng* (32.17 liters) of rice and 48 *sheng* (28.08 liters) of wheat per person per month plus a daily food allowance of 100 cash for the workers, and that this was not enough.²⁷ Another example from ca. 1078 mentions daily wages for building walls and forts of 2 to 2.5 *sheng* (1.17 to 1.46 liters) of rice and 10 cash for pickled vegetables.²⁸ In a state brewery, the pay was 300 copper cash per day for masters and 250 for unskilled helpers, with the option of a bonus for the master in case excellent wine was made.²⁹ By contrast, between 1063 and 1077, official salaries ranged from 300,000 to

was different from the Qing system, which did not reward artisans who surpassed their work quotas. However, in the Qing, there are records for bonuses for work in the commercial industry that exceeded the norms, for instance for the paper dyers in 1756 Suzhou. See *Ming Qing Suzhou gongshangye beike ji*, pp. 90-92.

25 *Meng liang lu*, chap. 13, p. 105 'Tuan hang' (Guilds and associations). The date of this source is disputed. It is given in characters of the hexagenarian cycle and could thus refer to '1274' at the end of the Southern Song as well as '1334' under the Mongol Yuan dynasty. Citing internal evidence, Umehara Kaoru, *Mu ryō roku*, vol. 3, pp. 374-375, plausibly argues that although the text deals only with the Southern Song and makes no reference to the Yuan rule, it must have been written in reminiscence of the splendour of the Southern Song capital. In view of the more rigid system of work recruitment under the Yuan, the Southern Song system may have seemed more lenient.

26 Xu Jianqing, *Qingdai qianqi*, p. 642, calculates one Qing dynasty *sheng* (1.035 liters) as a one-day ration.

27 *Songshi*, chap. 194, p. 4846.

28 *Xu zizhi tongjian changbian* (Continued Mirror for assistance in administration, Long version) 續資治通鑑長編, chap. 343 (*Siku quanshu* full text database).

29 Cited in Gao Xuan, 'Songdai chuantong gongyi', with reference to 'Regulations and precedents on brewing in the government breweries within the city' (*Zaicheng jiuwu zaojiu zeli* 在城酒務造酒則例), p. 12.

400,000 cash per month for the prime minister and 12,000 to 22,000 cash per month for county magistrates.³⁰

In sum, one can discern little change over time in the basic labour institutions of the Song. Labour market conditions seem to have been flexible; the public and private sector were not made impermeable by laws or regulations. There are thus no indications of a transition of the craft production from state dominance to a preponderance of the private industries as in the subsequent dynasties.

The Yuan System, 1279-1368

At the outset of the dynasty, the Mongol way of recruiting artisans for the service of the state was very different from the Song practice. In a sense, artisans were specially favoured by the Mongol elite in all their conquered territories, since few skilled artisans existed in Mongolian society previous to their conquest of sedentary peoples, and these were traditionally held in high regard.³¹ Therefore the Mongols showed strong interest in the artisans of the regions that had come under their domination. Artisans who specialized in armament production or produced luxury goods were spared from massacres in cities, taken to Mongolia, and presented to Mongolian nobles as personal servants.³² A famous saying of the times is 'spare only the craftspeople' (*wei jiang de mian*).³³ The dynastic history of the Yuan reports that in 1235, shortly after the conquest of the Jin dynasty, 720,000 'civilian artisans' or 'ordinary households and artisan households' were captured in the geographical areas corresponding to present-day Shandong, Hebei, and Shanxi.³⁴ The term 'captives' has been subject to debate in the literature. Ju Qingyuan, for instance, refuted the view that these were actually slaves and

30 Deng, *Premodern Chinese Economy*, p. 302

31 Frederick Mote, 'Chinese society under Mongol rule', p. 654.

32 See Ritsuko Oshima, 'The Chiang-hu in the Yüan', p. 72, quoting from A.J. Boyle, *The History of the World-Conqueror by 'Ala-ad-Din 'Ata-Malik Juvaini*, translated from the text of Mirza Muhammad Qazvini, for the attack on Khorazum (i.e., Chorasan or Choresm) between 1220 and 1222. Juvaini mentions 100,000 artisans that were spared. When Genghis Khan conquered Samarkand in 1220, 30,000 artisans are said to have been taken to Mongolia; see Hu Xiaopeng, 'Yuandai de xiguan jianghu', p. 77.

33 It occurs in *Yuanshi*, chap. 163, in the biography of Zhang Xiongfei, p. 3819; chap. 119, in the biography of Muqali (Muhuali 木華黎), p. 2932, referring to the year 1216; in Liu Yin 劉因, *Jingxiu ji* 靜修集, chap. 21.

34 *Yuanshi*, chap. 123, biography of Kōkō Buqa (Kuokuobuhua 闊闊不花), p. 3023. Oshima, 'The Chiang-hu in the Yüan', p. 73, considers 民 (ordinary [households]) and 匠 (artisan [households])

held that designations such as ‘captives’ or ‘captive slaves’ (*touxia*, *qukou*) were ‘merely linguistic habits of the historians’. Conversely, Zhu Cishou argues that the Mongols in the eleventh and twelfth centuries had entered the slave-holding period of their historical development and therefore treated these artisans as captive slaves.³⁵ Declaring oneself to be an artisan may often have been a survival strategy. In a eulogy to a Han official in the service of the Mongols, it is related how in 1232, after the siege of the Southern capital of the Jin, he was summoned to assemble the artisans to take them north, and sent many more people than those who were actually skilled, thus saving innumerable lives.³⁶ The dynastic history of the Yuan mentions that from 1275 onwards, more than three-hundred thousand artisans were summoned to the north after the Mongols had conquered the Southern Song.³⁷ Zhu Cishou outlines three distinct phases of the use of artisans in the Yuan dynasty: at first, they were forced to serve as slaves; later, they were registered as regular and permanent ‘official craftspeople’; finally, the system of ‘official craftspeople’ was changed to shorter, ad hoc labour shifts.³⁸ He argues that initially, the deported artisans stood at the mercy of their masters and were often mistreated.³⁹ In the second phase, the artisans were formally registered by the state. They worked under strict control in the state manufactories and had little personal freedom. For instance, they had no choice in marriage, and inheritance of the trade was obligatory. However, guidelines for their remuneration were set up in 1291, and they were allowed to produce and sell anything produced beyond their obligations to the state. In the third phase, the government resorted more to summoning labour for specific short-term obligations. This change becomes perceptible in the designations for the *corvée* duties. In the early phases the concerned artisans were referred to as ‘master-artisans’ *jiang*, while the designation ‘worker’ *gong* dominates later.⁴⁰

to be two separate categories, while Gao Rongsheng, ‘Yuandai jianghu sanlun’, p. 123, assumes that the 720,000 were only artisan households.

35 Chū Ch’ing-yüan, ‘Government artisans of the Yüan Dynasty’, p. 235/236; Zhu Cishou, *Zhongguo gudai gongye shi*, p. 554 ff.

36 Hu Zhiyu, *Zishan da quan ji*, chap. 16, pp. 1196-283, ‘Dexing Yanjing Taiyuan renjiang daluheqi Wang gong shendao bei’ (Epitaph for Mr. Wang, director of the artisans in Dexing, Yanjing, and Taiyuan). For a similar account in Baozhou (present-day Baoding in Hebei), cf. Ch’ü Ching-yüan, ‘Government artisans of the Yüan Dynasty’, p. 235.

37 *Yuanshi*, chap. 167, p. 3924.

38 Zhu Cishou, *Zhongguo gudai gongye shi*, p. 556 ff.

39 *Ibid.*, pp. 556/557.

40 *Ibid.*, p. 559; Gao Rongsheng, ‘Yuandai jianghu sanlun’, p. 124; Hu Xiaopeng, ‘Yuandai de minjiang’, pp. 66/67.

Registration and Size of the Official Workforce

Artisans were first registered as distinct households by the Mongols in 1252. The registers are no longer extant, but the dynastic history of the Yuan as well as other contemporary sources mention 'official artisan households', 'civilian [i.e. private] artisan households', and 'military artisan households'. Apart from these largest categories, other classifications also occur, such as 'salt making households', 'tea producing', 'iron smelting', 'mining', and 'gold panning' households.

The appended Table 2 shows a collection of references to numbers of artisans. These figures as well as the registration process and categories have been researched in detail, but opinions are still divided on how to interpret especially the larger figures. Apart from culling and complementing single references, calculatory methods have been applied, such as multiplying the officials in charge of artisans with the estimated number of artisans that were subordinate to them. With this method, Ch'ü Ching-yuan arrives at a figure of 300,000 official artisan households for the year 1272, excluding military artisan households but including 10,000 mangonel makers.⁴¹ More recent calculations take a broader perspective. Based on sample analyses of regional gazetteers, Hu Xiaopeng's statistics include military, salt making, wine and vinegar producing, and mining households.⁴² His result is more than one million households, seven percent of the entire households in 1290. This estimate is even doubled by Gao Rongsheng, who includes all available figures from historiography and arrives at two million households of official, private, and military artisans and (unskilled) workers. If one household is calculated to have five members,⁴³ this amounts to ten million artisans and workers for the late thirteenth century, and thus no less than ten percent of the population.

Remuneration

Together with the census registration, a remunerative system was established. In 1288, it was stipulated that regularly registered persons above fifteen years of age should be given three *dou* of rice every month (25.08 liters) and half a *jin* (316 grams) of salt. Their family members should receive

41 Ch'ü Ch'ing-yuan, 'Government artisans of the Yüan Dynasty', pp. 243-245. Mangonels are military machines for casting stones or other projectiles.

42 Hu Xiaopeng, *Yuandai de xiguan jianghu*, p. 79.

43 Gao Rongsheng, *Yuandai jianghu sanlun*, p. 124.

2.5 *dou* (20.9 liters) for adults above fifteen years of age and 1.5 *dou* (12.54 liters) for young persons between five and fifteen years of age, while no rations were given for those under five. Those of servile status (*qukou* 驅口) were to receive 12.54 liters for adults and 6.27 liters for young persons.⁴⁴ However, there are reports of cases when these regulations were not applied. The official Wang Hui (1227-1304) stated that in two artisans' offices, people usually earned four *dou* (33.4 liters) of rice per month and half a *jin* (316 grams) of salt, but some were complaining that they had only received 2.5 *dou* (20.9 liters) and no salt at all.⁴⁵ Other reports show that artisans sometimes received 15 *jin* (9.5 kg) of wheat flour in addition to their rice rations. There is scattered evidence for monetary wages of 1.5 tael paper money per month plus clothing for summer and winter. Compared to the remuneration during the Song, this is lower in terms of food wages, but during the Yuan artisans' incomes were similar to soldiers' rations.⁴⁶

The Interface of Official and Private Employment

Studies on the Yuan dynasty artisans concur that it was possible for government artisans to work for their own profit aside from their duties to the state.⁴⁷ In the early Yuan, sources suggest that if 'civilian artisans' (*minjiang* 民匠) from private workshops were summoned to work obligations, this was done according to fixed rules. However, in the later phase of the Yuan dynasty, as the state artisan offices declined, ad hoc requisitions of labour increased. The case of the first emperor of the Ming, Zhu Yuanzhang (1328-1398), illustrates the problems caused by the inflexibility of the registration system.⁴⁸ Zhu's grandfather had been registered as a member of a gold-panning household, but the family could neither produce the yearly amount of gold which they were obliged to present to the government nor change their household status and the obligations linked to it. They had to take to tenant farming in order to buy the gold on the market, but without sufficient income they eventually had to flee their home region in order to evade their fiscal obligations.

44 *Tongzhi tiaoge*, chap. 13, p. 387 f., 'Regulations and precedents on provisions for work' ('Gongliang zeli' 工糧則例), p. 390, 'Precedents on adult and young persons' ('Da xiao kou li' 大小口例).

45 Wang Hui, *Qianjian ji*, chap. 89, fol. 18a/b.

46 Hu Xiaopeng, *Zhongguo shougongye jingji tongshi*, p. 607.

47 Ch'ü Ching-yuan, 'Government artisans of the Yüan Dynasty', p. 243; Gao Rongsheng, 'Yuandai jianghu sanlun', p. 126.

48 Mote, 'Chinese society under Mongol rule', pp. 655/656.

Although obviously the Yuan system of coerced labour could not be maintained with the same vigour during the entire course of the dynasty, textual evidence is too scarce to warrant the assumption that a private commercial sector unfolded as a result of this process, as it did in the Ming dynasty. Yet it is known that during the Yuan, important technological innovations occurred in the form of cotton ginning and spinning and that the government actively promoted cotton cultivation.⁴⁹ Export ceramics were produced in the Fujian port city of Quanzhou with more or less the same intensity and involvement of households in the Yuan period as in the preceding Song period, in spite of the fact that the population had decreased by half. Billy So therefore assumes that double the amount of households, or around 14 percent of the prefectural population of Quanzhou, were engaged in full-time non-agricultural production by ca. 1290.⁵⁰ At least in this export-oriented craft branch in the port city with the highest export rates on China's coast, the craft sector was obviously not being repressed by the government nor overburdened by labour obligations.

The Ming System, 1368-1644

With only four classes – official, commoner, military, and artisan – the Ming system of household registration was more clear-cut than that of the Yuan. It was first devised in 1386 and provided that all registered artisans had to render service for three months every two years. The specific hardship of this system lay in the fact that this work was unpaid and that most service was required at the capitals, Nanjing until 1403, and thereafter at both Nanjing and Peking. Artisans who lived in remote areas had to travel far to fulfill their obligations. Two reforms were made in 1393 and 1454. In 1393, 62 craft branches were singled out for which service had to be rendered in one- to five-year shifts by 'shift artisans' (*lunban jiang*). Carpenters and tailors, for instance, were supposed to come to the capital every five years, while paperhangers,⁵¹ embroiderers, bow-makers, and printers had to take yearly turns. In 1454, this was once again changed to uniform four-year shifts. Other conditions applied for the registered artisans that lived near the capital, the so-called resident artisans (*zhuzuo jiang*). From the reign of

49 Zurndorfer, 'The Resistant Fibre', p. 48.

50 So, *Prosperity, Region, and Institutions*, p. 196.

51 *biaojiang* 裱匠, artisans who paste paper to window frames or mount paintings or calligraphies on hanging scrolls.

the Yongle emperor (1403-1424), they had to serve ten days every month. At first, the artisans were expected to work in the capital Nanjing. After the relocation of the capital to Peking, artisans from North and Central China were registered for service there, while those from the South and Southwest were expected in Nanjing, where a secondary capital with a downsized version of the Peking central government was maintained.

The number of registered artisans (see Table 4) varied from 232,089 people in 1393, of which 129,983 worked on shifts, to 289,000 in 1454 (240,000 for the two capitals, of which 25% for Nanjing and 75% for Peking). After the *corvée* obligations were changed to tax payments in 1562, 222,000 to 232,000 people remained as registered artisans within the respective household registration, which indicates that craft occupations remained inherited. Official Ming dynasty population figures are notoriously underreported, and therefore it is particularly difficult to define the percentage of the population that was registered as artisans. On the basis of Martin Heijdra's middle growth rates (see Table 7) for the years 1393 (90 million), 1454 (122 million), and 1562 (198 million), the percentage of registered artisans is 0.26, 0.24, and 0.12 percent respectively.⁵² Taking Angus Maddison's figures (see Table 6), the values are 0.34, 0.33, and 0.15 percent, calculated with the population figures for 1390, 1450, and 1560, which are slightly higher than Heijdra's. Nevertheless, in comparison to the Yuan, these numbers point to the much reduced profile of artisans in the permanent service of the government, which is certainly due to the greater availability of artisans from the labour market from the sixteenth century.

Remuneration of Resident Artisans and Substitution of Work Service by Tax Payment

This group's services were paid with rice provisions of generally three *dou* per month (29.6l liters), with an additional food allowance for days actually worked.⁵³ Since the Zhengtong era (1436-1449), extra provisions of one *jin* (590 grams) of salt are mentioned. We find no reference to monetary wages in the 'Statutes of the Ming', but according to Zhu Cishou artisans received gratifications of one to two silver tael on special occasions, such as imperial enthronement.

52 For a critique of Heijdra's estimates, see Robert Marks, 'China's Population Size during the Ming and Qing', pp. 4-6.

53 Zhu Cishou, *Zhongguo gudai gongye shi*, p. 648.

However, for obvious reasons, both types of registration and work obligations proved unpractical. In the course of the expanding market economy, the practice of labour service as a manner of tax payment in kind became obsolete.⁵⁴ Since 1485, artisans had the option to pay taxes rather than work for the state. The artisans from the south were supposed to pay 900 cash per person per month, and those from the north 600 cash.⁵⁵ In 1503 this was changed to a payment of 1.8 tael per shift or 450 cash per year, and from 1562 on it was expressly forbidden to render labour service rather than to pay taxes.⁵⁶ This did not mean that the state no longer employed artisans in permanent positions but that the work was now being paid in money and food provisions.⁵⁷ The 1615 compilation *Gongbu changku xu zhi* ('What should be known about the factories and storehouses of the Ministry of Public Works') has detailed information on the activities and craft branches under official supervision as well as some wage data for administrators and artisans, and finally the tax income by the artisan shift tax from the provinces.⁵⁸

Conclusion

The three dynastic administrations all had a distinctive approach to allocating craft labour. The Song did not register craftspeople as such but made sure that the guilds organized the required labour force from their ranks. Artisans were hired in permanent positions or worked for shorter shifts in palace or government manufactories. Work for the state was remunerated in food rations and cash.

The Yuan used a complex system of registration in various household categories like 'official artisans', 'civilian artisans', 'military artisans', and several other specific occupations. Slavery or bound labour seems to have existed at least during the initial phases. Later artisans had more personal freedom, yet the artisan status remained hereditary. As a rule, work was remunerated in food provisions.

The registration of artisan households in the Ming was less complex than that of the Yuan. An elaborate system of work shifts, mainly at the capital, was tried out and changed several times. This type of shift labour was

54 Cf. Wang Shixin, 'State Workshops and the Handicraft Industry', pp. 65-80.

55 *Da Ming huidian*, chap. 189, fol. 5b.

56 *Ibid.*, chap. 189, fol. 8a.

57 For details, see the section on the Longjiang shipyard in Chapter Six.

58 E.g. *Gongbu changku xu zhi*, chap. 3, fol. 1 ff., 'Nianli qianliang' (年例錢糧 'Yearly rules for money and provisions'), 1.5 tael per month for a printer.

unpaid, but the artisans were fed. Resident artisans in the capital worked in more frequent shifts of ten days per month and were paid with food allowances. A hundred years after the system was initiated, tax payments were gradually substituted for obligatory work shifts. Thereafter artisans were hired and paid in food and monetary wages.

Population data for the periods in question, disputed as they are, might offer a partial explanation of some of the institutional changes. The population apparently shrank in periods of dynastic decline and the subsequent uprisings and warfare. The interpolations both by Maddison and by Heilig assume a decline from the Southern Song to the Yuan, and again at the end of the Ming; moreover, Maddison supposes that a marked decline occurred at the end of the Yuan.⁵⁹ A decline in population may result either in greater coercion or, as in the case of Europe after the Black Death, in rising wages⁶⁰ or other incentives for the scarcer labour force. Declining population figures may have been one factor behind the higher level of compulsion – or at least the attempt of all-inclusive coverage of artisan workforce by registration – in the early Yuan and the early Ming. That the Qing government in its early phase officially abolished the artisan household registration, even if in actual practice it took longer for its last traces to be eliminated, may be an instance of the contrary measures taken in a similar situation – or at least of the political intention to do so. In the Ming, when the population and workforce increased and the commodity markets expanded, the artisan registration and *corvée* duties relaxed.

Both during the Yuan and the Ming, demand for skilled artisans was high in the initial phases of the dynasty, especially for building palaces, defensive structures, and infrastructure. That the government imposed stronger or lighter restrictions on the freedom of the workforce hinged also on its immediate demand for labour.

The economic situation under the Yuan is still disputed. The arguments have been elucidated in a volume of collected essays on the Song-Yuan-Ming transition.⁶¹ The issue at stake is whether the Yuan was a dark age of decline and a turning point that ended the early phase of the Tang-Song commercialization and early modernity, as portrayed by the Japanese historian Naitō Kōnan, or whether the trajectory between the Song and the Ming was rather an evolutionary phase that led to the second wave of commercialization

59 Maddison, *Chinese economic performance*, p. 26, Figure 1.1; Heilig, 'IIASA Data-Population: China's Population Growth, A.D. 0-2050'.

60 Routt, David, 'The Economic Impact of the Black Death'.

61 Smith and von Glahn, *The Song-Yuan-Ming Transition*, especially p. 2, which explains that the Yuan are still considered by many scholars as 'terra incognita' and the 'divide between mid- and late imperial China'.

starting in the mid-sixteenth century. The latter is the perception of the authors of *The Song-Yuan-Ming transition*, and most decidedly Li Bozhong.⁶² Depending on the perspective taken and on the research object, the outlook on the period between the tenth and the sixteenth centuries will differ. Those authors who look at the political economy of these eras, as Liu Guanglin did with the fiscal administration of the Song, Ming, and Qing dynasties,⁶³ find more differences and ruptures between these dynasties, while from the perspective of agricultural development or from the regional elites based outside the power centres, the evolutionary tendencies will seem stronger. Timothy Brook has pointed to continuities between the Yuan and the Ming in the political and economic field, such as the conflicting legacies of autocracy and commercialization.⁶⁴ Yet even Brook does not explain the arrangements for artisans in the service of the state in those two dynasties in terms of evolution but rather points to the discontinuity between the great detail of household registration in as many as eighty-three different groups in the Yuan and the return to the simplifying fourfold structure in the Ming.⁶⁵

Artisan registration and its gradual dissolution belong to the field of political economy, and consequently three distinct ways of organization emerge that are not directly related in a historical sense. The Yuan system was not an inheritance from the Song dynasty but shows the characteristics of a steppe and nomad regime with its initial preference for particular artisan skills (most notably in military and luxury production) and reservations towards agriculture. Military vigour and conquest played a central role in the political self-understanding of the Mongols, and traditions of unfree labour persisted.

The figures of official artisans in relation to the entire population also show that, numerically, direct state organization of the crafts was receding. From 350,000 permanent and temporary artisans with work obligations in the Song to two million registered artisan households in the Yuan, the figure of 280,000 registered artisans in the early Ming clearly indicates the waning engagement of the state. In terms of population figures, the artisan workforce in the service of the state in the Northern Song was at the most at 0.6 percent of the entire population; in the Yuan (1290), seven percent of the entire households were registered for actual or potential service for the

62 Ibid., p. 6; Li Bozhong, 'Was There a 'Fourteenth-Century Turning Point'?', pp. 135-175, p. 175.

63 Liu Guanglin, *Wrestling for Power and The Chinese Market Economy*.

64 Brook, *The Troubled Empire*, pp. 1 and 22, where the continuities of autocracy and commercialization are linked up to the Song.

65 Ibid., p. 147.

state; in the Ming, depending on the population estimates assumed, these figures were between 0.26 and 0.15 percent.

The evidence does not warrant the conclusion that under the Song or the Yuan system, the initially strong state organization weakened in the course of the dynasty. This is the case, however, for the Ming system, where the private sector started to supersede the state sector in scope and size. However, its characteristic transformation of labour obligations into tax payments was not unique to the Ming dynasty. This had also occasionally been implemented under dynastic rulers in the first millennium A.D. In the Ming, the private and state sector became largely permeable after the mid-sixteenth century.

Appendix

Table 1 Artisans and workers in the Song dynasty state workshops, manufactories, and mines

Time	Institution	Workforce (persons)	Specialization
Jingkang reign, 1126-1127	Imperial Arsenal, Armament production sites, Military Artisans of a Myriad Perfections (Yuqian junqi suo 御前軍器所, Junqi jian 軍器監, Wanquan junjiang 萬全軍匠)	3,700	Military artisans
	Imperial arsenal, Eastern and Western Workshops (Yuqian junqi suo 御前軍器所, Dong xi zuofang 東西作坊)	5,000	Military artisans; construction workers?
ca. late 12 th /early 13 th century	Wanquan zhihui 萬全指揮 (Myriad Perfections command)	5,700	Military artisans
	Military workshops in the provinces 諸州作院	1,000	Military artisans
1334 (retrospection to late 13 th century)	Paper manufacturing for paper money 造會紙局	1,200	Paper makers
South Song?	Shu jinyuan 蜀錦院 Brocade manufacturing in Sichuan (Chengdu)	500	Military artisans/weavers
13 th century	Zhanchun 蘄春, Tieqian jian 鈇錢監 (Iron and lead workshop)	300 Each day	iron and copper smelters
1078	Iron foundries at Xuzhou 徐州三十六冶	36 foundries, 100 workers each	iron smelters
?	Coloured metal mining 五金雜產 at Shaozhou 韶州	10,000	miners (and smelters?)

Time	Institution	Workforce (persons)	Specialization
early 13 th century	Iron foundry 鐵冶	500	iron smelters and casters
12 th century	Ironsmiths in one military prefecture (<i>jun</i> 軍)	18,000	Arms manufacturers: ironsmiths

Source: Ju Qingyuan, *Tō Sō kōgyōshi*, p. 31-32.

Table 2 Yuan dynasty artisans and workers in state workshops, manufactories, and mines

	Artisans and institutions	Figures (persons)
1276	籍江南民為工匠 Registration of Jiangnan population: 300,000 ordinary craft households	300,000 工匠 (workers and artisans)
1284	Among the 300,000 craft households in Jiangnan, 190,000 should be re-registered as ordinary households (<i>minhu</i> 民戶) because they had no specific skills	110,000 工匠 (workers and artisans)
1288	Gansu and Shaanxi military colony land for 1,500 artisans	1,500 工匠 (workers and artisans)
1310	For building the temple Wutai si 五台寺, 1,400 artisans and 3,500 soldiers were recruited	1,400 工匠 (workers and artisans)
1236	<i>Minjiang</i> (civilian artisans)	720,000 民匠 (civilian artisans)
	4 kilns at Dadu 大都四窯場, 300 artisans and labourers for the production of glazed tiles (<i>liuli zhuanwa</i> 琉璃磚瓦)	300 匠夫 [artisans and (unskilled) workers]
1261	<i>Xiunei si</i> 修內司 (Palace Maintenance Office) 140 offices, 450 <i>renjiang</i> 人匠 (ordinary artisans) for construction	450 人匠 (civilian artisans)
1271-1284	Number of craftspeople in <i>Xiunei si</i> enlarged	1,272 工匠 (workers and artisans)
1267/1274	<i>Caishi ju</i> 采石局 (Quarries)	2,000+ 夫 (unskilled workers)
1284	Dyeing and weaving office at Daming 大名織染雜造兩提舉司 鳩天下之工，聚之京師，分類置向，以考其程度，而給之食，復其戶使得以專于其藝 The artisans in the empire were inspected, they were assembled in the capital and categorized, and their skills were tested and they were given food and were registered according to their specializations.	1,540 人匠 (civilian artisans)
	Child/juvenile artisans, male and female, were recruited and sent to Hongzhou 收天下童男童女及工匠，置局弘州 (今河北陽原縣). Thus, there were 300 silk weavers 織金綺紋工 in Hongzhou and 300 wool weavers 織毛褐工 in Bianliang/Kaifeng.	300+ 戶 (households) 300+ 戶 (households)

Artisans and institutions	Figures (persons)
Dadu 大都 and Suzhou 蘇州: 600+ hunters and artisans	打捕戶及民匠 600+ (artisans and worker households)
Zhiying si 祇應司: Construction of palaces for princes	700工匠 (artisans and workers)
Rhinoceros horn and ivory craftshops 犀象牙局	150匠戶 (artisan households)
Foresters of Dadu 大都采山提領所	163夫匠 (unskilled workers and artisans)
<i>Dianpi ju</i> 甸皮句 (Office for hides)	30+匠 (artisans)
Baoding weaving and dyeing office 保定織染局	101戶匠 (artisan households)
<i>Guanling suilu zhuse minjiang daluhuachi guanguan</i> 管領隨路諸色民匠達魯花赤管官 (Overseer of the Supervisory Directorate of Artisans in the Various Routes, i.e. Provinces)	1,525戶民匠 (civilian artisan households)
<i>Dadu minjiang</i> 大都民匠 (Civilian artisans in Dadu)	202民匠 (civilian artisans)
Zhuozhou chengjin ju renjiang 涿州成錦局人匠 Brocade weavers in Zhuozhou	102戶人匠 (civilian artisan households)

Source: Yang Zihui, *Zhongguo lidai renkou tongji ziliao yanjiu*, p. 813 ff.

Table 3 Ming dynasty work obligation shifts of builders according to the 1393 regulations

Craft branch		Registered persons	Interval
Carpenters	木匠	33,928	five years
Sawyers	鋸匠	9,679	four years
Tilers and bricklayers	瓦匠	7,590	four years
Painters and lacquerers	油漆匠	5,137	four years
Earth pounders	土工匠	1,376	three years
Scaffolders	搭材匠	1,112	three years
Stone masons	石匠	6,017	two years

Sources: Ruitenbeek, *Carpentry and Building*, p. 17, and *Da Ming huidian*, chap. 189, fol. 1a-5a.

Table 4 Registered artisans in the Ming dynasty

Source	Time	Artisans	Figures (persons)
<i>Ming huidian</i> chap. 189, fol. 1b	1393	Total	232,089
		Registered shift obligation artisans	129,983

Source	Time	Artisans	Figures (persons)
<i>Zhengtong shilu</i> chap. 153	1454	Total	289,000+
		Labour obligations for Nanjing	58,000
		Labour obligations for Beijing	182,000
		Net	240,000
<i>Ming huidian</i> chap. 198, fol. 8a	1562	Tax obligations for Beijing	142,486
		Tax obligations for Nanjing	59,695
<i>Ming huidian</i> chap. 208		+ missing obligations for Nanjing	20,000-30,000 (estimated)
		Total	222,181-232,181

Sources: Zhu Cishou, *Zhongguo gudai gongye shi*, p. 643 ff. and *Da Ming huidian*, chap. 189.

Table 5 Ming dynasty Peking resident artisan positions in 1567

Institution		Overseers of artisans/ officials	Military and civilian artisans/ persons
Directorate of Ceremonial	司禮監	433	1,383
Directorate of Palace Eunuchs	內官監	480	1,883
Directorate of Imperial Regalia	司設監	33	1,437
Directorate of Imperial Accoutrements ¹	御用監	40	2,755
Directorate for Credentials ²	印綬監		19
Directorate of Imperial Apparel	尚衣監	42	654
Directorate of the Imperial Horses	御馬監	11	305
Palace Weaving and Dyeing Office	內織染局		1,343
Silversmith Office	銀作局	23	166
Palace Armory	兵仗局	6	1,781
Cap and Hat Office	巾帽局		498
Sewing Office	針工局	1	359
Paper Office	寶鈔司		624
Silver Storehouse	司銀庫		15
Storehouse Administration	內承運庫		359
Palace Granary ³	供應庫	4	259
Firewood Office ⁴	惜薪司		18
Condiments Service ⁵	酒醋麵局		169
Military Kitchen, Directorate of Palace Delicacies	尚膳監 軍廚		693
Total		1,073	14,740

Sources: *Da Ming huidian*, chap. 189 and Sun Jian, *Beijing gudai jingji shi*, p. 185.

¹ Hucker, *A Dictionary of Official Titles*, No. 8213: This office was responsible for preparing fine wood and ivory object for the Emperor's use and for presenting memorials for imperial attention that were submitted by the officialdom.

² Hucker, *A Dictionary of Official Titles*, No. 7994: in cooperation with the Directorate of Palace Seals (*shangbao jian*) managed the seals and tallies with which the imperial documents were authenticated.

³ *Gugong cidian*, p. 131.

⁴ *Ibid.*

⁵ Hucker, *A Dictionary of Official Titles*, No. 1319: prepared sauces and other condiments for palace use.

Table 6 Estimated Chinese population figures, 960 to 1640

Year	Million persons
960	55
1280	100
1380	68
1390	69
1400	72
1410	71
1420	73
1430	77
1440	82
1450	88
1460	93
1470	104
1480	116
1490	98
1500	103
1510	117
1520	133
1530	139
1540	144
1550	146
1560	151
1570	155
1580	162
1590	162
1600	160
1610	153
1620	145
1630	138
1640	130

Source: Maddison, *Chinese Economic Performance in the Long Run*, p. 169, Table D.1.

Table 7 A variant estimate for population figures in the Ming and the early Qing (million persons)

	1380	1500	1600	1650
High growth rates 1380-1500: 0.6 % 1500-1600: 0.5 % 1600-1650: 0.4%	85	175	289	353
Middle growth rates 1380-1500: 0.5 % 1500-1600: 0.4 % 1600-1650: 0.3 %	85	155	231	268
Low growth rates 1380-1500: 0.4 % 1500-1600: 0.3 % 1600-1650: 0.2 %	85	137	185	204

Source: Heijdra, 'The Socio-Economic Development of Rural China During the Ming', p. 438. Heijdra assumes that the middle or high growth rates are more probable than the low ones.

2. The Qing Central Government Institutions in Control of the Handicrafts

This chapter explores the institutional structure of those agencies of the Qing central government that controlled craft production and construction, together with one of their most important bureaucratic instruments, the handicraft regulations. Temporally it covers the entire range of the dynasty from the Ming-Qing transition through to the demise of the monarchy and the rise of the Republic of China. It does so by concentrating on the craft branches in the capital or in its close vicinity.

For the late nineteenth and early twentieth centuries, during the transition to 'modernity' in the sense of mechanized production, innovations in the government vocational schools are discussed, and the industrial policies of the Qing administration are outlined. By the nineteenth century, a divergence between the court and the central government in terms of government policy towards the craft institutions can be analyzed on the basis of official documentation: while the government and provinces had their artisan staff reduced to practically nothing, the court institutions were strengthened rather than weakened.

Political Background

The Manchu Qing rulers who had waged war against the Ming dynasty since the early seventeenth century seized the Ming capital Beijing in 1644. The Qing were well aware that they ruled as a tiny ethnic minority over the Han Chinese, and they identified themselves with the Mongol Yuan in several respects. Yet their attitude towards the Han Chinese population and elites for much of their rule differed markedly from that of the Yuan. The legacy of the Ming was adopted in respect to the official apparatus and bureaucratic structures. The superiority and leadership of the Manchu in the government and the military was asserted, and it was ensured that all important positions in the administration stood under dual and sometimes triple leadership (Manchu, Chinese, Mongol). Yet the conventional road to officialdom – the state examination system – was continued, and the Chinese elites had free access to it. As for the population, taxation was relatively low for most of the dynasty. For the craftspeople, different than in the previous Yuan and Ming

dynasties, official *corvée* duties were not resumed, and the special artisan tax of the Ming was abolished in the second year of the Qing dynasty. It was re-established in the transitional phase between 1658 and 1681, but after the consolidation of Qing rule it was finally done away with and the artisans were included as ordinary households in the land tax register. This meant that in a legal sense their occupation was no longer hereditary. Thus, the seventeenth century can be characterized as a period of appeasement of the Han Chinese, which included, in contrast to the preceding dynasties, light-handed policies towards the population in general and craftspeople in particular. Artisans in the direct service of the state were grouped into various departments of the court and central administration.

In the eighteenth century, the population rose to unprecedented levels. This was due to the committed, hands-on if autocratic style of government pursued by the second, third, and fourth of the Manchu emperors – Kangxi, Yongzheng, and Qianlong – in the initial years of their reign.¹ Internal security was ensured, and the Qing rule expanded far north, west, and south into the realm of Mongolian and Tibetan dominance. If the government style was actively committed, this implied that the intention of the emperors was to keep the bureaucracy under tight control and to maintain as slim an administration as possible.

In the nineteenth century, foreign trade started to cause serious problems, as an increase in opium imports negatively impacted what had up to then been a positive trade balance. The Chinese government clashed with the opium merchants, who were backed by Western governments, and in a sea war that broke out over the opium problem, the Chinese were defeated. Consequently, China was forced to open up initially five ports, and in the end more than one hundred, to Western traders. These were known as treaty ports. A major ecological crisis followed when in the 1850s the Yellow River changed its bed and estuary, causing inundations and devastating large parts of the central Chinese plains and their inhabitants. At the same time, the largest uprising of the Qing dynasty, the Taiping rebellion, nearly forced the Qing out of government and would have ended the dynasty by the 1850s had it not been for local militia leaders who fought back and destroyed the rebels. These armies became regular parts of the Chinese land forces, and their commanders Li Hongzhang (1823-1901), Zeng Guofan (1811-1872), and Zuo Zongtang (1812-1885) were rewarded with important government positions. They ushered in a period of so-called 'self-strengthening'. The principal aim of the self-strengthening

1 Will, Wong et al., *Nourishing the People*; Carol Shiue, 'Local Granaries and Central Government Disaster Relief'; Dunstan, *State or Merchant?*

efforts was to produce modern weapons and build up a modern army so that the Qing empire would be able to rebut any further foreign attacks. However, this proved to be infeasible. The worst defeat was suffered when the Chinese navy lost not to Western forces but to the Japanese military in the Sino-Japanese War of 1895. From that point, calls for constitutional reforms became louder. The proponents of reform demanded the promotion of commerce, crafts, and industries and called for the abolishment of the outdated social hierarchy which perceived the scholar-literati trained in the exegesis of Confucian classics as the highest class in Chinese society. In the meantime, the Chinese government started to endorse industrialization also in the civilian sector, mainly in cotton spinning and weaving, and in mining. A system of government-supervised and merchant-financed management of large factories, mainly in the treaty ports, was inaugurated. Eventually this proved to be problematic because the government officials assigned for these tasks often misappropriated funds and were, on the whole, not well-versed in operating large enterprises according to market principles.

After China's defeat by Japan in 1895, foreign manufacturing established itself more firmly in the treaty ports. The first attempt at constitutionalism, the so-called Hundred Day Reforms of 1898, which had also provided for an industrial programme, was crushed by the Empress Dowager Cixi. After the fiasco of the anti-foreign Boxer uprising which had ended in the invasion of Peking by joint foreign government troops, the Qing government implemented some of the constitutionalists' reform ideas and realized measures to promote industry and commerce. Private mechanized manufacturing (so-called 'indigenous capitalism') emerged in this period, and among other measures, the Qing government institutionalized a new type of vocational training centre for craftspeople.

Conventionally, the Qing government is blamed for most of the woes and crises that befell China in the nineteenth century; especially when China is compared to Japan which, when faced with the same menace of a loss of sovereignty, was able to establish a more rational administration and give its elites more political participation. Critically as well, the Japanese government had managed not to estrange itself from its populace on the issue of ethnicity. If the achievements of the period of self-strengthening are assessed, they are mostly attributed to the provincial leaders-turned-government officials. The last ten years are not taken into account or not attributed to the Qing. This view is taken to test here. There is evidence that even from 1901 to 1911 the Qing dynasty strove to modernize crafts and initiate industrial production with fossil-fueled machinery. Instead of blaming the Qing dynasty's decadence, which is the most commonly held view held by both the nationalists and

their socialist successors on the mainland, the following chapters suggest looking at what was being achieved on the institutional side.

Government Institutions in Control of the Crafts: Ministries of the Central Government and Court Administration

From the beginning, the number of government workshops and manufactories in the Qing period was more modest than during the preceding dynasties, but their product range was still broad. The main branches of activity were the construction of public, religious, and court buildings; silk weaving; the production of weapons and armour; ceramics and other arts and crafts objects; shipbuilding; cash casting; and printing.

In the central government in Peking, these tasks were mainly organized into three institutions: the Ministry of Public Works (*gongbu*), the Imperial Household Department (*neiwufu*), and the Ministry of Revenue (*hubu*). Provincial administrations organized, in cooperation with the lower-level prefectural or district authorities, the construction and maintenance of official civilian, religious, and military buildings; traffic arteries; cash production; armaments and ammunition; and shipbuilding. To this was added, depending on the local situation, river or sea dike conservancy, mining, and salt production, although in the latter two cases, the actual work and technical organization was in the hands of monopoly merchants rather than officials. The total numbers of artisans in the direct service of the government around 1800 may have been more than 40,000, of which about 14,000 were engaged in Peking and 26,000 outside the capital in various state manufactories and construction sites (see tables 14 and 15).

The Ministry of Public Works: Organization, Tasks, and Administrators

The Qing state administration encompassed several large domains of power that culminated in the person of the emperor. On the next level was the regular civilian officialdom with the Grand Secretariat (*neige*) as its highest organ, but since 1730, this was superseded by a 'Council of State' (*junji chu*) that consisted of five of the emperor's most trusted consultants who had all previously held leading positions elsewhere in the hierarchy.² The Grand Secretariat controlled

2 Hucker, *Official Titles*, No. 1735, pp. 85-86.

and coordinated the so-called Six Ministries and other specialized departments, such as the Court of Colonial Affairs (*lifan yuan*), which in 1861 was replaced by an Office of Foreign Affairs (*zongli yamen*); the Directorate of Education (*guozhi jian*), a kind of imperial university; the Court of Judicial Review (*dali si*); and many other institutions of civil administration.³ Independent of this main axis of the bureaucratic hierarchy were the Censorate and the Imperial Household Department in the capital, the provincial administrations, and the army.

The system of organizing the fundamental tasks of a government into six ministries had been institutionalized since the Sui dynasty (581-617) but allegedly goes back to pre-imperial times. Among the concerned Ministries of Personnel, Revenue, Rites, War, and Justice/Punishments, the Ministry of Public Works ranked sixth and last. The ranking also derived from pre-imperial times and is attributed to the 'Rites of Zhou', a source of disputed origin, probably from the later Zhou period or Warring States period (fifth to third century B.C.),⁴ in which the ministries are also attributed to heaven, earth, and the four seasons, with the Ministry of Works as the 'Winter Office'. Research on the hierarchy within the six ministries is not easy to come by. Charles O. Hucker briefly remarks that the Ministry of Public Works was 'usually considered the weakest of the Ministries; [it] was sometimes consolidated with the Ministry of Justice [*xingbu*] into a single agency'.⁵ According to Hucker, during the Qing dynasty the Ministries of Revenue, of Rites, and of Justice retained much of the authority they had wielded in the Ming. However, the Ministries of Personnel, of War, and of Public Works lost many of their functions to other agencies; the Ministry of Public Works in particular had to give up part of its prerogatives to the provincial governors and governors-general.⁶ These last two offices had become regular positions in the Qing rather than additional assignments for vice ministers of the central government who were sent to the provinces to supervise and coordinate.⁷ Beyond this loss of power – and the increase of prestige for the provincial administrators – the age-old inferior position of the Ministry of Public Works may have had to do with the area it organized, and the fact that it was furthest removed from the ceremonial, cultural, political, and military fields of engagement of its collegiate departments, and had less influence on personnel administration than the 'Ministry of Heaven'.

3 Hucker, *Official Titles*, No. 1735, pp. 86-87.

4 Michael Loewe (ed.), *Early Chinese Texts*, pp. 25-29.

5 Hucker, *Official Titles*, No. 3462.

6 *Ibid.*

7 *Ibid.*, No. 2731.

The Ministry was divided into four major sections and several subordinate or co-ordinate services, the detailed functions of which are shown in Box 1.

The records in the historiographic sources – such as the ‘Regulations and precedents of the Ministry of Public Works’ (*Gongbu zeli*), the ‘Collected Statutes with factual precedents’ (*Huidian shili*), and the ‘Draft history of the Qing dynasty’ (*Qingshi gao*) – all document the responsibilities and the official positions accorded to each of these offices and facilities in great detail, but also with a slight variance.

Box 1. Subdivisions and responsibilities of the Ministry of Public Works

Name	Function
Bureau of Construction <i>yingshan qingli si</i> 營繕清吏司	Estimating and accounting for construction and maintenance of city walls, buildings for official examinations (offices and examination sheds), granaries, garrison buildings, jails, and minor constructions like stele pavilions and sheds in the capital and the provinces. Supervising building and maintenance projects of altars, temples, and official buildings in all provinces Acquisition of timber and bricks; the handling of taxes in kind to be submitted in reed and timber Printing and distributing of regulations concerning building projects Control of timber storehouses and timber yards (<i>mu-chang</i>), and the glazed tile kilns at the Liuli chang site in the Outer City of Peking ¹
Bureau of Forestry and Weights <i>yuheng qingli si</i> 虞衡清吏司	Production of weapons, ammunition, fire rods, and armour, agricultural tools in Xinjiang, all vessels in the capital offices made of copper and iron, and official weights Casting cash in its Baoyuan ju ‘Well of Fortune’ mints Acquisition of copper, lead, nitre and sulphur, and the pearls delivered from the Eastern provinces (Manchuria). Specialized storing facilities: Army Requirements Storehouse (<i>junxu ku</i>), responsible for tents and flags Nitre and Sulphur Storehouse (<i>xiaohuang ku</i>), received and gave out the nitre and sulphur provided by all provinces Ammunition Office (<i>huoyao ju</i>), controlled and stored ammunition Lead Storehouse (<i>qianzi ku</i>), received and gave out lead bullets for big and small rifles and cannons Cannon Storehouse (<i>jiaozhi ku</i>), preserved old and damaged cannons Official Cart Office (<i>guan che chu</i>), provided all the carts for the officials and organized transports for building projects Firewood Recycling Storeplace (lit. Cherish The Firewood Yard, <i>xixin chang</i>), received and gave out recycled wood sent in from every place (such as wood poles and bamboo poles) ²

Name	Function
Bureau of Irrigation and Transportation <i>dushui qingli si</i> 都水清吏司	Maintenance of waterways, sea dikes, rivers, canals, irrigation and drainage ditches, fluvial dikes, embankments, sluices, bridges, roads, river and marine battleships, ferries, tribute rice barges Responsibility for the printed matter and books produced in all provinces, and for ceremonial vessels Responsibility for the textiles used in all altars, temples, and for official clothing Facilities: Ice vault (<i>bingjiao</i>) that provided the ice needed at all offices Coloured Silk Storehouse (<i>caichou ku</i>) that received and gave out textiles ³
State Farms Bureau <i>tuntian qingli si</i> 屯田清吏司	Maintenance of the imperial mausolea and official graves Collection and distribution of products of mountains and marshes, especially firewood, charcoal and coal ⁴
Manufacturing Storehouse <i>zhizao ku</i> 製造庫	Construction and maintenance of imperial carriages Production of ceremonial items such as paper effigies of door gods and auspicious writings in couplets Production of sacrificial and other religious objects Production of clothing ⁵
Auditing Office ('Savings Storehouse') <i>jieshen ku</i> 節慎庫	Bookkeeping, supervised the timber tax levied at the biggest customs stations Coordination of the finances of the storehouses ⁶
Office of Estimates <i>liaogu suo</i> 料估所	Control of the estimates for all projects and expenses ⁷
Archival, financial and bookkeeping facilities	Keeping record of expenses and monitoring the progress and accounts of specific projects ⁸

¹ *Gongbu zeli*, 1815 ed., chap.117, fol. 1a-1b, for a general description of the responsibilities; chap. 1-22 with all regulations concerning the responsibilities of this section; *Qingshi gao*, chap. 114, p. 3292. Liuli chang, which was later to become a district famous for antiques and book dealers, was defunct by 1825, and the production of the yellow glazed tiles and roof decorations for palace buildings was relocated to the Western Hills near Peking, where raw materials were available; see *Huidian shili*, chap. 875, fol. 5a.

² *Gongbu zeli*, 1815 ed., chap. 117, fol. 2a-2b; chap. 23-38; *Qingshi gao*, chap. 114, p. 3292.

³ *Gongbu zeli*, 1815 ed., chap. 117, fol. 2b-4a; chap. 39-104; *Qingshi gao*, chap. 114, p. 3292.

⁴ *Gongbu zeli*, 1815 ed., chap. 117, fol. 4a, chap. 105-111; *Qingshi gao*, chap. 114, p. 3292.

⁵ *Gongbu zeli*, 1815 ed., chap. 117, fol. 4a, chap. 112-114; *Qingshi gao*, chap. 114, p. 3292.

⁶ *Gongbu zeli*, 1815 ed., chap. 115-116; *Qingshi gao*, chap. 114, p. 3292.

⁷ *Gongbu zeli*, 1815 ed., chap. 117, fol. 5a; *Qingshi gao*, chap. 114, p. 3292.

⁸ *Gongbu zeli*, 1815 ed., chap. 117, fol. 5b.

What Preston Torbert has described for the Imperial Household Department also holds true for the Ministry of Public Works: It was 'not a static mass, but a constantly changing organism'.⁸ Similar to most institutions of the central

8 Torbert, *Ch'ing Imperial Household Department*, p. 28.

government and the highest provincial administrations, positions were filled with Manchu, Imperial Clansmen, Han Chinese, and Mongol candidates. In the nineteenth century, the ministry had about 230 permanent, core official positions, not including temporary, lower-echelon, unranked secretarial assignments or rotational jobs for officials with permanent positions elsewhere in the bureaucracy. A historical account of the addition or deletion of positions since the ministry was established in 1631 shows that appointments were added until about the mid-eighteenth century and then more or less remained at this level, as reflected in nineteenth-century sources.⁹ A Ministry of Public Works was also maintained in Shengjing (Mukden or Shenyang), which had been the capital of the Manchu ruler Nurhaci between 1634 and 1644, before the Qing established their government in Peking.¹⁰ Table 10 shows the distribution of staff positions according to ethnic and social groups. Among the multi-ethnic ruling elite, a distinction was made for the highest status group, the Manchu 'Imperial Clansmen'. 'Chinese-martial' refers to the Han Chinese members of the Banners, the basic socioeconomic unit of the Manchus and their associates. The distribution brings to light the preferred allocation of administrative positions for the privileged groups of the Qing society. A comparison with the other five ministries of the central government reveals that, although Manchus were also highly privileged in the other ministries, their percentage was highest in the Ministry of Public Works. The reason why this was the case is not quite clear. Could it imply that the tasks in the Ministry of Public Works were less demanding with regard to Classical Chinese erudition?

From the cases of shipbuilding and Yellow River dike maintenance, it becomes clear that after the Opium Wars, the Taiping Rebellion and in the ensuing period of 'self-strengthening' from the mid-nineteenth century onward, this ministry lost much of its former status to provincial authorities. The marine ships that were built in the Jiangnan Arsenal and the Fujian Navy Yard remained out of the actual organizational control of this ministry. The most crucial dike-building organization on the lower reaches of the Yellow River after it had changed its course in the 1850s was organized by Shandong province. However, despite their importance, these institutions were in a formal sense perceived to be merely of a temporary nature. Therefore, neither the Arsenals nor the Yellow River dike defense are included in the Collected Statutes of the Qing Dynasty.¹¹

9 *Qingshi gao*, chap. 114, pp. 3292-3294.

10 Rawski, *The Last Emperors*, p. 19.

11 Amelung, *Der Gelbe Fluß*, pp. 190-192.

The Artisan Workforce in the Ministry of Public Works

Considering the manifold tasks of the Ministry of Public Works, its artisan workforce with permanent positions was not large, and it was further reduced in the course of the dynasty (see Table 11). In the Bureau of Construction, the positions for 72 masters and 13 assistants as of 1723 were reduced to 44 masters and nine assistants in 1736, and in 1785 to 35 master positions, a reduction of over 50 percent. In the Bureau of Forestry and Weights, the twelve master positions in 1723 were reduced to three in 1736, and the originally thirty master positions in the Bureau of Irrigation and Transportation were all abolished by 1736.¹²

According to the 1822 *Huidian shili*, the Manufacturing Workshops of the Ministry of Public Works provided for 385 artisan positions for silversmiths (*yinzuo*), engravers (*jianzuo*), leather and fur makers (*pizuo*), embroiderers (*xiuzuo*), and armour makers, and 145 positions in the storehouse for the door gods (*menshen ku*) and for door curtains (*menlian ku*).¹³

A further craft branch of the ministry was cash production for the remuneration of the army in the mint Baoyuan ju, where during its periods of highest activity, more than a thousand masters and workers were employed.¹⁴ After 1728, the main mint had two branches with a total of 25 furnaces in permanent use and six additional furnaces.¹⁵

The two offices of the mint were badly damaged and their raw materials, cash, and silver pilfered by the invading international troops in 1900.¹⁶

12 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 1, pp. 160-161, citing *Jiaqing da Qing huidian shili*, chap. 717, fol. 1-3 and *Huidian shili*, chap. 952, fol. 1a ff.

13 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 1, pp. 158-159, citing the 1822 *Jiaqing Da Qing huidian shili*, j. 721, fol. 21-25. The figures for the Yongzheng reign are also contained in *Huidian shili*, chap. 957, fol. 15b-16b. Door gods are representations of guardian deities, most often printed on paper and fixed at doors of buildings to ward off evil influences. The respective storehouse was in charge of producing, mounting, and storing the effigies as well as couplet poems written on paper or on boards. Like the pictures of the gods, these were attached to or placed close to doors and pillars.

14 Vogel, 'Unrest and Strikes at the Metropolitan Mints', p. 412. If about 41 to 47 masters and workers were employed per furnace, as quoted for the Hangzhou mint between 1730 and 1740, more than a thousand artisans would be necessary to operate the 25 permanent furnaces of the Baoyuan ju. See Peng Zeyi, *Zhongguo jindai shougongye*, vol. 1, p. 36, citing the Qianlong Hangzhou gazetteer, *Qianlong Hangzhou fuzhi*, chap. 36, fol. 14-15, and Xu Jianqing, 'Qingdai qianqi', p. 320.

15 Burger, *Ch'ing Cash until 1735*, pp. 87-89, Yongzheng plates 5 and 6. According to Burger, the Baoyuan ju possibly had three branch offices.

16 First Historical Archives, *Gongbu qianfa tang*, No. 163, memorial received Guangxu 27/3/28 (1901), referring to Russian and German troops who took away the assets of the mints.

Although they were renovated in 1902,¹⁷ the mint was closed down in 1905 after having cast cash for the last time in the ninth lunar month and delivered all its minting metals to the Ministry of Revenue.¹⁸

Last but not least, the Ministry of Public Works also organized the production of arms, armour, and ammunition. The production site for ammunition, *zhuoling chang*, was founded in 1645.¹⁹ In the Collected Statutes, little information is available on the artisans employed here. Judging from a memorial of 1865, which suggests that three-thousand soldiers were delegated to produce ammunition,²⁰ it is likely that in previous times soldiers were also employed for military production.²¹ Yet as a rule, professional artisans in the service of the military were subordinated to the Banner army.

Craft Production Organized by the Ministry of Revenue

The cash coin production of the Ministry of Revenue at the Baoquan ju ('Fountain of Fortune') was about twice the size of that of the Ministry of Public Works. It was thus the largest mint in the Qing empire. The Qing had taken over both mints from the Ming and operated them from 1644 on.²² In 1726, the Baoquan ju was reorganized and divided into four branches with fifty furnaces in permanent use and ten additional furnaces.²³ In the Qianlong period, more than two-thousand masters and workers were employed here.²⁴ Most provinces also operated from one to several mints respectively.²⁵

The Baoquan ju was maintained until 1910, although in its last years, the quantity of cash cast here was very low, and the Ministry of Revenue had already applied to close down the last two remaining branches in

17 First Historical Archives, *Gongbu qianfa tang*, No. 167, estimates and reports by the construction firms Tianlin muchang 天林木廠 and Tianquan muchang 天泉木廠 of Guangxu 28 (1902).

18 First Historical Archives, *Gongbu qianfa tang*, No. 167, undated draft concerning the quantities of mint metals delivered, and an undated memorial draft reporting that the delivery was under way.

19 *Huidian shili*, chap. 894, fol. 7b and *Gongbu zeli*, 1884 ed., chap. 26, fol. 1a.

20 *Huidian shili*, chap. 894, fol. 10a/b.

21 For artisans in the Banner garrisons, see Moll-Murata and Theobald, 'Military employment in Qing dynasty China', pp. 373-374. Theobald, *The Second Jinchuan Campaign*, pp. 161-162, discusses military artisans on campaign.

22 Burger, *Ch'ing Cash until 1735*, p. 40.

23 *Ibid.*, pp. 87-89, 'Minting in the Qianlong Period', p. 383.

24 Vogel, 'Unrest and Strikes at the Metropolitan Mints', p. 412.

25 Burger, 'Minting', pp. 383-392.

1905.²⁶ Modern, machine-made currency was no longer cast but stamped. Such machinery was introduced subsequently in most provincial mints, and not only cash but also silver coins were produced there. Pioneering ventures of stamping money with machines were made in Zhili, Jiangsu, and Guangdong in 1887; other provinces joined in 1896, and by 1905 the twelve provinces of Guangdong, Zhili (Beiyang), Shandong, Henan, Anhui, Jiangsu, Jiangxi, Zhejiang, Hunan, Hubei, Fujian, and Sichuan were all minting with machines.²⁷ The merit of the new currency was that the coins were lighter than the old cash, and therefore their production was more profitable.²⁸

The monetary historian Peng Xinwei points to the situation in which traditional cash was still cast in the mints of the ministries while production in the provinces was already mechanized. However, he also mentions the existence of stamped coins, the so-called 'Great Qing Copper Coins', which carried the inscriptions *hubu* (Ministry of Revenue) or *duzhi bu* (Ministry of Finance), after 1906. In other words, not only the provinces but also the ministry experimented with the new technology even before having phased out the old casting methods permanently.

Craft Production in the Imperial Household Department

While the Ministry of Public Works organized craft production, building, hydraulic management, infrastructure, and armament in the capital and the provinces, another institution was more concerned with production for the court. This was the Imperial Household Department (*neiwufu*) which had its workshops within or in the close vicinity of the Forbidden City and the country palace Yuanming yuan (Garden of Perfect Brightness). In order to keep the power of the eunuchs in check, the Imperial Household Department was staffed with bondservants. These were mainly Han Chinese captives originating from the region of the Liao River Basin that were subordinate to the upper three of the Manchu Eight Banners.²⁹ By 1796 the Department had more than fifty subsections and official staff of about 1,600 men, a fourfold expansion from its size in 1662, when official positions totalled 402.³⁰

26 David Hartill, *Qing Cash*, pp. 78-79, with reference to *Xu Wenxian tongkao* 續文獻統考, p. 7752.

27 Peng Xinwei, *Zhongguo huobi shi*, pp. 771-774, transl. *Monetary History*, pp. 661-663.

28 Peng Xinwei, *Zhongguo huobi shi*, p. 761.

29 Naquin and Rawski, *Chinese Society in the Eighteenth Century*, p. 7; Torbert, *Ch'ing Imperial Household Department*, p. 27.

30 Torbert, *Ch'ing Imperial Household Department*, pp. 28-29.

Its basic task was to provide food, clothing, and shelter for the emperor and the court in the central imperial palace of the Forbidden City as well as in the Yuanming yuan. Furthermore, it supplied the symbolic and ceremonial attributes that were to instill respect in the emperor's subjects and the envoys from foreign countries. Finally, it had financial and distributional functions like managing land confiscated in North China and the reallocation thereof to bannermen, and it supervised monopolies like the sale of ginseng and of pearls from the emperors' Manchurian domains. It handled the state salt monopoly; the Imperial Silk Weaveries in Nanjing, Hangzhou, Suzhou, and in the capital; as well as the porcelain manufactory in Jingdezhen, several customs bureaus, and also supported favoured merchants with capital.³¹

The structure of the Imperial Household Department has been compared to that of the central government because its main components were in some ways analogous to the Six Ministries.³² Thus, the Grand Storage Office (*guangchu si*), in Torbert's rendering the 'Department of the Privy Purse', was likened to the Ministry of Revenue. The equivalent to the Ministry of Public Works was the Office of Palace Construction (*yingzao si*). This became part of the Imperial Household Department in 1661, was first designated as 'Ministry of Works of the Interior [Palace]', and in 1681 received its permanent name.³³ It organized construction and maintenance within the palace and the procurement of charcoal and firewood. Its seven storehouses and three workshops, situated outside the Western palace entrance (*Xihua men*) in the Northern Long Street (*Bei changjie*),³⁴ sometimes served also as sites of production. The timber storehouse (*muku*) was responsible for carpentry; the storehouse of construction materials (*fangku*) for stone masonry, bricklaying, scaffoldings, and tents; the utensil store (*qimin ku*) fabricated items from rattan and bamboo; the iron storehouse (*tieku*) received and dispersed iron and coal; the charcoal storehouse (*tanku*) received, dispersed, and transported charcoal and had an equivalent in the charcoal and firewood store of the Garden of Perfect Brightness (*Yuanming yuan chaitan ku*). In the porcelain storehouse (*ciku*), porcelain from the Imperial Manufactory at Jingdezhen and other producers was accumulated, and tea was stocked in the tea storehouse (*chaku*). The painting workshop (*youhua zuo*) was

31 Naquin and Rawski, *Chinese Society in the Eighteenth Century*, p. 7.

32 Torbert, *Ch'ing Imperial Household Department*, p. 32.

33 *Ibid.*, p. 35. According to the regulations and precedents of the Department, *Qinding zongguan Neiwufu xianxing zeli*, vol. 307, p. 366, it was renamed in 1677.

34 *Gugong cidian*, p. 250.

responsible for painting and paper hanging; the ironsmiths' workshop (*tiezuo*) made iron vessels and tools; and the fireworks workshop (*huapao zuo*) manufactured firecrackers (see Table 11).³⁵

The most important workshops for arts and crafts objects, the Workshop at the Hall for Nourishing the Mind (*Yangxin dian zaoban chu*), was initially situated in this hall but in 1691 relocated to the kitchen rooms of the dwellings of the empress (*Cining gong*) and was enlarged in 1709.³⁶ Items and vessels of precious metals, nephrite, wood, lacquer, copper, cloisonné, and glass as well as maps and paintings, weapons, and armour for use at court were produced in this centre of luxury production which was the most important one in the palace and in the entire empire. The crafts located here were originally divided into 42 specialized branches, but after 1765 they were reduced to thirteen, and then again raised to fifteen.³⁷

The Grand Storage Office (*guangchu si*, the 'Ministry of Revenue of the Interior'), not only accumulated the material assets of the emperors and the tribute gifts they received and awarded in the six storehouses but was also a site for craft production in various workshops, as shown in Table 12.

Further craft production sites in the capital under the supervision of the Imperial Household Department were the Imperial Printery in the Hall of Military Glory (*Wuying dian*), the arms and armour manufactory of the Court of Imperial Armaments (*wubei yuan*), and the Weaving and Dyeing Office in the Capital (*Jingnei zhiran ju*).

Outside of the capital, the most important workshops under the control of the Imperial Household Department were the silk weaving workshops in Nanjing, Suzhou, and Hangzhou as well as the porcelain manufactory in Jingdezhen.

The Artisan Workforce of the Imperial Household Department

The artisans who worked in the palace workshops came from different backgrounds and status groups. Most important among these were the banner artisans (*qijiang*) and the mostly Han Chinese civilian artisans (*minjiang*) who were hired from outside the palace for permanent or temporary assignments. When in permanent positions, they were referred to as 'provision artisans' (*shixiangjiang*), which means that they received a fixed

35 *Qinding zongguan Neiwu fu xianxing zeli*, vol. 307, pp. 366-367.

36 *Ibid.*, vol. 309, p. 287; *Gugong cidian*, pp. 20, 261.

37 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 1, p. 148.

stipend for buying food and were paid extra daily wages if they participated in particular work projects.

The banner artisans were either the higher status official artisans (*guanjiang*) or bondservants (*baoyi jiang*), a transliteration of the Manchurian word *booi*. Official artisans came from the Eight Banners, and thus for the most part were Manchus or Mongols. The bondservants worked in higher or lower craft, administrative, or guarding functions. Their work was remunerated, their positions were hereditary, and they were registered in the banners.³⁸

The specialized Han Chinese artisans hired from the outside (*Han jiang*) in the *Yangxin dian* workshops for arts and crafts were again subdivided into Northern artisans (*beijiang*), coming from Peking or North China, and Southern artisans (*nanjiang*), who hailed from Central or South China, with the exception of the Shandong glassmakers, who were also considered to be Southern artisans. Southern artisans were the most appreciated and best paid. They could be hired on a permanent basis. Some of them had their household registered with the Imperial Household Department, so that they could remain in the capital after retiring. Others were assigned permanent positions but were expected to return to their place of household registration after their retirement; but temporary assignments for particular projects were also possible.³⁹

In the regulations and precedents of some of the sections of the Imperial Household Department, we find reference to these specific artisans groups: for instance for the Office of Palace Construction in 1677 (see Tables 11 and 14), where the relation of banner artisans to civilian artisans was roughly 6:4 within a total of 732 artisan positions. In the time span of the next 140 years, the artisan positions (not those of the administrative staff) were reduced by about 10 percent, and for 1819, the regulations list a total of 665 positions, of which 396 for banner artisans and 269 for civilian artisans, thus maintaining the relation of 6:4.⁴⁰ They were specialized into as many as 62 different craft branches within the large structures of the storehouses and the workshops.

38 Cf. Rawski, *The Last Emperors*, p. 167, who points to the difference between slaves (*aha*), who worked in the fields, and bondservants (*booi*), who were engaged in domestic service.

39 Zhu Cishou, *Zhongguo gudai gongye shi*, pp. 793-794. Eunuchs, for instance, were also generally expected to return to their home towns once they retired, and the Kangxi and Yongzheng emperors made special provisions for those who could not return. In that case, the Imperial Household Department had to provide housing for them. See Torbert, *Ch'ing Imperial Household Department*, pp. 47-48.

40 *Qinding zongguan Neiwu fu xianxing zeli*, vol. 307, pp. 367-369.

In the *Yangxin dian* workshops, the positions were also reduced by one-fifth over the period from 1691 to 1846 (see Table 14).⁴¹

In the Grand Storage Office, the positions are specified according to gender and show a great number of not further specified seamstresses versus smaller numbers of male artisans in the more diversified craft branches (see Tables 12 and 14).⁴² In contrast to the Office of Palace Construction, very few positions were provided for civilian craftspeople in this institution. For instance, in the early Qing, among 1,460 artisan positions, only 21 were foreseen for civilian artisans. Following the trend of the other two offices, the number of positions was reduced here as well. In 1736, 1,026 positions remained,⁴³ and in 1813, there were 971 positions for banner artisans and 43 for civilian artisans.⁴⁴ The decrease between the early Qing and 1813 amounts to 33 percent.

Likewise, in the Court of Imperial Armaments, positions were reduced by 30 percent within 170 years (see Table 13).⁴⁵ The workforce was also complemented by artisans from other military units. The General Command of the Eight Banners, *baqi dutong*, originally had its own armoury and weapons manufactory, but its craftspeople were successively transferred to the Court of Imperial Armaments. According to the Collected Statutes, the Yongzheng emperor complained in 1730 and 1732 that the craft skills of one part of these craftspeople were quite deficient, and the responsible commanders were urged to train them better. It was decided that 'those banner people who were neither proficient in the Manchu nor in the Mongol languages, neither good riders nor good archers, were to be trained by skilled ironsmiths who came from outside the banners to learn casting and forging.'⁴⁶

The Weaving and Dyeing Office in the Capital, *Jingnei zhiran ju*, was first situated at the north of the palace inside the Di'an gate of the imperial city, but in 1751 it was transferred to the Longevity hill (*Wanshou shan*) in the summer palace Yihe yuan.⁴⁷ It came under the supervision of the Imperial Household Department in 1664. In its early years, 32 looms and 825 artisan positions are recorded to have existed. The reductions in this branch came sooner and were more radical than in the other offices and

41 Ibid., vol. 309, pp. 287-288.

42 Ibid., vol. 308, pp. 353-359.

43 Ibid., vol. 308, p. 361.

44 Ibid., vol. 308, pp. 361-362.

45 Ibid., vol. 309, p. 93.

46 *Huidian shili*, chap. 1121, fol. 13b ff.

47 *Gugong cidian*, p. 248.

workshops. In 1752, the number of looms was reduced by half, and only 162 artisan positions remained. Several 'Southern artisans' from the Imperial Silk Weaveries in Nanjing, Suzhou, and Hangzhou were delegated to these workshops, probably to train the Peking weavers in how to weave Southern patterns. The workshops were finally closed down in 1843.⁴⁸

While the artisan positions were thus diminished in varying degree over time, the official and administrative posts increased significantly by the first half of the Qing dynasty, and thereafter continued to expand, if at a more gradual pace.⁴⁹ According to the 'Draft history of the Qing dynasty', a large simultaneous cutback in official positions ensued in 1904, with 47 regular positions eliminated and 59 teachers' positions at three schools of the department that were closed down.⁵⁰ However, the institution as a whole existed even after the end of the dynasty until 1924. Actually, its importance increased after the demise of the Manchu rulers because it represented the interests of the ex-court (the so-called 'little court' *xiao chaoting*) against the Republican government.⁵¹ Although it received subsidies of four million tael per year, which roughly corresponded to the expenses of the court in the year 1911,⁵² the positions had to be cut subsequently. In 1914, 272 positions were eliminated but 783 remained, which means that before 1914, 1055 positions were still filled in the palace. In 1922, half of the then remaining positions were again cut, with 308 remaining.⁵³ By 1924, the abdicated emperor Puyi (1906-1967) reshuffled the entire department,⁵⁴ but since he was forced to leave the Forbidden City later that year, the Imperial Household Department ceased its functions for good, and the Forbidden City became a museum.

Handicraft Regulations

As we have seen, the artisan workforce engaged in the capital was under the control of a bureaucratic apparatus which in turn was ordered to use the resources of the state with great diligence and frugality while at the same time ensuring that the best craftsmanship was applied for production

48 *Huidian shili*, chap. 1195, fol. 15a/b, fol. 14a.

49 Torbert, *Ch'ing Imperial Household Department*, p. 28.

50 *Qingshi gao*, chap. 118, p. 3432.

51 Qi Meiqin, *Qingdai neiwufu*, pp. 272-273.

52 *Ibid.*, p. 274.

53 Qi Meiqin, *Qingdai neiwufu*, p. 275.

54 *Ibid.*, p. 276.

in the workshops of the state. Examples of the late Ming dynasty still loomed large, when eunuch supervisors allegedly squeezed labour and craft products from the artisans under the pretext of tax or labour duties. The Qing emperors were determined to keep taxation and work services as light as possible and to ensure the accountability and responsibility of its officials at all levels.

In the case of public construction, before building projects could be realized, cost estimates had to be submitted to the central government, either to the Ministry of Public Works or directly to the emperor, depending on the scope and importance of the project. The estimates were checked in the ministry for factual correctness on the basis of previously negotiated price and wage regulations. For luxury production, detailed lists of the prices of materials and of the workloads – in workdays or fractions thereof – were set up in order to control artisans, foremen, and the supervising staff. Moreover, technical data for building, shipbuilding, printing, silk weaving, and for a variety of other crafts in the imperial workshops were collected for the reference of all concerned officials who were responsible for the technical and financial supervision of these projects and processes.

Such references were kept in all the concerned offices, and since the Yongzheng reign, they were printed or transcribed in reference books, which were called ‘regulations and precedents’ (*zeli*). During the Qing dynasty, hundreds of such regulations and precedents were set up for all ministries and many of the offices in the capital.⁵⁵ Those that concerned craft production have been referred to as *jiangzuo zeli* ‘regulations and precedents for craft branches’ or simply handicraft regulations. The term was coined by the art historian and connoisseur Wang Shixiang in the 1960s.⁵⁶

For our context, the important question is whether the existence of handicraft regulations was able to prove the efficiency and accountability of the state management of handicrafts. On the one hand, regulation can signify an effort to realize transparency, communication, and responsibility. On the other hand, if too rigorously applied without taking specific circumstances into account, it can stifle flexibility and the improvement of techniques, or in the case of financial regulations lead to hardships for the suppliers of material and labour, who may react with various methods of evasion.

55 Moll-Murata, ‘New Editions’, p. 255, ‘Union List’.

56 Wang Shixiang, ‘Tan Qingdai de jiangzuo zeli’.

Handicraft regulations fall into mainly three areas. They can focus on general administration, which means that they concern the bureaucratic processes at large, focusing on the use and maintenance of specific objects (like city walls) and on the coordination of quality control if the objects made or repaired were shared with other ministries and with provincial governments, but they could also function as general guidelines on employing the workforce. Regulations like the *Qinding gongbu zeli* of the Ministry of Public Works or the *Zongguan neiwufu xianxing zeli* of the Imperial Household Department belong to this type.

A further type of regulation concentrates on technical issues. These are the *zuofa* or 'production methods'. The term should not be misunderstood: rather than stating how things are made (joined, woven, turned, carved, etc.), *zuofa* gave information on the material used and the working time required and were intended for supervising officials and accounting offices in the concerned ministries or provincial administrations. General *zuofa* that describe 'model' types of buildings are rare. For the Ministry of Public Works, the basic work was the *Gongcheng zuofa* (Technical instructions for the building crafts) of 1734 – the best known, often reprinted, and handcopied work on building types and their components. As far as technical detail and expertise is concerned, architectural historians prefer the clarity of the Song dynasty predecessor of this work, the twelfth-century *Yingzao fashi* (Patterns of architecture). In contrast to the *Yingzao fashi*, the *Gongcheng zuofa* emphasizes economy and finance,⁵⁷ and it served this purpose well. In 1741, shortly after the *Gongcheng zuofa* was published, the Imperial Household Department compiled its own *Neiting gongcheng zuofa* (Technical instructions for the building crafts of the Interior Courts) and, in addition to this, specific regulations for the country palace, *Yuanming yuan nei gongcheng zuofa zeli*.⁵⁸

Finally, the purely financial field is covered in the *zeli* on prices and wages. In 1736, all ministries and important central government institutions compiled prices of materials decided by the Nine Ministers (*Jiuqing yiding wuliao jiazhi*), which quotes prices for nearly 3,000 items ranging from gold and silver vessels, silk, perfume, and musical instruments down to ropes, timber, and tiles.⁵⁹ The professed concern of the compilers

57 Ruitenbeek, *Carpentry and Building*, p. 28.

58 'Union list' no. 1-4-15. The catalogue of the Tōkyō Kokkai toshokan has a *Yuanming yuan gongcheng zuofa zeli* ('Union list' no. 1-4-25), which I have not been able to investigate. It may refer to the same work.

59 Song and Moll-Murata, 'Notes on Qing Dynasty "Handicraft Regulations and Precedents"', p. 92.

was to keep track of the price fluctuations due to copper inflation and thus to pay prices at or near market rates rather than government-set, downwardly adjusted prices. Given the objective of the Qing government not to burden the population with expenses and labour services for the authorities, evidently such regulations would have been updated periodically. Although grain prices were observed and reported to the central government frequently,⁶⁰ the same was not the case for building materials. Moreover, the prices in the provinces may have varied widely from those in Peking. More than thirty years later, another initiative was started in order to at least settle the latter problem. Chen Hongmou (1696-1771), an outstanding field administrator who had served as governor or governor-general in most provinces of the Qing empire, was an avid collector of socio-economic data.⁶¹ He launched an empire-wide project for collecting prices and wages in public building. The extant parts of the *Wuliao jiazhi zeli* (Regulations and precedents on prices of materials) date from 1769, with later additions for Sichuan (1792) and Rehe (1795). I was able to locate most of the provincial editions, so that prices and wages for over 900 districts are available.⁶² Moreover, Chen Hongmou had similar plans for an empire-wide coverage of prices for shipbuilding. Fewer provincial editions seem to have been compiled in that project, but those of Fujian, Jiangsu, Zhejiang, and Hunan are still extant. As the Fujian edition, *Qinding Fujian sheng waihai zhanchuan zeli* (Imperially endorsed regulations and precedents on seagoing battleships of Fujian province) shows, these compilations are actually combinations of the *zuofa* and the price and wage regulation type that state the composition of each ship and the respective prices and wages in detail and in total. The intention of the promoter of this project was to collect market prices and wages and to make sure that the provinces could report them for reimbursement. In his study on the *Wuliao jiazhi zeli*, Chen Chaoyong doubts whether this was ever realized, especially for the timber prices. The prices sent to the Ministry of Public Works for evaluation and promulgation corresponded to prices already available thirty years before. The only difference was that now an increase in price was reported.⁶³ Thus, the prices in the *Wuliao jiazhi zeli*, which

60 Lillian Li, 'Grain Prices in Zhili Province'.

61 Rowe, *Saving the World*, p. 355.

62 For databases of the entire works on Zhili, Yunnan, Gansu, and Hunan, see 'Databases on Materials, Wages, and Transport Costs in Public Construction in the Qianlong Era'. For the wage data of all extant provincial editions, see 'Regulated wages paid by the state in public construction'.

63 Chen Chaoyong, 'Qianlong chao *Wuliao jiazhi zeli* zhong de wujia he gongjia', p. 329.

show great variance within and among the provinces, can be considered as reflecting not precisely market prices but actual regional differences. Apparently these compilations were deemed important in the ministry and the provincial administrations. Otherwise, amendments for the border provinces would not have been compiled, and the Jiangsu edition would not have been reprinted in the Daoguang reign (1820-1851).⁶⁴ Why were the price regulations not adjusted? Looking at the shipbuilding prices, we find that, ever since the Qianlong era, subsidies could be added (*jia jintie*) if the procurement prices for shipbuilding material were too low. This option may have existed in construction as well. Iwo Amelung has discussed the accounting procedures for dike building and comes to the conclusion that in the early nineteenth century, rather than applying for subsidies which by then had also become insufficient to cover expenses, the River Administration officials usually engaged in 'creative bookkeeping'. This meant that a larger dike breach would be reported than had actually occurred, in order to secure sufficient funds for the repairs⁶⁵ and perhaps also for the pockets of the officials involved.

For some very specialized craft branches, the regulations could be quite rudimentary. According to a study on rock landscape architecture, when the landscape gardeners (*shanzi jiang*) constructed artificial hills in gardens next to imperial palaces and villas, the materials they used – stones of bizarre shapes and sizes – could hardly be evaluated on a normative basis. Without regulations on sizes and working hours, the accounts sent in for reimbursement seem grossly overstated. According to the account books of 1772, for a specific rock garden next to the pavilion Wenjin ge in the Bishu shanzhuang mountain resort in Rehe, an improbable labour force of 403 people was engaged daily in a quite small garden for one year. It is not that without *zeli* the bookkeeping officials could not have inquired into the case, but on the basis of regulations and precedents, the control of cases of likely embezzlement must have been easier.⁶⁶

The most comprehensive handicraft regulations are those of the Ministry of Public Works. An overview of the distribution of those works that have been discovered and catalogued so far⁶⁷ reveals the following trends.

64 Sheng Jun, 'Qing Qianlong chao Jiangsu sheng wujia gongzi tongji', p. 108. I have not seen the reprint, but the prices and wages quoted by Sheng Jun are the same as in the 1769 edition.

65 Amelung, 'Preliminary Observations on 'Regulations and Precedents for River Works', p. 296.

66 Yang Naiji, 'Qingong dang'an zhong de dieshi gongliao shili', p. 18.

67 'Union List'.

Table 8 Handicraft regulations compiled by the Ministry of Public Works

General regulations, administration and coordination	Technical procedures	Financial aspects: Prices for materials and wages
<i>Gongbu xianxing zeli</i> , ca. 1896 ¹ , ms.		<i>Gongbu gong liao zeli</i> , ca. 1886 ² , 15 chap., ms.
<i>Qinding gongbu zeli</i> , 1884, 116 chap.	<i>Qinding gongbu xuzeng zuofa zeli</i> , Jiaqing 24 (1819), 153 chap.	
<i>Qinding gongbu zeli</i> , Jiaqing 20 (1815), 142 chap.	<i>Gongbu xuzeng zuofa zeli</i> , Jiaqing 22 (1817), 136 chap.	
<i>Qinding gongbu zeli</i> , Qianlong 58 (1793), 98 chap.		<i>Qinding wuliao jiazhi zeli</i> , 1769, with sequels, 220 chap.
<i>Qinding gongbu zeli</i> , Qianlong 24 (1759), 95 chap.		
<i>Qinding gongbu zeli</i> , Qianlong 14 (1749), 50 chap.; with appendix <i>Chengyu yizhang zuofa</i> (Manufacturing methods for imperial carriages and insignia)	<i>Gongcheng zuofa</i> , Yongzheng 1734, 74 chap.	<i>Jiuqing yiding wuliao jiazhi</i> , 1736, 4 (+4) chap.

¹ Song and Moll-Murata, 'Notes on Qing Dynasty "Handicraft Regulations and Precedents"', p. 105.² *Ibid.*, p. 108.

From its beginning in Yongzheng and throughout the prolific Qianlong reign, and having undergone a new stocktaking under Jiaqing and an active finale in the Guangxu reign, the *zeli* obviously fulfilled its function as a bureaucratic device quite well. Accounting and setting procurement prices was certainly the most problematic aspect of the *zeli*. As both Jane Kate Leonard and Iwo Amelung stress, flexibility in their application was of the utmost importance. Looking, for instance, at the rule of the Daoguang emperor, it seems that during this reign, the instrument of price regulating *zeli* was put to more effective use than under his predecessor Jiaqing.⁶⁸

68 Amelung, 'Preliminary Observations on 'Regulations and Precedents for River Works'', p. 301; Leonard, 'Timeliness and Innovation', p. 462.

To sum up, regulations and precedents for the handicrafts in the service of the state can be taken as indicators of state efficiency – at least of efforts made to ensure transparency and accountability within the administration. For technical *zeli*, not much amendment was necessary once the standards, especially those in building, were set. The situation is different for financial *zeli*, because unlike construction and production methods, the market prices fluctuated. Timber prices in particular tended to rise over time. Chen Chaoyong has shown that artificially low prices were laid down in the *Wuliao jiazhi zeli*. However, the fact that only these quotas could be reported for reimbursement to the Ministries of Public Works and of Revenue does not mean that the state could coerce dealers into providing the materials at below-market prices. Rather, they were to serve as a standard from which provincial administrators would have to find additional funds to finance their projects. For instance, already at the time when the respective *zeli* were compiled, the costs of shipbuilding exceeded the budgetary provisions of the central government. To cover the expenses, the provinces could either perform ‘creative bookkeeping’⁶⁹ or collect contributions from private persons, for instance shipowners in Fujian. In the case of city walls, affluent people in the localities could sponsor their construction or repair – but the district magistrates were warned not to impose funds for the city walls as penal punishments. Such prohibitions suggest that this had actually occurred.⁷⁰

Labour Organization and Wage Payment according to Handicraft Regulations

The officially acknowledged, legally binding regulations and precedents of the central government contain comparatively little information on labour administration. The quoted wages appear to be normative and allow, in most cases, only for the differentiation between skilled and unskilled labour. One source that specifies a branch-differentiated pay scale is the *Jiuqing yiding wuliao jiazhi*, according to which in 1736, carpenters (*mujiang*),

69 Amelung, ‘Preliminary Observations on ‘Regulations and Precedents for River Works’, p. 296, 300.

70 The regulations in *Gongbu zeli*, 1884 ed., chap. 6, lay out the rules for the renovation of city walls. On fol. 6a, honorary decorations of private persons who funded renovations of city walls are mentioned; a rule on fol. 7a-b forbids officials to impose ‘donations’ on private persons for the maintenance of walls, and on fol. 8a it is stated that donations for the city wall should not be imposed as legal punishments.

stone masons (*shijiang*), bricklayers (*zhuanjiang*), tilers (*wajiang*), paint makers (*youjiang*), and painters (*huajiang*) earned 154 cash for one workday, scaffolders (*dacaijiang*) received 140, and earth pounders (*hangwojiang*) 100 cash, unskilled labour 75 cash. 'Food provision artisans' (*shiliangjiang*) in permanent positions, presumably of the Ministry of Public Works or the Imperial Household Department, received, as the term implies, food wages and presumably other provisions as well, in addition to monetary wages of 60 cash per day.⁷¹ At less than half of what a hired artisan earned, one can hardly say that they were privileged or that the hired artisans seem to have been unfairly treated – if they received their entire wages without deduction. A set of wage notations from ca. 1766 from the Imperial Household Department concerning construction at the Yuanming yuan notes 0.154 tael for 'master artisans of all trades' but 0.18 tael for interior decorators (*caizijiang*), a low 0.0375 tael for food provision artisans, 0.14 tael for artificial stone hill gardeners (*shanzijiang*), 0.09 tael for earth pounders, and 0.08 tael for unskilled labour. From the point of view of the contemporaneous *Wuliao jiazhi zeli*, these were high wages, only occurring in sparsely populated Manchuria, the frontier of Xinjiang, and certain regions of Zhili province, as compared to lows of 0.03 tael for unskilled labourers in a considerable number of districts in Henan.⁷²

In silk weaving at the imperial workshops, differentiation was made also to the extent that some wages were paid as time wages, while others were piece wages. In 1686, monetary wages were paid in addition to food wages. The highly qualified designers and those who installed the design patterns on the looms received a monthly wage of two tael, while the costs for the two persons who wove and pulled threads were 0.06 and 0.03 tael per day respectively, with extra food provisions in addition to the grain given out every month. Only the amount of grain for the entire weaving office is specified. If it was divided evenly, every worker received 0.4 *shi* (41.42 l) of grain per month.⁷³ If the Southern weavers travelled north to work in the Peking Imperial Silk Weaveries, their wages and food provisions increased.⁷⁴ They could earn 3 tael per month (0.12 per day if they worked 25 days) and 2 *hu* of rice (103.55 l), while hired workers received between

71 *Jiuqing yiding wuliao jiazhi*, chap. 4, fol. 24a/b (p. 202).

72 'Regulated wages paid by the state in public construction. Data from *Wuliao jiazhi zeli*'.

73 Peng Zeyi, *Zhongguo jindai shougongye shi ziliao*, vol. 1, pp. 90-92, quoting Sun Pei 孫珮, *Suzhou zhizao ju zhi* 蘇州製造局志 (Treatise on the Silk Weaving Offices of Suzhou, 1686). See the translation by Elke Piontek-Ma, *Der Bericht von Sun Pei*, pp. 55-62.

74 The copper to silver exchange rate was almost equal in 1686 Jiangsu (833:1) and 1752 Peking (840:1). See *Exchange rates*.

1.5 and 2.5 tael per month and 21 *hu* (1087 l) of rice [every year], to be given out every season. In addition, each worker received a room for lodging.⁷⁵

Any comparison to the private market is difficult because no silk weaving wages are included in the set of wage notations we possess. In the literature we find information that the wages paid in the state workshops were higher than those in the private sector.⁷⁶ Comparable wage notations exist for printing (see Table 48 'Wages in commercial printing for carving 100 characters') and, according to these, wages in the service of the state were equal or higher to those in the private sector.

Labour organization in the palace workshops was based on a flexible system that allowed the hiring of experts from outside the palace. In some fields, especially those involved in luxury production, this could ensure the transfer of technology and artistic skills to the commercial sector. The court engaged artisans from the entire empire who specialized in working the materials from their places of origin. Especially the Qianlong emperor had strong preferences for design in the arts and crafts and communicated these to the artisans and artists.⁷⁷ After their assignments were finished, such artisans could return to their home regions and spread the 'court style'. Art historians argue that due to the fact that the Qing did not monopolize the skills and designs of the artisans in the palace workshops and instead secured the spread of the emperors and the court's aesthetic concepts, to this day the Qing palace style has retained a strong impact on arts and crafts production in China.⁷⁸

For instance, the glass and enamel section of the palace workshop Yangxindian zaoban chu attained considerable fame. Chinese artisans worked

75 *Huidian shili*, chap. 1195, fol. 15a/b, p. 19005. 21 *hu* to be given out per 'season' (*ji* 季) plus the living facilities seem out of proportion to the wages of the southern weavers if 'season' implies three months; it might refer to a period of longer duration. Peng Zeyi, *Zhongguo jindai shougongye shi ziliao*, vol. 1, p. 72, quoting from a memorial of Haiwang 海望 (d. 1755), Grand Minister Supervisor-in-Chief of the Imperial Household Department from 1735, mentions 'the regulations of the Imperial Household Department on hiring outside artisans, which provide for 21 *hu* of rice per person and year, in addition to 1 tael of monetary wages.' 21 *hu* per year amounts to 90.6 l per month. This memorial is interesting since it suggests the wage scale of 2.5, 1.5, and 1 tael 'as an incentive' for various levels of skill instead of uniform wages of 1 tael for foremen, weavers, and draw boys alike. Draw boys were the assistants in draw weaving who helped the weavers to control the warp thread by pulling on draw threads. In Chinese draw looms, the 'tower' from where the threads are manipulated is vertically installed upon the loom. The assistant works while sitting on top of the tower and therefore should be a light person, hence 'boy'.

76 Fan Jinmin, 'Qingdai feichu jiangji de lishi yiyi', p. 114.

77 Veit, 'Jean-Denis Attiret', pp. 144, 153.

78 Michèle Pirazzoli-t'Serstevens, 'Die Mandschu-Kaiser und die Kunst', p. 98.

together here with European missionaries and further developed European enamel techniques. The artisans mostly hailed from Boshan, a district in Shandong that also supplied the raw materials. Precious cloisonné pieces originate from here.⁷⁹ Moreover, artisans from North and South China and Uighur masters worked jade (nephrite) from Xinjiang and Mongolia in the associated 'sceptre house' Ruyi guan, where European missionaries since 1680 constructed precious clocks, often decorated in the European style, that stood in high demand at court and among the affluent.⁸⁰

Some highly visible symbols of imperial power, however, remained reserved for the court and the imperial clan. For instance, in construction, the yellow glazed tiles⁸¹ were not allowed except for court buildings, palaces, and religious buildings for the state cult.

In the palace workshops, huge clerical and security forces were always at hand, and all administrative actions were regulated in the finest detail, which individual artisans working in the palace must have found awe-inspiring and not exactly an invitation to resistance or argument. The situation changes if one looks at the administration in the provinces, for example when city walls were built. Although general guidelines were given in the regulations and precedents of the Ministry of Public Works,⁸² the actual administrative knowledge especially on how to hire and manage the workforce, which often numbered hundreds or thousands of hands, are not contained in these compendia. A short manuscript guidebook for officials organizing city wall building of ca. 1744 has survived, which offers insight into the main concerns of an official overseeing medium-sized or large building projects.⁸³ The basic problems that the author strongly emphasizes in *Chenggong shiyi* (Requirements and organization of work on city walls) are that the officials should keep personal control over all steps of the building procedures, starting from the burning of the bricks to the final touches on the wall. Labour organization should absolutely not be delegated to brokers or 'good-for-nothing loafers' who all too readily offered their services. Since officials in charge of wall building could not negotiate wages with every single worker, the workers' foremen should be directly approached without

79 Wu Jianyong, *Beijing tongshi*, p. 342.

80 Jami, Catherine, 'Europäische Wissenschaft und Technik am Hofe der Kaiser von China', p. 323.

81 *Gongbu zeli*, 1884 ed., chap. 14, fol. 4a, 'Officials and civilians should not presume to use glazed tiles or city wall bricks for their houses and walls. If this prohibition should be violated, it will be severely punished, and the responsible official will also suffer sanctions.'

82 *Gongbu zeli*, 1884 ed., chap. 4-6; 1815 ed., chap. 2-7.

83 Moll-Murata, 'Maintenance and Renovation', pp. 251-256.

intermediaries. Moreover, all wages and materials should remain at the market level and be paid out without deductions.

Government Restrictions of Craft Activities

If artisans' wages in the capital were not exploitatively low, what kinds of restrictions were inflicted on the craft sector that convince present-day Chinese authors that the Qing state stifled rather than promoted the crafts?

Such constraints were imposed in several ways, some affecting all craft branches, while others were confined to particularly scarce raw materials. One basic problem was that although the artisan registration had been nominally abolished in 1645 and all work in the service of the state should have been remunerated at market or close to market wages, throughout the Qing multiple complaints were heard that this lenient policy was contravened. This was effected either by local officials or by staff lower in the bureaucratic hierarchies who illegally requisitioned work services and/or handicraft objects from individual craftspeople or from guilds. One could say that the official emancipation of the artisans from their particular service status was one side of the coin, and extortion was the other. This tendency had a parallel in the low land taxes and frozen corvée tax rates of the Qing state and the illegal extraction of unwarranted extra fees by individual tax collectors during the actual collection process.

Moreover, the transition to the system of using exclusively hired labour proved more problematic than was possibly anticipated. The Qing court in 1645 promulgated that 'except for the artisans in the capital province (Zhili), the others no longer have to pay the artisan tax that substitutes their corvée service in the capital' and that 'they are only liable to obligations like the other civilians'.⁸⁴ In principle, artisans should thereafter have been recruited only if they were willing to be hired out. They should have been remunerated and been obliged to pay only land tax. However, it is frequently mentioned in the literature that officials made arbitrary deductions from the artisans' wages.⁸⁵ For instance in the weaving offices of Nanjing, Suzhou, and Hangzhou, where the transition to the hiring system resulted in labour scarcity, officials are reported to have resorted to the previous methods of requisitioning labour by coercion and of pocketing parts of the

84 Fan Jinmin, 'Qingdai feichu jiangji de lishi yiyi', p. 111, citing Qingchao wenxian tongkao 清朝文獻通考, chap. 21, zhiyi 職役, 1, and Qing Shizu shilu 清世祖實錄, chap. 16.

85 Fan Jinmin, 'Qingdai feichu jiangji de lishi yiyi', p. 112.

wages.⁸⁶ The basic problem of the early Qing years was that although the central government had freed the artisans – in a grand gesture that was expected from a new ruling house – it still badly needed this workforce in construction and for the products from the manufactories. Since labour supply and demand did not tally, from 1658 on the government resumed the collection of the artisan tax.⁸⁷ In the meanwhile, if artisans had given up their trade and left their place of registration, their children and offspring or their relatives, even those who were not in the trade, were still required to finance the tax.⁸⁸ Cases of double taxation were also reported. It took another few decades until both the artisan registration and the artisan tax were abolished for good. Apparently this was not realized in all provinces simultaneously but rather faded out only gradually.⁸⁹

A further unpopular measure by the Qing government that inflicted hardships on the maritime population was the so-called ‘sea prohibition’. In order to crack down on the maritime empire of the contender Zheng Chenggong (Coxinga) and related piracy, the Qing forbade shipbuilding, fishery, and in fact all settlement within a security belt of about fifteen kilometres from the sea.⁹⁰

To a lesser degree, the censorship activities of the Qianlong emperor in the 1770s and 1780s interfered with the development of the printing trades.

In the field of raw materials, the use of certain metals and minerals was restricted or downright forbidden. The government was particularly concerned about the availability of copper for minting, especially in the early Qing period before the Yunnan copper mines yielded sufficient ore, as well as counterfeiting, smelting down, and trimming of cash. Therefore, the use of brass utensils was forbidden between 1726 and 1736. After 1736, the use and fabrication of brass utensils still was monitored, especially in Peking.⁹¹ In theory, all copper was bought up by the state, and only after the mid-Qianlong reign was a small amount of so-called ‘commercial’ copper legally available on the market.⁹² Mining policies were often erratic and could

86 Ibid. Compare also Piontek-Ma, *Der Bericht von Sun Pei*, p. 60, who, referring to Liu Yongzheng and Hong Huanchun, also argues that the labour in the early phase was obligatory, although it was remunerated.

87 Fan Jinmin, *Qingdai feichu jiangji de lishi yiyi*, p. 112, citing Qingchao wenxian tongkao, chap. 21, zhiyi, 1.

88 Fan Jinmin, ‘Qingdai feichu jiangji de lishi yiyi’, p. 112, for cases from Suzhou, Zhejiang, Anhui, and Shanxi.

89 Ibid., pp. 112–113, with reference to Zhejiang (1697) and Jiangxi (1688).

90 For details, see chapters four and five.

91 See Vogel, *Chinese Central Monetary Policy*, sect. II.

92 Fang Zhuofen et al., ‘Copper Mining and Smelting in Yunnan’, p. 285.

thus cause shortages of other raw materials. The strictest controls applied to sulphur and saltpetre, used for the fabrication of explosives and forbidden in the private sector.⁹³ Iron and coal could be mined, bought, and sold freely. A contravention of the prohibition to export iron is shown when iron pots from Foshan were sold to foreign merchants between 1729 and 1731.⁹⁴

On the whole, restrictions and active prohibitions seem to have been less of a problem for craft production than the basic orientation of the Qing state that wanted to maintain the livelihood of the farming majority and provide food for its increasing population. Until the mid-nineteenth century upheavals, Qing policies did not aim to promote inland or overseas trade and commercial manufacturing but strove instead to keep farmers on the land, producing for their own subsistence rather than commercial crops. Exports and imports were legally restricted, so that at least officially, only four ports (Canton in Guangdong, Zhangzhou in Fujian, Ningbo in Zhejiang, and Yuntaishan in Jiangsu) were open for Chinese merchants after 1684, and foreign traders were confined to one harbour, Canton, between 1757 and the First Opium War.⁹⁵

Institutional Reforms in the Twentieth Century

As stated above, the period of self-strengthening that followed in the wake of the First and Second Opium Wars (1839-1842, 1856-1858) and the suppression of the Taiping rebellion triggered the introduction of modern military technology. One decade later, the government also promoted mechanized production for civilian purposes. These enterprises functioned as ad hoc government offices that also communicated with the Ministry of Public Works but did not belong to the core responsibilities of the ministry. Rather, the provincial governors or governors-general of the territories where the new enterprises were located organized the funds for operation and supervised the entire management. The fact that the new, prestigious, and profitable technologies were situated in agencies in which the Ministry of Public Works was not vitally involved certainly did not enhance its standing within the government structure.

The constitutional reforms of 1903-1906 brought about the end to this ministry in its traditional form. In 1903, a Ministry of Commerce (*shangbu*) was established, and the former Ministry of Public Works was merged with it

93 Fang Zhuofen et al., 'The Iron Industry', p. 253.

94 Ibid., p. 261.

95 Fang Xing, 'The Iron Industry', pp. 395-396.

in 1906 as the newly designated Ministry of Agriculture, Industry, and Commerce (*nong gong shang bu*). Thereafter, the responsibilities for construction projects were given over to the new Ministry of Civil Administration, the control of timber tax and ship administration was transmitted to the Ministry of Finance, the production of arms and military engines was included in the Army Ministry, and the care for ceremonial vessels was subordinated to the Imperial Household Department and the Ministry of Rites.

The new ministry was divided into four sections, one each for agriculture, crafts and industry, commerce, and general administration. The tasks of the Section for Craft and Industrial Affairs (*gongwu si*) are described as 'the administration of materials for craft and industrial production, production of tools and machines, work promotion and recruitment of workforce, organization of factories, nationwide investigation of mines, management of regulations for establishing factories'.⁹⁶

Other subsections and facilities of the ministry were the Official Newspaper Office for Commercial Affairs, the Commercial Journal Office, the Commercial Law Office, the Trademark Bureau, the Company Registration Bureau, the Bureau for Weights and Measures, the Industrial Laboratory, the Laboratory for Chemical Analysis of Ores, the Industrial Exhibition Hall, the Capital Craft and Industry Office, the Capital Apprentice Training Office (later renamed Industrial Training School), the Capital Business School, the Higher Agricultural School, the Bureau for Craft and Industry, and the Agricultural Experimentation Site.⁹⁷

Comparing the tasks and institutions of the old Ministry of Public Works and the new Ministry of Agriculture, Industry, and Commerce, what becomes evident is that the important concerns of the public sector – such as constructing and maintaining the infrastructure and public buildings like granaries and examination offices or civilian and military offices and housing facilities as well as transport vessels – were all detached from its responsibilities, and that its most important new obligation was to foster private enterprise by way of legislation and education.

The present-day assessment of the achievements of the new ministry is ambiguous. On the negative side, the previous Ministry of Commerce had stood under the leadership of an allegedly corrupt and inept imperial prince, Zaizhen (1876-1947), whose successor in 1907, Puting, a Manchu and imperial clansman, did not have a high profile.⁹⁸ The ministry did not have much of

96 *Zhongguo guanzhi da cidian*, p. 1516.

97 *Ibid.*

98 Wellington Chan, 'Government, merchants and industry to 1911', pp. 449, 453.

an impact in the provinces, and it lost the struggle with the Ministry of Post and Communications over the complete control of the state-owned China Merchants' Steam Navigation Company and had to share responsibilities with this rival institution.⁹⁹ However, the legal framework for commercial law on the whole proved effective, if in varying degrees: the Company Law (1904) was most significant,¹⁰⁰ while the law on patent rights (1906) had less impact.¹⁰¹ In the field of industrial, commercial, and agricultural promotion, the activities of the ministries have been considered more favourable as far as vocational training was concerned. A system of awards and brevet ranks for outstanding engineering and technical skills was set up, first within the 1898 Hundred Day Reforms, and once again in 1903, aimed at investors and promoters. Furthermore, a comprehensive system of distinctions for craftwork and in the technical and commercial sectors was established. However, not many rewards were actually bestowed; especially for investors and promoters, the sums they had to invest were too high. Guo and Pan quote a figure of ten million Chinese dollars and the hiring of more than one-thousand workers as requirements for a lifelong title of baronet (*nanjue*).¹⁰² These authors also give two examples of craftspeople being rewarded: a piece of embroidery on an eight-panelled folding screen (1904) and a straw hat (1907) reaped a fourth-grade and a fifth-grade commercial award respectively.¹⁰³

Government Schools for Crafts and Technical Learning

Among the reform efforts of the newly founded Ministry of Commerce, the new vocational schools stand out as a positive asset that was inherited and enhanced by the governments that followed the Qing. Formal vocational training was also actively fostered in the provinces and by the Eight Banner organization. Even an initiative by the Empress Dowager Cixi is recorded: she suggested setting up a weaving and embroidery school for the palace women. Everybody, no matter what rank, was allowed to join the school in

99 Ibid., p. 450.

100 Ibid., p. 446.

101 Compare Deli Yang, 'The Development of the Intellectual Property in China', p. 5, who dates the first trademark regulations to 1904 and the first copyright law to 1910, and discusses the preceding government efforts for the protection of inventor's rights in some industries, such as mechanised techniques in weaving (1882), papermaking (1889), winemaking (1895), and yarn spinning (1895) as approved by the Guangxu emperor.

102 Guo and Pan, *Qingmo shangbu*, p. 87.

103 Ibid., p. 87.

order to learn a trade, to appreciate the difficulty of craft production, and also to ease their transition to life as commoners.¹⁰⁴

However, the usual target group outside the palace were destitute youths, male and female, to whom the central and provincial governments offered professional training mostly in the traditional crafts. Precursors of such schools in the provinces were, for instance, weaving schools in Jiangsu, Henan, and Yunnan, where teenage girls were taught spinning and weaving. They paid no tuition fees and were rewarded if they graduated successfully.¹⁰⁵ These are isolated cases recorded in Peng Zeyi's comprehensive collection of materials for craft history from the Qing dynasty to the Republican period. More such local or regional level activities may have been going on in the decades that preceded the political reforms of the early twentieth century, and vocational training was not only provided by the state on its various administrative levels but also upon private initiative. However, the greatest impulse came from the side of the government in the early twentieth century. In 1902, even before the formal foundation of the Ministry of Commerce, the first proposals to establish a 'Craft Office for Agriculture, Industry, and Commerce' (*Nong gong shang gongyi ju*) in Peking were made by the later Minister of Commerce, Chen Bi (1852-1928), and the actual operation of the Craft Office began in 1904.¹⁰⁶ Its main objective was to train a target group of 500 apprentices in the branches of weaving, embroidery, dyeing, woodworking, leather working, glass production, paper making, rattan weaving, painting and lacquering, design, iron working, and well boring in a model school for the entire empire.¹⁰⁷ According to the statistics published by the ministry in 1908, the actual number of students was 392, the other 109 school members being teachers, foremen, and skilled craftspeople.¹⁰⁸

104 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 2, p. 515, quoting from the Peking gazette *Beijing bao* 北京報 of 1904. Not all women lived in the palace permanently, but they were drafted for five to ten-year shifts as servants between the ages of thirteen and thirty. See Evelyn Rawski, *The Last Emperors*, p. 170, for a figure of 150 to 200 maids in palace service under Empress Dowager Cixi, but over 2,000 in the 1730s, and 650 to 850 from the 1770s through 1831.

105 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 1, pp. 224-227.

106 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 2, p. 510.

107 From the memorial of the Ministry of Agriculture, Craft and Industry, and Commerce to the throne for opening a new factory for the Office, 1907, published in the *Nong gong shang bu gongyi ju kuoyun shiban jianzhang* 農工商部工藝局擴充試辦簡章 (Short regulations for the trial extension of the Office for Crafts of the Ministry of Agriculture, Crafts and Industries, and Commerce), p. 1, p. 4, quoted in Peng Zeyi, *Zhongguo jindai shougongye*, vol. 2, pp. 509, 511.

108 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 2, p. 510, Table 'Nong gong shang bu gongyiju gaikuang, 1904-1908 nian' 農工商部工藝局概況 1904-1908年 (Overview of the Craft Office of the Ministry of Agriculture, Craft and Industry, and Commerce, 1904-1908).

Peng Nansheng's tabulation of the government craft schools in the first decade of the twentieth century gives an overview of seventeen central institutions in each province and the capital. Together with the branch schools opened in every province, they number well over five hundred, but the number of students remains somewhat elusive and in some cases can only be estimated.

Table 9 Government craft and industry schools in Peking and the provinces, 1901-1909

Name of the institution	Year of establishment	Place and province of main branch	Number of students	Number of branch schools
Nonggongshang gongyi ju	1902	Peking	500	1
Beiyang gongyi ju	1903	Tianjin, Zhili	?	112
Jinan gongyi zhuanxi suo	1905	Jinan, Shandong	?	102
Shanxi sheng gongyi ju	1902	Taiyuan, Shanxi	?	10
Jiangxi gongyi yuan	1901	Nanchang, Jiangxi	?	76
Sichuan tongsheng quangong ju	1903	Chengdu, Sichuan	?	73
Guangdong gongyi ju	1904	Canton, Guangdong	?	21
Guangxi gongyi ju	1904	Guilin, Guangxi	200	14
Fujian gongyi chang	1903	Fuzhou, Fujian	160	14
Zhejiang gongyi zhuanxi suo	1905	Hangzhou, Zhejiang	160	39
Suzhou gongyi ju	?	Suzhou, Jiangsu (Jiangnan)	100	8
Shaanxi gongyi chang	1904	Xi'an, Shanxi	100	12
Gansu quangong ju	1906	Lanzhou, Gansu	100	49
Anhui quansheng gongyi chang	1908	Hefei, Anhui		3
Fengtian gongyi zhuanxi suo	1906	Shenyang, Fengtian (Shengjing)	129	12
Heilongjiang gongyi zhuanxi suo	1907	Harbin, Heilongjiang	?	7
Jilin shixi gongchang	1909	Songhua Jiang south bank, Jinlin	?	6
Total				558

Source: Peng Nansheng, *Hanghui zhidu de xiandai mingyun*, pp. 308-309.

As Table 9 shows, the distribution of the schools in the provinces was quite uneven. It was highest in Zhili and Shandong and conspicuously low in the affluent Jiangnan region and the other relatively well-off southeastern provinces of Zhejiang, Guangdong, and Fujian. A comparison with Peng Zeyi's figures for 1913, which include 'industrial offices' (*gongye ge ju*), 'industrial training centers' (*gongye gezhong chuanxi suo*), 'work promotion places'

(*quan gong chang*), and 'public and private reconstruction workshops' (*gong si jianshe ge gongchang*) still shows basically the same structure, with Zhili, Shandong, and Jiangxi ranking first.

As to the number of student-apprentices that each of these schools could accommodate, the scope of 400 in the capital Craft Office and 640 in the Tianjin experimental manufactory (Tianjin shixi gongchang) was clearly the highest.¹⁰⁹ Peng Nansheng gives figures of 100 to 200 for the provincial offices. Peng Zeyi's detailed table on the situation in Zhili between 1904 and 1910, which includes information on 87 vocational training sites, mainly established on the district level, reports between four and 640 apprentices, totaling 3,298, with an average of 38. This includes two expressly female vocational training sites teaching textile trades with an aggregate number of 402 apprentices. In addition, 'houses of correction' or 'training centers for vagrants' (*youmin* 遊民) reported training facilities for at least 272 convicts.¹¹⁰ The duration of apprenticeship in the schools is not specified but may have varied between several months and three years.¹¹¹ Therefore, the actual number of trainees graduated from the Zhili schools in the seven years covered might add up to at least 6,000 to 7,000. Extending this figure to the seventeen provincial institutions named above might yield a total number of 102,000 to 119,000 graduates.

In comparison to the training offered in the traditional apprentice system provided by the masters of individual workshops, Peng Nansheng points to the following differences.¹¹² The official vocational schools had two purposes: first, to promote crafts and industries, and second, to create occupational programmes for poverty reduction and the settlement of 'unoccupied migrants'. Basically – according to their own accounts – they were non-profit organizations and not subject to economic competition, while the individual workshops produced for the livelihood of the master and his family and had to compete within their guild formations. The official schools could take up students from a broader range of ages, extending

109 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 2, p. 528, 'Zhili geshu chuanxi gongchang gaikuang' 直隸各屬傳習工廠概況 (Overview of all types of training manufactories in Zhili, 1904-1910); p. 533, 'Zhili geshu zuifan xiyisuo gaikuang' 直隸各屬罪犯習藝所概況 (Overview of all types of craft training facilities for convicts in Zhili, 1904-1908).

110 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 2, p. 528, 'Zhili geshu chuanxi gongchang gaikuang', p. 532.

111 The Peking Craft Office foresaw flexible terms of one to two years, while the Hubei Eight Banner Craft Office and the Sichuan Labour Promotion Office provided for three terms per year. See Peng Nansheng, *Hanghai zhidu*, p. 314.

112 Peng Nansheng, *Hanghai zhidu*, pp. 312-315.

from 12 to 25 years, and were thus open to the very young and the very old in terms of vocational training. Individual masters within the guild system would certainly not take on apprentices without references, and parents often had to pay an entry fee to the master for the apprenticeship. The official schools fed the students and offered them a small stipend of one yuan per month, while the traditional system as a rule provided only food and housing. Moreover, training in the official schools was more flexible regarding the period before graduation. Quick learners could graduate sooner and were offered rewards and graduation certificates, while a guild master would be quite interested to keep especially his gifted apprentices in the workshops for as long as possible. Basically, the schools were interested in teaching large numbers of apprentices, while within the guilds, the number of apprentices was suspiciously monitored and often limited to only one in order to keep cheap labour equably available to all members or to limit competition on the labour market altogether if demand became slack.¹¹³

Finally, the schools not only offered training on the job but also reading, writing, and calculation skills or in some cases taught English and gave a basic introduction to the natural sciences.¹¹⁴ In the traditional system, such training was not provided by the individual craftshops. However, some guilds established elementary schools in order to teach reading and writing skills,¹¹⁵ and from the early twentieth century, we know of at least one case in which a vocational school was financed and organized by a guild, the carpenters' guild (*Suzhou Ziyi gongsuo*).¹¹⁶

The number of graduates calculated above can only give a rough approximation, and in relation to an estimated population of 423 million in 1910¹¹⁷ it may seem minuscule. Nevertheless, the concerted efforts of the

113 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 1, pp. 190-191, for five different guilds with the rule *chuyi jin yi* 出一進一 (when you let one apprentice go, you can take on the next), with apprentice terms from 1.5 to three years. See Bradstock, *Craft Guilds in Ch'ing Dynasty China*, pp. 189-190, for more examples and the observation that if the labour market was too crowded, some guilds temporarily halted the apprentice system for several years.

114 Peng Nansheng, *Hanghui zhidu*, pp. 314-315.

115 Ibid., pp. 55-56, refers to elementary schools established by the Shanghai customs brokers' guild. At Suzhou, the silk and satin guild (1889), the book merchants' guild (early twentieth century), the stone masons (1906), and the embroiderers (1906) also each financed elementary schools for twenty to forty pupils from within and without the trade. Niida Noboru, *Chūgoku no shakai to girudo*, p. 222, mentions schools for the children of guild members set up 'recently' in Peking by the hairdressers and tailors. In Shanghai, the shipping merchants founded an elementary school in 1906 ('Shanghai zui zao de huiguan').

116 Peng Nansheng, *Hanghui zhidu*, p. 56.

117 Maddison, *Chinese Economic Performance in the Long Run*, p. 169.

central and provincial governments, which markedly differed from the earlier professed disinterest in expanding craft production on the part of the commercial sector, show that the principles of state dirigisme had taken root even in the administration of the Qing dynasty. The vocational schools became one of the assets that the Republican state took over from the monarchy and enhanced in the following years.

Appendix

Table 10 Official positions in the Ministry of Public Works and the other ministries of the central government

Source	Manchus	Han Chinese	Mongols	Imperial Clansmen	Chinese-Martial	Total
<i>Gongbu zeli</i> , 1815 edition ¹	187	34	6	0	0	230*
Percentage	82%	15%	3%	0%	0%	
<i>Gongbu zeli</i> , 1884 edition ²	177	28	5	4	0	224*
Percentage	81%	15%	2%	2%	0%	
<i>Qingshi gao</i> ³	193	19	5	5	11	233
Percentage	83%	8%	2%	2%	5%	
Official positions in the other ministries of the central government (for comparison) Source: <i>Qingshi gao</i>⁴						
Ministry of Personnel <i>libu</i> 吏部	60%	24%	5%	2%	9%	143
Ministry of Revenue <i>hubu</i> 戶部	72%	17%	2%	2%	7%	270
Ministry of Rites <i>libu</i> 禮部	70%	17%	5%	3%	5%	96
Ministry of War <i>bingbu</i> 兵部	62,5%	21,5%	8%	2%	6%	150
Ministry of Justice <i>xingbu</i> 刑部	57%	35%	1%	1,5%	5,5%	308

*not all positions are specified according to ethnic groups.

¹ *Gongbu zeli*, 1815 ed., chap. 118, fol. 1a-3a, 'E que' 額缺.

² *Ibid.*, 1884 ed., chap. 102, fol. 2a-4a: 'Siyuan bitieshi kushi e que' 司員筆帖式庫使額缺.

³ *Qingshi gao*, chap. 114, pp. 3291-3292.

⁴ *Ibid.*, pp. 3271-3290.

Table 11 The Workforce at the Office of Palace Construction of the Imperial Household Department *yingzao si* 營造司 in 1677

	Supervision	Administrative staff	Banner artisans (qijiang 旗匠)	Civilian artisans (minjiang 民匠)
Timber storehouse, <i>muku</i> 木庫	2 storekeepers, 2 deputies	10 guards, 13 scribes and bookkeepers	73	103
Storehouse for stone work, stone masonry <i>fangku</i> 房庫	2 storekeepers, 2 deputies	10 guards, 8 scribes and bookkeepers	71	68
Utensil storehouse, <i>qimin ku</i> 器皿庫	2 storekeepers, 1 deputy	8 guards	13	26
Iron storehouse <i>tieku</i> 鐵庫	2 storekeepers	5 guards	6	
Charcoal storehouse <i>tanku</i> 炭庫	2 storekeepers, 1 deputy	7 guards, 58 <i>sula</i> 蘇 拉 (errand boys)		
Firewood storehouse <i>chaiku</i> 柴庫:	2 storekeepers, 1 deputy	7 guardsmen, 58 <i>sula</i>		
Yuanming yuan firewood and charcoal storehouse <i>Yuanming yuan chaitan ku</i> 圓明園柴炭庫	2 storekeepers, 1 deputy	7 guardsmen, 38 storehouse workers		
Painting workshop, <i>youshua zuo</i> 油畫作	1 deputy artisan overseer <i>weishu sijiang</i> , 7 assistants	5 scribes and bookkeepers	152	69
Ironsmiths' workshop <i>tiezuo</i> 鐵作	1 deputy artisan overseer		77	
Fireworks workshop 花 炮作	2 storekeepers, 1 deputy	3 guardsmen	32	42
Total	34	237	424	308

Source: *Qinding zongguan Neiwu fu xianxing zeli*, vol. 307, pp. 366-367.

Table 12 Artisan workforce at the Grand Storage Office of the Imperial Household Department *guangchu si* 廣儲司 in 1677

Subsection	Artisan positions
Silversmiths' workshop <i>yinzuo</i> 銀作	176
Tannery <i>shupi zuo</i> 熟皮作	162
Coppersmiths' workshop <i>tongzuo</i> 銅作	60
Dyeing workshop <i>ranzuo</i> 染作	50
Tailors' workshop <i>yizuo</i> 衣作	312
Embroiderers' workshop <i>xiuzuo</i> 繡作	147
Artificial flower workshop <i>huazuo</i> 花作	29
Capmakers' workshop <i>maofang</i> 帽房	20 (female)
Sewing workshop <i>zhenxian fang</i> 針線房	1170 (female)
Total	2126 (of which 1190 female positions)

Source: *Qinding zongguan Neiwu fu xianxing zeli*, vol. 308, pp. 353-359.

Table 13 Artisan workforce at the Court of Imperial Armaments of the Imperial Household Department *wubei yuan* 武備院

Branch	Before Kangxi 9 (1670)	Ca. 1841
Bow makers	187	499
Arrow makers	60	39
Arrow tip makers	40	
Tent makers	36	
Ironsmiths	991	633
Armour makers	21	30
Felt makers	485	106
Saddle makers	167	59
Tanners	266	216
Total	2253	1582

Source: *Qinding zongguan Neiwu fu xianxing zeli*, vol. 309, p. 93.

Table 14 Government artisan positions in Peking

	1660 to 1680	1681 to 1700	1701 to 1720	1721 to 1740	1741 to 1760	1761 to 1780	1781 to 1800	1801 to 1820	1821 to 1840	1841 to 1860	1861 to 1880
Imperial Household Department											
<i>neiwufu</i> 內務府											
Office of Palace Construction <i>yingzao si</i> 營造司	732							655			
Workshop at the Hall for Nourishing the Heart <i>Yangxin dian zaoban chu</i> 養心殿造辦處		285								233	
Grand Storage Office <i>guangchu si</i> 廣儲司	1,460			1,026				971		936 male 1190 female	84
Printing Office at the Hall of Military Glory <i>Wuying dian xiushu chu</i> 武英殿修書處											1,582
Court of Imperial Armaments <i>wubei yuan</i> 武備院	2,253										
Weaving and Dyeing Office in the Capital <i>jingnei zhiran ju</i> 京內織染局	825				162					closed 1843	
Ministry of Public Works <i>gongbu</i> 工部											
Bureau of Construction <i>yingshan si</i> 營繕司				85	53		44				
Manufacturing Storehouse <i>zhizao ku</i> 製造庫											385
Metropolitan Mint Well of Fortune <i>baoyuan ju</i> 寶源局					Ca.1,000						

Table 15 Estimate of artisans in government manufactories outside Peking, eighteenth century

Institution/Craft branch	Date	Persons
<i>Jiangning zhizaoju</i> 江寧織造局(Nanjing Weaving and Dyeing Office)/weavers dyers and silk reelers	1745	1,780 777
<i>Suzhou zhizaoju</i> 蘇州織造局 (Suzhou Weaving and Dyeing Office)/weavers designers and others	1745	1,932 243
<i>Hangzhou zhizaoju</i> 杭州織造局 (Hangzhou Weaving and Dyeing Office)/weavers dyers and silk reelers	1745	1,800 530
Jingdezhen Imperial Porcelain Kiln 景德鎮御器廠/porcelain manufacturers		300 permanent artisans; together with various assisting functions ca. 1,000
26 Government mints for copper cash in the provinces/copper casters	Qianlong era	at an average of 100 workers per mint: 2,600
About 40 government shipyards	Qianlong era	at an average of 400 artisans and workers (figures from biggest Ming shipyard): 16,000
Total		26,662

Sources: Zhu Cishou, *Zhongguo gudai gongye shi*, p. 789 (Jiangning), p. 792 (Suzhou, Hangzhou), p. 790 (Jingdezhen), Burger, 'Minting', pp. 377-391, this study, section 'shipbuilding'.

3. The Rise, Decline, and Reinforcement of the Crafts in the Service of the State

Historians' opinions are divided as to the usefulness of the classical pattern of ascent, flourishing, decay, and decline for the structural framework of analysis of political entities. In China, this had been a time-honoured concept applied to all dynastic histories. Yet it has been criticized because it focuses too much on the central government and is therefore not able to analyze socio-economic trends over periods that span several dynasties, most prominently the 'commercial revolutions' in the Song and the Ming.¹

Nonetheless, since dynastic power *did* rise, flourish, and decline, this basic pattern for the shifts in power relations is certainly applicable to the core political decision-makers. This is especially so when it is combined with a complementary perspective on local and regional elites and bureaucracies, whose influence tends to increase after the central power has passed its apex.² Naquin and Rawski have modified the paradigm with regard to the most influential networks or factions in the empire. In their three-phase model, imperial princes and Manchu institutions first wielded the greatest political power between 1644 and the 1730s; in the second phase, between the 1730s and the 1820s, the official examinations for both Manchus and Chinese were the career path to highest political influence, and the most powerful institution in the central government was the Grand Council. During the third phase, lasting from 1820 to the end of the Qing dynasty, extrabureaucratic, intellectual networks and provincial administrators dominated, although at the top of the central government, Manchu control resurged.³ It was not embodied in the persons of the young or weak emperors Xianfeng, Tongzhi, Guangxu, and Puyi but by their regents: Empress Dowager Cixi, the mother of the Tongzhi and the aunt of the Guangxu emperors, Prince Gong (Yixin, 1840-1891), the brother of the Xianfeng emperor, and Zaifeng (1883-1851), the father of the last emperor Puyi.

In this sense, this could be considered dynastic decline if the power of the dynasty is associated only with the influence of the emperor. However,

1 Zurndorfer, 'A Guide to the "New" Chinese History', p. 184.

2 For a study of this phenomenon in the field of local and regional historiography, see Moll-Murata, *Die chinesische Regionalbeschreibung*, esp. p. 239.

3 Naquin and Rawski, *Chinese Society in the Eighteenth Century*, pp. 52-53.

if other powerful personalities from the imperial clan are considered, the downward trend was not that obvious.⁴

In regard to the financial strength of the Qing empire, the record is ambiguous. Naquin and Rawski maintain that in the eighteenth century, the Qing state collected a surplus in taxes, which amounted to 24 million tael in 1736 and was tripled by 1786. However, the government also spent much of the revenues for warfare: 23 million tael for the conquest of Xinjiang (1755-1760), and three times as much for the campaigns in Jinchuan in Western Sichuan (1772-1776). In the 1790s, for the first time the court did not have enough funds when it repressed the White Lotus rebellions. At one hundred million tael, it swallowed up more than 130 percent of the yearly income of the central government. Moreover, since 1840, indemnities demanded by the imperialist states put an extra strain on the budget of the Qing state. The additional tax charged since the suppression of the Taiping rebellion, *lijin*, remained in the provinces and thus could not help the financial situation of the central government. By 1900, the Chinese central government obtained less of the gross national product than in 1753.⁵

R. Bin Wong notes however that after the mid-nineteenth century, 'whatever the Qing state's weaknesses, raising money was not among them'.⁶ He points to the capabilities of the Qing state to raise commercial taxes and especially customs revenues and quotes a figure of 49.5 million tael of revenue raised in 1849, 77 percent of which came from agriculture and the rest from commerce. A total of 77 million tael was collected in 1885 due to a fourfold increase in commercial revenues. According to Wong, annual expenditures of the Qing ranged from 30 to 40 million tael between the 1720s and the early 1840s and reached 70 to 80 million tael per year between the 1860s and the early 1890s, while the gross income rose to as much as 302 million tael of revenue gathered in 1911, of which about 50 million came from agriculture, another 45 million from miscellaneous sources, and more than 207 million from commercial taxes.⁷

Moreover, whereas Naquin and Rawski point to the weakness of the military sector in the nineteenth century as well as the problem that since the Taiping rebellion the central government army was unable to maintain a military monopoly,⁸ Bin Wong emphasizes the successful suppression of the Taiping (1850-1864), Nian (1851-1868), and Muslim (1867-1873) rebellions

4 Ibid., pp. 218-219.

5 Naquin and Rawski, *Chinese Society in the Eighteenth Century*, p. 219.

6 R. Bin Wong, *China Transformed*, p. 156.

7 Ibid., pp. 155-156.

8 Naquin and Rawski, *Chinese Society in the Eighteenth Century*, p. 219.

and the fact that most of the regional armies that fought these rebels were demobilized in the 1870s.⁹

In terms of the state's involvement in the economy, Naquin and Rawski mention the long-term trend away from mining and manufacturing, tea and salt production, domestic and foreign trade and claim that

The Qing state never reconciled the divergence between traditional notions of its proper economic function and its increasing impotence, nor did it evolve a new vision of its role in the economy. Until the last decade of its life, it preferred to try to preserve stability in the midst of change rather than to promote development.¹⁰

In their analysis, particularism existed in the economy and in the bureaucracy during the expanding commercialization, so that administrative responsibilities were assumed by private parties rather than public entities.¹¹ This implied that the local elites took on many government functions, but it was only in the twentieth century that they turned their power against the state.¹²

On this point, Bin Wong maintains that the state could mobilize the funds to build up steamship lines and railways and not only heavy military industries but also light industries like textiles, thus expanding its range of activities in the late nineteenth century.¹³

These apparently conflicting views demonstrate that with regard to the state administration of craft manufacture, a general trend of retreat from direct management can be observed after activist beginnings. But in the final years of the dynasty, the commitment intensified once again and diversified into the promotion of manual trades as well as the introduction of mechanized production. In order to demonstrate this trend, the following sections outline the particular patterns of development in the main sectors of state engagement.

The State Retires: Building Projects in the Nineteenth Century

As shown in the preceding chapter, the number of permanent positions in the Bureau of Construction (*yingshan si*) of the Ministry of Public Works

9 R. Bin Wong, *China Transformed*, p. 155.

10 Naquin and Rawski, *Chinese Society in the Eighteenth Century*, p. 223.

11 *Ibid.*, pp. 223-225.

12 *Ibid.*, p. 229.

13 R. Bin Wong, *China Transformed*, p. 155.

was not high and receded by almost half in the course of the dynasty. By contrast, in the palace the permanent positions for builders were almost tenfold that of the Ministry and were reduced by only eleven percent. For building, the workforce was usually hired in temporary assignments. After 1860, the names of the construction companies and even the individual owners of these companies begin to appear in estimates and various types of communications in archival materials or the documentation of particular projects. For instance, in the 1872-1873 reconstruction project for the country palace Yuanming yuan, which in 1860 had been destroyed by English and French troops in the wake of the Second Opium War, seven firms and their owners were named in the archival documents of the Imperial Household Department. The project was broken off due to a lack of funds, little support from political decision-makers, and the difficulty in acquiring the necessary timber.¹⁴ The task of the building firms in this project was to contract labour (*baogong*) and provide less costly building materials.¹⁵ A case that nevertheless shows the interaction of government officials and a private craftsman and building contractor occurred during the construction of the mausoleum for the Xianfeng emperor, Dingling, in 1874. Guo Fenglin, the owner of the timber yard and carpentry shop Xianghe muchang in Peking, had clashed and verbally abused a Section Director about the payment of compensation for repairing a pavilion built over a well that had collapsed within the warranty time.¹⁶ This act of insubordination, which caused considerable commotion and paperwork, shows the self-assertion of the concerned person who maintained, certainly in order to stress his probity and status, that he had previously donated money to the state and acquired the official title of *baoshou bei* (保守備) (defender-in-attendance).¹⁷ Guo and other owners of timber yards and construction firms¹⁸ are referred to in the late Qing documents as *shangren*. As ordinary workmen or masters (*jiang*), they would hardly have been acceptable as business partners in official work projects.

With regard to the production of building materials, the imperial kilns may serve as an example. As both Zhu Cishou and Xu Jianqing have pointed out, the Qing dynasty operated fewer kilns for baking bricks and tiles than the Ming dynasty. The three centres were the Liuli chang (Glazed Tile

14 Liu Dunzhen, 'Tongzhi chongxiu Yuanmingyuan shiliao', p. 56.

15 Ibid., p. 44.

16 *Gongcheng beiyao*, chap. 7, pp. 1-18. The entire chapter is dedicated to the incident. The sum in question was 450 tael.

17 Ibid., chap. 7, p. 15.

18 For instance, the owners of the timber yards Tianlin muchang 天林木廠 and Tianquan muchang 天泉木廠 in Peking who renovated the official mint Baoyuan ju in 1902.

Manufactory) in Peking, which was used continuously until 1825 and then relocated to the Western Hills near Peking; the brick manufactories in Linqing and Shandong; and the Suzhou Metal Tile Manufactory (Jinzhuan chang).¹⁹ The Liuli chang Manufactory was supervised by one Han and one Manchu official, but apparently from early on, the operational risk was outsourced to so-called 'kiln households' (*yaohu*), which are mentioned since 1694. These brick bakers also had to pay a land tax for the plots where their kilns were situated. Therefore this can hardly have been an imperial manufactory but rather subcontracted workshops that supplied the state.²⁰ The other two sites were activated in case of large building projects but not permanently run, and were no longer used after the Daoguang reign.²¹ Xu Jianqing refers to Suzhou brickmakers who obtained their food rations even if the kilns were not in operation. She suggests that this applied also to other government workshops and manufactories, such as the silk weavers in Jiangnan, the porcelain potters in Jingdezhen, and the shipbuilders in Fujian and Hangzhou.²²

Thus, although official building projects were directed and administered by the state, they required a considerable standing workforce for palace buildings only. For buildings outside the palace and also within the palace precincts (if a larger workforce was required), workers were hired by means of a contractual system. The building materials for the state were not permanently kept on stock but provided from the market in the case of timber and in a kind of subcontracting system for bricks.

The Three Silk Weaveries in Jiangnan

The state weaving manufactories in the Lower Yangzi region, the *Jiangnan san zhizao ju*, located in Suzhou, Nanjing, and Hangzhou, were revived in the first years of the Qing rule after they had been closed down at the end of the Ming dynasty.²³ Their responsibility was to reel the silk, to dye, to weave, and partly to embroider the fabrics used at court and for high

19 Zhu Cishou, *Zhongguo gudai gongye shi*, pp. 789-790, Xu Jianqing, *Qingdai qianqi*, p. 329. Kerr et al., *Ceramic Technology*, p. 516, point out that the Suzhou tiles were referred to as 'metal tiles' for the metallic sound they emitted when struck. Their colour was actually black.

20 Xu Jianqing, *Qingdai qianqi*, pp. 329-330.

21 *Ibid.*, p. 328.

22 *Ibid.*, p. 334.

23 For the scope of production of the Ming state weaveries, see Schäfer and Kuhn, *Weaving an economic pattern in Ming times*. These authors date the interruption of state silk production during the Ming-Qing transition from 1628 to 1645 (p. 56).

officials as well as the textiles used as gifts from the emperor to officials or emissaries from tributary states.²⁴

In relation to their size in the Ming dynasty, the three weaveries were enlarged so that the number of looms as well as artisans was more than doubled. In the first decades of the Qing, these vacancies could not be filled, so that by 1667, in Suzhou 170 looms were missing.²⁵ The actual figure of 800 looms was probably reached around 1686. Furthermore, a system of outsourcing in silk weaving seems to have applied, at least in certain phases and for certain parts of the production. This was the so-called *lingzhi* ('weaving to order') system, in which the authorities gave out licenses to the weaving households for subcontracting people to weave in the manufactory.²⁶ The system was inherited from the Ming. After initial confusion in the early years of the Qing, the practice emerged that the state provided the materials and paid the artisans monetary wages and food rations. They had the status of official artisans and worked in the government weaveries under strict supervision and discipline.²⁷

Table 16 The norm quotas of looms and artisans at the Three Silk Weaveries in the early and mid-Qing

Location	Period	Number of looms			Number of artisans
		Early Qing, [ca. 1686]	1725	1745	1745
Nanjing		538	557	600	2,550
Suzhou		800	710	663	2,175
Hangzhou		770	750	600	2,330
Total		2,108	2,017	1,836	7,055

Sources: Fang Xing et al., 'Silk Weaving in Jiangsu and Zhejiang', p. 206, and Peng Zeyi, 'Qingdai qianqi', p. 99.

In relation to the private weaveries, the total number of looms and people employed in the three silk weaveries in the mid-eighteenth century (about 7,000) was not large. According to Zhu Cishou, in the Qianlong and Jiaqing reigns, the aggregate number of satin (*duan*) looms in Nanjing was as high as 30,000. Private weaveries in Suzhou had a total number of 10,000 looms and

24 Shih Min-hsiung, *The Silk Industry in Ch'ing China*, p. 39.

25 Piontek-Ma, *Der Bericht von Sun Pei*, p. 63.

26 Fang Xing et al., 'Silk Weaving in Jiangsu and Zhejiang', p. 205.

27 Ibid.

340 dyeing workshops, and the private weaveries in the city of Hangzhou had about 3,000 looms.²⁸ The looms of the Imperial Weavery in Nanjing thus amounted to only two percent of those of the private weaveries. For Suzhou this figure was six percent, and for Hangzhou twenty percent. Other estimates give even higher figures for the private looms.²⁹

In the Taiping rebellion, all of the three weaveries were badly damaged. They were rebuilt in the Tongzhi reign (1864-1872), but thereafter operated only at a reduced level with about one-third of the original looms and artisans.³⁰ For 1870, Shih Min-hsiung quotes figures of about 600 looms in Nanjing, 240 in Suzhou, and 122 in Hangzhou.³¹ The weavery in Nanjing was dissolved in 1904 because it seemed uneconomic to have two imperial workshops, Suzhou and Nanjing, in one province.³² The main reasons for the decline may have been less demand from the court and the high prices for raw silk, which had doubled since the post-Taiping period.³³ Xu Jianqing points to the fact that after the Taiping period, the court turned to the commercial market for its needs. In the case of satin from Nanjing, the percentage of the weaves bought from private producers amounted to up to 80 percent.³⁴

'Prosperity is not on the wane':³⁵ The Jingdezhen Porcelain Manufactory

The market town of Jingdezhen was founded in the first year of the Jingde era in the Northern Song (1004) and from early on produced 'real' porcelain, in contrast to the earthenware produced by other Southern Song centres of ceramic production.³⁶ Porcelain, similar to tea, was sent to the court as

28 Zhu Cishou, *Zhongguo gudai gongye shi*, p. 789.

29 Fang Xing et al., 'Silk Weaving in Jiangsu and Zhejiang', p. 207, assume an aggregate number of 80,000 looms in the two provinces Zhejiang and Jiangsu.

30 Xu Jianqing, *Qingdai qianqi*, p. 324.

31 Shih Min-hsiung, *The Silk Industry in Ch'ing China*, p. 47.

32 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 2, p. 504, quoting from *Donghua xulu* 東華續錄 for the year Guangxu 30 (1904).

33 Shih Min-hsiung, *The Silk Industry in Ch'ing China*, pp. 47-49. Shih dates the closure to 1894, but this is not corroborated by the three sources cited by Peng Zeyi.

34 Xu Jianqing, *Qingdai qianqi*, p. 324.

35 This was the impression of an English traveller to Jingdezhen, Mr. Drew, in 1869. *Decennial Reports, 1882-1891*, p. 205.

36 Definitions for 'porcelain' vary in China and the West. Traditionally, in the West, transparency is the criterion for deciding whether a piece of ceramic constitutes porcelain; in China the clear sound coming forth from pieces of porcelain struck against each other serves as distinctive feature for *ci* 瓷 as opposed to the earthenware *tao* 陶. Rose Kerr et al. quote the modern definition

'tribute', a kind of natural tax, and the quality of the items was controlled by government officials.³⁷ Yet it was only in the Ming dynasty that a completely state-run government manufactory with kilns was established.³⁸ From this time on, the local Jingdezhen ware was referred to as 'official ware' *guanyao*. The imperial manufactory first operated 20 kilns, then 58 in the Xuande reign (1425-1436)³⁹ – each for different kinds of wares – and 23 specialized workshops for the particular steps of production. In the Zhengde and Jiajing reigns (1505-1566), 300 craftsmen including masons, carpenters, and blacksmiths were employed in addition to hired labour.⁴⁰ Another source refers to 500 craftsmen and over 1,000 labourers at the imperial kilns during the Jiajing reign.⁴¹ At the same time, private kilns also flourished. Porcelain was being made in five or six other locations in the Ming empire, but the official manufactory and the private enterprises at Jingdezhen had become the centre of the industry. According to the technical compendium *Tiangong kaiwu* ('The exploitation of the works of nature', 1637), by the end of the dynasty Jingdezhen produced more than all other regions put together.⁴² The imperial manufactory continued to produce until 1608.⁴³

In the Qing dynasty, the imperial manufactory and kilns were reopened on the original site in 1654⁴⁴ and refurbished in 1680. They flourished for about one hundred years under the direction of official commissioners sent from

'a vitrified, white, and translucent ware --- that is fired at 1,300° C plus' (Kerr et al., *Ceramic Technology*, p. 9, from Hamer & Hamer, *The Potter's Dictionary of Materials and Techniques* 1975, p. 229) but qualify this by noting that Chinese porcelain was not necessarily white or translucent, and it was fired at temperatures between 1,150 and 1,400° C. In Kerr's view, porcelain was not 'invented' but rather 'discovered' or, more accurately, it 'emerged' in China when potters in the north experimented with whiter materials and higher kiln temperatures. Scholarly opinions on the earliest specimens of 'real' porcelain vary. Kerr and colleagues consider that 'the world's first true porcelains' were the Xing wares made in Hebei province during the early Tang dynasty (Kerr et al., *Ceramic Technology*, pp. 151-152).

37 Kerr et al., *Ceramic Technology*, pp. 185-186.

38 The founding date is disputed. Some authors assume that the year 1369 (Sayer [transl.], *Ching-te-chen t'ao-lu*, p. 41) is correct. Others, as in *Jingdezhen taoci shigao*, pp. 96-97, doubt that a manufactory could have been built as early as that, just after the rise of the Ming, and suggest the year 1402 instead. For further discussion, see also Kerr et al., *Ceramic Technology*, p. 186, fn. 273.

39 Sayer (transl.), *Ching-te-chen t'ao-lu*, p. 41.

40 Fang Zhuofen et al., 'The Porcelain Industry of Jingdezhen', p. 311, *Zhongguo taoci shi*, p. 366, quoting from *Jiangxi da zhi* 江西大志, 'Taoshu' 陶書.

41 *Jiangxi tongzhi* (1881), chap. 93, fol. 9a, Memorial by Xu Zhi.

42 Xu Jianqing, *Qingdai qianqi*, p. 557; Fang Zhuofen et al., 'The Porcelain Industry of Jingdezhen', p. 309, both referring to Song Yingxing, *Tiangong kaiwu*, chap. 2.

43 Kerr et al., *Ceramic Technology*, p. 188.

44 *Jiangxi sheng tongzhi*, chap. 93, fol. 7a.

Peking. The manufacturing and despatch of porcelain was arranged by the Palace Workshops (*[Yangxin dian] zaoban chu*) of the Imperial Household Department. The workshops would send order lists and models to the manufactory that would be produced under the supervision of the superintendent's assistant in Jingdezhen. After control by the resident superintendent, who often also oversaw the customs affairs of the region, the finished porcelain in standard and substandard quality would be shipped to Peking.⁴⁵ In the palace, the porcelain was received in the porcelain storehouse, *ciku*, of the Imperial Household Department.⁴⁶

The number of craft specialisations in the imperial manufactory is given as 23, as in the Ming, and the number of kilns as six, each for a specific type of vessel. It is disputed whether facilities of this limited size could produce the output stated for the Yongzheng and Qianlong eras.⁴⁷ Lu Jiaming, referring to the 'Record on Porcelain in Jingdezhen' (*Jingdezhen taolu*, 1815), argues that from the early eighteenth century on, the late Ming method of forming and painting in the imperial manufactory and firing in private kilns must have been reintroduced.⁴⁸ Yet during the Qing, the practice was managed more efficiently than in the Ming, so that the kiln owners did not take the risk alone.⁴⁹ After the reconstruction in 1866, only low temperature muffle furnaces for firing overglaze ornamentation remained in use in the imperial manufactory.⁵⁰

The superintendents of the early and mid-eighteenth century became famous because of their achievements in quality improvements, so that the wares produced during their terms of office were given their names. We thus know of 'Lang ware' after Lang Tingji, superintendent from 1705 to 1712; 'Nian ware' after Nian Xiyao, superintendent from 1726 to 1735; and most illustrious

45 Kerr et al., *Ceramic Technology*, p. 201.

46 The porcelain chamber belonged to one of the Six Storehouses *liu ku* 六庫 of the Grand Storage office *guangchu si*. Besides 'old and new porcelain', gold, silver, enamel, inlay, bronze, and tin dishes and vessels were accumulated there. See *Zongguan neiwufu xianxing zeli*, 'Guangchu si', chap. 1, p. 352.

47 Fang Zhuofen et al., 'The Porcelain Industry of Jingdezhen', p. 312, Lu Jiaming, 'Ming Qing shiqi Jingdezhen yuqichang', p. 32.

48 Lu Jiaming, 'Ming Qing shiqi Jingdezhen yuqichang', p. 31, see *Jingdezhen taolu tushuo*, chap. 10, p. 261: 国朝初燒造龍缸未成，至唐窯始復其制，搭民官燒。[...] 然今則廠器盡搭燒民窯，照數給置，無役派賠累也，(transl. Sayer) p. 112: 'In the beginning of the present dynasty they [the palace factory] failed to make dragon jars, and it was not until Tang Ying's time that they resumed their manufacture using private kilns for that purpose. [...] To-day the palace articles are entirely farmed out to private kilns, payment being made according to the numbers to be baked, and the losses incurred by the default of the workmen do not fall upon them.'

49 Kerr et al., *Ceramic Technology*, p. 200.

50 Kerr et al., *Ceramic Technology*, p. 200.

of all, 'Tang ware' after Tang Ying (1682-1756),⁵¹ Nian Xiyao's assistant since 1728 and superintendent between 1736 and 1756. Lao Ge, the assistant to Tang and succeeding superintendents from 1741 to 1768, maintained the high quality standards after Tang Ying's death, but after Lao Ge's own retirement, artistic standards are said to have not reached the same level again.⁵² From 1787 onwards, the connection to the central government and the Imperial Household Department seems to have become looser, so that together with the director of the nearest customs station on the Yangzi River, Jiujiang, who previously had also been in charge,⁵³ regional administrators took over the responsibility for the imperial manufactory.⁵⁴ In the attacks by Taiping troops and counterattacks by the government army between 1854 and 1864, the manufactory was destroyed and the workforce scattered.

The manufactory was rebuilt in 1866 on a larger scale than before.⁵⁵ Reports on the period between 1866 and 1910 are relatively scarce. Most documents recording the despatch to Peking at the Jiujiang customs station are extant.⁵⁶ Based on these, Liang Miaotai has set up a statistical table of the production volume and the expenses in the last years of the Qing. Production figures are reported until 1908 and expenses until 1910.⁵⁷ At a yearly average of 22,000 pieces of first-grade (*shangse*) and second-grade (*cise*) quality, the production was not much lower than in the best years of Qianlong, when the respective norm figures were 29,000 pieces.⁵⁸ However, concerning the quality norms set by the government, first-grade pieces according to the 1743 norm figures were acceptable in a range of 62-65 percent, and second-grade pieces between 35 and 38 percent. Up to 20 percent of kiln wasters (that is, misfired pieces) were allowed.⁵⁹ Between 1866 and 1908, the factual figures were 30 percent first-grade and 70 percent second-grade pieces, and a percentage of 18 for

51 For biographical information, see Hummel (ed.), *Eminent Chinese of the Ch'ing Period*, p. 442.

52 Kerr et al., *Ceramic Technology*, p. 27.

53 Fu and Zhen, 'Tang Ying nianpu', state that Tang Ying directed the Jiujiang customs and worked concurrently as the Director of the Imperial Manufactory from 1739. He would spend half a month during the firing periods in spring and in autumn at the Manufactory. According to Zhu Shan, 'Taoci shi shang bei yiwang de ren', pp. 36-37, it was Lao Ge who stayed in Jingdezhen continuously as deputy director during Tang's absences in Jiujiang.

54 Kerr et al., *Ceramic Technology*, p. 188; *Jiangxi tongzhi*, chap. 93, fol. 8a.

55 Lu Jiaming, 'Ming Qing shiqi Jingdezhen yuqichang', p. 32. *Jiangxi tongzhi*, chap. 93, fol. 8a.

56 However, at the First Historical Archives in Peking they were 'lent out for publication' in 2006.

57 Liang Miaotai, *Ming Qing Jingdezhen*, pp. 112-113.

58 *Tang Ying ji*, 'Taocheng jishi' 陶成紀事 (Record of facts about porcelain production), p. 950, also quoted by Lan Pu in *Jingdezhen taolu tushuo*, p. 62, (transl. Sayer) p. 12.

59 *Tang Ying ji*, 'Taocheng jishi', p. 950.

wasters. Liang Miaotai's table of expenses shows that the court in the late Qing period spent considerable amounts for porcelain: for the despatches between 1870 to 1910, this totaled 975,470 tael or an average of ca. 25,000 tael per year.⁶⁰ By comparison, the highest norms in the two hundred years before the Opium War were set at 10,000 tael per year in 1739.⁶¹

Therefore, it can hardly be argued that the imperial porcelain manufactory at Jingdezhen experienced a marked economic decline in the last fifty years of the dynasty, even if the firing process was outsourced to private kilns. Regarding the wares produced in the Tongzhi reign (1862-1874), a Dutch porcelain expert concludes that the late Qing potters 'hadn't lost their skills'.⁶²

As in silk weaving, the quality of the porcelain from the imperial manufactory was arguably the highest and set the standard for the commercial market,⁶³ and again as in silk weaving, the commercial market had a far bigger output than the imperial manufactory. Since systematic and long-term data are missing for the private sector, its production can only be estimated on the basis of reported numbers and the firing capacities of kilns. Fang Zhuofen and colleagues point out that the total output of Jingdezhen porcelain in the early Qing has been calculated on the basis of the consumption of firewood at about 200,000 *dan*⁶⁴ or 40 million pieces per year, but they assume that for the Qianlong reign, the figure must have been about 300,000 *dan* or 60 million pieces a year. The maximum – but not undisputed – quota for imperial porcelain was 'several hundred thousand pieces'.⁶⁵ If this implies about 500,000 pieces, then the imperial porcelain amounted to about 0.8 percent of the private production at its most active period.⁶⁶

The manufactory was closed down in 1910 and succeeded by the Jiangxi Porcelain Company (*Jiangxi ciye gongsi*) that operated partly with

60 Liang Miaotai, *Ming Qing Jingdezhen*, pp. 123-126. Two years were not included in this account.

61 *Ibid.*, p. 120, 129.

62 Nanne Ottema, *Chineesche Ceramiek*, p. 233.

63 Since official production was fired at private kilns, some was illegally appropriated from there. For the faking of the marks on imperial wares, see Liang Miaotai, *Ming Qing Jingdezhen*, p. 138. The kiln wasters were either sent to Peking for sale, or they were sold on site. See Kerr et al., *Ceramic Technology*, pp. 200-201.

64 *dan* 擔 is the unit for a kiln load of 200 porcelain pieces.

65 *Tang Ying ji*, p. 144 (Preface to the gazetteer of Fuliang, the district where the market town Jingdezhen was situated, *Fuliang xianzhi* 浮梁縣志, dated 1740). However, this figure has been doubted by Lu Jiaming, 'Ming Qing shiqi Jingdezhen yuqichang', p. 32, who supposes that it spans several years, since Tang Ying in 1743 reported the quota of a maximum of 29,000 pieces per year.

66 Fang Zhuofen et al., 'The Porcelain Industry of Jingdezhen', p. 314.

government funds from the provinces of Hebei, Hubei, Jiangsu, Anhui, and Jiangxi and partly with private capital.⁶⁷

Patterns of Development and Decline

The three sectors outlined above show how the state withdrew from the organization of craft production in varying degrees and for different reasons.

In building, the system of cooperation with local building companies and timber merchants who were employed especially for recruiting the workforce is evident for the later phases. State administration still controlled all accounting procedures, the allocation of building materials, and the progress and execution of the work. For glazed tiles and bricks, sub-contractors worked on demand, while timber was allocated from the market.

Silk weaving is a clear case in point of Xu Jianqing's model of state engagement in the crafts, according to which the state at first organized and financed craft branches in which the private sector could not supply its needs but later retired from the active organization of weaveries and relied on the commercial sector for its silk textiles.⁶⁸

In the manufacturing of porcelain, the output of the state workshops was also extremely small but was leading in design and workmanship. Since forming and firing are such distinct phases of the working process that require very different equipment and skills, kiln work could be outsourced from early on, but forming and decoration remained within the imperial porcelain manufactory. The 'decline' of the official sector is therefore less marked than in the silk weaving sector.

In the two sectors of luxury production, silk weaving and porcelain manufacture, the state did not produce for profit, although in the case of porcelain, kiln wasters or at times second-grade porcelain were sold on the open market and thus could make up for some of the production costs. In the late nineteenth century, the costs for silk weaves for the use of the court were lower if bought from commercial producers than those produced at the state manufactories. What is the reason, then, that the government maintained the craft production almost to the end of the dynasty? For porcelain, it has been plausibly argued that the main reason for this was that imperial patterns

67 Kerr et al., *Ceramic Technology*, p. 188; Jiangxi sheng qinggongye ting (ed.), *Jingdezhen taoci shigao*, p. 270.

68 Xu Jianqing, *Qingdai qianqi*, p. 554.

had to be preserved.⁶⁹ For silk weaving, Paolo Santangelo explains that the manufactories were not economic enterprises but political and organizational centres. Since they came under the supervision of high-ranking bondservants from the Imperial Household Department whose relationship to the emperor was particularly close, they can be understood as a representation of the court in the most affluent region of the empire that lay far away from Peking. Especially in the early Qing, the supervisors of the Nanjing and Suzhou weaveries often informed the emperors about the political and economic situation in Jiangnan.⁷⁰ Moreover, they also organized the acquisition of various objects produced in the region – not only silk weaves.⁷¹ Although the informal services for the emperor were no longer required in the late Qing, reports about silk prices and the labour market were regularly delivered also in this period. The Jingdezhen manufactory did not have the same politically and economically essential functions as the weaving manufactories.

As the three samples show, the reasons for state engagement or retreat were complex and pertained to local political situations and the nature of the commodity that was being produced.

The following chapters present investigations on two craft branches that do not belong to the field of luxury production but were of strategic importance for two fundamental tasks of the Qing state: security and information. Shipbuilding in the military field served to defend China's sea frontier and to transport grain provisions for the court and the army. Printing produced the texts used for the legitimation of the Qing state, the education and civilization of its subjects, and the dissemination of information to its officials. Both branches of production belong to the complementary fields to which the self-strengthening effort of the nineteenth century was devoted: the preservation of the Chinese 'cultural essence' (*tiyong*) and the application of modern Western techniques.

These two craft branches will be treated in more detail because it was in these branches that mechanization and technology transfer were actively realized by central and local governments at an earlier date than in the other sectors. Thus they exemplified a particular dynamism in times of crisis.

69 Lu Jiaming, 'Ming Qing shiqi Jingdezhen yuqichang', p. 32.

70 Santangelo, 'The Imperial Factories of Suzhou', p. 285.

71 Among the documents concerning the Suzhou weaving manufactory in the First Historical Archives, Peking, we found, for instance, the production prices of white jade bowls. The jade carvers earned the palace standard wage of 0.154 tael per day. First Historical Archives, *Neiwufu tang qingce* 內務府堂清冊, *Gongye* 工業, nos. 94 and 106 from 1770 and 1775; a late document from 1884 records the purchase of bamboo items. *Neiwufu tang qingce*, *Gongye* 273, *Su[zhou]* 蘇 226 for a purchase in 1884.

4. Government Shipbuilding

Naval construction, together with the production of ordnance, takes a special position among the branches of production in which the Qing state engaged actively. They constitute central elements in the transition to the mechanization and industrialization of the Chinese economy in the second half of the nineteenth century. For the basic hypothesis of this study – the relative efficiency of craft and industrial administration by the Qing state over its entire duration – we will first explore the achievements of the state in ship construction.

One of the central tasks that any government must fulfil is to provide the basic supplies for the government, its officials, and its military as well as border defence and the maintenance of internal order. In the imperial Chinese state, devices for the transport of provisions and of armed forces were considered to be so strategically important that the only option was to produce them in institutions under direct government control. Therefore, state shipyards at fluvial and sea harbours were operated and managed by the ministries responsible for Public Works, Finances and the Military. However, ship construction both for grain transport and the fluvial and naval forces receded in output and efficiency from its highest levels in the early eighteenth century until the period of interior and exterior cataclysms of the Taiping rebellion and the Opium Wars.

When the military crises of the nineteenth century took place, together with the financial predicament of the central government and the disaster of the Yellow River flooding, substitutes for the grain transport vessels and the favoured transport route on the Grand Canal had to be found. Grain shipping was first transferred to commercial shippers and later to the first ‘merchant managed and officially supervised’ China Merchants’ Steam Navigation Company (CMSNC). With regard to the marine forces, the security of the Qing dynasty and its sovereignty was threatened from overseas by faster ships and more destructive weapons. Although the Qing state soon acquired such vessels and military materiel from abroad, top officials felt uneasy about the paradoxical situation of having to rely on potential and real enemies to provide weapons and military transport facilities for the country’s national defence.

The court faction around Prince Gong (Yixin 1840-1891), the founder of the Office of Foreign Affairs (*Zongli yamen*) saw this danger and agreed to the demands of the high-ranking provincial officials and military men, Zeng Guofan, Li Hongzhang, and Zuo Zongtang, to set up arsenals and shipyards in Western style. The aim of this so-called self-strengthening (*zhiqiang*) programme was to learn the techniques of mechanical production in the military sector as

quickly as possible to reach a level of self-sufficiency within a few years. What were the achievements and the failures of government shipbuilding in the early and mid-Qing and during the period of self-strengthening? With a view to the thesis of the relative efficiency of the Qing, we will look at the output and financing in naval construction and explore the organization of government shipyards before and after the advent of steam navigation. In chapter five, this will be set against the activities of private shipyards so as to come to an estimate of the relative size of both sectors and their relationships and interdependence.

Government Shipbuilding in the Civilian Sector: Grain Tax Shipment and Organization

Within the system of taxation, the rice growing regions in Jiangsu, Zhejiang, Anhui, Hubei, Hunan, Shandong, and Jiangxi were subjected to a special imperial grain tax. This so-called tribute rice and other natural produce in smaller quantities, such as millet and beans, timber, mats, and bamboo, were shipped on the Grand Canal to the capital to supply the court, the officials of the central government, and the troops stationed in Peking. Since Peking lies about one thousand kilometres north of the abundant rice regions, considerable logistical efforts were necessary to achieve this task. As Harold Hinton has aptly formulated, grain tribute ‘occupied a position particularly close to the hearts and stomachs of the emperors and their courts.’¹

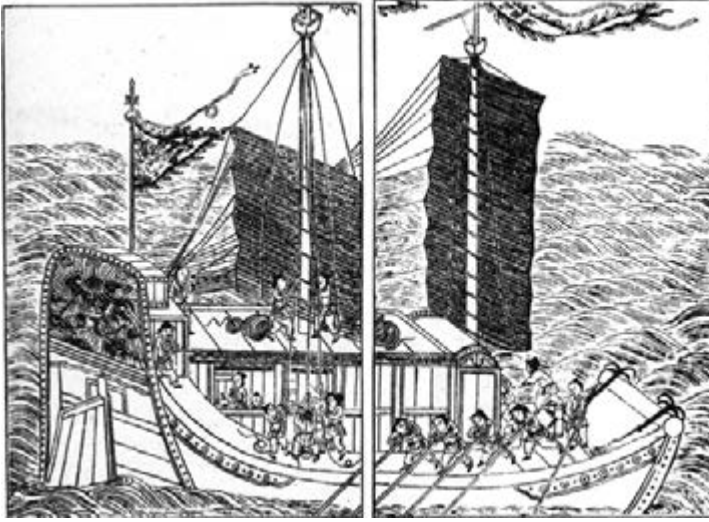
Table 17 Volume of tribute grain shipment in the early nineteenth century

Grains collected	ca. 6.2 mio shi (443,300 tons)
<i>Thereof</i>	
Grains used for covering the costs of collection, transport, and storage	ca. 2.8 mio shi (200,200 tons)
Grains that reached the Peking granaries	ca. 3.4 mio shi (243,100 tons)
<i>From the grains that reached the Peking granaries</i>	
Salaries in kind for court, nobility, officials	ca. 0.4 mio shi (28,600 tons)
Military provisions for soldiers in the capital	ca. 2.4 mio shi (171,600 tons)
Sacrificial use, gruel stations, sales on open market for stabilizing food prices	ca. 0.6 mio shi (42,900 tons)
<i>For comparison</i>	
Grains that reached Peking granaries, early Qing	ca. 4.4 mio shi (314,600 tons)

Source: Based on data from Leonard, *Controlling from Afar*, pp. 98-99.

1 Hinton, *Grain Tribute System*, p. 97.

Figure 1 Grain transport ship, *Caofang chuan*



Source: Qing illustration to the late Ming text *Tiangong kaiwu* by Song Yingxing (1637), p. 178.

In the Ming dynasty, which since 1420 had also established their capital in Peking, grain transport had been handled by the military, and state shipyards had built the grain transport ships (see Figure 1). The measurements of these two mast ships were an average length of 18 to 26 metres and had a width of 3 to 3.4 metres. The cargo-carrying capacity was about 2,000 *shi* [140 tons].²

This system was essentially taken over by the Qing. Together with taking care of the general tax grain administration, the provinces were also responsible for the construction and maintenance of the vessels. Grain boat captains and crews were selected from a group of hereditary tenants on military colonies (*tuntian*). Between the late seventeenth and the early nineteenth century, the number of state ships and crews decreased by approximately 43 percent as the volume of tribute grain diminished.³

2 Leonard, *Controlling from Afar*, pp. 103-4. *Huidian*, chap. 935, fol. 3b (Kangxi 22, 1683) gives the 'new pattern' to which the grain ships of all provinces should conform: 7.1 *zhang* (22.72 m) length and 1.44 *zhang* (4.60 m) width. However, subsequent sections of the chapter discuss various deviations from this model. The smaller-sized lighters (*bochuan*) ranged in lengths from 18.56 m (Tianjin) and 16.96 m (Shandong) to 14.4 m (Jiangsu) and widths of 3.54 m (Tianjin), 3.84 m (Shandong), and 2.94 m (Jiangsu) and eight to nine holds (specifications in *Huidian*, chap. 935, fol. 7b, 9b, 11b for Tianjin 1786 and Shandong and Jiangsu 1788).

3 Hinton, *Grain Tribute System*, pp. 11-12.

Table 18 Quotas for the number of grain transport ships in the grain-providing provinces

Province	Original quotas in the early Qing	Reduced quotas (1812)	Remarks
Zhili	39	37	
Shandong	1,054	887	Thereof 361 official, 185 self-organized (<i>zibei</i>) ships; those who transported for Shandong: 646; those who assisted the transport of Henan: 241
Jiangnan Jiang'an grain circuit	4,887	2,696	Including 97 who assisted the transport of Henan
Jiangnan Su-Song grain circuit	648	522	
Zhejiang	1,999	845	
Jiangxi	1,002	638	
Huguang (Hubei and Hunan)	886	358	
TOTAL	10,515	5,983	

Source: *Huidian shili*, chap. 202, fol. 1b.

From the late eighteenth century onward, the junction of the Grand Canal and the Yellow River became so silted that the traffic from the Yangzi Delta to the capital was slowed down or at times even blocked. Inland transport was maintained by using small-size lighter boats (*bochuan*) upon the entire Grand Canal or at least for certain stretches.⁴ The southern provinces were also admonished time and again to downsize their regular grain ships. This can be seen from the references in the Collected Statutes presented in Table 19, which documents the government norm measurements.⁵

4 Leonard, *Controlling from Afar*, p. 39, 48, 49, 102, and 'Timeliness and Innovation' p. 454, 459 ff., where she points out the three options described in the government regulations on Canal shipping: transfer shipment, which 'included the cart haulage of the cargoes over the south bank of the Yellow River to waiting lighters that ferried the grain across the river for northward transport to the capital' (op. cit., p. 454), sea transport and lock transport, which used a hydraulic device to send the grain ships over the Grand Canal – Yellow River junction. *Huidian*, chap. 935, fol. 7b, 9b, 11b specifies the measurements for 1786 (Tianjin) and 1788 (Shandong and Jiangsu), with lengths ranging from 18.56 m (Tianjin) and 16.96 m (Shandong) to 14.4 m (Jiangsu), and widths of 3.54 m (Tianjin), 3.84 m (Shandong) and 2.94 m (Jiangsu).

5 *Huidian shili*, chap. 935, fol. 14b.

Table 19 Grain ship sizes

Date and reference in Collected Statutes (Huidian shili)	Province	Length	Width	Depth of holds
Kangxi 22 (1683), chap. 935, fol. 3b	'All provinces'	7.1 <i>zhang</i> /22.72 m	1.44 <i>zhang</i> / 4.60 m	
Kangxi 52 (1713), chap. 202, fol. 5b	Jiangxi and Huguang	Between 9 and 10 <i>zhang</i> (28.8-32 m), normally 10, never less than 9		
Qianlong 50 (1785), chap. 202, fol. 21b	Henan and Shandong	'smaller' than in the southern provinces		
Qianlong 50 (1785), chap. 202, fol. 21b/22a	Zhejiang and Jiangnan	8 <i>zhang</i> /25.6 m	1.5 <i>zhang</i> /4.8 m	0.6 <i>zhang</i> /1.92 m
Qianlong 50 (1785), chap. 202, fol. 21b/22a	Jiangxi and Huguang	9.5 <i>zhang</i> /30.4 m	1.65 <i>zhang</i> /5.28 m	0.69 <i>zhang</i> /2.2 m
Jiaqing 15 (1811), chap. 202, fol. 25a	Jiangxi and Huguang	9 <i>zhang</i> /28.8 m	1.65 <i>zhang</i> /5.28 m	0.66 <i>zhang</i> /2.11 m

In 1826 and 1847, experiments with grain transport by sea were carried out. Sea shipment was organized by private merchants.⁶ In the 1850s, the Yellow River changed its bed so that its estuary no longer lay south but north of the Shandong peninsula. This caused enormous floods and made traffic from the regions south of the Yangzi to Tongzhou altogether impossible. Moreover, the regions near the junction of the Grand Canal and the Yellow River lay in the territory of the Taiping rebels and thus out of the control of the central government. Therefore, from 1851 onward, the tribute grain that was still being sent to the capital was shipped entirely by merchants via the sea route from the Yangzi Delta to Tianjin. Such new developments temporarily benefited some safer regions, such as Ningbo in Zhejiang. The concerned shipping merchants cooperated (and competed) in the so-called associations of the 'Northern' *bei hao* and the 'Southern ship traders' *nan hao*, the Northerners hailing from Jiangnan and Shandong, the Southerners from Fujian and Guangdong, with local Ningbo people represented in both associations.⁷ These groups had already participated in the 1826 experiment with sea transport, employing 130 merchant ships of the 'Northern ship traders' to Tianjin, and between 10,000 and 20,000 weighing masters, dock

6 *Huidian shili*, chap. 935, fol. 17b/18a (Daoguang 2, 1822). Leonard, *Controlling from Afar*, p. 39 ff.; Ni Yuping, 'Caoliang haiyun', p. 125.

7 Shiba Yoshinobu, 'Ningpo and Its Hinterland', p. 399.

workers, porters, shipwrights, and sail and rope makers at Ningbo harbour.⁸ In the 1850s, as Zhejiang delivered 600,000 to 700,000 *shi* of grain to the north, sea trade and shipbuilding boomed again. The cargo was delivered on board flat bottomed sand ships⁹ (Figure 2) and the typical Ningbo ‘egg ships’,¹⁰ but the changed strategic situation also prompted the trading companies to acquire, for 70,000 tael, the steam ship Baoshun as a security escort for their northbound vessels.¹¹

After the Taiping rebellion was defeated, and as foreign competition in sea transport increased, ship trade and shipbuilding in Ningbo entered into a decline. Only 400 of the original 3,000 sand ships reported in the 1840s still existed in 1867, and the number of egg ships in the possession of the northern ship traders dropped from 200 to 100 after 1864.¹²

8 Ni Yuping, ‘Caoliang haiyun’, p. 2, referring to Duan Qingguang 段清光, *Jinghu zizhuan nianpu* 鏡湖自撰年譜 (Jinghu's autobiographical chronology).

9 ‘Sand ships’ (*Shachuan*) were named after their region of origin, the Chongming islands or sands in the Yangzi estuary (*Zhonghua wenhua jingcui fenlei cidian*, p. 599). An alternative etymology is that these ships were suitable for sailing in shallow coastal waters, sandbanks, and shoals. Sand ships were mainly constructed in the Yangzi delta area and in coastal regions north of it. They were used for coastal and open sea transport as well as the interface between fluvial and marine transport. They had a flat U-shaped bottom, a low draft between 0.7 and 2.5 metres, and were most often sized about 30 by 6 metres, with a loading capacity of several hundred metric tons (Deng Gang, *Chinese Maritime Activities*, p. 29). Their bow and stern were both square. They were slower than keeled ships but could still reach acceptable speeds because of their shallow draft and their many sails on multiple masts (Fang Zhuofen et al., ‘Shanghai Maritime Shipping’, p. 359). Sand ships were made of Chinese fir (*shamu*) or pine (*songmu*) timber (Xu Jianqing, *Qingdai qianqi*, p. 594; Scheuring, *Drachenfluß-Werft*, p. 129, identifies *shamu* as *Cunninghamia lanceolata*). A vessel of this type was still found circulating at Wusong in Jiangsu province by researchers of the Shanghai Digital Ship Museum in 2002. For the richly illustrated documentation of this research, see the relevant pages of the Digital Ship Museum of Jiaotong University, Shanghai: <http://shipmuseum.sjtu.edu.cn/shachuan/shachuaninfo.htm>.

10 The so-called ‘egg ships’ (*danchuan*) form an intermediary type between the flat bottom and the V-shaped ocean-going keel vessels. Deng Gang in *Chinese Maritime Activities*, p. 29, introduces it as the third most basic type of Chinese sailing ships. The ship originates from Ningbo and is commonly also referred to as ‘Ningbo junk’ (Sun Wujun, ‘Zhongguo diyi sou lun’). This type was adapted for sailing the shallow sea waters to the north as well as the greater depths to the south of Ningbo. It was used for overseas grain transport after 1826 (Ni Yuping, ‘Caoliang haiyun’, p. 125).

11 Ni Yuping, ‘Caoliang haiyun’, p. 126, referring to *Zhejiang haiyun quan'an xinbian* 浙江海運全案新編 (New edition of the complete archives of Zhejiang sea transport), chap. 6, ‘Fangyang xunhu shiyi’ 放洋巡護事宜 (Requirements and organization of security for seafaring).

12 Ni Yuping, ‘Caoliang haiyun’, p. 127, referring to *Chouban yiwu shimo* (*Tongzhi chao*) 籌辦夷務始末, 同治潮 (The management of barbarian affairs, from A to Z. Tongzhi era), chap. 28 (for sand ships) and *Haifang dang*. *Goumai chuanpao* (3) 海防檔, 購買船炮 (3) (Coastal defence archives: Acquisition of ships and cannons), ed. Zhongyang yanjiuyuan, 1957, p. 816.

Figure 2 Sand ship, *Shachuan*

Source: Illustration in the encyclopedia *Gujin tushu jicheng* (1726), reprint 1884, section 'Jingji huibian' 經濟彙編 (Collection on governance), 'Rongzheng dian' 戎政典 (Military administration), 'Shuizhan bu' 水戰部 (Naval warfare), 'Huikao' 彙考 (Extracts from standard works), chapter 79, fol. 8a/2 (in 1964 reprint, vol. 749, p. 9/2).

The Qing government was now in a dilemma as to how to reorganize grain transport. Grand Canal transport was possible only on certain stretches, but most of the grain ships had been destroyed during the war. In 1866 the Shanghai Customs Intendant Ying Baoshi suggested that the court either buy up all available seagoing sand ships or, as he petitioned in 1869, acquire foreign sailing ships (*jiabanchuan*)¹³ for the grain transport. However, both options as well as steamship transport were deemed too costly for the Qing state. Until 1873, about one million *shi* of the tribute, only one half of the pre-Taiping quotas, was shipped to Tianjin in chartered private sailing ships and from there to Tongzhou by lighters.¹⁴ Eventually, the Governor-General of Zhili province, Li Hongzhang (1823-1901), succeeded in promoting the China Merchants' Steam Navigation Company (CMSNC) in 1872. This was the first company under 'official supervision and merchant management' (*guandu shangban*), which implied special government protection and control and mainly merchant capitalization. Li Hongzhang made arrangements to let this company – the literal Chinese designation implies a 'government bureau promoting merchant [engagement] in steam navigation' rather than a 'company' – organize the shipment of grain tribute. At first, despite its name, its fleet consisted not only of steamships, but started out with a ratio of 80 percent sand ships and 20 percent steam ships. This was later changed to sixty percent sand ships and forty percent steam ships. In 1877, Li Hongzhang decided that 40 to 50 percent of the grain tribute from Zhejiang and Jiangsu must be transported by steamship. In order to fight foreign competition, the CMSNC bought up the two biggest foreign shipping firms including their steamships, docks, and administrative buildings in Shanghai: the Shanghai Steam Navigation Company (Qichang), founded in 1862, the first domestic steam shipping company ever to be established in China; and the English Butterfield and Swire Company (Taigu or Taikoo), founded in 1866.¹⁵ The business form of government control and merchant management was and still is seen as a downright failure, or at least is heavily criticised for its many shortcomings, especially in comparison to the achievements of the foreign competitors (see Table 23).¹⁶ Yet the CMSNC successfully, and from 1902 onward

13 *jiabanchuan*, 'double-plank ship', see Xin Yuan'ou, *Zhongguo jindai*, p. 6.

14 Hinton, *Grain Tribute System*, p. 90, 99.

15 This is Ni Yuping's version of the events in 'Caoliang haiyun', p. 126. Liu Kwang-ching, 'Steamship Enterprise', p. 440, only mentions the takeover of Russell & Co.'s Shanghai Steam Navigation Company in 1877. According to Liu Kwang-ching, *op cit.*, p. 448, in 1883 the CMSNC acquired eight steamships from the China Navigation Company, under the agency of Butterfield and Swire, but the latter remained an – eventually more successful – competitor.

16 Liu Kwang-ching, 'Steamship Enterprise', pp. 452-4.

exclusively, handled the tax grain shipment until the system was abolished in early 1911. Since the transport canal Beihe that links Tianjin and Tongzhou also became heavily silted and was hardly navigable after 1894, lighterage once more became a problem and was given up after 1902, when the last part of the journey was covered by railway. Before the twentieth century, the CMSNC did not allow Chinese competitors into the market, but with government backing ensured that it retained at least the Chinese transport monopoly throughout the nineteenth century.¹⁷

For our context, it is important to note that the company did not actively promote shipbuilding. It bought its vessels mainly from foreign manufacturers at Shanghai and Hong Kong.¹⁸ However, in 1874 it initiated the foundation of a maintenance and repair company for the CMSNC ships that was capitalized by merchants and operated formally as an independent company under the name Tongmao but de facto probably was a spin-off under 'official control' like the CMSNC. At first, all its workers and technicians were Chinese, but after two years, foreigners were called in for assistance. At its own repair shipyard in the Shanghai industrial quarter Hongkou, all the machinery was steam powered. Due to mismanagement, it had to be closed down in 1879 and was then taken over as a private company by a previous staff member of the CMSNC. Besides repair, in the 1880s, six small iron hull steamers were constructed here, but it also was closed down again in 1886.¹⁹

The Qing management of tribute grain shipment, including the construction of the needed ships, exemplifies the options and the dilemmas of a large empire upon the threshold of industrialized, fossil-fuelled transportation. Turning to ship construction for military purposes, the emerging picture becomes even clearer. For this purpose, it is necessary to turn back to the early days of Qing administration.

Government Shipbuilding in the Military Sector: Construction of Sailing Ships for the Naval Forces

Until the late nineteenth century, the Qing armed forces consisted of the two large units known as 'Eight Banners' and 'Green Standards'. The Eight Banners

17 Ibid. p. 453.

18 Cornet, *Etat et entreprises*, p. 41. However, Pong, *Shen Pao-chen*, p. 236, states that in early 1874, three vessels of the Fujian Navy Yard were turned over to the China Merchants' Steam Navigation Company.

19 Xin Yuan'ou, *Zhongguo jindai*, p. 205.

were composed of Manchu, Mongols, and Han Chinese who had surrendered early to the Manchus, while the 'Green Standards' formed the provincial troops with a soldiery of surrendered Ming men. In the eighteenth century, the standing troops totalled about 200,000 bannermen and 660,000 Green Standard troops.²⁰ The marine forces *shuishhi* belonged to the Green Standards and thus not to the core troops under the direct command of the emperor or imperial princes. Like all Green Standard units, they constituted 'a kind of provincial constabulary, or a ready reserve force' and were formally subject to the administrative jurisdiction of the Ministry of War but actually came under the actual control of provincial civilian administrators (governors and governors-general) and military commanders (*tidu*) in each province.²¹

The administrative control by the Ministry of War implied that the number, quality, construction, and maintenance of marine ships were supervised by that ministry and, as far as technical matters were concerned, the Ministry of Public Works, which in cooperation with the Ministry of Revenue also formally decided on funds to be allocated to the provinces for their marine equipment. The actual shipbuilding was carried out in provincial shipyards.

The activities and attitudes of the central government and the provincial administrations toward defensive shipbuilding are reflected in the chapters of the Collected Statutes of the Qing Dynasty with Factual Precedents, *Qinding Da Qing huidian shili* (1899, hereafter *Huidian shili*), concerning the Ministry of Public Works.²² The chapters of the Ministry of War include the overall figures of government ships for the situation of about 1880 and original quotas of the early eighteenth century.

Table 20 Quotas for coastal and fluvial guard and patrol ships of all sizes

Province	'Original quotas' (ca. 1736)	'Actual figures', ca. 1880	Remarks	Relation (ca. 1736 = 100)
Shengjing	Not mentioned	10		
Zhili	Not mentioned	50		
Shandong	12	20		166.67
Jiangsu	575	684	Thereof 2 steamships	118.96
Anhui	82	332		404.88
Jiangxi	39	185		474.36

20 For a discussion of the statistical evidence, see Moll-Murata and Theobald, 'Military employment in Qing dynasty China', pp. 346-349.

21 Hucker, *Dictionary of Official Titles*, p. 91.

22 *Huidian shili*, chap. 936-938.

Province	'Original quotas' (ca. 1736)	'Actual figures', ca. 1880	Remarks	Relation (ca. 1736 = 100)
Fujian	394	81		20.56
Zhejiang	471	469		99.58
Hubei	86	200		232.56
Hunan	70	68		97.14
Guangdong	705	349	Thereof 22 steamships	49.50
Total	2,434	2,448 ¹		100.01

Source: *Huidian shili*, chap. 712, fol. 1a-7a.

¹ Note the difference of 247 ships less in the statistics given by Worcester, *Junks and Sampans*, p. 612, 'Chinese War Vessels and their Stations', which he quoted from *The Chinese Repository*, vol. 20 (1851), p. 379.

In these statistics, the grand total remain virtually unchanged, yet the quotas for several provinces showed a large increase (for the inland provinces Anhui, Jiangxi, and Hubei). There was also a moderate increase for the coastal Zhili and Shandong provinces, a slight decrease for the coastal Zhejiang and inland Hunan, and a large decrease for Guangdong and Fujian, the most sea-oriented of all the provinces. To embed this evidence, four distinct phases of defensive shipbuilding can be discerned from the compilation of edicts and memorials that were exchanged between provincial officials, the central government, and the emperors (and their edict writers).

Phase 1: Initial reconstruction and succession of the Ming System, ca. 1675-1722

In the middle and late Kangxi era, especially after the maritime empire of Zheng Chenggong (Coxinga) on the southeastern coast and Taiwan had been defeated in 1683, the Qing actively established coastal defence according to the model of the Ming. Supervision and organization of shipbuilding was delegated to the provinces and their shipyards (see Table 21). The methods of financing by the provinces and norm prices of ships were laid out. The cycle of shipbuilding was a small overhaul after three years, a large one after five years, and if the ships were still usable after another five years, another general overhaul.²³ When ships were broken up, the utilizable materials were to be recycled and built into the new ships.

²³ *Huidian shili*, chap. 936, fol. 1a (Kangxi 13, 1674). In Kangxi 29 (1690) this pattern was modified into a small overhaul after three years, a big overhaul after six years, and if the ship was still

Phase 2: Expansion and consolidation, 1723-ca. 1750

Although there were problems in the financing and timing of the repairs, a conviction that such issues could be solved by methods of extra subsidies and moral exhortation underlies the memorials and edicts of the Yongzheng and early Qianlong period.

Phase 3: Reorganization, fleet reductions, and downsizing of ships, ca. 1750-1840

Despite government sanctions and guidelines, the situation did not improve. In the next phase, for about ninety years from the mid-eighteenth century to 1840, major reshuffles and a reorganization of navy and fluvial marine vessels took place. The first cry of alarm came in 1759, when the central government was no longer sure whether the situation could be remedied by increased care in carrying out overhauls and reconstructions. The emperor commented on a memorial stating that for the spring drills at the Chongming marine station in Jiangsu, only five patrol ships were present. The ships of the other marine patrol stations were all at the shipyard for repair.²⁴ A similar incident occurred in 1817, when a censor found out that in the Jiaozhou bay in Shandong, some ships had remained in the shipyard for between eight and ten years, waiting for overhauls.²⁵

Therefore the Collected Statutes of this period abound with information on reductions of battleships from the official vessel registers or replacement by other, more economic or more efficient ship types.²⁶ Officials repeatedly proposed to rebuild the battleships in the form of merchant ships, since the latter were found more suitable for chasing pirates. The emperor and central government were aware that merchant ships lasted at least twice as long as battleships,²⁷ but this was to a large extent due to the unsatisfactory maintenance of the state ships. However, not everybody was convinced that downsizing the ships would solve the problem. In 1790, government

functional after nine years, another big overhaul; if not, it was broken up and reconstructed with part of the usable material. For the fluvial marine, a small overhaul after nine years was provided, but the rest of the maintenance procedure was the same.

²⁴ *Huidian shili*, chap. 937, fol. 1a.

²⁵ *Ibid.*, fol. 20a.

²⁶ The first relevant record states that in 1754 the ten ships of the Lüshun marine patrol station in Fengtian province were reduced to four. *Huidian shili*, chap. 937, fol. 1b.

²⁷ *Huidian shili*, chap. 936, fol. 14b, edict Qianlong 13 (1748).

officials in Guangdong province memorialized that sea marine ships had to be sturdy enough for numerous troops and ordnance. They should not all be constructed like merchant ships, because chasing pirates was not their only purpose.²⁸

Phase 4: Crisis, reform, and modernization, 1840-1911

The shock of the First Opium War (1839-1842), which started out and was decided at sea, prefigured the last phase of official shipbuilding (1840-1911). It can again be subdivided into a phase of disillusioned assessment of the current situation, an episode of the commitment of local elites, and after 1865, reform efforts as proposed by provincial administrators with varying support and funding by the central government. In 1844, a sober account of the situation of the Jiangnan fleet states that of its 275 ships, none was actually well maintained. It was suggested that their number should be reduced to 135 and that they should all be repaired at the Jiangnan and Suzhou shipyards at market prices (*shijia* 市價).²⁹ The total costs of 357,102 tael for one ten-year cycle of maintenance, 2,645 tael per ship, were to be covered by the districts and the province of Jiangnan.³⁰ In the case of the Fujian fleet, the Ministry of Public Works informed the province that if Fujian raised the funds for shipbuilding, the ministry would cover the costs for cannons and guns.³¹

The Cantonese population was the most exposed to new developments in Western warfare and transport, and after the controversies on the opium trade escalated, a group of Cantonese merchants, scholars, and officials engaged in researching and developing Western ordnance and shipbuilding.³² The most famous action was that of Pan Shicheng (c. 1804-1873), who donated four large sailing ships in a hybrid Western and Cantonese style with a value of 19,000 tael each, and an American-type battleship of the same size for 43,000 tael.³³

28 *Ibid.*, chap. 937, fol. 11b.

29 *Huidian shili*, chap. 938, fol. 9a.

30 *Ibid.*, fol. 11b.

31 *Ibid.*, fol. 13a, Daoguang 27 (1847).

32 Kennedy, *The Arms of Kiangnan*, p. 14.

33 *Huidian shili*, chap. 938, fol. 12b, Daoguang 24 (1844). According to Gideon Chen's study, Pan's first ship was finished in 1841 and had a copper bottom. See Gideon Chen, *Lin Tse-hsü*, p. 36. For the biographical data of Pan Shicheng, see *Eminent Chinese of the Ch'ing Period*, p. 606, and Chen Zehong, 'Pan Shicheng luekao', *Guangdong shizhi* 1995/Z1, pp. 69-70.

After this episode, entries in the Statutes are shorter and more widely interspersed and seem to be taken at random from the routine documentation of the Ministry of Public Works. Thus, in 1866, 14 new gunboats and *sampans*³⁴ built for the Shandong fleet and 36 new cannon boats built for Zhili in 1867 are mentioned.³⁵ The last entry, from 1878, concerns the relocation of seven battleships from Shandong to Zhili.³⁶ Li Hongzhang in 1872 had suggested giving up traditional shipbuilding altogether, at least for navy ships. This idea was rejected by the Office of Foreign Affairs (*Zongli yamen*),³⁷ but nevertheless the main government allocations after the 1860s went to the development of steam navigation. In this field, the Ministry of Public Works was no longer involved.

Locations of Government Shipyards

Although the records of the locations of the government shipyards in the *Huidian shili* are not complete, they nevertheless reflect where the main centres of shipbuilding were from the beginning of the dynasty up to the mid-nineteenth century. A total of 44 shipyards established (or re-established) between 1670 (Nanjing) and 1851 (Fengtian) are mentioned in the Collected Statutes (see Table 22). Some of them had branches; others were not included. No locations in the border regions Mongolia, Xinjiang, Tibet, Yunnan, Guangxi, and Guizhou, and the provinces Zhili, Gansu, Shanxi, Shaanxi, and Sichuan are mentioned. It seems improbable that not even temporary sites were set up in some of the provinces such as Zhili, Yunnan, and Guizhou. The end station of the Grand Canal at Tongzhou in Zhili, for instance, certainly had at least maintenance facilities.³⁸ However, the Collected Statutes also show evidence that ships for one province could be built in another province where materials and/or technical skills were more abundant. Generally speaking, the southern provinces constructed the ships for the north. Thus in Qianlong 1785, Jiangxi and Huguang provinces built 1,200 lighters for Zhili. However, there are also cases of an alternative, namely to send the timber to Tianjin and have the ships built there. In

34 Small cruisers, a general reference to open or half-decked boats of 30 to 40 feet (c. 9 to 12 meters) measurement. See Worcester, *Junks and Sampans*, p. 614.

35 *Huidian*, chap. 938, fol. 14b.

36 *Ibid.*, fol. 15b/16a.

37 Kuo Ting-yee, 'Self-Strengthening', p. 510.

38 According to Hinton, *Grain Tribute System*, p. 11, ships were repaired by personnel of the altogether 67 transport stations *weisuo* along the Grand Canal and the related waterways.

1822, the emperor endorsed a complaint by the provincial administrator Songyun, who reported that the lighters were not well built in Zhili because the craftspeople there were inexperienced. He suggested returning to the previous system and having the finished ships sent to Tianjin rather than the material.³⁹ In another case, in the Qianlong reign, shipbuilders from Hubei and Hunan were sent to the Yunnan border to construct ships for a military expedition against Burma.⁴⁰

Mechanized Shipbuilding in the Era of Self-Strengthening

The government modernization efforts of the last fifty years of the Qing dynasty were focused on armaments and shipbuilding. This was carried out in what is in the Western literature referred to as ‘arsenals’ and in Chinese as ‘manufacturing bureaus’ (*zhizao ju*) or ‘machine manufacturing bureaus’ (*jiqi zhizao ju*) and the Fujian Navy Yard (*Fujian chuanzheng ju*). Table 23 shows the number and various lines of production of these first sites of government-organized mechanization of craft branches. The broad designation ‘manufacturing bureau’, first coined by Li Hongzhang for the Jiangnan Arsenal, was chosen because production in these first mechanized workshops was intended not only for military but also, in a second step, for civilian purposes.⁴¹ At the same time, the arsenals were government offices administrated by traditional officials, who had to learn the ways of administration in mechanized production factories with a workforce of one to two-thousand and an important group of technicians, and with foreigners in leading technical positions. The idea that Western military technology must be adopted had already been formulated in the 1840s by the elites that sought to remedy the situation of Chinese helplessness against Western military aggression. Wei Yuan (1794-1856), a scholar and mid-level administrator who cooperated with the Opium Commissioner Lin Zexu (1785-1850) in Canton, demanded this most clearly in the first Chinese work on Western countries, the *Haiguo tuzhi* (Illustrated treatise on the maritime kingdoms, 1843). He advocated the establishment of an arsenal and shipyard in Canton, the hiring of foreign experts as teachers

39 *Huidian shili*, chap. 935, fol. 7a, 16a.

40 *Qingshi gao*, chap. 135, p. 3997. The place where the ships were built is given as Manmu 蠻暮, probably a variant of Manmu 曼暮, which according to the *Historical Atlas of China*, vol. 8, p. 48, lay beyond the western border of Yunnan.

41 Kennedy, *The Arms of Kiangnan*, p. 47.

on shipbuilding and navigation, and the inclusion of formal examinations of technical knowledge and navigational skills in the imperial examination system.⁴²

The two main propagators of mechanized manufacturing in the era of self-strengthening were Zeng Guofan (1811-1872) and Li Hongzhang (1823-1901). Both Zeng and Li were high-level regional army commanders who had helped the Qing dynasty defeat the Taiping rebellion with their Hunan (Zeng) and Anhui (Li) armies and were therefore rewarded with the ranks of provincial governors. Zeng had supported Li's nomination, yet they differed in their priorities for modernizing China and for fighting imperialist enemies and internal adversaries of the Qing dynasty. Zeng Guofan placed the most emphasis on naval construction and marine development, while Li Hongzhang stressed arms manufacturing and the spread of mechanization also into fields of civilian manufacture.⁴³ They found a compromise in setting up arsenals at different sites with specific tasks: the Jiangnan Arsenal in Shanghai for small arms, the Jinling (Nanjing) Arsenal for heavy ordnance, and the Tianjin Arsenal for powder and ammunition. One exception was that, at Zeng Guofan's personal suggestion, steamships were also built at the Jiangnan Arsenal.⁴⁴ Another representative of the self-strengthening programme, Zuo Zongtang (1812-1885), a general of the Hunan army who had also fought the Taiping and later subdued the Moslem uprisings in Xinjiang and the Northwest, while acting as Governor-General of Fujian and Zhejiang, had proposed the establishment of a great shipyard at Fuzhou.

The earliest arsenal at Anqing in Anhui, Li Hongzhang's home province, took up pre-Taiping initiatives and experimented with steamship construction. In 1863, a small steamer was turned out, but its quality and speed were found wanting. The construction team had been entirely Chinese, and from this prototype it became clear that more expert Western knowledge and technical transfer were necessary. Therefore, foreigners were employed both in the Jiangnan Arsenal and the Fujian Navy Yard as directors or co-directors, technicians, teachers, and translators. In Shanghai the main influence was British and American, while in Fuzhou the advisors were French.

Other facilities that experimented with steamship technology were the Tianjin Arsenal at Dagu, established in 1880, and the official shipyard in Whampoa/Huangpu near Canton that was founded in 1885. Both had limited outputs of up to ten smaller warships. Finally, in 1890 a large dockyard for

42 Hao and Wang, 'Chinese Views of Western Relations', p. 149.

43 Kennedy, *The Arms of Kiangnan*, p. 76.

44 *Ibid.*

the repair and maintenance of the steamships of the North China fleet was built in Lüshun on Liaodong peninsula in Fengtian province. It was equipped with a 400-foot stone dock and cost three million tael. A thousand workers were employed here, and between 1890 and 1894, 58 steamships were repaired at the dock. However, in 1894 it was damaged in the Sino-Japanese War and was greatly reduced in scale. In 1897 it was occupied by Russia and after the Sino-Russian War in 1905 was taken over by Japan.⁴⁵

Scope of Production of the Jiangnan Arsenal

In 1865, the Jiangnan Arsenal was established by taking over an American shipyard, Thomas Hunt and Company (in Chinese known as *Qiji tiechang*) in the Hongkou district of the Shanghai foreign settlement, and by merging this with the two smaller Shanghai arsenals. The Shanghai Circuit Intendant was the principal director. Technical work was the domain of foreigners, who were either retained from the original employer or recruited later.⁴⁶ In production and policy, the Jiangnan Arsenal followed what Thomas Kennedy has called a 'zigzag course of development'.⁴⁷ This was due to the different priorities that its two founders, Li Hongzhang and Zeng Guofan, identified in terms of China's defence and their alternating influence on the Jiangnan Arsenal. In its first two years, the Arsenal produced small arms, as Li Hongzhang felt that arms and ammunition were the first priority for fighting internal enemies, in this case the Nian uprising in Central and Northern China. But after Li was called to replace and relieve Zeng Guofan as the commander of the North China pacification campaign, Zeng returned to his post of Governor-General of Jiangsu, Jiangxi, and Anhui and decided to initiate ship production at the Arsenal. With additional funds from the Shanghai maritime customs income, the Arsenal moved to a more spacious site at Gaochang miao on the banks of the Huangpu River, where a plant for steamship construction and a dry dock was built.⁴⁸ The first ship, the 600-ton steamer *Dianji*, was launched in August 1868. Subsequently, fourteen steamships were built until 1875 (see Table 23).⁴⁹ In the years between 1867

45 Xin Yuan'ou, *Zhongguo jindai*, pp. 164-5; Immanuel Hsü, 'Foreign Relations', p. 112; Liu Kwang-ching, 'Military Challenge', p. 256.

46 Kuo Ting-yee, 'Self-Strengthening', pp. 520-21.

47 Kennedy, *The Arms of Kiangnan*, p. 58.

48 *Ibid.*, pp. 59/60.

49 The 1983 History of the Jiangnan Arsenal, *Jiangnan zaochuan chang changshi* (hereafter cited as *Jiangnan* 1983), p. 39, table 2, based on Wei Yungong, *Jiangnan zhizaoju*, chap. 3, fol. 55a-b

and 1875, 97 percent of the annual income of the Arsenal – ca. 450,000 tael – came from the Shanghai Maritime Customs, and 44 percent thereof was devoted to steamship construction and upkeep.⁵⁰

The first ships were provided with steam engines in wooden hulls. Technical advances were made in the improvement of the propeller system, which was introduced in the second vessel to replace the previous paddle wheel propulsion. On the third ship, the propeller was inserted at a more protected position below the waterline. Armaments also became increasingly sophisticated. Moreover, the shipyard experimented with twin propellers and armour-plated gunboats. All these vessels had a shallow draft and were well adapted for manoeuvring in harbours and rivers.⁵¹

After Zeng Guofan's death, Li Hongzhang's influence prevailed, and as a result the shipbuilding programme of the Jiangnan Arsenal was stopped in 1875. In his function as Governor-General of Zhili since 1870, Li was also the responsible Commissioner for the Maritime Defence of North China. In the general discussion on defensive strategies to counter the menaces to the Qing dynasty from the separatist movement in Xinjiang and the threat to Taiwan from the Japanese (1874-75), Li had frequently complained that the ships built at the Jiangnan Arsenal were too expensive, not adapted to the needs of Chinese coastal defence, and inferior in quality to Western steamships.⁵² Moreover, he argued that the arsenals, and most of all the Jiangnan Arsenal, should focus their efforts on ordnance, ammunition, or shipbuilding and not extend their activities too broadly. Even his colleague Shen Baozhen (1820-1879), the Commissioner for Maritime Defence of South China who had previously been responsible for the Fujian Navy Yard, agreed that, at that moment, building up a defence fleet for Northern China had priority. Therefore, the government funds for maritime defence were all allocated to the North China Navy, and the Jiangnan Arsenal concentrated on the production of small weapons. Yet, since funds earmarked for the Northern navy had to be diverted to disaster relief, Li Hongzhang was not able to provide for the ironclad steamships as intended. Shen Baozhen thought that in this case,

(‘Steamships constructed in our shipyard’); Kennedy's statistics also take the more complete figures given by Wei Yungong in chap. 3, fol. 2a-6b, 16a, 27a, as well as archival sources into account. Kennedy, *The Arms of Kiangnan*, pp. 161/2, table 1. Meng Yue, ‘Hybrid Science’, p. 16, refers to eleven ships built in ten years (1868-1876), thereof ten warships, five wooden and five with iron hulls.

50 Kennedy, *The Arms of Kiangnan*, pp. 61-2.

51 *Ibid.*, pp. 60-1.

52 Kennedy, *The Arms of Kiangnan*, p. 95.

the Southern Fleet should at least have some additional wooden hulled steamers for joint operations with the Northern Fleet.⁵³ This eventually led to the construction of a few more ships in the Jiangnan Arsenal, most notably the Baomin, which was finished in 1885. However, there are no reports of new ships being made between 1885 and 1905, although the steamship department was obviously retained during this period for maintenance.⁵⁴ In 1905, shipbuilding and arms construction were officially divided. The arsenal remained subordinate to the Ministry of War, while the shipyard became a commercial company that produced for profit and also supplied civilian customers.⁵⁵

Scope of Production of the Fujian Navy Yard

From the beginning, production at the shipyard of Mawei near Fuzhou was focused on shipbuilding. It was established in 1866 upon the initiative of Zuo Zongtang and subordinated to the Fujian Bureau for Naval Administration (or Fujian Navy Yard). Shen Baozhen, who had previously acted as provincial Governor of Jiangxi, led it until 1875, when he was appointed to the post of Governor-General of Jiangsu, Anhui, and Jiangxi and Commissioner of Trade for the Southern Ports. Funds provided for this venture were even bigger than those for the Jiangnan Arsenal. The original budget for Fuzhou provided for expenditures of three million tael over five years, but actually 5.25 million were spent in the first six-and-a-half years until July 1874,⁵⁶ exceeding the original estimates considerably. The Chinese government had contracted for the construction of 16 steamships with two French naval constructors, Prosper Giquel (1835-1886) and Paul d'Aiguebelle (1831-1875).⁵⁷ With a workforce of 45 foreign technicians, 2,000 Chinese craftsmen, and 900 labourers as well as a Chinese staff of 150 officials, this task could be nearly fulfilled: fifteen ships were launched within five years, among them ten between 1,000 and 1,450 tons.⁵⁸ Compared to the products of the Jiangnan Arsenal, the Fuzhou ships were considered to be of superior quality but still not up to the European standards of 1870. Between 1875 and 1877, only four ships were turned out, but one of them, the Weiyuan, a composite model

53 Ibid., p. 100.

54 Wei Yungong, *Jiangnan zhizaoju*, chap. 2, fol. 4b.

55 Cornet, *Etat et entreprises*, p. 58.

56 Kuo Ting-yee, 'Self-Strengthening', pp. 522-24.

57 For a critical appraisal of Giquel's achievements, see Leibo, *Transferring Technology to China*.

58 Kuo Ting-yee, loc. cit.

with an iron frame and wooden exterior, was equipped with a compound engine that had been built at the yard.⁵⁹ Compound machines constituted a considerable technical advance through their efficient use of steam. They had been introduced in European and U.S. merchant ships after the 1860s, but the British navy started to use them only after 1876; thereafter most other navies followed their example.⁶⁰ Thus the production at Fujian was up to date with recent technological developments.

A big shock for the Chinese government, and particularly for the reformers, was the destruction of the entire Fuzhou fleet in the bombardment of the Mawei shipyard by the French marine in 1884. This occurred in the course of the French expansion in Annam, where China had also claimed special rights that the French were not prepared to acknowledge. Historians today believe that it was not entirely due to French technological superiority that China lost the battle but also the result of insufficient coordination between the regional Chinese fleets and their commanders (the Northern Fleet based at Weihaiwei and Port Arthur, and the Southern Fleet based at Shanghai, Fuzhou, and Canton) as well as their lack of experience in modern naval strategy.⁶¹ In Benjamin Elman's analysis, the Chinese fleet had consisted of eleven wooden ships, and the nearby eight French vessels were ironclad, but the Chinese ships could have outmanoeuvred the heavier French ships. The Fuzhou fleet fought practically unassisted and was taken by surprise, since the French had attacked without warning.⁶²

The losses of ships in this battle did not bring the Mawei shipbuilding project to a complete standstill, but it was certainly slowed down. This was also related to the death of its founder and main supporter, Zuo Zongtang, and the rise of the North China fleet under Li Hongzhang as the main Chinese navy.⁶³ The overall production of the Fuzhou shipyard is given as 40 vessels built in the 46 years between 1866 and 1911, for which 19.21 million tael were used – 8.52 for 'actual' construction costs and the rest for administration or downright 'waste'.⁶⁴

59 Kuo Ting-ye, 'Self-Strengthening', p. 524, 533.

60 Radunz, *100 Jahre*, pp. 150-152.

61 Elman, *On their Own Terms*, pp. 377-8. Kennedy, *Arms of Kiangnan*, p. 89. Meng Yue, 'Hybrid Science', p. 17.

62 Elman, *On their Own Terms*, p. 378.

63 Ibid.

64 Entry 'Fuzhou chuanzheng ju Mawei chuanchang' 福州船政局马尾船厂, in *Chuanbo shuzi bowuguan*, quoting from *Shuiyun jishu cidian* 水运技术词典 (Dictionary of water transport), p. 109.

From the perspective of their output, the achievements of both shipyards regarding quantity and quality were not impressive compared to those Western countries where steam navigation had first been developed. A considerable part of the North Chinese and South Chinese steamship fleet had to be acquired from European manufacturers, who could produce cheaper and higher quality ships. However, the technological gap was narrowed, and industrialization and mechanization were started in these ventures.

Schools for Technical Learning

One of the great differences between traditional and modern government shipbuilding is that in the biggest shipyards, formal education and training was offered to some of the apprentices and artisans. The Chinese administrators had accepted the advice of their foreign consultants that steam technology and mechanized production of ordnance and ammunition could not be transmitted in informal on-the-job training. This type of education was part of the larger plans of the founders of the self-strengthening programme, namely to enable China to enter into the phase of domestic mechanized production in the military and civilian sectors with less reliance upon foreign goods. This entailed the theoretical acquisition of Western science and technology and its practical application. Each of these steps was highly problematical and controversial. Eventually, internal resistance against the modernization programmes waned as traditional elites became aware that after China's defeats in the 1884 conflict with France and the 1894/5 war with Japan, and the suppression of the Boxer Rebellion by international armed forces, the Chinese administrative and defensive system could not help but modernize.

Up to the present, the methods and impact of technology transfer and acquisition form one of the big issues in China's relation to the world. The beginnings of this in the 1860s have been studied by a wide range of scholars, who all offer their specific assessments of this complicated process.⁶⁵ For our topic, we need to come to a perspective on what difference the option for formal technical learning meant for the workforce in shipbuilding, the skilled artisans, and the apprentices.

65 The classical study is Biggerstaff, *Earliest Modern Government Schools* (1961), on which Kennedy, *The Arms of Kiangnan*, relies, and Bennet, *John Fryer*. More recent assessments are contained in Pong, *Shen Pao-chen*, Cornet, *Etat et entreprises*, Meng Yue, 'Hybrid Science', and Elman, *On Their Own Terms*.

The earliest, largest and best-documented centres of learning in naval construction were at the Fuzhou Shipyard and the Jiangnan Arsenal, which will be presented in the following sections.⁶⁶

Technical Learning in the Fujian Navy Yard and the Jiangnan Arsenal

As in naval production, the profile of the Fujian Navy Yard in education on shipbuilding stands out clearer than that of the Arsenal. The school of the Navy Yard was established in 1867 under the name *Qiushi tang* (Academy for the Search of Truth). Zuo Zongtang had planned that European engineers and technicians first be employed here as teachers for a period of five years. Thereafter, Chinese teaching and training staff would take over from them. Students should come from 'all levels of society', but the ideal target group were 'intelligent local boys with some literary knowledge'.⁶⁷

About 100 pupils of age 14 enrolled initially.⁶⁸ By 1873, the apex of the school's activities, the French director Prosper Giquel reported that more than 300 students and apprentices from the various departments of the yard were registered.⁶⁹ However, the dropout rate was high, even in the initial phase of the school. From 105 students admitted in 1867, only 39 remained at the end of 1873.⁷⁰ From 1874 to 1897, the so-called 'period of self-management', the student numbers declined due to the curtailment of funds and less enthusiasm and support by the central government and provincial officials. Statistics from 1884 show a total of 188 students. In the early 1890s, school activities slowed down, but the school was not closed down. Between 1907 and 1913, no new students were recruited, and in 1913 it was reorganized into three separate schools for naval construction (*zhizao xuexiao*), the navy school (*haijun xuexiao*), and the technical school (*yishu xuexiao*).⁷¹

66 At a later stage, elements of shipbuilding and navigation also taught at the Huangpu/Whampoa 'School of Western Learning' (Xixue guan), founded in 1880 and subsequently renamed 'Guangdong shixue guan' (Guangdong School for Practical Studies). See Biggerstaff, *Earliest Modern Government Schools*, pp. 47-48, and *Jiaoyu da cidian*, vol. 10, p. 134.

67 Biggerstaff, *Earliest Modern Government Schools*, pp. 201, 205.

68 Kuo Ting-yee, 'Self-Strengthening', p. 532.

69 Biggerstaff, *Earliest Modern Government Schools*, p. 217; Giquel, *Foochow Arsenal*, p. 20.

70 Biggerstaff, *Earliest Modern Government Schools*, p. 210. Giquel, loc. cit. reports that the high attrition rate was due to six cases of death, and sixty pupils who were 'incapable' of following their courses and had been sent away.

71 *Ibid.*, pp. 221, 226-241.

Teaching and learning was realized at different levels and in various disciplines. In his account of the achievements of the school after seven years, director Giquel described that the school consisted of a 'French Division' and an 'English Division'. The French Division consisted of the Department for Naval Construction (*zhizao xuetang*), the Department for Design (*huishi yuan*), and the Department for Apprentices (*yipu*), while the English Division or Naval Academy had Departments for Theoretical Navigation (*jiashi xuetang*) and Practical Navigation (*lian chuan*) as well as an Engine Room (*guan lun xuetang*).⁷² Except for those from the Apprentice Department, the graduates from the French and English Divisions were supposed to become naval engineers and officers after full-time study of five years. The Apprentice Department provided part-time tuition for future foremen. It was set up later (1868) than the rest of the school, after it had become evident that mere on-the-job training for the workforce, such as carpenters, ironworkers, brass workers, and ship construction workers, created only a few able foremen.⁷³ Therefore, groups of ten to forty boys between the age of fourteen and seventeen from the operation divisions were to learn theoretical foundations for one-and-a-half hours before and after work. In the night and morning classes, these 'apprentices' (*yitu*) studied French, arithmetic, geometry, algebra, drawing, and took part in a course descriptive of engines. The course lasted three years or longer, and after graduation the young workers were expected 'to make a specification of the designs of an engine, to calculate the masses and weights of each of the parts; they are able, further, to describe the working of it in its most minute details'. Two classes of about twenty students each had finished the course by 1874. Director Giquel was particularly pleased about the achievements in this department, and the student statistics of 1884 show that the biggest group of the students, 32 percent, followed the apprentice course.⁷⁴ At the same time, during the production processes, on-the-job training for the regular workforce was given by French instructors during the initial phase and by their Chinese successors thereafter.

The English Division did not provide for a separate apprentice course. However, the full-time schooling in the engine room was targeted for students recruited from Hong Kong and Shanghai who had experience of iron working and a basic knowledge of English. This was desirable because few of the French, English, and at one period also German instructors spoke Chinese.

72 *Ibid.*, p. 210.

73 *Ibid.*, p. 209.

74 Biggerstaff, *Earliest Modern Government Schools*, pp. 213-4, 227.

The Jiangnan Arsenal also had technical curricula, but we do not know whether these were actually utilized. Regulations set up in 1870 provided for on-the-job training for workmen in the machine shops, shipyard, and arms factory. The instructors were to be the foreign and later Chinese engineers and machinists. Evening classes for workers and ship crews were also planned, and finally the curriculum of the Arsenal's famous and highly productive translation and interpretation department (*Guang fangyan guan*, Institute for the Dissemination of Foreign Languages, 1870) was to be expanded so as to include scientific and engineering departments. Foreign engineers were to teach two classes from 6 to 9 P.M., one in machinery and shipbuilding and the other on navigation and naval manoeuvres, for skilled workers, pilots, sailors, and ship mechanics who could follow the lectures with the help of interpreters.⁷⁵

More formal training was offered to several dozen apprentices who in 1875 were sent to the *Guang fangyan guan* to study Western and Chinese subjects. Biggerstaff assumes that they were assigned to technical teaching departments.⁷⁶ Later technical instruction outside the *Guang fangyan guan* was provided in a separate 'technical school' (*Gongyi xuetao*) established in 1898. It was planned to admit fifty students per year. Twenty of them were slotted to be children of Arsenal workers or artisans. One course was to last for four years.⁷⁷ The technical school and the *Guang fangyan guan* were combined in 1905 to form a *Gongye xuetao* (industrial school), but soon afterwards they were reorganized into a primary, middle, and higher military school.⁷⁸

What both schools had in common was the difficulty of acquiring technical knowledge in foreign languages. Moreover, at least in the first decades of the modernization initiatives, job perspectives after graduation were uncertain for the new engineers and naval officers if they could not stay on in their original schools. On a more general level, conservative elites doubted or even denied the necessity of modernization and modern education. Since the technical education offered in the Arsenals and the shipyard were so unorthodox, it had to be made attractive to the students by free tuition, board, and room and the promise of military or civilian titles in the traditional official system after graduation. This break with tradition highly irritated those in the Confucian establishment who saw graduation from these schools as a cheap shortcut to the coveted examination grades

75 Ibid., p. 168. Cornet, *Etat et entreprises*, p. 44, quoting from Bennet, John Fryer, pp. 9-11.

76 Biggerstaff, *Earliest Modern Government Schools*, p. 188.

77 Cornet, *Etat et entreprises*, p. 44.

78 Biggerstaff, *Earliest Modern Government Schools*, p. 193.

that opened the way into officialdom.⁷⁹ As a matter of fact, the Fujian Navy Yard engineers had difficulty finding jobs within the yard or the navy, and some of them sought employment with foreign firms or foreign consulates to work as translators or interpreters.⁸⁰

Nevertheless, to the workers and apprentices, this systematic change in knowledge transfer must have had its challenging sides. The traditional chain of professional training, either from master to apprentice or from family elders to the next generation, was broken up. Theoretical scientific knowledge was made available to workers and artisans. The schools fostered skills that could be applied more widely than within the confines of the particular institution, and finally cultural transfer was offered from foreign teachers in foreign languages – all this was new and could benefit the pioneer generation of workers and technicians, if carefully and consequently carried out. That it was actively propagated by some of the Chinese statesmen as early as the 1870s and 1880s constitutes the big difference between shipbuilding and arms production and the other craft branches that were directly managed by the government.

Appendix

Table 21 List of documented state shipyards

No.	Province	Location and name	Reference to construction of grain ships	Reference to construction of marine ships
1	Jiangnan (i.e. Jiangsu)	Jiangning (Nanjing) Longjiang shipyard 龍江船廠	Kangxi 9 (1670); 're-established' in Kangxi 33 (1694)	
2		Huai'an Qingjiang 清江 shipyard	Kangxi 33 (1694) 're-established'	Personnel of Huai'an shipyard reduced in Qian-long 24 (1759)
3		Huai'an Shandong shipyard	Yongzheng 2 (1724)	
4		Suzhou		Kangxi 57 (1718), in Yongzheng 10 (1732) location moved to Taicang zhou, Liuhe defang 太倉州, 劉 河地方

79 Biggerstaff, *Earliest Modern Government Schools*, p. 73; Cornet, *Etat et entreprises*, p. 44; Kuo Ting-yee, 'Self-strengthening', p. 529.

80 Biggerstaff, *Earliest Modern Government Schools*, p. 84.

No.	Province	Location and name	Reference to construction of grain ships	Reference to construction of marine ships
5		Yangzhou		Kangxi 57 (1718), in Yongzheng 9 (1731) location moved to Jiangning
6		Zhenjiang		Yongzheng 5 (1727)
7		Songjiang		Yongzheng 5 (1727), in Yong-zheng 10 (1732) moved to Taicang zhou, Liuhe difang
8		Shanghai		In Yongzheng 9 (1731) moved to Songjiang
9		Jinshan 'local shipyard'	Yongzheng 2 (1724)	
10		Zhenjiang 'local shipyard'	Yongzheng 2 (1724)	
11		Suda 蘇大 [Sutai 蘇太] ¹ 'local shipyard'	Yongzheng 2 (1724)	
12		Zhenhai 'local shipyard'	Yongzheng 2 (1724)	
13		Outside Liuhe pai 劉河牌外		Qianlong 24 (1759)
14		Old shipyard at Haizhou New Dike 海州新壩		Qianlong 26 (1761)
15		Xiazhen difang 夏鎮地方	Qianlong 31 (1764) ships for Xuzhou pre-viously built in Jiangning, now new shipyard established here	
16	Shandong	Linqing	Qianlong 14 (1749)	
17		Linqing , Hujia wan 胡家灣	Qianlong 47 (1782)	
18		Jiaozhou (ships of Southern Command)		Kangxi 57 (1718; only repair)
19		Dengzhou (ships of Northern Command)		Kangxi 57 (1718; only repair)
20	Zhejiang	Renhe	Yongzheng 2 (1724)	Kangxi 57 (1718)
21		Qiantang	Yongzheng 2 (1724)	Kangxi 57 (1718)
22		Ningbo		Kangxi 57 (1718)
23		Wenzhou		Kangxi 57 (1718)
24		Zhapu		Yongzheng 11 (1733)
25	Fengtian	On the Liao, Yidunhe, and Huntongjiang rivers	Kangxi 22 (1683)	

No.	Province	Location and name	Reference to construction of grain ships	Reference to construction of marine ships
26		Fengtian shipyard		Xianfeng 1 (1851)
27	Heilongjiang		Kangxi 22 (1683)	
28	Fujian	Fuzhou		Kangxi 57 (1718)
29		Zhangzhou		Kangxi 57 (1718)
30		Taiwan		Kangxi 57 (1718; repair only)
31		Quanzhou		Yongzheng 7 (1729)
32		Xiamen		In Qianlong 1 (1736), the official shipyard of Quanzhou was moved to Xiamen
33	Guangdong	Guangzhou Henan difang 河南地方		Qianlong 17 (1752)
34		Chaozhou Anbu difang 庵埠地方		Qianlong 17 (1752)
35		Gaozhou Zhikai difang 茺茅地方		Before Qianlong 8 (1743); then location be moved to Guangzhou; mentioned again in Qianlong 17 (1752)
36		Qiongzhou , Hainan, Haikou difang 海南海口地方		Qianlong 17 (1752)
37		Longmen difang 龍門地方		Qianlong 2 (1737)
38	Hubei	Wuchang	Yongzheng 2 (1724)	
39		Hanyang	Yongzheng 2 (1724)	
	Anhui	Anqing 'local shipyard'	Yongzheng 2 (1724)	
41		Xin'an 'local shipyard'	Yongzheng 2 (1724)	
42		Xuanzhou 'local shipyard'	Yongzheng 2 (1724)	
43		Jiayang 'local shipyard'	Yongzheng 2 (1724)	
44	Jiangxi	'All guard stations should establish local shipyards'	Yongzheng 2 (1724)	

Source: This list is based on the chapters 202 (*Hubu: Caoyun*), 935 (*Gongbu: Chuanzheng: Liangchuan*), and 936 to 938 (*Gongbu: Chuanzheng: Zhanchuan*) of the Collected Statutes (*Huidian shili*), which do not give a systematic geographical coverage of all official shipyards in the provinces, but they contain a compilation of relevant memorials, decisions, and edicts concerning grain ships (*liangchuan* 糧船) and battleships (*zhanchuan* 戰船).

¹ The photomechanic reprint edition of *Wenxing shuju* has the character 大, the scanned version in the online full text database *Chinese Text Project* has 太. See *Huidian shili*, chap. 935, fol. 4b, and [http://ctext.org/library.pl?if=en&file=27560&page=9&editwiki=587292#box\(166,384,0,2\)](http://ctext.org/library.pl?if=en&file=27560&page=9&editwiki=587292#box(166,384,0,2)).

Table 22 Arsenals established in China, 1860-1895

No. of foundation	Year of Plant Name	Province	Location	Establishing Official	First Director	Estimated Establishment Costs (taels)	Estimated Annual Income (taels)	Chief Products	Remarks
1	1861 Anqing Arsenal 內軍械所	Anhui	Anqing	Zeng Guofan 國藩				Small guns, explosive shells	
2	1863 Shanghai Arsenal	Jiangsu	Shanghai	Li Hongzhang 鴻章	Han Dianjia 韓殿甲			Small guns, explosive shells	1865 merged with Jiangnan
3	1863 Shanghai Arsenal	Jiangsu	Shanghai	Li Hongzhang	Ding Richang 丁日昌			Small guns, explosive shells	1865 merged with Jiangnan
4	1863 Songjiang Arsenal	Jiangsu	Shanghai	Li Hongzhang	Halliday Macartney, Liu Zuoyu 劉佐禹			Explosive shells	1863 moved to Suzhou
5	1863-64 Suzhou Arsenal	Jiangsu	Suzhou	Li Hongzhang	Halliday Macartney, Liu Zuoyu			Explosive shells	1865 merged with Nanjing
6	1865 Jiangnan Arsenal 江南 (機器)製造 (總)局	Jiangsu	Shanghai, Hongkou	Li Hongzhang, Zeng Guofan	Ding Richang	1,000,000		Rifles; heavy coastal defense ordnance; quick firing guns' black, brown, and smokeless powder'	1867 moved to Gaochang miao 高昌廟; 1867 rocket plant established at Chenjia gang 陳 家港; 1871-1874 powder plant established at steel machine tools; steamships Longhua 龍華

No.	Year of foundation	Plant Name	Province	Location	Official Establishting	First Director	Estimated Costs (faels)	Annual Income	Estimated Chief Products	Remarks
7	1862	金陵鐵道局附設金陵火藥局 Nanjing Arsenal	Jiangsu	South Gate Nanjing	Li Hongzhang	McCarty	-120'000 100'000		ammunition iron ordnance and Wuloung shan	gunpowder ammunition' 1875 prop- bioduction 1872 resumed bioduction' 1875 stopped
8	1866		Zhili	Tianjin	崇厚 劉長祚, Chonghou		60'000		ordnance Liquor	bioduction 1868 stopped Nanjing in 1874 merged with of Yangzi forts; 1874 for subport Arsenal, est.
9	1866	天津鐵器局 Arsenal East	Zhili	賈家沽壩 Tianjin qao	Chonghou	Wesqoms	388 178	152'000- 420'000	Arsenal incl. West cartridges, naval brown powder, Black and	
10	1866	Arsenal Tianjin West	Zhili	Tianjin	Chonghou	Stewart	92'792		machines 2 small guns, ammunition, steel	
11	1869	Arsenal Fochow	Fujian	樟光寺 Haidang zi	英桂 Ying Gui	Fai Chang 賴長			powder ammunition'	

No.	Year of foundation	Plant Name	Province	Location	Establishing Official	First Director	Estimated Establishment Costs (taels)	Estimated Annual Income (taels)	Chief Products	Remarks
13	1870	Tianjin Mobile Arsenal 天津機器製造局	Zhili	Tianjin	Li Hongzhang				Ammunition	Subordinate Huai Army
14	1872	Lanzhou Arsenal	Gansu	Lanzhou	Zuo Zongtang	Lai Chang			Various types of ordnance, ammunition, powder	1882 stopped production
15	1872	Yunnan Arsenal	Yunnan	Kunming					Ordnance, ammunition, powder	Ceased production, date uncertain; 1880-81 resumed production; 1885 resumed production
16	1873	Guangdong Arsenal	Guangdong	Canton; Juxian fan	Rui Lin 瑞麟	Wen Zishao 溫子紹	170,000		Small steamships, ammunition, mines	1885 merged with Guangdong Powder Plant
17	1875	Shandong Arsenal 山東機器局	Shandong	Ji'nan, Lekou	Ding Baozhen 丁寶楨	Xu Jianyin 徐建寅, Xue Fuchen 薛福辰	186,000	36,000	Rifles, ammunition, powder	
18	1875	Hunan Arsenal	Hunan	Changsha	Wang Wenshao 王文韶	Han Dianjia 韓殿甲				

No. of foundation	Year of Plant Name	Province	Location	Establishing Official	First Director	Estimated Establishment Costs (taels)	Estimated Annual Income (taels)	Chief Products	Remarks
19	1875 Guangdong Powder Plant	Guangdong	Canton; Cengpu	Zhang Zhaodong 張兆棟	Pan Lu 潘露			Powder	
20	1877 Sichuan Arsenal 四川機器局	Sichuan	Chengdu, South Gate	Ding Baozhen	Xia Shi 夏崑 Hua Hengfang 華衡芳	77,000	20,000- 60,000	Rifles, guns, ammunition, powder	1880 Sichuan Powder Plant established nearby at Gujiaba
21	1881 Jilin Arsenal 吉林機器局	Jilin	Near Jilin city	Wu Dacheng 吳大澂	Song Chun'ao 宋春鰲		40,000- 100,000	Ammunition, powder	
22	1881 Nanjing Powder Plant	Jiangsu	Nanjing, Shuangqiao gate	Liu Kunyi 劉坤一	Sun Quanyue 孫傳燾, Gong Zhaoyuan 龔	183,000	50,000	Powder, ammunition	
23	1882 Zhejiang Powder Plant	Zhejiang	Hangzhou, Liangshan gate		Zhao Yuan 照瑗	100,000		Powder	1885 merged with Zhejiang Arsenal
24	1882-84 Shanxi Arsenal	Shanxi	Taiyuan	Zhang Zhidong 張之洞				Ammunition	
25	1883 Beijing Field Forces Arsenal		Beijing, Sanjia dian	Prince Chun 醇親王(奕譞)	Pan Junde 潘駿德	200,000- 300,000			1890 destroyed by fire
26	1883 Zhejiang Arsenal 浙江機器局	Zhejiang	Hangzhou	Liu Bingzhang 劉秉璋	Wang Enxian 王恩咸			Powder and ammunition	

No.	Year of foundation	Plant Name	Province	Location	Establishing Official	First Director	Estimated Establishment Costs (taels)	Estimated Annual Income (taels)	Chief Products	Remarks
27	1885	Guangdong Cartridge Plant	Guangdong	Canton, Shijing	Zhang Zhidong	Xue Peirong 薛培榕			Cartridges	
28	1885	Taiwan Arsenal	Taiwan	Taibei, North gate	Liu Mingchuan 劉銘傳	Ding Dayi 丁日鐸			Ammunition, powder	
29	1890	Hanyang Arsenal 漢陽槍炮廠	Hubei	Hanyang, Dabie shan	Zhang Zhidong	Cai Xiyong 蔡錫勇	1,400,000		Rifles, light artillery, ammunition, powder	Entered production 1895
30	1894	Shaanxi Arsenal	Shaanxi	Xi'an, Fenghuo dong	Lu Chuanlin 鹿傳霖				Ammunition	

Source: adapted from Kennedy, *The Arms of Kiangnan*, p. 175

Table 23 Ships built at the Jiangnan Arsenal

No	Date Completed	Name	Length (chi/ metre)	Width (chi/ metre)	Horse Power	Displacement (tons)	Description	Construction Costs (tael)
1	1868 Aug.	Dianji 恬吉	185/ 59.2	27.2/ 8.7	150/ [392]	600	Wooden hull, paddle wheel	81,397
2	1869 May- June	Caojiang 操江	180/ 57.6	27.8/ 8.9	80/ [425]	640	Wooden hull, propeller	83,306
3	1869 Aug. 25	Cehai 测海	175/ 56	28/ 8.9	125/ [431]	600	Wooden hull, propeller	82,736
4	1870 Sept.-Oct.	Weijing 威靖	205/ 65.6	30.6/ 9.8	150/ [605]	1,000	Wooden hull, propeller	118,031
5	1872 May 24	Zhen'an 鎮安, changed to Hai'an 海安	300/ 96	42.0/ 13.4	500/ [1800]	2,800	Wooden hull, propeller	355,190
6	By July 1872						Armour plate, twin propeller	5,360
7	By July 1872						Armour plate, twin propeller	See below
8	By 1874 Jan.						Armour plate, twin propeller	13,599 Including above vessel
9	1873 Dec. 23	Yuyuan 馭遠	300/ 96	42/ 13.4	500/ [1800]	2800	Wooden hull, propeller	318,717
10	1874-75	Jin'ou 金 甌	105/ 33.6	20/ 6.4	200		Ironclad (Monitor class)	62,586
11	1874-75						Armour plate, twin Propeller	8,960
12	1874-75						Armor plate, twin propeller	10,943
13	1874-75						Motorized sampan	990
14	1874-75						Foreign style sailing vessel	57,005
15	1881		136/ 43.5	22/ 7	650	400	Twin propeller	
16	1885	Baomin 保民	225.3/ 72	36/ 11.05	1900		Steel armoured	223,800

Source: adapted from Kennedy, *The Arms of Kiangnan*, p. 161/2, table 1, and *Jiangnan zaochuan chang changshi*, p. 39, table 2. The figures given for horsepower vary for all except two ships. Figures in brackets are from *Jiangnan zaochuan chang changshi*.

5. Private Shipbuilding, Private and Government Cooperation, and Procurement Prices

Throughout the Qing dynasty, shipbuilding for the market economy surpassed the state sector in output. In Southeast China, shipping arguably constituted the most important mode of transport in the Ming and Qing periods. Its pervasiveness and the huge amount of vessels always impressed foreign visitors who approached China from the sea.¹

The government and the private shipbuilding sector had been cooperating in various ways since the beginning of the dynasty. Early on, when the authority of the Qing was still threatened from the sea by the power base of Zheng Chenggong and his descendants on Taiwan, the Qing imposed a sea ban, a policy inherited from the Ming. Between 1662 and 1683, not only was construction of coastal and overseas ships forbidden but orders were given to destroy existing sea ships in private possession. After this unpromising start, a gradual deregulation followed and policy towards seafaring traders and shipbuilders became less constraining after the Qing dynasty had consolidated its rule over maritime China by conquering Taiwan in 1683.

In addition, licensed merchants organized the distribution of state monopoly goods such as salt, minerals, and fuel. This type of economic activity has been characterized as 'hybrid' organization as opposed to 'marketplace', 'public', and 'private'.² In consequence, the construction of transport vessels for these transactions also had a hybrid quality, since the ships were used both for government (public) and commercial (market) purposes and were financed by the monopoly merchants. In the course of the eighteenth century, this also applied to a part of the lighters used in the tax grain system and in the nineteenth century for the seagoing vessels that substituted for the official grain ships.

In the period of the First Opium War, merchants actively promoted technology transfer in naval technology and ordnance. Although the Daoguang

1 Audemard, *Jonques chinoises*, p. 20, cites Père Barnadine (*An Account of the Empire of China*, 1745), Navarrete (*An Account of the Empire of China*, 1650) on ships at Macau and Père D. Gandar (*Variétés Sinologiques* no. 4, 1894, 'Le Canal Impérial') on the ships on the Grand Canal. Their number seemed to surpass anything these observers had seen in their home countries.

2 Myers and Wang, 'Economic Development', p. 624 ff., 630.

emperor was interested in this initiative, at that time this was obstructed by the provinces.³ Another twenty years later, after the dynasty had nearly been extinguished by the Taiping rebels, a new group of provincial governors, who were all military men, ushered in the phase of self-strengthening with priority given to the mechanized production of ordnance and steam engines. Due to the much larger investments necessary for shipbuilding with machine technology and the difficulty in acquiring the necessary skills and knowledge, some decades passed before private enterprises could enter the market as steamship and machine manufacturers. From the late nineteenth century, Chinese-owned firms officially supplied the Chinese navy, but competition with foreign shipbuilding enterprises remained acute.

While in the preceding chapter, the state-private relationship was portrayed from the perspective of the state and the example of merchant participation in the tribute grain shipment was discussed, here we will consider the side of shipbuilding in the private sector, starting out with an overview of the locations of shipbuilding, both for the construction of wind-propelled wooden ships and for steamships, together with the estimated numbers of ships circulating in Chinese waters at different points in time. Thereafter, documented prices of the government ships will be set off against prices of ships on the market in order to come to an assessment of the cooperation of government and private shipbuilding and ship transport in the traditional and the mechanized sectors.

Sites for Shipbuilding, Major Ship Types, and Estimated Number of Ships

Geographically, the centres for official shipbuilding were also centres of private shipbuilding. It seems likely that by the late Ming, the private sector had already overtaken the official sector in scope and perhaps in quality. After an interval during which seafaring was prohibited,⁴ private shipbuilding from 1683 onwards once again surpassed the official sector. The Qing centres of shipbuilding were the coastal provinces of Fujian and Guangdong in the South, Zhejiang and Jiangsu in the Yangzi delta and Qiantang estuary, Shandong and Zhili in the North, and Jilin and Liaoning (Fengtian) in Manchuria. Evidence for shipbuilding on the rivers comes from Hunan, Hubei, Jiangxi, and Sichuan and from the Songhua jiang in Jilin

3 Gideon Chen, *Lin Tse-hsü*, p. 58.

4 For details, see the section 'The Relationship of Government and Private Shipbuilding'.

and Heilongjiang. No systematic official accounts are available, but from scattered evidence, an overview can be gained as laid out in Figure 6.⁵ As has been pointed out by Xu Jianqing, a huge variety of ship types was built all over China. She estimates that, during the Qing dynasty, two-thousand to three-thousand different ship types existed.⁶ Attributing the ship types to geographic regions does not mean, however, that the specific ships were exclusively built in that region. On the contrary, all types could and were constructed in all shipbuilding centres.

In Fujian, the biggest concentration of shipbuilding sites lay in the prefectures of Quanzhou, Zhangzhou, and Fuzhou. The Quanzhou districts of Tong'an, Jinjiang, Hui'an, and Xiamen were especially productive, with Xiamen (Amoy) in Quanzhou prefecture acting as an important newcomer (1727), which attracted large numbers of migrants. Xiamen peaked in the Qianlong era and in the Jiaqing era still boasted over one-thousand seagoing merchant vessels. Tong'an produced a type of commercial ship (Tong'an sou 同安艘) that was faster than official ships. Therefore in 1795/96, the government ordered the rebuilding of marine ships for the Fengtian fleet in the Tong'an style.⁷

The Fujian ship was the typical seagoing ship in use at least since the ninth century. With its keel and a V-shaped bottom, it was not suitable for shallow waters. It had three to five masts and multiple stern rudders to improve steering. It was built with iron nails and caulked with hemp and *tong* oil.⁸ They were usually made of fir timber (*Cryptomeria*, *shamu*). The Grand Fujian ship as described in the encyclopedia *Gujin tushu jicheng* had a deeper draft (3.50 to 3.60 m) than the sand junks and was therefore not convenient for the marine patrols if the pirates they chased came close to the coast; but models with shallower drafts were also developed in Fujian.⁹

In Guangdong, the largest shipbuilding centre was Canton (Guangzhou). According to Audemard, in the 1840s, English residents in Canton estimated seeing about 40,000 junks and a population of 200,000 living and working on house boats.¹⁰ Since Canton had for long been the only port officially open for foreign trade (ca. 1720-1842), demand for shipbuilding and maintenance was especially large. As with the Tong'an style boats in Fujian, in the late 1790s, the Canton-style civilian rice ships (*miting*) seemed more convenient

5 Xu Jianqing, *Qingdai qianqi*, pp. 583-594. The following geographical overview mainly follows Xu Jianqing's presentation.

6 *Ibid.*, p. 594.

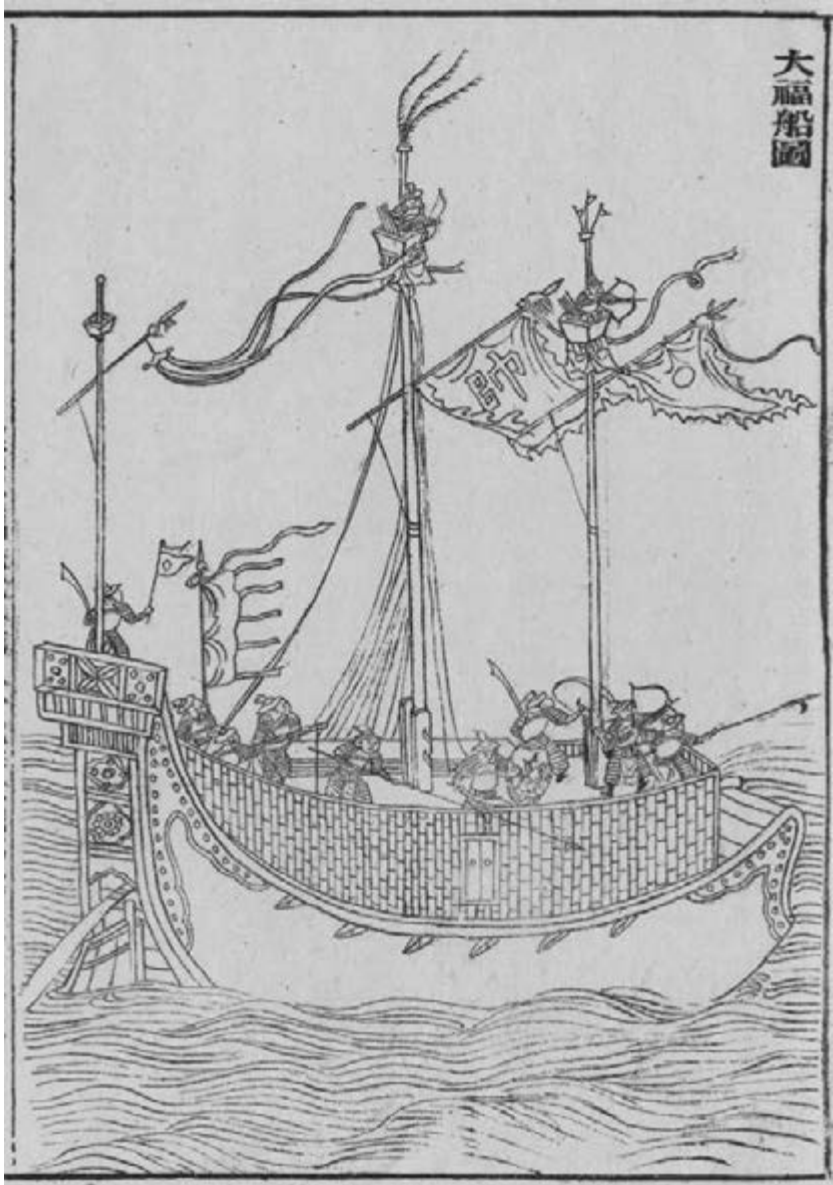
7 *Huidian shili*, chap. 937, fol. 15a.

8 Deng Gang, *Chinese Maritime Activities*, p. 27.

9 Audemard, *Jonques chinoises*, pp. 53-55.

10 *Ibid.*, p. 21.

Figure 3 Big Fujian ship, *Da Fuchuan*



Source: Illustration in *Gujin tushu jicheng* (1726), reprint 1884, section 'Jingji huibian' 經濟彙編 (Collection on governance), 'Rongzheng dian' 戎政典 (Military administration), 'Shuizhan bu' 水戰部 (Naval warfare), 'Huikao' 彙考 (Extracts from standard works), chapter 79, fol. 8a/2 (in 1964 reprint, vol. 749, p. 15/2).

for the naval forces' patrol needs than other models and were therefore to be rebuilt for the Guangdong fleet in this style.¹¹ Since the Canton harbour Henan silted up, the port was moved to Huangpu/Whampoa. This is also where sometimes as many as one-hundred foreign ships moored. In Guangdong, Chenghai developed as a new harbour and shipbuilding centre.

Guangdong ships were also oceangoing ships with keels that had larger dimensions than most Fujian type ships and a steeper V-form of their bottoms than Fujian-style ships. They were made of more expensive timber, so-called 'ironwood' (*tielimu* 鐵力木; 鐵梨木; 鉄栗木, commonly identified as *Mesua ferrea*, commercial name *Penaga*)¹². According to the *Gujin tushi jicheng*, a Guangdong ship would cost twice as much but was also more durable than a Fujian ship because of the high quality of the timber, which is very strong relative to its weight and displacement.¹³ By the mid-eighteenth century, *tielimu* became scarce; and today it is probably all but extinct in Guangdong. After the mid-eighteenth century, at least part of the Guangdong ships were built in Southeast Asia (Siam and Malaysia). The size of a large Guangdong ship for a crew of several hundred men could reach 165 feet (ca. 52.8 m) in length, the crossbeam 36 feet (11.5 m) and abreast with a mast 120 feet (38.4 m) tall. The English privateer Captain William Dampier was impressed by these masts, which he likened to 'any Third-Rate Man of Wars Mast in England, and yet not pieced together as ours, but made of one grown Tree; and in all my Travels I never saw any single Tree-masts so big in the body, and yet so well tapered, as I have seen in the Chinese Jonks'. Most ships had one or two masts, but the larger one possessed three to five.¹⁴

In Jiangsu, the province that produced the most government grain ships, the most important shipyards in Jiangsu lay in Nanjing (Jiangning), Yangzhou, and Yizheng on the Yangzi, Suzhou, and the Shanghai (Songjiang) area with Taicang and Chongming island.

The number of Jiangsu or 'Jiangnan' ships has been estimated at 5,000 seagoing vessels of 2,000-3,000 *shi*¹⁵ in the ports of Shanghai and Zhapu (in Zhejiang) in the early Jiaqing era, and for the Daoguang era, about 3,600 seagoing freighters over 1,000 *shi* in and around Shanghai alone. In the early

11 *Huidian shili*, chap. 937, fol. 15a (Jiaqing 4, 1799).

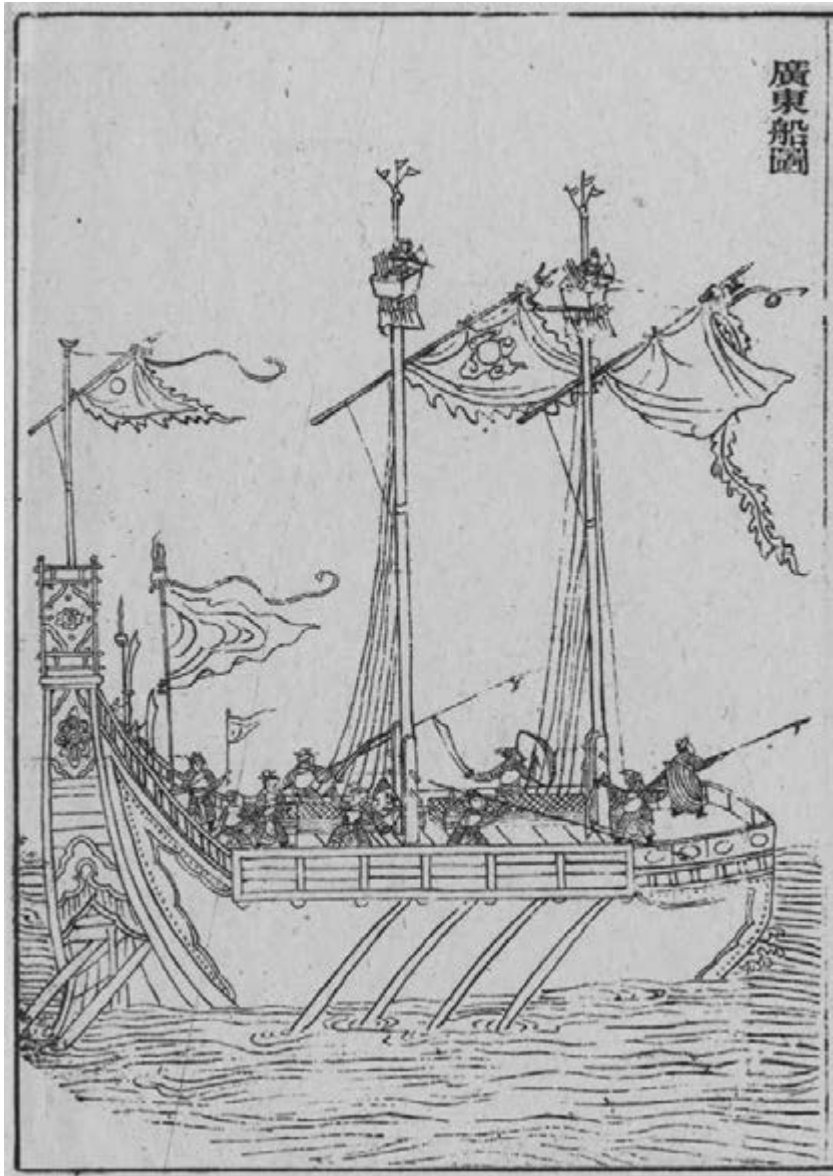
12 For a variant identification of *tielimu* as *Erythrophleum fordii*, see Lin Yangsan, 'Mingshi jiaju'. Both are valuable hardwood trees native to Guangdong, Guangxi, and Southeast Asia.

13 Audemard, *Jonques chinoises*, p. 49.

14 Marks, *Tigers, Rice, Silk, and Silt*, pp. 168/9, quoting from Ye Xian'en et al., *Guangdong hangyun shi, gudai bufen* (The history of shipping in Guangdong in the ancient times) and William Dampier, *A New Voyage Round the World*.

15 As a measure of ship capacity, one *shi* amounts to c. 70 kg.

Figure 4 Guangdong ship, *Guangdong chuan*



Source: Illustration in *Gujin tushu jicheng* (1726), reprint 1884, section 'Jingji huibian' 經濟彙編 (Collection on governance), 'Rongzheng dian' 戎政典 (Military administration), 'Shuizhan bu' 水戰部 (Naval warfare), 'Huikao' 彙考 (Extracts from standard works), chapter 79, fol. 7b/3, (in 1964 reprint, vol. 749, p. 14/3).

nineteenth century, as profits declined, their number sank to about 1,400 and later stabilized at about 2,000. Including smaller vessels of 400-900 *shi*, they numbered about 3,000.¹⁶

The richest shipowners were reported from the Shanghai area, especially Chongming, where the sand ships were originally produced. Before the Opium War, shipbuilding in Shanghai on both sides of the Huangpu River was already quite advanced. From here, there is more evidence on successful private shipowners who also manufactured the ships they used. For instance, Zhang Yuanlong (d. 1710) in the early eighteenth century planned to build up a fleet of hundred ships for trade with the Liaodong peninsula.¹⁷ The brothers Ge Yuanxiang and Ge Yuanrui of the 'Ge family shipyard' in the eighteenth century also traded with Shandong and Fengtian in the North. These are just a few examples; more manufacturers and traders are known from Shanghai, and at least in the big Jiangsu centres of Suzhou, Nanjing, and Yangzhou, the situation was probably similar.

After Shanghai became a treaty port in 1842, it developed into the most important site for shipbuilding in Jiangsu. A manufacturer and trader of renown in this period was Zhu Puzhai, who specialized in big oceangoing vessels and by the end of the century owned seven freighters that circulated in the Yellow and South China Sea.¹⁸

Another manufacturing region of importance within Jiangsu was the Wujiang district on Lake Tai, where small and big fishing ships for lakes and rivers were built.

In Zhejiang province, the biggest centres for seagoing vessels were situated in the Hangzhou, Ningbo, and Wenzhou areas. Inland ships were built on the south banks of Lake Tai. More than a thousand ships circulated on the Fuchun or Qiantang River and were probably constructed in the adjacent villages.

In the provinces along the mid and upper reaches of the Yangzi – Hunan, Hubei, Jiangxi, and Sichuan – shipbuilding developed as the upper reaches of the river were made navigable. In Sichuan, the biggest centres were Chongqing (Jiangbei ting) and Wan(yuan) xian.

In the North, the official shipyards were situated in Linqing, Dengzhou, and Jiaozhou on the Shandong peninsula and in Tianjin in Zhili province.

In Manchuria, official shipyards existed in Jilin on the rivers Songhua jiang, Liaohe, and Heilongjiang. According to one report, during the Qianlong

16 Fang Zhuofen et al., 'Shanghai shipping', p. 362.

17 Actually, these plans did not materialize but were crushed on charges of smuggling. See Tang Bo, 'Da haishang'.

18 Xu Jianqing, 'Qingdai qianqi', p. 600.

reign, 30,000 to 40,000 migrants from Shandong and other provinces were found to be working at the official shipyard in Ningguta (today's Ning'an) on the Mudanjiang River. Moreover, in 1824, the Fengtian authorities checked on unlicensed private shipbuilders and found 46 persons and more than 80 ships that had traded between Liaoyang and Niuzhuang.¹⁹

Overall estimates of ships circulating in Chinese waters before the Opium War assume 9,000 sea ships with a transport capacity of 700-800 *shi* (over 50 tons) and 200,000 sailing ships below 50 tons travelling in inland waters, not including fishing boats, farmer boats, and small barges without sails, totalling more than 200,000 sailing ships and a transport capacity of four to five million tons.²⁰ To get an idea of how this compared to the number of government-owned ships at the time, we can look at the records for grain ships and patrol ships. Assuming a figure of 10,515 grain ships circa 1662 and 6,000 circa 1812, and adding to this a figure of 2,400 (see Table 20, 'Quotas for coastal and fluvial guard and patrol ships of all sizes'), we arrive at a total of about 13,000 official ships before 1800 and about 8,500 after 1800. This constitutes about 6.5 and 4 percent respectively of the overall figure of 200,000. Although this is only a rough approximation that does not take transport capacity into account, it nevertheless shows the relationship between public and private shipping. If we apply the lower figure of 130,000 private transport ships on the yearly tax records, to which Deng Gang refers for the second half of the eighteenth century, official ships accounted for ten percentage of the total number of ships in China.²¹ For the transitional period between the Qing and the Republic, Deng Gang estimates the number of fishing boats alone at 1.08 boats for each fishing household, which, on the basis of data for Fengtian prefecture, total about 101,926 households for coastal China in his calculations. This amounts to at least 110,000 private fishing boats.

Foreign and Chinese Mechanized Shipbuilding

After the first treaty ports were opened in 1842, in the first days of steamship technology, Chinese shipbuilding artisans were not yet able to carry out the

19 Xu Jianqing, *Qingdai qianqi*, p. 593.

20 Ibid., p. 596, citing Fan Baichuan 樊百川, *Zhongguo lunchuan yunye de xingqi* 中国轮船运业的兴起 (The rise of steamship transport in China), Sichuan renmin chubanshe 1985.

21 Deng Gang, *Chinese Maritime Activities*, p. 69, referring to *Gongzhong zhupi zouzhe* (Palace memorials of the Qing with imperial rescripts), entry 'Customs under the Qianlong reign'. Deng also quotes a total figure of 988,000 to 1,163,584 'junks' operating in the 1930s on Chinese inland and sea waters (from Thomas Rawski, *Economic growth in prewar China*, pp. 403-4).

repairs of engines, propellers, and boilers. Therefore, foreign shipbuilders established repair and shipbuilding companies in China. According to the post-Opium War treaties, foreign manufacturers were not allowed to set up production in China before 1895, but the Chinese government tolerated them in the treaty ports.²² According to admittedly incomplete statistics, a total of 67 foreign ship constructors set up business in China successively between 1843 and 1896 and constructed 91 ships, most of them steam-propelled. While the first foreign shipbuilding companies were established in Hong Kong and Canton, Shanghai gained greater importance after the mid-1860s. Of the 67 firms, 43 percent were located in Canton and Hong Kong, 38 percent in Shanghai, and 19 percent in other treaty ports (Shantou in Guangdong, Fuzhou and Xiamen in Fujian, Yantai in Shandong, Tianjin in Zhili), while 21 percent of the ships were built in Hong Kong and Canton, 77 percent in Shanghai, and only two percent in other treaty ports.²³

The first of these was the Couper shipyard, founded in 1845 at Canton/Whampoa by the Scotsman J. John Couper, which was considered to be the biggest shipyard in China until the early 1860s.²⁴ In Shanghai, foreign shipbuilders had been present since the 1850s. The first shipyard here was established by the American George Purvis and Company, while the biggest manufacturers were the British firm Nicholson & Boyd Co. (Xiangsheng, founded in 1862) and S.C. Farnham & Co., which was first American-owned, then British-owned (Yesong, founded in 1864).²⁵ The foreign shipyards could rely on a developed and expanding infrastructure for shipbuilding supplies and metalworking. Small docks for Chinese sailing ships were already present on the east bank of the Huangpu River in Shanghai's southern suburb Nanshi, and a Shanghai shipyard established by Gu Minghai in the Pudong suburbs specialized in the construction of small sailing ships and lighters of five to ten tons. Several small smithies that hailed from Hangzhou, Wuxi, and Suzhou had migrated to Shanghai during the Taiping rebellion. The Pu family from Shaoxing reportedly owned ten workshops for iron tools. Shipbuilders from Wuxi had come to the little fluvial harbour of Xinzha, setting up 75 small workshops. Some members of the Xiangshan workshops near Suzhou who specialized in iron smelting and carpentry had migrated to Shanghai. Copper and tin smiths had been concentrated in Suzhou, Nanjing, Shaoxing,

22 Feuerwerker, 'Economic Trends', pp. 28-29.

23 Xin Yuan'ou, *Zhongguo jindai*, p. 42.

24 Xu Shulan, *Kepai chuanwu yizhi*.

25 Cornet, *Etat et entreprises*, pp. 17-8, quoting from Wang Zhiyi, *Zhongguo jindai zaochuan shi* (History of modern Chinese shipbuilding). Xin Yuan'ou, *Zhongguo jindai*, pp. 19-47.

and Ningbo since the fifteenth century. Many of these proto-industrial workshops became suppliers to the foreign and Chinese shipyards.

Colonial governments also engaged in shipbuilding, such as the Russians from 1898 in Dalian, taken over by the Japanese after the Russo-Japanese War of 1904, as well as the German colonial government in Qingdao between 1898 and 1914.²⁶

In modern, mechanized shipbuilding, foreign firms and in part also the colonial shipbuilding facilities were competitors with the Chinese government institutions of Jiangnan Arsenal and the Fujian Navy Yard. Farnham, the largest of them, employed 2,000 Chinese workers in the 1880s. In 1888, 2,500 to 4,500 workers were hired in the Kowloon plant of the British Admiralty Dock. In 1902, the Russian-built dockyard at Dalian employed 495 workers and technicians, of which 409 were Chinese, 80 Russians, and six Indians. In 1903, the labour force of the newly founded German shipyard at Qingdao totalled 703, with 33 European and 670 Chinese workers and technicians. Including temporary workers, this total rose to as much as 3,000 by 1914.²⁷ Smaller establishments, such as the British New Amoy Dock Company (est. 1892), still had 200 Chinese workers under permanent contract and in case of demand hired more on a temporary basis.²⁸

A few private Chinese manufacturers also managed to establish themselves in the niche between the foreign firms and the Chinese government shipbuilding ventures. Their numbers were limited, and their scope of production and numbers of hired workers remained very modest, at least before the Sino-Japanese War. Xin Yuan'ou has collected evidence for twelve privately capitalized shipbuilding and machine construction companies established between 1869 and 1894 in Shanghai, two in Canton, and one each in Tianjin and Hanyang. Their initial investments ranged between 300 and 1,000 tael and the numbers of hired workers between twenty and fifty. Only one of them, the Junhe'an machine manufacturers in Canton founded in 1888, had a higher initial capitalization of 3,000 to 4,000 tael and an estimated workforce of fifty to one-hundred. The business scope of these companies included steamship repair and the construction of small steamships as well as silk filature machines and mechanic cotton gins.²⁹ After the Sino-Japanese War, in the course of a more active industrial government policy, several dozens of entrepreneurs established machine

26 'Kiautschou', in *Deutsches Kolonial-Lexikon*, '19. Gouvernementswerft'.

27 Xin Yuan'ou, *Zhongguo jindai*, pp. 62-68.

28 *Ibid.*, pp. 33-45.

29 Xin Yuan'ou, *Zhongguo jindai*, p. 209.

manufacturing and shipbuilding companies. The largest among these were Song Weichen's Yangzi machine manufacturing company (Yangzi jiqichang, established 1907) in Wuhan with a capitalization of 400,000 tael that could build 800 to 1,000-ton lighters and 100-ton motor ships. In 1907, it employed 3,000 workers. In July 1911, the Qing navy placed an order of three steamships, which eventually were delivered in 1916. In Shanghai, the biggest firm was the Searching for Novelty Machine and Steamship Construction Company (*Qiuxin jiqi lanchuan zhizao chang*), which Zhu Zhiyao (1863-1955), the son of the Shanghai ship owner Zhu Puzhai, started with a relatively small capitalization of 40,000 tael. After additional investments, capitalization in 1910 increased to 316,000 tael. With a workforce of 500, this company constructed 19 ships between 1906 and 1910 – mostly steam propelled but also sailing ships – for the Chinese customs, the CMSNC, and other steam navigation companies. In Canton, a former ship carpenter at the Jiangnan Arsenal, Lin Jing, founded after 1891 the Perpetual Profit for Guangzhou Steamship Construction Company (*Guang changli zhuangzao lanchuan chang*), which together with other smaller manufacturers constructed ten steam ships. The capitalization of the largest Chinese manufacturers amounted to only one-tenth that of the big foreign firms, and they could not compete with the high annual subsidies of the Jiangnan Arsenal and the Fuzhou Navy Yard.³⁰ Nevertheless, a private market gradually developed mechanized manufacturing and especially in Shanghai offered new job opportunities for a workforce with expertise in machine production.

The Relationship of Government and Private Shipbuilding

The state controlled, interacted, and competed with the commercial sector in several ways. Between 1662 and 1683, the Qing adopted similar measures of 'sea prohibition' as the Ming had done. Private sea trade was severely forbidden in order to crack down on the descendants of the Ming dynasty and their supporters.³¹ The coastal population was forced to settle further inland and leave an evacuation belt of thirty *li* (approximately 15 km) to the sea shores. The existing ships were to be burned by imperial order. Apparently the Qing troops did carry out this decree, and only a small group of smugglers and pirates escaped the prohibition to bases in Southeast Asia.³²

30 Ibid., pp. 210-216.

31 Xu Jianqing, *Qingdai qianqi*, p. 594, p. 582/3.

32 Marks, *Tigers, Rice*, p. 167. See also chapter two, 'Government Restrictions of Craft Activities'.

In 1683 the territory of Zheng Chenggong, a Ming loyalist who had set up his own administration on Taiwan and was owner of seven-thousand ships, had been destroyed by the Qing, and Taiwan was declared part of Fujian province. Subsequently, the ban was lifted. Settlement on the coast as well as trade and fishing were once again permitted, but for security reasons, the sizes and possession of the ships were restricted. At first, the maximum acceptable size was up to 500 *shi* (ca. 25-35 tons). In the year Kangxi 42 (1703), this limitation was relaxed. Now merchant ships with up to two masts, a width of 1.8 *zhang*, and a maximum of 28 helmsmen on board were allowed to circulate on inland, coastal, and sea waters. But shipowners had to remain on board during the journey. It was forbidden to lease ships. Restrictions notwithstanding, shipbuilding boomed. This was so much the case that the timber used for Guangdong ships, *tielimu* (the 'iron hardwood'), became all but extinct in the second half of the eighteenth century, and the Guangdong ships were often ordered in Southeast Asia rather than built in China.³³ In Fujian province, Xiamen developed into an entrepôt for Southeast Asian timber.

About sixty years later, the restrictions on leasing were also suspended, and from 1818 the size of the ships and number of masts were no longer prescribed. However, regional administrations still registered the shippers and supervised their coming and going.³⁴ The 'secret' (i.e. unregistered) production and sale of ships was still forbidden by the Qianlong era, but as a 1781 document in the provincial regulations of Fujian states, if shipowners fell on hard times, it was very common and 'difficult to punish' if they sold their ships.³⁵ Sales were permitted and private shipyards could operate legally if they were known and acknowledged by the regional authorities.

Keeping in mind the ratio of government to private ships, it is doubtful whether non-compliance with rules could actually be sanctioned. In the encyclopedia *Gujin tushu jicheng*, for instance, the section on sand ships documenting the situation of the late Ming and early Qing notes that the first Ming emperor had restricted the number of masts to two and had rigorously forbidden that they should be taken to sea without official permission. In the course of the dynasty, this law fell into oblivion, and a huge sand ship could have up to five masts, covering as many as a thousand Chinese miles (594 km or 320 sea miles) per day. The shippers would install removable masts, which were reinserted after the ships had passed official scrutiny in the harbours. Another

33 Marks, *Tigers, Rice*, pp. 167-8.

34 See, for instance, Grant Alger, 'Regulatory Regionalism'.

35 *Fujian shengli*, p. 642, 'Shangyu chuanzhi maimai liding zhangcheng' 商譽船隻買賣立定章程 (Regulations established for the sale of merchant and fishing ships').

rule that allowed only one ship per family is cited here as well. Audemard states that the sand ships he saw (in the first decade of the twentieth century) had four or five masts. Typically three of them were removable.³⁶

The renting of ships between shipowners and merchants, another profit-seeking activity that was initially prohibited, was increasingly reported from the late eighteenth century, with references to merchants who owned between ten to more than fifty ships. In the early nineteenth century, merchants in the Shanghai region who possessed less than five ships were considered small shipowners.³⁷

There is ample evidence of cooperation between the state and the private sector, which warrants the opinion that the exploitation and suppression of the private sector was not as severe as early Chinese Marxist historiography suggests. Merchants rented out their ships to the authorities to chase pirates, even if they were sometimes afraid of the vindictiveness of the freebooters, as in 1794 Guangdong.³⁸ Or in the case of 1817 Shandong, the government had neglected to maintain a number of its ships, forcing the local authorities to rent private ships – which had never been taken to sea for inspection and manoeuvres – to make up for the lack of marine vessels.³⁹ There was also a contrary case when, in 1710, a shipping merchant was found to have illegally ‘rented’ battleships for trading rice. The culprit was Zhang Yuanlong, who had intended to build up a large merchant fleet of one-hundred ships and had also used his family connections to the Governor-General of Liang Jiang to get access to the battleships.⁴⁰

Merchants also volunteered to offer considerable credit to the government for financing lighters, as the Tianjin salt merchants did in 1785. They advanced 300,000 tael for building an additional 1,200 lighters, to be refunded within ten years. This granted them the continuous free disposition of their own vessels, which previously had been requisitioned by grain transport authorities.⁴¹ Likewise, the Collected Statutes report that in 1764, Xiamen overseas merchants (*yanghang*) donated 7,000 tael to build battleships. This fact is recorded in conjunction with the release and legalization of

36 Audemard, *Jonques chinoises*, pp. 73-76. See also the illustration in Chapter Four.

37 Xu Jianqing, *Qingdai qianqi*, p. 599, quotes evidence of a shipowner possessing more than ten Fujian style freighters, of Shanghai region merchants owning 40 to 50 sand ships, of an owner in the Zhejiang district Ciqi who transported 40,000 shi of tribute grain overseas in 30 ships, and of a private shipyard in Wuqing zhen on Lake Tai that rented out all the ships it produced.

38 *Huidian shili*, chap. 937, fol. 14a.

39 *Ibid.*, fol. 20a, see above.

40 Tang Bo, *Da haishang*.

41 *Huidian shili*, chap. 203, fol. 3a-5b; chap. 935, fol. 6a-7a.

overseas trade, formulated in the 'Regulations on overseas trade' (*Yanghang maoyi zhangcheng*) which the provincial administrator Chen Hongmou (1696-1771) had promoted.⁴²

A most active period of private initiatives for marine defence followed the First Opium War, 1839-1842, when Canton merchants like Pan Shicheng and others experimented with new ship design and ordnance, which they presented to the court.⁴³ Pan's was not an isolated case. Elsewhere, experiments with shipbuilding and, more generally, the adaptation of Western naval and military equipment were also carried out with the aim to construct larger, faster, and better armoured vessels. In 1841, a frigate junk of about three-hundred tons, built after a European model, was found by British invaders in a dry dock at Xiamen. At the same time, a paddle-wheel ship, using human instead of steam power, was developed in Ningbo by Gong Zhenlin, a district administrator of Jiaying in Zhejiang and Canton.⁴⁴ Twenty years later, in 1862, members of the Shanghai gentry rented a fleet of seven steamships to transport the government troops led by Li Hongzhang for the defence of Shanghai and the Yangzi Delta against the invading Taiping armies.⁴⁵

In sum, a general tendency of deregulation evolved in the second half of the eighteenth century, and at the same time private merchants supported and substituted government efforts in shipbuilding and ship maintenance. In the period of self-strengthening in the 1860s and 1870s, regional and local elites increasingly assumed roles in public service that had previously been the task of government officials. For shipbuilding and ship transport, this became most evident when merchants began to organize the sea transport of tribute grain and subsequently cooperated with the government in the China Merchants' Steam Navigation Company and other 'officially supervised and merchant-organized' enterprises. Significant government shipbuilding remained confined to ships for the naval forces, even though one of the directors of the Shanghai Arsenal, Feng Junguang (1830-1878), suggested renting the Arsenal-built steamers out to merchants who transported the tribute grain in order to save on maintenance costs.⁴⁶ His idea was not real-

42 *Xiamen zhi*, chap. 5, p. 154.

43 As famous as Pan's Western-style sailing ships was his investment of 65,000 taels in developing water mines, which he explained in his *Shuilei tushuo* (Illustrated account of water mines). In 1843, he hired a foreign specialist who developed the water mines within nine months, and successfully demonstrated the device to the authorities in Tianjin. However, this was not adopted. Gideon Chen, *Lin Tse-hsü*, pp. 44-46, 60.

44 Gideon Chen, *Lin Tse-hsü*, pp. 32-36.

45 Kuhn, 'The Taiping Rebellion', pp. 299, 306.

46 Kennedy, *The Arms of Kiangnan*, p. 83.

ized at the time, but it shows that connections to the Chinese private sector were actively sought from within the institution of the Jiangnan Arsenal.

Prices and Funding in Shipbuilding

In the course of the Qing dynasty, timber became an increasingly scarce commodity, and prices rose continuously. When comparing government prices and prices on the free market, Chinese authors often point to the low procurement prices for ships, implying that the government exploited merchants as well as shipbuilders. One often-cited reference from the late Ming, for instance, assesses the prices of privately built versus government-procured ships in a ratio of three to one.⁴⁷ However, direct comparisons are difficult, because evidence is widely scattered in time and often vague, not mentioning the specifications of the ships. Without information on equipment and quality, it is difficult to come to definitive conclusions on how exploitative these prices were for the merchant suppliers. Another question is what can be inferred about wages from the total prices of the ships.

Evidence is included in Tables 24 and 25. For government grain ships in the early Qing, Li Bozhong has calculated a market price of 600 tael, based on the amount of tax relief that was granted to several Zhejiang districts which were allowed to pay monetary taxes rather than supplying finished ships in kind. Another indirect reference from 1731 in the Collected Statutes provides for 50 tael for shipwrights' (*zuanfu*) wages (mentioning that the wages remained 'unchanged' from before) and a maximum of 51 tael for material costs, totalling 101 tael for government grain ships. This would amount to only one-sixth of the presumed 'market price' of 1672. Almost ninety years later, in 1760 and 1761, much higher procurement prices of between 400 and 1,000 tael are quoted for Jiangxi and Hunan – provinces that had to send their ships through lakes and the Yangzi and thus were bigger than those of the provinces in the Yangzi Delta, such as Shandong and Hebei. In 1785, an attempt was made to introduce a unified price of 280 tael which provided for simpler equipment, but still allowed for varying sizes for the southern and the Yangzi delta ships. This arrangement obviously did not last long, since in the following years extra subsidies are frequently mentioned. The last recorded price is 800 tael for 1812 Zhejiang, including a 590 tael subsidy to the basic price of 208 tael. At the same time, a salt transport ship with a carrying capacity of about 750 to

47 Li Bozhong, *Jiangnan de zaoqi gongyehua*, p. 253, Xu Jianqing, *Qingdai qianqi*, p. 597, both quoting from Zhang Xie, *Dong Xi yang kao*, chap. 9.

2,000 *shi*, comparable to the bigger grain transport ships, cost 1,600 to 1,700 tael. However, this was probably not the average size, which is judged by Hinton as varying between 300 to 400 *shi*, and only occasionally 800 to 1,000 *shi*.⁴⁸

Without clear specifications, navy ships and merchant seagoing vessels are even less comparable because unlike grain ships, their function was not restricted to the transport of goods and their sizes varied more than those of the grain ships. More scattered evidence shows decreasing prices between 1646 and 1682. A most detailed statement for the prices of government battleships is contained in the government regulations for the battleships of Fujian province, *Fujian sheng waihai zhanchuan zeli*, of around 1769. Prices range, according to equipment and size, between 411 and 1,438 tael. These quotations are especially interesting because working wages are mentioned as well. As can be seen from Table 25, working wages amounted to only 11 to 15 percent of the entire costs per ship, while in the early Qing, subsidies paid for labour and material costs of government ships are quoted as more or less equal. However skewed the early quotation may be, it shows the tendency of increasing material costs, even in government procurement. For 1835, the Collected Statutes actually mention the ratio of prices of merchant ships to navy ships used for patrols and other purposes. The Liang Jiang (Jiangnan, Jiangxi, Anhui) navy had owned eight merchant freighters, which were to be broken up and rebuilt as battleships to ease patrols. The costs for those battleships were only half that of the freighters.⁴⁹ If both ship types were acquired at procurement prices, and if the statement is factual and not just understated for political reasons, this implies that those battleships were cheaper in construction than the freighters. If the merchant ships were acquired on the market, this reference gives a clue to the price relations, but we still do not know whether the equipment and finishing of the two types was comparable.

For 1820, we also have evidence for the market prices of seagoing merchant ships at various locations. They range between 15.5 tael per ton in Siam, 33.6 tael per ton in Chaozhou (Guangdong province), and 44.1 tael per ton in Xiamen (Fujian province).⁵⁰

What was to be done if prices set by the Ministry of Public Works failed to meet the actual costs? One method was to supplement the basic prices with subsidies. To do so, the actual market prices of ship timber, especially for

48 Hinton, *Grain Tribute System*, p. 11.

49 *Huidian shili*, chap. 938, fol. 8a.

50 Marks, *Tigers, Rice*, p. 167. Marks calculated the prices per ton by applying the conversion of rate of 59.5 kg per *shi*. This is the conversion corresponding to the weight of an Imperial standard *kuping shi* to 131.58 [British] pounds. If the conversion of ca. 70 kg per *shi*, taking the *shi* as 120 jin of 0.6 kg is applied, as in Ng, *Trade and Society*, p. xiv, the respective prices are 13.21, 28.5, and 37.5 tael.

the most costly mast timber (*weimu*), had to be investigated and reported.⁵¹ Regular subsidies for repair and reconstruction are mentioned in the Collected Statutes. In the case cited for 1736, the subsidy was 125 percent, for Shandong battleships in 1737 it was 100 percent, for Guangdong ships it was 80 percent for breaking up and reconstruction (in 1738), and it was 60 percent for large and 40 percent for small overhauls. Special regulations applied for Taiwan, since transporting the raw materials there was more expensive.⁵²

Once regular and basic ministry prices and subsidies were defined, it was open to debate as to which authorities should raise the funds for the subsidies. In 1741, all Fujian prefectures, not only those where the shipyards were situated, were summoned to provide financial assistance to buy up the timber for the masts of Fujian battleships.⁵³

Other, less ideal methods to cope with a lack of funds were delaying necessary repairs and reconstructions, resizing the ships, or using less expensive timber such as pine (*song*) and fir (*sha*) rather than oak (*limu*, *Quercus chinensis*) in order to spare expenses and speed up the construction and repair processes.⁵⁴ Delays of necessary repairs are reported from 1740 for the coastal provinces, where only 70 to 80 percent of the reported maintenance work was actually accomplished.⁵⁵ In an edict, the Qianlong emperor admonishes the responsible officials that even though they were enjoying peaceful times, sea defence should be taken seriously – they should not, as was often the case, just give the ships a new painting and neglect more thorough maintenance. Two years earlier, delays of maintenance and reconstruction had been sanctioned in a catalogue of punishments meted out to officials in charge of the repair and reconstructions of Jiangnan fluvial marine patrol and guard ships.⁵⁶ They ranged from a fine of six months' salary for passing the deadline by more than one month and degradation by one official degree to transfer from one's position for delays of more than five months. For high-level supervising officials such as the governors and governors-general, the fines were lighter, but for passing the deadline for

51 *Huidian shili*, chap. 936, fol. 8b, Yongzheng 10 (1731), concerning Guangdong battleships.

52 *Ibid.*, fol. 10a, 'If in the Jiangnan shipyards patrol sand ships *sha xiaochuan* 沙唬船 are broken up and reconstructed for the price set by the ministry of 100 tael, they shall receive an additional subsidy (*jia jintie*) of 125 tael.' Shandong (1737), *op. cit.*, chap. 936, fol. 10b, Guangdong (1738), chap. 936, fol. 11a/b, additional 30 percent for big and 20 percent for small overhauls for Taiwan (Qianlong 12 (1747), *op. cit.*, chap. 936, fol. 14a).

53 *Huidian shili*, chap. 936, fol. 13a.

54 *Ibid.*, fol. 14a (Qianlong 8, 1743).

55 *Ibid.*, fol. 12 a.

56 *Ibid.*, fol. 11b.

more than five months, degradation by one degree and a one-year salary stop was still threatened. We do not know whether these sanctions were actually carried out; officials most often will have found good reasons for why they were not responsible for the delays. The province-specific deadlines for small and large overhauls, break ups, and reconstruction were set out in 1732.

Access to timber and other materials was not equal among the provinces. During early Qing, the southern provinces were still better endowed, but from 1822 on, even the Fujian shipyards (Fuzhou, Quanzhou, and Zhangzhou) reported timber shortages but were urged by the emperor to finish at least one ship per month.⁵⁷ At about the same time, Shandong province suffered more severely from the lack of timber. Shandong officials suggested that Jiangnan handle the entire shipbuilding procedure on their behalf. This was not favourably received by the emperor and the central government. Instead, Shandong was ordered to send envoys to acquire timber in Zhejiang or Fujian, just as Jiangnan had done.⁵⁸ The Shandong officials then explained that none of the required materials was readily available in Shandong. Timber, coir fibre, vines, oil, iron, and sails were bought in the south, lime, charcoal, hemp, linen, and cotton cloth purchased in the north. In view of the high transport costs, they preferred having the ships constructed in Shanghai and then having them sailed to Shandong. After the expansion of overseas trade, timber for shipbuilding, especially Oregon pine, was also imported from British Columbia in Canada and Puget Sound in the U.S. state of Washington. In Ningbo, for instance, such trade was registered in the Customs Registers from 1868.⁵⁹

As discussed in the last section, merchants' commitment for sponsoring the state's shipbuilding expenses remained an option that occurred occasionally, according to the sources, and gained in importance over time.

Given that prices for the private and the public sector can only be based on relatively vague comparisons and that wages in the private sector are as good as unknown, any conclusions we can make in this area remain tentative. Procurement prices remained lower than market prices, but we may assume that in the course of the eighteenth century, government prices moved to converge towards market prices. The sorry state of government ships from the nineteenth century on due to their lack of maintenance is also proof of the decline of the state's coercive and fiscal power.

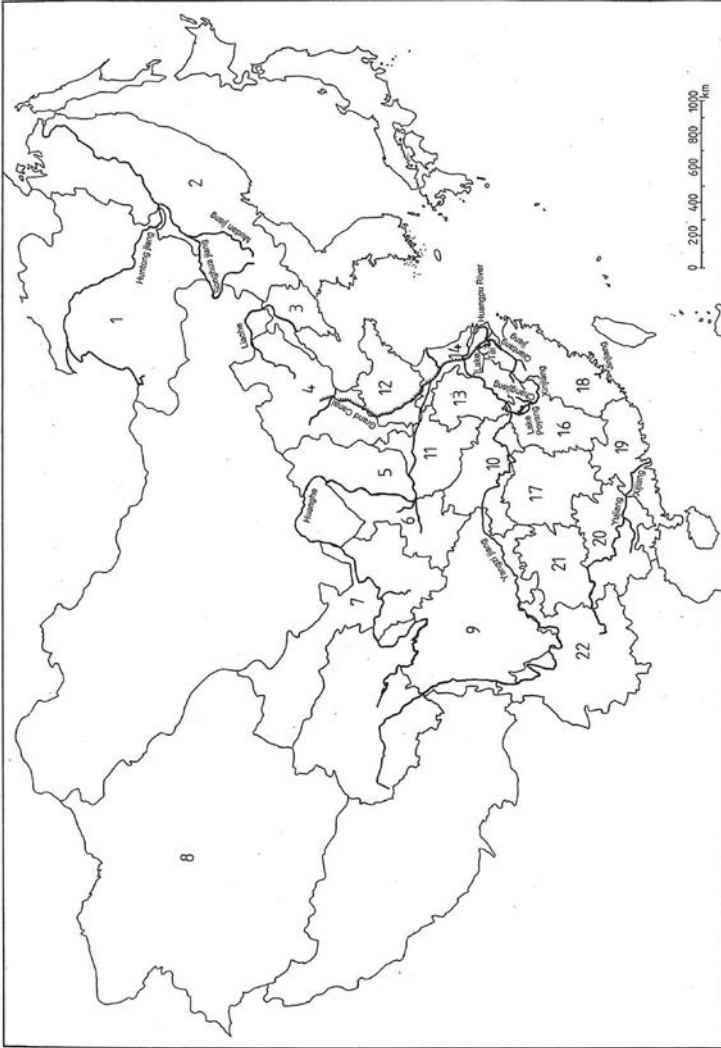
57 *Ibid.*, fol. 4b; this rule was repeated for the Taiwan shipyard in 1835, see chap. 938, fol.7b.

58 *Huidian shili*, chap. 937, fol. 20b, edict of Jiaqing 23 (1818).

59 Worcester, *Junks and Sampans*, p. 74.

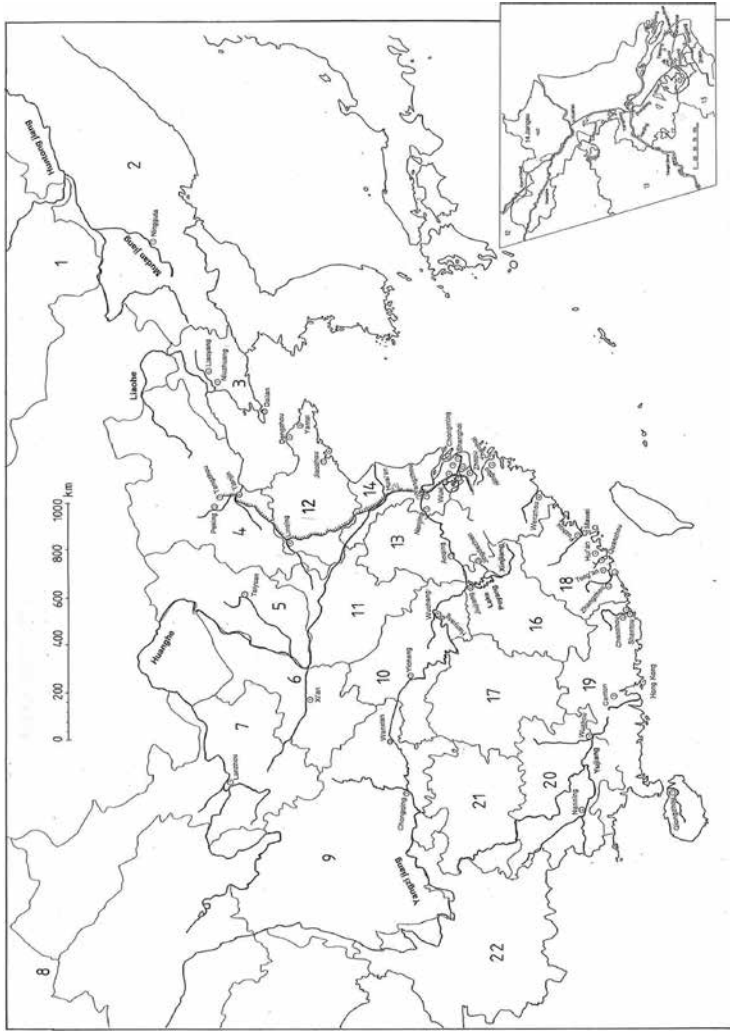
Appendix

Figure 5 Waterways in the Qing dynasty



Design: Bettina Dilger

Figure 6 Centres of shipbuilding in the Qing dynasty



Design: Bettina Dilger

Table 24 Government price quotas for shipbuilding

Year	Place	Grain ships	Battleships: Government procurement price in tael	Market price
Shunzhi 3 (1646)			283	
Shunzhi 17 (1660)			Reduction by 42.3 tael (240.7)	
Kangxi 1 (1662)			Further reduction by 7.2 tael (233.5)	
Kangxi 10 (1671)			Further reduction by 10.4 tael (223.1)	
Kangxi 11 (1672)				Calculated price: 600 for grain ships in Zhejiang ¹
Kangxi 22 (1683)				Between 2,000 for small and 8,000 for big seagoing merchant ships ²
Mid-Kangxi (after 1683)	Fujian and Guangdong		Total price reduced to 177	
Kangxi 26 (1687)			177 and 208	Small seagoing boat several dozens of tael ³
Late Kangxi (1662-1722)	Zhejiang (Ningbo)			
Yongzheng 5 (1727)		37,633 + 2 tael extra		
Yongzheng 9 (1731)	Jianghuai and Xingwu transport stations (in Northern Jiangsu)	50 tael ship-wrights' 鑽夫 material, total 101 tael		
Qianlong 25 (1760)	Jiangxi, Nanchang	650		
	Jiangxi, Yuanzhou	400		
	Jiangxi, Ganzhou	1,000		
	Jiangxi, Xinfeng	1,000		
	Jiangxi, Huichang	800		

Year	Place	Grain ships	Battleships: Government procurement price in tael	Market price
	Jiangxi, Nan'an	900		
	Jiangxi: Ji'an, Jianchang	300		
	Jiangxi, Yongxin	400		
	Jiangxi, Anfu	420		
	Jiangxi, Fuzhou (city)	500		
	Jiangxi, Fuzhou (military colony)	400		
	Jiangxi, Guangxin	650		
	Jiangxi, Geyang, Guixi	800		
	Jiangxi, Chuanshan	800		
	Jiangxi, Raozhou	400		
Qianlong 26 (1761)	Hubei, Jingzhou, Left guard station	600		
	Hubei, Jingzhou, Right guard station	480		
	Hubei, Mianyang	400, in the case of impoverished descendants of military colonists 450 ⁴		
After Qianlong 33 (1768)	Fujian		Between 411 and 1,438 (Table 25)	
Qianlong 42 (1777)		287.77 tael + 50 tael for shipwrights' <i>zuanfu</i> wages		

Year	Place	Grain ships	Battleships: Government procurement price in tael	Market price
Qianlong 46 (1781)	Anhui, Anqing	300 (government subsidy)		
Qianlong 50 (1785)	Southern provinces Jiangxi, Hunan and Hubei, Zhejiang and Anhui	208 tael, simpler ships, unified measures for (larger (smaller) Zhejiang and Anhui vessels		
Qianlong 50 (1785)	Used in Tianjin, built in Jiangxi and Huguang	Lighters: 250 tael subsidies for material (<i>liaojia yin</i>)		Between 5,000 and 10,000 for big seagoing merchant ships ⁵
Qianlong (1736-1795)	Guangdong and Fujian			
Jiaqing 5 (1800)	Jiangxi	300 tael subsidies		
Jiaqing 13 (1808)	Fujian		2,268 without weapons	
Jiaqing 13 (1808)	Guangdong			4,000 including weapons (guns and equipment)
Jiaqing 17 (1812)	Zhejiang	208 tael basic subsidy, 590 tael + additional subsidy, altogether 800 tael		
Jiaqing 20 (1815)	Liang Jiang (Jiangnan, Jiangxi, Anhui)			1,600 for <i>zeng-chuan</i> (large Fujian-type freight ship)
Mid-Jiaqing (1796-1820)	Jiangsu			Salt transport ship 1,600-1,700 tael, transport volume 750 to 1,000 <i>shi</i> ⁶
Mid-Jiaqing (1796-1820)	Jiangsu			Shanghai mer-chant sand ships, transport volume ca. 2,000-3,000 <i>shi</i> : 7,000-8,000 tael ⁷
Mid-Jiaqing (1796-1820)	Fujian			Fujian 'big' coastal merchant ship 15,000 tael ⁸

Year	Place	Grain ships	Battleships: Government procurement price in tael	Market price
Jiaqing (1796-1820)	Coastal ships 沿海商船			Between several dozens of tael to hundred tael, for large vessels several thousand tael. ⁹
Daoguang 15 (1835)	Jiangnan	489,675 tael for battleship; a merchant ship cost 997,350 tael	Hongze Lake: 400 tael for patrol ship	
Daoguang (1821-1850)	Jiangnan			Big sand ships more than 10,000 tael, middle-sized ships several thousand tael ¹⁰
Daoguang (1821-1850)	Zhejiang			Mid-sized seagoing ships 5,000-6,000 tael ¹¹
Daoguang (1821-1850)	Shanghai			Big shipowner Li Yeting possesses ships worth 'several tens of thousands of tael' ¹²
Daoguang (1821-1850)	Fujian, Xiamen			Big seagoing ships: several tens of thousands of tael ¹³
Daoguang 24 (1844)	Guangdong			Donation of 19,000 and 43,000 tael for a hybrid model and a Western-style battleship, 18,000 tael for a coppered rice junk
Xianfeng 1 (1851)	Fujian			892,1226 tael, market price of fast sailing ship <i>kuai chuan</i> 快船
Xianfeng 1 (1851)	Fengtian		12,500 tael for battleships <i>kaifeng chuan</i> and <i>Guangdong chuan</i> , two each, total 50,000 tael	

Year	Place	Grain ships	Battleships: Government procurement price in tael	Market price
Xianfeng era (1851-1861)				70,000 tael for steamship Baoshun financed by Ningbo merchants as armed escort for overseas grain transport ¹⁴

Source: *Huidian shili*, chap. 202-203, 935-938, and market prices

¹ Li Bozhong, *Jiangnan de zaoqi gongyehua*, p. 251, calculated from a reference to the tax reduction granted to several districts in Zhejiang. They were spared the delivery of tribute grain due to inundations and allowed to deliver the tax in cash. This saved them the construction costs for 660 ships, that is 39,600 tael (for 66 ships because according to the regulations, the new ships had to be built every 10 years). That means that a ship cost ca. 600 tael.

² Xu Jianqing, *Qingdai qianqi*, p. 596, quoting from Lan Dingyuan 藍鼎元, *Luzhou chujij* 鹿洲初集 (First collection of Luzhou), chap. 3.

³ *Ibid.*, p. 597, quoting from *Guangxu Dinghai xianzhi* 光緒定海縣志 (Dinghai gazetteer of the Guangxu era), chap. 20.

⁴ *Huidian shili*, chap. 202, fol. 18a, routine memorial of Qianlong 26 (1761). The term *chiding* 赤丁 (men without means) refers to the descendants of soldiers of military colonists whose land had been sold. The wages are presumably higher as a special subsidy. The term is explained in *Qinding hubu caoyun quanshu*, chap. 25, 20-2.

⁵ Xu Jianqing, *Qingdai qianqi*, p. 597.

⁶ Li Bozhong, *op. cit.*, p. 252, referring to Bao Shichen 包世臣, *An Wu sizhong* 安吳四種 (Four ways of pacifying the Yangzi delta), 庚辰雜著五 (Miscellaneous writings from the year 1820), chap. 3, 'Zhonggu yishao' 中衢一勺.

⁷ Li Bozhong, *op. cit.*, p. 254, referring to Bao Shichen, *An Wu sizhong*, 'Haiyun nancao yi' 海運南漕議 (Deliberation on the sea transport of tribute grain from the South); *Duxue lu sangao* 獨學齋三稿 (Three drafts from the hut of independent learning), chap. 3 'Dai Jiang Zhe dufu yifu haiyun chazi' 代江浙督撫議復海運札子 (Note in reply to the memorial responding to the deliberation on sea transport, written for the Governor-General of Jiangsu and Zhejiang).

⁸ Xu Jianqing, 'Qingdai qianqi', p. 597.

⁹ *Ibid.*, citing from *Huangchao jingshi wenbian*, chap. 85, Wang Zhiyin 汪志伊, 'Yi haikou qingxing shu' 議海口情形疏 (Memorial discussing the situation of the sea ports).

¹⁰ Li Bozhong, *op. cit.*, p. 255, citing Qi Xueqiu 齊學裘, *Jianwen xubi* 見聞續筆 (Continued notes from my brush about things I saw and heard), chap. 2.

¹¹ Li Bozhong, *op. cit.*, p. 254, citing Xie Zhanren 謝占壬, *Haiyun tiyao* 海運提要 (Essentials on sea transport), 'He hai zonglun' 河海總論 (General argumentation on sea and river transport).

¹² Xu Jianqing, *Qingdai qianqi*, p. 597.

¹³ *Xiamen zhi*, chap. 15, p. 645.

¹⁴ Ni Yuping, *Caoliang haiyun*, p. 126.

Table 25 Government procurement costs for ships built in Fujian

Ship number	Length of hull in chi	Length of hull in m	Width of midships in chi	Width in m	Number of ships	Holds (cang 艙)	Costs of material and labour (tael)	Labour costs (tael)	Costs of Material (tael, calculated)	Labour/Man-days (gong 工)	Labour in relation to material costs
For Jinzhou in Fengtian	74	23.68	18.70	5.98	3	21	1438.5550	143.549	1295.0060	2870.97	11.08%
No.1	46	14.72	13.20	4.22	5	15	411.7134	47.216	364.4974	944.31	12.95%
No.2	54	17.28	15.70	5.02	2	16	454.3380	54.608	399.7300	1092.15	13.66%
No.3	50	16.00	14.60	4.67	4	16	479.8584	57.769	422.0894	1155.38	13.69%
No.4	55	17.60	15.70	5.02	9	16	496.2048	59.416	436.7888	1188.32	13.60%
No.5	57	18.24	16.20	5.18	14	16	523.8030	63.118	460.6850	1262.35	13.70%
No.6	62	19.84	16.70	5.34	8	17	563.8479	67.284	496.5639	1345.67	13.55%
No.7	65	20.80	18.40	5.89	3	18	582.4686	72.024	510.4446	1440.47	14.11%
No.8	68	21.76	17.70	5.66	7	19	594.2160	74.670	519.5460	1493.41	14.37%
No.9	69	22.08	18.50	5.92	2	19	611.2575	74.670	536.5875	1493.41	13.92%
No.10	70	22.40	18.90	6.05	57	20	658.9674	76.826	582.1414	1536.52	13.20%
No.11	73	23.36	19.30	6.18	6	21	658.9674	79.659	579.3084	1593.18	13.75%

Source: *Qinding Fujian sheng waihai zhanchuan zeli* (ca. 1769), for the ship type *ganzeng chuan* 趕繡船 (Fujian style merchant ship)

6. The Shipbuilding Workforce Employed by the State and Private Workshops and Enterprises

This chapter deals with the working and living conditions of the artisans and workers in the government shipbuilding institutions as well as the shipbuilders in the commercial and subsistence sector. The question is raised as to how the greater appreciation on the part of the central government of industry and commerce influenced the lives and professional outlook of the shipbuilders. Did the mechanization in this branch and the changed labour relations enhance the social respectability of the workers? As in the preceding chapters, a long-term perspective will be taken which starts in the late Ming. This is because the best information on work organization in an imperial shipyard originates from the Ming period. Most outstanding is the monograph on the late Ming official shipyard at Nanjing, *Longjiang chuanchang zhi* (1553), which draws on previous texts, the *Nanchuan ji* (An account of the Southern ships, 1541) and the *Caochuan zhi* (Records of River and Canal Shipping, compiled in 1501, enlarged in 1544). No comparably comprehensive descriptions on shipbuilding exist until the age of mechanization and quality control posed new exigencies for accountability upon the officials and engineers in the arsenals. Although strictly speaking, the Ming situation falls out of the focus of the present study, we refer to it here under the assumption that the problems of personnel and material administration resemble those in the Qing official shipyards. For the eighteenth and nineteenth centuries, official evidence of the *zeli* type includes the regulations and precedents on Fujian, Jiangsu, Hunan, and Zhejiang of ca. 1769, which can be complemented with the provincial regulations of Fujian (ca. 1874) and the Xiamen gazetteer of 1839.¹ The *zeli*, however, concentrate on the cost of materials and the composition of ships in order to ensure accountability, as was common in other official craft branches, but include very little information on problems of labour and personnel administration. Given their strategic importance, it seems amazing that government shipyards are not mentioned in the general regulations and precedents of the Ministry of Public Works before the 1884 edition, which includes nineteen short clauses about 'naval administration'.²

1 'Union List' nos. 1-5-4 to 1-5-6-3, *Fujian shengli, Xiamen zhi*.

2 *Qinding gongbu zeli*, Guangxu ed., chap. 72-75.

An Account from the Sixteenth Century

The Monograph of the Dragon River Shipyard (*Longjiang chuanchang zhi*) shows the decline of the hereditary artisan system that had been adopted by the Ming dynasty and the transition from this type of corvée labour to wage labour. Our question here is whether the conviction often expressed by Chinese historians³ that artisans preferred not to work for the government holds true.

In the early Ming system, craftspeople were subjected to a specific kind of household registration and had to render obligatory labour service at the capital for specific periods of time. In the course of the Ming dynasty, the enforcement of this rigid system declined. From 1485, artisans had the option to substitute monetary payment for their service, and in 1562 it was expressly forbidden to render labour service instead of monetary payment.⁴ The Monograph of the Dragon River Shipyard was written by Li Zhaoxiang, the director of the shipyard for several years in the 1550s, at a time when corvée obligations had not entirely come to an end but were declining. Li states that the workforce originally commanded for obligatory service at the shipyard consisted of 400 families from Zhejiang, Jiangxi, Huguang, Fujian, and Southern Zhili (i.e., Jiangsu) that were relocated to Nanjing between 1368 and 1424. Of these, only 245 remained in 1541, and less than 200 in 1551. The rest had fled and found work outside the wharf.⁵ Most of these remaining artisan families were poor: 'only one in ten of them is not hard-pressed for food and clothing'. When a shipbuilding project was launched, they received no wages or food allowances but instead an advance payment that was later deducted from their wages at 20 percent interest.⁶ Some of them were given plots of unused shipyard land for farming in return for rent that had to be delivered in the form of the natural produce of hemp and tong-oil. These materials were needed for caulking the ships. The tenants did not grow these materials on their plots but had to acquire them on the market. Moreover, tenants were expected to participate in tasks like water pumping or dike maintenance on the grounds of the shipyard.⁷

The Monograph gives no information on daily, monthly, or piece wages. The norms for working time for constructing a number of ship types are

3 Li Bozhong, Xu Jianqing, Fang Zhuofen et al.

4 *Da Ming huidian*, chap. 189, fol. 5b, 8a.

5 *Longjiang chuanchang zhi*, chap. 3, fol. 8a; Scheuring, *Drachenfluß-Werft*, p. 85.

6 *Ibid.*, chap. 6, fol. 2b; Scheuring, *Drachenfluß-Werft*, pp. 135-136.

7 *Ibid.*, chap. 5, fol. 1b-6a; Scheuring, *Drachenfluß-Werft*, p. 126 ff.

specified, including the total working days (*gong*) and labour costs. Assuming that all artisans received the same wage for one work day, this results in wages of around 0.03 silver tael per workday.⁸ The distinction between the work of a master and of an unskilled labourer is not made here. The text mentions that for odd jobs such as breaking up ships, marines from the nearby Xinjiangkou marine station were employed and paid for by the Ministry of War. However, this applied only to the construction of warships. The working costs for the imperial ships – those that the emperor and court used in Peking and Nanjing – had to be covered entirely by the Ministry of Public Works.⁹ Grain ships were not built at this site.

The author of the Monograph of the Dragon River Shipyard also complained that the estimated work days for the construction of ships often did not include the help of unskilled labourers, for example in hauling out the ships and setting them into the water after the repair work. These jobs should have been taken over by soldiers but often they did not come at all or not in the necessary numbers. Control officials, in order to ingratiate themselves with the Ministry of Public Works, did not account for such extra costs, and in consequence the artisans were often forced to work overtime without pay, which resulted in their impoverishment and in the deteriorating quality of the ships.¹⁰ Li Zhaoxiang therefore called for ‘compassion’ for the needs of the artisans and their families. At the same time, he repeatedly warned that artisans as well as merchants and lower-echelon officials were committing a variety of fraud and corrupt practices. Embezzling or ‘saving’ material or working time for one’s own advantage could involve mixing old (recycled) and new nails when only new nails should be used; boring holes in planks without nailing them but applying caulking mass on them as if nails had been used; sawing the boards too thinly to ensure that the stocks of timber would suffice; using new materials instead of recycling them; and superficial caulking. Generally, the author observed that hired unskilled labour worked hastily and less diligently than the soldiers employed for the same jobs.¹¹

Product quality was a constant concern of the leading officials on the shipyard. In 1528, one of the directors complained that the crews handled

8 *Longjiang chuanchang zhi*, chap. 7, fol. 2a ff. This obviously was the uniform wage for skilled artisans employed by the Ministry of Public Works. Chow Kai-wing, *Publishing*, p. 53, fn 223, mentions the same daily wage for a construction worker, which was slightly lower than in the private sector, for which he quotes 0.033 tael per day.

9 *Longjiang chuanchang zhi*, chap. 1, fol. 25b; Scheuring, *Drachenfluß-Werft*, p. 48.

10 *Ibid.*, chap. 6, fol. 8a/b. Scheuring, *Drachenfluß-Werft*, p. 145.

11 *Ibid.*, chap. 6, *Fuge zhi* 孚革志 ‘Consideration of improvements’, Scheuring, *Drachenfluß-Werft*, pp. 137-147.

the ships carelessly because they felt little responsibility for public property, and therefore the ships were sent for overhauls or breaking up before their term was due. Quality control of the finished ships was extremely important because if specialists inspected ships for imperial use, these could last for more than thirty years, whereas for battleships the usual term of breaking up was merely ten years. Officials should take care that artisans could not conspire with the controllers and pay them hush money if their products were found defective.¹²

The director characterizes the artisans in the imperial shipyard as follows:

The artisan families, although they have been living in the [Southern] capital [Nanjing], for generations still are a rough and uncivilized lot. Even if their foremen have contact with the offices every day, they remain different from [the clerks] who work in the offices. If they are relentlessly controlled and shaken by intimidation, they will not report on their own if they have difficulties fulfilling their tasks. But if we treat them with mildness and severity, compassion and legal sanction [in the appropriate degree], make them fear us so they don't dare to cheat us, feel affection for us so they couldn't bear to cheat us, they would not let us down if anything unforeseen should happen, but would gladly come up with solutions, and success will be ours.¹³

As can be seen from the 228 regular positions (Table 28), a considerable number of artisans were not located at the shipyard at all, and those few that worked there seem to have been employed for more decorative tasks. The larger ships certainly could not be built with a workforce as small as this. The other workers were probably hired labour.

This monograph of the Dragon River Shipyard also contains detailed lists stating how much labour (in man-days) was necessary to build specific ships. These quotas clearly show the division of labour in ship construction into as many as 33 different specializations.

The total man-days are quoted as 2,558.5 *gong*.¹⁴ The overall labour costs are given as 76,785 tael. Divided by the total number of man-day, the resulting wages amount to ca. 0.03 tael per labour unit. Table 29 only shows the working time for the most expensive and lavishly decorated ship in the list. The text

12 *Longjiang chuanchang zhi*, chap. 1, fol. 9a, chap. 6. Scheuring, *Drachenfluß-Werft*, p. 30, 137-147.

13 *Ibid.*, chap. 6, fol. 2a. Scheuring, *Drachenfluß-Werft*, p. 135-6.

14 However, when one adds up the posts, the result is 2,564.5 *gong*.

includes the working times for twenty more ship types in three construction series that span the years 1524 to 1553. The expenses and man-days for the largest battleship, the 400 unit¹⁵ flagship of the battleships, were only slightly lower (2,487.1 man-days and 74.61 tael). At the low end, fishing boats with work norms of 80 to 90 man-days for labour costs of 2.52 to 2.1 tael were also built. To give a rough impression of the wage income of a shipbuilder, if we assume an average rice price of 0.58 tael per *shi* (about 70 kg) in the time span 1522-1566,¹⁶ a shipbuilder would have to work 19 days for one *shi* of rice. This means he earned about 0.05 *shi* or 3.5 kg per day. Assuming further a subsistence consumption of 171 kg (or 2.44 *shi*) of rice per person per year in 'Coastal Asia',¹⁷ the shipwright in 1553 would have had to work for 185 days to feed a family of four only with their daily rice needs. 300 working days per year would earn about 15 *shi* (1,050 kg) of rice. Thus, if work was abundant, shipwrights in the Dragon River Shipyard would be able to make ends meet, but if not, they would have to turn to other income sources besides wage labour on the yard, such as subsistence farming on the fields of the yard or family members somehow making up for the lack of wages.

Were these standard wages of 0.03 tael per day so low that everyone would be tempted to defect from the Dragon River Shipyard at the first occasion? Considering other urban skilled wages, for instance 0.033 tael for a construction worker in the private sector, 0.04 tael per day for a weaver, and 0.05 tael per day for a letter carver (with a daily work quota of 100 characters carved)¹⁸, the government wage rate was certainly at the lower end. However, the working conditions at the government shipyard stated in the monograph may well have given the shipbuilders more reason than the moderate norm wages to consider whether it was worthwhile to stay on. Thus, the message of director Li Zhaoxiang is clearly that skilful personnel management might make the difference in keeping the labour force in the service of the state.

The Workforce in the Early and Mid-Qing Period

In the transitional period until around 1700, before the government shipyards were formally reestablished, government ships were constructed

15 The unit *liao* corresponds to about 55 kg, thus 400 *liao* are roughly 20 tons. See Scheuring, *Drachenfluß-Werft*, p. 65, fn. 8.

16 *Zhongguo huobi shi*, p. 849, transl. Monetary History, p. 752.

17 Allen et al., 'Wages, Prices, and Living Standards in China: In comparison with Europe, India, and Japan', 'Table 2: Subsistence Lifestyles', 'Coastal Asia'.

18 All wages from Chow Kai-wing, *Publishing*, pp. 53-54.

at shipyards that were installed ad hoc and according to demand. After the establishment of government shipyards, the artisans were probably hired, as was the case in the late Ming. In Guangdong, about 30 foremen (*touyi*) were employed in the government shipyard at Anfu in Chaozhou prefecture. Their positions could be inherited by their offspring, but this was not the case for hired artisans.¹⁹ The other artisans were hired in the surrounding areas where shipbuilding was developed. This is not to say that shipbuilders were always employed and remunerated according to market conditions. Documentary evidence from the 1736 routine memorials of the Ministry of Public Works shows that the shipbuilders were occasionally requisitioned (*paibo*) to work for the state and rewarded in kind ('rice, salt, and brushwood') but not paid the full wages. The ministerial officials asked for approval to change this system and to account for the working wages in full when applying for shipbuilding. This particular case did not occur at a well-established government shipyard but during ad hoc activities when ferryboats in Shengjing, Manchuria had to be built. We note, however, the awareness of the ministry that even in such situations, wages should have been paid in money and not at depressed procurement prices.²⁰

During the Qianlong era, the government regulations for shipbuilding in Fujian (after 1769) explicitly state the wages of shipbuilders: ship carpenters, joiners, sawyers, caulkers, ironsmiths, tailors, painters and paint makers, rope makers, coir palm workers, rattan workers, character carvers, sturdy labourers (unskilled labour), all at 0.05 tael per *gong* (working day).²¹ This was the average ration accounted for feeding a soldier per day in the early Qing.²² The amazing fact here is that although we find a division of labour into more than ten craft branches and between skilled 'master artisans' (*jiang*) and unskilled labourers (*fu*), the wages still seem as undifferentiated as in the Ming. Extra payment or food rations may have been included but is not documented here.

19 Xu Jianqing, *Qingdai qianqi*, p. 332, quoting from *Guangdong chuanyun shi, Gudai bufen* (History of Guangdong transport, Historical part). Renmin jiaotong chubanshe 1989.

20 *Gongke tiben* 工科題本 (Routine memorials of the Ministry of Public Works), vol. 1, 88, 2-84-1, *Zaochuan gongcheng: Yiban chuanzhi* 造船工程: 一般船隻 (Shipbuilding: Civilian ships), Qianlong 1/6/10, routine memorial by Maizhu 邁柱, Minister of Public Works of the Secondary Capital Shengjing, et al.

21 'Wages paid for armament, military equipment, and shipbuilding workers, 1769 and 1816'.

22 Peng Xinwei, *Zhongguo huobi shi*, p. 849, transl. *Monetary History*, p. 752. See also Luo Ergang, *Luying bingzhi*, p. 344, who quotes a monthly wage of 1.5 tael for a cavalryman and 1 tael for a foot soldier of the Green Standard troops in the first year (1644) of the dynasty. Mark C. Elliott, *The Manchu Way*, p. 192, specifies a monetary wage and grain allowances for the stipend of the bannermen. The monetary part varied according to rank and location of service, with a typical monthly wage of 4 tael in the capital and 3 tael in provincial garrisons.

These regulations apply to all government shipyards of Fujian, namely Fuzhou, Zhangzhou, Xiamen, and Taiwan. A source from the Ming contains a more qualitative appraisal of the different skills of the workforce. The government ships used to exchange tribute with Liuqiu/Ryūkyū (present-day Okinawa) were built in Fujian, and the specific differences of shipbuilding in Fujian are mentioned in a text on the missions to Liuqiu. It claims that the Fuzhou shipbuilders painstakingly maintained the patterns of the regulations but were inflexible; the Zhangzhou and Quanzhou shipbuilders were good at choosing materials and built stable ships, but their workmanship was rough. As a modern naval historian might suppose, these general patterns were also true in the Qing.²³ However, migration may have led to a certain integration of shipbuilding skills and priorities for construction. The Xiamen gazetteer states that since the official shipyard was newly established in 1736, it surpassed and gradually replaced the Quanzhou shipyard and attracted migrant shipbuilders from other regions in Fujian.²⁴

No explicit information is available as to how many artisans worked in one shipyard or of the size of the labour force in official and private shipbuilding. On the basis of evidence for the Ming and Qing periods, Li Bozhong has estimated a workforce of over 10,000 in the Jiangnan region for the grain ships and military ships in the government sector as well as for the merchant and fishing ships built in the private sector. For Jiangnan in the Qing era, he assumes a workforce of several tens of thousands that specialized in government shipbuilding and ship maintenance.²⁵ For a rough estimate of the workforce of government shipbuilders in all provincial shipyards, we set out from Li Bozhong's figures for Jiangnan.²⁶ Since the maintenance cycle of grain ships lasted ten years, after which the ships were routinely broken up, the usable parts recycled and new material used for the rest, one-tenth of the fleet had to be rebuilt every year.²⁷ The grain fleet of Jiangnan consisted of some 3,000 ships according to the 1812 quotas. Li Bozhong assumes 3,750 shipbuilders working permanently (300 days/year) to construct and maintain the annual reconstruction quota of one-tenth (300 ships), which is about 12.5 men per ship in the case of routine work procedures without particular peaks or lulls. For the entire grain fleet of 6,000 ships, this adds up to 7,500 shipbuilders who built the yearly norm of 600 ships.

23 Lai Zhengwei 赖正维, *Ming Qing shiqi*, pp. 80-82.

24 *Xiamen zhi*, chap. 5, p. 154.

25 Li Bozhong, *Jiangnan de zaoqi gongyehua*, p. 264.

26 See table 'Quotas for grain transport ships in the grain providing provinces'.

27 *Huidian shili*, chap. 202, fol. 4a (Kangxi 13, 1674); chap. 935, fol. 5a (Yongzheng 1, 1723).

Likewise, Li Bozhong estimates that 5,000 shipbuilders constructed ten percent of the one-thousand sea ships (flat-bottom sand ships) – that is, around 100 ships every year – that were necessary for the experiment with sea shipments of tax grain in 1826. Since this project was organized and financed by merchants, this figure does not strictly speaking concern the government sector. However, here the ratio of 50 shipbuilders for one ship is of interest. Applied to the entire battleship fleet of roughly 2,400 ships (see chapter four, Table 20 ‘Quotas for coastal and fluvial guard and patrol ships of all sizes’), and setting out from the production figure of one-tenth of the fleet annually, the result is an overall figure of 240 ships x 50 shipbuilders = 12,000 shipbuilders permanently engaged in government naval construction.

Adding up the grain ship and the navy shipbuilders yields a total of roughly 20,000 workmen. Divided by the number of about forty official civilian and military shipyards recorded in the Collected Statutes, this results in a figure of about 400 workmen per government shipyard, which tallies with the original figure of labour obligations reported for the Dragon River Shipyard at Nanjing.²⁸ By the mid-sixteenth century, only half of the artisans remained, but since the other labour was hired on demand, the figure of 400 seems fairly consistent, even if at particular peak periods a greater workforce must have been engaged in the government shipyards.²⁹ Their work load at times was divided among several smaller local shipyards that may have been established temporarily.

The Dragon River Shipyard with an area of about 500,000 square metres was probably the largest shipyard worldwide;³⁰ another contemporary reference shows that, for instance, the Fuzhou shipyard (or one of them)

28 Compare also Xu Jianqing’s estimate that a grain transport shipyard built more than hundred ships yearly and employed several hundred workers, and that a military shipyard had an average production of several dozen of ships yearly. However, this decreased in the nineteenth century; in 1822, the Fujian shipyards, which lacked suitable timber, were ordered to maintain at least the production of one ship per month. See *Huidian shili*, chap. 938, fol. 4a.

29 Li Bozhong, *Jiangnan de zaoqi gongyehua*, on pp. 256/7 cites a statement from Yao Tinglin in *Linian ji* (Annual chronicle) that in 1677, the Songjiang prefecture was ordered to provide fifteen big sand ships for the naval forces. The responsible officials commented: ‘To achieve thousand work units (*gong*) every day and to finish the work in three months is certainly not an easy task.’

30 For comparison, Frederic Lane, *Venice*, p. 362, quotes a size of 60 acres (242,811 square meters) for the Venetian arsenal in the 1560s. In the Mediterranean, this arsenal was only matched in size by the Imperial Arsenal at the Golden Horn in Istanbul, for which no estimates are available. See İdris Bostan, ‘Tersane-i Amire’, p. 559. Its successor that is operative to this day, the Halic shipyards, covers an area of 68,000 square meters. On the Atlantic, the Portuguese Royal Shipyard Ribeira das Naus, judging from the position given on historical and present-day maps, such as the sixteenth-century copper engraving ‘Olisippo Lissabona’, ‘Planta de Lisboa Arruinada pelo

measured only 7,000 square metres (10.5 *mu*) including the artisans' living quarters.³¹

The government shipyards most probably remained the biggest employers in shipbuilding. It is as yet not possible to compare wages in the private shipbuilding sector to those of the government sector, since wage data are extremely rare. We have so far only localized one instance, a payment of 5,000 copper cash for caulking a leaking boat in Baling district in Hunan.³² Judging from the differences in the procurement prices of government ships and market prices (see chapter five, Table 24), ranging from twice to three times the amount for private ships, we can assume that the privately built ships were more carefully worked and more costly materials were used, and that wages may also have been higher. The government obviously paid subsistence wages to its workforce like those of the military, and in fact soldiers may have been employed for auxiliary jobs as in the Ming. One part of the positions in the government shipyards may have been hereditary, linking up to the tradition followed in the early Ming period, but the main workforce was hired. There are no indications that large shipbuilding enterprises existed before the late nineteenth century.³³ Rather, clusters of smaller shipyards may have cooperated when building the larger seagoing ships, so that wage labour may have been quite restricted. Thus, family enterprises would have prevailed as in the supplying sectors of sail and net making.

The Workforce in Private Enterprises after the Opening of the Treaty Ports and in the Earliest Phases of Industrialization

After the Opium War and the opening of the treaty ports, the workforce engaged in shipbuilding increased where the demand was the greatest. At this point in time, foreign manufacturers also offered work opportunities. However, the mechanized production of steamships did not start

terremoto de 1755', and 'Terreiro do Paço' (1879) could have measured maximally about 20,000 square meters.

31 *Shi Liuqiu lu san zhong* [1606], mission of Xia Ziyang 夏子陽, p. 238 'shipbuilding'.

32 Peng Zeyi, *Zhongguo jindai shougongye*, vol. 1, pp. 396-414, translated in 'Wages paid on the free market'.

33 The samples for larger proto-capitalist or capitalist enterprises, depending on the definition, cited by Zhu Cishou, *Zhongguo gudai gongye shi*, pp. 789-804, include mining of iron and copper ores, metal smelting and refining; cotton processing; the Shaanxi timber industry; papermaking; salt wells in Sichuan, sugar production in Taiwan; tea curing; and flour mills; but not shipbuilding. Likewise, Myers and Wang, 'Economic Developments', p. 644, point out that by 1800, 'few private organizations had achieved large-scale size and complexity'.

immediately and everywhere. For several decades to come, the use of wind-propelled vessels also intensified, as the numbers of sailing ships entered and cleared at Shanghai during the years 1902-1941 (Figure 10) show. Rising from 6,379 entries and clearances in 1902 to a peak of 77,420 in 1935, the figure dropped sharply in 1937, when the Republican government was forced out of its capital Nanjing, and Shanghai was occupied by the Japanese, but in 1940 returned to 21,428. At the same time, the number of steamships in Chinese possession rose continuously, with setbacks during the French-Chinese War in 1884 and in the last decade of the Qing dynasty (Figures 11 and 12). On the Upper Yangzi, the turning point for transported tonnage occurred between 1919 and 1920, when the transport volume by steamship rose from 58,728 to 75,386 tons, while the tonnage of sailing ship transports sank from 74,289 to 40,757 tons. The last year with information on sailing ship traffic was 1925, when one sailing ship transported 20 tons of goods. At the same time, the figures of steamships in Chinese possession, first reported in 1882 at 30 and a tonnage of 22,111, had by 1921 risen to 1,592 ships with a transport capability of 183,286 tons (Figures 13 and 14).

From personal observation and statistical evidence, the Chinese Maritime Customs Inspector Worcester concluded that, at least up to 1935, wooden sailing ships had not yet disappeared. However, the junks that did circulate were smaller, and the profusion of ship types seen in the Shanghai harbour in the late nineteenth century existed no longer. Worcester stresses the case of the Fuzhou merchant ships, of which by the 1930s only eleven rapidly disintegrating specimens were left in Chinese waters, the most recent of them twenty years old.³⁴ For a comparison to inland navigation, the 1922-1931 numbers and tonnage of steamships and sailing ships circulating on the Yu river in Guangxi shows that wooden sailing ships still were in use by 1931, even if their number had declined also on this rather minor traffic artery (Figures 15 and 16). In sum, the sailing ships that were still in use in the first half of the twentieth century were smaller and could mainly be found further inland.

Figures on the global situation of the steamships and sailing ships are controversial. French sources state that by as early as 1860, the number of sailing ships worldwide equalled those of steamships.³⁵ The transport volume of steamships as a rule being larger than that of sailing ships, this information conflicts with the statement of a German expert who claimed that the net

34 Worcester, *Junks and Sampans*, p. 194, 197.

35 Cornet, *Etat et entreprises*, p. 19, referring to André Reussner, and Nicolas André, *La puissance navale dans l'histoire, 1815-1914*, p. 37.

volume of the worldwide sailing fleet equalled that of the entire steamship fleet only by 1892, and that by 1900 the steamship tonnage increased to twice the tonnage of sailing ships. He added that by 1907, 15 to 20 percent of all ships were sailing ships and 85 to 80 percent were steamships.³⁶ In any case, not only had the number of sailing ships in China not declined by the end of the Qing dynasty, but the number of steamships was also increasing. Moreover, if steam technology was applied, the engines were often inserted in wooden rather than steel ships, which caused a more gradual transition from traditional ship carpentry to the manufacturing of metal ships.³⁷

As far as is known from written evidence before the mid-nineteenth century, the size of the workforce in private shipyards ranged from family businesses to enterprises that hired workers in the range of a dozen. In accordance with the increased shipbuilding activities, the reports about shipyards for traditional wooden ships show that those that employed a larger workforce date from the end of the nineteenth century. In Sichuan, in the district of Jiangbei ting in Chongqing prefecture on the Upper Yangzi, 40-50 shipyards for wooden boats employed 2,000 shipbuilders, and thus each had a workforce of 40 to 50 persons. They operated permanently and produced 700-800 wooden ships of 30 to 100 tons per year.³⁸ However, in shipbuilding areas such as the Lake Tai region, smaller shipyards could form cooperative clusters that offered work opportunities for local shipbuilders beyond the scope of one single workplace. For one of the Sichuan shipbuilding centres, Wan(yuan) xian, the trade is described as a typical side business for farmers until the Republican era.³⁹ By comparison, a recent account of a typical family business of shipbuilders in Zhoushan in Zhejiang province, which is currently in its fourth generation, describes a workforce during the period between 1925 and 1953 of one father and four sons who were joined by their wives, thus totalling nine persons in peak times.⁴⁰ As for the South China region around Hong Kong, wooden sailing ships were a frequent sight up to the 1970s, and for inland water traffic, sailing ships gave way only gradually to engine-propelled craft.⁴¹

36 Radunz, *100 Jahre*, p. 134, referring to an undated paper by the Bremen mayor Johannes Rösing (1833-1909), *Die Segelschiffahrt und ihre Zukunft*, Bremen.

37 For evidence of the building of traditional sailing ships in Hong Kong in 1979, see Maitland, *Setting Sails*, pp. 57-61.

38 Xu Jianqing, 'Qingdai qianqi', p. 602, citing Xu Zengze 許增澤, *Sichuan gudai zaochuanye fazhan guiji* 四川古代造船業發展軌跡 (Traces of historical shipbuilding in Sichuan).

39 Ibid., citing the local gazetteer *Wanyuan xianzhi* 萬源縣志, chap. 3.

40 Xin Yi, Zheng Ming (eds.), *Putuo chuantong muchuan zhizao jiyi*, pp. 126-139.

41 Maitland, *Setting Sails*, p. 59.

According to Worcester's description of a typical shipyard for Yangzi ships, the working time was from 8 A.M. until dark, with a break of one hour at noon and two hours during the summer months. The shipwrights were usually offered three meals a day by their master. Sawyers and caulkers⁴² formed 'a different class'. Sawyers were initiated into their trade, which was not considered as highly skilled, from their childhood.⁴³

The supplying trades of sailmaking and net making were also specialized. Worcester reports for the 1930s that all nets used in the Ningbo fishing industry were manufactured in only two or three places, where the population mainly or exclusively relied on net production. As in the sailmaking trade, the entire family was engaged. While the sailmakers did not process the yarn or weave the sail cloth on their own, the net makers' families processed the raw material hemp from the stalk to the finished product.⁴⁴

According to Worcester, all work in these handicraft shipyards was exclusively handwork, marking a strong contrast to the fully mechanized workshops of the government and foreign steamship manufacturers.

The Workforce of the Jiangnan Arsenal and the Fujian Navy Yard

Unlike the management of the government shipyards under the Ministry of Public Works, the concerns of the Jiangnan Arsenal and the Fujian Navy Yard were more in the domestic and international limelight. Therefore, the information on its workforce also stands out in clearer profile than the rather indirect conclusions we can gain for the previous periods.

The first big difference between traditional provincial shipyards and their mechanized counterparts was the size of their workforces. At the Jiangnan Arsenal, the workforce rose from about 200 Chinese workers (including 100 from Thomas Hunt and Company and 100 from two smaller Shanghai arsenals that had been retained, as well as eight foreign technicians) to 1,300 Chinese and 13 foreigners by 1869. In 1876 it consisted of ca. 2,000 Chinese workers.⁴⁵ After 1890, the workforce increased to about 3,000.

42 For documentation of shipbuilding at Hong Kong, see the illustrations in figure 1 to 3.

43 Worcester, *Junks and Sampans*, pp. 34-5.

44 *Ibid.*, pp. 178/9, 183 for net makers, with a detailed description of the work processes and the children's tasks, mainly spinning (p. 72). While complimentary to the net makers, Worcester notes that the workmanship of the family sail makers compared unfavourably to those of their professional British counterparts, with an average of only 72 stitches to the square yard against the 120 prescribed by the British Navy.

45 *Jiangnan* 1983, pp. 84-85.

From the monograph on the arsenal published in 1905, Chinese historians have extracted the following figures.

Table 26 Number of workers in the Jiangnan Arsenal in 1905

Work type	Number	Remarks
Skilled workers 工匠	2,314	Including child labour 童工
Unskilled workers for odd jobs 小工	486	
Porters 夫役	40	Not engaged in production
Total	2,840	

Source: *Jiangnan 1975*, p. 22, adapted from *Jiangnan zhizao ju ji*, chap. 2, pp. 13-14. Foremen not included.

However, these workers were not all shipbuilders. At the time of stocktaking, no new ships had been built at the arsenal for twenty years. Nevertheless, the monograph lists the administrative and productive personnel of the 'Steamship plant' *lunchuan chang* as follows: one *weiyuan* (commissioner), two overseers (*sishi*), three foremen (*jiangmu*), 105 skilled workers (*gongjiang*), and 72 unskilled workers (*xiaogong*),⁴⁶ who must have been employed for maintenance and repair services.

The arsenal was guarded by 100 patrol soldiers (*fanghuying*) and 270 artillery soldiers (*paoduiying*) whose task was not only to test the weapons but also to keep the workers under control.⁴⁷ The 133 administrative positions that had accumulated over time were reduced to 80 between 1885 and 1890.⁴⁸

At the Fujian Navy Yard, the workforce rose from about 300 at its foundation in 1867 to 500 in 1869 and to as much as 3,000 at the peak of the construction process. Thereafter, the normal level was about 1,900, including 600 employed at the dockyard, 800 in the workshops, and 500 porters. Moreover, 500 soldiers guarded the premises and were also employed for unskilled manual labour, similar to the case of the Dragon River Shipyard 340 years earlier. The administrative staff was formed by about 150 members, most of whom came from the local gentry.⁴⁹

Both institutions initially encountered difficulties finding skilled labour. According to the 1975 history of the arsenal, at first skilled workers from the Hunt Shipyard were hired but also Qing army soldiers from the smaller

46 Wei Yungong, *Jiangnan zhizaoju*, chap. 2, fol. 4b.

47 *Jiangnan 1975*, p. 19.

48 Cornet, *Etat et entreprises*, p. 26.

49 Pong, *Shen Pao-chen*, p. 209.

Shanghai ammunition and ordnance arsenals that had been merged with the Hunt Shipyard to form the Jiangnan Arsenal. After the arsenal moved to the bigger site in the southern suburbs of Shanghai, new recruitment methods were tried out. Recruitment officers travelled to exterior provinces and hired skilled workers, demobilized Anhui and Hunan soldiers, and children from orphanages.⁵⁰ Working at the arsenal was not popular with the farmers who lived nearby. According to the 1975 history, they resented the fact that their land had been expropriated and worked at the arsenal only if they had gone bankrupt. The 1983 history identifies the fear of machine production and the strict military control of the workplace as reasons for local resentment.⁵¹

Experienced workers were few at the time of the foundation and still by 1894, only eight percent of all Shanghai workers were employed in mechanized production. This constituted 3.84 percent of the workforce in the 'modern industrial' sector of the entire country.⁵² The skilled – and also unskilled – non-local workforce often came from Hong Kong and treaty port cities, especially Canton, Fuzhou, and Ningbo. In 1898, one of the streets in front of the arsenal was called 'Guangdong Street' because many Guangdong natives lived and worked there.⁵³ The Fujian Arsenal initially also experienced a shortage of skilled workers. Blacksmiths and carpenters had to be hired from Shanghai and Hong Kong. Later, most workers could be recruited locally.⁵⁴

In the so-called sub-contractual system (*baogongzhi*), workers were recruited by intermediary agents, often foremen or low-level officials. The workers depended on the recruiters for their wages, and the recruiters were responsible for the workers' personal conduct and work performance. In the arsenal, this method seems to have officially started in the early twentieth century, when about 70 percent of the workers were hired as sub-contractual labour and only 30 percent had a permanent position.⁵⁵ One of the undesirable consequences of the sub-contracting system was that the intermediaries could abuse their power in many ways, and they often squeezed money out of the contract workers. This occurred in the Jiangnan Arsenal as well as in the Navy Yard after the demise of the first director Shen Baozhen.⁵⁶ When considering the wage levels of these institutions, therefore, it is important to keep in mind that not the entire wage may have arrived in the hands of the workers.

50 *Jiangnan* 1975, pp. 17-18.

51 *Jiangnan* 1983, p. 86.

52 *Ibid.*

53 *Ibid.*, p. 87.

54 Pong, *Shen Pao-chen*, p. 208, 212.

55 Cornet, *Etat et entreprises*, p. 127.

56 *Ibid.*; Pong, *Shen Pao-chen*, p. 212.

Working Conditions and Wage Payment

At the Navy Yard in Fuzhou, all workers received contracts for five years.⁵⁷ They worked a six-day week with few holidays, one each in spring and autumn and one week at New Year. A leave of 21 days was granted for mourning deceased parents – which was short in comparison to the hundred-day leave given to the students of the Navy Yard School for the same circumstances. The working hours were 8½ hours in winter, nine in spring and autumn, and ten in summer for the skilled workers, who on average received 7 to 21 tael per month.

Unskilled workers were paid 4.5 to 7 tael per month for an eleven-hour day. Further wage incentives were given to skilled labour recruited in Hong Kong and Shanghai. Foremen could earn 21 to 49 tael a month.

According to the 1975 history, wages at the Jiangnan Arsenal ranged on average between five to ten silver dollars (*yinyuan*) per month, which amounts to 3.75 to 7.5 tael. Skilled wages were about 7.5 tael, while unskilled and children's wages were between 3.75 and 4.5 tael.⁵⁸ Monthly salaries of officials varied from 200 Hunan tael⁵⁹ for a director-general (*zongban*), 150 tael for a director (*huiban*), 80 tael for a coordinator (*tidiao*), and 25 to 30 tael for commissioners (*weiyuan*) and overseers (*sishi*).⁶⁰

On the basis of the 1904 account of the Jiangnan Arsenal, the 1983 history calculated some of the wages.

The 1975 history has a similar table⁶¹ based on the same source but with slightly differing daily rates in silver dollars: skilled workers 0.56 dollars; child workers 0.21 dollars; unskilled workers 0.176 dollars; porters less than 0.1 dollars. The slight difference is due to the fact that the wages were notated as lump sums for the different departments of the enterprise and that the disbursed currencies and rhythms of wage and salary payment differed. Foreign specialists were paid monthly in pound sterling (*yingbang*) and Chinese administrative commissioners in silver tael. Foremen, skilled workers, and child workers received daily wages in silver dollars (*yangyuan*), and unskilled labourers in copper cash.⁶²

Arsenal wages in 1904 were about average for factory work in Shanghai, where skilled carpenters, smiths, and dock workers (*qugong*) earned between

57 The following information about wages, working times, and labour organization are all from Pong, *Shen Pao-chen*, pp. 210–212, who collected them from several sources which show variances in the range of 20 to 40 percent.

58 *Jiangnan* 1975, p. 20.

59 1.0363 Hunan tael corresponded to 1 standard treasury tael.

60 *Jiangnan* 1975, p. 33.

61 *Ibid.*, p. 30.

62 Wei Yungong, *Jiangnan zhizaoju*, chap. 2, fol. 3a.

Table 27 Daily wage rates at the Jiangnan Arsenal in 1904

Designation	Average daily wage (silver dollar <i>yinyuan</i>)	Conversion to tael (calculation by author)	Rice value (<i>shijin</i> 市斤 0,5 kg)
Foreign technician 洋匠	11.433	8.57475	357.28
Managers 委員, 提調, 幫辦	1.773	1.32975	55.41
(Administrative) overseers 司事	0.886	0.6645	27.69
Foremen 匠目	1.746	1.3095	54.56
Skilled workers 工匠	0.652	0.489	20.38
Child worker 幼童	0.207	0.15525	6.47
Unskilled workers 小工	0.166	0.1245	5.19

Sources: *Jiangnan* 1983, p. 89, based on Wei Yungong, *Jiangnan*, chap. 2, pp. 3-14. Rice prices from *Zhongguo jindai gongyeshi ziliao*, vol. 1, p. 1209. Prices for 1904: 1 *shi* (156 *shijin*) 5 dollar (*yuan*), each pound (*shijin*) cost 0.032 *yuan*.

0.6 and 0.85 silver dollars per day. The 'child labour' force (*tonggong* or *youtong*) is explained as a group of 'apprentices' (*yitu*), but in the view of Chinese historians it actually was exploitative child labour. Conclusive evidence about the age at which children started working is not available. One old arsenal worker cited in the 1975 history said that his father joined the arsenal at the age of ten.⁶³ In 1904, about 300 child workers and 400 unskilled workers were employed. The 1975 history states that the conversion between various types of silver dollars (big and small) when the wages were paid out was to the advantage of the officials at the expense of the wage earners. Unskilled labourers were paid in debased cash of low value. Thus, deductions from the wage rates stated in the sources were frequently made. One director in 1903 reported as one of his achievements that during his tenure the wages were paid out in full without deductions; this implies that before then, wages were cut.⁶⁴ As in Fuzhou, the working week had six days. Until 1890, the Jiangnan Arsenal workers had an eight-hour day, but thereafter the norm was nine hours.

Accounts both of the Fujian Navy Yard and the Jiangnan Arsenal stress the huge differences between the Chinese wages and the salaries of the foreign specialists. In Fuzhou, the wages of the foreigners between 1868 and 1874 'constituted the largest item of maintenance': 12,000 tael per month out of total operation costs of between 50,000 and 80,000 tael, while the labour costs for about 2,000 Chinese were 10,000 tael per month. Assuming there were about 50 French and English experts, their average salaries would

63 *Jiangnan* 1975, p. 20.

64 *Ibid.*, p. 31, 33.

have been about 240 tael.⁶⁵ Likewise, the Jiangnan Arsenal salaries ranged between 160 and 270 tael per month.⁶⁶ By comparison, the nominal wages in Fuzhou were slightly higher than those in Shanghai.

Work Discipline and Living Conditions

Since the Jiangnan Arsenal and the Fujian Navy Yard stood under the overall control of the Ministry of War and produced exclusively for defence, military discipline was enforced on the work sites. In retrospect, Shen Baozhen's administrative and educational achievements as director of the Fujian Navy Yard between 1868-1875 stand out clearer than those of his colleagues in Shanghai, the Shanghai Circuit Intendants Ding Richang (1823-1882) and Ying Baoshi, and the Directors Han Dianjia, Shen Baojing, and Feng Junguang. In his study on this administrator, David Pong argues that while Shen had internalized traditional elite values, for instance a disdain for physical labour and exercise, he nevertheless sought to introduce elements of Western learning even in the curricula for the apprentices and the workers and decidedly advocated a general revision of the official educational system. Shen Baozhen vigorously enforced discipline at the shipyard, the schools, and the workers' living quarters. These dormitories at first were overcrowded, but soon more houses were built to provide for more space and to improve hygiene. Movement between the dormitory wards was forbidden at night, and within the wards, drunkenness, gambling, opium smoking, and rowdiness were all heavily sanctioned.

This type of management reflects a Confucian authoritarian approach and also a scholar-gentry bias against the lower classes.⁶⁷ At the same time, while Shen was in control, he tried to enforce the same discipline on all employees of the shipyard, including the mid and low-level administrators, in order to prevent corruption. Punishments could be draconian: one man was tried and executed for stealing brass in 1869.⁶⁸

What did this mean for the workers in the shipyard? Paternalistic attitudes and disregard of physical labour on the part of administrative elites were common in the mid-nineteenth century. Disciplinary enforcement certainly was not unknown in the army and military production sites. Nonetheless, protection against corruption can only have been welcome. Compared to

65 Kuo Ting-yee, 'Self-Strengthening', p. 524.

66 *Jiangnan* 1975, p. 20; Wei Yungong, *Jiangnan zhizaoju*, chap. 2, fol. 9b.

67 Pong, *Shen Pao-chen*, pp. 209-210.

68 *Ibid.*, p. 209.

the Shanghai Arsenal, wages at the Fujian Navy Yard were relatively high. Finally, the young workers had the opportunity to pursue vocational training and basic education in the apprentice classes. The idea that some of the apprentices should receive more intensive training to raise them above the level of foremen probably came from the foreign consultants rather than the Chinese directors, but the fact that they agreed to such reforms shows a degree of openness on the part of the Chinese administrators. The presence of foreigners and the necessity to learn from them in their own languages, although disturbing to orthodox elites outside the shipyard, may have been an attractive benefit for some of the younger workforce.

Reports and assessments of the Jiangnan Arsenal are quite somber, especially with regard to the workforce and the living conditions. The 1975 and 1983 histories are certainly prejudiced against the administration and on some points are rather exaggerated in their indignation. Hardly any contemporary or present-day military production site worldwide would allow its workers come and go without security controls, and harsh punishment in case of disobedience was not exceptional to this industry. The authors' claims of arrogance on the part of the officials towards the workers are plausible; it may well be that the officials – or at least some of them – regarded the workforce as mere 'corvée labourers in official service' (*zai guan renyi*), as the 1975 history charges.⁶⁹ However, it was perfectly clear to the officials that they had to pay these workers, especially the skilled among them, if they were to stay on. That work accidents often occurred and were insufficiently or not at all insured was again a common contemporary phenomenon worldwide in the early industrial phases, which by then was just beginning to be addressed by the labour movements in Western countries. Nevertheless it shows little consideration for the workforce if no invalidity insurances were provided for workers but only for the administrative staff who died on duty.⁷⁰

Moreover, we must take into account the reports on corporal punishment, the exploitation of workers – especially young children – and most of all the poor and cramped housing conditions in the arsenal dormitories with a mere 100 bays (*jian*) of housing for 1,300 workers in low, dark, and moist rooms in the vicinity of the Huangpu River.⁷¹ After some time, the obligation to live in these dormitories was lifted, but for many workers, the housing

69 *Jiangnan* 1975, p. 19.

70 *Ibid.*, p. 34, cites the case of one official of the lowest rank (*sishi*, overseer) who died on duty. His family received a compensation of 2,000 tael. If workers died on duty, the Arsenal only covered the costs of a simple coffin and a low sum for funerary expenses.

71 *Jiangnan* 1975, pp. 20-21. The measure of the bay (*jian*) length varies between 2.5 m and 5.5 m; each room for thirteen workers each can hardly have been more than 30 square meters.

outside the arsenal did not offer much of an improvement. Sometimes these facilities were even worse, with no access to clean water or sanitation. Moreover, between 1870 and 1905, rice prices increased by 66 percent and coal prices by 38 percent, while wages stagnated. As a result, some of the unskilled labour and porters could never afford to marry and have a family. In the case of families, all members had to work to support themselves – a fact that on its own cannot be considered an indication of exploitation in the contemporary context, even if the 1975 history implies this.⁷²

Strikes and workers' protests in the Jiangnan Arsenal were triggered by the long working hours and the brutal treatment workers received from officials and overseers. The first recorded strike occurred in 1883, and between 1905 and 1927, about ten strikes were resolved.⁷³ In view of the unfavourable conditions, the number of strikes may seem to be low, but the workplace was heavily guarded and protesters were more likely to be heavily punished than in other industries. At the Fujian Navy Yard, at least during Shen Baozhen's term of administration, no strikes were reported.⁷⁴

The Fujian Navy Yard may have been a better organized workplace in its initial phase with a more enduring leadership, slightly higher wages, and better housing facilities. The military drill and discipline may have been stricter here, but since the orientation towards shipbuilding and the acquisition of skills was clear from the beginning, also for apprentices, technical learning may have been easier to accomplish in this institution.

Conclusion

From the perspective of the artisans, the observed periods witnessed change and acceleration in much more drastic ways than in the centuries before. The Ming-Qing transition brought about the legal abolition of corvée labour. As a rule, labour was hired in the government shipyards, but for building the ships of the naval forces, soldiers were probably engaged as unskilled workers, as in the late Ming. The scant evidence we possess suggests that building ships for the government was not well paid. Clearly the prices for

72 See *ibid.*, p. 31, for a case where an Arsenal worker raised vegetables after work and sold them to increase the family income, while his 14-year old son also worked in the Arsenal and his daughter made stockings.

73 Cornet, *Etat et entreprises*, p. 138.

74 The only report of unrest at the shipyard dates from 1899, when a contest of skills between the Chinese and foreign workers flared up into a riot. Chinese workers were wounded, and a strike followed. Li Yunjun, *Wan Qing*, p. 786, Nov. 28.

government ships were procurement costs at a rate much lower than those on the free market. The question remains whether this price difference was mainly due to the prices for materials, which had been rising since the late Ming, or whether it was also affected by the artificially low wages paid by the government.

The rise of steam navigation in China proceeded at a fairly slow pace, while trade volumes increased much faster due to China's rising participation in the world market. Traditional wooden sailing ships were built by private shipyards for at least one or two more decades after the fall of the Qing dynasty. In the area of mechanized production of steamships, artisans turned into industrial workers. We may wonder whether that was a desirable process for those personally involved. Initially, the wages and working hours seem to have been more acceptable; but inadequate housing and the strict military control of work on the sites, at least in the Jiangnan Arsenal, must have made work unattractive. The situation deteriorated rather than improved after the arsenal was managed as a private enterprise. Nevertheless, this was a place for learning mechanized production on the job as well as for receiving a more formalized education. Moreover, working conditions for apprentices in the private sector, judging from the accounts given in Reed's work on early printing machinery production, do not seem to have been much better.⁷⁵ The Shanghai Arsenal was an important institution for spreading technological know-how, despite difficult working conditions. It is no coincidence that in the early days of the printing machine industry – in which Shanghai became leading in the early twentieth century⁷⁶ – mechanics who had previously worked at the arsenal started to develop machines rather than just concentrating upon repair and maintenance.⁷⁷

Shipbuilding between the seventeenth and early twentieth centuries passed through two phases of more rigorous control by the central government and the gradual takeover by regional and merchant elites: between the 1650s and the 1830s, and between the mid-1860s and the end of the dynasty. In the second, much shorter phase, government shipbuilding served as a kind of catalyst that eventually spread new knowledge and skills into sectors that were beyond the direct influence of the government. Thus, even if government institutions could not promote economical production and could not keep up with the latest technology, they were actively behind the launch of modernization in shipbuilding and in the supply of raw materials in China.

75 Reed, *Gutenberg*, p. 147.

76 *Ibid.*, p. 134.

77 *Ibid.*, p. 146.

Figure 7 Construction of wooden sailing ships in the 1970s, Hong Kong



Throughout his work *Setting Sails*, Derek Maitland stresses the continuity in the construction of junks up until the late 1970s. The illustrations for the book were taken by photographer Nik Wheeler, who kindly provided several of his pictures and granted permission to reproduce them.

Figure 8 Compartments within the hull construction



Fotograph: Nik Wheeler, reproduced with permission. See also Maitland, *Setting Sails*, p. 60.

Figure 9 The caulking procedure



Fotograph: Nik Wheeler, reproduced with permission. See also Maitland, *Setting Sails*, p. 61.

Appendix

Table 28 Regular positions in the imperial Dragon River Shipyard, Nanjing, 1553

Number of staff	Chinese	Transcription	Translation
40	廂長	<i>xiangzhang</i>	Group leaders ¹
45	作頭	<i>zuotou</i>	Foremen ²
38	內官監匠	<i>neiguanjian jiang</i>	Artisans for the Eunuch Bureau ³
4	御馬監匠	<i>yumajian jiang</i>	Artisans for the Imperial Stables ⁴
3	丁字庫匠	<i>dingziku jiang</i>	Artisans of the T-shaped storehouse ⁵
2	寶船匠	<i>baochuanchang jiang</i>	Shipbuilders of the Treasure Ship Shipyard ⁶
3	酒醋麪庫匠	<i>jiucumianju jiang</i>	Artisans in the Imperial Wine and Vinegar Press and Noodle Store ⁷
37	後湖水夫	<i>houhu shuifu</i>	Sailors of the Posterior Lake ⁸
20	看料匠丁	<i>kanliao jiangding</i>	Artisan-guardians for the material storage ⁹
15	更夫	<i>gengfu</i>	Night watchmen
4	橋夫	<i>qiaofu</i>	Bridge guards
1	腳頭	<i>jiaotou</i>	Foreman of the porters
	船戶	<i>chuanhu</i>	Shippers
	佃戶	<i>dianhu</i>	Tenants
16	上作頭	<i>shangzuotou</i>	Superior foremen, ¹⁰ working as:
3	蓬作	<i>pengzuo</i>	Sailmakers
1	旗作	<i>qizuo</i>	Flag maker
1	油畫作	<i>youhuazuo</i>	Painter and paint maker
1	鼓作	<i>guzuo</i>	Drum maker

1 Group leaders: The artisans were divided into four groups (*xiang*) according to their specific branch: 1) Makers of wooden parts, oars, and ropes; 2) Shipwrights, smiths, and ropemakers for heavy ropes; 3) Caulkers; and 4) Mat and sailmakers. Each group was divided into ten units (*jia*), and each of the ten units originally consisted of ten families. Each group was supervised by a group leader, who was chosen among them on a rotational basis for three months. Many of the artisans quit, however, so that the actual figures are given as 245 in 1541 and below 200 in 1551. See Scheuring, *Drachenfluß-Werft*, p. 84.

2 Foremen were chosen from the families that rendered more than one member's labour.

3 Artisans for the Eunuch Bureau: Shipyard artisans who worked for the eunuchs in the palace and formed ceremonial vessels. The shipyard paid their wages.

4 Artisans for the Imperial Stables: Shipyard artisans who produced mangers and drinking buckets for the Imperial Stables.

5 Artisans in the T-shaped Storehouse built wooden containers for fish oil used in caulking.

6 Although the storehouses of the Treasure Ship Shipyard were dilapidated, two artisans were commanded to work there.

7 The artisans in the Imperial Wine and Vinegar Press and Flour Store were hired out, like their colleagues who were sent to the Imperial Stables.

8 This was a popular odd job for shipyard artisans because work was lighter than in the yards.

9 Artisan-guardians for the material storage: Originally the artisans worked as guardsmen, too, but this assignment was stopped in 1508, and people from outside were hired for the security service.

10 The Superior foremen were directly subordinated to the Ministry of Public Works and probably responsible for special tasks, such as interior decoration.

Number of staff	Chinese	Transcription	Translation
1	銅作	<i>tongzuo</i>	Coppersmith
1	系條作	<i>taozuo</i>	Cord and ribbon maker
1	鑄作	<i>zhuzuo</i>	Metal caster
1	蝟殼作	<i>likezuo</i>	Shell polisher
1	穿椅作	<i>chuanyizuo</i>	Chair maker
1	貼金作	<i>tiejinzuo</i>	Gilder
1	纓作	<i>yingzuo</i>	Tassel maker
1	旋作	<i>xuanzuo</i>	Jade carver
2	箍桶作	<i>gutongzuo</i>	Vat makers

Source: Scheuring, *Drachenfluß-Werft*, pp. 84-9, *Longjiang chuanchang zhi* chap. 3, fol. 8a.

Table 29 Labour force required for the construction of a Big Imperial Ship On Permanent Duty *Yubei da huangchuan* 預備大黃船, 1503

No.	Craft branch	Transcription	Translation	Working units (man-days)
1	船木作	<i>chuanmu zuo</i>	Shipwrights	780
2	鋸作	<i>Juzuo</i>	Sawyers	225
3	裝修作	<i>zhuangxiu zuo</i>	Interior decorators	310
4	雕鑿作	<i>diaoluan zuo</i>	Wood carvers	58
5	鋸作	<i>Juzuo</i>	Sawyers	74
6	艙作	<i>nianzuo</i>	Caulkers	300
7	舂灰, 搗麻, 扯鑽	<i>chunhui, qima, zhizuan</i>	Lime grinders, hemp cutters, nail hole drillers	43.5
8	鉄作	<i>tiezuo</i>	Ironsmiths	130
9	上鉄作	<i>shang tiezuo</i>	Superior smiths	27.5
10	蓬作	<i>pengzuo</i>	Mat makers	91.5
11	索作	<i>suozuo</i>	Rope makers	74
12	上索作	<i>shang suozuo</i>	Superior rope makers	1.5
13	纜作	<i>lanzuo</i>	Truss makers	29.5
14	竹作	<i>zhuzuo</i>	Bamboo winders	20.5
15	油漆作	<i>youqi zuo</i>	Painters, paint makers	133
16	五墨作	<i>wuhei zuo</i>	Paint makers	32.5
17	粧鑿作	<i>zhuangluan zuo</i>	Curtain makers and interior decorators	8
18	抹金作	<i>mojin zuo</i>	Gilders	4
19	旗作	<i>qizuo</i>	Flag makers	6
20	鼓作	<i>guzuo</i>	Drum makers	6
21	蝟殼作	<i>like zuo</i>	Shell polishers	23.5
22	纓作	<i>yingzuo</i>	Tassel makers	2.5
23	旋作	<i>xuanzuo</i>	Winch makers	5

No.	Craft branch	Transcription	Translation	Working units (man-days)
24	染作	<i>ranzuo</i>	Dyers	103
25	裁縫作	<i>caifeng zuo</i>	Tailors	9.5
26	擺錫	<i>boxi zuo</i>	Tin casters	1.5
27	雙綫作	<i>shuangxian zuo</i>	Leather workers	2
28	絲作	<i>taozuo</i>	Silk ribbon makers	4
29	穿椅作	<i>chuanyi zuo</i>	Hammock chair makers (?) ¹	6
30	桶作	<i>tongzuo</i>	Vat makers	12.5
31	銅作	<i>tongzuo</i>	Copper smiths	21.5
32	響銅作	<i>xiangtong zuo</i>	Gong and bell makers	14
33	鑄作	<i>zhuzuo</i>	Metal casters	5

Source: Scheuring, *Drachenfluß-Werft*, p. 159, *Longjiang chuanchang zhi*, chap. 7, fol. 2a-3a.

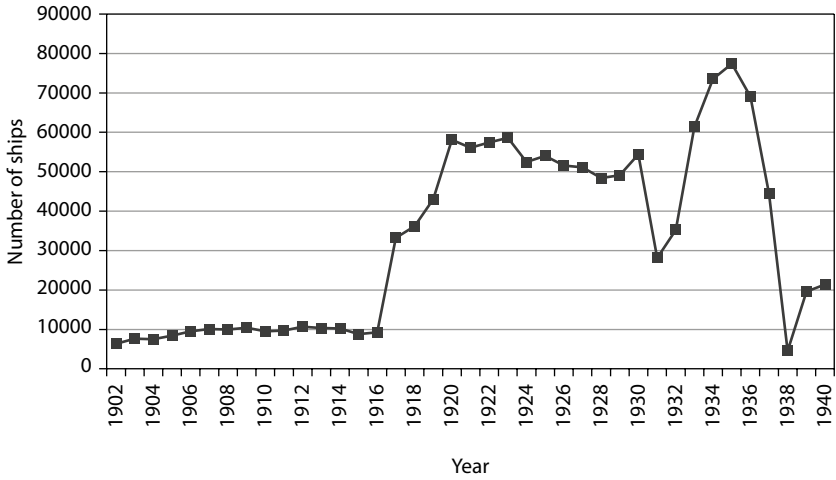
¹ Scheuring translates this as 'Hängestuhlbauer' (*Drachenfluß-Werft*, p. 159).

Table 30 Shipping tonnage of the China Merchants' Steam Navigation Company and the China Navigation Company (founded in 1872 by Butterfield and Swire)

	China Merchants' Steam Navigation Company		China Navigation Company	
	Number of Ships	Tonnage	Number of Ships	Tonnage
Fleet during 1877	33	23,967	5	8,361
Additions, 1877-93	16	15,378	34	36,630
Losses and Wrecks, 1877-93	9	6,759	9	9,837
Dismantled, 1877-93	11	7,128	1	611
Sold, 1877-93	3	2,174	-	-
Fleet during 1893	26	23,284	29	34,543

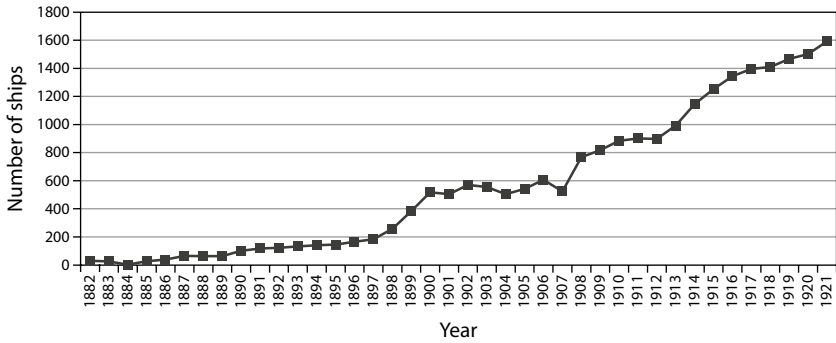
Source: Liu Kwang-ching, 'Steamship Enterprise in Nineteenth-Century China', p. 452.

Figure 10 Number of sailing ships entered and cleared in Shanghai, 1902-1941

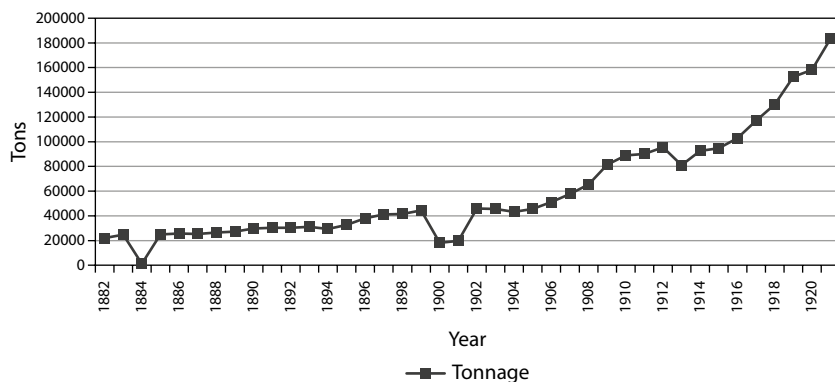


Source: Worcester, *Junks and Sampans*, p. 198, referring to the statistics of the Tidesurveyor's Office, Chinese Maritime Customs, Shanghai.

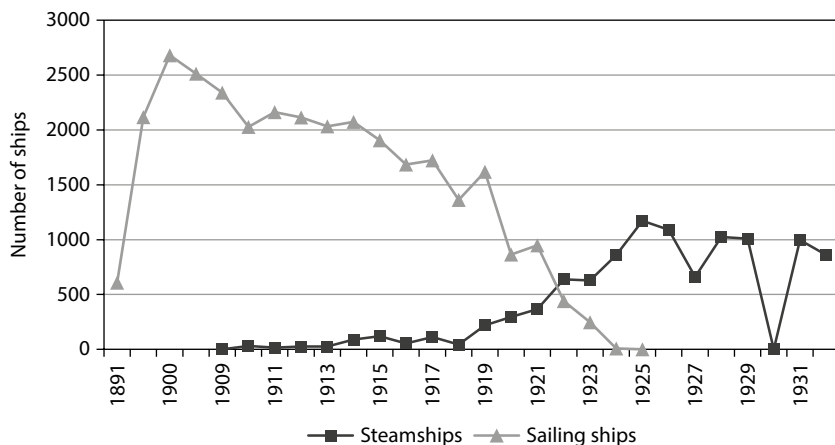
Figure 11 Number of steamships in Chinese possession, 1882-1921



Source: Yan Zhongping, *Zhongguo jindai jingjishi tongji ziliao xuanji*, p. 227. Based on the *Decennial reports* of the Shanghai Maritime Customs.

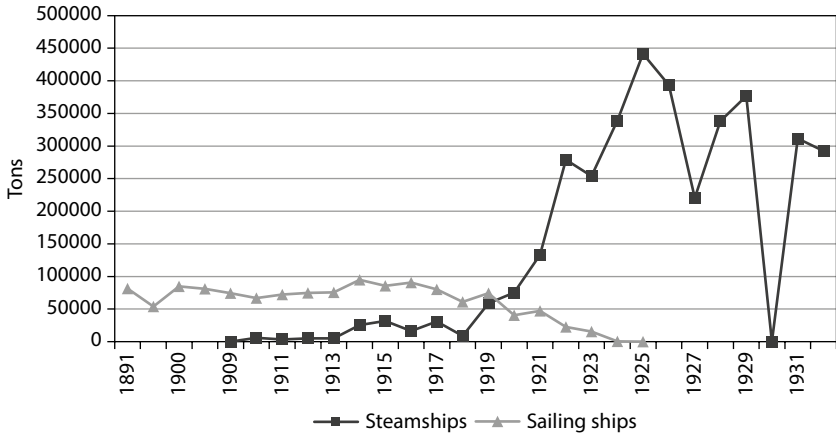
Figure 12 Tonnage of steamships in Chinese possession, 1882-1921

Source: Yan Zhongping, *Zhongguo jindai jingjishi tongji ziliao xuanji*, p. 227.

Figure 13 Numbers of steamships and sailing ships on the Yangzi in Sichuan, 1891-1932

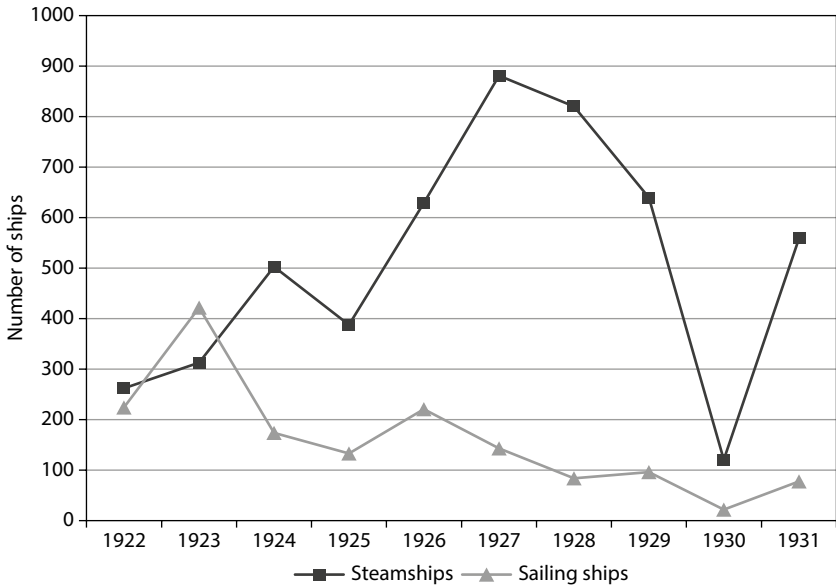
Source: Yan Zhongping, *Zhongguo jindai jingjishi tongji ziliao xuanji*, p. 227. The ships circulated on the Yiyu line 宜渝线 between Yichang in Hubei and Chongqing in Sichuan.

Figure 14 Tonnage of steamships and sailing ships on the Yangzi in Sichuan, 1891-1932



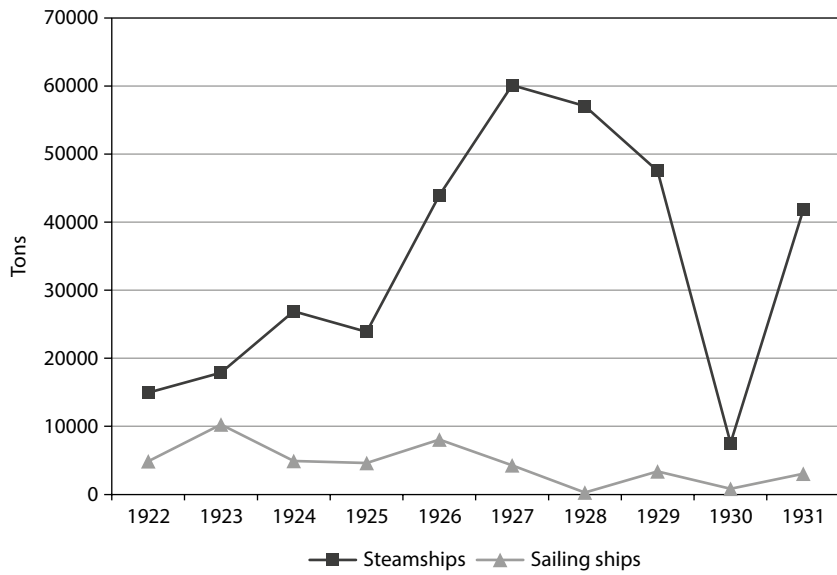
Source: Yan Zhongping, *Zhongguo jindai jingjishi tongji ziliao xuanji*, p. 227.

Figure 15 Number of steamships and sailing ships on the Yu River in Guangxi, 1922-1931



Source: Yan Zhongping, *Zhongguo jindai jingjishi tongji ziliao xuanji*, p. 236. The ships circulated on the Yu River 郁江, a tributary to the Xijiang 西江, between Nanning in West Guangxi and Wuzhou in East Guangxi.

Figure 16 Tonnage of steamships and sailing ships on the Yu River in Guangxi, 1922-1931



Source: Yan Zhongping, *Zhongguo jindai jingjishi tongji ziliao xuanji*, p. 236.

7. Printing in the Service of the State

Introduction

The duplication of texts and illustrations with prefabricated moulds does not belong to the field of subsistence technologies but constitutes one of the cultural foundations of the East, West, and South Asian, European, and North African civilizations and is one of the basic requirements of most governments. Rulers strove to control this means of communication, even if on a different level than shipbuilding or the manufacturing of weapons.

In this section, we will explore printing in the service (and under the direct supervision) of the state as well as printing in the private economy with respect to the question whether the state exploited and tightly controlled the private sector. Moreover, on the basis of the model of dynastic rise, flourishing, and decline and the takeover by local elites and regional governments in the later part of the dynasties, we will inquire into the modernization efforts of the central and provincial governments. Finally, we will look at the situation of masters and workers in the printing trade and find clues about the social position of 'artisans' and 'merchants' in the trade.

Like its predecessors since the Song, the Qing dynasty used printing not only to distribute information to all levels of administration and to educate a narrower target group of pupils and students preparing for official examinations on the state orthodoxy but also to educate (*jiaohua*) all the emperor's subjects in morals. Unlike the preceding Ming rulers, the Qing were not Han Chinese. They spoke a different language and used a different script but still had to present themselves as the patrons and legitimate defenders of Han Chinese civilization. Had they not done so, they would have faced great difficulties in securing the administrative knowledge and skills of the Chinese scholar-official elite. And anything but co-operation was out of the question, given the numerical ratio of the Manchus to the Han Chinese. Therefore the Qing adopted and refined the state examinations as their basic method for fostering a meritocracy educated in the Confucian state orthodoxy with its texts and commentaries. However, the state orthodoxy of the Qing left room for other belief systems as long as they did not clash with the ruling system. From time to time,

the government also sponsored printing projects of the basic religious texts of Buddhism.¹

Technically, the craft of printing during the Qing was executed mainly as woodblock printing (xylography), which leaves the mirror image of the printing parts of the block in relief and cuts away all non-printing parts. To a much smaller extent, movable type made of wood, metal alloys based on copper or tin, clay, or enamel was also used. From the nineteenth century on, missionaries introduced lithography and letterpress printing with cast metal type, mainly lead. This type of printing was also promoted by the first foreign newspaper entrepreneurs in the treaty ports. Gravure printing with copperplate had been brought to the Qing court by missionaries in the early eighteenth century but did not become a broadly accepted medium in the private printing workshops.

On various levels, the government engaged in printing and established permanent or temporary printeries. The so-called 'palace editions' (*dianben*) stood out for their editorial, technical, and artistic quality throughout the dynasty. However, in this field of cultural production, the Qing court and central government took much longer to adopt new technologies and devices than in the military and shipbuilding sector. Printing did not belong to the top priorities for modernization before the twentieth century.

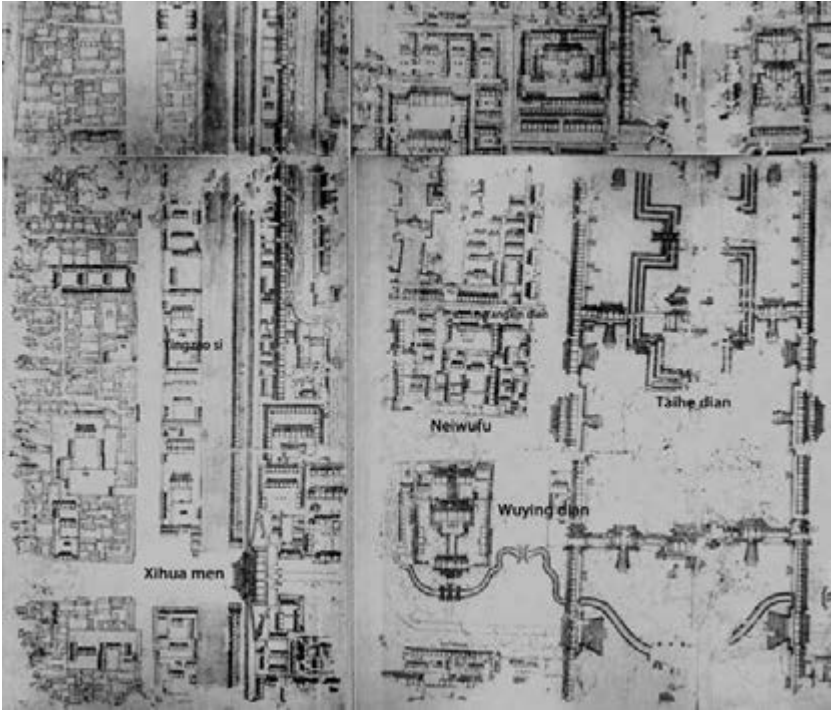
Printing in the Palace: Scope and Output of the Workshops at the Hall of Martial Valour

The single most famous printing agency of the central government was the printery in the Hall of Martial Valour (*Wuying dian*) within the Forbidden City. It was situated next to the western palace gate *Xihua men*, south of the administrative buildings of the Imperial Household Department – to which it was subordinate² – and west of the central, highest-ranking throne hall *Taihe dian*, the Hall of Supreme Harmony (see Figures 17-19).

1 The largest government printing project for Buddhist texts was the *Longzang* 龍藏 (Dragon Tripitaka), comprising 1,662 works, which could be completed in the relatively short time of three years (1735 to 1738) by using some of the old printing blocks carved during the Ming period. See Tsien Tsuen-hsuin, *Paper and Printing*, p. 185.

2 On the relationship between the *Wuying dian* printery and the Imperial Household Department, see Yang Yuliang, 'Wuying dian xiushuchu ji neiwufu xiushu ge guan', especially the organizational charts on p. 39 and 40.

Figure 17 Position of the Wuying dian Printery within the Imperial Palace in Peking



Source: Based on *Kenryū keijō zenzu/Qianlong jingcheng quantu*, fold 7, p. 6-7, and fold 8, pp. 6-7.³

During the Ming-Qing transition, the pretender Li Zicheng (1606-1645) occupied the Ming palace in 1644 and chose this compound as his government seat. After the Manchus took over Peking later that year, the regent Dorgon set up his administrative seat here. In 1680, the production site Wuying dian Palace Workshop (Wuying dian zaobanchu) was first established here. In 1729, it was explicitly named Wuying dian Book Production Site (Wuying dian xiushu chu) after some workshops that were not directly related to printing – such as the ateliers of the ink slab makers, the enamel makers, and the painters – were relocated to the workshops at the palace

3 The importance and accuracy of the map of the Imperial City produced during the early years of the Qianlong reign (ca. 1740) has been pointed out by Yang Naiji, *Qianlong Jingcheng quantu kaolue*. For a recent investigation of palace workshops Yangxin dian zaoban chu on the basis also of this map, see Zhang Xueyu and Li Xiaocen's study 'Qinggong Zaobanchu chengli ruogan wenti xintan', p. 9.

Figure 18 Entrance of the Main Hall of Wuying dian



Figure 19 Entrance to the Wuying dian compound



Source: Photographs taken by the author in August 2006, after the compound had been renovated and reopened to the public.

hall *Yangxin dian* (*Yangxin dian zaoban chu*).⁴ Prior to 1680, printing had taken place in the Imperial Household Office of Rites, as under the Ming, and since the styles and layouts of early Qing printing strongly resembled that of the late Ming, it has been assumed that the Qing may have retained the personnel from the Ming palace printery, the so-called ‘classics manufactory’ (*jingchang*).⁵

The printing activities of the central government flourished between 1729 and c. 1805. With a permanent staff of about one-hundred, the highest quality of materials, and sometimes even personal supervision by the emperors, the ‘palace editions’ were products of the highest quality that were distributed not only to the capital offices but also to the provincial governments. The government promoted the reproduction of these exemplars (model editions to be used for reprinting) by provincial government printeries and also by private publishers. The palace editions were also sold in less luxurious binding and paper.

Statistics on the total output of the *Wuying dian* are not available; Chinese book historians have estimated an output of at least 381 by 1805,⁶ but an analysis of provincial holdings and the imperial library at the secondary capital Shenyang (Shengjing) reveals that the number of imprints until the end of the dynasty was 572.⁷ The texts include personal writings by the Qing emperors; histories of previous dynasties; reprints of the historical, philosophical, and literary writings of previous dynasties; records of military campaigns of the Qing and its expansion to the West; dictionaries, encyclopedias, and collectanea; literary works; and, last but not least, some works introducing European sciences, especially astronomy, cartography, and mathematics that were written by the Jesuit missionaries of the late seventeenth and early eighteenth century. The output of the palace printeries – expressed in the four traditional bibliographic categories of the Confucian canonical classics, histories (and all types of administrative guides and handbooks as well as legal codices), thinkers (including scientific and proto-scientific writings, fine arts, encyclopedias, as well as Buddhist and Daoist writings and canons), and literary collections (including prose, poetry, and drama) is as follows:

4 Liu Qiang, ‘Qing *Wuying dian*’, p. 266.

5 *Ibid.*

6 Lu Shaw, *Imperial Printing*, p. 15.

7 Liu Qiang, ‘Qing *Wuying dian*’, p. 266, referring to Zhu Saihong, ‘*Wuying dian*’, pp. 29-30, who quotes from the Annotated bibliography of Qing Imperial Household printings *Qingdai neifu keshu mulu jieti*. However, Zhu points out that not all ‘Imperial printings’ or ‘palace copies’ were produced in the *Wuying dian*.

Table 31 Output of palace edition printings, in numbers of titles, since the foundation of the Wuying dian printery in 1680

Era [Number of years]	Text category	Canon <i>jing</i>	History <i>shi</i>	Thinkers <i>zi</i>	Literary collections <i>ji</i>	Collectanea <i>congshu</i>	Total	Average per year
Kangxi (1662) 1680-1722 [43]		1	1	1			3	0.06
Yongzheng 1723-1735 [12]		1	3	1			5	0.4
Qianlong 1736-1795 [60]		31	156	28	24	148	387	6.45
Jiaqing 1796-1820 [25]			38	6	27		71	2.84
Daoguang 1820-1850 [31]		4	25	8	9		46	1.48
Xianfeng 1851-1861 [11]		1	10	6	5		22	2
Tongzhi 1862-1874 [13]			4	7	1		12	0.92
Guangxu 1875-1908 [34]			7	12	1		20	0.58
Xuantong 1909-1911 [3]			4				4	0.75
Unknown date		1	1				2	
Total 268 [250]		39	249	69	67	148	572	2.28

Source: Zhu Saihong, 'Wuying dian', p. 30, referring to *Qingdai neifu keshu mulu jieti*.

Lu Shaw, in her account of the printer, dates the period of decline in printing to after 1805. On the basis of recent research, the nineteenth century does not seem quite as bleak, but it is clear that the Qianlong era constitutes the peak of production of high-quality prints. In the nineteenth century, the printing activities at the Wuying dian were continued even though its finances were cut in the 1840s due to urgent government expenses for the Opium War. A fire destroyed the greater part of the Wuying dian in 1869 as well as most books and some of the printing blocks. It was rebuilt but was struck by lightning in the Guangxu era; in 1901, the hall burned down once again.⁸ After 1869, much of the printing was delegated either

8 Schierlitz, 'Zur Technik', p. 37, referring to Osvald Sirén, *The Imperial Palaces of Peking* (Paris 1926), Luther C. Goodrich, *The Literary Inquisition of Ch'ien-lung* (Baltimore 1935), and

to provincial printing offices that proliferated and blossomed after the mid-nineteenth century or to private printing enterprises by mediation of the Office of Foreign Affairs (*Zongli yamen*). However, archival records show that on a much reduced scale, the Wuying dian printery was active until at least 1910.⁹ However, the main impetus and innovatory energy after the mid-nineteenth century was to be found in the provincial printeries and private printing enterprises.

Large Printing Projects with Movable Types

As the above table shows, the highest output of individual works was during the Qianlong era. Yet counting individual titles or titles in collections gives a skewed view. The huge encyclopedia *Gujin tushu jicheng* (Complete collection of old and new illustrations and texts), which was begun under the Kangxi and finished under the Yongzheng emperor, is exceptional in its size, boasting over 10,000 chapters bound in 5,020 volumes, as well as being impressive in terms of the technical process of its production.¹⁰ The edition was printed with movable copper type in about sixty sets over three years from 1726 to 1728.¹¹ An estimated 230,000 to 250,000 copper (or rather, brass) types were produced for the purpose.¹² Present-day scholars generally believe that these types were not cast but carved.¹³ The type carvers received piece wages of 0.025 tael per type produced, while those carving wooden types were only paid 0.08 to 0.14 tael for one-hundred types. This is a difference that is more feasible if the types for the *Gujin tushu jicheng* were carved, since it takes much more effort to carve metal than wooden types or to cast metal types.¹⁴

Paul Pelliot, 'Notes de bibliographie chinoise', *Bulletin de l'Ecole française de l'Extrême-Orient*, 2/1902. See also Zhu Saihong, 'Dianben', p. 60.

9 The booklet 30, 'Qianliang dice' 錢糧底冊 (Money and food provision accounts) of the Wuying dian documents in the First Historical Archives dates from 1910. *Neiwufu ... boce*, no. 432-5-41.

10 Lionel Giles, *Index*, p. ix, has estimated the volume of the *Gujin tushu jicheng* to cover about three to four times the content of the eleventh edition of the *Encyclopedia Britannica* (1911, 29 vols.). According to Lothar Ledderose, *Ten Thousand Things*, p. 141, the compilation of this encyclopedia also inspired French and English encyclopedists who brought out the French *Encyclopédie* (printed 1751-1765) and the first edition of the *Encyclopedia Britannica* (printed 1768-1771).

11 See Lu Shaw, *Imperial Printing*, pp. 48-49, for the controversy on the number of sets printed.

12 In Korea, where printing with metal movable type was more common than in China, various alloys are known in which the copper content ranged between 50 and 70 percent. See Table 32.

13 Lu Shaw, *Imperial Printing*, p. 47.

14 'Wages for Printing'.

However, the types were not preserved but in 1744 were melted down for coin production. Why this was done is not clear. The value of the carved types should have been much higher than that of mere scrap material for coinage. Moreover, the mass of brass alloy cannot have made an enormous difference to the output of monetary coins. Even assuming that the entire set of 250,000 types was melted down, this would have yielded between 700 and 800 strings of thousand cash, if the alloy was more or less the same as that used for coinage (see Table 32). In the 1740s, the Metropolitan Mints produced a yearly total of 700,000 to 1.5 million strings or 58,333 to 125,000 strings per month.¹⁵ Between 1741 and 1745 (Qianlong 6 to 10), the entire annual output has been estimated at an average of 2.1 million strings.¹⁶ The material obtained from the printery can therefore hardly have made a big difference in the monetary liquidity of the capital. The 'Palace history of the Qing' explains this action of recycling as a cover-up for graft. According to this source, the custodians of the copper type storehouse had stolen part of the types and, taking advantage of an actual shortage of coins in the capital, suggested to have the types melted down for coin production.¹⁷ Another source states that more than half of the original types were found to be missing; if that was so, even less was gained by melting the types.¹⁸

Several reasons may have prompted the emperor to consent to the destruction of the type. First, if there was a perception of an actual scarcity of material for coinage, and together with this, the notion that since the use of brass was time and again restricted or entirely forbidden by imperial decree,¹⁹ the court should show a good example and do away with all unnecessary items made of that scarce material.²⁰ Or did the emperor

15 Vogel, 'Unrest and Strikes', p. 395.

16 Burger, 'Minting', p. 392.

17 Lu Shaw, *Imperial Printing*, p. 48, citing *Gongshi xubian*, chap. 94, fol. 4a. Tsien Tsuen-hsuei, *Paper and Printing*, p. 216, citing *Huidian*, chap. 1199, fol. 1b. See also Jin Jian, *Wuying dian juzhenban chengshi*, fol. 1b/2a, who comments that 'the yield was limited and the loss enormous' (*suode youxian er suohao shenduo* 所得有限而所耗甚多) when the copper types were melted down.

18 Lionel Giles, *An Alphabetical Index*, p. xvii, citing Wu Changyuan 吳長元 (fl. 1770), *Chenyuan shilue* 宸垣識略 (An outline of knowledge about [everything within the Peking] city walls, 1788).

19 Vogel, *Chinese Central Monetary Policy*, in sect. II.3 and III.1.c describes brass prohibitions, in 1673, 1679, and 1726-1736, but also several control measures against the melting down of coins and counterfeiting after the ban was officially lifted. Thus, in the years 1744-1745, when the Wuying dian types were melted down, hundreds of Peking brass manufacturers and dealers were ordered to move to workshops provided by the government where their trade would be supervised by officials.

20 For the year 1781, about 655 strings were actually reported as cast from salvaged copper in the Peking mints. See Werner Burger, 'Minting', p. 383.

and court administration try to save what could be saved before the types entirely disappeared from the storehouse? Or does this case show that although the printing project of the *Gujin tushu jicheng* was successfully finished, movable types made of copper were deemed too much of a luxury when wood, the more conventional printing material, would have served its purpose just as well?²¹

Another possible explanation that has so far not been discussed in the literature would be that at least part of the types were worn down and actually had to be recycled. Since one copy of the encyclopedia has about 100 million characters, after a print run of 64 copies, if each of the 250,000 types was used regularly (which is not probable); it would have been applied more than 25,000 times. It is more likely, however, that some of the types were used much more often and some rare ones were hardly taken out of the sorting cases at all. Cast lead types can be used for many more print runs before they are worn down.²² However, if the types used in this project were carved, and if what Christopher Reed concludes for tin types applies also for copper (de facto brass) types – namely that ‘brushing’ the paper onto the printing forms rather than ‘pressing’ it in a Gutenberg-style printing press wears down the types much sooner²³ – then at least some of them may have been defect after the printing was completed.

At any rate, the technique of printing with metal movable type was successfully applied for a project of enormous dimensions, but thereafter its use was discontinued in the palace printery. There were certainly economic reasons that made the use of metal movable type seem wasteful: the process of typesetting – which involves finding the right characters in a set of ca. 25,000 different characters and sorting back the characters into the type cases after the printing was finished – rather than carving the printing blocks must have seemed too time-consuming. Moreover, the option of carving rather than casting types further slowed down the procedure and made it very costly. At the same time, manpower and storage space were abundant in the palace, and metal casting was a well-known everyday technology in the workshops of the central government, most prominently for casting cash. The *Gujin tushu*

21 The reverse case, when monetary metal was requisitioned for making type, occurred in 1910. From the mint of the Ministry of Revenue, Baoquanju 寶泉局, closed down in 1910, 977,500 jin (583,372 tons) of lead were requisitioned for the lead-type letterpress of the new ministerial printery. See Chen Zhen, *Zhongguo jindai*, vol. 1, p. 318.

22 Typographus sinensis (W. H. Medhurst), ‘Estimate’, pp. 250–251, mentions that millions of tracts can be printed and the types used for twenty years without stopping, with a much smaller set of ten types where each has 3,000 different characters.

23 Reed, *Gutenberg*, pp. 66–67.

jicheng project was neither the first nor the last where metal movable types were applied. The technology, which had first been developed in Korea,²⁴ was re-invented in China and is associated with Hua Sui (1439-1513) from Wuxi in Jiangsu. It was first used in Jiangnan by several affluent families who intended to show themselves as sponsors of learning and printing. Later in the Ming dynasty, it was also used in the publishing centre Jianyang in Fujian for commercial printing,²⁵ although the predominant technology remained woodblock printing.²⁶ In the Ming, no printing projects with metal movable type of the court or central government are known at all. When the Qing court used this method, it still retained some of the flair of luxury that it had when the first Jiangnan families reprinted the rare works in their libraries in order to transmit knowledge and at the same time impress their peers. However, the *Gujin tushu jicheng* project was neither the first nor the most voluminous imperial encyclopedia. Under the Ming dynasty, the even bigger Yongle encyclopedia (*Yongle dadian*) had been compiled but due to lack of funds was never printed, and the original manuscript was almost entirely lost by the end of the Ming.²⁷ Thus, even if the Qing could not surpass their predecessors in terms of volume, they certainly achieved the printing of their imperial encyclopedia – and not in the conventional way but with an alternative technology that few people in the empire possessed – from the very material that cash was made of. This last fact may have been of some importance for the fate of the printing types after they had served their purpose.

The next outstanding project in Qing cultural policy that eventually also came to concern the Wuying dian printing office was the compilation of excellent and rare works extant in the eighteenth century. These were eventually combined to form the collectanea *Siku quanshu* (The complete books of the Four Storehouses [one each for the bibliographic categories cited above]). For this purpose, not only the books and manuscripts in the palace libraries but also those in the holdings of provincial authorities and private collectors were ordered to be sent to the capital – some for purchase, others on loan. In 1773, a commission of three-hundred officials and scholars was founded for collecting, classifying, and annotating – and, in the case of supposed or

24 See the discussion of several theories about the date of invention of metal movable types in Korea, from the earliest (1047-1083) to the date that is generally accepted (1232), 'The beginning of metal type printing', website of the Cheongju Early Printing Museum. The earliest book printed with metal movable types, the Buddhist commentary *Jikji* 直指 (Revelation of the deepest principles), printed in Chinese characters in Korea, is dated 1377.

25 Tsien Tsuen-hsuei, *Paper and Printing*, pp. 211-213.

26 Lucille Chia, *Printing for Profit*, p. 257.

27 Endymion Wilkinson, *Chinese History*, pp. 604-605.

actual criticism of the dynasty or the emperors, also destroying²⁸ – the books that were submitted from all parts of the empire. As a result, 10,246 titles were recorded in one extensive and one abridged bibliography. About 3,500 of these were transcribed eight times in handwriting, bound and stored in the Palace and in eight libraries built for that purpose.²⁹

One spin-off of the project, however, kept not only the proofreaders and binders but also the character carvers of the Wuying dian busy during the 1770s and 1780s, producing one of the rarest Chinese handbooks of printing. The Ming encyclopedia *Yongle dadian* had been searched for entire works that had not been transmitted individually by the 1770s, and the result of this compilation – 138 reconstructed books – was printed by the Wuying dian printery between 1773 and 1794 in wooden movable type and included in the collectanea *Wuying dian juzhenban shu* (Wuying dian books [printed with] assorted gems). Jin Jian (or, having been of Korean ancestry, Kim Kan, deceased 1795),³⁰ the Superintendent of the Wuying dian, directed the project. After having gained experience with the technical procedures, in 1777 he published the illustrated manual *Wuying dian juzhenban chengshi* (Patterns for printing with movable types at the [Imperial Printery] Hall of Martial Valour).³¹

28 See Kent Guy, *The Emperor's Four Treasuries*, pp. 166-200, for a general outline and specific cases of the so-called 'literary inquisition' of the Qianlong emperor in the 1770s and 1780s. This refers to a report of 1781 giving the figure of 52,480 destroyed woodblocks for printing seditious books that had been broken up for firewood (p. 171).

29 Lu Shaw, *Imperial Printing*, p. 8, 49-50, *Ciyuan* vol. 4, p. 566: the libraries Wenyuan ge 文源閣 on the precincts of the country palace Yuanmingyuan to the northwest of the capital; Wenyuan ge 文淵閣 in the Forbidden City; Wensu ge 文溯閣 in Shenyang; Wenjin ge 文津閣 in Rehe; Wenlan ge 文瀾閣 in Hangzhou; Wenhui ge in Yangzhou 文匯閣; and Wenzong ge 文宗閣 in Zhenjiang. According to Lu Shaw, two manuscripts were stored in the Forbidden City at the Huangji Palace 皇極宮 and the Qianqing Palace 乾清宮. This would make a total of nine sets. Kent Guy, *The Emperor's Four Treasuries*, p. 104, defines as the first among the products of the Siku compilation project seven manuscript copies of the *Siku quanshu*.

30 For biographical information on Jin Jian, see *Eminent Chinese of the Ch'ing Period*, pp. 159-160. One of Jin Jian's ancestors had joined the court of an early Manchu ruler, Hong Taiji 洪太極 (reg. 1634-1643), as an interpreter. The family remained in the service of the Manchus. Jin's younger sister was a concubine of the Qianlong emperor and mother of three of Qianlong's sons. Therefore, the family was freed from the status of bondservants and became members of the Manchu Plain Yellow Banner. Between 1783 and 1792, Jin Jian served as Minister of Public Works ('President of the Board of Works') and thereafter of the Board of Civil Appointments (1792-95). As the Minister of Public Works he also directed several imperial building projects, such as the construction of the Imperial Lecture Hall Biyong 辟雍 in the Imperial Academy Guozijian 國子監 (1785).

31 Union list 3-2-11. Translated by Richard Rudolph in *A Chinese Printing Manual*, and discussed and commented by Ernst Schierlitz, 'Zur Technik der Holztypendrucke'. Ironically, the handbook was printed with blocks.

Together with the Yuan dynasty record that is included in the 'Treatise on Agriculture' (*Nongshu*) by Wang Zhen (1290-1333), these are the only known technical descriptions of printing with wooden movable types. Even so, the written evidence for technical details of the movable type technology is better than that for block printing. This may be attributed to the fact that to gain financial support or to attract the reading public to special, more economic procedures for large printing projects, detailed justifications for the breach with established methods were necessary.

In his description of the methods of wood type printing, Jin Jian, while deploring the fact that the copper types of the *Gujin tushu jicheng* were no longer stored at the Wuying dian,³² explains the shaping of all wooden parts of the printing process: the types, the sorting trays, the outlines and columns of the finished sheets that were not printed together with the movable type, the cases where the types were kept and the order in which they were stored, and the benches on which the typesetters stood in order to reach the higher drawers of the type cases. He also describes in detail the ten-day cycle of searching out the types from the type cases, setting them on forms, proofing the forms, printing, and re-distributing them into the cases (see Figures 20-22).³³

Jin Jian also gave an estimate of the material costs of the project and pointed out that, by comparison, printing a copy of the 130-chapter *Shiji* (Memories of the Grand Historian) with the block printing method would entail the carving of 2,675 blocks for 1,450 tael. In a first estimate, he assumed that carving about 150,000 types of the most common six-thousand and several hundred characters including type blanks, type cases, setting forms, and other equipment would cost 1,400 tael.³⁴ In his final account, he quotes a much higher figure of 235,000 types for a total material cost of 2,339.75 tael together with the wage quota of 0.69 tael for cutting one-hundred types.³⁵ This would result in 22,425 tael for the entire set. Starting out with a staff of twelve, the number of workers and employees was eventually increased to one-hundred.³⁶

32 Jin Jian, *Wuying dian juzhenban chengshi*, fol. 1b/2a.

33 *Ibid.*, fol. 31a-33b, transl. in Rudolph, *A Chinese Printing Manual*, p. 14.

34 Rudolph, *A Chinese Printing Manual*, p. xix, fol. 1b-2a

35 *Ibid.*, p. xxi, fourth memorial dated from 1774. These figures, including the wage quotations for cutting type blanks (0.22 tael per hundred), carving characters (0.45 tael), handwriting the characters to be carved (0.02 tael) are also specified in *Huidian*, chap. 1199, fol. 4b-5b.

36 Rudolph, *A Chinese Printing Manual*, p. xxii. Jin Jian, *Wuying dian juzhenban chengshi*, 'Zouyi' (Memorials), fol. 10b/11a.

Figure 20 Sawing the wooden types



Source: Jin Jian, *Wuying dian juzhenban chengshi*, fol. 16a.

Figure 21 Carving the types



Source: Jin Jian, *Wuying dian juzhenban chengshi*, fol. 18a.

Figure 22 Type setting. This process includes selection of the types from the type cases, placing them on trays, arranging them in the right sequence, and proofing the set forms.



Figure 23 Individual wooden movable types in different sizes at the Gutenberg Museum, Mainz, dating about 1860



According to the memorials in the preface of the *Wuying dian juzhenban chengshi*, the collectanea were printed in twenty sets upon white fourfold paper *liansizhi* for court display and preservation, and several more³⁷ on yellow bamboo paper *zhuzhi* to be sold at a fixed price.³⁸ Provincial and private printeries were expressly authorized to reprint selected items of these exemplars or of the entire set, which they did in Jiangsu, Jiangxi, Zhejiang, Fujian, and Guangdong. The Jiangxi and Fujian reprints were especially complete and true to the originals.³⁹ The reprints, as far as can be judged from the extant copies, were done with block prints rather than movable type.⁴⁰ According to Schierlitz, in 1792 the types were copied in Korea in a set of 320,000. Here, they were referred to as ‘continuously renewed types’ (*shengsheng zi*).⁴¹

37 According to Lu Shaw, *Imperial Printing*, p. 57, ‘three hundred sets were printed on bamboo paper for public consumption.’

38 Jin Jian, *Wuying dian juzhenban chengshi*, ‘Zouyi’ (Memorials), fol. 6a.

39 Lu Shaw, *Imperial Printing*, p. 58; Schierlitz, ‘Zur Technik’, p. 36.

40 It is not easy to discern the difference between imprints with movable type and block prints.

41 Schierlitz, ‘Zur Technik’, pp. 36/37.

Shiow-jyu Lu Shaw lists six further individual titles that were printed with this set but states that later the entire set was destroyed by custodians and burned as firewood.⁴² In fact, they were probably not destroyed in the fires at the Wuying dian in 1869 and 1901 because they were kept in an external storehouse. The entire workshop for typesetting and printing was situated not in the Wuying dian but at a branch office in the Bei changjie Street near the Xihua men palace gate.⁴³ Schierlitz reports that a Chinese eyewitness saw wooden types on sale in Peking after the revolution of 1911. These may have been remnants of the ‘assembled gems’, but since at least one other private printery in Peking also used wooden movable type, the whereabouts of Jin Jian’s types remains uncertain (see Figures 23-25 for a set of wooden movable types).

Nevertheless, it becomes clear from these two large projects that although the palace printery was innovative in developing alternative printing technologies and even published a kind of ‘user manual’, the use of printing with either metal or wooden movable type actually remained quite limited.

Provincial Printeries

After the mid-nineteenth century, the provinces and provincial elites gained greater independence from the central government than was the case in the eighteenth century. In the course of these political shifts, the printing facilities of the provincial printeries increased in size.

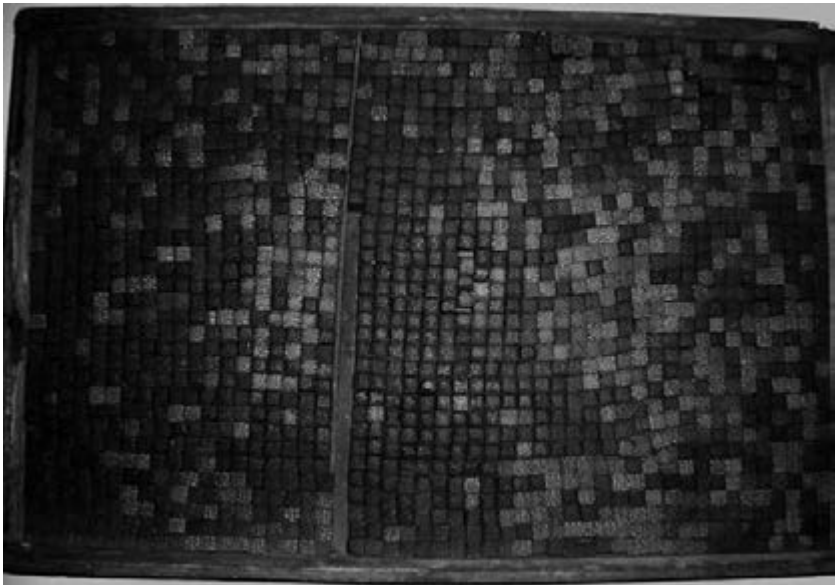
In the late seventeenth and early eighteenth century, an official printery was established at Yangzhou, the so-called Yangzhou shiju (Yangzhou Poetry Office), which was supervised by the eminent and affluent Cao Yin (1658-1712), a bondservant of the Manchus who had also been in charge of the Imperial Silk Weaveries in Nanjing (1693-1712) and concurrently acted as salt censor of the Liang-Huai circuit in 1704, 1706, 1708, and 1710.⁴⁴ Since Cao Yin’s connection to the Imperial Household was particularly close, many printing projects were entrusted to him, such as the 900-chapter *Complete poetry of the Tang dynasty* or several smaller-sized encyclopedias. As such, this institution stood between the central government and the purely provincial institutions. The output of the Yangzhou Poetry Office amounted to about 3,000

42 Lu Shaw, *Imperial Printing*, p. 59.

43 Schierlitz, ‘Zur Technik’, p. 37, 18, fn 1.

44 Lu Shaw, *Imperial Printing*, p. 34.

Figures 24 and 25 Types on the tray, Gutenberg Museum



Source: Author's photographs, August 2008. Courtesy of the Gutenberg-Museum.

chapters. They were executed as block printings of very high quality in the cherished and expensive 'soft style' of printing. This is a generic designation for the 'handwriting' or 'calligrapher's' style. Since the width of vertical and horizontal lines is more evenly distributed, this resembles calligraphy more than the 'hard style' or 'Song type', also referred to as the 'artisan style' (*jiangti*). Carving the soft style takes longer and requires greater skill. The 'artisan style' (*jiangti* 匠體) with strong vertical and light horizontal lines became widespread during the late Ming, as the printing industry expanded.⁴⁵

Provincial governments already possessed printing facilities in the seventeenth and eighteenth centuries. For instance, the 1769 'Regulations and precedents on the prices of materials' (*Wuliao jiazhi zeli*) were printed separately for each province, presumably at the provincial government office. Confucian schools that were maintained by local and regional administrations often organized printing activities, as many regional gazetteers suggest.⁴⁶ After the Opium War and the Taiping rebellion, most provinces established provincial printeries more formally and prominently with funds of their own. They clearly had the order to reprint works that had gotten lost in the turmoil. The lack of texts of the Confucian state orthodoxy was especially felt in the Jiangnan area, where of the three libraries that had been specifically built for housing the apex of knowledge contained in the *Siku quanshu*, two (at Yangzhou and Zhenjiang) were completely destroyed, and one (in Hangzhou) was damaged. Book historians are not quite clear as to whether the main impulse came from the central government or from the provinces. While Zhang Xiumin vaguely refers to 'the ruling classes' who established provincial publishing houses with printeries (*guan shuju*) 'in order to restore the old order',⁴⁷ more recent publications specifically stress the role of the provincial governments and provincial elites, most of all Zeng Guofan, one of the central figures of the self-strengthening reforms.⁴⁸ Likewise, while Zhang Shudong presents the Yangzhou shiju as one of the first provincial

45 'Plurality of Printing Techniques' Website of the Palace Museum, Taipei, Taiwan.

46 See [*Qianlong*] *Hangzhou fuzhi* j. 10, fol. 17a, referring to the carving and printing of the Kangxi emperor's Sacred Edict; or [*Qianlong*] *Dushan zhoushi*, 'Baoming xiuji zhishu shenwen' 報明修輯志書申文 (Declaration on the compilation and editing of [this] gazetteer), fol. 1b/2a. The literature on gazetteer compilation amply discusses the issue, see for instance Li Jingwen, 'Qingdai Henan shuyuan keshu qianlun', p. 102, and Zhang Andong 'Qingdai xiuzhi jigou de renyan shezhi he ziliao lai yuan', p. 50.

47 Zhang Xiumin, *Zhongguo yinshua shi*, pp. 559/560.

48 Zhang Shudong, *Zhongguo yinshua*, chap. 7, Sect. 6-5, (5), 1. (3) 地方官書局刻書; *Qingdai yinshua*, 'Qingdai de difang zhengfu yinshua' 清代的中央政府印刷. *Qingdai yinshua* is obviously an abbreviated form of Zhang Shudong's account.

printeries, Zhang Xiumin does not discuss continuity but rather stresses the difference between the Kangxi era and the mid-nineteenth century.⁴⁹

The evaluation of the achievements of these provincial offices varies as well. Tsien Tsuen-hsuei states in a general sense that 'all were renowned for careful execution and mutual co-operation',⁵⁰ but Zhang Xiumin and especially Zhang Shudong discuss in more detail the achievements and failures of the print products of these institutions. The scholars agree, however, that among the twenty offices listed (see Table 31), the Zhejiang and the Guangdong printeries had the greatest output. Thus, an account of 1935 gives the number of printing blocks that were still extant from the Qing as 122,000 carved at the Zhejiang office and an additional 39,000 that had been presented or deposited there by private collectors and printers, such as Ding Bing (1832-1899) from Hangzhou and Hu Fengdan from Jinhua. The number of printing blocks in the Guangya shuju and two Guangdong academies amounted to a total of 150,000 to 160,000.⁵¹ However, not all imprints were carved in blocks. The Jinling and the Jiangxi official printeries also used wooden movable type, and the Yunnan and Zhejiang office had a lead letterpress. Since luxury and ornamental editions were not usually in the product range of the official printeries, few multicoloured prints (*taoyin*) were produced; merely a few specimens are reported from Hubei and Zhejiang.⁵²

On the basis of bibliographies of the provincial printeries, Zhang Xiumin estimates that their aggregate book production was about 1,000 titles. All four categories of Chinese bibliography were included, but most of their books belonged to the fields of classics and history, especially the dynastic histories.⁵³ In addition to this, books dealing with 'modern' topics like telegraphy or documented recent treaties with foreign countries were also printed.⁵⁴

The main government printing activities thus spread from the central government to the provinces, as is clear from the approximate data of 36 'palace editions' (*dianben*) against about one-thousand '[provincial printing] office editions' (*juben*) between 1862 and the end of the dynasty. The reason

49 In his book length study on Cao Yin, Jonathan Spence discusses Cao's efforts and achievements in the printing of the 'Complete Poems of the Tang', but although he elaborates on the other institutions which Cao directed, the Nanjing Imperial Silk Weavery and the Liang Huai Salt Commissioner's office, he mentions the printery not as an institution but rather as an ad hoc commission for one specific project – albeit one that earned Cao Yin great honours. Spence, *Ts'ao Yin*, pp. 164-165.

50 Tsien Tsuen-hsuei, *Paper and Printing*, p. 188.

51 Zhang Xiumin, *Zhongguo yinshua shi*, p. 564.

52 *Ibid.*, p. 564.

53 Zhang Xiumin, *Zhongguo yinshua shi*, p. 563

54 *Ibid.*, p. 563. These titles are all from the Zhejiang office.

for this situation was most probably the central government's lack of funds. It is no wonder, then, that the regions with the most collectors who showed interest in supporting the official printing offices with either printing blocks or exemplars, such as Ding Bing, or with active fund-raising officials, such as Zhang Zhidong in Guangdong, had the largest facilities and the greatest output.

Nevertheless, the central government did not completely avoid modernization in the printing sector in terms of contents, technology, and equipment. Modern government schools such as the Peking Tongwen guan (basically a school for translators and interpreters that had branches in Shanghai and Canton) and the research departments of the Jiangnan Arsenal and the Fujian Navy Yard all had their own printeries. Both the Peking Tongwen guan and the Jiangnan Arsenal publishing departments printed about 200 translated works respectively. The Jiangnan Arsenal print shop at first (in 1868) only carved woodblocks, but in about 1875 installed its first lead type letterpress machine. It was later taken over by the Shanghai Official Printing Office.⁵⁵ The Tongwen guan press, which was established in 1876 (or 1873),⁵⁶ also printed internal documents, edicts, and announcements and had seven hand letterpresses and four sets of Chinese types. In 1884, government publications were also printed in the newly founded Xiehua shuju that possessed modern printing machinery. In 1905, it was taken over by the commercial publisher Shangwu yinshuguan and had its name changed to Jinghua yinshuju. At first, it had about twenty to thirty employees and only letterpress machines, but later colour presses and lithographic machines were added. Another modern printing facility in Peking was the 'Zhili official printing bureau' (*Zhili guan shuju*), which was also named the 'Metropolitan official publishing bureau' (*Jingshi guan shuju*).⁵⁷ Its foundation is attributed to General Yuan Shikai (1859-1916), who was a provincial judge in Zhili province between 1897 and 1899. Its exact date of establishment cannot be ascertained, but the thirteen extant editions in the National Library of China, all lithographs or typeset, date from the Guangxu reign, with the last from 1907. In terms of content, these were administrative documents of a more general interest, such as the 'Collected Statutes' in one-hundred chapters but without the voluminous 'Factual Precedents' (in 1,220 chapters). Since the Collected Statutes had previously

55 Zhang Shudong, *Zhongguo yinshua*, chap. 14, sect. 1.

56 Bai Shouyi, *Zhongguo tongshi*, vol. 11, chap. 18, sect. 2, 'Zhongguo jindai chuban shiye de zhubu fazhan' 中国近代出版事业的逐步发展 (The gradual development of the modern Chinese publishing sector).

57 Bai Shouyi, *Zhongguo tongshi*, vol. 11, chap. 18, sect. 2, 'Chuantong keshuye de fazhan' 传统刻书业的发展 (The development of traditional character carving).

been published in Shanghai, and in view of its other publications which are all much shorter, this printery apparently was not a very large institution.

After the administrative reforms of 1905, both the Ministry of Education (1906) and the Ministry of Finance (1907) established their own printing offices. The Ministry of Education printed textbooks at its *Xuebu tushuju*, while the Ministry of Finance, which had invested large sums and acquired the newest Western technology, produced paper money and other financial documents at the *Duzhi bu yinshua ju*.

In sum, the modern printeries of the capital that had been founded and financed in part or entirely by the central government until the last decade of the Qing rule remained smaller in scope and more specialized than the Wuying dian had been, and neither the printery of the Jiangnan Arsenal nor the Zhili provincial printing office were entirely under the control of the court and central government.

These developments illustrate the general shift of political power from the Peking central government to the affluent Jiangnan and Guangdong centres as well as the North Chinese military faction around Yuan Shikai and Li Hongzhang. Within Peking, they also show the diversification of printing institutions, which no longer came under the direct and personal control of the emperors or the regents.

Periodical Government Publications of the Nineteenth and Twentieth Centuries: Court Gazettes and Provincial Newspapers

One of the government printing products, although published in the capital and pertaining to the Qing court, was not at all a luxury or exemplary item but aimed to inform a broader reading public beyond the directly concerned officials in the affairs of the court and the central government. Government news had been spread in short bulletins since the Song dynasty. The earliest extant examples date from the Ming. In the Qing, the so-called *dichao* (liaison officials' transcripts), *jingchao* (capital transcripts), *gongmen chao* (palace gate transcripts), and *jingbao* (capital reports) were copied, printed, and distributed to the provinces by the 'newspaper workshops' (*baofang*) of the postal relay stations (*titang*) in the Peking publishing and bookselling centre *Liuli chang*. These gazettes contained edicts, memorials, and reports that had been released by the Grand Secretariat.⁵⁸ Sixteen of the relay stations existed in Peking, assigned for delivery to and from Zhili, Shandong, Shanxi,

58 Vittinghoff, *Anfänge*, p. 57.

Henan, Jiangnan, Jiangxi, Fujian, Zhejiang, Hubei, Hunan, Shaanxi and Gansu, Sichuan, Guangdong, Guangxi, Yunnan, and Guizhou. A foreign observer in the late Qing assumed that the printing was done in only one of the relay stations,⁵⁹ while another source hints that the gazette was issued by twelve publishing houses and distributed at a rate of ten-thousand copies per day.⁶⁰ The official copies were printed with wooden movable type; unofficial, faster copies were either handcopied or printed with wax plates.⁶¹ Zhang Shudong also refers to yet another method of fast duplication, the so-called 'dried doufu plates' (*dougan'er ban*), and a kind of fast hardening plaster which was burned after the characters were carved. In both cases, the non-printing parts of the plate were carved out as in wood block carving. Their quality was very low, but these methods were cheaper than the handcopied versions and faster than the wooden type versions.⁶² In the provinces, the court gazettes were once again reprinted and distributed. Circulars that contained only information from provincial authorities were referred to as *yuanmen chao* or *yuanmen bao* (transcripts or reports from the provincial government gates). The printing, most often with wax plates, and distribution of these provincial gazettes was handled entirely by the private sector.⁶³

The court gazette was published until 1911 but declined in the last years of the dynasty. This may have been due to the competition from the private press that had emerged in the treaty ports, most of all in Shanghai. However, as Vittinghoff argues, the decline was perhaps more linked to the challenge from so-called 'official newspapers' (*guanbao* or *gongbao*), which regional administrators published after private newspapers had been forbidden in 1898.⁶⁴ Like the provincial printeries, and sometimes together with them, such official newspapers were founded in most provinces.⁶⁵ The most famous

59 Ibid., referring to Mayers, 'The Peking Gazette', p. 15.

60 Ibid., p. 57.

61 For a detailed description of the various unofficial formats and versions of the court gazettes, see Barbara Mittler, *A Newspaper for China*, pp. 179-187.

62 Mayers, 'The Peking Gazette', p. 16. Mayers quotes the following subscription prices for the copies of the Peking Gazette: 25 cents per month for natives, somewhat more for Europeans; about the same sum or slightly more for the official (post relay) version, but five taels per month for the handcopied version. The Gazette was also reprinted in the modern treaty port journals, such as *Shenbao* (1872-1949) and *Shanghai Xinbao* (1861-1872); see Janku, *Nur leere Reden*, p. 65, 171. Moreover, it was translated into English in the Shanghai based journal *North China Herald*.

63 Zhang Shudong, *Zhongguo yinshua*, chap. 7, sect. 3; Vittinghoff, *Anfänge*, p. 58.

64 Vittinghoff, *Anfänge*, p. 58.

65 For a list of official printing institutions of the late Qing, including the official newspapers, see Zhang Shudong, *Zhongguo yinshua*, chap. 14, sect. 1, table 14-2 'Guanyin, guanbao deng qita guanban yinshua jigou yilan biao' 官印、官报等其它官办印刷机构一览表 (Overview of official printeries, official journals and other official printing institutions).

among these were Shandong Governor-General Yuan Shikai's *Beiyang guanbao* (North China Official Newspaper, established in 1902) and Hu-Guang Governor-General Zhang Zhidong's *Hubei guanbao* (established in 1898).⁶⁶

Nevertheless, government institutions continued to supply daily court information until the end of the dynasty. The very last of the 'modern' printing institutions founded under the Qing dynasty were the facilities of the Imperial Household Department which were installed to print the long-established court gazette *gongmen chao* with lead type letterpress.⁶⁷

Paper Money in the Nineteenth and Twentieth Centuries

Although the use of paper money and official bills of exchange was first recorded in the Song dynasty and the system was continued for longer or shorter periods during the Yuan and Ming, the Qing only adopted it as a method of last recourse in situations of extreme scarcity of monetary metal. This occurred during one decade in the early years of the dynasty (1651-1661), but thereafter, for a lapse of almost two hundred years, no paper money was printed by the government.⁶⁸ It was only in 1853, during the Taiping rebellion, that the Qing issued bank notes denominated in cash, the so-called Great Qing treasure notes (*Da Qing baochao*), and in silver, the Ministry of Revenue official notes (*Hubu guanpiao*). The cash notes were denominated from between 500 and 1 million cash, and the silver notes from between one and 50 taels.⁶⁹ We can only estimate how many single notes were issued. Frank King quotes a figure of over 15 million (*ching-*)*ch'uan* (cash strings) in Peking alone, not considering the provinces;⁷⁰ Zhang and Tan assume that the total figure may have been 9.78 million of silver tael and 27.11 million cash string notes; in 1868, only 3.28 million silver tael notes were reportedly retrieved. The rest may have been destroyed in the Taiping rebellion or hoarded, as in a case described by Zhang and Tan.⁷¹

In Peking, the silver notes were issued directly by the Ministry of Revenue and the cash notes through official banks.⁷² As in the Song dynasty, the ministry or its agents printed the notes either with wooden or copper blocks.

66 Vittinghoff, *Anfänge*, p. 58.

67 Zhang Shudong, *Zhongguo yinshua*, chap. 14, sect. 1, table 14-2.

68 Peng Xinwei, *Monetary History*, p. 707.

69 King, *Money*, p. 150.

70 Ibid.

71 Zhang and Tan, 'Xin faxian', section 4.

72 King, *Money*, p. 150.

The ornamental, relatively simple two or three colour prints resembled those of the Ming dynasty notes. Counterfeiting was not difficult. In order to prevent it, the issuing institutions stamped the notes with official seals. Apparently, the Ministry also delivered blank notes to the provincial governments which would later print out the denomination.⁷³

The experiment was not considered a success, and the notes were withdrawn by 1872. Privately issued drafts, silver bills by pawnbrokers, cash bills, and foreign notes nevertheless continued to be used, and the central government did not (and could not) restrict their circulation. After the Sino-Japanese War, the provincial governments started to issue their own bills, such as the North China Railroad Official Track General Office (*Beiyang tiegui guanlu zongju*) in 1895, or the Hubei and Guangdong provincial administrations in 1899. The Beiyang Railroad bills were printed in London and the Hu-Guang bills by the Japanese Treasury Department.⁷⁴ The Railroad bill was produced in the 'modern', horizontal format, but the Hu-Guang bill retained the traditional vertical format. Taiwanese banknotes were issued by the Tainan Official Silver and Cash Bill General Office after the island had become a Japanese colony in 1895.⁷⁵

After the reorganization of the central government and its ministries in 1904, the new Ministry of Finance (*duzhi bu*) considered printing paper money again. At first, the Ministry investigated the options for outsourcing. The Beiyang Official Newspaper Office, the Japanese Treasury Department, and the Commercial Press in Shanghai all had the skilled labour and know-how in machinery and technical processes and could have fulfilled the commission, but in the end the Ministry established a printery of its own for paper money, stamps, tax seals, and other financial documents and entrusted the acquisition of machinery and technology transfer to the American Banknote Company. The printing office was founded in 1907, and two specialists from the American Banknote Company were invited to teach Western methods of steel-plate intaglio printing to the Chinese printers and engravers.⁷⁶ The central government invested a total of 1.1 million tael to set up a modern factory in Peking outside the city gate *Xuanwu men* on an area

73 Zhang and Tan, 'Xin faxian', from a sample of 267 notes in eleven denominations have made out eight different block (or stamp) types for the characters on same denomination silver notes, and the cash notes also showed differences. In some cases, the figures were handwritten, as on a 1859 five tael note auctioned in November 2013. See the website of the auction house Chengxuan, '2013 qiuji paimai hui. Zhibi' Lot 2342.

74 Peng Xinwei, *Monetary History*, pp. 711-712.

75 *Ibid.*, p. 712.

76 Reed, *Gutenberg*, p. 65; *Zhongguo yinshua tongshi*, chap. 17, sect. 3.

of 240,000 square metres (see Figure 26). Architectural firms from Japan and the United States (Milburn, Heister & Company) were entrusted with the construction, which was finished only in 1914, after the demise of the Qing dynasty.⁷⁷ The newest machines for steel-plate gravure, lithographic, and letterpress printing as well as photographic devices and power engines were imported from the United States in order to guarantee the production of high-quality bank notes.

One of the first model banknotes of the 'Great Qing Bank', a one-hundred silver dollar (*yinyuan*) bill showing a large portrait of the regent Zaifeng (1883-1851), the father of the last emperor, was designed by the American illustrator Lorenzo J. Hatch (d. 1913) of the American Banknote Company. It was finished in 1910, and on the first day of the third month of the year 1911, regular printing production was started.⁷⁸ The investment of the Qing government in modern printing machinery, technology, and knowledge transfer lasted longer than the dynasty. After the fall of the Qing, the American experts stayed on and continued to train Chinese printers and designers. In 1915, the products of the printery of the Ministry of Finance won an award at the Panama Pacific International Exposition.⁷⁹

Conclusion

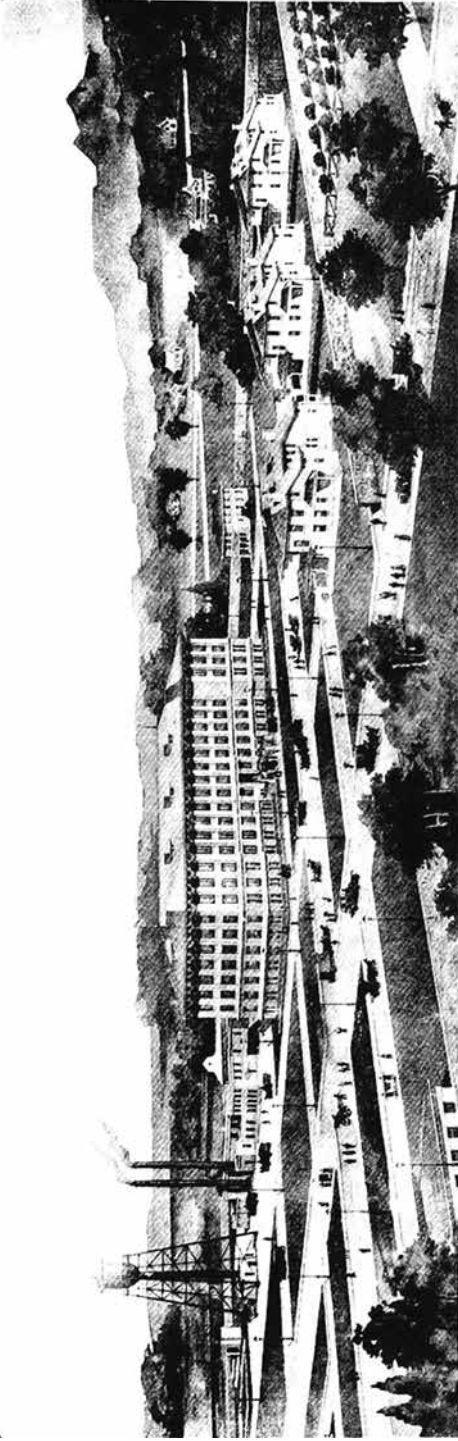
In considering the three fields of government printing discussed above – the reproduction and augmentation of traditional learning with books, the printing of information on actual court events and decisions, and the

77 Chen Zhen, *Zhongguojindai*, 'Beijing duzhibu yinshuaju' 北京度支部印刷局 (The Printing Office of the Peking Ministry of Finance), pp. 319-320. Milburn, Heister and Company, *Selections from the Latest Works of Milburn, Heister & Co.*, p. [28]; *Specifications for a Bureau of Engraving and Printing for the Chinese Government to be erected in Peking*. According to 'Commerce: The Chinese Bureau of Engraving and Printing', at present the main building houses one part of the China Banknote Printing and Minting Corporation.

78 According to Zhang Shudong, chap. 17, sect. 3, this day was declared the 'banknote printing memorial day' (*chaopiao yinshua jinianri* 钞票印刷纪念日). Peng Xinwei, while affirming the high quality of the paper money printed with modern machines, is sceptical whether much of it was actually used, since most of the banknotes he had seen were model notes (p. 713). More specifically, an anonymous article published on the website *Gu qianbi shoucang wang* 古钱币收藏网 ('Old money collector's web', dated 2004-10-16, accessed Sept. 2007) declares that although Hatch's design was superb, the banknote could not be circulated because the dynasty fell soon after it was finished. See 'Zhibi de jianing he bianwei' 纸币的鉴定和辨伪 (Assessing paper money and forgeries).

79 Zhang Shudong, *Zhongguo yinshua*, chap. 17, sect. 3.

Figure 26 Design of the Printing Office of the Ministry of Finance Duzhi bu yinshua ju



BUREAU OF ENGRAVING AND PRINTING FOR CHINESE GOVERNMENT
Peking, China.

MILBURN HEISTER & Co,
Architects, Washington, D. C.

Source: *Pacific Exchange*, 'Commerce: The Chinese Bureau of Engraving and Printing'. Reproduced by courtesy of the National Postal Museum, Smithsonian Institution, Washington, D.C.

production of financial documents – the Qing central government placed the highest importance on the first for much of its reign, experiencing an apex in the eighteenth century. The Qing continued to supply information on court events and decisions but only hesitantly engaged in the production of financial documents, and only in the last moment. Provincial governments took the lead after the mid-nineteenth century, replacing or complementing the printing activities of the centre. In the case of the currency, however, the Qing government tried to reassume its leading role and unify the multiple notes and bills in circulation at the time in an attempt to stimulate technology transfer from the West and, to some extent, Japan. It was not a technical problem that stood in the way here.

Appendix

Table 32 Estimate of the mass of cash coins to be retrieved from 250,000 copper types used in the printing project for the imperial encyclopedia *Gujin tushu jicheng* (1726-1728)

Size of <i>Gujin tushu jicheng</i> types on the imprints	ca. 1 cm x 1 cm for regular characters, 0.5 cm x 1 cm for half width commentary size characters ¹
Standard weight of one copper cash	2.98 to 4.48 g ²
Estimated weight of one copper type	Ca. three times that of a copper cash, that is 8.94 to 13.44 g ³
Estimated weight of 250,000 types	2,235 to 3,360 kg
Weight of one string of 1,000 cash	2.98 to 4.48 kg
Estimated yield of 250,000 types in strings	750 strings if one type yields three copper cash
Alloy of types	Unknown
Alloy of cash	ca. 50% copper, 41.5% zinc, 6.5% lead, and 2% tin
Alloys of Korean metal types	<i>Bok</i> type in Korean National Museum: 50.9% copper, 0.7% zinc, 28.5% tin, 10.2% lead, 2.2% iron ⁴ 'General value': copper, tin, and zinc in the ratio of 7:2:1 ('ancient times'), general proportion of bronze: 70%~95% copper, 5%~30% tin. ⁵
Conclusion for the conversion of type into cash	The copper content shouldn't be a problem, if the content of tin can be adjusted accordingly.
For comparison	In 1781, 655 strings and 200 cash were cast from salvaged copper in the Peking mints. ⁶
Wear and tear of the types during the 64 print runs	
Number of characters of one set of <i>Gujin tushu jicheng</i>	ca. 100,000,000
Number of types	ca. 250,000

If all types were used, each of them would occur:	400 times
In a print run of 64 copies, each would be used:	25,600 times

1 Lu Shaw, *Imperial Printing*, p. 47, however, mentions 0.5 x 0.5 cm for the commentary size. This can hardly be the case, since commentary characters had the same height as regular ones.

2 Burger, 'Minting', p. 378, 383.

3 The regular (not commentary) size Korean bronze types in the Gutenberg-Museum Mainz weigh between 10 and 15 grams. My thanks to Director Dr. Eva-Maria Hanebutt-Benz for the information.

4 Cheongju Early Printing Museum, 'Metal types in Korea [i.e. Koryŏ] dynasty', 'Bok types and Jun types of Korea Dynasty'.

5 Cheongju Early Printing Museum, 'The process of making metal types'.

6 Burger, 'Minting', p. 383.

Table 33 Provincial printing offices established in the second half of the nineteenth century

Name	Place	Year of establishment	Founders	Remarks
Jinling shuju 金陵官書局, renamed Jiangnan guan shuju 江南官書局 in the early years of Guangxu	First Anqing, then Nanjing	1864	Zeng Guofan 曾國藩	
Jiang Chu shuju 江楚書局	Nanjing	1901	Liu Kunyi 劉坤一, Zhang Zhidong 張之洞	
Suzhou shuju 蘇州書局, alternative name Jiangsu shuju 江蘇書局	Suzhou	1865	Li Hongzhang 李鴻章	
Huainan shuju 淮南書局	Yangzhou	1869	Salt Commissioner Fang Junyi 方濬頤	
Zhejiang guan shuju 浙江官書局	Hangzhou	1864 (alt. date 1867)	Provincial Treasurer Yang Changjun 楊昌浚, Provincial Judge Wang Kaitai 王凱泰	Greatest output. Over 100 and several dozen titles. In 20 years, 200 titles. Printed 浙江通志 (1899). Merged in 1909 with the Zhejiang library.
Qushui shuju 曲水書局 (Anhui shuju 安徽書局 or Anhui fuwen shuju 安徽敷文書局)	Changzhou	1863		The Fuwen shuju used wooden movable types.

Name	Place	Year of establishment	Founders	Remarks
Fujian Fuzhou shuju 福建福州書局	Fuzhou	1866	Gov.-General Zuo Zongtang	
Hubei guan shuju 湖北官書局, alternative name Chongwen shuju 崇文書局	Wuchang	1867	Gov.-General of Huguang and Gov. of Hubei, Li Hanzhang 李瀚章	Hubei shuju and Chongwen shuju were originally separate and later merged. Output 250 titles, 140,000 printing blocks. Printed Hubei tongzhi. Received financial subsidies by Li Hanzhang and Zhang Zhidong. In peak times employed 60 to 70 letter-carvers, printers, and binders.
Hunan guan shuju 湖北官書局, alternative names Xiangnan shuju 湘南書局, Hubei sixian shuju 湖北思賢書局	Changsha	1865		Focus on the works of contemporary writers
Jiangxi guan shuju 江西官書局	Nanchang	1863		
(Guangdong) Guangya shuju (廣東) 廣雅書局	Guangzhou	1886	Gov.-Gen. of Hu-Guang, Zhang Zhidong 張之洞, director Wang Binsi 王秉思	Funds raised by Zhang Zhidong. Output ca. 300 titles. Had its own catalogue.
Shanxi guan shuju 山西官書局, originally Junwen shuju 浚文書局	Taiyuan	1879	Gov. Zeng Guoquan 曾國荃	Printed <i>Shanxi tongzhi</i>
Shandong guan shuju 山東官書局, alternative name Shandong huanghua shuju 山東皇華書局 (Shandong Imperial China Printery)	Jinan	1869-1870	Ding Baozhen 丁寶楨	Relatively high-quality prints.

Name	Place	Year of establishment	Founders	Remarks
Zhili guan shuju 直隸官書局	First Baoding then Tianjin	1881	Lao Naixuan 勞乃宣, director Sun Jianai 孫家鼎	Initially planned to focus on 'modern' topics. But since it didn't receive a budget for printing, it did not produce its own imprints. Instead, since 1896 they were transported by the CMSNC from southern official printeries and sold by this office at the original price.
Sichuan cungu shuju 四川存古書局 (Sichuan Printing Office for Conserving Antiquity), Chengdu shuju 成都書局	Chengdu	1863	Wu Tang 吳棠	
Yunnan shuju 雲南書局	Kunming	1880	Songfan 崧藩	Zhang Xiumin: 'relatively small output'
Guizhou shuju 貴州書局	Guiyang	1896	Songkun 嵩昆	Zhang Xiumin: 'relatively small output'
Henan guan shuju 河南官書局		1884		
Lanzhou (Gansu) guan shuju 蘭州官書局	Lanzhou	1903		
Zunjing shuyuan 尊敬書院	Qinghai	unclear	Long Xiqing 龍錫慶	Only in Zhang Shudong, sect. 14-1
Dihua shuju 迪化書局	Urumchi	1880	Zuo Zongtang 左宗棠	Only in Zhang Shudong, sect. 14-1
Guiyuan shuju 桂垣書局, in 1907 Guangxi shuju 廣西書局	Guilin	1890	Ma Piyao 馬丕瑤	Only in Zhang Shudong, sect. 14-1

Sources: Zhang Shudong, *Zhongguo yinshua*, chap. 7, sect. 6-5, (5), 1. (3); chap. 14, sect. 1 各地官書局 (www.cgan.net/book/books/print/g-history/big5_12/14_1.htm#1411); *Qingdai yinshua*; Zhang Xiumin, *Zhongguo yinshua shi*, p. 559 ff.

8. Private Printing, Private and Government Cooperation, and the Printing Workforce

The Private Printing Sector

In the field of printing that was not financed or controlled by the government, production for commercial purposes provided textbooks and learning aids of all types to prepare for official examinations. Moreover, information was provided in fields of knowledge beyond those that were directly controlled by the state – for instance, merchantry, navigation (maps), medicine, and agriculture – but less for the craft trades, where skills were for the most part transmitted orally. Commercial publishers also supplied the entertainment sector, especially the theatre, with scenarios and fictional writings. Multicolour block printing was used for book illustration, calendars, and for room decoration such as New Year's pictures. And from the mid-nineteenth century, information on contemporary political, economic, and cultural affairs and events was also printed in newspapers and journals, using lithographic and letterpress equipment imported from overseas.

Printing for non-commercial purposes served to enhance scholarly and social prestige. The boundaries of non-commercial and commercial publishing were sometimes blurred. If collectors reprinted their valuable editions of medical texts, for instance, for the use of other scholars or a wider public and sold these books, they preferred to understand their income by sales as only a means to purchase more rare editions that they could reprint and redistribute rather than gaining mere profit.¹ Religious beliefs were

1 A typical case of a gentleman-merchant who printed to enhance his prestige rather than to make profits was Pan Shicheng (c. 1804-1873), a Guangdong comprador and book collector, who between 1845 and 1851 published the collectanea *Haishan xian guan congshu* 海山仙館叢書 and other works. See *Eminent Chinese of the Ch'ing Period*, p. 606; Wang and Lin, 'Nan Yue xianxian'. A famous early non-profit printer was the father of the philosophers Cheng Yi and Cheng Hao, see Tsien Tsuen-hsuei, *Paper and Printing*, p. 381, fig. 1234; see also Ellen Widmer 'The Huanduzhai', p. 97 with a description of a philanthropist who was prompted by supernatural forces to print the medical texts in his possession. One of the most productive printer-publishers was Mao Jin (1599-1659), who is said to have published more than 600 works on over 100,000 woodblocks in thirty years, which were sold all over the country at fixed prices. But rather than accumulating profit, Mao invested the family fortune in his bookselling enterprise. See Fang Xing et al., 'Paper Making, Printing and Publishing', p. 235.

another important stimulus for non-commercial printing. Thus, the first known examples of printed scrolls and books in East Asia contain Buddhist writings.² Buddhists were especially eager to duplicate texts because they believed that this was a way of acquiring merit and improving their *karma*, and that the quantity of texts produced had a direct influence on the amount of personal merit.³ Christian missionaries had made efforts to spread their creed in China from the sixteenth century, and in the nineteenth century, the letterpresses they had imported and the fonts they had developed helped to launch mechanized printing. Christian competition in turn may have been one of the triggers for the lay Buddhist movement of the late nineteenth century, which adopted the reproduction and distribution of Buddhist texts as its foremost method of promoting its religious mission.

State of the Field and Locations of Printing Workshops

Since the 1980s and 1990s, the study of Chinese book and publishing history has been expanding in academic circles in China and abroad.⁴ In the People's Republic of China, important outline histories have been written by Zhang Xiumin and Zhang Shudong. The technical aspects have been most thoroughly treated in English by Tsien Tsuen-hsuei and in Chinese by Pan Jixing. In addition to these overviews, detailed studies of printing in the provinces and smaller centres are also abundant.

Japanese scholarship has traditionally been strong on the study of dating and editions, since Chinese books were acquired in Japan from an early period and in considerable quantity. A fair number of books no longer extant in China have been preserved in Japan. One of the classical studies in this respect is Nagasawa Kikuya's *Wa Kan sho no insatsu to sono rekishi* (The printing of Japanese and Chinese books and its history). More recently, the eminent expert of Chinese bibliography, Yoneyama Toratarō, published

2 Ledderose, *Ten Thousand Things*, pp. 150-152, refers to *dharani* rolls, several centimetres high and some metres long, that contain parts of the 'Great Dharani Sūtra of Stainless Pure Light', discovered in the monastery Pulguksa in Korea, dating before A.D. 751, and of the same text, which in A.D. 764, a Japanese empress vowed to have printed in one million copies. The oldest dated printed scroll (23.7 cm, more than five metres long) from China is the Diamond Sūtra discovered in Dunhuang. Its colophon records the year A.D. 868. Cf. Tsien Tsuen-hsuei, *Paper and Printing*, p. 8.

3 Ledderose, *Ten Thousand Things*, p. 152.

4 For overviews of the recent state of the field, see McDermott, *Social History of the Chinese Book*, 'Bibliographical Notes', pp. 263-278, and Meyer-Fong, 'The Printed World'.

Zusetsu Chūgoku insatsu shi (An illustrated history of Chinese printing). Younger generations of Japanese scholars have concentrated on the cultural meaning transported in Chinese books. An outstanding study in this respect has been presented by Inoue Susumu in his work *Chūgoku shuppan bunkashi* (2002) on scholars, the state, and book distribution from the beginnings of handwritten books in the first millennium B.C. to the Ming; a further important contribution to the book history of the High Qing is Okamoto Sae's 1996 study on censorship ('book prohibition' *kinsho/jinshu*) in the Qing.

The field is also increasingly flourishing and gaining momentum in European languages. Recently, there has been extensive study of the previously fairly unknown activities of private printing and publishing workshops and enterprises. For the Ming and Ming-Qing transition, outstanding research has been carried out by Lucille Chia about publishing in the Fujian province centre at Jianyang (2002), by Ellen Widmer on the publishing house Huanduzhai in Hangzhou and Suzhou (1996), and by Chow Kai-wing on Late Ming commercial publishing and the way in which political control was exerted on the contents of books privately printed, especially in comparison to censorship in European countries (2006). Joseph McDermott's study on the social history of the Chinese book (2006) develops the thesis of the importance of the manuscript versus the imprint in late imperial China, which at several points draws on Inoue Susumu's previous studies.⁵ Imprints and manuscripts remained complementary throughout the Qing and even Republican periods, even though printing as a means of duplicating texts gained ascendance in the late Ming.⁶ The situation of government and private printing from the Song era up until the early Ming has been presented and analysed in a collected volume edited by Hilde de Weerd and Lucille Chia,⁷ and Cynthia Brokaw and Christopher Reed brought together articles on both traditional and present-day publishing in their 2010 collection *From Woodblocks to the Internet*.

Important work on printing in the nineteenth and early twentieth centuries focuses on the rise of newspapers and the emergence of a public sphere, especially in Shanghai. Major achievements here have been reached by the Heidelberg project group, which has focused on the beginnings of a public sphere in China, with particular focus on the *Shenbao* (1872-1949),

5 McDermott, 'The Ascendance of the Imprint', p. 57.

6 *Ibid.*, p. 92. Cf., for instance, the fact that the Court Gazette was also sold in a handcopied edition throughout the longest part of the Qing period.

7 De Weerd and Chia, *Knowledge and Text Production in an Age of Print: China, 900-1400*. Leiden: Brill 2011.

one of the first commercial daily newspapers in China, founded in 1872 by the British entrepreneur Ernest Major (1841-1908).

Barbara Mittler, Natascha Vittinghoff, and Andrea Janku have studied the rise of the public sphere and the role and self-evaluation of the intellectuals in the political upheavals of the late nineteenth and early twentieth century in monographs and, together with other authors, in contributions to a volume edited by Rudolf G. Wagner.⁸ Other important research on publishing in Shanghai includes the early study by Jean-Pierre Drège on the Commercial Press between 1897 and 1949 and, more recently, Christopher Reed's inquiry into the rise of Chinese 'print capitalism' in the late Qing and early Republic of China.

Research on popular multicolour ornamental printing has been presented by John Lust in an overview in *Chinese popular prints* and in a monograph on ornamental printing in Shandong by James A. Flath. Gabriele Goldfuss has inquired into the religious printing activities of the lay Buddhist movement around Yang Wenhui (1837-1911) in the late nineteenth century.

In this impressive range of scholarship that looks at book production from economic, technical, political, and cultural perspectives, the most recent highlight is Cynthia Brokaw's exploration of printing and publishing in Western Fujian, a region even more remote than Jianyang in the same province, which was researched by Lucille Chia. Brokaw directs our attention to the Sibao publishers, who were hardly ever acknowledged in the standard Chinese elite-oriented printing histories. Their products of average or low quality were what most people could afford, such as primers for reading and writing, fiction, and medical handbooks. This research shows that block printing, which Shanghai book and press historians were to dismiss as marginal in the twentieth century, was carried out on the periphery until the 1940s. In fact, as Goldfuss has shown, if printing blocks were not recycled for purposes such as heating or for paving ways and roads, and if they survived political upheavals, they could be used for printing in the late 1980s.⁹ In 2006, UNESCO declared the Chinese engraved block printing technique to be an Intangible Cultural Heritage that deserves to be safeguarded.¹⁰

8 Rudolf G. Wagner (ed.), *Joining the Global Public*.

9 Goldfuss, *Vers un bouddhisme*, p. 51 ff, and fig. 2, 5-6 with photographs of the 'Sutra carving site' (Kejing chu 刻經處) in Nanjing taken in the early 1980s, which show printers inking the woodblocks and binding the sutra texts.

10 The list 'Guowuyuan guanyu gongbu [...] Fei wuzhi wenhua yichan minglu', dated May 2006, mentions the techniques of block printing sites in Yangzhou, the Jinling Sutra Printing Site, and the Dege Sutra Printing House in Sichuan Province (as numbers 429/VIII/78 to 80 respectively) as protected intangible cultural heritage. See also 'Jinling kejing yinshua jishu'.

Like the other branches of handicraft manufacture, the printing sector during the Qing era followed the pattern of rising commercialization and expansion of manufacturing of the late Ming. After a short lull during the Ming-Qing transition, the production of printing also spread out to rural and peripheral areas.¹¹ Some important commercial publishing sites in the late Ming (sixteenth and seventeenth centuries) were Nanjing, Suzhou, and Huzhou in Jiangnan; Yangzhou in Northern Jiangsu; Hangzhou in Zhejiang; Huizhou in Anhui; and the Jianyang centres of Masha and Shufang in Fujian. In the Ming-Qing transition, Jianyang as a centre of printing suffered and did not recover. Nanjing and Hangzhou lost their leading positions, and Peking with its Liuli chang district rose to primacy.¹² Zhang Xiumin lists only thirteen commercial publishing houses in Peking in the late Ming period, while 38 commercial printers in Nanjing are known. This ratio was turned around during the Qing era, when 112 publishing houses and bookstores existed in Peking, and only thirteen in Nanjing. In the provinces, starting from the Kangxi era, Sichuan had ten large commercial houses in Chengdu and several establishments in Chongqing. Nevertheless, these figures may be just the tip of the iceberg. The Jiangnan printing industry – including all publishers not only in Nanjing but also Suzhou, Yangzhou, and Hangzhou – was still prolific even in the eighteenth century. In the nineteenth century, the Jiangnan metropolis Shanghai again overtook Peking and, together with Canton, became the first place where mechanized printing machinery was operated.

Canton became a centre of printing in the mid-Qing. It was a place where much information on overseas powers and countries arrived. Reformers and statecraft thinkers from before and after the Opium Wars published their writings in the *jingshi wenbian* collections and monographs such as the *Haiguo tuzhi* (Illustrated treatise on the maritime kingdoms). At least 23 printing shops existed from the 1850s until the first decade of twentieth century. Two more towns in the vicinity of Canton had print shops of more than local importance: the market town Foshan and the more rural Magang in Shunde district. Foshan, a busy market town which was also a centre for ceramics and the iron industry, had at least twelve publisher-printers, more than any other city in Guangdong with the exception only of Magang, where female block cutters practiced their low-wage trade.¹³ For the market town of Xuwan, a printing centre in Jiangxi, there are figures of about 47 individual

11 Brokaw, *Commerce in Culture*, p. 8. The following overview follows Brokaw p. 8 ff. and Zhang Xiumin, *Zhongguo yinshua shi*, pp. 551-559.

12 Brokaw, *Commerce in Culture*, p. 8.

13 Brokaw, *Commerce in Culture*, p. 11.

printing and publishing shops. According to Brokaw, Xuwan and Magang had the single greatest output of block printings. In north China, Ji'nan and Liaocheng were important locations for printing, as both were strategically located near the north-south traffic artery of the Grand Canal. Yuechi county in eastern Sichuan was a rural region where farmers practiced block cutting as a subsidiary craft in the eighteenth and nineteenth centuries. They supplied the urban book market in Chengdu and Chongqing but also had their own direct distribution channels.¹⁴ The rural centres of printing in South China were most often located in areas that also had a prolific paper manufacturing industry.¹⁵

The art of multicoloured woodblock printing used for house decoration, especially during New Year (*nianhua*), in the early and mid-Qing era was concentrated in the three largest artistic centres of Suzhou (in the Taohuawu district); Yangliuqing in Hebei, fifteen kilometres west of Tianjin; and Mianzhu in Sichuan, about one-hundred kilometres northeast of the provincial capital Chengdu.¹⁶ On a smaller scale, ornamental block prints were produced in many locations throughout the Qing empire.¹⁷

Output of the Printing Industry

In the private printing sector, it is difficult to make a clear division between the concepts of 'publishing house', 'print shop', and 'bookstore'. As a rule, the publishing house (*shufang*, literally book-workshop) both produced and distributed books.

So far, much doubt remains about the aggregate output of these rural and urban centres of printing and publishing. One estimate that is frequently quoted in the literature was made by Yang Jialuo: among the 253,000 titles registered in official historiography and bibliography from the Han to the Qing era, about half of the output – over 126,000 titles, probably also including manuscripts – are attributed to the Qing,¹⁸ yielding a yearly average of 471

14 Ibid., p. 12.

15 For an excellent, comprehensive study on papermaking in Sichuan, see Eyferth, *Eating Rice From Bamboo Roots*.

16 John Lust, *Chinese Popular Prints*, p. 47, 66, 80.

17 Lust, *Chinese Popular Prints*, p. 86, mentions one to three minor centres in every province, and James Flath in *The Cult of Happiness*, p. 12-13, gives details on six further locations in the North China 'aesthetic region'.

18 Tsien Tsuen-hsuein, *Paper and Printing*, p. 190, fn. f, citing Yang Jialuo 楊家駱, 'Zhongguo gujin zhuzuo mingshu zhi tongji' 中國古今著作名數之統計 (Statistics of old and new Chinese book titles), in *Xin Zhonghua* 新中華 (The New China Fortnightly), 1946, vol. 4, p. 7.

titles per year for the 267 years of the Qing dynasty. Not all Chinese book historians agree with this figure. At present, the estimates for the Qing dynasty range between 70,000/80,000¹⁹ and 200,000²⁰ titles. This result does not impress European bibliometricians, who point to annual averages of book production between 1751 and 1800 on a scale of, for instance, 2,300 in the regions now known as Germany and 3,100 in France, or 12,500 for entire Europe including Russia.²¹ The low-end estimates for China are based on information in various Qing bibliographies, which tend to understate or ignore books beyond the scope of state orthodoxy. Thus, Buddhist writings and local compilations, especially the great number of genealogies, were often disregarded. As we see from Brokaw's study on Sibao, the sales volume of one of the largest Sibao publishing houses in the early twentieth century, when mechanized printing started to replace the handicraft trade, amounted to 8,000 sold copies of 250 titles per year. These are most certainly not considered in any of the above estimates. In the heyday of Sibao publishing in the Qianlong and Jiaqing eras, 46 such publishing houses were founded.²²

The total number of copies of existing 'ancient books' (printed and handwritten before 1912) has been assessed at between 35 and 50 million.²³ The number of titles produced between 1912 and 1949 has been estimated at 68,000 titles, which amounts to about 1,800 per year.²⁴

Looking at the issue from the consumer side is difficult because no systematic surveys of literacy rates were conducted before the twentieth century, and observations by Chinese and Western observers between the seventeenth and the nineteenth centuries diverge sharply. The most generous estimate of Qing dynasty literacy rates has been made by Evelyn Rawski. From scattered evidence, she has concluded that during the Qing era about 30 to 45 percent of the men and two to ten percent of the women could read and write.²⁵ For nineteenth-century rural Guangdong, she estimated a male

19 Wu Feng 吴枫, 'Zhongguo guji shuliang shulue' 中国古籍数量述略 (A brief account on the quantity of Chinese old books), in *Wu Feng xueshu wencun* 吴枫学术文存 (Collected works of Wu Feng), Beijing: Zhonghua shuju 2002. The author is grateful to Professor Gao Xuan 高瑄, Vice Director of Tsinghua University Library, Peking, who provided this information and the following data on Chinese estimates.

20 Wang Shuwei 王树伟, 'Woguo guji zhi duoshao' 我国古籍知多少 (How many old Chinese books exist?), in *Baike zhishi* 百科知识 (Encyclopedic knowledge), 1981, no. 12.

21 Buringh and van Zanden, 'Charting the 'rise of the West'', p. 44; van Zanden, 'De timmerman', p. 117/118.

22 Brokaw, *Commerce in Culture*, p. 3, 8.

23 Ancient Collection Division, 'Current situation' and information by Gao Xuan.

24 Reed, *Gutenberg*, p. 298, note 8.

25 Rawski, *Education and Popular Literacy in Ch'ing China*, pp. 22-23.

literacy rate of 40 to 50 percent, and in Canton city even 89 to 90 percent. Li Bozhong, who discusses Rawski's data, estimated a maximum literacy rate in the region of the Yangzi Delta of 30 percent for both genders.²⁶ Other scholars are more sceptical and have estimated male literacy in the range of 20 to 25 percent. Opinions on what 'literacy' actually means are also divided. According to Li Bozhong, 'being literate' implies knowledge of at least one-thousand characters and 'half-literate' about 500 to 600 characters,²⁷ but scholars such as Wilt Idema have defined 'moderate literacy' as starting with a knowledge of about 2,000 characters.²⁸

Literacy does not necessarily mean that a person will buy books. However, in view of the estimated 51 to 102 million literate people in 1800 or 60 to 120 million in 1900,²⁹ even the highest estimate of 50 million extant books (as of 1912) seems a low rate that may imply that much book production was not recorded by Chinese bibliographers.

Price trends for books were decreasing throughout the Qing era and varied broadly according to the quality of collating and proofing, character-carving, and materials used for printing and binding. The sales prices that Liu Qiang states for the Wuying dian books ranged from 12.46 tael for the rhyme dictionary *Peiwen yunfu* (106 chapters), printed in 1711; 5.148 tael for the 'Regulations and precedents of the Ministry of Personnel' *Libu zeli* (52 chapters) printed around 1800; and 6.721287 tael for the Peking city gazetteer *Rixia jiuwen kao* (160 chapters), printed in 1778. The last quoted price at that time bought 268 *jin* (ca. 160 kg) of white wheat flour.³⁰

Cynthia Brokaw quotes book prices for the low end of the production scale and at a time when prices had fallen, mainly due to the decline of woodblock prices since the Jiaqing era. The cheapest items on the Sibao merchants' account books in the last decades of the Qing and in the early years of the Republic were primers like the 'Three character canon' *Sanzi jing* for 0.005 tael, an edition of the six-chapter 'Three-hundred collected Tang poems', or a simple annotated 'Book of Changes' or 'Classic of History' for 0.03 tael. The most expensive item was a sixteen-chapter collection of ghost stories, *Liaozhai zhiyi*, with a wholesale price of 1.1 tael and a retail

26 Li Bozhong, 'Bagu zhi wai', p. 8.

27 *Ibid.*, p. 7.

28 Brokaw, *Commerce in Culture*, pp. 562-565.

29 Assuming an optimistic literacy rate of 30 percent and a pessimistic rate of 15 percent respectively for a population of 341.6 million in 1800 and 400 million in 1900. For population figures, see Angus Maddison, *Chinese Economic Performance in the Long Run*, p. 169, 'Table D.1. Chinese Population, 50 AD-1996'.

30 Liu Qiang, 'Qing Wuying dian', p. 276.

price of 1.32 to 1.76 tael.³¹ About half of the titles cost 0.1 tael or below. In view of wages in the late Qing period, the low-priced books should have been affordable for families whose income was at least partly in monetary wages, while the palace editions remained luxury editions for the very wealthy or for state institutions.

If the output of the government printeries is seen in relation to the overall output, even in Yang Jialuo's figures, at 600 for the central government and 1,000 for the printeries of the provincial governments, this accounts for but one percent of the titles. However, the comparison is skewed because the voluminous encyclopedia *Gujin tushu jicheng* is only counted as one title. The percentage would increase significantly if we took court and provincial gazettes into account, but in this case we would also have to include the output of the commercial newspapers and journals published especially in the treaty ports. Leaving newspapers and court gazettes aside, it is still evident that the output of government printeries comes to but a fraction of the total production of the printing industry in the Qing period.

Mechanization in the Printing Industry in the Late Qing and Early Republic

From the beginning of the nineteenth century, as political crises of unprecedented scale shook the empire and competing value systems appeared in the form of Christianity and – for two decades – the Taiping ideology, the printing industry boomed and diversified. Already before the Opium War, the London Missionary Society had started to develop Chinese letterpress printing and letter-casting machines (relief media) as well as planographic media (lithography) in Southeast Asia and in the city of Canton. The post-Opium War treaties of Wangxia (1844) and Tianjin (1858) guaranteed overseas powers the freedom of Christian missionary activity in China. Consequently the printing activities of both Protestant (the London Missionary Society, the American Presbyterian Mission Press) and Catholic (Jesuit) groups intensified. The Protestant missions preferred letterpress relief media, while the Catholics favoured planographic printing (lithography and colotype).³²

Copperplate engraving (*intaglio*) had first been introduced in the Kangxi era and from 1712 had been applied by Jesuit missionaries at court for map

31 Brokaw, *Commerce in Culture*, p. 514.

32 Reed, *Gutenberg*, p.29.

making.³³ The Qianlong emperor was particularly interested in the artistic and graphic qualities of this medium. In 1765, he ordered from the French royal academy for painting and sculpture in Paris a series of sixteen copperplate engravings of the military expeditions to Turkestan to be executed on the basis of the paintings of his court painters Giovanni Castiglione, Denis Attiret, Ignatius Sichelbarth, and Jean-Damascène Sallusti. The offprints and copperplates were delivered in 1774. Thereafter, the series of military expeditions and suppressions of uprisings were all glorified with large-size copperplate engravings, and this time executed by Chinese designers and engravers.³⁴ Around 1787, the buildings in European style of the imperial gardens Yuanming yuan were also, upon imperial order, depicted with this foreign technique by Chinese artists who had been trained by Castiglione.³⁵ The last series of copperplates showing battle scenes depicts the subjugation of the rebellion by Jehangir in Eastern Turkestan between 1825 and 1828 and was designed in 1828.³⁶ After a lapse of a few decades, mechanized copperplate engraving was reintroduced in the Jianghai Customs Printing Office in Shanghai but more importantly in the printery of the Ministry of Finance for banknotes, stamps, and government seals.³⁷

Private, secular printing firms like Ernest Major's enterprises used letterpress for newspaper production and lithography for illustrated magazines and reprints of classical Chinese literature.

Yet before the turn of the twentieth century, most book printing outside the treaty ports was still done in woodblock carving.

The rise of the modern printing industry has been described in detail by Christopher Reed, who has shown that in the last thirty years of the Qing dynasty, lithography dominated over the letterpress in output and popularity.³⁸ However, after the 1890s, letterpress typography began to replace lithography; by the early twentieth century, both types of mechanized

33 The technique was introduced by the Jesuit Matteo Ripa. The first maps were engraved in 1712 and 1719, and later under the Qianlong emperor in 1775. Helen Wallis, 'Die Kartographie der Jesuiten am Hof in Peking', p. 121.

34 See the catalogue of the exhibition *'Europa und die Kaiser von China'* with the introduction by Müller-Hofstede and Walravens, 'Paris-Peking', pp. 163-172, for the illustrations of the expeditions to Jinchuan in Sichuan (1775/76), Taiwan (1786/87); Annam (1789/90), against the Gurkhas in Tibet (1793-1799) and the ethnic uprisings of the Miao in Guizhou, Hunan, and Sichuan (1798-1803) and Wäadow, 'Die 'Schlachtenkupfer' aus der Regierungsdevise Qianlong'.

35 Jean Paul Desroches, 'Yuanming yuan: Die Welt als Garten', p. 124.

36 Walter Fuchs, 'Schlachtenkupfer der Kienlung- und Taokuang-Zeit', p. 119.

37 Reed, *Gutenberg*, pp. 28/29, table 1.1 'Western print media in China, 1700-1913', p. 65.

38 Reed, *Gutenberg*, p. 121 and p. 327, note 124. On p. 126, however, he gives the figure of 94 lithographers.

printing largely replaced woodblock printing – at least in Shanghai. Furthermore, not only were Western printing machines imported to China starting from the 1870s, the machinery was also first repaired and later built domestically. Between 1914 and 1932, Shanghai was the most important Chinese centre of printing machinery production that also exported to Southeast Asia and even to Japan.³⁹ Domestic printing machinery makers only emerged in the period after the fall of the Qing, but it shows the vitality and adaptability of the Chinese manufacturing sector.⁴⁰

As Brokaw has shown, in the periphery beyond Shanghai, block printing was still practised, if with decreasing profits, until the 1940s.⁴¹ Yet even in a former treaty port, Qingdao – with a population of over 400,000⁴² and several newspaper publishers, universities, and institutes of secondary education – printing and character carving was exercised as a handicraft trade in the 1930s. Only every one in a thousand persons was engaged in this sector, but within the handicrafts in Qingdao, printing ranked fifth in respect to households and persons employed (see Table 34 and Table 35). We have no indicators as to the relation of handicraft (block) printing and mechanized printing in Qingdao. According to a nationwide estimate of the net production value of handicrafts within the entire manufacturing sector, the share of handicrafts in the total production value of manufacturing in 1933 was still 72 percent. However, in the printing sector, mechanization had advanced faster, with the percentage of the net production value of handicrafts at only 45.3.⁴³

In less industrialized inland cities, mechanized printing was probably less advanced, but demand for products of the ‘information industries’ may also have been comparatively lower than in Qingdao, for instance, where several universities and institutes of secondary learning were based. At any rate, even in early 1930s Qingdao, handicraft printing and letter

39 Ibid., p. 136.

40 Ibid., p. 135.

41 However, even in Shanghai in the 1890s, ‘printing from blocks is still done with advantage whenever a larger work meets with continuous demand, though only a small number is needed, perhaps some hundred copies, per year.’ See Reed, *Gutenberg*, p. 320, note 32.

42 For the population figures of Qingdao, see Cui Yuting, ‘Kangzhan yiqian Qingdao’, p. 145.

43 ‘Yijiusansan nian Zhongguo shougongye chanzhi zhan gongye chanzhi de bishong guji’ 一九三三年中国手工业产值占工业总产值的比重估计 (Estimates of the relation of the net value of Chinese handicraft production to the total net industrial production value), in Peng Zeyi, *Zhongguo jindai shougongye*, vol. 3, pp. 814–815. Peng quotes here the figures given in Wu Baosan et al. (eds.), *Zhongguo guomin suode* (China’s national income), 1933, vol. 1, p. 64, 65, and 66, with (a very slight) modification in Wu’s *Zhongguo guomin suode 1933 xiuzheng*, pp. 135, 140, and 142.

carving still could feed the artisans and was moderately popular as a career choice for young people considering learning a craft, probably also for the reason that little capital was necessary to start up a shop of one's own (see Table 35).

In Peking, according to the city gazetteer of 1939, about 30 lead letterpress printers and 500 smaller and larger lithographers operated their business with a workforce of about 10,000. About 2,000 of them worked at the printery of the Ministry of Finance. The section on printing states that character carving was no longer practised in commercial enterprises but was still done in schools, churches, and newspapers.⁴⁴ However, the section on book and rubbings informs us that 'formerly there were several dozen of character carvers in Peking. They first all came from Nanjing, only later did they take on North Chinese apprentices. At present almost all the old shops have been closed down. Among those who persisted, the Wenkai studio is best known. [...] It often employs more than one hundred people. The other shops engage between seven and eight or one to two carvers.' Bookbinders, character copyists, and specialists for taking ink rubbings from metal or stone are also mentioned. But the print-related handicraft trade that still employed the most workers was the paper mounting of calligraphic or painting scrolls. 1,500 paper mounters are reported for Peking. The trade, like character carving, was first practised in Peking by Jiangnan artisans from Suzhou but was later mastered by Northern workers.⁴⁵

To conclude, although mechanization started in the 1870s and took off in the second decade of the twentieth century, it did not immediately push the handicraft sector from the market. Due to the huge increase in demand for information, education, and entertainment encoded in print media, the craft sector survived for several decades thereafter.

The Relationship of Government and Private Printing

The censorship of books was carried out most severely and systematically in the Qianlong era in connection with the compilation of the collectanea *Siku quanshu*. Recent scholarship has pointed to the emphasis by the Qianlong emperor and his central government upon censorship of anti-Manchu writings, the eagerness of officials to find suspicious books in order to gain rank and prestige, and the compliance of the scholarly elites with this

44 *Beijing shizhi gao*, vol. 3, p. 493.

45 *Ibid.*, p. 509-511.

policy.⁴⁶ The monitoring activities had consequences for publishers. Zhang Xiumin refers to 'over 120 cases' of censorship in the Kangxi, Yongzheng, and Qianlong eras and states that, in the larger initiatives of censorship, not only authors but also artisans could be implicated.⁴⁷ One particularly drastic case is reported from the Kangxi era, when in the year 1663, the author of an indicted 'History of the Ming Dynasty', Zhuang Tinglong, was posthumously punished by having his corpse dug up and burned. Those who had edited, distributed, sold, and bought the work – as well as Tang Dafu, who had carved the blocks during a period of five years, Li Xiangfu, who had printed forty copies of it, the bookbinder, and the porter of the blocks, altogether seventy (and in another version, 120) persons were sentenced to death and executed in Hangzhou.⁴⁸

Other scholars have assessed the direct impact of the 'literary inquisition' of the 1770s as less severe. For one, the suspect books were more often issued by private, not commercial publishers, and thus the range of persons involved was more confined.⁴⁹ Moreover, if character carvers, printers, or sales agents were illiterate, which occurred now and then, their sentences were mitigated.⁵⁰ The blocks of the incriminated books would often be destroyed, but sometimes the emendation or deletion of the passages offensive to the emperor and his dynasty was an acceptable alternative.⁵¹ According to a report to the throne from the year 1781, 52,480 woodblocks of seditious books had been broken up and recycled as firewood. Since two pages of a book are carved on one block, the forms for at least one hundred, but more likely several hundred books, were destroyed in this process. Books were burned, too, but absolute control could not be achieved; indeed, some of the works on the 1782 index could still be found in the twentieth century.⁵² The censorship focused mostly on scholarly works in the field of history, and to some extent lexicography; examples of works of entertainment are not recorded, so it appears that commercial publishing was not greatly affected by the prohibitions. Following the model of the preceding dynasties, cultural politics during the Qing era promoted an education that was focused on

46 Guy, *Four Treasuries*, pp. 198-200.

47 Zhang Xiumin, *Zhongguo yinshua shi*, p. 544.

48 *Ibid.*, pp. 757-758.

49 Brook, 'Censorship', p. 181.

50 *Ibid.*, p. 183, refers to a reduction of the sentence of flogging from one hundred to eighty blows, as well as exemption from three years of banishment for the illiterates engaged in book production.

51 Brook, 'Censorship', p. 191.

52 Guy, *Four Treasuries*, pp. 171, 194.

the students' participation in official examinations on various levels, from district and provincial to the level of the capital. Scholarly status greatly enhanced one's social prestige. Whoever could afford the tuition fees and the books (and was not dependent upon family male labour power for more basic economic pursuits) could allow their sons to study in preparation for a degree in one of the levels of the examination hierarchy.

The road was theoretically open for all males except those with 'debased' status, but artisans, for instance, could rarely take it due to financial reasons. Until the mid-eighteenth century, the canon of books to be mastered for analysis and exegesis in official examinations covered the Confucian classics, historical works, political administration and decision-making, and jurisprudence. After 1756, the composition of a poem was demanded in addition to essays and exegetical answers to questions on moral philosophy, while the legal question was eliminated from the examination questionnaires.⁵³ Only a limited percentage of the population participated in official examinations: it has been estimated that in the late Qing period 1.6 to 1.9 percent of the total population took part in the examinations. By 1800, a quota of over two million examination candidates together with about 750,000 degree holders who had already attained scholarly status were channelled into this specific type of elite learning by the decisions of the central government.⁵⁴

Knowledge of science, medicine, and technology was required only at the general level that was necessary for administrative decisions. Expertise in these fields was not tested in the highest examinations that were held at the capital. Nevertheless, Qing emperors and scholar-official elites, especially in Jiangnan, were aware of the importance of knowledge of precise studies, especially mathematics. The early Qing emperors Shunzhi and Kangxi employed Jesuit missionaries at court who brought recent European knowledge of astronomy, mathematics, geography, cartography, and, to a certain extent, mechanics, to the personal attention of the rulers and the Chinese scholars. In the eighteenth century, proto-scientific research was exercised outside the court in Jiangnan scholarly communities. It was linked to 'evidential research' (*kaozhengxue*), which had previously for the main part involved philological scholarship. As long as these endeavours remained apolitical, the Qing state did not interfere with the evidential researchers.⁵⁵

53 See Elman, 'The Social Roles of Literati', p. 367, 'The Format of Provincial and Metropolitan Civil Examinations, 1646-1756', p. 374 for the content of boyhood education, p. 409 for the 'Reformed Format of Provincial and Metropolitan Civil Service Examinations, 1757-1787', p. 413 for the 'Reformed Format of Provincial and Metropolitan Civil Service Examinations, 1793-1898'.

54 Elman, 'The Social Roles of Literati', p. 370.

55 *Ibid.*, p. 425.

Since only the smallest part of these prospective and already successful candidates could actually attain a post in administration, one of the ways of putting one's knowledge to good use was by teaching in state or private schools and academies or by opening a bookstore-publishing house. As literacy spread from the early nineteenth century on, basic writing and calculating skills were taught on a wider scale than before,⁵⁶ and teaching materials were also printed and distributed by lowbrow publishing houses such as those based in Sibao or Xuwan at affordable prices.⁵⁷

The state did not obstruct the publishing and printing activities of the private sector if it kept clear of criticism of the dynasty, such as downright condemnation of the Manchus as 'barbarians' or, more subtly, referring to the Qing emperors and empresses by their personal names rather than using the obligatory substitute characters. Two examples, one large and one small, illustrate the relation of the central government and the private sector after the decline of printing activities at the Wuying dian in the mid-nineteenth century. In the first case, the central government and the court privatized the reproduction of what had once been the essence of Qing dominance over the canon of knowledge in the empire. In the second case, printing the internal rules and regulations of court life was also outsourced.

On imperial order, the encyclopedia *Gujin tushu jicheng* was reprinted twice in the late Qing, once by letterpress and once in lithography. The court had 1,500 copies printed of the letterpress lead type edition by a company established specifically for this purpose that went by the name of 'Tushujicheng Lead Type Publishing Company' (*Tushujicheng qianyin shuju*). It is preserved in many libraries worldwide, which, somewhat confusingly, date it to 1884,⁵⁸ but the printing dates 1885 to 1888 seem more plausible.⁵⁹ The publishing company was a subsidiary of Dianshizhai, which belonged

56 Elman, 'The Social Roles of Literati', p. 370.

57 The publishers of Xuwan, according to Brokaw, *Commerce in Culture*, p. 538, were mostly 'failed' scholars or low degree holders. Brokaw, *op. cit.*, p. 516, has calculated that during the late Qing, a modest selection of twenty elementary schoolbooks by the Sibao publishers for the examination curriculum would cost between 0.1728 and 0.2580 tael.

58 According to the digital library catalogues of the Academia Sinica, Taiwan, the Japanese Union Catalogue Nacsis, the Taiwan National Library, and the Beijing tushuguan (the Chinese National Library), '1884' is presumably the year when the project was started. According to the Beijing tushuguan, the imprint expressly says: 'in the summer of the year Guangxu *jiashen* (1884), the Shanghai Tushu jicheng lead type edition publishers assembled stocks for the reprint' 光緒甲申年夏上海圖書集成鉛版印書局集股重印. The National Library lists another lead-type edition by the Shanghai Tushu jicheng letterpress publishers of Guangxu 30 (1904). No information was available on this reprint.

59 Giles, *Alphabetical Index*, p. xix; Reed, *Gutenberg*, p. 116.

to the Shenbao group that the American entrepreneur Ernest Major had founded and at that time still owned.⁶⁰

Whether lithographic rather than letterpress printing is more aesthetically pleasing to the Chinese remains unresolved,⁶¹ but obviously the government wanted to commission an additional, more presentable lithographic reprint and eventually gave out another order to Tongwen press, the largest Chinese-owned lithographic enterprise at the time.⁶² The initiators from the Council of Foreign Affairs (*Zongli yamen*) intended to use it also as a gift in international diplomacy, presumably to show the scope of Chinese learning. The court covered the entire sum of about 350,000 tael for one hundred copies, which were printed and published as a revised edition with emendations, totalling 1,672 volumes (*ce*).⁶³ The production process lasted from 1892 to 1894.⁶⁴ Part of the edition was to be sold for 3,500 tael per set, but after several years, a considerable number of copies remained on stock, taking up much space. After 1901, the government presented copies to the provinces⁶⁵ and also to foreign heads of states and institutions.⁶⁶

From the perspective of the government and court, the contrast to the Kangxi/Yongzheng project must have been striking. Back then, applying a comparatively rare but sophisticated technology and collecting the latest information on the widest imaginable scope of topics including knowledge of Western mathematics, astronomy, geography, and armament provided by missionaries, the court produced this sum of learning on its own in a

60 Reed, *Gutenberg*, p. 104.

61 See Rudolf Wagner's critique of Reed's thesis that early lead-type printing before ca. 1900 could not satisfy Chinese aesthetic demands. Wagner, 'Gutenberg' (Chapter 1); Reed, *Gutenberg*, p. 27.

62 Reed, *Gutenberg*, pp. 115-117.

63 The memorial with the cost estimate for the project states that the original Kangxi edition to be used as an exemplar for the reprint cost 13,000 tael. 'Zhupi Guangxu Shiliu nian shi yue shisi ri junjichu zoupian' 硃批光緒十六年十月十四日軍機處奏片 (Memorial note of the State Council, Guangxu 16/10/14, with vermilion rescript), in Zi Ye, 'Qing ting shiyin', p. 62.

64 Zhang Xiumin, *Zhongguo yinshua shi*, p. 592.

65 'Zhupi Jiangxi xunfu xie'en shangci Gujin tushu jicheng pian' 硃批江西巡撫謝恩賞賜《古今圖書集成》片 (Note by the Jiangxi governor on the grateful receipt of the *Gujin tushu jicheng*, with vermilion rescript, [Guangxu 27, 1901]), in Zi Ye, 'Qing ting shiyin', pp. 62-63. Zi Ye mentions that this is the earliest of twelve notes by provincial governors on the receipt of the encyclopedia.

66 One set was donated to the China Society of London and given on loan to the Library of the University of Cambridge, see 'Introduction to the Chinese Collections'. Another one was presented to the American president Theodore Roosevelt, who had it stored in the Library of Congress, see Zi Ye, 'Qing ting shiyin', p. 63. In 1902, Columbia University in New York also received one set. See Reed, *Gutenberg*, p. 325, fn. 103.

veritable 'palace edition'. Now, in an effort to conserve Chinese learning that must be understood as part of the self-strengthening movement, the project had to be outsourced to 'merchants'⁶⁷ and earlier had even been reproduced by a foreign-owned printing company.

A printing project much smaller in scope concerning subject matter particularly important for everyday life at the Qing court was the revision of the 'Imperially endorsed interior court regulations' (*Qinding gongzhong zeli*). The accounts book of the project are preserved in the First Historical Archives. They are not dated, but from all the information available about court regulations, we can assume that the book contained the 1884 regulations. In the bibliography of the works of the Imperial Household Department, this edition as well as its predecessor of the Tongzhi years (1862-1874) is attributed to the Wuying dian.⁶⁸ However, from extant documents we see that these regulations – which concern, for instance, the conduct of all courtiers and eunuchs, and the treatment of palace women – were commissioned to printers and character carvers from a commercial printshop, *Zhuanyun zhai* (Carved cloud studio)⁶⁹ at the book and antique centre Liuli chang. This printing and character carving workshop printed all Peking pawn certificates (*dangpiao*). Apparently it held this monopoly by customary agreement among the pawnshops.⁷⁰ Five printers with their materials, including the blank printing blocks, were sent to execute the job in the palace.⁷¹ They finished after 115 days, and two of them stayed on for another eleven days for corrections and emendations. Seventy more workday units (*gong*) were necessary for printing and binding.⁷²

It remains a puzzle as to why of all texts, the court regulations that are most intimately related to the personal life of emperors, eunuchs, and court women were entrusted to outside printers at a time when, judging from the other extant accounts, the Wuying dian was not yet quite defunct. The archival records

67 This designation is preserved in the memorial of the State Council, which states, 'We, the ministers, have found out that the Shanghai merchants are the most familiar with lithography' 'Zhupi Guangxu Shiliu nian', in Zi Ye, 'Qing ting shiyin', p. 61.

68 *Qingdai neifu*, pp. 236/7.

69 Archival record at the First Historical Archives, Neiwufu zeliguan 內務府則例館 (Regulation and precedent office of the Imperial Household Department) 23, Fuwen 附文 1 to 3, undated.

70 Wang Yongbin, 'Dong hengzhao dangpu'; 'Beijing de qianshi jinsheng.' Besides pawn certificates, Zhuanyun zhai also printed works of entertainment like the scenario book *Guwu lu* 顧誤錄, an edition of 1851.

71 The document Neiwufu zeliguan 內務府則例館 23, Fuwen 附文 (Appended note) 1 mentions 'additional food money for printers that are sent to the Palace' and 'wages for those who transport the blocks into the palace.'

72 Neiwufu zeliguan 內務府則例館 23, Fuwen 附文 3, p. 1.

show that the entire text was carved, printed, and bound by the *Zhuanyun zhai* personnel. This suggests that the Wuying dian at this time did not have enough qualified manpower at its command for even for this relatively minor project.

Both printing projects outlined above – the huge imperial encyclopedia and the short handbook of court behaviour – show that not only the central government but also the court administration had already relinquished the idea that only – or at least mainly – imperial craftsmen upon palace precincts should execute the printing of the texts that ensured the emperor's control and sponsorship of learning in the whole Qing realm and the conduct of his thousands of personal servants in the Forbidden City.

The Workforce Employed by the State and Private Workshops

The locations where printing blocks were prepared, characters carved, and books were printed and bound ranged from the centre of imperial power to rural surroundings at a distance of thousands of kilometres from Peking, where characters might be carved under the open sky. The workforce was as varied as these settings. However, also within the craft – or art – of block printing, the required knowledge and skills differed widely. This involved writing out the model transcript in beautiful calligraphy onto sheets that were pasted in reverse on the printing blocks, carved out in relief, brushed with ink, covered with the pages, pressed, taken off, dried, controlled, and thread-bound into flexible volumes. Accordingly, the qualifications and payment of the craftspeople varied as well.

Artisans in the Palace Printery Wuying dian

In the imperial printery, students of the imperial academy would write out texts that were subsequently processed by artisans in decreasing order of qualification. During the longest period of its activities, highly skilled artisans were employed at the imperial printery, but here, too, a strict hierarchy applied to the various stages of the printing process.⁷³ As one

73 For information on the staff of the Wuying dian, both Lu Shaw, *Imperial Printing*, pp. 9-11 and Liu Qiang, 'Qing Wuying dian', pp. 267-269, refer to the Guangxu edition of the Collected Statutes (*Huidian*, chap. 89, 98; *Huidian shili*, chap. 1045, 1173), but vary slightly. Liu Qiang concentrates on the fuller staff after 1778 and mentions more subordinate sections and officials of intermediate position than Lu Shaw.

of the agencies of the Imperial Household Department, it came under the general supervision of a high-ranking member of the imperial clan. Its two main sections were those of the Overseer of Works (*jianzao chu*) and of Proofreading (*jiaodui shuji chu*). The section of the Overseer of Works was responsible for printing books and tracing the emperor's handwriting for engraving. It had several subordinate sections that respectively functioned for the entire time span of this institution or only for certain periods. These were the copper type storehouse (*tongzi ku*) for the copper type used in the *Gujin tushu jicheng* project; a bindery (*shuzuo*) within the Wuying dian, in the south-eastern aisle;⁷⁴ a printery (*shuayin zuo*), where the transcripts for block printing were copied and the blocks were prepared and cut – initially the blocks were cut only within the Wuying dian, but after 1860, two additional exterior sites were used;⁷⁵ the paper-folding section (*zhepei zuo*); the house for wooden types ('assembled gems' *juzhen guan*) for Jin Jian's wooden movable type project at a location outside the palace gate Xihua men, not far from the Wuying dian; a section for tracing the imperial handwriting (*yushu chu*);⁷⁶ and several storage, financial, and other administrative subsections. In its fullest expansion, it had regular positions for about twenty leading staff, thirty subordinate clerical jobs, and eighty to ninety artisans. The Section of Proofreading was headed by one Manchu and one Han Chinese high-ranking official, an administrative and supervising staff of 26, and 32 unranked scribes, secretaries, and assistants. No artisans worked here. The proofreaders were chosen from the members of the Hanlin Academy and were responsible for drafting and editing the more ceremonial government pronouncements or historiographical projects, or from students (*gongsheng*) of the Imperial University (*Guozijian*)⁷⁷. Although working at the Wuying dian was prestigious, the ranks of its officers were not high. Most of the intermediate and subordinate positions were not ranked but filled with clerks (*baitang'a*) or banner people without permanent official posts (*sula*).⁷⁸ The 'Current regulations and precedents of the Imperial

74 Liu Qiang, 'Qing Wuying dian', p. 268.

75 *Ibid.*, loc. cit.

76 Due to a lack of funds, it was incorporated into the Wuying dian printery *xiushu chu* in 1843. *Qinding Zongguan Neiwufu xianxing zeli*, p. 318.

77 *Huidian*, chap. 1199, fol. 6a/b. Academy students were employed for writing out the transcripts between 1738 and 1769 and again after 1780. A regulation of 1820 provides that writing one hundred chapters should not last longer than a half year, and correcting one thousand characters should be achieved within twenty days.

78 According to Evelyn Rawski, *The Last Emperors*, pp. 167-168, the Manchu term *baitang'a* means 'applicable, useful' and refers to 'errand boys, handymen, underlings', a 'catch-all term for unranked clerks in government offices, artisans, and doctors.' *Sula* were labourers, from the

Household Department' contain detailed prescriptions of how Wuying dian positions at all higher levels should be filled by promoting personnel of lower positions into the vacancies.⁷⁹

As a rule, artisan posts were assigned to banner people and referred to as 'inner-clan work service [positions]' (*jianei jiangyi*) or 'banner artisans' (*qijiang*). These artisans were unfree bondservants (*booi*) of the upper three of the Eight Banners (bordered yellow, plain yellow, plain white) that formed the emperor's household servants.⁸⁰ Bond service was arranged hierarchically. At the top, it could include powerful personalities like Cao Yin, the director of the Imperial Silk Weaveries in Nanjing. Emancipation was possible in special cases. Thus, as mentioned above, Jin Jian and his family were freed from the status of bondservants.⁸¹ The lowest stratum of bond service was that of the 'state slaves' (*sinjeku*), who were prisoners of war (or their descendants) and ranked far below the *booi*.⁸² *Sinjeku* were employed for physical, often agricultural, tasks on the imperial lands but also within the palace. *Sinjeku* women also worked in the palace and at the imperial mausoleums and palaces in the secondary capital Shengjing.⁸³ It is not recorded whether women worked in the palace printery.

In view of the superior quality of the Wuying dian editions, it is usually assumed that only the most skilled and experienced artisans were employed in the Imperial Printery. However, the 'Current regulations and precedents of the Imperial Household Department' mention that artisans from the Office of Palace Construction (*yingzao si*) were also employed at times when specialists were missing. These may have been skilled in other crafts (in the case in question, the palace printery 'borrowed' ten paper mounting artisans [*biaojiang*], two painters [*huaqiang*], and sixteen carpenters [*mujiang*] from the Office of Palace Construction) but were not professional printers or character carvers. The merit of this arrangement for the Wuying dian was doubtless that these

original Manchu meaning 'idle, unemployed'. The term was applied for banner people without regular official positions. These were menial and low-paid but nevertheless sought-after posts. 79 *Qinding Zongguan neiwufu xianxing zeli*, pp. 308-309, 'Jianshe yuanyi' 建設員役 (Assigning jobs to administrators).

80 Rawski, *The Last Emperors*, p. 167. Banners were the basic Manchu military and social organization, but not all banner people were Manchus. Mongols, Koreans, and Han Chinese who had surrendered in the early seventeenth century before the Manchus took over imperial rule were also represented.

81 *Eminent Chinese of the Ch'ing Period*, p. 159.

82 Rawski, *The Last Emperors*, p. 171.

83 *Ibid.*, p. 172, mentions more than five thousand *sinjeku* women in the palace in addition to more than four thousand at the imperial mausoleums in the late seventeenth and eighteenth centuries.

artisans remained on the payrolls of the Office of Palace Construction.⁸⁴ On the whole, although exterior artisans could be hired, it was obviously preferred to first provide whatever workforce was needed from within the palace personnel. At one point in 1811, Wuying dian artisans numbered 104 banner artisans and only eight [exterior] 'hired artisans' (*zhaomu.jiang*).⁸⁵

The 'hired artisans' normally came from the capital, the adjacent districts, or the provinces of Shanxi and Jiangnan.⁸⁶ We do not know whether the six colleagues from the Liuli chang printery *Zhuanyun zhai* remained in the palace overnight, but at least the artisans from outside Peking probably lived in dormitories on the precincts. The respective regulations of the Imperial Household Department foresaw:

In case of large work projects within the palace, when exterior civilian artisans must be employed, the ministers shall plan to let the overseers of works employ trustworthy foremen, and for this special task, these foremen shall search for calm and law-abiding workers among the artisans with whom they usually come into contact. In addition to overseers of works or of renovations, officials shall be assigned to wait for the artisans at the palaces gates and distribute belt marks⁸⁷ with their names written on them. First the respective overseers of works or overseers of renovations shall examine them outside; then the special delegates shall count and control them on the palace precincts. Every group of ten artisans shall be escorted by one delegate.⁸⁸

When working within the palace, we know that an excellent level of performance was expected from the character carvers, the type setters for the movable type projects, the printers, and the binders. If artisans made too many mistakes, especially with carving or type setting, they could be fined part of or even all of their wages.⁸⁹ For all printing editions and projects, but

84 *Qinding Zongguan neiwufu xianxing zeli*, p. 309, 'Tiaoqu jiangyi' 挑取匠役 (Selecting artisans' work obligations).

85 *Qinding Zongguan neiwufu xianxing zeli*, p. 309.

86 Liu Qiang, 'Qing Wuying dian', p. 271.

87 The documents of the Wuying dian in the First Historical Archives contains a 'List of all belt marks given out at the Wuying dian' *Wuying dian fa fang gejian yaopai zhang* 武英殿發放個件腰牌賬. *Neiwufu ... boce*, no. 432-5-41, booklet 02, dated 1905. The belt marks evidently were given out for identification and control of external personnel.

88 *Qinding Zongguan neiwufu xianxing zeli*, *Guangchusi*, chap. 3, p. 57-58, quoted in Peng Zeyi, *Zhongguo jindai shougongye*, vol. 1, p. 156.

89 Liu Qiang, 'Qing Wuying dian', p. 269, quoting from *Huidian*, chap. 1050, Hanlin yuan – zhizhang – zuanxiu shushi 翰林院, 職掌, 纂修書史.

especially for the emperor's personal writings, utmost care was required for all parts of the procedures, not least for the proofreading. As a rule, imperial manuscripts had to be proofread three times by officers of increasingly higher status before the transcript for carving could be written out.⁹⁰

Few new printing projects were launched in the nineteenth century, and funds for the imperial printeries decreased. Liu Qiang argues that the Wuying dian started to save on expenses for external artisans from Jiangnan and hired Shanxi character carvers instead, who produced lower-quality blocks. Moreover, the qualified banner artisans in permanent positions had become old and frail and were not replaced by equally skilled successors, so that the number of those who actually worked at the Wuying dian decreased to twenty to thirty people.⁹¹ Among the Wuying dian archival documents in the First Historical Archives, one undated file records the names of the artisans in permanent positions and assistants (*sula*) of the printing and bookbinding section. In a total of 59 names, there were fourteen artisans in leading positions, 28 'artisans on work obligation' (*jiangyi*), one carpenter, five 'civilians of Wanping district' (*Wanping xian min*)⁹², and eleven *sula*. The banner affiliation (plain yellow, plain white, and bordered yellow) is recorded for all leading positions and all *sula*. Only four people are expressly named as 'civilians'. Apparently not all of the artisans always showed up for work; for those who did not, the list reports 'did not arrive' (*wei dao*).⁹³

The trend towards outsourcing is obvious also from the fact that even the small group of five character carvers, together with an unknown but probably equally limited number of printers, binders, and bookcase makers for the 1884 *Gongzhong xianxing zeli* project were hired entirely from outside.

Wages in the Palace Printery

Comparatively comprehensive information is available for the wage rate of the imperial printery Wuying dian (see Tables 36 to 39, 42, 43). The Collected Statutes and the regulations and precedents of the Imperial Household Department show that since wages began to be recorded (1705), they were differentiated into wages for the 'internal' banner artisans and the 'external,

90 Liu Qiang, 'Qing Wuying dian', p. 269.

91 Liu Qiang, 'Qing Wuying dian', p. 271.

92 The Wanping and Daxing districts together made up the territory of urban Peking).

93 *Neiwufu ... boce*, no. 432-5-41, booklet 03, *Wuying dian xiushuchu, shuayin zuo* 武英殿修書處,刷印作 (Wuying dian printery, printing and bookbinding section).

hired' artisans (see Table 36). However, direct comparison is possible only in one case. The regulations of 1705 state that banner artisans who printed 1,000 sheets of paper received 0.1 tael 'food provision money', but the hired artisans, depending on the quality of the paper printed, were paid monetary wages between 0.12 and 0.16 tael.⁹⁴ While it is not strange from an equitable point of view that external, highly qualified artisans should receive higher wages than the palace employees in permanent positions, who enjoyed other, more long-term benefits, it does show that from the beginning of the eighteenth century at the latest, the palace paid civilian, hired artisans well and did not discriminate against the Han Chinese who served the state temporarily. On the contrary, in 1705 the system of offering the banner artisans in the Wuying dian printery 'official food' (*guanfan*) had already been abolished. The banner artisans from 1705 onward were paid according to predefined workloads in a wage system equal to that of the hired artisans.⁹⁵ Thus, the pre-1705 stage was a system of time wage payment, and in the later phase, efficiency wages were paid to both banner artisans and the external, Han Chinese artisans.

From the wage lists and the jobs for which external artisans' wages were provided, it seems that the external artisans were engaged in carving and writing out transcripts, while the banner artisans were mainly employed for the binding and ornamentation of the book covers. The section for imperial writings (*yushu chu*), which was responsible for carving and printing texts authored or personally calligraphed by the emperors, paid higher wages than the printery for the other (non-imperial) texts (*xiushu chu*). Unlike their colleagues from the *xiushu chu*, the printers, ink makers, paper mounters, and ink carvers from the section for personal writings of the emperors also retained the right to food provisions. These consisted of daily rations of 2 *liang* mutton (74.6 g), 9 *ge* old rice (0.93 l), 1 *liang* sauce (37.3 g), 5 *qian* light sauce (18.65 g), 4 *liang* bean curd (149.2 g), 2 *liang* bean sprouts (74.6 g), 1 *jin* brushwood (596.8 g), and 1 *liang* charcoal (37.3 g).⁹⁶ After about sixty years, the bean curd and bean sprouts were no longer provided but instead converted to monetary payments given as exactly 0.0032924 tael per daily ration.⁹⁷ For the ranked and unranked officials, these rations were higher, and the provisions in kind were continuously given out in addition to

94 *Huidian*, chap. 1199, fol. 2b.

95 *Ibid.*, fol. 2a.

96 *Ibid.*, fol. 9a/10a. 'Old rice' refers to grain that had been stored at the granaries for several years.

97 *Ibid.*, fol. 11b. It was a custom of the Qianlong era to give accounting data in extremely fine units.

their salaries.⁹⁸ However, in the section for imperial writings, the multiple controlling and proofreading procedures have to be taken into account, so that it took much longer to finish a block with imperial script and receive the according wages than for other texts.

Comparing the standard workloads to be achieved within one workday (*gong*), like copying one-hundred characters for a transcript to be pasted in mirror image on the block and subsequently embossed, carving one-hundred characters, or printing one-thousand sheets, the nominal wage level expressed in silver tael seems to have remained more or less equal over long time spans. However, if one realizes that these formal wages were converted to copper cash, this has radically different implications. In the mid-eighteenth century, when copper cash was scarce and became expensive, the low exchange rate must have caused discontent, while wage notation in silver was very much to be preferred during the early nineteenth century and especially after the mid-nineteenth century, when copper inflation raised the exchange rate to more than ten times that of the ideal rate of 1:1,000.

The accounts book of the *Zhuanyun zhai* are in both silver and copper cash for different types of expenses (Table 44). The fees of 0.24 tael for every 100 characters carved, a very considerable rate compared to the earlier wage rates of a maximum of 0.16 tael, are accounted for in silver (Table 46). It is doubtful whether this rate meant that the wages were actually paid out in silver. Presumably the print shop deducted part of the money as a transaction fee and paid it out in copper. However, the food and drink money was accounted in copper cash and probably flowed more directly into the hands of the artisans. Wages for printing and binding were not accounted for but occur only as expenses for the daily food and drink allowances, 400 cash, for seventy workdays.⁹⁹ If one compares the palace wages to those of the provincial printery of Zhili (Table 40), the wages for carving 100 characters – 0.044 tael for carving new blocks and 0.065 for adding text to existing blocks – were only one-half of those of the palace. Comparison with the few wage rates that are known for commercial printing (Table 48) indicate that the wages paid by the government were higher than those in commercial printing. Nevertheless, some direct and indirect evidence shows that the inflexibility of the wages paid by the government raised

98 See Liu Qiang, 'Qing Wuying dian', p. 272, for details about the various food rations in the hierarchy of Wuying dian officials. As Liu Qiang points out, after 1845, the meat ration was reduced for leading officials and definitely abolished for the artisans.

99 Neiwufu zeliguan 內務府則例館23, Fuwen 附文 (Additional note) 1, and 3, p. 1-2.

problems when the cost of living increased. The wage raise of 0.01 tael per hundred characters for the externally hired artisans who wrote out the transcript for the yearly calendar *Zhongxing genglu* between 1751 and 1795 can be understood in this way (Table 41).¹⁰⁰ In 1810, the Wuying dian printers pleaded for augmentation of their wages because they could no longer make ends meet. Consequently, they received a wage raise of 0.02 tael for every 100 characters carved, and 0.01 tael for every 100 characters of the transcripts copied out. Moreover, if blocks had to be corrected and if these corrections made it necessary to recarve subsequent blocks, the foremen could now account for the costs of the corrections and did not have to deduct these from wages.¹⁰¹ Thus, although the artisans employed in the imperial printery may have experienced difficulties in securing their livelihood, some indications show that at least until the mid-nineteenth century, the authorities tried to comply with their requests. One example may show that these artisans were comparatively well taken care of. In the winter and summer months, temperatures in the palace workshops were always a problem. For instance, the palace studio of the Jesuit painter Denis Attiret (1702-1768), who worked for the Qianlong emperor between 1739 and 1768, was heated only by a small furnace in winter for keeping the paint from freezing, and in summer became stiflingly hot because it was unsheltered from the torrid sunshine.¹⁰² Apparently, the working conditions in the Wuying dian were somewhat better. Not only were stoves and fuel provided in the winter months but in the summer matting was provided to shade the workplaces and ice blocks were applied to lower the temperature. While heating in winter was used commonly in Peking, cooling in summer was rather exceptional, at least for commercial printers.¹⁰³

Working and Living Conditions of Commercial Printers

Book historians have pointed out that more names of late Ming printers are known from imprints in books than of their successors in the early and mid-Qing, probably due to the fear of the consequences of the literary

100 *Huidian*, chap. 1199, fol. 11b/12a. Actually, the wages had been reduced by 0.01 tael in 1751 and were raised again to the pre-1751 level in 1795.

101 Zhang Xiumin, *Zhongguo yinshua shi*, p. 756, quoting from the accounts of the imperial printery at the Wuying dian, Wuying dian xiushuchu baoxia dang'an 武英殿修書處報銷檔案.

102 Veit, 'Jean-Denis Attiret', p. 144.

103 Zhang Xiumin, *Zhongguo yinshua shi*, p. 756.

inquisition.¹⁰⁴ This fear receded gradually in the nineteenth century, and thus more is known about character carvers, printers, and book binders from this era. Amazingly enough, the character carvers were often illiterate.¹⁰⁵ Little capital was available and necessary for commercial printing, and in order to remain competitive, one option for publishers was to outsource the most cost-intensive job of character carving to rural regions, even if the carved blocks had to be transported over long distances. Suzhou publishers, for instance, had their blocks carved in Magang in Guangdong province, which lies at a distance of more than one thousand kilometres from Suzhou.

Character carving was a craft branch in which many women and girls were engaged. This is well attested for Magang in Guangdong and Xuwan in Jiangxi. Magang and Xuwan brides often received their self-carved blocks as their dowries.¹⁰⁶ In the block-printing region Yongzhou in Hunan province, girls and boys of young age would 'carve the blocks while leaning on a tree and tending the oxen'.¹⁰⁷ The employment of young and female labour explains the low wages paid and thus the competitiveness of these rural locations (see Table 48). However, the quality of their work is generally assessed as low. It was executed swiftly and contained many errors. The adult women would usually work in their own houses; 'in exceptional cases', the elderly women would also manage the household subsidiary business, especially when men were sojourning elsewhere.¹⁰⁸

Cynthia Brokaw, to whom we owe so much firsthand information on the practice of traditional printing, has illustrated several business forms and patterns of labour recruitment.¹⁰⁹ Yuechi in Sichuan province was a rural setting where carving was predominant and only very little publishing was practised. For the most part, it supplied the publishing houses in the metropolises of Chongqing and Chengdu, which were at distances of over 100 and 200 kilometres respectively. Work was either sent out or the carvers, who were all male, sojourned and were permanently engaged at the Chengdu or Chongqing publisher/booksellers' enterprises.

104 Ibid., p. 754.

105 Brokaw, *Commerce in Culture*, p. 14, McDermott, *Social History of the Chinese Book*, p. 35. McDermott also specifies on pp. 29-30 that the carving process was divided in a way that all similar strokes (horizontal, vertical, slanting) of all characters on a block were carved separately, which made division of labour and consecutive work of several people possible.

106 Zhang Xiumin, *Zhongguo yinshua shi*, p. 754; Brokaw, *Commerce in Culture*, p. 540.

107 Zhang Xiumin, *Zhongguo yinshua shi*, p. 754.

108 Brokaw, *Commerce in Culture*, p. 133.

109 Ibid., pp. 537-546.

Xuwan in Jiangxi was much better connected by water and land to the greater cities on the middle and lower Yangzi. It was a publishing and printing centre where the male and female labour force was recruited from the surrounding villages. The carvers, printers, and binders either worked at the publishers' shops, or the blocks were delivered to them for carving.

Mainly women were engaged in Magang in Guangdong. They supplied the publishers in nearby Foshan and Canton. A few of the women were specialists, but for most, carving was subsidiary business that was outsourced to them by the shop managers of the printing shops. No female sojourners came from Magang, since women as a rule did not work outside of their own families before the twentieth century. However, male sojourning was common in Shunde prefecture, where the district Magang is situated. Shunde is well known to sociologists for the habit of female 'marriage resistance', which means that parents were willing to let their daughters stay at home after marriage or live together with other women.¹¹⁰ The women who did not join their husband's household were most often engaged in silk reeling and worked outside their homes in silk filatures; no cases of character carvers are reported. Nevertheless, it may not be pure chance that the trade was practised here, where greater female independence caused by wage earning outside family abodes created the rare equivalent of the non-religious sorority.¹¹¹

In the rural Sibao region in Western Fujian, some of the fifty and more publishing houses also bought the printing blocks from elsewhere, for instance from the Magang women carvers.¹¹² Actually, the Sibao publishers used various forms of labour supply to produce the books they distributed in the entire southern part of China. In interviews with the members of publisher lineages, informants said that writing the transcript and carving characters was highly skilled labour that was done by the elders of the households. Other character carvers travelled to their customers and were offered free board and accommodation in the publisher's family or at a local temple while working on a particular project.¹¹³ Since the equipment needed by the itinerant carvers and printers – knives and brushes – was light and unsophisticated, this was a logical option for low-capital publishing.

110 See Hill Gates, *China's Motor*, pp. 189-191, who refers to the relevant studies by Marjorie Topley (1975), Janice Stockard (1989), and Andrea Sankar (1978).

111 Professional sororities like 'self-combing women' were not confined to Shunde but occurred in all of Guangdong and Guangxi. Their members worked mainly in the silk industry. Jinsheng, 'Yue Gui de 'zishu nü'', p. 89.

112 Brokaw, *Commerce in Culture*, p. 101.

113 *Ibid.*, pp. 96-98, 99.

This was even more so if the books to be produced were not required in large print runs. A typical job for itinerant printers was the production of genealogies, which they could conveniently carve and print at the ancestor shrines of rural well-to-do lineages.¹¹⁴ The migrants often exercised their trade as a subsidiary business in the agricultural slack season and as a rule had not received any formal training. In contrast, an apprenticeship system existed for professional character carvers that lasted from three to five years, starting at age nine or ten.¹¹⁵ In Yuechi and Magang, the children were also first taught the skills of carving at age nine or ten for one to three years before they were given paid work.¹¹⁶

Printing and binding could be done as unpaid family work by women or children. One of the two big publisher families in Sibao, the Zous, had a 'book printing school' (*yinshu xuetao*) in one of their ancestral halls by the mid-eighteenth century, which might have been a place to train character carvers, printers, and binders in the family business.¹¹⁷ In Sibao, the printing and binding of books were usually done by women, sometimes with the help of children, in their own homes.¹¹⁸ In less rural settings – for example, the market town of Xuwan in Jiangxi – printing was usually done in the back rooms of the publishing and bookselling houses.¹¹⁹

Since the largest proportion of Sibao's production was school books, most of the production had to be ready by the beginning of the school year after the Chinese New Year in January or February. In the 1920s and 1930s, a smaller shop specializing in schoolbooks would at New Year's day need a stock of 2,000 to 3,000 copies of the reading and writing textbook *Sanzi jing*¹²⁰ and 800 to 1,000 other primers and textbooks. With a labour force of household members and two hired female labourers, a publishing house could print and bind 100 copies of the *Sanzi jing* in one day. For a sum of 4,000 primers, at least 40 workdays would be necessary to finish this target.¹²¹

1930s wages in Sibao ranged from 0.2 and 0.4 to 0.5 yuan for every 1,000 sheets printed, and thus about 0.6 yuan to 1.2-1.5 yuan per day with an

114 Zhang Xiumin, *Zhongguo yinshua shi*, p. 757.

115 Brokaw, *Commerce in Culture*, p. 14, for professional character carvers from Yuechi in Sichuan.

116 *Ibid.*, p. 540, 545.

117 Brokaw, *Commerce in Culture*, p. 105, referring to a 1947 lineage genealogy of the Zou family, *Fanyang Zoushi zupu*.

118 See *ibid.*, p. 106, fig. 3.3 for a photograph of such printing rooms, and her detailed description of the printing process, pp. 107-111.

119 *Ibid.*, pp. 105-106, fn. 64.

120 This is a short text with 1,128 characters. In its original form, it would fit on three printing blocks of four hundred characters each, but can be extended by commentaries of various lengths.

121 Brokaw, *Commerce in Culture*, pp. 122-123.

average daily print run of about 3,000.¹²² In comparison, the wages reported for the Qingdao handicraft printers were anywhere between eight and 15 yuan per month, with an average of ten yuan (see Table 34). If the Qingdao printers worked for 25 days, their daily wages would vary between 0.6 and 0.32 yuan, with an average of 0.4 yuan. Thus, in the high season, Sibao wages would surpass those of Qingdao, but daily production was not always as high as 3,000 pages throughout the year and may have been more evenly spread in the city of Qingdao.

In China's centre of modernity and capitalist production, Shanghai, the mechanized printing industry emerged in the last decades of the nineteenth century. Lithography thrived from the 1870s and was surpassed by the letterpress only in the early twentieth century. But block printing had not yet completely disappeared in Shanghai. By the 1890s, it was still used in a missionary textbook edition started in 1879, although the missionary publishers had first introduced printing machinery to China.¹²³

While the scope of block printing compared to letterpress and lithography has yet to be explored, the relation of the letterpress and lithography is better researched. Christopher Reed estimates that the number of workers in all Chinese lithographic printeries may have been as high as 8,050 by 1894 as against only 870 letterpress workers. He also mentions that between 1876 and 1911, 149 lithographic printers started business in Shanghai, relative to only 21 lead type shops between 1842 and 1911.¹²⁴ In Reed's view, the decline of lithography and the rise of the letterpress can be attributed to the fact that although lithographic printing could produce less expensive books than block printing, in relation to the letterpress the necessary workforce was still too large. The use of kerosene and steam power could reduce the number of workers per machine from eight to three, but the lithographic workshops still employed 100 to 200 workers each because preparing the stone plates, copying the text, and reducing its size by photography required a much larger workforce than letterpress printing. By the 1920s, although the wages reported for lithographic copyists were astonishingly low (0.3 yuan to 0.1 yuan per thousand written characters),¹²⁵ contemporary Chinese and foreign observers found that, in view of the cost performance, the alternative technology of letterpress printing was preferable.

122 Ibid., p. 131.

123 Reed, *Gutenberg*, p. 320, fn. 32, quoting John Fryer, *Records of the General Conference of the Protestant Missionaries of China*, p. 715.

124 Ibid., p. 97, 121.

125 Ibid., p. 322, fn. 54, quoting from Chen Cunren, *Yinyuan shidai shenghuo shi* (Everyday life history of a dark age), p. 232.

The Social Status of Publishers and Printers

Carvers, printers, and binders produced indispensable receptacles of scholarly knowledge, but their crafts were not considered to be highly qualified occupations. This may have to do with the simplicity of the production process. Neither complicated devices (like weaving looms) nor risky installations (such as a furnace or kiln) were necessary. Printing with movable type was not unknown but still relatively uncommon. Therefore, we do not know whether the image of the typesetters was any higher than that of the character carvers. Compared to building or shipbuilding, printing did not require much capital: a relatively small, often female or young household-based labour force could accomplish its projects. In rural settings, writing out the transcript was therefore done by family elders and managers with some knowledge of characters and was considered the highest qualified part of printing. In the palace printery, where we can assume a higher literacy rate, the carving of characters earned twice the wages of copying, as it took much longer to carve a character than to write it with a brush (see Table 36). However, the best paid tasks were proofreading and control of work processes rather than copying the transcript or carving characters. The printers and binders earned the lowest wages.

In the family publishing business, where printing was often a subsidiary occupation during the agricultural slack season, a gender and age division prevailed in which women and children produced the books and men decided which books to print. It was also the men who distributed and sold the books after they were produced.¹²⁶

There is ample proof in the field of printing of one of the assumptions of this study, namely that the status of artisans and commoners within the 'four occupational groups' was actually reversed in the sense that not merchants but artisans ranged last. Among the merchants, the publisher-booksellers were held in comparatively high esteem, especially when they managed to create the image of printing not for profit but to generously spread information to all those who needed it.

Once again, Cynthia Brokaw provides insights into how the Sibao book traders were perceived by the local elite of society. Even if they were commended for earning their living by 'plowing the Classics and sowing the historiographies' (*geng jing jia shi*) or for their competence in character carving,¹²⁷ praise of such a condescending nature demonstrates the low status of book merchants, even if they were trading in Confucian items.

¹²⁶ Brokaw, *Commerce in Culture*, pp. 132-133.

¹²⁷ *Ibid.*, p. 286.

Attitudes did change when the artisans and the elite scholar-officials came into direct contact. For one, if asked to write stele texts for guild houses, the scholar-officials would certainly do so. Thus, the author and the calligrapher of the 1898 stele inscription and the character designer of the inscription board of the character carvers' guild temple *Wenchang miao* in Peking were both Hanlin academicians and compilers of the Collected Statutes; the author, Yang Shixiang (1860-1909), served as Governor-General of Zhili province between 1907 and 1909. On behalf of the character carvers who feared a crisis in traditional learning and official examinations, he expressed the hope that Confucian writing and character carving would persist and secure the living of those in the association.¹²⁸

More precise are the few examples of acknowledgement to the book carvers' efforts documented in Zhang Xiumin's book history. In the light of the files of the *Wuying dian* in the First Historical Archives, Zhang's complaint that virtually no printers' names from the Qing are transmitted (as against seventy to eighty from the Ming) seems no longer tenable, but much more research in local archives will be necessary to explore the characteristics of all Chinese printing centres. Even then, it will be difficult to find more names of female printers. According to Zhang Xiumin, precisely one female character carver, who lived in Songjiang in Jiangnan province during the Qianlong reign, is known by her family name Ma because the customer whose poetry collection she carved thanked her in a poem.¹²⁹ Among the few known male carvers is Liu Yongri, a master from Suzhou who in 1671 was honoured by a literatus whose poems he carved in extraordinarily elegant characters, with a 'Preface for the character carver Liu Yongri's sixtieth birthday'. The text praises Liu's reliability, stating that although he was sixty, he walked every day, rain or shine, to his customer's house to fulfil his task.¹³⁰

Another master who rose above anonymity was Zhu Gui from Suzhou. Coming from an impoverished scholar family, Zhu in the Kangxi reign 'changed his trade' and started to carve texts and illustrations. His most famous works are 'Charts of plowing and weaving' (*Gengzhi tu*) that had been commissioned by the Kangxi emperor and the pageant on the 'Emperor's birthday celebrations' (*Wanshou shengdian*). Having ingratiated himself to

128 Li Hua, *Ming Qing yilai*, pp. 162-163, 'Chongjian Wenchang ci ji' 重建文昌祠記 (Record of the renovation of the Wenchang shrine).

129 Zhang Xiumin, *Zhongguo yinshua shi*, p. 755, who quotes the verse from this poem 'with profuse efforts, a female worker carved my worthless writings in pear wood' 漫勞紅女為灾梨 which is explicit about the gender of the carver.

130 Zhang Xiumin, *Zhongguo yinshua shi*, p. 758, 'Jijue shi Liu Yongri liushi shou xu' 劄劄氏劉永日六十壽序 (Preface for character carver Liu Yongri's sixtieth birthday).

the court, he managed to secure a low-echelon official position in the Court of State Ceremonials (*Honglu si*) of the Imperial Household Department.¹³¹ He had risen to officialdom not exclusively due to his artisan skills but also because of his family's scholarly status. What certainly helped him to promotion was that he also carved illustrations and that his work was thus associated with art. This was also the case with the block printer's family of Huang Lizhong (1652-1738) from Qiu village in the She district in Huizhou prefecture, who was already in the trade during the Ming dynasty and rose to local fame because of the family's charitable activities.¹³² In the Ming period, the Huang family did not try to disguise their origins as artisans and merchants but actively sought – like other artisans, especially potters, gardeners, bamboo carvers, and lacquerers who produced art and craft items – to acquire a literati image. They practised and refined their skills in calligraphy, painting, music, and poetry and also participated in civil examinations but never ascended above the local level. Their gains from commercial activities enabled this family of 'literati carvers' to attain prominence.¹³³ A further case is that of Mu Jinwen (1721-1812) from Suzhou, a 'plain-clothed' (*buyi*) scholar without office and famous character carver who combined the scholarly, art connoisseur, merchant, and philanthropic levels of the trade or art and thus remained at the social level of the literati, with famous friends such as the men of letters Yuan Mei (1716-1797) and Qian Daxin (1728-1804).

Intermediary stages between the artisan and the artist existed as well and have been aptly described by James Flath. New Year's posters usually come with colophons. As a rule, the master artisan designers of the popular block prints in rural North China had not received systematic Confucian schooling and therefore were not completely proficient in the literary style but nevertheless tried to avoid the vernacular for their illustrations, thereby creating in their prints a half-popular and half-literary style. Only in a few cases did accomplished artisans design New Year's posters, such as the painter Qian Hui'an (1833-1911) from Shanghai or the designer Gao Tongxuan (1835-1906), both of whom worked at Yangliuqing. From Gao Tongxuan's workshop, we also know how the hierarchy of master and subordinate artisans who processed his drafts translated into remuneration. One draft by Gao Tongxuan earned about five to six yuan, and with an average of 170 designs per year, his income was about ten times that of the artisans in his print shop.¹³⁴

¹³¹ Zhang Xiumin, *Zhongguo yinshua shi*, p. 758.

¹³² *Ibid.*

¹³³ McDermott, *Social History of the Chinese Book*, pp. 35-36.

¹³⁴ Flath, *Cult of Happiness*, p. 16.

Conclusion

To assess the role of the Qing state in the private printing sector, book historians point out that previous dynasties preferred to reserve the books of the palace printeries for court and government use, so that private printers had no chance to obtain and use them as exemplars for reprints.¹³⁵ Yet in the Qing dynasty, most of the printed products of the *Wuying dian* were sold to those who could afford the prices, which were already high in the eighteenth century. This change may be attributed to the greater anxiety of the first Manchu rulers to present themselves as active guardians and promoters of the Han Chinese civilization, moral philosophy, and book learning. However, the outsourcing of the re-edition of the imperial encyclopedia *Gujin tushu jicheng* stands in strong contrast to the imperial vigour and activism of the early eighteenth century. It also shows the degree to which the enhanced productivity of lithography and letterpress enabled the Shanghai and Canton elites to promote the cultural aspect of the self-strengthening project – who were still in the service of the dynasty and the court, notwithstanding their latent anti-Qing feelings.

In the seventeenth and eighteenth centuries, the court and central government controlled the contents of the printed matter issued by private publishers to the extent that actual and supposed anti-dynastic writings were not tolerated at all. Since the waves of inquisition came sporadically but unexpectedly, publishers and printers were generally careful not to criticize the government. However, no restrictions for politically neutral contents applied. Investments for lithography or letterpress and typesetting devices were neither hindered nor encouraged by the state. The organization of Chinese handicraft printing and the transition to mechanized printing was left to the printers, especially in the treaty ports which were within the jurisdiction of foreign powers.

Journals were forbidden time and again, for instance when the constitutional Hundred Day Reforms were crushed in 1898.¹³⁶ However, the Shanghai-based journals remained out of the reach of the central government due to the extraterritorial status of that city. In 1906, the first press and publication law (*Da Qing yinshuawu zhuanlü*) was promulgated, and the newly established Ministries of Commerce, Education, and Surveillance jointly supervised a 'General Printing Bureau' (*Yinshua zongju*) where all printeries and newspapers had to register.¹³⁷

¹³⁵ Liu Qiang, 'Qing Wuying dian', p. 271.

¹³⁶ Janku, 'Ironie, Spott und Kritik', p. 211.

¹³⁷ 'Jiefang qian de Beijing yinshuaye'.

Previous Chinese craft historians have claimed that the state exploited the artisans recruited from the private sector.¹³⁸ However, looking at the palace printery Wuying dian, we find that as far as wage payment is concerned, this was certainly not the case. Wages in the palace tended to be higher than in the Peking private sector, and the treatment of the artisans that were engaged in all parts of the printing process was considerate in terms of food provisions, heating, and cooling, as far as we can tell from various sources. Work in the palace was highly hierarchic, and the banner affiliation played a great role. If the banner craftspeople were not free to leave their permanent positions at will, this can be understood as exploitative. However, this did not concern the hired civilian artisans.

In the non-government sector, the position of artisans was to a large extent subordinated to the merchant publishers in the trade, so that, as in other craft occupations, the path to social success and prestige went predominantly through commerce. There were hardly any character carvers and no printers or binders who could achieve fame only by their craft skills. In this branch of cultural production, the advancement in status from artisan to artist was possible, but this held more for those who designed illustrations than for those who only carved characters. As for the women in the trade, who are more visible here than in other crafts, the chance to manage a print shop may have arisen when the men in the family were missing or sojourning elsewhere. However, most of them practised the craft as unpaid family work or as a subsidiary business to their agricultural labour.

At the end of the dynasty, printing activities were to be found in extremely different locations. In the modernizing cities, an increasing number of book and newspaper publishers operated mechanized presses, although even here, block printing persisted for some time. Particularly in the rural regions, where raw materials were easily available, wood blocks for elementary schoolbooks were still carved by hand. In the hinterland, as education was spread through government reforms and private initiative, the commercial and the subsistence sectors came into much closer contact than when the Manchus conquered the Ming empire.

138 Zhu Cishou, *Zhongguo gudai gongye shi*, 'The ebb and rise of the official and private crafts', p. 787, 795; Tong Shuye, *Zhongguo shougongye shangye fazhan shi*, p. 316.

Appendix

Table 34 Statistics of handicraft sectors in Qingdao city, Shandong, 1931-1932

No Trade	Trade (Chinese) 类别	Households	Persons	Apprentices	Highest wages (per month in Yuan)	Lowest wages (per month in Yuan)	Average wages (per month in Yuan)	Number of persons who can support themselves with their wages	Number of persons whose wages are insufficient	Number of persons who support themselves or earn surpluses	Percentage of those who can support themselves or earn surpluses
1	Furniture makers	170	457	311	35.00	12.00	18.00	169	185	103	59.52
2	Basin and vat makers	7	14	5	16.00	10.00	14.00	8	6		57.14
3	Boxmakers	12	60	16	16.00	10.00	12.00	21	39		35.00
4	Cart makers	18	64	19	26.00	12.00	16.00	48	16		75.00
5	Other woodworking	16	52	22	26.00	13.00	16.00	34	7		65.38
6	Silversmiths	14	36	49	28.00	12.00	18.00	22	10	4	72.22
7	White iron smiths	139	256	228	17.00	8.00	15.00	178	88	0	69.53
8	Iron goods makers	21	60	39	20.00	8.00	15.00	18	42		30.00
9	Mould makers/[Metal] foundry shops	5	42	53	35.00	12.00	16.00	16	14	12	66.67
10	Copper object makers	7	19	24	26.00	10.00	18.00	16	3		84.21
11	Tinsmiths	1	3	1	14.00		11.00		3		0.00
12	Other coloured metal workers	1	2		14.00				2		0.00
13	Tile and brick makers	15	248	5	30.00	10.00	18.00	168	54	26	78.23

No Trade	Trade (Chinese) 类别	Households	Persons	Apprentices	Highest wages (per month in Yuan)	Lowest wages (per month in Yuan)	Average wages (per month in Yuan)	Number of persons who can support themselves with their wages	Number of persons whose wages are insufficient	Number of persons who surplus wages	Percentage of those who can support themselves or earn surpluses
14	Stonemasons	9	82	1	30.00	12.00	16.00	32	38	12	53.66
15	Paint and lacquer makers	29	65	13	19.00	11.00	14.00	48	17		73.85
16	Other building material makers	4	16	4	20.00	12.00	14.00	6	10		37.50
17	Rattan objects	6	19	21	30.00	12.00	20.00	9	5	5	73.68
18	Bamboo objects	11	47	12	18.00	10.00	14.00	20	27		42.55
19	Other bamboo and rattan workers	1	2		14.00				2		0.00
20	Tailors (Chinese garments)	168	388	329	32.00	14.00	18.00	357	32	9	94.33
21	Mens' Western dressmakers	41	141	143	60.00	18.00	28.00	31	26	76	75.89
22	Ladies' Western dressmakers	4	19	19	60.00	18.00	28.00	9		10	100.00
23	Cap makers	7	44	18	15.00	9.00	12.00	42	20		95.45
24	Shoemakers	131	352	285	28.00	12.00	16.00	90	161	101	54.26
25	Leather processing	10	27	12	20.00	14.00	16.00	21	6		77.78
26	Leather goods makers	48	157	279	28.00	12.00	17.00	89	47	21	70.06
27	Carpet making	4	38	29	22.00	16.00	18.00	33		5	100.00
28	Weaving stockings	18	45	61	18.00	12.00	14.00	12	41	4	35.56

No Trade	Trade (Chinese 類別)	Households	Persons	Apprentices	Highest wages (per month in Yuan)	Lowest wages (per month in Yuan)	Average wages (per month in Yuan)	Number of persons who can support themselves with their wages	Number of persons whose wages are insufficient	Number of persons who earn surplus wages	Percentage of those who can support themselves or earn surpluses
29	Other weaving and spinning	6	43	16	18.00	13.00	15.00	14	29		32.56
30	Papermaking	9	33	26	19.00	12.00	14.00	26	7		78.79
31	Printers and character carvers	53	257	221	15.00	8.00	10.00	240	17	0	93.39
32	Other stationery makers	4	12	5	16.00	10.00	14.00	12			100.00
33	Flicking cotton	4	12		14.00	11.00	12.00	12			100.00
34	Dyeing, weaving, and mending	8	18	4	22.00	14.00	18.00	14	4		77.78
35	Laundry	23	108	70	14.00	8.00	10.00	82	26		75.93
36	Soap and Western candle production	12	45	9	27.00	12.00	15.00	43		2	100.00
37	Cosmetics production	6	6	9	12.00			6			100.00
38	Scalemakers	4	15		20.00	10.00	13.00	10	2	3	86.67
39	Brush making	5	14	11	15.00	10.00	13.00	14			100.00
40	Glass vessel makers	2	40	12	27.00	12.00	18.00	23	14	3	65.00
41	Paper cord makers	5	12	2	15.00	10.00	12.00	6	6		50.00
42	Cardboard box makers	4	21	15	13.00	10.00	12.00	18	3		85.71
43	Matchbox makers		6490								0.00
44	Ropemakers	5	27	3	14.00		9.00	20	7		74.07

No Trade	Trade (Chinese) 類別	Households	Persons	Apprentices	Highest wages (per month in Yuan)	Lowest wages (per month in Yuan)	Average wages (per month in Yuan)	Number of persons who can support themselves with their wages	Number of persons whose wages are insufficient to earn surplus wages	Number of those who can support themselves or earn surpluses	Percentage
45	Agar-agar (gelatine) makers	3	160		22.00	14.00	18.00	118	16	26	90.00
46	Sugar makers	3	19	13	26.00	12.00	15.00	15	2	2	89.47
47	Soy sauce makers	44	155	56	27.00	10.00	15.00	78	43	34	72.26
48	Sesame oil pressers	5	14		15.00	10.00	12.00		14		0.00
49	Beef [broth] condensers	5	45		22.00	10.00	17.00	33	12		73.33
50	Pastry makers	33	104	34	28.00	10.00	14.00	90	2	12	98.08
51	Wine distillers	39	195	9	22.00	8.00	12.00	160	35		82.05
52	Doufu makers	20	96		15.00	8.00	12.00	48	48		50.00
53	Mills	12	33	5	18.00	10.00	12.00	28	5		84.85
54	Milk condensers	20	40		20.00	14.00	16.00	40			100.00
55	Honey makers	14	21	7	30.00		15.00	12		9	100.00
56	Peanut sorters		75		22.00	12.00	18.00	71		4	100.00
57	Clock makers	30	35	14	25.00	10.00	13.00	8	5	22	85.71
58	Riksha pullers and cyclists	24	45	37	22.00	15.00	17.00	33	12		73.33
59	Machine repair	8	21	34	36.00	18.00	26.00	8		13	100.00
	修理類: 各種機器										

Source: Qingdao shi xingzheng tongji huibian, Shehui 青島市行政統計彙編, 社會 (Collected administrative statistics of Qingdao city, Society), 1932, pp. 7-14, quoted in Peng Zeyi, Zhongguo jindai shougongye, vol. 3, pp. 567-568.

Table 35 Position of handicraft printing and character carving among all craft trades in Qingdao, 1931-32

<i>Entire handicraft sector</i>	
Households employed in the handicraft sector	1,327
Persons employed in the handicraft sector	10,939
male	4,782
female	6,157
Apprentices, all male	2,600
Trades included	59
<i>Printing and character carving</i>	
Percentage of total craft households	3.99%
Percentage of total employed persons	2.35%
Percentage of apprentices relative to all apprentices in handicrafts	8.47%, rank 6
Rank within total number of craft households	5 of 59
Rank within total number of persons employed in crafts	5 of 59
Percentage of apprentices relative to the households in the trade	4.2 apprentices per household, rank eight
Percentage of apprentices relative to persons engaged in the trade	0.9 apprentices per person in the trade, rank 12
Rank within highest wage levels	46
Rank within lowest wage levels	Lowest minimum wage recorded (together with wine distillers/beer brewers, iron goods makers, white iron smiths, doufu makers, and launderers)
Rank within number of handicraft workers who can support themselves with their wages in Qingdao	Two
Rate of those persons engaged in the trade who can make a living	93%; the others don't earn enough.
Rank within trades that can support the wage-earners' daily lives or ensure a surplus	15, after tailors for Western-style ladies' wear, stationery makers, cotton flickers, soap and Western candle makers, cosmetics makers, brush makers, milk condensers, honey makers/beekeepers, peanut sorters, and machine mechanics, whose rates are all 100%, the pastry makers (98%), cap makers (95%), and tailors for Chinese garments (94%).

Source: See Table 34.

Table 36 Government wage rates for block printing and binding, 1705

Status group	Work procedure	Work procedure in Chinese	Unit	Wage in silver tael
Banner artisan printer 家內匠役	Printing	刷書	1,000 sheets	0.1 food provision money
Banner artisan book binder	Making book covers	作書	One	0.1 food provision money
Banner artisan border designer	Drawing lines and columns	畫界	160 sheets	0.1 food provision money
Banner artisan book binder	Making small book covers	做小套	One	0.05 food provision money
External, hired artisan 外雇匠役	Tracing the emperor's handwriting	鈎摹御筆發刻	Each character	0.01 money wage
External, hired artisan	Carving letters for inscription boards or the throne	刊刻圍屏板牆寶座		wage according to size
External, hired artisan	Carving printing style characters (Song type), for block printing	刻宋字	100 characters	0.08
External, hired artisan	Carving handwriting ('soft') style characters	刻軟字	100 characters	0.14 to 0.16
External, hired artisan	Copying printing ('Song') style characters for the transcript	寫宋字版樣	100 characters	0.02-0.04
External, hired artisan	Copying handwriting ('soft') style characters	寫軟字	100 characters	0.04
External, hired artisan	Folding and fixing the sheets	摺配齊訂書籍	1,000 sheet	0.13
External, hired artisan	Printing on fourfold Lianzhou paper	印刷連四紙書	1,000 sheet	0.16
External, hired artisan	Printing on bamboo paper	印刷竹紙書	1,000 sheet	0.12
External, hired artisan	Cutting pages	裁書	1,000 sheet	0.02

Source: *Huidian*, chap. 1199, fol. 2a-3a.

Table 37 Government wage rates for the production and setting of copper characters for the Imperial Encyclopedia *Gujin tushu jicheng*, 1726 and 1728

Work procedure	Work unit	Wage
Copper type setting		3.5 tael per month food provision money
Carving movable copper types	Each type	0.025 tael money wage

Source: *Huidian*, chap. 1199, fol. 1a.

Table 38 Government wage rates for block printing, binding, and ornamentation of books and covers at the printeries for the emperor's personal writings, *yushu chu*, 1768

Status group	Work procedure	Work procedure in Chinese	Size of carved characters	Quantity per workload (<i>gong</i>)	Wage for every workload in silver tael
External, hired character carver (外雇刻字人)	Carving characters	刻字	0.32-3.2 cm	10	0.24
External, hired character carver	Tracing characters in black or red	鈎墨頂硃		60	0.24
External, hired character carver	Carving characters	刻字	3.52-6.4 cm	8	0.24
External, hired character carver	Tracing characters in black or red	鈎墨頂硃		48	0.24
External, hired character carver	Carving characters	刻字	6.72-9.6 cm	4	0.24
External, hired character carver	Tracing characters in black or red	鈎墨頂硃		24	0.24
Sutra binder	Folding sutra texts	摺經		20 folds	0.16
Coloured lacquerer, gilder					0.18
Copyist for printing (Song) style characters				100 characters	0.03

Source: *Huidian*, chap. 1199, fol. 10b.

Table 39 Government wage rates for printing with wooden movable type for reprinting rare books of the ‘Four Treasuries’ project in the collectanea *Wuying dian juzhenban [cong]shu, 1774*

Work procedure	Work unit	Wage
Carving the types	100 types	0.45 tael
Copying the characters (for carving Song-style types)	100 types	0.02 tael

Source: *Huidian*, chap. 1199, fol. 6b.

Table 40 Wage rates for block printing in the provincial printery of Zhili, 1807

Work procedure	Work procedure in Chinese	Unit	Wage in tael
Carving characters for judicial protocols: New cases, in Chinese characters	刷印招冊, 刊刻新事漢字	100 characters (new)	0.044
Carving characters for judicial protocols: Previous cases, added at the end, in Chinese characters	刷印招冊, 刊刻舊事後尾漢字	100 characters (old)	0.065
Correcting and emending old facts on the blocks	修補舊事漢字	100 characters (repairing)	0.12
Planing the surface of old and new printing blocks	新舊板片刨面	One printing block	0.08
Sawing the edges of old and new printing blocks	新舊板片鋸邊	One printing block	0.08
Carving Manchu letters for new Mongolian legal cases	刻出蒙古案件新事清字	100 characters (old)	0.08
Copying the red lines for the Chinese characters in old and new legal cases	繕寫新舊漢字紅格	100 characters (old and new)	0.01
Copying the red lines for the Manchu letters in Mongolian legal cases	繕寫蒙古案件清字紅格	100 characters Mongolian or Manchu script	0.13
Printing the judicial protocols in Chinese characters and the volumes concerning Mongolian legal cases	刷印漢字招冊並蒙古事件清冊	100 pages	0.012
Binding the judicial protocols in Chinese characters and the volumes concerning Mongolian cases	裝訂漢字招冊並蒙古事件清冊	100 pages	0.013
Tracing margins for the yellow volumes	黃冊描邊	100 pages	0.055

Source: Peng Zeyi, *Zhongguo jindai shougongye*, vol. 1, pp. 407-408.

Table 41 Government wage rates for copyists at the *yushu chu*, 1751 and 1795

Year	Status group	Work procedure	Work procedure in Chinese	Unit per workload <i>gong</i>	Wage in tael
1751	External, hired artisan	Copying printing ('Song') style characters for the transcript of the yearly calendar <i>Zhongxing genglu</i>	寫《中星更錄》宋字	100 characters	0.02
1795	External, hired artisan	Copying printing ('Song') style characters for the transcript of the yearly calendar <i>Zhongxing genglu</i>	寫《中星更錄》宋字	100 characters	0.03

Source: *Huidian*, chap. 1199, fol. 11b. The increase of 0.01 tael is expressly mentioned.

Table 42 External, hired artisans' wages for block printing in the *Wuying dian*, 1861

Work procedure	Work procedure in Chinese	Unit per workload <i>gong</i>	Wage in tael
Carving/printing ('Song') style characters	書刻宋字	100 characters	0.08
Carving standard handwriting ('soft') style characters	刻軟字	100 characters	0.08
Carving Ou-type handwriting style characters	刻歐字	100 characters	0.14
Carving Ou-type handwriting style characters: above wage doubled if carved in jujube wood	刻歐字	100 characters	0.28
Carving out the white spaces in the printing blocks and sawing the edges	剷除板片空地， 鋸截板邊		0.02
Carving illustrations	刻畫圖	one square inch per <i>gong</i>	0.154
Copying/printing ('Song') style characters	書寫宋字	100 characters	0.02
Copying standard handwriting ('soft') style characters	寫軟字	100 characters	0.03
Copying Ou-type handwriting style characters	寫歐字	100 characters	0.04
Copying illustrations	畫圖	two square inch equals one workload <i>gong</i>	0.154
Folding and fixing the sheets	摺配齊訂書籍	1,000 sheets	0.13
Printing on fourfold Lianzhou paper	印刷連四紙書	1,000 sheets	0.16

Work procedure	Work procedure in Chinese	Unit per workload <i>gong</i>	Wage in tael
Printing on bamboo paper	印刷竹紙書	1,000 sheets	0.12
Cutting pages	裁書	1,000 sheets	0.02

Source: *Qinding zongguan Neiwufu xianxing zeli* 欽定總管內務府現行則例 (Imperially endorsed current regulations and precedents of the Imperial Household Department). 1851-1861. Reprint *Gugong zhenben congkan*, vol. 309, p. 313.

Table 43 Wage rates for Wuying dian block printing projects of the 1870s/1880s

Work procedure	Work procedure in Chinese	Unit per workload <i>gong</i>	Wage in tael
Copying/printing ('Song') style characters for the transcript of the astronomical work <i>Xukan sanyuan jiazi biannian wannian shu</i>	繕寫《續刊三元甲子編年萬年書》宋字板樣	100 characters	0.02 plus food allowance 0.01
Carving/printing ('Song') style characters for the <i>Xukan sanyuan jiazi biannian wannian shu</i>	刻《續刊三元甲子編年萬年書》宋字	100 characters	0.08 plus food allowance 0.02

Source: Liu Qiang, 'Qing Wuying dian', pp. 273-274, from the account books of the Wuying dian, *Wuying dian xiushuchu zouxiao qingce* 武英殿修書處奏銷清冊.

Table 44 Carving fees paid to the external printery Zhuanyun zhai in Peking, 1884

Work procedure	Work procedure in Chinese	Norm wages for carving 100 characters
Carving [soft-style] characters for the palace regulations <i>Gongzhong xianxing zeli</i>	刻《宮中現行則例》[軟字]	0.24 silver tael plus 400 copper cash food and drink allowance per day

Source: First Historical Archives document *Neiwufu zeli* 內務府則例館 23, Fuwen 附文 (Additional note) 1, and 3, p. 1-2.

Table 45 Synopsis: Wages for copying 100 characters at the Wuying dian

Year	Status group	Norm wages in silver tael	Exchange rate 1 tael to copper cash	Remarks
1705	External, hired artisan	0.04	1,400	Soft style
1705	External, hired artisan	0.02 to 0.04	1,400	Song style
1751	External, hired artisan	0.02	780	For the calendar <i>Zhongxing genglu</i>
1768		0.03	950	Song style
1774		0.02	955	For carving wooden movable types, no running text
1795	External, hired artisan	0.03	1,150	Wage increase expressly mentioned (<i>Zhongxing genglu</i>)
1860s	External, hired artisan	0.02		Song style
1860s	External, hired artisan	0.03		Soft style
1860s	External, hired artisan	0.04		Ou style
1870s		0.02 plus 0.01 food allowance		For <i>Xukan sanyuan jiazi biannian wannian shu</i>

Source: Tables 36, 38, 39, 41 to 43.

Table 46 Synopsis: Wages for carving 100 characters (government wage rates)

Year	Status group	Wages in silver tael	Exchange rate	Institution	Remarks
1705	External, hired artisan	0.08	1,400	W	Song
1705	External, hired artisan	0.14 to 0.16	1,400	W	Soft style
1807	Civilian artisan	0.044	970 (Ningjin)	Zhili provincial printery	New [blocks]
1807	Civilian artisan	0.065	970 (Ningjin)	Zhili provincial printery	Characters carved on old [blocks]
1807	Civilian artisan	0.08	970 (Ningjin)	Zhili provincial printery	Manchu letters
1861	External, hired artisan	0.08	1,400-1,500 (1855)	W	Song style
1861	External, hired artisan	0.08	1,400-1,500	W	Soft style
1861	External, hired artisan	0.14	1,400-1,500	W	Ou style

Year	Status group	Wages in silver tael	Exchange rate	Institution	Remarks
1870s		0.08 plus 0.02 food allowance	17,000 (1875)	W	Song style
Ca. 1884	External, hired artisans	0.24 tael plus 400 cash food and drink allowance per day	16,250	Zhuanyun zhai (Peking, Liuli chang), working in the palace	For <i>Xianxing gongzhong zeli</i> . Soft style. 400 cash food allowance = 0.02 tael
For comparison 1726-28		0.025	900	W	Carving one copper movable type
1774		0.45	955	W	Carving 100 wooden movable types

W = Wuying dian

Source: Tables 36, 37, 39, 42 to 44.

Table 47 Synopsis: Wages for printing 1,000 sheets (government wage rates)

Year	Status group	Wage in silver tael	Exchange rate	Institution	Remarks
1705	Banner artisan printer家内匠役	0.1 food provision money	1,400	W	
1705	External, hired artisan	0.16	1,400	W	Printing on fourfold Lianzhou paper
1705	External, hired artisan	0.12	1,400	W	Printing on bamboo paper
1807	Civilian artisan?	0.12	970 (Ningjin)	Zhili provincial printery	Wage given for 100 pages (0.012 tael)
1861		0.16	1,400-1,500 (1855)	W	
1861		0.12	1,400-1,500	W	

W = Wuying dian

Source: Tables 36, 40, 42.

Source for exchange rates: 'Exchange Rates Database' of the project group 'Monies, Markets, and Finance in China and East Asia 1600-1900', Tübingen University, Institute for Chinese and Korean Studies.

Table 48 Wage rates in commercial printing for carving 100 characters

Year	Place/Workshop	Wage in silver tael	Wage in cash	Exchange rate	Source
1644	Peking, printer hired by missionary Tang Ruowang (Adam Schall von Bell)	0.06		5,882	Tang Ruowang 湯若望, <i>Xiyang xinfa lishu zoushu</i> 《西洋新法歷書奏疏》
1662-1722	Peking	0.08		1,428-780	No source given
1773	Peking, Wuying dian	0.1		955	Carving on pear wood blocks
1790s			56-63 coins <i>zhi-qian</i> 制錢 (official cash)	1,060-1,150	No source given
Around 1800	Suzhou		110 +	1,450 (1799)	Wang Huizu 汪輝祖, <i>Bingtā menghen lu</i> 病榻夢痕錄
Late 1870s	Hunan, Yongzhou		50-60		<i>Shulin qinghua</i>
Mid 1880s	Hunan, Yongzhou		80-90		<i>Shulin qinghua</i>
Mid 1880s	Hunan, Yongzhou, Yuan-style script, small		150		<i>Shulin qinghua</i>
Mid 1880s	Hunan, Yongzhou, Yuan-style script, big		200		<i>Shulin qinghua</i>
Mid 1880s	Hunan, Yongzhou, seal script per character		5		<i>Shulin qinghua</i>
Ca. 1910	Hunan, Yongzhou (male wages)		130	1,600	<i>Shulin qinghua</i>
Ca. 1910	Hunan, Yongzhou (female wages), but also in Guangdong and Jiangxi		20-30	1,600	<i>Shulin qinghua</i>

Sources: Zhang Xiumin, *Zhongguo yinshua shi*, p. 755; Ye Dehui, *Shulin qinghua*, pp. 154-155.

9. The Artisan's Place: The 'Four Occupational Groups' and the Social Position of Craftspeople

In imperial and pre-imperial periods, Chinese governments made practical provisions to allocate and supervise skilled labour in the service of the state. A particular perspective of social hierarchy came with this system which expressly included artisans.

The concept of the 'four occupational groups' originates from the intention of rulers and administrators to divide and settle the population according to occupations and to monitor their numbers and activities. Together with the assessment that scholars and farmers were 'fundamental' but artisans and merchants were 'secondary' or derived groups, this notion confirmed the dominance of agriculture and Confucian learning and administration.

Origins and Early Applications of the Concept

Chinese philosophy has brought forth several concepts of hierarchy in human society. The first textual evidence for the basic Confucian view can be traced back to the philosopher Mencius (fl. fourth century B.C.), who considered the most fundamental relationships in human life to be those between father and son, ruler and minister, husband and wife, elder and younger brother, and between friends. These pairs, which set up a hierarchy of age, descent, and gender, were captured in the formula of the 'five human relationships', which was sometimes also reduced to the first three matching pairs. They were shaped into the principal outlook on humanity by Confucian commentators in the first century B.C. This is still – at least partly – culturally relevant to East Asian societies.

A further concept that also goes back to Mencius is the distinction between rulers and administrators, who work mentally, and the ruled, who labour physically. It is the quintessence of an explanation for the necessity of the division of labour:

Great men have their proper business, and little men have their proper business. Moreover, in the case of any single individual, whatever articles he can require are ready to his hand, being produced by the various

handicraftsmen: if he must first make them for his own use, this way of doing would keep all the people running about upon the roads. Hence, there is the saying, 'Some labour with their minds, and some labour with their strength. Those who labour with their minds govern others; those who labour with their strength are governed by others. Those who are governed by others support them; those who govern others are supported by them.' This is a principle universally recognised.¹

Several other rankings and views, e.g. on the hierarchy of nobility, were formulated in the pre-imperial period. The idea that is most relevant for the crafts originates from sometime between the fifth to third centuries B.C. It defines four occupational groups of commoners (literally 'four people' *simin* 四民): 1. officials/officers, both civilian and military (*shi* 士); 2. farmers (*nong* 農); 3. artisans (*gong* 工); and 4. merchants (*shang* 商). We find this concept in works such as the *Guanzi* (Master Guan) in the following passage:

Guanzi replied [to the question of Duke Huan of Qi as to how he should organize the people]: 'They [the gentry, peasants, artisans, and merchants] should not be allowed to dwell together in confusion. If they do so, their speech will become distorted and their work disorganized. For this reason, the sage kings, in situating the gentry, were certain to send them to places of leisure. In situating the farmers, they were certain to send them to the fields. In situating the artisans they were certain to send them to the bureaus responsible for them. In situating the merchants they were certain to send them to the marketplaces.'²

This also occurs in the *Shujing* (Book of History)³ and *Gongyang zhuan* (Gongyang's commentary to the Spring and Autumn Annals),⁴ always with

1 *Mengzi*, 'Teng Wengong shang' 滕文公上 3a.4, transl. in *The Chinese Classics*, Vol. 2, *The Works of Mencius*, p. 249 f.

2 *Guanzi* chap. 20, p. 135 'Xiao kuang' 小匡 (Little basket), in Allyn Rickett's translation, *Guanzi*, p. 185. The 'Sayings of the States' (*Guoyu*), 'Qiyu' 齊語 (Sayings of Qi), chap. 6, p. 226, have a close paraphrase of the passage in *Guanzi*.

3 *Shujing*, 'Zhou guan' 周官 (Offices of the Zhou): 'The Minister of Works manages the earth [works] of the country, fixes the living quarters of the four people, and sets the seasonal schedule for working the earth.' The comment says: 'The 'Winter Minister' [i.e. Minister of Works] is in charge of the empty portions of the territory, where the 'four people' settle, namely officers, farmers, artisans, and merchants'; transl. by Séraphin Couvreur, *Chou King*, p. 335, (12).

4 *Gongyang zhuan* 公羊傳, *Cheng gong yuan nian* 成公元年 (First year of the reign of Duke Cheng, third month), *jiegu* 解詁 (commentary): 'The four people of antiquity were, first, those who were virtuous and able and held official positions: the officers; second, those who cultivated the

an emphasis upon the distinction between the four occupational groups and the importance that rulers should not allow them to mix with each other.

Derk Bodde has pointed out that the term was first introduced by the legalist school of thought that 'wanted to build up the state's wealth and power through a planned economy that would involve the total population and utilize quantitative techniques'. As applied by the legalists, the distinction between the four groups hinges precisely on occupation and not income or hierarchical status. Thus, the 'officers' from around the eighth to third centuries B.C. were low-level, learned aristocrats who lived by their professional skills either as civilian or military officials, while others were engaged in agriculture together with tenants or serfs. In the imperial era, they became the landholding 'scholar-gentry' from which the official class was recruited. 'Farmers' loosely designated all those working on the land, whether as owners, tenants, or hired labourers. The 'artisans' included skilled and unskilled craftsmen, and the 'merchants' encompassed the whole range from very large-scale traders and proto-industrialists – for instance the owners of iron foundries – to peddlers.⁵

The sequence of these four groups, with the officer/officials first and the merchants last, was not yet fixed in pre-imperial times but commenced from the Han and thereafter remained in this order.⁶ The designations *benye* ('root' or fundamental occupations) for the officers and farmers and *moye* ('branch' or secondary/derived occupations) were coined in the era of the Warring States (c. third century B.C.). Throughout the period of imperial China, in the precepts of the ruling and educated elites, this dichotomy between 'fundamental' and 'derived' implied a ranking of useful and less useful activities that should be promoted or restricted by the rulers. This tendency is captured in the phrase 'emphasizing the roots and disregarding the branches' (*zhongben yimo*) or, more specifically, 'emphasizing agriculture and disregarding commerce' (*zhongnong yishang*). Sometimes the artisans, *gong*, were included with the merchants.

Recent research has fine-tuned the argument to the effect that already in the pre-imperial era, during the period between 353 and 334 B.C., the legalists advised rulers to restrict as much as possible the 'secondary occupations',

land and produced grains: the farmers; third, those who had ingenuous minds and experienced hands and produced utensils: the artisans (三曰巧心勞手以成器物曰工); fourth, those who circulated wealth and sold commodities: the merchants. Since the four people did not mix among each other, there was enough wealth for all.' See the variant in *Hanshu* (Dynastic history of the Han), chap. 24a, pp. 1117/8, which formulates more tersely, 'those who created ingeniously and produced utensils were called artisans' 作巧成器曰工, or in Nancy Lee Swann's translation in *Food and Money*, p. 115, 'those who devised and made utensils [and instruments] were the craftsmen'.

5 Bodde, *Chinese Thought*, pp. 204-205.

6 *Ibid.*, p. 371 ff. has a detailed analysis of all Zhou and Han occurrences of the term.

which produced for and traded on the commercial market, or to forbid them altogether (*jinmo*, 'prohibiting the secondary occupations').⁷ The legalist philosopher Han Feizi (d. 233 B.C.) claimed that merchants and artisans made up two of the 'five vermin of the state' that only brought forth or distributed useless objects.⁸ In the later Han dynasty, Wang Fu (ca. 78-163 A.D.) criticized the extravagance and 'cunning' decoration in the craft objects and the profit orientation of the merchants.⁹ Apart from the fact that some artisans produced art and crafts objects of high value, their extraordinary skill, *qiao* – a character that also bears the connotation of 'cunning' that resembles the English term 'crafty' or 'crafted' – made them suspicious in the eyes of the scholar-elite.

The concept of the 'four people' was used throughout imperial China as a set designation for commoners, implying virtually 'everybody'.¹⁰ It is occasionally mentioned in the dynastic histories, but the priorities among the four occupations are neither discussed nor redefined. In the Tang dynasty it was once prominently used by the scholar-official Han Yu (768-824) in an essay where he criticizes the impact of Buddhism and Daoism in general and specifically the prerogatives of tax freedom and suspension of labour services accorded to monasteries, monks, and nuns. In the text, he claims that the 'four people' had to feed two unproductive groups, the Buddhists and the Daoists.¹¹

Conversely, not everybody who worked as an artisan was a free commoner and belonged to the group of the *gong*. In some periods, especially between the third and eighth centuries A.D., craft labour was also considered a lowly occupation and executed by slaves and bondservants. In the Tang dynasty, artisan households were legally classified as 'lowly people' together with other groups like the musicians of the Court of Imperial Sacrifices, bondspeople, musician's households, and male and female government slaves. However, from the Ming dynasty onward, only the category of slaves remained in a legally debased status.¹²

7 Zhou Shengchun et al., 'Zhongguo lishi shang', pp. 15-16.

8 Han Feizi 韓非子, chap. 49, *Wu chong* 五蠹 (Five vermin), in *Hanzi qianjie*, p. 489, transl. W. K. Liao, *The Complete Works of Han Fei Tzu*, p. 296. The other groups are scholars, the sword-carriers, and the courtiers.

9 Wang Fu, *Qianfu lun*, chap. 12, transl. Rainer Holzer, *Ch'ien-fu lun*, p. 70; see also Craig Clunas, *Superfluous Things*, p. 142.

10 Bodde, *Chinese Thought*, p. 203, with reference to a book title like the agricultural almanach *Simin yueling* 四民月令 (Monthly ordinances for the four people) by Cui Shi 崔寔 (d. ca. 170 A.D.). For the *Simin yueling*, see also Monique Nagel-Angermann, 'Nongjia', p. 82.

11 Han Yu, 'Yuan dao' 原道 (What is the true way?), transl. Charles Hartman in *Sources of Chinese Tradition*, p. 377/379.

12 Hansson, *Chinese Outcasts*, pp. 28/29. However, some artisan occupations, such as tanners and butchers, retained a low image. But generally speaking, the outcast status was more

In the second millennium, only a few thinkers and officials reconsidered the ranking of scholars and farmers as fundamental and of merchants and artisans as secondary, or the concept of the four occupational groups as a whole. Those who did so were the Song philosophers Chen Xiqing (1180-1256) and Zheng Zhidao (fl. 1079); the Ming scholars He Xinyin (1517-1579), Zhao Nanxing (1550-1627), Wang Daokun (1525-1593), and Feng Yingjing (1555-1606); and the Qing philosopher Huang Zongxi (1610-1695).¹³ They postulated that farmers, artisans, and merchants all belonged to the 'fundamental occupations', or even that merchants and artisans surpassed the farmers in importance. However, such reasoning remained the exception to the rule. The dominant view was the 'physiocratic' conviction that agriculture in combination with subsidiary production, mainly in textiles, was of the greatest importance to the state and that specialization in manufacturing and commerce was undesirable and suspect. This was formulated by the Yongzheng emperor in 1727 as follows:

Among the four classes of people, next to the scholars, farmers are the most valuable. All artisans and merchants rely on their food for farming, which is why farming is the basic pursuit (*ben*) throughout our realm while crafts and trade are merely secondary (*mo*). With the rising demand today for the ever more elaborate and finely crafted implements, clothing, and amusements, we are surely going to be needing more artisans. One more artisan in the market place, however, means one less farmer in the fields. Moreover, when the simple people see how much more artisans make than farmers do, they are sure to stampede to learn a trade. A sudden increase in the number of artisans will mean a glut of manufactured goods on the market, which will make it harder to sell things, as blockages develop, and prices fall. Thus, not only will an increase in people who pursue secondary occupations harm agriculture..., it will also have a harmful effect on the artisans themselves.¹⁴ [...]

Hastily correcting this by legislation is not what the situation demands and would be hard to achieve. The only solution is patiently to instruct people day by day so that they understand that the basic occupation is an honourable one.¹⁵

associated with sexual pollution and less with blood and death than, for instance, in Korea and Japan (p. 18).

13 Zhou Shengchun et al., 'Zhongguo lishi shang', pp. 17-18.

14 This is the translation by Susan Mann, 'Household Handicrafts and State Policy in Qing Times', p. 78.

15 Fang Xing, 'The Retarded Development of Capitalism', pp. 392-393, gives a longer excerpt of the relevant edict, which is included in the 'Veritable Records of the Qing', *Da Qing Shizong Xian (Yongzheng) huangdi shilu*, chap. 57 (Yongzheng 5/5/4), fol. 3b, p. 884. This shows the insight of the emperor that the government hardly had the option to reverse the general trend of commercialization.

Make them respect honesty, not indulge in crafty skills, and if this is done day by day and month by month, it will eventually become a habit, and although not all artisans have to return to farming, it can at least prevent the farmers from hastening to become artisans. [...] ¹⁶

Why did the imperial state and especially the first Qing rulers insist on extolling agricultural pursuits rather than emphasizing manufacturing and commerce? In view of the population increase and the labour intensiveness of rice cultivation, it seems plausible that the central government feared that the food supply would be jeopardized if too many farmers left their occupation. The central government may also have been worried that the tax-in-kind on the rice-producing provinces and regions, the so-called 'grain tribute', would decrease. Moreover, many believed that political stability would be endangered if the ideal situation of a village-based agricultural state were to crumble. ¹⁷

This opinion remained dominant until before the Opium War, and even important advocates for political and social reforms such as Gong Zizhen (1792-1841) ¹⁸ and Wei Yuan (1794-1857) ¹⁹ initially remained true to the traditional pattern, although Wei Yuan later changed his view. The transitional phase between the First Opium War (1842) and the Sino-Japanese War (1895) led contemporary intellectuals to the conviction that commerce and industries were of the utmost importance for the 'self-strengthening' and 'enriching' of China.

Historians' Assessments

Chinese and Western historians of China have reflected upon the concept of the 'four people' in various ways. Those who discuss phases of pre-imperial

16 This is the end of the excerpt as given in Peng Zeyi, *Zhongguo jindai shouongye*, vol. 1, p. 419. The target of the Yongzheng emperor's policy is expressed even more clearly here.

17 For a detailed discussion of the insistence on the 'four occupations' and its extension, which prescribes the gender relation of men who till and women who weave, but stay in the house, see Francesca Bray, 'Towards a Critical History', p. 201 ff.

18 Gong Zizhen, a forerunner of late nineteenth-century reformers, was less successful as mid-level official in Peking, but later became famous for his early call to abolish the civil service examinations, footbinding, opium smoking, and exaggerated deference to the emperor in court. Hucker, *Eminent Chinese*, p. 431-434.

19 Wei Yuan was especially concerned about China's foreign relations and in 1843 published *Haiquo tuzhi* 海國圖志 (An illustrated treatise on the maritime kingdoms), the first geography of overseas Western countries. Before this, Wei Yuan, who was acquainted with Gong Zizhen, had edited the first Qing dynasty edition of statecraft writings.

and early imperial social history do not refrain from using it, even if they qualify this critically, to describe the constituents of these societies. For instance, Derk Bodde conceives of these four as 'four major categories or social classes'²⁰ but notes the omission in this concept of at least four groups that were significant in the West: the clergy, the nobility, the military, and slaves. On the relationship of the Confucian scholar to the artisans, he states that this concept, together with Mencius' division between brain workers and manual workers, resulted in

a polarization of mental and manual work which barred the literatus from any sort of manual activity other than painting and calligraphy, kept the hand worker in unlettered silence, and induced the former either to disregard the latter entirely in his writings or to describe his way of life in casual, patronizing, or idealized language.²¹

In his research on social mobility, Wolfram Eberhard also refers to the 'four classes of free burghers' and emphasizes that craftspeople made up the group that generally had 'the smallest chances of upward mobility'.²²

Philip A. Kuhn discusses the concept of the 'four large occupational status groups', which he defines as 'scholars, agriculturalists, artisans, merchants' as an element in his analysis of the four axes of social differentiation formulated in pre-modern sources: (1) occupational status; (2) rulers and ruled; (3) free and unfree; (4) rich and poor.²³ According to Kuhn, political status ranked supreme in social importance, but occupational status was not unimportant and closely related to the political hierarchy.²⁴ The first two of his axes were considered universal and built into the natural order. However, this was not the case with the latter two – the free and the unfree, and the rich and the poor – which were seen as 'man-made' rather than naturally occurring.²⁵

Other historians more sharply refute the value of the concept. Ho Ping-ti, for instance, finds the classification into 'four major functional orders' too broad and too narrow at the same time.²⁶ In the first place, it does not take into account 'debased people'. And within the particular groups of the fourfold division, a broad range of stratifications prevailed, which makes it

20 Bodde, *Chinese Thought*, p. 203.

21 Bodde, *Chinese Thought*, p. 222.

22 Eberhard, *Social Mobility*, pp. 237-238.

23 Kuhn, 'Chinese Views of Social Classification', pp. 18-26.

24 *Ibid.*, p. 27.

25 *Ibid.*, pp. 22-25.

26 Ho Ping-ti, *The Ladder to Success*, p. 18.

obvious 'that the traditional Chinese society was always a multiple-class society'.²⁷ Marie-Claire Bergère finds the 'quadripartite division of society' especially unsatisfying for the late nineteenth and early twentieth centuries, when class relations changed and new groups formed, as exemplified in the increasing number of brokers in commerce and politics as well as rebel members of secret societies that belonged to none of the traditional categories. Merchant communities assumed new roles as they mediated between these newly emerged middle strata and the public authorities.²⁸

A representation of the four groups from the early twentieth century was designed in the Qijianlong workshop of the printing centre Yangliuqing near Tianjin.²⁹ The artists obviously felt the need to comment on the lack of one distinct professional group, the soldiers. Nevertheless, in the printing they presented an idealized image of the four groups in harmony. Among the four, the artisans are not easily identifiable. Since they are not shown at work, it would be difficult to recognize them as artisans and not simply as merchants, were it not for the title 'Scholar, farmer, artisan, merchant'. The inscription, in the spirit of the self-strengthening movement and the increasing militarization of the late Qing society, reads:

Study battle, strengthen daily,
Scholars form a single faction,
Compete to become stronger,
Coordinate merchants, exhort workers,
In China, farming always comes first,
But this is a shortcoming, it is one's duty to serve as a soldier.³⁰

學戰日烈唯士所宗
競爭增劇通商勸工
況在中國首先重農
惟有缺點義務充兵

While there can be no doubt about the dynamism of the late Qing society and the emergence of new economic players, or about the economic variance in each of the four groups, in the late Qing era, the concept of the four groups was

27 Ibid., p. 20.

28 Bergère, *The Golden Age of the Chinese Bourgeoisie*, pp. 19-20.

29 See James Flath, *The Cult of Happiness*, illustration after p. 20, 'Scholar, farmer, artisan, merchant'.

30 Flath, *The Cult of Happiness*, translation of the inscription by Flath, p. 61.

far from withering away.³¹ On the contrary, it was applied to the contemporary situation and the perceived need for industrialization, commercial relations with foreign countries, and military service, as expressed in the poem: *tong shang* 'to take up trade relations', *quan gong* 'to promote [industrial] work', and *chong bing* 'serving as a soldier'. For the first time, the functions of the *gong* – the craftsmen of old and present-day workers in manufacturing sites and industry, technicians, and engineers – were discussed and favourably assessed in comparison to the tasks and achievements of the other three groups.

Late Qing Views on the Position of Artisans

In the historical narratives of the dynastic histories that were compiled between the second century B.C. and the eighteenth century A.D., the four occupational groups (*simin*) or the synonymous term, 'scholars, farmers, artisans, and merchants' (*shi nong gong shang*) only occur occasionally, and always in the meaning of 'all commoners'. The concept is not discussed or qualified.³²

The situation changed in the nineteenth century, and this change can be identified from within the so-called 'statecraft writings'. From then onwards, these writings reflect an increasing concern for the composition of the group of commoners and, at the very end of the dynastic rule, also for a reassessment of their relative importance.

The concept of statecraft – literally, 'to order/manage the world' (*jin-gshi*) – originates from the Song dynasty. Statecraft authors, most often committed officials and scholars, aimed to solve immediate political and socio-economical problems with a long-term view to creating a 'universal moral order'.³³ As has been shown by Jane Kate Leonard, statecraft writings tended to become more practical and pragmatic from the Southern Song to the Qing periods, but up to the late Qing, ostensibly moral ends always justified the proposed practical solutions.³⁴

31 For the application of the fourfold division since the sixteenth century in Japan, where it was combined with 'status' (*mibun* 身分) and legally more binding than in contemporaneous China, see Douglas R. Howland, 'Samurai Status', pp. 355-362.

32 A text analysis of the twenty-five dynastic histories installed at the Academia Sinica full text database yields a result of 50 hits for *simin* and 7 for the synonymous *shi nong gong shang*, *Hanji quanwen ziliaoku* 漢籍全文資料庫/ *Scripta Sinica*, <http://hanchi.ihp.sinica.edu.tw/ihp/hanji.htm>.

33 Leonard, *Wei Yuan*, p. 20.

34 *Ibid.*, pp. 20-22.

Statecraft writings deal with all matters and aspects of administrative concern. They were compiled from existing texts that were not initially written with the purpose of being included in these collections. Some of them were imperial edicts or government orders, while others were the communication of officials to the central government, mostly in the form of memorials. The latest editions also contain texts that are suggestions from intellectuals outside the government, or descriptions of foreign political and administrative matters that stand in no immediate relation to China but were thought to be useful as possible models.

In the Qing dynasty, the first of these collections was edited in 1826 by He Changling (1785-1848), a provincial administrator in Jiangsu, and Wei Yuan, who served as a mid-level district administrator in the same province. The editors proposed a change of the bureaucratic framework in order to prevent corruption and to stabilize social and economic conditions. However, the collection also contains texts from the early and high Qing that were considered relevant for contemporaneous problems. With the first of these editions, Wei Yuan created a model for political expression that was taken up by later intellectuals who edited sequels and complements to the original edition. The editors, including Wei Yuan, belonged to the scholarly elite but did not rank high in the bureaucratic hierarchy. Some of them were related to more prominent personalities, such as Mai Zhonghua (1876-1956), a student and the son-in-law of Kang Youwei,³⁵ or Sheng Kang, father of the industrialist Sheng Xuanhuai (1844-1916).³⁶

In her study on the relationship of statecraft writings and the press, Andrea Janku explains that from the 1890s on, such compilations increased and reached their apex around 1898. After Kang Youwei's Hundred Day Reform was crushed in the summer of 1898, the original group of statecraft compilers kept silent or resumed their work in other forms from exile. In 1902, statecraft writings were once again used in order to justify the government's reform efforts. Meanwhile, many of the previous editions were reprinted, but compilation and reprint activities petered out after the fall of the dynasty. As a public sector began to take shape and political opinion could be expressed in newspapers and journals, statecraft writings and journalism approached each other in content, and with this assimilation, the genre of statecraft writings gradually faded away. The last of the editions is from 1914.³⁷

35 Janku, *Nur leere Reden*, p. 79.

36 Janku, 'Preparing the Ground', p. 75, fn. 27.

37 *Ibid.*, pp. 74-76.

The ten most important collections, dating from the years 1826 to 1902, are listed in the following table.³⁸ They formed the text corpus for this study. Recent research has identified about nineteen late Qing and early Republican statecraft collections.³⁹

Table 49 Collections of statecraft writings, 1826-1902

	Editors and Titles	Year	Chapters	Entries <i>simin</i> 四民	Entries <i>shi nong</i> <i>gong shang</i> 士農工商
1	He Changling 賀長齡 and Wei Yuan 魏源, <i>Huangchao jingshi wenbian</i> 皇朝經世文編 (Statecraft writings of our August Dynasty)	1826	120	19	7
2	Rao Yucheng 饒玉成, <i>Huangchao jingshi wenbian xuji</i> 皇朝經世文編續集 (Continued collection of statecraft writings of our August Dynasty)	1882	120	12	2
3	Ge Shijun 葛士濬, <i>Huangchao jingshi wen xubian</i> 皇朝經世文續編 (Sequel to the statecraft writings of our August Dynasty)	1888	120	13	6
4	Sheng Kang 盛康, <i>Huangchao jingshi wen xubian</i> 皇朝經世文續編 (Sequel to the statecraft writings of our August Dynasty)	1897	120	35	5
5	Chen Zhongyi 陳忠倚, <i>Huangchao jingshi wen sanbian</i> 皇朝經世文三編 (Third edition of statecraft writings of our August Dynasty)	1898	80	13	12
6	Mai Zhonghua 麥仲華, <i>Huangchao jingshi wen xinbian</i> 皇朝經世文新編 (New edition of statecraft writings of our August Dynasty)	1898	21	16	11
7	Shao Zhitang 邵之棠, <i>Huangchao jingshi wen tongbian</i> 皇朝經世文統編 (Comprehensive edition of statecraft writings of our August Dynasty)	1901	107	65	38
8	He Liangdong 何良棟, <i>Huangchao jingshi wen siban</i> 皇朝經世文四編 (Fourth edition of statecraft writings of our August Dynasty)	1902	52	19	7

38 These were installed at the Academia Sinica Taiwan 'Electronic Editions of Chinese Writings Full-text Database' 中央研究院漢籍電子文獻瀚典全文檢索系統, <http://www.sinica.edu.tw/~tdbproj/handy/> and have later migrated to other sites. Photomechanic reproductions were published in several editions, for instance by the Guofeng chubanshe and in the Collectanea *Jindai Zhongguo shiliao congkan*.

39 Shen Yan, 'Wan Qing jingshi wenbian', p. 58, counts nineteen; Andrea Janku, p. 74, table 2, has seventeen sequels to the 1826 edition.

	Editors and Titles	Year	Chapters	Entries <i>simin</i> 四民	Entries <i>shi nong gong shang</i> 士農工商
9	Qiushi zhai (pseud.) 求是齋, <i>Huangchao jingshi wenbian wuji</i> 皇朝經世文編五集 (Fifth collection of statecraft writings of our August Dynasty)	1902	32	11	2
10	Gan Han 甘韓, <i>Huangchao jingshi wen xinbian xuji</i> 皇朝經世文新編續集 (Sequel to the new edition of statecraft writings of our August Dynasty)	1902	21	18	8
	Total		793	221	98

A closer investigation of the context of the terms ‘the four groups’ (*simin*) or ‘scholars-farmers-artisans-merchants’ (*shi nong gong shang*) in the earliest of these collections shows that in the texts of the first collection (1826), both terms refer to commoners in general. Some texts outline the characteristics and complementary functions of each of the four groups and any other groups that are perceived as necessary or at least as existent. For example:

The scholars understand the way of the former kings and support the ruler of men in governing the realm. The farmers till the fields with physical labour and harvest the grain to feed the realm. The artisans produce the necessary vessels and objects for the use of the realm. The merchants bring scarceness and abundance into contact and assemble goods for the profit of the realm. Besides, those ordinary people who are close to the officials, such as present-day office assistants, are indispensable for administration, and therefore must also be appended to the four people.⁴⁰

Other texts designate the scholars as ‘those who excel’; soldiers as ‘those who are strong’; and farmers, artisans, and merchants as ‘those who are weak’.⁴¹ Single groups are also discussed. The statement one comes across

40 Jin Fu 靳輔 (1633-1692), ‘On creating wealth and augmenting provisions, memorial one’ (‘Sheng cai yu xiang diyi shu’ 生財裕餉第一疏), Collection 1, chap. 26, fol. 20a/b. Jin Fu, a bannerman, was a specialist in river conservancy and served as the Director-General of the Yellow River Conservancy for eleven years. He successfully organized dike and canal construction on the lower reaches of the Yellow River. See Hummel, *Eminent Chinese*, p. 161 ff.

41 Shen Qiyuan 沈起元 (1685-1763), ‘Reflecting on strategies for current tasks’ (‘Ni shiwu ce’ 擬時務策), Collection 1, chap. 35, fol. 41b. Shen Qiyuan directed the Confucian academy at Luoyang; see Hummel, *Eminent Chinese*, p. 175.

most frequently is that the scholars rank first among the four groups,⁴² while it is mentioned only once that the farmers face the greatest hardships of all four.⁴³ Merchants are also mentioned once,⁴⁴ but there is no separate characterization or discussion of artisans.

It was also a matter of debate what the right apportionment of the four categories of people was. Generally, the best ratio was considered to be 70 percent farmers and 10 percent each of artisans, scholars, and merchants.⁴⁵ The most extensive discussion of the four groups was formulated by Yun Jing 惲敬 (1757-1817),⁴⁶ the founder of the 'Yanghu school' of practical learning. He pointed out the fact that at the time not only four but as many as fourteen groups existed but that those who fed and provided the essential services were still the same four as in ancient times.⁴⁷ To some extent, the additional ten groups is a rhetorical inflation stemming from a preference for pairs. It includes, in an allusion to Han Yu, Buddhist and Daoist clergy; the nobility (*gui*) and the rich (*fu*); military leaders (*cao bing zhe*) and their followers (*jianyi zhe*), their offspring (*zidi*), wives, and in-laws (*yinya*); commercial agents and brokers (*ya, hu*); servants (*pu* and *tai*); courtesans; and actors

42 Zhou Kai 周凱, 'An explanation of the poem on cultivating mulberry trees' ('Zhong sang shishuo' 種桑詩說), Collection 1, chap. 37, fol. 23a claims that 'scholars are the first among the four groups, and often farm as well as study. When the scholars lead [in introducing agricultural methods], the people [i.e. farmers] will certainly follow.' Zhou Kai (ca. 1779-1837) acted as a mid-level civil and military official in various provincial governments and was a specialist in navigation and shipbuilding. For further references on the position of the scholars within the four groups, see Xu Chengxuan 許承宣 (fl. 1676, Supervising Censor in the Office of Scrutiny for Public Works, see *Zhongguo lidai renming da cidian*, p. 750), 'Comment to a document on 'Four problems of corvée and taxation' [of 1645]' ('Fuchai guanshui sibi shu' 賦差關稅四弊疏), dated 1680, Collection 1, chap. 28, fol. 28a; Chen Qingmen 陳慶門, 'About being a honest official' ('Shixue yiguan lu' 仕學一貫錄), Collection 1, chap. 22, fol. 28a.

43 Wang Peixun 王沛恂, 'Record on wild silkworms' ('Ji shan can' 紀山蠶), Collection 1, chap. 37, fol. 23b.

44 Zhang Jian 章謙, 'On preparations for years of drought' ('Bei huang tonglun, xia' 備荒通論下), Collection 1, chap. 39, fol. 12b/13a.

45 Jin Fu, 'On creating wealth and augmenting provisions, memorial one', in Collection 1, chap. 26, p. 7-1. Xu Chengxuan, 'Comment to a document on four problems of taxation [of 1645]', Collection 1, chap. 28, fol. 28a says that scholars constitute ten percent of the entire four groups.

46 For biographical information, see Hummel, *Eminent Chinese*, pp. 959-960 and *Zhongguo lidai renming da cidian*, p. 1783. Yun had passed the second-degree official examinations in 1783 and successfully worked as regional administrator in various districts. He was known as an upright official, but in 1814 was relegated and stripped of his offices after being accused of overlooking that his subordinates had accepted bribes. He was an expert in classical, pre-Han dynasty writing (*guwen*, a style revived by Han Yu) and close to legalist thinking. Since he came from Yanghu in Jiangsu, his school of thought was entitled 'Yanghu school' (Yanghu pai 陽湖派).

47 Yun Jing, 'Subsequent changes from the Three Emperors onwards' ('Sandai yin'ge lun' 三代因革論), Collection 1, chap. 11, fol. 11a-12b.

(*furen, nanzi*). According to Yun Jing, on top of the burden of feeding these ten superfluous groups, other tendencies lead to the impoverishment of farmers, artisans, and merchants. He states that contrary to the ideal in 'antiquity', when the rulers owned all land and made the people till it, the rich now buy land and delegate agricultural labour to landless, destitute workers (*yong*). The artisans of olden times had specific patterns of production and were supervised by the officials, but later they allegedly did not conform to any rules and 'made everything on their own'. Yun Jing claims that unskilled artisans cannot support themselves, and the skilled hands produce items of such exaggerated refinement that it takes them several years to finish a single one, with the result that they, too, cannot make a living. Traditionally, merchants were not allowed to wear sumptuous dress and use luxury carts, but in Yun Jing's era, they indulged in exaggerated luxury which did not match with their positions, and tried to imitate the scholar-officials. Consequently, their wealth also decreased. Yun Jing ends his argument with the urgent advice that the members of the unproductive groups be reduced.

Another conservative thinker, Wang Boxin (1799-1873),⁴⁸ a friend of commissioner Lin Zexu (1785-1850), who had ordered the destruction of imported opium in Canton in 1839 and the punishment of those Cantonese compradors who had handled the opium trade, called for an outright 'prohibition of the secondary occupations' ('Jin mo').⁴⁹ Deploring the situation where craftspeople were no longer supervised and controlled by officials, he made a distinction between those artisans who followed their inherited trade and were impoverished and those who produced 'clever devices' for the market and flourished. He called for the punishment and discrimination of the latter and the merchants who traded in their products.

Such anti-commercial invectives, which do not touch on the position or value of the scholarly class, gradually diminished in the statecraft collections in the course of the late nineteenth century. They showed the anxiety of a part of the scholarly elite that society was changing for the worse and that the economically active groups that produced and traded goods were to blame for it.

Re-evaluations: Turning to Antiquity and Facing the West

From the fifth of the statecraft collections (1898) onwards, the change to more assertive views of craft production and commerce becomes manifest.

48 For biographical data, see Hummel, *Eminent Chinese*, p. 511.

49 Collection 4, chap. 55, fol. 3a-4a.

This re-evaluation sometimes went hand in hand with a more critical view of the role of the scholars. Among the lines of thought developed, some still referred to antiquity, while others brought up for discussion the position of crafts and commerce in overseas countries. Both antiquity and the situation abroad served as positive models that stood in contrast to the circumstances in China at that time.

In these argumentations, the ancient times were superior not only because able administrators closely supervised the crafts but because the saint kings and their highest ranking councilors were engineers and inventors. The examples cited are almost identical: the mythical figures of Fuxi (the inventor of hexagrams for divination, hunting, fishing, and animal sacrifice), Shennong ('Celestial Farmer', patron of Chinese medicine, agriculture), Huangdi ('Yellow Emperor', inventor of Chinese characters, ships and carts, medicine, music, sericulture), the saint kings Yao and Shun (inventors of the game *weiqi* and the calendar) and Yu (hydraulic engineering), and finally the historical personages of Duke of Zhou (regent for the second Zhou king Cheng, fl. 1030 B.C., consolidator of the Zhou dynasty, the purported inventor of a compass-like 'south pointing needle'⁵⁰), Zhang Heng (78-139), a court astronomer in the Later Han who invented a seismoscope and a rotating celestial globe, and Zhuge Liang (181-234), military strategist and councilor to Liu Bei, ruler of the state of Shu-Han in the Three Kingdoms, to whom the invention of the 'wooden ox',⁵¹ a war engine, is ascribed.⁵² According to this reasoning, after the Song dynasty, the spirit of inventiveness and interest for technical matters declined because the scholars were too concerned with book learning and passing official examinations. Craftspeople were hence considered vulgar, and it was believed that only the simple-minded became artisans.⁵³ Another text

50 Needham, *Science and Civilisation in China*, vol. 4 part 3, *Physics and Physical Technology: Civil Engineering and Nautics*, p. 582.

51 The *muniu* 木牛 or *muniu liuma* 木牛流馬 (wooden ox and flowing horse), is most often identified as wheelbarrow.

52 Xue Fucheng 薛福成 (1838-1894), 'A theory on promoting crafts and industries', written in 1893 (*Zhen baigong shuo guisi* 振百工說癸巳), Collection 5, chap. 63, fol. 3a. Xue served as secretary to Zeng Guofan and was a diplomat in London and Paris from 1890 to 1894; see Hummel, *Eminent Chinese*, pp. 331-332. For the same sequence of inventions by sage kings and court officials, see also 'Written after the inauguration of an industrial school' ('Shu chuangxing yixue hou' 書創興藝學後), by an anonymous author, Collection 7 (1901), chap. 87, fol. 8b.

53 'A theory on promoting crafts and industries', Collection 5, chap. 63, fol. 3a. As to the low esteem for craftspeople, even after the merchants had risen in prestige by buying official titles, see also 'Suggestion to all provinces to enlarge their official manufactories' ('Gesheng tuiguang

draws on a citation from the 'Book of Changes' (*Yijing*) that criticizes the neglect of technical matters: '[In later times] it was ignored what the *Book of Changes* says: 'In preparing things for practical use, and inventing and making instruments for the benefit of all under the sky, there are none greater than the sages.'"⁵⁴

Over time, the voices that called for an equitable appraisal within the four occupational groups became more and more articulate. They claimed that in antiquity the artisans and merchants stood on an equal footing with the scholars. A skilled artisan could allegedly even criticize the government. In later times, the Ministries of Revenues and Work controlled commerce and crafts, but the officials did not understand the actual problems of commerce and crafts or industries. Consequently, they demanded that the ways of antiquity be applied.⁵⁵

However, the greatest difference with the first collections of statecraft literature lies in the fact that comparisons to industrializing and industrialized countries – the 'West' and Japan – were beginning to be incorporated into discussions on the four occupational groups. The main contrast was seen in the status of the counterpart of the Chinese artisans (*gong*) abroad, namely craftspeople, technicians, engineers, and industrialists (of all scales). Three crucial factors seemed different: foreign rulers appreciated the efforts of craftspeople and industrialists, protected their property rights by legislation, and made sure that technical knowledge was transmitted and enhanced in official vocational schools. As we have seen before, authors began to question the normative dominance of the scholars, but the discourse diversified into positions that perceived the Western counterparts of the artisans as dominant and decisive in Western societies and economies, and those that insisted on the dominance of the merchants. Xue Fucheng formulated both

gongju yi' 各省推廣工局議), Collection 7, chap. 87, fol. 9a. Criticism of pure book learning is expressed in 'Suggestion that China should open additional training centers for crafts and industries' ('Lun Zhongguo yi ling she yishu' 論中國宜另設藝塾), Collection 8 (1902), chap. 42, sect. 18 (<http://ctext.org/wiki.pl?if=gb&chapter=464464>).

54 'Written after the inauguration of an industrial school', Collection 7, chap. 87, fol. 8b: 'Yi yue, beiwu zhiyong, li chengqi, yiwei tianxia li, mo da hu shengren' 易曰備物致用,立成器,以為天下利,莫大乎聖人. Translation James Legge, *I ching*, p. 373; *Yijing*, chap. 'Xici A' 繫辭上, 7, p. 107.

55 'A theory on Chinese and foreign wealth and poverty, similarities and differences' ('Zhong wai pin fu yi tong lun' 中外貧富異同論), Collection 7, chap. 106, fol. 32a. See also Ying Zuxi 應祖錫 (1855-1927), 'Promoting the industries and opening commerce' ('Xing gong tong shang' 興工通商), Collection 9 (1902), chap. 12, part 5, sect. 8 (<http://ctext.org/wiki.pl?if=gb&chapter=874265>). Ying Zuxi served first as a diplomat in Spain, later as a regional administrator under the Qing and in the Republic of China.

opinions in separate texts. In 'Theory on promoting crafts and industries', he explained that:

In Western usage, states are built on commerce and industry. The artisans generally form the substance and the merchants the application, which means that the artisans actually rank higher than the merchants.⁵⁶ The scholars research the natural sciences and techniques, which means that as far as merit is concerned, the artisans combine their own and the scholars' affairs.⁵⁷

In his conclusion, he compared the Western situation to China's antiquity. If China wanted to strengthen itself and promote the crafts, it first had to overcome its prejudices against artisans and its exaggerated appreciation for scholars and official examinations.⁵⁸

The critique of the interrelation of classical text learning as the main road to office, power, and reputation is also formulated by contrasting this with the West. One text claims that in the West, merchants, artisans, soldiers, and farmers all learned their trades in specialized schools and therefore stood on the same level as Chinese scholars:

The appreciation of commerce in the West goes so far as to establish commercial schools. One first has to *learn* [emphasis added] a trade in order to be a merchant. That means that the merchants of the West are similar to the scholars in China. Actually, not only the merchants are similar to the scholars, but all technical branches, military matters, and agriculture are taught in schools in order to train the talents. That means that artisans (technicians) as well as soldiers (military officers) and farmers (agronomists) all are like scholars.⁵⁹

Taking this kind of vocational training as a model, reformers demanded that such schools also be established in China⁶⁰ and that the most efficient

56 Identical to 'Written after the inauguration of an industrial school', Collection 7 (1901), chap. 87, fol. 8b.

57 Xue Fucheng, 'A theory on promoting crafts and industries', Collection 5, chap. 63, fol. 3a.

58 Xue Fucheng, 'A theory on promoting crafts and industries', loc. cit.

59 'A theory on public profit' ('Gong li shuo' 公利說), anonymous author, Collection 7, chap. 107, p. 13b.

60 'Suggestion that China should open additional training centers for the industries', Collection 8, chap. 42, sect. 18 (<http://ctext.org/wiki.pl?if=gb&chapter=464464>); 'Written after the inauguration of an industrial school', Collection 7 (1901), chap. 87, fol. 8a/b.

merchants and engineers should be conferred official posts as incentives,⁶¹ or that industrialists should be elevated to the nobility.⁶²

Several authors considered the Western system of ensuring property rights for inventors as key to the success of the West and should therefore be emulated in China.⁶³ They argued that without patent legislation in China, the West would continuously lead in technical innovation, and China would never catch up.⁶⁴ In one instance, the importance of patent rights was spelled out in detail. In an account that here and there runs counter to the understanding of historical facts, Chen Chi (1855-1900)⁶⁵ narrates the story of the 'simple copper smith' (*tonggong* 銅工) Krupp, who learned advanced gun-making technology in France with the consent of Napoleon Bonaparte. France was the first country where the inventor's patent rights were protected by law, which for a while made it the leading power in Europe. When Krupp presented his breech-loading gun (sic) to the German ruler, he was richly rewarded and given nobility status. In the German-French war [1870], Krupp's guns defeated the French. Thus, it was the invention of 'a small copper manufacturer' rather than military prowess and diplomatic skill that decided the victory.⁶⁶ Chen Chi concludes that the only way for China to rise out of its backwardness was to promote industry, and the first step in promoting industry was patent legislation. In this account, which contains several counterfactual points,⁶⁷ the author directly addressed the emperor

61 Ying Zuxi, 'Promoting the industries and opening commerce', Collection 9, chap. 12, part 5, sect. 8 (<http://ctext.org/wiki.pl?if=gb&chapter=874265>), demands the option to confer official positions to merchants and artisans. 'A theory on Chinese and foreign wealth and poverty, similarities and differences', Collection 7, chap. 106, fol. 32a more specifically calls for official status for the most skilled technicians.

62 Xue Fucheng, 'A theory on promoting crafts and industries', Collection 5 (1898), chap. 63, fol. 3b.

63 'On attaching importance to crafts and industries' ('Zhong gong lun' 重工論), anonymous author, Collection 8, chap. 42, sect. 18 (<http://ctext.org/wiki.pl?if=gb&chapter=464464>), parallel in Xue Fucheng, 'A theory on promoting crafts and industries', Collection 5 (1898), chap. 63, fol. 3b.

64 'Suggestion to all provinces to enlarge their official manufactories', Collection 7, chap. 87, p. 8b.

65 As a middle echelon official in the Ministries of Revenue and Justice and Secretary in the State Council, Chen Chi studied Western affairs and recorded his ideas on economic and administrative reform in *Yongshu* 庸書 (A commonplace book, 1893) and *Xu fuguo ce* 續富國策 (Sequel to 'Strategies for enriching the country', 1896). Together with Kang Youwei he organized the 'Study association for (national) strengthening' (Qiang xue hui 強學會). Wang Yantao, 'Chen Chi de jingji sixiang', p. 183.

66 Chen Chi 陳熾, 'A theory on fostering industries and strengthening the country' ('Quan gong qiang guo shuo' 勸工強國說), Collection 6, chap. 9, fol. 2b.

67 For instance, the technology that the Krupp family developed was steel casting rather than copper manufacture, and cannon rather than gun fabrication. Although not impossible, it seems improbable that (Friedrich) Krupp (1787-1826) saw Napoleon in person, as in Chen Chi's narrative. It was not Friedrich but his son Alfred Krupp (1812-1887) who successfully presented

and the central government. Therefore he stressed the acknowledgement that Western artisans who had become manufacturers and industrialists received from their rulers and underlined the risk that all rulers run if they do not give their utmost attention to such industries.

Finally, many of the statecraft writings express the hope of retrieving profits lost to Western countries trading in China. For this reason, they point to Western models of industrial promotion and the protection of property rights. In this sense, Xue Fucheng points out:

If we disregard what the Western people esteem highly, then the extreme wealth produced in China will gradually flow overseas, China will become poorer and weaker every day, and the West will become richer and stronger every day – and this is what the Westerners keenly desire.⁶⁸

To conclude this review of perceptions of the concept of the four occupational groups, we should add that even the late collections of statecraft writings contain articles that insist that there were far too few farmers, and that the other three groups as well as the additional ten described by Yun Jing had increased disproportionately. One writer, who uses a pseudonym, advocated that several ten thousands of inefficient scholars and several millions of artisans 'who merely seek excessive refinement but are unproductive' and 'merchants who are not active in business' should return to working on the land. In his view, the government should concentrate on developing new agricultural land rather than on fostering trade and commerce.⁶⁹ However, this remains an exception embedded in a majority of accounts that call for a revision of rigid agrarianism, in the spirit of Confucius, 'the sage whose actions were timely.'⁷⁰

breech-loading cast steel cannons to the Prussian king Wilhelm I. Furthermore, while Friedrich in his final years had all but driven the family business into ruins, the Krupps, having been members of the Essen notables since the seventeenth century, and in particular Alfred Krupp, were hardly 'small copper smiths'. See William Manchester, *Krupp*, p. 37 ff.

68 Xue Fucheng, 'Explanation on the English use of merchants to open new lands' ('Yingjili yong shangwu pi huangdi shuo' 英吉利利用商務闢荒地說), Collection 5, chap. 74, fol. 4b. See also 'Written after the inauguration of an industrial school', Collection 7 (1901), chap. 87, fol. 8b; 'Suggestion to all provinces to enlarge their official manufactories', Collection 7, chap. 87, p. 8b.

69 Gu'an zi 古庵子 'On the four occupational groups' ('Simin lun' 四民論), Collection 7, chap. 106, fol. 16a.

70 'Extension of the theory on the four occupational groups' ('Guang simin lun' 廣四民論), Collection 7, chap. 106, 16b to 17a. For the quote from *Mengzi* 孟子, 'Wanzhang' B, see the translation by D.C. Lau, *Mencius*, p. 150.

The concept of the four occupational groups was applied even at a time when it may have seemed outdated and even by the reformers of the day who invoked it to call for industrialization and the promotion of commerce: 'The wealth of the country is stored in four big chambers. The first are the scholar-officials, the second the farmers, the third the artisans, the fourth the merchants.'⁷¹

Concept and Reality

How close is such reasoning to the realities of society, and what, in particular, does it tell us about the actual social position of the craftspeople?

The observed texts variously touch on the relationships between the four occupational groups. Until the late nineteenth century, the dominant position of the scholars remained undisputed. Thereafter, the first critical voices were raised.⁷² Farmers were rarely mentioned in the texts after the fifth collection, and the focus shifted to the two other groups, which previously were conceived of as secondary or derived and now required 'promotion'. This comes as no surprise as far as the merchants are concerned. Several indicators show that the actual position of the merchants had risen in the course of commercialization since the Late Ming era.⁷³ The most important of such indicators was the possibility of participation in civil service examinations. In the Song period, merchants and artisans had been excluded from the examinations and consequently from taking office. But since the Ming dynasty, these discriminatory restrictions were lifted.⁷⁴ In order to attain greater acceptance by the political elite, the merchants adapted to the norms of the scholar-official class by acquiring knowledge of the Confucian scriptures that formed the canon for official examinations, and in addition to that emulated the lifestyle and fashions of the 'high-cultural' circles.⁷⁵

71 Ying Zuxi 應祖錫, 'Promoting the industries and opening commerce', Collection 9 (1902), chap. 12, part 5, sect. 8 (<http://ctext.org/wiki.pl?if=gb&chapter=874265>).

72 Xue Fucheng, 'A theory on promoting crafts and industries', Collection 5, chap. 63, fol. 3a/b; 'A suggestion that China should open additional training centers for the industries', Collection 8, chap. 42, sect. 18 (<http://ctext.org/wiki.pl?if=gb&chapter=464464>).

73 Lufrano, *Honorable Merchants*, p. 37.

74 Ho Ping-ti, *The Ladder to Success*, p. 42; Miyazaki Ichisada, *China's Examination Hell*, p. 19, mentions only restrictions as to 'base occupations' such as running brothels, and that the candidate needed a guarantor for his personal respectability, but not – if he was a commoner – a certificate of his ancestors' occupation. See also Lufrano, *Honorable Merchants*, p. 38.

75 See, for instance, Brook, *Confusions*, p. 128, for the mid-Ming Huizhou merchants based at Yangzhou. Compare also Antonia Finnane's more sceptical approach to the question whether Huizhou merchants in Yangzhou actually were an exemplary and representative case of 'blurred

The merchants did not create a dominant culture of their own that would have superseded that of the learned classes with privileged access to state office. Antonia Finnane perceptively remarks that the wealthy merchants of Yangzhou had their portraits made in their gardens, showing them pursuing elegant pastimes rather than doing business in their counting houses.⁷⁶

As we have seen, orthodox representatives of the state and the scholar class wished to limit the influence of this group and hence invoked the ideal of an agrarian society. However, after the Opium Wars and the Taiping Rebellion, with the enlarged export and import markets, business opportunities broadly increased, commercialization intensified, and buying official titles and examination degrees became a frequent practice among merchants.⁷⁷ Moreover, Western values spread in post-Opium-War China, especially Protestant utilitarianism, and this contributed to more appreciative views of profitable commercial business.

When reformers called for a wider recognition of the positive contribution of merchants to society, an innovative form of business organization – the so-called 'official-supervised, merchant-managed' enterprises – emerged, where merchant know-how and capital was invested under official patronage. Together with the arsenals and dockyards, these were the greatest modern companies established in the second half of the nineteenth century.⁷⁸ Some of the statecraft writers such as Zheng Guanying (1842-1922)⁷⁹ were actively involved in such companies.

The position of artisans, if seen from their legal chances of receiving a higher education, was formally equal to that of the merchants.⁸⁰ However, the examples of artisans who rose to fame and high social status only on basis of their skills are few and far between. There have always been the

boundaries' between social groups, that is, between scholar-literati and merchants in her *Speaking of Yangzhou*, pp. 253-264.

76 Finnane, *Speaking of Yangzhou*, p. 264.

77 Naquin and Rawski, *Chinese Society*, p. 221.

78 Feuerwerker, *China's Early Industrialization*, p. 9, lists as examples and models for late Qing industrial and commercial enterprises the China Merchants' Steam Navigation Company (1872), the Kaiping Coal Mines (1877), the Shanghai Cotton Cloth Mill (first planned 1878, later the Huasheng Cotton Mill), the Imperial Telegraph Administration (1881), the Moho Gold Mines (1887), the Hanyang Ironworks (from 1896), the Daye Iron Mines (1896), the Imperial Bank of China (1896), and the Pingxiang Coal Mines (1898).

79 Zheng had pursued classical studies in his youth but did not pass official exams. He learned English at an Anglo-Chinese school in Shanghai, and in 1860 entered an English trade company at age seventeen, where he worked as a 'comprador' before setting up his own business. Like many other merchants, he acquired official rank by purchase. See Feuerwerker, *China's Early Industrialization*, p. 116, and especially Johannes Kehnen, *Cheng Kuan-ying*, p. 18 ff.

80 Lufano, *Honorable Merchants*, p. 37.

big names, especially in palace architecture. In the Ming era, some of these builders rose to official status, like Xu Gao, who became Minister of Public Works in 1562.⁸¹ However, as Clunas remarks, throughout the Ming period it was noted with disapproval when persons of artisan backgrounds were elevated to high government positions, as these were reserved as the domain of the learned classes.⁸² During the Qing era, palace architects were never to rise as high as that. Lei Jinyu (1659-1729), the patriarch of the most renowned family of palace builders in the Qing, acquired a rank and official salary of the seventh grade of nine,⁸³ which was much lower than a minister, who ranked grade 2a in the Ming. The 'Record of outstanding artisans' (*Zhejiang lu*), which portrays the efforts of the Lei family in the chapter on Qing architects, includes short biographies of 42 builders. Most of them were mid or high level officials, and except for the Leis, only two other persons are explicitly described as artisans. All the others 'supervised' rather than engaged in manual efforts and arrived at their leading positions in the traditional way of official examinations rather than by professional craft training.⁸⁴

Other cases known from the late Ming or Ming-Qing transition when artisans rubbed shoulders – or, as the Chinese expression goes, 'sat together and exchanged greetings' – with the high-cultured circles was when they produced luxury items like carved bamboo, lacquers, bronzes, and ceramics. Elite customers treasured those wares as proofs of their connoisseurship, but this did not mean that the status of artisans rose to equality with the scholars or even with the merchants who could afford such art objects.⁸⁵

Until the very late Qing period, the most feasible path of upward mobility for artisans must have been to acquire enough wealth to enter commerce, with the option of studying the prescribed curriculum for the state examinations or to purchase office. Clues that artisans tried to enter commerce can be found. For instance, a French Jesuit missionary who visited the Jingdezhen porcelain production centre wrote in 1710: 'Although for one artisan who gets rich, a hundred ruin themselves, they will always try their fortune in the hope to accumulate enough money for opening a shop of their own one day.'⁸⁶ More examples of this trend are given in the chapters on shipbuilding

81 Klaas Ruitenbeek, 'The Rebuilding of the Three Rear Palaces in 1596-1598' and 'Building Regulations (*Zeli*) and their Context', p. 189.

82 Clunas, *Superfluous Things*, p. 147.

83 Zhu and Liang, *Zhejiang lu*, in *Zhongguo yingzao xueshe huikan* IV/1 (1933), p. 84.

84 *Ibid.*, pp. 83-115.

85 Clunas, *Superfluous Things*, pp. 61-62. See also Angela Hsi, *Social and Economic Status of the Merchant Class*, p. 143.

86 Père d'Entrecolles, 'Lettre', p. 202.

and printing. From the numerical evidence, merchants' guilds as bodies of self-organization seem to outnumber craftspeople's guilds, and authorities also seem to have taken more authoritarian measures against artisan guilds than against merchant guilds.⁸⁷ In Hankow, the 'Upper Eight Guilds' (*shang ba hang*) were those of 'the most lucrative commercial trades of the city: copper and lead dealers, piece-goods dealers, medicinal herb dealers, paper dealers, Shanxi bankers, pawnbrokers, vegetable oil dealers, dealers in miscellaneous commodities', while the 'Lower Eight Guilds' (*xia ba hang*) referred to the handicraft workshops (*zuofang*).⁸⁸

The opinion that commerce relied upon manufacturing and that therefore craftspeople should rank above the merchants was formulated for the first time in the late statecraft writings.⁸⁹ It stands to reason that such ideas were articulated most decidedly in texts that deal with institutions of vocational training that were founded as a key part of the Qing government's efforts to promote industry, i.e., the schools and official model factories that were opened between 1902 and 1909 in Beijing and the provinces.⁹⁰ The last of the statecraft collections contains the statutes for the Peking Reconstruction Craft Centre,⁹¹ which offer more concrete insights into the labour force than the more exhortative and abstract texts. This centre formed the core of a government employment programme for reconstruction after the devastations of the Boxer Rebellion (1900/1901). The statutes explain that: 'The four groups lost their occupations after the Western powers invaded Peking to fight the Boxer Rebellion.' The centre therefore was intended not only for people originally from Peking but also for those who had fled the turmoil in their home regions and caused the population in the capital to swell from around 700,000 to two million.

Except for merchants, officials, and soldiers, there are basically two ways of earning one's living: 'eating from one's strength', which the Westerners call 'workers', and 'eating from one's skill', which the Westerners call 'technicians'. Most of the physical labourers are domestics, rickshaw pullers, water carriers, and mason's helpers. Most of the skilled labourers

87 Timothy Bradstock, *Craft Guilds in Ch'ing Dynasty China*, pp. 63-64.

88 William T. Rowe, *Hankow*, p. 332.

89 'Written after the inauguration of an industrial school'; 'Suggestion to all provinces to enlarge their official manufactories', Collection 7, chap. 87, fol. 8b; 'On the importance of the industries', Collection 8, chap. 42, sect. 14 (<http://ctext.org/wiki.pl?if=gb&chapter=464464>).

90 Peng Nansheng, 'Wan Qing shougongye jingji zhong de zhengfu xingwei', pp. 51-52.

91 Huang Zhonghui, 'Statutes for the Peking Reconstruction Craft Center' ('Chuangban Beijing shanhou gongyi ju shuo tie' 創辦北京善後工藝局說帖), Collection 10, chap. 9, p. 6b to 7b.

are carpenters and masons. Moreover, there are people from various craft branches in town, certainly not below several hundred thousands, but they are all migrants, not local people. They originally led a secure life, but came to our city because of the foreign attacks and have lost all their belongings. Some of them have become criminals. In order to prevent further illegal actions, it was suggested to establish several reconstruction offices. [...] Three groups of people can be allowed into the center: 1) Those who originally have learned a craft. These are the foremen who teach the others. 2) Young and clever persons will be taught by the foremen such crafts as: cotton weaving, belt weaving, embroidery, ivory or wood carving, cloisonné making. 3) The unskilled, old and young and crippled can weave mats, make ropes, brooms and brushes and do all simple and rough jobs.

The plans for the centre foresaw that the objects produced should be typical Peking arts and craft products that were in demand by foreign customers, but crafts that were so far unknown in China could also be introduced.

It would be unfair to end this account with an institution devoted to poverty reduction and crime prevention rather than with the modernization and mechanization of craft production. For the statecraft writings also contain texts on technical schools with higher ambitions of teaching the theory of mechanics in order to enable, in the second phase of instruction, practical and ingenious constructions.⁹² The most famous among these are the schools of the Fujian Navy Yard and the Jiangnan Arsenal discussed in the previous chapters. China's economy was on the road to industrialization by the early twentieth century, and the reformist intellectuals perceived the necessities of the times. The government in its last years tried to develop new administrative structures that were intended to accommodate and foster commerce and industries in 'modern' ways.

The Place of the Female Artisan

The concept of the 'four groups' is not gender specific. Since it aimed to classify the ruler's subjects in a general sense, it sets out from the perspective

92 'Written after the inauguration of an industrial school', Collection 7, chap. 87, p. 8b; 'Suggestion to all provinces to enlarge their official manufactories', Collection 7, chap. 87, fol. 9a/b; 'On the importance of the industries', Collection 8, chap. 42, sect. 14 (<http://ctext.org/wiki.pl?if=gb&chapter=464464>); 'Suggestion that China should open additional training centers for the industries', Collection 8, chap. 42, sect. 18 (<http://ctext.org/wiki.pl?if=gb&chapter=464464>).

of households rather than individuals. While in the Qing dynasty, male sojourning was a frequent practice, the female artisan's place was in her family.⁹³ Within an extended family, a married woman's chances of rising to a managing position depended on the relative position of her husband within the birth hierarchy and the number of sons she bore, her relation to the mother-in-law but also, and not least, on her personal skill in the craft production. As Susan Mann has convincingly argued, the custom that girls and women 'begged for skill' *qiqiao* on the seventh day of the seventh lunar month stems from the hope for continuous work efficiency and, consequently, for a good income to support oneself and the family.⁹⁴

The trades in which women engaged lay mainly in the textile sector, such as spinning, weaving, and embroidery, or were related to processing any cash crops the family might produce or raw materials that were locally available, such as cotton, silkworms, bamboo, and wood for paper production and carving printing blocks, sugar production, or tea curing.

Both Mann and Bray have discussed how the Qing state also tried to control male and female occupational patterns.⁹⁵ According to state orthodoxy, which drew on ancient models, the right type of complementary work for peasant couples was silk and hemp spinning and weaving for women, and grain production for men.⁹⁶ Since the late Ming era, this basic pattern was discontinued in many regions because weaving cotton proved so profitable that entire families would engage in it, with the husband at the loom and the wife spinning, or in the case of silk production, reeling the silk. In other regions, women worked in the fields. This seemed disquieting to the Confucian elites, because it was the beginning of a specialization that implied that farmers could become artisans or merchants.⁹⁷ In the perception of the elites and the government, in an agricultural family the occupation of the male head of the household was in agriculture, even if women and children earned incomes from craft production for the commercial sector. The transition from a farmer to an artisan took place when the men in the

93 Francesca Bray, 'Towards a Critical History', pp. 187-188, citing from *Shenshi nongshu* 沈氏農書, reports that rural landlord households hired women by the year to weave cotton. The extent to which this was practised and organized is not discussed, but since food for these women was accounted for one year, they probably lived with the family of their employer. Urban weaving households, according to Bray, p. 189, hired only men and paid daily wages.

94 Mann, 'Women, Families and Gender Relations', pp. 464-465, who coined the phrase 'managed daughter-in-law' and 'managerial mother-in-law' for the power relations within families of male sojourners.

95 Mann, 'Household Handicrafts and State Policy in Qing Times'.

96 Bray, 'Towards a Critical History', p. 193.

97 *Ibid.*, pp. 190-203; Bray, 'The Meaning of Work'.

family gave up farming. It is from this perspective that the gender issue also plays a role in the stability of society, which was believed to rely on an ideal numerical relation of the 'four groups'.

Conclusion

The concept of the 'four groups of the people' appears to have remained immutable throughout the imperial period, despite the fact that more occupational groups than those four existed at all times. By itself, the concept was not devised as an instrument for a comprehensive social analysis of all the ruler's subjects but for monitoring the balance between the agricultural part of the population – which was the most important for the revenue of the state – and the rest, who were also deemed potentially more dangerous to social stability. Assuming that governments had the power to restrain or control occupational structures, political counselors from the fourth century B.C. included the additional idea that the non-agrarian and non-administrative occupations were 'derived' and 'secondary'. This ranking was disputed and re-evaluated in certain periods, and it was finally rejected by the reformers of the late nineteenth century. Nevertheless, reformist circles invoked the concept of the four occupational groups in order to demand a greater appreciation for the manufacturing and commercial occupations as well as a thoroughgoing revision of the educational system. This, they claimed, was the only way to ensure wealth and self-assertion against Western and Japanese encroachments on the Qing empire.

Some indicators – such as the opportunity to attend Confucian schools and to participate in state examinations since the Ming period, and the fact that since the mid-Ming era artisans were no longer registered as subjects obliged to render *corvée* service – show that artisans' legal status was improving. Nevertheless, artisans who did not produce luxury items or work as court architects found it nearly impossible to rise to prominence, and their work was considered 'menial' by the more articulate elite. Their opportunities for upward mobility, if they existed at all, lay in commerce and from there, if their finances allowed it, to learning. Thus, although they ranked third in the hierarchy, they were in fact worse off than the merchants.

Philip Kuhn has observed that the 'four occupational groups' is the closest of all Chinese concepts to the medieval and early modern European model of the three classes or three estates.⁹⁸ Both notions do indeed group the ruler's

98 Kuhn, 'Chinese Views of Social Classification', p. 20.

subjects according to their occupations, but the differences in substance outweigh the similarities in structure. The European medieval concept of *oratores, defensores, laboratores* – or clergy, nobility, commoners – as in early modern France, does not differentiate between those engaged in gainful work for subsistence or profit, as does the Chinese model of farmers, artisans, merchants. In the *simin* concept, the military element is completely missing, and the religious function of the clergy is not quite parallel to the more moral and political obligations of the Chinese scholars. The French estates had explicit political and economic functions and rights in the state. This was not the case in Ming and Qing China, where it would have been unthinkable for elected representatives of the four occupational groups to assemble before the emperor and deliberate on fiscal matters and other grievances. The question posed by the Abbé Sieyès (1748-1836) 'Qu'est-ce que le Tiers état?'⁹⁹ would have been meaningless in the Chinese context, since at least the 'last' three of the occupational groups constituted the commoners that were combined in the European third estate. Although the French Revolution of 1789 and the ousting of the Qing dynasty in 1911 were both the result of the struggle of majority groups for greater political participation and coincided with the beginning of industrialization, the preconditions of social formation were obviously not equal.

The reformists from the 1880s on appealed to the government for a greater appreciation of craftsmen and technical producers within the four occupational groups. However, in the political arena, this concept was invoked by one of the harshest opponents of the imperial system, Liang Qichao (1873-1929), to drive home another message. In 1902, while in exile in Japan, he noted that there was no problem with equality among the four occupational groups because a class system with special prerogatives had not existed in China since the period of the Warring States. While labour issues might arise in future days, he did not see this occurring anytime soon because the industrial production sector had not yet been developed. In his analysis, China's most pressing problems were a lack of general political participation and the building of a nation-state.¹⁰⁰ As a result, appeals that would have pitted occupational groups against each other were not taken to battle when the Chinese monarchy was brought to fall in the 1911 revolution.

99 Emmanuel Joseph Sieyès, *Qu'est-ce que le Tiers état?*

100 Liang Qichao 梁啟超, *Xinmin shuo* 新民說 ('On the new people'), chap. 'Lun ziyou' 論自由 ('Discussion of liberty'), pp. 40-42. For other references by Liang Qichao and related authors to the four occupational groups as representatives of the entire 'people', see Janku, 'Preparing the ground', p. 103, 105, 107, 111.

10. Merchant and Craft Guilds¹

While the previous chapters addressed the relationship between the state and artisans from the perspective of the concerned state institutions and specific branches, we now turn our attention to the modes of organization of representatives of the crafts and their interaction (or avoidance of interaction) with state authorities at the local level. Chinese associations of merchants and artisans that are commonly referred to as ‘Chinese guilds’ originate from the late sixteenth century. Initially, they were alliances of travelling merchants who, due to the intensified interregional trade and geographic mobility, had settled down in the regions of their sales markets. Guilds exclusively for craftspeople existed, but in many cases the division between both can barely be made.

Unlike their counterparts in most European countries which were disbanded in the late eighteenth and early nineteenth centuries, Chinese guilds proliferated from the mid-eighteenth century onward, and their numbers soared after the intercession of the Taiping rebellion and the Opium Wars in the mid-nineteenth century. They began to decline during the last decade of the Qing dynasty, superseded by chambers of commerce that were promoted in the state’s economic and political reforms. Subsequent governments of the Republic of China, both at Peking (1912-1927) and Nanjing (1927-1937), first launched branch-specific commercial and industrial associations and eventually ordered the re-organization of the traditional guilds. Although this command was formally implemented, various transitional modes and arrangements lingered on until the foundation of the People’s Republic in 1949.

This chapter gives an outline of the rise and spread of the guilds, their typologies and functions and their relationship to the government, power relations within the guilds, and finally their transition in the twentieth century within the framework of the increasingly active involvement of the state in the economic sphere in the course of the late Qing and early Republic.

Origins and Typology of Chinese Guilds

Early types of urban business associations (*hang* ‘[business] street/line’, *zuo* ‘manufacturers’ or ‘workshops’, *tuan* ‘associations’) had been established

¹ This chapter is partly based on the author’s article ‘Chinese Guilds, Seventeenth through Twentieth Centuries: An Overview’.

by government order since the eighth century.² These organizations served to recruit artisans for public works and to coordinate the delivery of taxes-in-kind by the merchants, and also to maintain urban security. As the cities expanded, the concept of one trade line per street could no longer be maintained. This may have led to the formation of voluntary merchant associations beyond the government-ordered restrictions.³ However, while the guilds from the mid and late Ming period onwards published and perpetuated their regulations in stele inscriptions, no comparable epigraphy exists for the earlier periods. Scattered evidence suggests that the meeting places of the early trade associations were temples, such as the temple of the silk-loom god established between 1078 and 1085 in Suzhou. The earliest reference to a *gongsuo* (public hall), that of the silk weavers of Wu Prefecture (Suzhou), dates from 1295.⁴

The link between these early guilds and those founded after the mid-Ming is tenuous. In their epigraphic writings, the Ming and Qing guilds do not claim origins earlier than the late Ming.⁵ Although the new type of guilds from the sixteenth century still coordinated the merchants' and artisans' obligations to the government, their main purpose was to regulate access to markets and homogenize business opportunities for their membership.

One early instance of such a new guild may be found in the fifteenth century,⁶ but more solid evidence is available from the Wanli era (1573-1619). The names of twelve Ming dynasty guild houses – nine of which were located in Peking and one each in Hunan, Suzhou, and Foshan (near Canton) – are known.⁷ Nine were expressly entitled *huiguan* (houses of assembly), and with the exception of the potters' guild in Foshan, they were all merchant guilds.

The *huiguan* were based on the membership criterion of common geographic origin. Another important form of trade association was based on the principle of common occupation and most often designated as *gongsuo*

2 Peter Golas, 'Early Ch'ing Guilds', pp. 555-557.

3 Katō Shigeshi, 'On the Hang or Associations of Merchants in China', pp. 45-83. Compare also Shiba Yoshinobu, *Commerce and Society in Sung China*, p. 2, who characterized the change from the Tang to the Song guilds as a transformation 'into something more nearly approaching an autonomous trade association.'

4 Guo Rongdong, 'The Silk-Weaving Craftsmen in Suzhou', p. 10.

5 Golas, 'Early Ch'ing Guilds', p. 555.

6 Michel Marmé, *Suzhou*, p. 137, for a reference to a 1466 foundation of a guild of cotton cloth merchants from the Jiangsu districts Jiading 嘉定, Kunshan 崑山, and Suzhou, at Linqing 臨清, an important entrepôt city on the Grand Canal in Shandong.

7 Peng Zeyi, *Zhongguo gongshang hanghui*, 'Short table of the Chinese craft and commercial guilds, 1655-1911', pp. 997-1048; hereafter 'Short table'.

(public hall). For the *gongsuo*, common geographic origin could play a role but was not a necessary requirement. Other designations for guilds were *bang* (literally, mutual help associations) or *shuyuan* (Confucian academy), named after their places of assembly, or houses of Daoist and popular religious worship.

Generally speaking, the earlier guilds were more of the *huiguan* type, while in later periods the *gongsuo* prevailed. Some *huiguan* guild houses in Suzhou were renamed *gongsuo*, with the specification of their particular trade. The guild historian Liu Yongcheng believes that this occurred because the common origin set too narrow limitations on the activities of merchants and craftsmen in one trade.⁸ However, the opposite trend that several *gongsuo* combined into a *huiguan* was also possible.⁹ Wang Rigen defines the difference between *huiguan* and *gongsuo* as one of scope: *huiguan* were larger, and within *huiguan*, several *gongsuo* could exist. *Huiguan* were more formal organizations, and their demands on their members regarding representation and contribution were higher than those of the more informal *gongsuo*.¹⁰ The *huiguan* served not only economic purposes. On the contrary, they were first established as meeting places and hostels for officials on duty away from their home places, and for students preparing for official examinations on different levels – local, regional, provincial, or imperial in Peking. Peking was the city with the most *huiguan* – more than 400 – but only a fraction thereof were used predominantly as assembly houses for merchants and craftspeople.¹¹ From Peking we also find a case where scholar-officials and merchants preferred to keep to themselves, as was the case with the Guangdong merchants who in 1712 built a *huiguan* of their own, the Xiancheng *huiguan*, and moved out of the Canton *huiguan*.¹² However, since merchants and scholar-officials relied on each other for power and finances, *huiguan* were also the places where both parties could easily get together if they wished.¹³

8 Liu Yung-ch'eng, 'The Handicraft Guilds in Soochow', pp. 124-125.

9 For instance, the Timber merchant guild in Shanghai, Mushang *huiguan* 木商會館, established in 1858, that was first a *gongsuo* and in 1897 changed its name to *huiguan* ('Short table', p. 1019).

10 Wang Rigen, *Ming Qing minjian shehui de zhixu*, pp. 186-187.

11 Li Hua, *Ming Qing yilai Beijing gongshang huiguan beike xuanji*, p. 20, estimates that 86 percent of the Peking *huiguan* houses were established as hostels and meeting places for scholar-officials. See also Belsky, *Localities*, pp. 59-60.

12 Li Hua, *Ming Qing yilai Beijing gongshang huiguan beike xuanji*, p. 1; Wang Rigen, *Ming Qing minjian shehui de zhixu*, p. 183; Belsky, *Localities*, pp. 91-92.

13 Wang Rigen, *Ming Qing minjian shehui de zhixu*, pp. 186-187.

A marked difference between Chinese and European guilds is the fact that it was not necessary to be a formally registered citizen of a particular city or place in order to become a guild member. Instead, the Chinese guilds – at least for the *huiguan* type – required that members belonged to a particular place of origin.

Not all guilds or proto-guilds disposed of guild houses, written regulations, and official recognition.¹⁴ The guilds that featured all three criteria were mostly founded or re-organized in the late nineteenth century and showed a certain degree of organizational sophistication.

Distribution in Space

An essential statistical overview of Chinese guilds is the ‘Short table of the Chinese craft and commercial guilds, 1655-1911’,¹⁵ which contains a list of ca. 600 dated and 130 undated guild houses and associations. Since few stele inscriptions were considered for its compilation, it is certainly not complete and requires enlargement,¹⁶ but we can assume that it gives a first impression that is not too far off the mark for features such as distribution over time and space as well as the regions of origin of the guild members. According to this list, guild concentration was the highest in the Lower, Middle, and Upper Yangzi (the provinces of Jiangsu, Hubei, Hunan, and Sichuan which include the cities Suzhou, Shanghai, Changsha, Hankou, and Chongqing respectively) and along the coastline in Guangdong, Guangxi, Fujian, Zhejiang, Zhili, and Fengtian. These were the economically most advanced areas with the most treaty ports in the second half of the nineteenth century. The inland regions such as Sichuan, Jiangxi, and Yunnan but also the northwestern and northeastern frontiers such as Inner Mongolia¹⁷ and Manchuria appear to have been quite underrepresented. It is probable that the existence of many more *huiguan* with economic functions will come to light as research in Chinese local archives and field research intensifies.¹⁸ Further research and statistical compilations have so far reached a total of more than 2,800

14 Peng Nansheng observed that ‘trades without associations and associations without regulations’ were a common phenomenon. Peng Nansheng, *Hanghui zhidu*, p. 22.

15 Peng Zeyi, *Zhongguo gongshang hanghui*, pp. 997-1048.

16 Vincent Goossaert, ‘Matériaux et recherches’, p. 210.

17 See the epigraphic materials contained in Imahori Seiji’s survey on the social groups of Hohhot, *Chūgoku hōken shakai no kikō* (The structure of feudal Chinese society).

18 Lan Yong, who studied the *huiguan* in Sichuan province, based on written evidence and field research has arrived at a number of 1,400 houses (Lan Yong, ‘Qingdai Sichuan tuzhu yimin

guilds of all types, including both the more economy-orientated merchant and craft guilds and guilds with social and administrative functions.¹⁹

Typical outsending regions, which can best be observed by the names of guild houses of the *huiguan* type, were the coastal provinces of Guangdong, Zhejiang, Fujian, Jiangsu, Shandong, and Zhili as well as the home provinces of the famous local bankers, the Shanxi merchants, and the wealthy salt traders, the Huizhou merchants from Anhui.

Merchant Guilds and Craft Guilds

As we have seen, the earliest guilds were merchant associations. The first Shanghai guild, for instance, was the shipping merchant guild house, Shangchuan huiguan, which was established in 1715.²⁰ This was one of the richest and most influential guilds in Shanghai, which was involved in the sea transport of grain tribute after the Grand Canal was no longer navigable. It was professionally organized, employing directors and monthly managers from 1844. All of the managers owned large fleets of merchant ships,²¹ mostly of the *Shachuan* type for coastal navigation. According to one stele, the costs of its renovation in 1891 – including big hall, drum and bell tower, southern and northern aisle, tower, gate, and posterior wall – amounted to 2,304 British pounds, 106 Shanghai tael, and 118,000 cash.²² Between 1863 and 1868, its facilities were used as the Jiangnan Arsenal's office buildings.²³ While sixteen further shipping guilds are included in the 'Short table',²⁴ only two guild houses that expressly represented the Ningbo and the Zhejiang shipwrights are recorded.²⁵

fenbu de dili tezheng yanjiu', and personal conversation with the author, October 2007), while Richard Belsky, *Localities at the Center*, p. 37, records only 586 *huiguan* for Sichuan.

19 'Chinese Guilds Database' and 'Datasets – Guilds – China – Craft guilds: Report on the data collection', compiled by the author et al., Website *Institutions for Collective Action*, installed 2012.

20 'Short table', p. 1002.

21 Chen Zhongping, 'The Origins of Chinese Chambers of Commerce', p. 170.

22 *Shanghai beike ziliao xuanbian ji*, p. 196. For comparison, in the Shanghai embroiderers' and tailors' guild, a total of 154 members donated a sum of 406 Dollar (*yangyuan*), thus about ca. 304 tael (*Shanghai beike ziliao xuanbian*, p. 301-304). The exchange rate of the British pound to one tael in 1891 was about 0.22 (Peng Xingwei, *A Monetary History of China*, p. 763). 2,304 pound would thus amount to over 10,000 tael. This is more than thirty times of what the embroiderers and tailors could afford.

23 'Shanghai zui zao de huiguan'.

24 'Short table', p. 1003-1046.

25 The 1853 Zhejiang red network of ship carpenters, Zhejiang hongbang muye gongsuo 浙江紅幫木業公所, 'Short table', p. 1018, and the Siming muye changxing hui 四明木業長興會, 'Short table', p. 1018.

Regarding the division between commercial and craft guilds, a clear categorization is often more difficult for craft guilds than for unequivocal merchant guilds like those of the shippers or bankers. With roughly 250 commercial guild houses and 250 craft or both craft and commercial guild houses, by far not all entries in Peng Zeyi's 'Short table' allow for a clear-cut attribution to one or the other. However, Peng's tabulation is not the last word on the quantity and distribution of Chinese guilds. Therefore, the result of an almost equal number of exclusively merchant and craft guilds can only be tentative. Burgess' study on the Peking guilds in the 1920s, for which he and his team conducted field research in the guild houses, has about the same half-half ratio with 40 craft, 60 commercial, and 11 'professional' guilds of the service trade.²⁶ Yet Li Hua, in whose opinion the specialization of Chinese craft and commercial guilds occurred extremely late, claims that among the 36 (sic) pre-Opium-War craft and commercial guilds in Peking, 25 were exclusively commercial guilds, 13 were both commercial and craft guilds, one was both agricultural and commercial (the vegetable traders' guild), and only one was an exclusively artisan guild.²⁷ This may be a problem of conflicting definitions. Nevertheless, Li Hua's observation for Peking corroborates our view on the importance of the merchant image for craftspeople.

Niida Noboru, a Japanese specialist on Chinese law and society, also pointed out the difficulty of differentiating between merchant and craft guilds in his monograph on the Chinese guilds. He discussed the different types of crafts in Peking that produced on demand only and therefore can be considered 'pure' handicraft guilds, such as the building trades, hairdressers, and some shoemakers, while others maintained a stock that they sold throughout the year, such as the sheep hide tanners.²⁸ For Niida, who throughout his book took a comparative perspective, the difference between the merchant and craft guilds was not as marked in China as in Europe.²⁹ He maintained that in Europe, especially in Germany and Holland, the merchants gradually forced the craftsmen out of the guilds due to their contempt for the latter's 'dirty hands' and 'blue fingernails'. The craftspeople thereafter established their own guilds and fought with the merchants for political participation in the municipal governments in what was known as the 'Zunftkampf' (battle of the guilds). Niida thought that the Chinese guilds could 'not even dream' of having the same prerogatives in municipal

26 John S. Burgess, *The Guilds of Peking*, p. 119-120.

27 Li Hua, 'Lun Zhongguo fengjian shehui de hanghui zhidu', p. 107.

28 Niida Noboru, *Chūgoku no shakai to girudo*, pp. 46-48.

29 *Ibid.*, pp. 45-46.

administration as their European counterparts.³⁰ This view requires some qualification. The Dutch guild historian Maarten Prak posits that conflicts among the guilds of the Low Countries occurred not so much between craft and merchant guilds but between the rich guild members and the poor within the same guild, or between the non-affiliated urban elites and the guilds.³¹ Guilds and elites were united in their aim to preserve ‘political autonomy [from princes and ministers] for their local community’ and ensured that working classes were kept excluded from local governments.³² Moreover, in more recent German historiography, the opponents in the struggle for political participation are not simply reduced to ‘guilds’ and ‘patricians’, and the term ‘urban conflict’ (*Stadtkonflikt*) is preferred to ‘guild conflict’.³³ For the Chinese context, William Rowe’s research on Hankou identifies the guilds of that city from the late nineteenth century as the unofficial city government that wielded great power. After the revolution broke out in October 1911, the city was actually administered by the ‘All-Hankou Guild Alliance’ (*Ge huiguan gongsuo lianhe hui*), an association that had evolved from earlier, pre-Taiping networks – the ‘Upper Eight Guilds’ (*shang ba hang*), to be precise, of the merchants, not the artisans.³⁴ Earlier, in the city of Chongqing in Sichuan on the Upper Yangzi, an eight-province guild house network had formed that also had largely taken over administrative functions from the municipal government. Niida was aware of these tendencies and also referred to the Chongqing case, but he stressed that the functions of the guilds were – like those of twelfth and thirteenth-century England – ‘supplementary’ to those of the urban administrations and not legally defined.³⁵ Thus, while Niida looks at the legal foundation of the guilds – inspired by Max Weber, Karl August Wittfogel, and Charles Gross³⁶ – Rowe considers their actual influence. It is no wonder that both arrive at different conclusions.

Concerning the late emergence of craft guilds relative to merchant guilds,³⁷ Timothy Bradstock has offered a plausible explanation in his study

30 Ibid., p. 46.

31 Maarten Prak, ‘Corporate politics in the Low Countries’, p. 105.

32 Ibid., p. 106.

33 Mathias Puhle, *Magdeburg im Mittelalter*, p. 85, with reference to Karl Czok, ‘Zunftkämpfe, Zunftrevolutionen oder Bürgerkämpfe?’, *Wissenschaftliche Zeitschrift der Karl-Marx-Universität Leipzig* 7, 1956/57, pp. 129–142.

34 Rowe, *Hankow*, p. 334.

35 Niida, *Chūgoku no shakai to girudo*, p. 51.

36 Charles Gross, *The Gild Merchant: A Contribution to British Municipal History*, Oxford 1890.

37 For the situation in the Low Countries, compare Bert De Munck, Piet Lourens, and Jan Lucassen, ‘The Establishment and Distribution of Craft Guilds in the Low Countries’, pp. 42–43, which gives 1400 as the date of the full maturity of the guild system and points out that ‘at

on Chinese craft guilds. Incidents from the early eighteenth century show that the Suzhou city administration denied unskilled workers the right to form a guild.³⁸ The rising number of the craft guilds in the eighteenth century may be attributed to the fact that guild managers and business owners became more prosperous and, unlike unskilled workers and journeymen, were able to establish better ties with officials, for instance by purchasing titles. From the perspective of the authorities, a knowledgeable and educated guild leadership was a reliable agent of self-control and the maintenance of propriety, including such functions as tax collection and the organization of public works.³⁹ The local authorities therefore allowed trusted craftspeople to form guilds under the leadership of the employers and shopowners in each trade, but they formally reserved the right to endorse guild regulations and in extreme cases also to dissolve the guilds. The craft guilds – like the merchant guilds – thus ‘filled a vacuum created by urban growth and the rise of commerce, one which the central government had neither the means nor the inclination to take responsibility for until the twentieth century’.⁴⁰

Functions and Internal Organization

The constitutive elements of Qing guilds are a common-interest group of merchants or artisans, a commonly owned or rented place of assembly, written regulations, and recognition by the local administration. The last three characteristics indicate the transition of a guild from informal to formal organizational status.⁴¹ Qiu Pengsheng outlines the process of formalization of the Suzhou guilds as follows: individual artisans or merchants mobilized colleagues to form a group on grounds of common homeplace, religious beliefs, and the necessity of mutual help. They raised funds for a meeting place and sought recognition from the local administration. In a second

first only merchants and woollen workers had guilds, within a few centuries a whole range of occupations had become organized, particularly in industry’.

38 The Suzhou calenderer’s strikes between 1670 and 1734 are well-explored labour incidents of the Qing dynasty and have been discussed by a great number of researchers. The stele materials that record the incidents are contained in *Ming Qing Suzhou gongshangye beike ji*, pp. 53-82. For relevant studies, see Terada Takanobu, ‘Soshū no tambogyō no kei’ei keitai’; idem, ‘Tambogyō ni kansuru hikoku’; Tsing Yuan, ‘Urban Riots and Disturbances’, pp. 279-320; Paolo Santangelo, ‘Urban Society in Late Imperial Suzhou’ pp. 81-116; idem, ‘Alcuni aspetti di vita urbana’, pp. 1-45.

39 Bradstock, *Craft Guilds*, p. 5.

40 Ibid., p. 6.

41 Rowe, *Hankow*, p. 257.

step, the group negotiated and formalized measures for the protection and use of its common property.⁴²

Like most craft and commercial associations worldwide, the Chinese guilds combined economic, social, and religious functions. In the economic field, guilds regulated prices and wages and tried to obtain monopolies within their territories by including all actors in the trade. As a rule, guild regulations stipulated that rather than keeping newcomers out, everybody in the trade should be forced into the guilds.⁴³ Another important task was to secure access to raw materials and training the labour force. Guild regulations most often fixed the duration of apprenticeship – three years as a rule – but did not specify the contents of professional training. The number of apprentices a workshop could take on was restricted and often limited to only one. The duration of the three-year apprenticeship actually regulated wage costs and work quality at least as much as the amount of skill that could be learned within that period.⁴⁴ Chinese guilds did not formally test the master's qualifications. Whoever had the funds to open a shop and to pay the entrance fees for the guild could do so.

One specific function for the *huiguan* more than the *gongsuo* was labour recruitment. In the case of the Shanghai ship transport and shipbuilding firms, including the Jiangnan Arsenal, many of the shippers, dock workers, and shipbuilders, were recruited from exterior provinces. The labourers typically came from Ningbo and Canton but also Shaoxing in Zhejiang, Zhangzhou in Fujian, and Chaozhou in Guangdong. Labour contractors (*baotou*) from the particular regions introduced newcomers to specific shipping and shipbuilding companies or to the Arsenal. Since local dialects, religious veneration, and eating habits differed widely, the guild houses provided shelter, food, and entertainment to their fellow countrymen. For instance, at the Ningbo guild house, which was known as both Ningbo *huiguan* or Siming *gongsuo*,⁴⁵ labour contractors recruited shipwrights from Ningbo for Ningbo employers.⁴⁶ The Ningbo ship carpenters also had their own association, the Siming *muye changxing hui*, from 1879.⁴⁷ At the Arsenal, the forgers belonged to the Wuxi network (*Wuxi bang*), and the

42 Qiu Pengsheng, *Shiba, shijiu*, p. 190.

43 Rowe, 'Ming-Qing Guilds', *Ming Qing yanjiu*, Sept. 1992, p. 60.

44 A representative of the Peking barbers' guild informed Niida Noboru that big and reputable shops employed few apprentices and many journeymen, and only small places had many apprentices. Niida, *Pekin kōshō girudo shiryōshū*, II, p. 298.

45 'Short table', p. 1012, established 1797.

46 Johnson, 'Dock Labour at Shanghai', p. 273.

47 'Short table', p. 1028.

painters and metal workers were organized in the North Jiangsu network (*Subei bang*).⁴⁸ The division of labour could be quite precise: for instance, a 'red group' of Zhejiang carpenters (Zhejiang hongbang muye gongsuo) registered in 1869,⁴⁹ constructed only steamboats, while a 'white group' specialized in house construction and was not supposed to encroach on the work of others. The forgers (*duangong*), who venerated Laozi as their patron saint, assembled at the Laozi temple (*Laojun miao*). In the shipping industry, both the *huiguan* and the *gongsuo* were vertically organized and stood under the control of the employers.⁵⁰ However, as the samples given in the 1975 Arsenal history show, this did not mean that the workforce did not organize on their own. The networks remained informal and could be defined as religious rather than occupational groups.

The social functions of the guilds included the provision of welfare facilities like communal cemeteries, elementary schools, and poverty relief to members as well as municipal tasks in firefighting, policing, maintaining infrastructure (especially streets, bridges, and piers), and last but not least, entertaining in the form of theatrical plays and processions for the guild patrons.⁵¹ Certainly not all guilds could fulfil all of these tasks for everybody, but at least in Hankou, where commerce thrived in the second half of the nineteenth century, charity and community service was not restricted to guild members.⁵²

William Rowe has discussed the specific devotional piety which serves as a form of self-assertion and which creates a feeling of responsibility and accountability towards the patron saint(s) of the guild. In nineteenth-century Hankou, virtually every guild was a religious fraternity.⁵³ Burgess and Niida, who studied the Peking guilds, were less convinced of the importance of religion in the twentieth-century capital; but Timothy Bradstock, reading the same sources, comes to the conclusion that if religious service was not practiced, this was the result of a lack of funds rather than disenchantment and religious scepticism.⁵⁴

As a rule, Qing guilds were organized in management boards with directors that were recruited among its members. Cases of rotational leadership are

48 *Jiangnan* 1975, p. 26.

49 'Short table', p. 1018.

50 Johnson, 'Dock Labour at Shanghai', p. 273.

51 Rowe, 'Ming-Qing Guilds', p. 49

52 Rowe, *Hankow*, pp. 265-6.

53 *Ibid.*, p. 290.

54 Burgess, *The Guilds of Peking*, p. 214; Niida, "Industrial and Commercial Guilds", p. 181; Bradstock, *Craft*, pp. 248-249.

known, as well as those where the guild offices were hereditary.⁵⁵ In a recent monograph on Chinese guilds, Peng Nansheng also reflects on this organizational system, which combined 'rudimentary democracy, authoritarianism, and customary law'.⁵⁶ He sees democratic elements in the system of yearly rotating directorship of some guilds, in the elections held by other guilds, in the fact that a *quorum* was necessary for important decisions, and in the practice followed by some guilds to put controversial decisions to a secret vote.⁵⁷

The tasks of the board comprised arbitration among the members and active support in cases of official encroachments or unfounded customer claims. Moreover, in the course of the late nineteenth century, some of the common-origin guilds started to include several smaller guilds or networks (*bang*).⁵⁸ As their membership swelled to several thousands of people and they gained considerable corporate property in the form of large guild houses and other real estate, the tasks became more complex. In such guilds, directors and managers had to handle the financial dealings and allocation of expenses for building and maintaining guild houses and other social facilities like cemeteries and schools, or make arrangements for sacrifices, theatrical performances, plenary meetings, and banquets.

Relationship to the Government

As in the case of guild functions, opinions are divided about the relations between the government and the guilds. Some studies stress the importance of the guilds being recognized by local authorities. Bradstock assumes that the known craft guilds all were sanctioned by the local authorities, and that in fact the main rationale of these guilds was to assist the government in the administration of commerce and crafts, and especially to control unruly elements. He argues that the increasing number of guilds in the latter half of the eighteenth century coincides with the dilemma of population growth

55 Morse, *Gilds of China*, p. 12, cites as examples the Tea Guild at Shanghai, with 'an annually elected committee of twelve, each committee man acting in rotation for one month as chairman, or manager'; the Bankers' Guild at Ningbo with an elected treasurer and a committee of twelve; the Carpenters' Guild at Wenzhou with five elected headmen; the Millers' Guild of Wenzhou, composed of sixteen mill proprietors who elect four representatives annually. Niida, *Pekin kōshō girudo*, III, p. 529, heard from a representative of the hatmakers' guild that leadership positions were now rotational but had been hereditary before 1928.

56 Peng Nansheng, *Hanghui zhidu*, p. 32.

57 *Ibid.*, pp. 32-33, 40.

58 This process has been described by Rowe, *Hankow*, p. 264, as the formation of 'multiplex guilds'.

without a concomitant increase of administrative personnel.⁵⁹ To prevent worker' strikes and riots from breaking out, local administrations preferred to depend on employers' guilds rather than allow journeymen or unskilled labourers to form their own associations. The strike incidents of the Suzhou calenderers, which occurred time and again from 1670 until 1729, are a case in point. Calenderers worked woven and dyed cotton cloth by pressing it with heavy foot rollers, holding onto a kind of railing.⁶⁰ This was low-wage, unskilled, physical labour exerted by migrants who came to the industrial city of Suzhou in great numbers: 7,000 to 8,000 in the early Qing era, and about 10,000 by 1730.⁶¹ The conflicts that flared up in early Qing Suzhou between these workers and their employers, the owners of the calendering workshops, who processed the textiles as contractors for cloth merchants, concerned mostly wage issues. In order to drive home their demands, the calenderers also resorted to violence against their employers' property. In addition to demanding wage raises and threatening strikes, in 1715 some calenderers also requested the prefectural government grant them the right to build a guild house, an orphanage, and a hospital. The government sided with the employers and refused to allow the calenderers to build a guild house, chastising their representatives with corporal punishment on the grounds that 'Once a *hui-kuan* is completed, all those vagabonds without any proper registration will be quartering there with their factions and crowds, and the harm will be incalculable.'⁶² The unrest was suppressed for a while but broke out again in 1723 and in 1729, when it became part of a greater anti-Qing conspiracy that involved wider circles of the Suzhou society.⁶³ It was discovered and crushed, and no separate guild foundation of the calendering workers is reported in Suzhou thereafter.

One less long-lasting case that did not pose the same potential threat to the authorities as that of the calenderers is that of the Suzhou printers. The issue here was not the establishment of a guild house, as the Suzhou bookstore owner–publisher–printer (*shufang*) guild house, Chongde gongsuo, was an early establishment founded in 1671.

59 Bradstock, *Craft Guilds*, pp. 63-66.

60 Santangelo, 'Urban Society in Late Imperial Suzhou', p. 109. Fang Xing et al., 'Cloth Processing in Suzhou and Songjiang', Xu Dixin et al., *Chinese capitalism*, p. 225, complements this description: 'After dyeing, most cloth shrinks and requires pressing or calendering, especially cloth dyed in light colours. Calendering was done by rolling the cloth with a wooden roller, applying weight and movement by means of a vaguely rhombus-shaped stone, rocked backward and forwards. This work was done by strong and agile men, mostly at night, and was a specialised occupation.'

61 Tsing Yuan, 'Urban Riots and Disturbances', p. 307.

62 Ibid., p. 305. *Ming Qing Suzhou gongshangye beike ji*, p. 66.

63 Tsing Yuan, 'Urban Riots and Disturbances', pp. 305-306.

For comparison, Peng Zeyi's 'Short table' includes relatively few booksellers' guilds and, as we might expect, even fewer character carvers' guilds:

The bookstore guilds are:

- Chongde gongsuo 崇德公所, established in 1671 in Suzhou ('Short table', p. 1001);
- Wenchang huiguan 文昌會館, established in 1864 in Peking; actually two sites, one of the Southern and one of the Northern booksellers ('Short table', p. 1021);
- Book trade association in Wugang 武岡, Hunan, which negotiated guild regulations in 1904 ('Short table', p. 1037);
- Shuye shanghui 書業商會, the Shanghai bookseller's association, established in 1905 in Shanghai ('Short table', p. 1039);
- Wenlin gonghui 文林公會, the 'Forest of Learning Association', established in 1908 in Changsha, Hunan ('Short table', p. 1041);
- Zhibao tang 至寶堂, established between 1875 and 1908 in Wuzhou 梧州, Guangxi, a guild for the trade of paper, books, and fireworks ('Short table', p. 1044);
- Wenchang association 文昌會, established in 1910 in Taoyuan 桃源, Hunan ('Short table', p. 1046).

The character carvers' guilds include:

- Jike gongsuo 劓剗公所, established in 1739, in Suzhou ('Short table', p. 1005);
- The guild of the character carvers of Hunan, Changsha, established between 1736 and 1795, ('Short table', p. 1005);
- Kezi hang gongsuo 刻字行公所, Character carvers' guild house, Peking, established in 1897 ('Short table', p. 1035);
- Character carvers of six classes Liumen diaobang 六門雕幫, established in 1909 in Changde 常德, Hunan ('Short table', p. 1035).

The Chongde gongsuo in 1845 reported to the magistrate of Wuxian (Suzhou) that the printers (*yinshou*) – thus the employees, not the owners of the printshops – had unilaterally set up regulations for this guild, which previously had not had any written binding rules. These regulations had provided for training apprentices, hiring additional labour, and an increase of the festival bonus (*jieli*). Moreover, the printers had 'cheated newcomers into paying guild fees'. A first attempt to make the bookshops accept the new regulations had failed, and after the printers had tried a second time, the bookstore owners appealed to the authorities for support. The verdict was

that a festival bonus had to be paid but that the bookshops did not need to accept any other rules.⁶⁴ Those printers who had set up the regulations were forbidden to return to Suzhou and stir up trouble again, and the booksellers were ordered to set up a stele at their guild house with the official record of the matter.

The incident did not remain an isolated occurrence in Suzhou. At least four more examples are known in which the Suzhou authorities intervened against 'private' (in the sense of 'secret', unregistered) guilds.⁶⁵ A secretly founded guild of tobacco processors was banned in 1867 for 'trying to monopolize the market'. In the same year, in reaction to a complaint by eighteen candlemakers' shops to the effect that twelve individuals had tried to organize a guild and 'instigate the masses [i.e. the workers against their employers]', this association was declared illegal, too. In 1870, brocade weavers were not allowed to 'try to establish a guild house (*gongsuo*), set up a guild leader and guild regulations, and molest their colleagues by enforcing donations'. It was also forbidden for the guild to re-open under another name or define itself as a religious community. In the fourth case, a magistrate prohibited the establishment of a second guild for cloth dyers on the grounds that the previous guild was well-functioning and active in charitable work, so there was no need for a second guild. Control over existing guilds was, moreover, intensified by local governments after the mid-nineteenth century: they were required, or forced, to collect the transit tariff *lijin* and perform community tasks like firefighting, policing, and building and maintaining municipal infrastructure.⁶⁶

But while the local authorities enforced their power to sanction, the guilds also could gain more autonomy by cooperating with officials.⁶⁷ Hosea Morse, Statistical Secretary of the Inspectorate General of Customs in China, an institution founded by foreign traders that collected maritime trade taxes between 1854 and the late 1940s on behalf of the Chinese state, took a completely different perspective on the power relation between the guilds and the authorities. In one of the earliest studies on Chinese guilds, Morse presented China as a caretaker state that only collected taxes and provided security services by installing police forces, and stressed the independence of the guilds from the government: 'The trade guilds [...] have moulded their own organization,

64 *Ming Qing Suzhou gongshangye beike ji*, pp. 95-96; Fang Xing et al., 'Paper Making, Printing and Publishing', p. 247.

65 Peng Nansheng, *Hanghui zhidu*, pp. 58-59.

66 Peng Zeyi, 'Shijiu shiji houqi', p. 91.

67 Peng Nansheng, *Hanghui zhidu*, p. 62.

sought their own objects, devised their own regulations, and enforced them in their own way and by their own methods.⁶⁸ In an assessment that was frequently cited later, Morse formulated that ‘The guilds were never within the law: they grew up outside the law; and as associations they neither recognized the law nor claimed its protection.’⁶⁹ Actually, Qing legislation issued by the central government does not include any provisions on guilds. Legal texts did call for vigilance against the ‘monopolistic formation of cartels’,⁷⁰ but the manner of converting this warning into action was entrusted to the judgment of the local authorities. Thus, it was not the central government but the local authorities that interacted with the guilds. This explains why the handicraft regulations (*jiangzuo zeli*) issued by the central government for officials who managed building and production for the state contain no references to the guilds, although the artisans hired from private workshops were certainly organized in guilds. In the guild stele writings, only a few clues show that central government institutions were aware of the guilds,⁷¹ although officials – at least on the Peking stele inscriptions – frequently appear as authors, editors, or calligraphers of these inscriptions – off duty, but conveying authority and probity to the respective institution.⁷²

In Hankou, guilds were not coerced by the local government into registering; rather, it was the advantages of registering a guild that prompted guilds to seek official recognition. A registered guild could appeal to the local authorities if they saw their rights infringed or their collective property violated. Some of the smaller guilds, however, preferred to stay anonymous, but also bigger groups such as the *Huizhou huiguan* in Hankou applied for official recognition only 27 years after its foundation.⁷³ Informal existence was possible if the guild could make do without administrative protection.

68 Morse, *Gilds of China*, pp. 20-1.

69 Morse, *Gilds of China*, p. 27. He qualifies as ‘rare’ the case of the Wenzhou carpenters’ guild that was recognized by the city officials in return for corvée duties (p. 12).

70 Rowe, *Hankow*, p. 257, quoting from the legal code with commentary *Da Qing lüli huiji bianlan* 15.2-3.

71 Niida, *Pekin kōshō girudo shiryō shū*, IV, p. 682 (1899) and p. 723 (1792) among the names of donors for the embellishment of two guild temples includes the names of the Bureau of Construction of the Ministry of Public Works, *yingshan (qingli) si* 營繕(清吏)司 and the Office of Palace Construction of the Imperial Household Department *yingzao si* 營造司.

72 In Li Hua’s stele text collection for 38 trades, at least 25 steles have inscriptions by mid-level officials. Officials of the highest ranks are few – only one Minister calligraphed the characters for the guild house of the actors, Liyuan gongsuo 梨園公所. See Li Hua, *Ming Qing yilai*, p.105. Officials of the Imperial Household Department or the Ministry of Public Works have left no traces as authors or calligraphers of stele texts for the Peking guild houses.

73 Rowe, *Hankow*, p. 258.

How can these contradictory views of tightening control versus laissez-faire approach on the part of local governments be reconciled? To a certain extent, they may reflect regional variance. From early on, Suzhou was one of the most important manufacturing centres, especially for silk and cotton textiles. Conflicts between employers and workers are recorded in the Suzhou guild epigraphy since the early eighteenth century. It is conceivable that the authorities in Suzhou were more likely to try to obtain closer control especially of the workers' guilds than local governments in other regions. For Hankou, however, at least one case has been quoted where a guild – that of the itinerant fish peddlers – was not prohibited, but whose exclusive sales right were not acknowledged by the local authorities.⁷⁴ On the whole, the Hankou case shows yet another instance of government support for the guilds as well as the attempts of the guilds to actively court Hankou and provincial officials by, for instance, conferring honorary titles on them.⁷⁵ It is quite feasible that Hankou officials were more accommodating towards guilds than their colleagues in Suzhou. The balance of power also depended on the distribution of commercial and craft guilds in the respective localities. We may safely assume that merchant guilds provided better resources and possibilities to make the authorities act on their behalf. In sum, cooperation between local officials and guilds and their interconnection certainly were much more complex than Morse believed (which Max Weber took over from him), with significant variation from place to place.

Power Relations within the Guilds: 'The Master and the Man'

The relationship of guilds and would-be guilds to the government in the cases cited for Suzhou at the same time also reflect the vertical relationship between the guild members. As a rule, journeymen could belong to the guilds, which were, however, dominated by the shopowners. Observers of guild relations in early twentieth-century Peking have found relative harmony between 'master and man'. John Burgess defined as one of the characteristics of Peking guilds that they aimed at the welfare of all members of the guilds, which were mostly face-to-face groups with close personal relationships between master, journeymen, and apprentices.⁷⁶ There can be no doubt that this was a paternalistic and hierarchical bond, especially between

74 Rowe, *Hankow*, pp. 297-8.

75 *Ibid.*, pp. 334-7.

76 Burgess, *The Guilds of Peking*, p. 211.

masters and the journeymen they had personally trained as apprentices. As one retired carpenter told the Niida team, previous apprentices were considered family members and had the duty to participate in the master's family celebrations, and when the master passed away, they were expected to wear the same mourning clothes as his family members. However, the care was mutual, so that a master was also obliged to support his previous disciples after they had finished their apprenticeship.⁷⁷ A representative at the tailors' guild specified that journeymen who had not served as apprentices in the workshop where they worked did not wear mourning clothes, were not expected to assist in the master's family rituals, and were not taken care of by the master after they had left his shop.⁷⁸ This implies that conflicts were possible and did occur, even if as a rule the relationships of employer and employee were close or at least respectful from the side of the hired workers.

Yet this was not always the case. Generally speaking, the central and southern Chinese workers and hired artisans staged more strikes than their colleagues in Peking, but even in the capital, work stoppages occurred after the mid-nineteenth-century. In the Peking shoemakers' guild, for instance, the journeymen went on strike and obtained wage raises in the 1850s and subsequent years until 1882.⁷⁹ Although both journeymen and shopowners belonged to the same guild – the shoe and boot guild *Xuexie hang* – the degree of organization of the journeymen was obviously better than that of the employers. The journeymen's *Hemei hui* (Assembly of United Beauty) was able to enforce wage raises until in 1882 the shopowners took the initiative to unite and establish their own association, the *Caishen hui* (Assembly of the God of Wealth) within the shoe and boot guild. In the end, 120 shopowners were involved and took the continuing wage conflict to court for arbitration. The workers' demands were rejected, and the victorious shopowners set up a stele in commemoration of their achievements.⁸⁰

77 Niida, *Pekin kōshō girudo shiryōshū*, IV, pp. 654-655. The legal historian Niida Noboru (1904-1966) collected information on the Peking guilds in two fieldwork periods in 1943 and 1944, with the assistance of colleagues, among which Imahori Seiji 今堀誠二 (1914-1992) and Okuno Shintarō 奥野信太郎 (1899-1968). They recorded stele inscriptions, took photographs of the guild houses, and interviewed the representatives of the guilds. His study mentioned above was based on the insights gained during these research periods. The materials were edited and published between 1975 and 1983.

78 Niida, *Pekin kōshō girudo shiryōshū*, II, p. 235.

79 Documentation is included in Niida Noboru, *Pekin kōshō girudo shiryōshū*, III, p. 489 ff. and in Li Hua, *Ming Qing yilai*, p. 164 ff., and analysed in Niida, *Chūgoku no shakai to girudo*, pp. 207-209.

80 For a translation, see Moll-Murata, 'Social Harmony and Social Unrest', pp. 269-271.

This was a rare case in which the journeymen were organized earlier than the employers. Contrary examples are known for central and south China. If the skilled, hired craftspeople felt the need to combine, they did so in informal groups known as *hang* (trade line), *bang* (mutual help group or 'gang'), *dang* ('faction'), *tuan* ('association'), and the like. The Canton silk weavers, for instance, split into the Xijia hang (Employees' trade) and the Dongjia hang (Employers' trade).⁸¹ The Changsha tailors had seven associations in the last decades of the nineteenth century, of which two were for the masters and five for the journeymen, but these were all reunited after which they revised their old regulations. The separate masters' and journeymen's associations of the Changsha brushmaking shops also reunited during the same time period but kept their respective separate regulations.⁸² For other guilds, it was expressly stated that they were open to masters and journeymen, or that masters or shopowners and journeymen negotiated the guild regulations together.⁸³

Cases in which employers and employees associated in separate guilds are also known, apart from those mentioned, for three other Hankou guilds.⁸⁴

Burgess and Gamble, whose writings are based on their observations in 1918 and 1919, predicted that even in Peking the harmonious relationships within the guilds would dissipate in the process of industrialization and that this would bring an end to the craft guilds.⁸⁵ However, in small-scale handicraft production, guilds or informal proto-guilds survived longer. Thus the craft guilds that had phased in later than the merchant guilds during the commercialization of the sixteenth to eighteenth century were also later in phasing out.

Outlook to the Twentieth Century

In recent years, the transition of the guilds from 'traditional' to 'modern' has been intensely researched by Chinese scholars. The establishment of

81 Liu Yung-ch'eng, 'The Handicraft Guilds in Soochow', p. 145.

82 Peng Zeyi, 'Short table', pp. 1042-1043.

83 Examples in the 'Short table' are the Changsha incense makers in the Jiaqing reign (1796-1820, p. 1014), the Hankou biscuit roasters in 1860 (p. 1019), the Hankou gold leaf makers in 1870 (p. 1024), the Changsha lacquerers in 1887 and 1906 (p. 1030), the Changsha restaurant trade, which included journeymen since 1898 (p. 1042), or the Sichuan embroiderers in 1842 (p. 1017). The cases from Hunan and Hubei seem overrepresented in Peng Zeyi's table.

84 The coal and charcoal maker journeymen's guild, established in 1871 ('Short table', p. 1025), the plasterer journeymen's guild, built in 1867 (p. 1022), and the Hankou firework trade journeymen's association of 1890 (p. 1032).

85 Burgess, *The Guilds of Peking*, p. 236.

chambers of commerce in the late Qing era is a focal point for this transition and for the further fate of the guilds. In an important case study, Chen Zhongping has described the beginnings of the Shanghai Chamber of Commerce. Unlike in Hankou, alliances of several guilds are not found in the cities and market towns of the Yangzi Delta. In a complex process of cooperation and competition of elite merchants with the local, provincial, and central governments, the Qing state in 1904 finally prioritized the promotion of commerce in its 'New Policies' through the chambers of commerce. The central government approved that these chambers had their leadership recruited from and elected by elite merchants. The role of the guilds therein was not specified in the 1904 decree. In practice, not all guild members could join the chambers of commerce but only the leaders of the most influential guilds.⁸⁶

After the fall of the Qing, the subsequent Republican governments at Peking and Nanjing tried to strengthen state control of commerce and industries, and in their legislation they gradually eliminated the traditional forms of association. The National People's Party (*Guomindang*) had consolidated its government in Nanjing in 1927, and economic development ranked high on its agenda. The 'Regulations on the craft associations'⁸⁷ that were promulgated in late 1927 stipulated that the pre-existing guilds should all reorganize and report to the authorities in charge.⁸⁸ This was to be applied to all production enterprises, regardless of whether these were mechanical or handicraft manufacturers. In any administrative region, the associations were the sole representatives of their respective trade branch. The associations were obliged to set up regulations according to a given pattern. Moreover, they were expected to cooperate with government authorities by answering questionnaires on the situation of their trade.⁸⁹ Together with the 1929 'Law on Industrial and Commercial Associations' (*Gong shang tongye gonghui fa*) and the 1930 'Detailed Regulations for the Execution of the Law on Industrial and Commercial Associations' (*Gong shang tongye gonghui fa shixing xice*), this body of commercial legislation now emphasized compulsory membership and cooperation with government authorities and secured the inclusion of all firms within a certain branch.⁹⁰ The old-style guilds were to be reorganized within one year and had to report

86 Chen Zhongping, 'The Origins of Chinese Chambers of Commerce', p. 191.

87 Peng Zeyi, *Zhongguo gongshang hanghui*, pp. 990-995, 'Gongyi tongye gonghui guize', promulgated by the Ministry of Agriculture and Industry (Nonggong bu 農工部) on 1927/11/21.

88 *Ibid.*, 'Regulations on craft associations', p. 995, par. 36.

89 *Ibid.*, p. 990, par. 2, 3, 12.

90 Peng Nansheng, *Hanghui zhidu*, p. 76.

to a supervisory committee (Shangren tuanti zhengli weiyuanhui). The names of the associations were unified, and almost all of them were renamed.

In the Republic of China, the actions of the commercial associations were closely monitored and presented in municipal statistics. By 1934, *Wuhan* (the conglomeration of what was previously Hankou and the adjacent districts of Hanyang and Wuchang) had 159 new associations; Shanghai had 236 (of which 40 were industrial, 1936 figures), and Chengdu in Sichuan had 111 by 1939. By 1933, there were a total of 4,185 new associations in 21 provinces.⁹¹ This is certainly more than even the closest reading of Qing texts and steles will ever reveal. The process of transformation seems to have been concluded by the 1930s.

Guilds in Transition

When Niida Noboru and his colleagues and students conducted another extensive investigation on traditional guilds and their successors, they visited about fifty previous guild sites, recorded the existing stele texts, and interviewed guild representatives.

These interviews show that little enthusiasm was felt for the new trade associations, while nostalgia for the guilds remained. The main reason for this was that the new associations had less autonomy than the guilds. One informant from the barbers' association said that the statutes of their association had been imposed on them in 1942 but that these were not considered the 'real' rules of the trade.⁹² To a representative of the hatmakers' guild, the inheritance of leadership positions seemed preferable to rotational directorship.⁹³ Several interview partners confirmed that belonging to an association brought little or no benefit.⁹⁴ This led to a situation in which the 'old' *huiguan* and the 'modern' associations coexisted – sometimes in competition with each other but at other times complementing each other. The rule of sole representation of one trade branch was sometimes avoided

91 Ibid., p. 78.

92 Niida, *Pekin kōshō girudo shiryōshū*, II, p. 294.

93 Ibid., III, p. 529.

94 Ibid., interview at the furriers' association, III, p. 561 ('there was no advantage in establishing commercial or trade associations'); carpenters' guild, IV, p. 652: ('the only advantage of guild membership is being able to see the theater performances'); jade carvers' association, I, p. 38 ('it is no advantage to be a member of the [new] association (*gonghui*)'); gold and silver smelters' association, I, p. 127 ('Nobody wants to become a director of the association (*tongye gonghui huizhang*). It [is a rotational task that brings no advantages] and only costs money.') See also Bradstock, *Craft Guilds*, p. 247.

by declaring the reason for association as one of common geographic descent rather than of common occupation. A Shanghai guidebook published in 1930 lists nine guilds in the tobacco trade, nine dyers' guilds, and three lacquerware guilds, many of which in their names suggest common-origin associations.⁹⁵ In general, the guild members were more disposed towards the *huiguan*, which retained some of their social, religious, and cultural functions. They rejected the new associations also because they considered them as instruments of the authorities, which in Japanese-occupied Peking restricted and fixed prices and their access to raw materials.

The transition from the guilds to the trade associations may not have roused as much antipathy in other cities with bigger industrial sectors where the guilds, and especially the *huiguan*, were not as omnipresent as in the ex-capital. Clearly, the representatives of small-scale handicraft business – who had known the traditional system with values such as solidarity, relative economic autonomy, and guild morals – resented the top-down reforms that restricted their degree of self-determination and called into question the pre-existing hierarchy and didactic methods. Nonetheless, after the foundation of the People's Republic of China in 1949, the last remaining traditional guilds were closed down.

Guilds in Jingdezhen

What can we know about the guilds that were located beyond the great and well-documented centres of Peking, Suzhou, Shanghai, and Hankou? In spite of the lack of documentation, a look at the producer city of Jingdezhen can illustrate the existence of guilds, the characteristics of proto-guilds, and their survival until the twentieth century.

In Peng Zeyi's 'Short table', Jiangxi province in general does not rank high among the host regions. Likewise, for Jingdezhen, the largest porcelain production centre in China in the Qing period (and, until the late eighteenth century, in the world), the 'Short table' mentions only two associations – 'Perfect Porcelain' (Taocheng) and 'Celebrated Porcelain' (Taoqing) – even though in its eighteenth-century heyday, hundreds of thousands of workers are said to have been engaged in the porcelain trade in and around this market town.⁹⁶

⁹⁵ Bradstock, *Craft Guilds*, p. 242.

⁹⁶ The figures are disputed. Tang Ying, the Superintendent of the Imperial Kilns, mentioned one hundred thousand workers in 1743 (Kerr, *Ceramic Technology*, p. 200). In the *Decennial Reports*, p. 204, several estimates are discussed, the highest of them referring to a workforce of one million.

How is it that so little about Jingdezhen guild activity is known? Artisan and commercial activities of 'trade lines' (*hang*) and 'networks' (*bang*) are referred to here and there in Qing contemporary writings on Jingdezhen as well as surveys and histories of the Republican era, but stele inscriptions or other contemporary guild documents have not survived. However, customary rules of the trades were recorded in local gazetteers and monographs on porcelain production in Jingdezhen. They report that the division of labour was very detailed, with at least eight production lines: kiln firing; the forming of the blanks (on the wheel or in moulds); the painting of ornaments; the production of saggars, the protective clay containers used for firing porcelain objects; the packing and transporting; the forming and attaching of the standing rim of the vessels; the production of tools for porcelain making (especially knives for cutting and carving the clay); and the service trades (especially cart builders and the horse guild). These were again split up into 36 subdivisions, which explains the saying that each finished porcelain vessel had passed 72 hands. There were no easily identifiable formal 'guilds' but rather proto-guilds that roughly tally with the subdivisions, so that basically as many trade networks (*hangbang*) as trades (*hang*) existed. The difficulty is to assign these networks to localities and to the guild houses, which in Jingdezhen are of the *huiguan* (common-origin) and *shuyuan* (Confucian academy) type rather than the *gongsuo* (common-occupation) type.

About half of the *huiguan* that have survived to this day carry alternative names of Confucian academies. They were places of assembly for members from the following outsending regions: ten for people from different prefectures in Jiangxi, two for people from Guangdong, two Anhui *huiguan*, one each for people from Zhejiang, Hubei, Hunan, Fujian, three for people from Jiangsu, and one for people from the remote northwestern province Shanxi. The dates of origin of the houses are not recorded, but the names of a few of them occur in eighteenth-century texts.

The home regions of the ceramic workers within Jiangxi province are also known. Duchang⁹⁷ people were engaged in almost all trades of the high, medium, and low-skill varieties. They were kiln workers, formers of 'round forms',⁹⁸ kiln fillers, kiln builders, painters, and saggars makers. Potters who produced 'open forms'⁹⁹ came from Fuzhou, which was at a distance of 200 km by river; only

97 On the northern shore of lake Poyang, ca. 100 km waterway from Jingdezhen.

98 'Round forms', *yuanyi* 圓器, refers to items that were formed either on the potters' wheel or in a mould.

99 'Open forms', *zhuoqi* 琢器, are pieces such as vases and ceremonial vessels that are ornamented by cutting, embossing, or carving out patterns on the clay, or that are polygonal.

the top-quality kiln builders of the Wei family hailed directly from Jingdezhen but were later superseded by the Yus from Duchang. Those who performed the high-skill trade of forming and carving vases were from Fengcheng, about 250 km waterway. Workers in low-skill trades such as saggar makers first came from the relatively nearby districts of Leping and Poyang (25-40 km away) but later also hailed from Duchang, Fuzhou, and Raozhou. People from all five northern and central prefectures in Jiangxi province worked as packers of small items.¹⁰⁰

Concerning the networks of artisans, information is relatively scarce.¹⁰¹ An 'old' and a 'new' network were comprised of people from Duchang and Poyang; the 'Perfect Porcelain' and 'Celebrated Porcelain' network convened at the Jingyang Academy (Jingyang shuyuan). These were kiln workers specializing in pine faggot kilns ('Perfect Porcelain') and in brushwood kilns ('Celebrated Porcelain') respectively. The Jiangzhen guild house (Jiangzhen gongguan)¹⁰² was built with donations from the Duchang potters. It was not reserved for potters but was also frequented by Duchang people who came to Jingdezhen for academic formation, hence its alternative name 'Old Southern Academy' (Gu nan shuyuan).

Although guild regulations did not exist or were not transmitted, customary rules offer some insights into the activities of the networks. Most of them concern the riskier part of the production and distribution processes, namely firing, unloading of the kilns, and packing. Rules are further recorded for the critical periods in the twelfth lunar month (when work was stopped), the beginning of work in the third lunar month, and the renewal of contracts or dismissal of labourers and foremen in the seventh lunar month. When work was interrupted during the winter period, workers could return to their home regions, but some of them stayed on.¹⁰³

Merchant networks, also called *bang*, are well documented for the twentieth century. For 1936, 26 such networks were reported.¹⁰⁴ As business was thriving after the Second World War, these networks increased to as many as 76. According to a twentieth-century observer, owners of ceramic

100 Liang Miaotai, *Ming Qing Jingdezhen chengshi jingji yanjiu*, p. 216.

101 'Jingdezhen de fengqing'; *Zhongguo cidu*, vol. 2, pp. 775-781, 'Ciye hanggui' (Rules of trade of the porcelain makers).

102 Peng Zeyi, *Zhongguo jindai shougongye* I, p. 184, quoting from a gazetteer of Duchang county compiled in the 1870s, *Tongzhi Duchang xianzhi*.

103 'Jingdezhen de fengqing', sect. 10: 'After production is stopped in the XIIth month, the workers have nothing to do. For making a living, they sell loads of vegetables, other regional products and eel, small fish, and fresh-water snails in the streets.'

104 See Jiangxi sheng qingongye ting (ed.), *Jingdezhen taoci shigao*, p. 322: seven from Hubei, six from Jiangxi, two from Manchuria, two from Zhejiang, two from Anhui, one each from Tianjin, Guangdong, Henan, Sichuan, Peking, Jiangsu, Hunan.

businesses had to be members of one of the guilds or form a partnership in which one of the members belonged. The sanction of the guilds was required before a newcomer could begin manufacturing, and the guild had to approve beforehand what type of ware could be made.¹⁰⁵

An industrial history of Jingdezhen from the 1930s, which gives a relatively clear overview, classifies 'trade associations' according to the criterion of common occupation. 21 branches are listed under their traditional names, among them the venerable 'Perfect Porcelain' and 'Celebrated Porcelain' associations. They are all designated as *she*, which implies a sacrificial community. The author was obviously not favourably inclined towards these associations. He informs us that they existed of old but that they no longer had much to do. They merely congregated several times a year and offered sacrifices.¹⁰⁶ After the foundation of the People's Republic, such associations were deemed even more dubious in retrospect and seemed to be the breeding ground for the underground activities of secret societies. Such insinuations are formulated in the most generalizing way,¹⁰⁷ so that the illegal potential of these old Jingdezhen guilds can hardly be assessed. The respective groups existed until the 1950s and are said to have offered considerable resistance to the collectivization of the porcelain trade.¹⁰⁸

In an interview with the vice president of the Jingdezhen Ceramics Museum, Hans Wilm Schütte was told that in the 1930s, brawls between the different local-origin groups that at the same time represented different trades burst out in the city as a consequence of diminishing opportunities to earn a living in the traditional handicraft sector.¹⁰⁹

Thus the range of guild and proto-guild activities, especially of the informal *bang* networks that were not officially registered, could also include clandestine and violent action and thus constitute the 'reverse' side of their relationship with the government.

Conclusion

The investigation of the guild system shows that the argument that craft-people were subordinate to merchants is also valid in view of the potential

105 Rose Kerr, *Ceramic Technology*, p. 771, fn 230, quoting Stanley Wright, *Kiangsi Native Trade and Taxation* (Shanghai, 1920), pp. 191-192. Fees were pre-determined, and conditions were very restrictive.

106 Wang Siqing, *Jingdezhen ciye shi*, pp. 183-185.

107 *Jingdezhen taoci shigao*, p. 299.

108 Hans Wilm Schütte, 'Perfektion als Hemmschuh?', p. 72.

109 *Ibid.* The interview was conducted in 1986.

impact of their associations. For one, craft guilds were established later than merchant guilds because artisans as a rule had fewer possibilities to attract the attention of local authorities than merchants. If they wanted their guild regulations endorsed, artisans had to enhance their respectability like the merchants by purchasing titles and convincing the officials of their probity. Conversely, the guilds with the most influence in municipal governments in the later nineteenth century were merchant guilds that could afford to finance the 'liturgical service' of charity, maintaining infrastructure, and installing local militia, rather than the craft guilds.

Relationships within the guilds were hierarchical, and shopowners dominated the decisions of the associations. Evidence of separate journeymen's guilds is from the late nineteenth century. Before that, local authorities would rarely allow journeymen or unskilled labour to set up their own guilds or to formulate unilateral guild regulations in existing guilds where employers and employees were both represented.

Craft guilds survived until the twentieth century, even if central governments tried to eliminate and transform them into bodies that could be more easily controlled than the traditional associations. However, the Qing government did not touch the craft guilds. By the 1920s and 1930s, the formally acknowledged guilds slowly disappeared, but groups that had always existed as proto-guilds remained. Religious associations and the veneration of a common patron saint played an important role from early on and could also serve as a rationale of occupational assembly until the mid-twentieth century.

In the Republican era, industrial workers in the cities probably preferred to organize themselves in workers' unions rather than to join the traditional guilds. Power and decision-making structures in unions were more democratic, while in the pre-existing guilds, the masters frequently decided questions of price fixing, wages, and hours of work among themselves.¹¹⁰ Moreover, membership in trade unions had to remain voluntary, unlike in the traditional system in which persuasion and pressure could be applied informally in order to make everybody in the trade or from a particular home region join the guild. Instances of fusion of guilds with labour unions were also reported. In fact, the basic policies of the Guomindang included the building up of labour unions, the legalization of strikes, the promotion of arbitration by government commissions and the principle of voluntary membership, all of which it enforced at its power base in Canton.¹¹¹ A 1927

¹¹⁰ Burgess, *The Guilds of Peking*, p. 224.

¹¹¹ Burgess, *The Guilds of Peking*, p. 230. Canton was the capital of an alternative military government established in 1917 under Sun Yatsen.

survey of the Canton city government shows that, out of 180 labour unions, 74 were reorganized guilds.¹¹² Apprenticeship was evolving into a system in which the rights and duties of the apprentices were regulated more clearly, and which entailed more theoretical training in schools that were often operated or supervised by the government.

Among the organizations surveyed, the *huiguan* proved to be the most persistent, even if they are no longer occupational representations. Some of the old buildings are being renovated and serve as museums or theatres for traditional opera performances. The principle of regional representation in the capital or in provincial cities in hostels with restaurants and entertainment sector has never been given up. Although most of the old *huiguan* have not been preserved in their original buildings, the institution per se is perpetuated in capital liaison offices for provinces, special economic zones, and lower-level administrative areas, of which many hundreds are present in Peking.¹¹³ The flair of the *huiguan*, however, as stages where important people meet in a representative setting, has been imaginatively adopted by the hotel and restaurant caterers who also know how the designation of this venerable institution translates into English.

112 Ibid., p. 225, quoting Ta Chen and S.K. Sheldon Tzo, 'The Unionization of Labour in China', *Monthly Labour Review*, Washington.

113 Belsky, *Localities*, p. 25.

Figure 27 Toothpick cover, collected at the 'All-Shanxi huiguan' (Quan Jin huiguan) in Taiyuan, April 2006



Source: Author's photograph.

Conclusion

Efficiency of State Institutions in the Direct and Indirect Control of the Crafts

Setting out from the observation that in the early economic historiography of the People's Republic of China, the Qing state as a rule was depicted as weak and inefficient, but that more recent research on craft history has come to a more appreciative view of the performance of the last dynasty, this study has reviewed the role of state institutions controlling craft production as well as the historical precedents for their activities.

As a result, it has become clear that the manner in which the Chinese dynastic states of the second millennium procured their requirements all varied from each other. During the Song era, either artisans were hired by the government in permanent positions or the guilds were delegated the task to ensure that the government was provided with sufficient temporary labour forces at government manufactories and palace workshops. The Yuan dynasty registered the artisans in an elaborate system, and the artisan status became legally hereditary. Specific obligations were linked to this artisan status. These were more rigid in the initial phase of the dynasty in the thirteenth century, when bound labour or slavery existed, and were slightly relaxed towards the dynasty's end. This change over time has been plausibly attributed to the greater demand of the Mongolian rulers and elites for the skills and the objects produced not only by Chinese but also by Central Asian artisans. For the supply of artisan skills was scarce in this nomadic society when the Mongols started their conquests. The Ming dynasty took over the principle of artisan registration but with a less complex system of periodic work shifts. *Corvée* obligations were more frequent for those living in or close to the capitals and less demanding for those coming from greater distances. This service system was changed and streamlined several times, and although the registration of artisans remained a requirement throughout the dynasty, the service obligations were by and large commuted to a system of monetary payment. Thus, both in the Yuan and the Ming era, state coercion relaxed towards the middle and late phases. Artisans required to provide *corvée* services and those in permanent service of the state in the Northern Song (ca. 1000 A.D.) comprised at the most 0.6 percent of the entire population; in the Yuan dynasty (1290), seven percent of all households were registered for actual or potential service for the state; in the Ming, depending on the population estimates assumed, registered

artisans represented between 0.26 and 0.15 percent of the population. The percentage of registered artisans in the entire population was thus at its height in the Yuan period and sharply decreased from then on.

This was the situation when the Manchu Qing dynasty commenced. The historiographic record states that, instead of tightening control over the artisan workforce as had been the case in the preceding dynasties, the registration of artisans was abolished permanently as early as the second year of the dynasty (1645) and that artisans thereafter were recruited of their own volition and remunerated. However, scattered evidence shows that government demand initially could not be adequately satisfied by hired artisans alone. Moreover, the artisan registers were still on record, and until about 1700, a special artisan tax was collected.

In order to gain an overview of the artisan workforce under the Qing, this study surveyed the institutions of the central government that were directly responsible for craft production, i.e., those organizations that operated craft manufactories and employed construction workers on a permanent basis. The Ministry of Public Works, which organized building, weapons, ammunition and armour, shipbuilding, the Imperial mints, and the production of arts and crafts, reduced in the course of time its construction workforce. Where it was feasible, for instance for building materials like bricks and tiles, production was outsourced to private or semi-private producers, but the sectors involved in military and monetary production remained under the exclusive control of the state. The other imperial institution that employed a large artisan workforce was the Imperial Household Department. Here the trend to outsourcing was less marked, but it was also evident in the state manufactories for silk weaving in Jiangnan and for porcelain in Jingdezhen. An estimate of all known permanent artisan positions in the service of the state yields a figure of at least 40,000 persons around 1800. This is about 0.01 percent of the population and thus a significant reduction as compared to the Ming, even though we must bear in mind that soldiers who were engaged as skilled or unskilled workers in arms production were not always designated as 'artisans'.

As far as the written normative sources reflect reality, the wage rates of the workers in permanent positions at the Ministry of Public Works or the Imperial Household Department were rather high, especially for work within the palace. Given that few wage quotations for comparable private sectors exist, we can only conclude that their income was apparently at least at market level or above. The artisans in permanent positions were referred to as *shiliang jiang* (food provision artisans), which implies that they received part of their wages in grains and other foodstuffs. In periods of price inflation, this could alleviate their living circumstances. The workers at the

Jiangnan weaving manufactories were reported to be entitled to their food rations even in periods when there were no work assignments and they could not obtain any monetary wages. For temporary work in construction, wages differed widely between the provinces. The available wage quotations from the *Wuliao jiazhi zeli* (Regulations and precedents on the prices of materials, 1769) on the whole also reflect market prices – with considerable variance across regions. This was not the case for the shipbuilding and armament manufacturing crafts. Here, uniform soldiers' wages were applied.

The private sector began to unfold at the same time that the workforce directly employed by the state shrank. The estimates in this study have yielded the result that the ships owned and constructed by the state represented only one-tenth of the entire existing ships in the second half of the eighteenth century; the overall output of book publications by the government in the Qing amounted to about one percent of total publications. For food, shelter, and luxury production, the private sector was increasingly able to supply the court and the state. Early on in the dynasty, this had already been the case for construction, silk weaving, and arts and crafts production. In other branches of craft production, transitional modes were realized. For instance, in order to maintain imperial designs and symbolism, porcelain for court use was formed and decorated at the Imperial Porcelain Manufactory in Jingdezhen but fired in private kilns. The 'weaving households' of the Jiangnan Imperial Silk Weaveries were allowed to find substitute workers who wove in their stead on the looms of the Imperial Manufactories. A further option was for the private sector to provide transport vessels needed by the state, like ships for grain or copper transport.

In some sectors the central government asserted its monopoly more vigorously, such as arms production, battleships, and coinage. Other economic branches such as luxury beverage processing – tea and alcohol – were entirely outsourced. In the case of printing, the Qing adopted a policy of propagation of the Confucian canon and the historically legitimatory texts by allowing part of the books from the palace printery to be sold to the public and to be used as exemplars for reprinting. Thus, it broke with the custom of preceding dynasties, which kept the books from palace printeries for the sole use of the court and administration. The Qing dynasty reserved and at certain periods aggressively defended their supreme power over the production of texts that formulated cultural and ethical values, as in the literary inquisition, but duplication of the orthodox texts was favoured. Finally, certain symbols of imperial power and presence remained the exclusive privilege of the ruling house, such as yellow glazed tiles for buildings belonging to the court or the state cult but also specific porcelain designs.

Did the central government exploit the artisans in order to achieve these goals? Various prohibitions – the seafaring prohibition between 1662 and 1683, the literary inquisition or book prohibition in the 1770s and 1780s, and the copper prohibition in the 1730s and 1740s – were enforced in concrete situations for political (at least in the case of the first two) rather than socioeconomic reasons. It is also possible that even the copper types of the encyclopedia *Gujin tushu jicheng*, a costly imperial prestige project, fell victim to the copper prohibition. In the phases when these bans were most rigorously enforced, they affected the artisans negatively. Examples include the shipbuilders, who were forbidden to construct overseas and coastal vessels; the character carvers, printers, and binders who were called to account for producing real or presumed anti-Manchu publications; and the coppersmiths who were expected to work under official supervision in order to prevent coin manipulation. Although the most acute periods of government pressure did not last long, such embargoes and preventions had long-term consequences and illustrate the basic approaches of Qing dynasty economic policies that curbed rather than stimulated certain economic activities. In the case of the sea prohibition, the ban was lifted after 1684, yet the size of the ships remained restricted, at least officially. Only four ports were open to foreign trade, and after 1757, all but Canton were officially closed. Foreign trade and overseas expansion were thus limited, which clearly had consequences for craft production. Basically, until the Opium Wars, the Qing state did not actively promote craft production and commerce but concentrated instead on agriculture. Even so, it did not – and was aware it could not – stop the transition from self-sufficient agricultural production for self-sufficiency to full-time craft production for the market. More direct encroachments occurred when artisans suffered illegal deductions from their negotiated or norm wages by officials or lower-level administrative personnel or were obliged to deliver taxes-in-kind at prices below market rates. However, these restrictions and limitations hardly had a long-lasting negative impact on most craft activities. The state did not foster large-scale enterprises and manufactories, but they did exist in small numbers.

The situation changed radically after the shock of the Taiping rebellion and the Opium Wars. Armament production and shipbuilding, which had reached a kind of impasse by the time the Opium Wars broke out, were now mechanized in ambitious ‘self-strengthening’ programmes, and technology transfer was actively sought. However, the first stage of the self-strengthening movement did not have the desired result.

In printing, the spread of orthodox, state-supporting texts that were deemed to represent the Chinese cultural ‘essence’ was enhanced in

importance due to reprinting projects in the provinces. The palace printery rapidly lost its importance, although it was not completely closed down. Mechanical text reproduction using foreign machinery was started in the provinces and from the 1880s also commenced in the capital.

As for the vessels built in Chinese shipyards, they were second rate at best, and the navigational skills of the new navy captains and crews could not ward off French or Japanese attacks in 1884 and 1895. The development of steam technology made little economic sense if all raw materials had to be imported at high cost and if the finished products from foreign manufacturers were not only cheaper but of better quality.

At the same time, if the ultimate aim was to preserve China's independence from the European and American imperialist states, there was no option but to acquire the techniques of mechanized production and the scientific knowledge that they were based on. In defence of the modernization efforts in general and the development of steam navigation in particular, it has been pointed out that the Chinese learned and applied Western skills in a relatively short time. To a certain extent, they were even able to close the gap with some Western technologies. The experiments with shipbuilding production made clear that it was not sufficient to master the skills of assembling the new ships and how to navigate them; the necessary coal mining as well as iron and steel technologies also had to be acquired. In consequence, modern mining was developed in coal mines in Zhili, Taiwan, and Shandong, and steel refineries were set up at the Jiangnan and Tianjin Arsenals.

The educational structures also had to be modified in the process of modernization and industrialization. Schools and universities for technical learning were now established on a much wider scale, which in retrospect had the effect of enhancing the recognition of the pioneering role of the Fujian Navy Yard School in particular.

More fundamental change that no longer remained confined to technology but also provided for new political structures was ushered in by the Hundred Day Reforms of Kang Youwei. These measures were first crushed by the forces of reaction under Empress Dowager Cixi. However, after China lost much of its autonomy in the aftermath of the Boxer Rebellion, the reforms were widely adopted. In the process of these administrative and constitutional reforms, the ministry that had previously been responsible for public works was completely reshuffled, some of its old competencies given to other ministries, and its tasks redefined. For instance, in the craft sector, training programmes for apprentices were launched. However, as in earlier centuries, the ruling ethnic group of the Manchus

was overrepresented in the leading positions of the new government departments.

Did foreign imports and the presence of foreign manufacturing crush the handicraft sector? For shipbuilding as well as printing, traditional techniques persisted well into the Republican era and complemented the mechanized industries. In the cases presented in this study, sailing ships and wooden barges were used in the large seaports for lighterage and on the more torrential streams, which were not accessible by steam navigation. Even during an age when the letterpress and lithography had made large inroads in the cities, character carving was still utilized in medium-sized provincial cities like Qingdao, not to mention the rural backwaters of Sibao, where mechanized printing did not gain much ground until the mid-twentieth century. In fact, neither shipbuilding nor character carving crafts have completely died out, even if junks and woodblock printing nowadays have little economic importance but rather belong to the fields of historical reminiscence or religious activities.

Artisans Between Merchants and Hired Labourers

Until the late nineteenth century, the Qing state and its elites were for the most part suspicious of merchants and artisans, although they were aware that these groups fulfilled important functions and although some elite merchants had the means to provide themselves with all the necessary attributes of the scholarly, highly cultured circles. Despite the fact that artisans ranked above merchants in the traditional classification of the four occupational groups, the former had fewer chances for social ascent than merchants. The road to success for an artisan was through commerce and from there via official examinations (for his progeny) or via the purchase of an official title. In the latter case, this was a position where the government recognized the value of this group as 'merchants' (*shangren*) who could supply the requirements of the state. This tendency was clear in building and printing.

As for government recognition of merchant and artisan associations, the central government did not concern itself with guilds. The interface of merchants and craftspeople and the government were the district and prefectural administrations which could endorse guild regulations and provide enforcement and arbitration in cases of conflict. However, in return they also expected welfare and administrative services from the guilds. In this setting, merchants were again at an advantage against artisans. Craft

guilds were established later than merchant guilds. While the first records of merchant guilds are from the sixteenth century, the first records of craft guilds are from more than a hundred years later. However, both merchant and craft guilds started to flourish only in the nineteenth century, when they may have felt a greater necessity to assert and solidify their position in the market due to the enhanced competition by foreign goods and producers. It took craft guilds longer to convince the local authorities of their probity and respectability, not least because, besides the small masters and storeowners, unskilled, low skilled, or skilled hired labour were also represented in the guilds. These workers were perceived to be unruly elements in the urban landscapes, especially if the labourers were migrants, as in the case of the Suzhou calenderers. As a rule, local authorities would not grant them the right to establish their own journeymen's guilds, siding with the employers in order to keep down demands for wage raises. The author is aware of only one contrary example from Peking, where it took the employers several decades to unite against a pre-existing journeymen's association within the shoemakers' guild. However, in most cases, as in Europe, the authorities and the guild leaders were allied against the workers. What seems different from the European case, as generalized by James Farr, is that the artisans did not *lose* their influence within the guilds and urban politics: they never had it to begin with. Thus, Ming and especially Qing guilds provide an important alternative model for the causes, forms, and percentages of associations of skilled and unskilled artisans in guilds and proto-guilds, with a chronological, structural, and social setting that differs in many respects from the European case.

At the very end of the Qing, a process of empowerment of the merchant elites began which led to the formation of chambers of commerce. These successors to the merchant guilds now came 'within the law', with all the consequential legal prerogatives and duties. It took a while until this process of legalization came to include the craftshop owners and masters as well, and it is doubtful whether they were content with the greater supervision of their activities and the internal regulations imposed by the Republican state.

For hired workers, the labour unions may have been more attractive than the guilds, where the masters made most of the decisions. Proto-guilds, often also associated with secret societies, persisted in their geographical locations of strength, as exemplified in the case of Jingdezhen, where some observers have regarded the hired labourers' activities for keeping up with increasing competition as notorious and illegal. In the larger context of this study, the gradual increase in affiliation with the guilds goes hand in hand

with the increase of waged or commodified labour for the market.¹ In the period under observation, corvée labour was just starting to be abandoned legally and practically. However, this did not reflect the mindset of many officials, who certainly did not consider the workforce to be free wage labourers in the first stage of modernization, when the arsenals were still led as bureaucratic institutions rather than as industrial enterprises.

Depreciation and Appreciation of Craft Production and Craftspeople during the Qing Dynasty

To sum up, until the mid-nineteenth century the Qing government ideology stressed agriculture and regarded the crafts and commerce from a distance. It did not obstruct or systematically exploit craftspeople, but there were systemic weaknesses like corruption or squeeze, due partly to the fact that local and regional administrators and their personnel were chronically underfinanced, which could cause discontent. However, the precise extent of such illegal practices is still largely unexplored.

Technical and institutional modernization followed in two phases, each after a major crisis that almost ended dynastic rule: the Taiping and the Boxer Rebellions. In the first phase, with the help of (well-paid) Western specialists, state-operated shipyards and arsenals started mechanized production and offered vocational education on different levels beyond mere training on the job. The ships they produced could not adequately defend China's territory, but the new skills were transferred to a growing group of technicians who gradually, and with low capital, started their own mechanized enterprises. In the second phase, reforms were much more far-reaching. For the first time, widespread programmes for vocational training were instituted that showed a growing and genuine concern for crafts and industries beyond the field of military production. Formal commercial legislation, the beginnings of patent law, awards and prizes for achievements in craft and industrial production all came to rise in this period. To put things briefly, in the phase between 1902 and 1911, efforts were made and successful institutions created that outlived the dynasty. Chinese historiography has now rediscovered the achievements of this period of the 'New Policies'. Together with a critical

1 Marcel van der Linden and Jan Lucassen, *Prolegomena for a Global Labour History*, pp. 9-10. For definitions of labour relations as proposed by the Global Collaboratory on the History of Labour Relations, 1500-2000, see Hofmeester et al., 'Conquerors, Employers, and Arbiters: States and Shifts in Labour Relations 1500-2000: Introduction', pp. 23-26.

appreciation of the policies before the mid-nineteenth century, this can enhance the process of a more balanced reappraisal of the achievements of the Qing central government which has already commenced in recent Chinese publications on the economic and social history of craft production.

At the outset, this study pointed to the recent growth and export successes of the Chinese economy. How are they linked to the centuries of Qing rule and most of all to the phase of early industrialization? From a technical point of view, connections seem hard to find, since present day *manufacturing* is predominantly executed with machines and powered by fossil energy. Institutionally, handicraft production in private enterprises was able to hold out and even increased throughout the era of the Republic of China, but suffered under nationalization in the first decade of the People's Republic of China. It has expanded again since the economic reforms of the recent decades.² If there is a connection between the beginnings of industrialization and the present, one can see it, on the basis of this study, in the difficulty of states to find an adequate level of regulation for manufacturing. For much of the Qing dynasty, and in fact also for the Republican era, the crafts thrived perhaps due to the low degree of intervention from the side of the state. The strong interventionist course of economic policies from the 1950s to 1970s – with the priority placed on building up heavy industries and the virtual abolishment of individual workshops and small-size enterprises – inhibited rather than promoted craft production. The present economic policies of partial deregulation still constitute a much stronger presence of the state than the regulatory efforts of the early twentieth century. In the present globalized and interlinked world, *laissez-faire* policies in the manner of the Qing dynasty before the nineteenth century are no longer feasible. A legal framework for product quality, property rights, environmental protection, and labour issues is indispensable, but finding the right degree of protection and promotion of craft enterprises and industries would be a challenge for any government. The enhancement of vocational training, one of the first steps taken by the Qing in their 'New Policies', remains a task that the government of the People's Republic of China is now readdressing after having concentrated excessively on higher tertiary education for decades.³ The long road travelled since the late nineteenth century is demonstrated in a quote that the American economic historian Albert Feuerwerker referred to in 1959 – with the intention of illustrating the

2 Schütte, 'Handwerk', pp. 289-291.

3 Erling, 'China kopiert die deutsche duale Ausbildung'.

somewhat unrealistic expectations of late Qing economic reformers, in this case Chen Chi, regarding China's economic development:

One writer was so optimistic about the future of Chinese goods, which he said would be as good as but cheaper than foreign manufactures, that he looked beyond recapturing the domestic market to ask, 'We can't prevent our people from using Western manufactured goods; can they prevent their people from using Chinese goods?'⁴

4 Feuerwerker, *China's Early Industrialization*, p. 36.

References

Conventions

Translations of book titles are not capitalized.

Dates of last access to materials available on the internet are given in square brackets.

References that are published only electronically are included in the last section.

Qing and pre-Qing Dynasty Sources in Chinese

Chenggong shiyi 城工事宜 (Requirements and organization of work on city walls). After 1744, ms. Chinese Text Project/*Zhongguo zhexue shu dianzihua jihua* 中國哲學書電子化計劃.

Chou King, transl. by Séraphin Couvreur. Sien Hsien: Imprimerie de la mission catholique 1934 (4^e édition).

Chunqiu Gongyang zhuan 春秋公羊傳 (Gongyang commentary to the Spring and Autumn Annals). Edited by *Shisanjing zhushu* 十三經注疏 (Commentaries and subcommentaries to the Thirteen Classics), reprint of *Sibu beiyao* edition. Shanghai: Zhonghua shuju n.d.

Collection: see *Huangchao jingshi wenbian*.

Da Ming huidian 大明會典 (Collected statutes of the Great Ming dynasty). Compiled by Li Dongyang 李東陽 et al., edited by Shen Mingxing 申明行, et al. Taipei: Huawen shuju 1964.

Da Qing huidian shili Qinding 欽定大清會典事例 (Imperially endorsed collected statutes of the great Qing dynasty, with factual precedents). Edited by Kungang 崑岡, Li Hongzhang 李鴻章, et al. 1899 edition. Reprint Taipei: Zhongwen shuju 1963.

Da Qing Shizong Xian (Yongzheng) huangdi shilu 大清世宗憲 (雍正) 皇帝實錄 (Veritable records of the emperor Shizhong Xian (Yongzheng) of the great Qing dynasty). Reprint Taipei: Taiwan Huawen shuju 1969.

[*Qianlong*] *Dushan Zhouzhi* 獨山州志 (Gazetteer of Dushan subprefecture). Edited by Liu Dai 劉岱 et al., 10 juan, Qianlong 34 (1769) block print. Web edition in *Scripta Sinica*.

Fujian shengli 福建省例 (Provincial regulations of Fujian), ca. 1873-1874. Web edition *Handian*, based on edition *Taiwan wenxian congkan*, vol. 199 [Jan. 2018].

Fujian sheng waihai zhanchuan zeli, (Qinding) 欽定福建省外海戰船則例 (Imperially endorsed regulations and precedents on seagoing battleships of Fujian province). Web edition *Handian*, based on edition *Taiwan wenxian congkan*, vol. 125, [Jan. 2018].

Gongcheng beiyao 工程備要 (Essentials on the building project [of the Mausoleum Dingling for the Xianfeng Emperor]). 1874.

Gongcheng zuofa 工程做法 (Technical instructions for the building crafts), Edited by Yunli 允禮 et al., 1741. Reprint *Gugong zhenben congkan: Qingdai zeli*, vol. 339-340. Haikou: Hainan chubanshe 2000.

Gongbu changku xu zhi 工部廠庫須知 (What should be known about the factories and storehouses of the Ministry of Public Works), by He Shijin 何士晉. Edition *Xuanlan tang congshu xubian*, vol. 223-225. Reprint Taipei: Guoli zhongyang tushuguan, Zhengzhong shuju 1985.

- Gongbu zeli (Qinding)* 欽定工部則例 (Imperially endorsed regulations and precedents of the Ministry of Public Works). Compiled by Cao Zhenyong 曹振鏞 et al., 1815. Reprint *Gugong* 297-298. Haikou: Hainan chubanshe 2000.
- Gongbu zeli (Qinding)* 欽定工部則例 (Imperially endorsed regulations and precedents of the Ministry of Public Works). Compiled by Wenyu 文煜 et al., 1884. Reprint *Gugong zhenben congkan* 297-298. Haikou: Hainan chubanshe 2000.
- Guanzi* 管子 (Master Guan). Edited and commented by Sun Bo 孫波. Beijing: Huaxia chubanshe 2002.
- Gujin tushu jicheng (Qinding)* 欽定古今圖書集成 (Imperially endorsed complete collection of old and present illustrations and texts). Compiled by Chen Menglei 陳夢雷 et al. (1726). Reprint Shanghai: Gujin tushu jicheng ju 1884.
- Gujin tushu jicheng (Qinding)* 欽定古今圖書集成 (Imperially endorsed complete collection of old and present illustrations and texts). Compiled by Chen Menglei 陳夢雷 et al. (1726). Photomech. reproduction. Taipei: Wenxing shudian 1964.
- Guoyu* 國語 (Sayings of the States). Edition Shanghai: Shanghai guji chubanshe 1988.
- Han Feizi* 韓非子, *Hanzi qianjie* 韓子淺解 (Simplified comment to the writings of Master Han). Edited by Liang Qixiong 梁其雄. Beijing: Zhonghua shuju 1960, 2nd. ed. 1982.
- Handian: Hanji dianzi wenxian Handian quanwen jiansuo xitong* 漢籍電子文獻, 瀚典全文檢索系統, full text database of Academia Sinica, Taipei, <http://hanji.sinica.edu.tw/>
- [*Qianlong*] *Hangzhou fuzhi* 杭州府志 110 juan. Edited by Zheng Yun 鄭澐 et al., compiled by Shao Jinhan 邵晉涵 et al., block print ed. of 1784, electronic edition of Erudition (愛如生) full-text database *Zhongguo fangzhi ku* 中國方志庫 (Chinese gazetteer database) [Jan. 2018].
- Hanshu* 漢書 (Dynastic history of the Former Han), by Ban Gu 班固 et al. Edition Beijing: Zhonghua shuju 1964.
- Hu Zhiyu 胡祇通 (fl. 1265-1296), *Zishan da quanji* 紫山大全集 (Complete works of Mr. Zishan), edition *Yingyin Wenyan ge Siku quanshu*, 影印文淵閣四庫全書, vol. 1196.
- Huangchao jingshi wenbian* 皇朝經世文編 (Statecraft writings of our August Dynasty), ten series, 1826-1902, Web edition *Handian*, installed at Academia Sinica Taiwan 2000. As of 2016 included in *Chinese Text Project*.
- Collection 1: He Changling 賀長齡 and Wei Yuan 魏源, *Huangchao jingshi wenbian* 皇朝經世文編 (Statecraft writings of our August Dynasty), 1826. Photomechanic reproduction. Taipei: Guofeng chubanshe 1953.
- Collection 2: Rao Yucheng 饒玉成, *Huangchao jingshi wenbian xuji* 皇朝經世文編續集 (Continued collection of statecraft writings of our August Dynasty), 1882.
- Collection 3: Ge Shijun 葛士澐, *Huangchao jingshi wen xubian* 皇朝經世文續編 (Sequel to the statecraft writings of our August Dynasty), 1888. Photomechanic reproduction. Taipei: Guofeng chubanshe 1954.
- Collection 4: Sheng Kang 盛康, *Huangchao jingshi wen xubian* 皇朝經世文續編 (Sequel to the statecraft writings of our August Dynasty), 1897. Photomechanic reproduction in *Jindai Zhongguo shiliao congkan* 近代中國史料叢刊 (Collectanea of materials on Modern Chinese history), 831-850. Taipei: Wenhai chubanshe 1972.
- Collection 5: Chen Zhongyi 陳忠倚, *Huangchao jingshi wen sanbian* 皇朝經世文三編 (Third edition of statecraft writings of our August Dynasty), 1898. Photomechanic reproduction. Taipei: Guofeng chubanshe 1965.
- Collection 6: Mai Zhonghua 麥仲華, *Huangchao jingshi wen xinbian* 皇朝經世文新編 (New edition of statecraft writings of our August Dynasty), 1898. Photomechanic reproduction. Taipei: Guofeng chubanshe 1953.
- Collection 7: Shao Zhitang 邵之棠, *Huangchao jingshi wen tongbian* 皇朝經世文統編 (Comprehensive edition of statecraft writings of our August Dynasty), 1901. Photomechanic

- reproduction in *Jindai Zhongguo shiliao congkan xubian* 近代中國史料叢刊續編 (Sequel to Collectanea of materials on Modern Chinese history), 711-720. Taipei: Wenhai chubanshe 1980.
- Collection 8: He Liangdong 何良棟, *Huangchao jingshi wen sibian* 皇朝經世文四編 (Fourth edition of statecraft writings of our August Dynasty), 1902. Photomechanic reproduction in *Jindai Zhongguo shiliao congkan* 近代中國史料叢刊近代中國史料叢刊 (Collectanea of materials on Modern Chinese history), 761. Taipei: Wenhai chubanshe 1972. In database Chinese Text Project <http://ctext.org/wiki.pl?if=gb&res=501120> [Jan. 2018].
- Collection 9: Qiushi zhai (pseud.) 求是齋, *Huangchao jingshi wenbian wuji* 皇朝經世文編五集 (Fifth collection of statecraft writings of our August Dynasty), 1902. Photomechanic reproduction in *Jindai Zhongguo shiliao congkan sanbian* 近代中國史料叢刊三編 (Third sequel to Collectanea of materials on Modern Chinese history), 271-273. Database Chinese Text Project, <http://ctext.org/wiki.pl?if=gb&res=967472> [Jan. 2018].
- Collection 10: Gan Han 甘韓, *Huangchao jingshi wen xinbian xuji* 皇朝經世文新編續集 (Sequel to the new edition of statecraft writings of our August Dynasty), 1902. Photomechanic reproduction in *Jindai Zhongguo shiliao congkan* 近代中國史料叢刊近代中國史料叢刊 (Collectanea of materials on Modern Chinese history), 801. Taipei: Wenhai chubanshe 1972.
- Huidian: See Da Qing huidian shili.
- I-ching [Yijing]. Translated by James Legge, *The Sacred Books of the East. Texts of Confucianism*, vol. 2. Oxford: Clarendon Press 1882.
- Jiangxi tongzhi* 江西通志 (Gazetteer of Jiangxi province). Edited by Liu Kunyi 劉坤一, compiled by Liu Duo 劉鐸, Zhao Zhiqian 趙之謙 et al., 1881. Reprint Taipei: Chengwen chubanshe 1989.
- Jin Jian 金簡, *Qinding Wuying dian juzhenban chengshi* 欽定武英殿聚珍版程式 (Patterns for printing with movable types at the [Imperial Printery in the] Hall of Martial Valour), in *Wuying dian juzhenban shu* 武英殿聚珍版書 (Wuying dian books [printed with] assorted gems), vol. 478. Edition Guangya shuju 1899.
- Juqing yiding wuliao jiazhi* 九卿議定物料價值 (Prices of materials decided by the Nine Ministers), 4 j., 4 ce. Edited by Maizhu 邁柱 et al., 1736. Reprint *Gugong zhenben congkan: Qingdai zeli*, vol. 317. Haikou: Hainan chubanshe 2000.
- Kenryū keijō zenzu [Qianlong jingcheng quantu]* 乾隆京城全圖 (Complete map of the imperial city in the Qianlong period), ed. by Kōain Kahoku renrakubu seimukyoku chōsajo 興亞院華北連絡部政務局調査所. Peking: Kōain Kahoku renrakubu seimukyoku chōsajo 1940.
- Li Hua 李華 (ed.), *Ming Qing yilai Beijing gongshang huiguan beike xuanji* 明清以來北京工商會館碑刻選集 (Selected stele texts of Peking commercial and craft guild houses from the Ming and Qing dynasties). Beijing: Wenwu chubanshe 1980.
- Liang Qichao 梁啟超, *Xinmin shuo* 新民說 (On the new people), Web edition *Handian*, [Jan. 2018].
- Longjiang chuanchang zhi* 龍江船廠志 (Monograph of the Dragon River Shipyard), by Li Zhaoxiang 李昭祥. Nanjing: 1553 (preface). Edition *Xuanlan tang congshu, Xuji* 玄覽堂叢書續集, 117-119. Reprint Taipei: Guoli Zhongyang tushuguan 1985, vol. 226.
- Mencius, in James Legge (transl.), *The Chinese Classics*, Vol. 2 [1895], *The Works of Mencius*. New York: Dover Publications 1970.
- Meng liang lu* 夢梁錄 (A dream while the millet porridge [was cooking]), by Wu Zimu 吳自牧, ca. 1334. In *Dongjing menghua lu wai si zhong* 東京夢華錄外四種 (The Dream of Hua in the Eastern Capital and four other texts). Beijing: Zhongguo shangye chubanshe 1982.
- Ming Qing Suzhou gongshangye beike ji* 明清蘇州工商業碑刻集 (A collection of Ming and Qing Suzhou stele inscriptions on crafts and commerce). Edited by Suzhou lishi bowuguan 蘇州歷史博物館 (Suzhou Historical Museum) et al. Nanjing: Jiangsu renmin chubanshe 1981.

- Neiting gongcheng zuofa* 內庭工程做法 (Technical instructions for the building crafts in the Inner Courts). Edited by Yunli 允禮 et al., 1741. Reprint *Gugong zhenben congkan: Qingdai zeli*, vol. 340. Haikou: Hainan chubanshe 2000.
- Neiting Yuanming yuan neigong zhuzuo xianxing zeli* 內庭圓明園內工諸作現行則例 (Current regulations and precedents on interior handicrafts in the Inner Courts of the Garden of Perfect Brilliance), ca. 1766, ms. Reprint *Qingdai jiangzuo zeli* 清代匠作則例 (Handicraft regulations of the Qing dynasty). Edited by Wang Shixiang 王世襄 et al., 2 vols. Zhengzhou: Daxiang chubanshe 1999.
- Qinding hubu caoyun quanshu* 欽定戶部漕運全書 (Imperially endorsed Complete book of the Ministry of Revenue on grain transport). Edited by Zailing 載齡 et al., compiled by Fuzhi 福趾 et al. Qing Guangxu 2 (1876) block print. Electronic edition in *Scripta Sinica*.
- Qinding Zongguan neiwufu xianxing zeli* 欽定總管內務府現行則例 (Imperially endorsed Current regulations and precedents of the Imperial Household Department). Edited by Yucheng 裕誠 et al., 57 chapters, 1852. Reprint *Gugong zhenben congkan: Qingdai zeli*, vols. 306-310. Haikou: Hainan chubanshe 2000.
- Quan Tang shi* 全唐詩 (Complete Tang poems). Photomechanic reproduction. Taipei: Fuxing shuju 1961.
- Scripta Sinica: Zhongyang yanjiuyuan Hanji dianzi wenxian Handian quanwen qiansuo xitong* 中央研究院漢籍電子文獻瀚典全文檢索系統 (Academia Sinica Taiwan, Electronic Editions of Chinese Writings Full-text Database), since 1984. Access via platform Cross Asia: <http://erf.sbb.spk-berlin.de/han/ScriptaSinica/hanchi.ihp.sinica.edu.tw/ihp/hanji.htm>.
- Shanghai beike ziliao xuanbian ji* 上海碑刻資料選編 (Selected edition of Shanghai stele texts). Edited by Shanghai bowuguan tushu ziliao shi 上海博物館圖書資料室. Shanghai: Shanghai renmin chubanshe 1980.
- Shi Liuqiu lu san zhong* 使琉球錄三種 (Three records of the missions to Liuqiu) [1606]. Edition *Taiwan wenxian congkan*, vol. 287.
- Shujing* 書經 see *Chou King*.
- Song Yingxing 宋 應星, *Tiangong kaiwu* 天工開物 (The exploitation of the works of nature). Edition Shanghai: Shangwu yinshuguan 1954.
- Songshi* 宋史 (Dynastic history of the Song). Compiled by Tuo Tuo 脫脫 et al. Edition Beijing: Zhonghua shuju 1977.
- Tang Ying 唐英, 'Taocheng jishi' 陶成紀事 (Record of facts about porcelain production), in *Tang Ying ji* 唐英集 (Collected writings by Tang Ying). Edition Shenyang: Shenyang shushe 1991.
- Tongzhi tiaoge* 通制條格 (Clauses and paragraphs of the unified system) (1322). Edited and commented by Fang Linggui 方齡貴. Beijing: Zhonghua shuju 2001.
- Wang Hui 王恽 (1227-1304), *Qiuqian ji* 秋澗集 (Collection of Mr. Qiuqian). Edition *Sibu congkan* 140/1396-1398.
- Wei Yungong 魏允恭, *Jiangnan zhizaoju ji* 江南製造局記 (An account of the Shanghai arsenal). Photomechanic reprint of the original edition, Shanghai: Wenbao shuju 1905, in *Jindai Zhongguo shiliao congkan* 近代中國史料叢刊, series 41, vol. 404. Taipei: Wenhai chubanshe 1969.
- Xiamen zhi* 廈門志 (Xiamen gazetteer). Edited by Zhou Kai 周凱. Web edition *Handian*, based on edition *Taiwan wenxian congkan*, vol. 95, [Jan. 2018].
- Yuanming yuan neigong zaxiang jiazhi zeli* 圓明園內工雜項價值則例 (Regulations and precedents on prices of miscellaneous items), in *Neiting Yuanming yuan neigong zhuzuo xianxing zeli*, 內廷圓明園內工諸作現行則例, vol. 1, pp. 615-656.
- Yijing* 易经 [Zhou Yi 周易] (The Book of Changes/Changes of the Zhou). Edition *Shisan jing zhushu* 十三經注疏 (Commentaries and subcommentaries to the Thirteen Classics), reprint of *Sibu beiyao* edition. Shanghai: Zhonghua shuju n.d.

- Yuanshi* 元史 (Dynastic history of the Yuan). Compiled by Song Lian 宋濂 et al. Edition Beijing: Zhonghua shuju 1976.
- Zhongguo fangzhi ku* 中國方志庫 (Chinese gazetteer database), comp. by Erudition/Airusheng 爰如生, full-text database. Access via platform Cross Asia: <http://erf.sbb.spk-berlin.de/han/>
- Archival materials from the First Historical Archives, Beijing
(Diyi lishi dang'anguan 第一歷史檔案館)
- Gongbu qianfa tang 工部錢法堂 (Coin production office of the Ministry of Public Works), folders No. 163, 167.
- Neiwufu tang qingce* 內務府堂清冊 (Account books of the offices of the Imperial Household Department), Gongye 工業 (Craft production), files 94 (1770), 106 (1775), 273 *Su[zhou]* 蘇 226 (1884).
- Neiwufu Wuying dian xiushuchu, yushuchu, Jingshan guanxue, Wenyuange boce* 內務府武英殿修書處、御書處、景山官學、文淵閣簿冊 (Notebooks of the Imperial Household Department: Wuying dian printery, Imperial Writings Section, Jingshan Official School, Wenyuan ge Library). no. 432-5-41.
- Neiwufu zeliguan* 內務府則例館 (Regulation and precedent office of the Imperial Household Department) 23, Fuwen 附文 1 to 3, undated.
- 'Qianliang dice' 錢糧底冊 (Money and food provision accounts [of Wuying dian]), in *Neiwufu [...] boce* (Notebooks of the Imperial Household Department [...]), no. 432-5-41, booklet 30, dated 1910.
- 'Wuying dian fa fang ge jian yaopai zhang' 武英殿發放個件腰牌賬 (List of all belt marks given out at the Wuying dian), in *Neiwufu ... boce* (Notebooks of the Imperial Household Department [...]), no. 432-5-41, booklet 02, dated 1905.

Post-1912 literature and sources in Chinese Studies and reference works in other languages

- Abel, Wilhelm, 'Zur Ortsbestimmung des Handwerks vor dem Hintergrund seiner Geschichte', in *Das Handwerk in der Modernen Wirtschaft und Gesellschaft*. Edited by Deutsches Handwerksinstitut. Munich: Hans Holzmann Verlag 1966, pp. 48-81.
- Alger, Grant, 'Regulatory Regionalism during the Qing: River Transport Administration in the Fujian shengli', in *Chinese Handicraft Regulations of the Qing Dynasty*, pp. 465-488.
- Allen, Robert; Jean-Pascal Bassino; Debin Ma; Christine Moll-Murata; Jan Luiten van Zanden, 'Wages, Prices, and Living Standards in China, 1738-1925: In Comparison with Europe, Japan, and India', *Economic History Review*, 64, S1 (2011), pp. 8-38.
- Amelung, Iwo, *Der Gelbe Fluß in Shandong (1851-1911): Überschwemmungskatastrophen und ihre Bewältigung im China der späten Qing-Zeit*. Wiesbaden: Harrassowitz 2000.
- , 'Preliminary Observations on 'Regulations and Precedents for River Works' (*Hegong zeli*) during the Qing Dynasty', in *Chinese Handicraft Regulations of the Qing Dynasty*, pp. 285-305.
- Ancient Collection Division, Fudan University, Shanghai, 'The current situation and prospects of ancient books work in Chinese libraries', contribution at the *62nd IFLA General Conference – Conference Proceedings* – August 25-31, 1996. <http://www.ifla.org/IV/ifla62/62-funu.htm> [Jan. 2018].
- Audemard, Louis, *Les jonques chinoises*. Rotterdam: Museum voor Land- and Volkenkunde en het Maritiem Museum 'Prins Hendrik' 1957-1971.

- Bagley, Robert, 'Shang Archeology', in *The Cambridge History of Ancient China: From the Origins of Civilization to 221 B.C.* Edited by Michael Loewe and Edward L. Shaughnessy. Cambridge: Cambridge University Press 1999, pp. 124-231.
- Bai Shouyi 白寿彝 (General editor), *Zhongguo tongshi, Di Shiyi juan: Jindai qianbian (Shang ce)* 中国通史.近代前编(上册) (A general history of China, Vol. 11: Modern Era, Part One). Originally published at Shanghai renmin chubanshe, electronic version installed at Website *Zhongguo tongshi* 中国通史, [http://www.uus8.org/其他历史书籍/历史/通史/中国通史\(白版\)/19/index.htm](http://www.uus8.org/其他历史书籍/历史/通史/中国通史(白版)/19/index.htm) [Jan. 2018].
- Baller, F. W., *An Analytical Chinese-English Dictionary*. Shanghai: China Inland Mission 1900.
- Bao Yilai 鲍义来, *Huizhou gongyi* 徽州工艺 (Huizhou crafts). Hefei: Anhui renmin chubanshe 2005.
- Barbieri-Low, Anthony J., *Artisans in Early Imperial China*. Seattle and London: University of Washington Press 2007.
- Beijing shizhi gao* 北京市志稿 (A draft gazetteer of Peking). Edited by Wu Tingxie 吴廷燮 et al., emended by Yu Jie 于傑 et al. Beijing: Beijing Yanshan chubanshe 1998. 15 vols.
- Belsky, Richard, *Localities at the Center: Native Place, Space, and Power in Late Imperial Beijing*. Cambridge, Mass.: Harvard University Press 2006.
- Bergère, Marie-Claire, *The Golden Age of the Chinese Bourgeoisie, 1911-1937*. Cambridge: Cambridge University Press 1989 (translated from the French *L'âge d'or de la bourgeoisie chinoise*).
- Bennet, Adrian A., *John Fryer: The Introduction of Western Science and Technology into Nineteenth-century China*. Cambridge, Mass.: Harvard University Press 1967.
- Biggerstaff, Knight, *The Earliest Modern Government Schools in China*. Ithaca, N.Y.: Cornell University Press 1961.
- Bodde, Derk, *Chinese Thought, Society, and Science: The Intellectual and Social Background of Science and Technology in Pre-Modern China*. Honolulu: University of Hawaii Press 1991.
- Bodolec, Caroline, *L'architecture en vouûte chinoise: Un patrimoine méconnu*. Paris: Maisonneuve & Larose 2005.
- , 'The Technology of the Vault Structure in Chinese Architecture: Links between the *Gongcheng zuofa* and the Contemporary Building Methods of *yaodong* Houses in Shaanxi and Shanxi Provinces', in *Chinese Handicraft Regulations of the Qing Dynasty*, pp. 213-232.
- Bostan, İdris, 'Tersane-i Amire', in Gábor Ágoston and Bruce Masters (eds.), *Encyclopedia of the Ottoman Empire*. New York: Facts on File 2009, pp. 559-561.
- Bradstock, Timothy R., *Craft Guilds in Ch'ing Dynasty China*. Ph. D. Dissertation, Harvard University 1984.
- Bramall, Chris and Peter Nolan, 'Introduction: Embryonic Capitalism in East Asia', in *Chinese Capitalism, 1522-1840*. Edited by Xu Dixin and Wu Chengming. Translated from the Chinese *Zhongguo ziben zhuyi fazhan shi*, vol. 1 (1985). Houndsmills: Macmillan 2000.
- Bray, Francesca, *Technology and Gender: Fabrics of Power in Late Imperial China*. Berkeley: University of California Press 1997.
- , 'Towards a Critical History of Non-Western Technology', in Brook and Blue, *China and Historical Capitalism*, pp. 158-209.
- Brinker, Helmut, and Roger Goeppe, *Kunstschatze aus China, 5000 v. Chr. bis 900 n. Chr.: Neue archäologische Funde aus der Volksrepublik China*. Zürich: Kunsthau Zürich 1980.
- Brokaw, Cynthia J., *Commerce in Culture: The Sibao Book Trade in the Qing and Republican Periods*. Cambridge, Mass., London: Harvard University Asia Center 2007.
- Brook, Timothy, 'Capitalism and the Writing of Modern History in China', in Brook and Blue, *China and Historical Capitalism*, pp. 110-157.
- , *The Confusions of Pleasure: Commerce and Culture in Ming China*. Berkeley: University of California Press 1998.

- , 'Censorship in Eighteenth-Century China: A View from the Book Trade', *Canadian Journal of History*, 22/2 (1988), pp. 177-196.
- Brook, Timothy, and Gregory Blue (eds.), *China and Historical Capitalism: Genealogies of Sinological Knowledge*. Cambridge: Cambridge University Press 1999.
- Burger, Werner, *Ch'ing Cash until 1735*. Taipei: Mei Ya 1976.
- , *Ch'ing Cash. Year Tables*. Hong Kong: Hong Kong University Museum and Art Gallery 2016. 2 vols.
- , 'Minting during the Qianlong Period: Comparing the Actual Coins with the Mint Reports', in *Chinese Handicraft Regulations of the Qing Dynasty: Theory and Application*, pp. 373-394.
- Burgess, John Stewart, *The Guilds of Peking*. New York: Columbia University Press 1928. Reprint Taiwan: Ch'eng-wen 1966.
- The Cambridge History of China*, Vol. 6: *Alien Regimes and Border States, 907-1368*. Edited by Herbert Franke and Denis Twitchett (1994). Vol. 8: *The Ming Dynasty, 1368-1644*, Part 2, edited by Denis Twitchett and Frederick W. Mote (1998). Vol. 9, Part 1: *The Ch'ing Empire to 1800*, edited by Willard Peterson (2002). Vol. 10: *Late Ch'ing, 1800-1911*, Part 1, edited by John K. Fairbank (1978). Vol. 11: *Late Ch'ing, 1800-1911*, Part 2, edited by John K. Fairbank and Liu Kwang-ching (1980). Cambridge: Cambridge University Press.
- Cao Shouliang 曹守亮, 'Zhongguo zibenzhuyi mengya yanjiu lilun jichu bianxi' 中国资本主义萌芽研究理论基础辨析 (An analysis of the theoretical foundation of research on the Sprouts of Capitalism in China), *Xuexi yu tansuo* 学习与探索 (Study and Exploration) 2011/03, 251-255.
- Chan, Wellington K.K., 'Government, Merchants and Industry to 1911', *The Cambridge History of China*, vol. 11, pp. 448-451.
- , *Merchants, Mandarins and Modern Enterprise in Late Ch'ing China*. Cambridge, Mass.: Harvard University Press 1977.
- Chang, Chung-li, *The Chinese Gentry: Studies on their Role in Nineteenth-Century China*. Seattle: University of Washington Press 1955.
- Chen Chaoyong 陳朝勇, 'Qianlong chao Wuliao jiazhi zeli zhong de wujia he gongjia' 乾隆朝《物料價值則例》中的物價和工價 (On Prices of Building Materials and Wages in Public Construction in Wuliao jiazhi zeli, 1769), in *Chinese Handicraft Regulations of the Qing Dynasty*, pp. 327-344.
- Chen, Gideon, *Lin Tse-hsü: Pioneer Promoter of the Adoption of Western Means of Maritime Defence in China*. Peiping: Department of Economics, Yenching University 1934.
- , *Tseng Kuo-fan: Pioneer Promoter of the Steamship in China*. Peiping, Yenching University, 1935.
- , *Tso Tsung T'ang: Pioneer Promoter of the Modern Dockyard and the Woollen Mill in China*. Peiping: Department of Economics, Yenching University 1938.
- Chen Shiqi 陳詩啓, *Mingdai guan shougongye de yanjiu* 明代官手工業的研究, (Research on Ming dynasty official crafts). Wuhan: Hubei renmin chubanshe 1955.
- Chen Zehong 陈泽泓, 'Pan Shicheng luekao' 潘仕成略考 (Brief study on Pan Shicheng), *Guangdong shizhi* 广东史志 (Guangdong local history), 1995/Z1, pp. 68-76.
- Chen Zhen 陳真 (ed.), *Zhongguo jindai gongyeshi ziliao. Di san ji: Qing zhengfu, Beiyang zhengfu he Guomindang guanliao ziben chuangban he longduan de gongye* 中国近代工业史資料. 第三輯. 清政府、北洋政府和國民黨官僚資本創辦和壟斷的工业 (Materials for the history of modern Chinese industry. Part Three: The industry that was organized and monopolized by the Qing government, the North China Government, and the Guomindang bureaucratic capital). Vol. 1. Beijing: Sanlian 1961. Reprint Tōkyō: Dai'an 1966.
- Chen Zhongping, 'The Origins of Chinese Chambers of Commerce in the Lower Yangzi Region', *Modern China* 27/2, April 2001, pp. 155-201.

- , *Modern China's Network Revolution: Chambers of Commerce and Sociopolitical Change in the Early Twentieth Century*. Stanford: Stanford University Press 2011.
- Chia, Lucille, *Printing for Profit: The Commercial Publishers of Jianyang, Fujian (11th to 17th Centuries)*. Cambridge, Mass.: Harvard University Asia Center 2002.
- Chinese Handicraft Regulations of the Qing Dynasty: Theory and Application*. Edited by Christine Moll-Murata, Song Jianze, and Hans Ulrich Vogel. Munich: Ludicium 2005.
- Ching-te-chen t'ao-lu or The Potteries of China*, by Lan Pu and Zheng Tinggui, translated and commented by Geoffrey R. Sayer. London. Routledge and Kegan Paul 1951.
- Chow Kai-wing, *Publishing, Culture and Power in Early Modern China*. Stanford: Stanford University Press 2004.
- Chü Ch'ing-yüan [i.e. Ju Qingyuan], 'Government artisans of the Yüan Dynasty', in John De Francis and E-tu Zen Sun (translated and edited), *Chinese Social History. Translation of Selected Studies*. Washington D.C.: American Council of Learned Societies 1956, pp. 234-246.
- Ch'ü T'ung-tsu, *Law and Society in Traditional China*. Paris: Mouton 1961.
- Clark, Gregory, 'Lifestyles of the Rich and Famous: Living Costs of the Rich versus the Poor in England, 1209-1869'. Paper presented at the Conference 'Towards a Global History of Prices and Wages', Utrecht, August 2004. Installed on the website of the International Institute for Social History, <http://www.iisg.nl/hpw/papers/clark.pdf> [Jan. 2018].
- Clunas, Craig, *Superfluous Things: Material Culture and Social Status in Early Modern China*. Honolulu: University of Hawaii Press 2004 (paperback edition).
- Cornet, Christine, *Etat et entreprises en Chine, XIXe-XXe siècles : le chantier naval de Jiangnan, 1865-1937*. Paris: Editions Arguments 1997.
- 'Dagu zaochuansuo' 大沽造船所 (The Dagu shipyard), by anon., *Shuilu yunshu wenzhai* 水路运输文摘 Water transportation diges), 2001/10, p. 24.
- Decennial Reports*, see Imperial Maritime Customs (ed.)
- Deng, Gang, *Chinese Maritime Activities and Socioeconomic Developments, c. 2100 B.C.-1900 A.D.* Westport, CT: Greenwood 1997.
- Deng, Kent G. [i.e. Deng, Gang], *The Premodern Chinese Economy. Structural Equilibrium and Capitalist Sterility*. London and New York: Routledge 1999.
- Desroches, Jean Paul, 'Yuanming yuan: Die Welt als Garten', in *Europa und die Kaiser von China, 1240-1876*. Edited by Berliner Festspiele. Frankfurt: Insel 1985, pp. 122-143.
- Drège, Jean-Pierre, *La Commercial Press de Shanghai, 1897-1949*. Paris: Collège de France, Institut des Hautes Etudes Chinoises 1978.
- Duan Benluo 段本洛, Zhang Qifu 张圻福, *Suzhou shougongye shi* 苏州手工业史 (Craft history of Suzhou). Nanjing: Jiangsu guji chubanshe 1986.
- Dunstan, Helen, *State or Merchant? Political Economy and Political Process in 1740s China*. Cambridge, Mass.: Harvard University Press 2006.
- Eberhard, Wolfram, *Social Mobility in Traditional China*. Leiden: Brill 1962.
- Ehmer, Joseph, 'Artisans, Guilds and Craft Regulations in European History and Historiography', in *Chinese Handicraft Regulations of the Qing Dynasty*, pp. 61-76.
- Elkar, Rainer S., 'Fragen und Probleme einer interdisziplinären Handwerks-geschichte', in Rainer S. Elkar (ed.), *Deutsches Handwerk in Spätmittelalter und Früher Neuzeit: Sozialgeschichte – Volkskunde – Literaturgeschichte*. Göttingen: Schwartz 1983, pp. 3-31.
- Elliott, Mark C., *The Manchu Way: The Eight Banners and Ethnic Identity in Late Imperial China*. Stanford: Stanford University Press 2001.

- Elman, Benjamin A., *On Their Own Terms: Science in China, 1550-1900*. Cambridge, Mass.: Harvard University Press 2005.
- , 'The Social Role of Literati in early to mid-Ch'ing', in *The Cambridge History of China*, vol. 9. Edited by Willard Peterson. Cambridge: Cambridge University Press 2002, pp. 360-427. *Eminent Chinese*, see Hummel (ed.).
- Eng, Robert 'From 'The West and the Rest' to Global Interconnectedness: China Historians and the Transformation of World History as a Discipline', *Asia Network Exchange* 2015, Spring, vol. 22/2, pp. 35-48.
- d'Entrecolles, François Xavier, 'Lettre du Père d'Entrecolles, Missionnaire de la Compagnie de Jesus: Au Père Orry de la mesme Compagnie, Procureur des Missions de la Chine & des Indes' (1712), in Stephen Bushell, *Description of Chinese Pottery and Porcelain. Being a Translation of the T'ao shuo 陶說*. Oxford: Clarendon 1910 (Reprint New York: AMS Press 1973), pp. 181-209.
- Esherick, Joseph W., and Mary Backus Rankin (eds.), *Chinese Local Elites and Patterns of Dominance*. Berkeley and Los Angeles: University of California Press 1990.
- Etymologisch Woordenboek van het Nederlands*. Edited by Marlies Philippa et al. Amsterdam: Amsterdam University Press 2008-2009.
- Fairbank, John King, *China. A New History*. Cambridge, Mass.: Harvard University Press – Belknap Press 1994.
- Fan Jinmin 范金民, 'Qingdai feichu jiangji de lishi yiyi' 清代废除匠籍的历史意义 (The historical significance of the abolishment of the artisan registration in the Qing Dynasty) *Qingshi yanjiu* 清史研究 (Studies in Qing history), 96 (1995), 108-15.
- Fang Xing, 'The Retarded Development of Capitalism', in Xu Dixin and Wu Chengming (eds.), *Chinese Capitalism, 1522-1840*, pp. 375-401.
- Fang Xing, Shi Qi, Jian Rui, Wang Shixing, 'Cloth Processing in Suzhou and Songjiang', in Xu Dixin and Wu Chengming (eds.), *Chinese Capitalism, 1522-1840*, pp. 213-227.
- Fang Xing, Shi Qi, Jian Rui, Wang Shixing, 'Paper Making, Printing and Publishing', in Xu Dixin and Wu Chengming (eds.), *Chinese Capitalism, 1522-1840*, pp. 228-246.
- Fang Xing, Shi Qi, Jian Rui, Wang Shixing, 'Silk Weaving in Jiangsu and Zhejiang', in Xu Dixin and Wu Chengming (eds.), *Chinese Capitalism, 1522-1840*, pp. 203-212.
- Fang Zhuofen, Hu Tiewen, Jian Rui, Fang Xing, 'Copper Mining and Smelting in Yunnan', in Xu Dixin and Wu Chengming (eds.), *Chinese Capitalism, 1522-1840*, pp. 265-288.
- Fang Zhuofen, Hu Tiewen, Jian Rui, Fang Xing, 'The Iron Industry', in Xu Dixin and Wu Chengming (eds.), *Chinese Capitalism, 1522-1840*, pp. 249-264.
- Fang Zhuofen, Hu Tiewen, Jian Rui, Fang Xing, 'The Porcelain Industry of Jingdezhen', in Xu Dixin and Wu Chengming (eds.), *Chinese Capitalism, 1522-1840*, pp. 308-326.
- Fang Zhuofen, Hu Tiewen, Jian Rui, Fang Xing, 'Shanghai Maritime Shipping', in Xu Dixin and Wu Chengming (eds.), *Chinese Capitalism, 1522-1840*, pp. 359-371.
- Farr, James R., *Artisans in Europe, 1300-1914: New Approaches to European History*. Cambridge: Cambridge University Press 2000.
- Feuerwerker, Albert, *China's Early Industrialization: Sheng Hsuan-huai (1844-1916) and Mandarin Enterprise*. Cambridge, Mass.: Harvard University Press 1958.
- , *The Chinese Economy, 1870-1949*. Ann Arbor: Center for Chinese Studies 1995.
- , 'Economic Trends in the Late Ch'ing Empire, 1870-1991', in *The Cambridge History of China*, Vol. 11, pp. 1-69.
- Finnane, Antonia, *Speaking of Yangzhou: A Chinese City, 1550-1850*. Cambridge, Mass: Harvard University Asia Center 2004.

- Flath, James A., *The Cult of Happiness: Nianhua, Art, and History in Rural North China*. Vancouver: UBC Press 2004.
- Friese, Heinz, *Das Dienstleistungs-System der Ming-Zeit (1368-1644)*. Hamburg: Gesellschaft für Natur- und Völkerkunde Ostasiens/Wiesbaden: Kommissionsverlag O. Harrassowitz 1959. (*Mitteilungen der Gesellschaft für Natur- und Völkerkunde Ostasiens*, 35A).
- Fuchs, Walter, 'Die Entwürfe der Schlachtenkupfer der Kienlung- und Taokuang-Zeit. Mit Reproduktion der 10 Taokuangkupfer und der Vorlage für die Annam-Stiche', *Monumenta Serica*, IX (1944), pp. 101-122.
- Fu Zhenlun 傅振倫 and Zhen Li 甄勵, 'Tang Ying ciwu nianpu changbian' 唐英瓷務年譜長編 (Chronological biography of Tang Ying's porcelain engagements, enlarged version), *Jingdezhen taoci* 景德鎮陶瓷 (Jingdezhen's Ceramics) 1982/02, n.p. [1-48].
- Gamble, Sidney D., and John Stewart Burgess, *Peking. A Social Survey*. New York: Doran 1921.
- Gao Rongsheng 高榮盛, 'Yuandai jianghu sanlun' 元代匠戶散論 (Discussion about artisan households in the Yuan dynasty), *Nanjing daxue xuebao (Zhaxue, renwen, shehui kexue)* 南京大學學報 (哲學, 人文, 社會科學) (Journal of Nanjing University, Philosophy – Humanities – Social Sciences edition), 1997/1, pp. 123-129.
- Gao Xuan 高瑄, 'Songdai chuantong gongyi' 宋代传统工艺 (Traditional crafts in the Song Dynasty), chapter 8 of *Zhongguo chuantong gongyi zonglun* 中国传统工艺综论 (Outline of traditional Chinese crafts). Edited by Su Rongyu and Dai Wusan. Forthcoming.
- Gates, Hill, *China's Motor. A Thousand Years of Petty Capitalism*. Ithaca: Cornell University Press 1996.
- Gerss, Wolfgang, *Struktur und Entwicklung des Handwerks in Nordrhein-Westfalen*. Cologne: Kölner Universitäts-Verlag 1971. (*Abhandlungen zur Mittelstandsforschung*, 53).
- Giles, Herbert, *A Chinese-English Dictionary*. 2nd ed., rev. & enlarged. Reprint NY: Paragon Press 1964. 1st ed. Shanghai 1892, 2nd ed. Shanghai 1912.
- Giles, Lionel, *An Alphabetical Index to the Chinese Encyclopedia Ch'in ting ku chin t'u-shu chi ch'eng*. London: British Museum 1911.
- Giquel, Prosper, *The Foochow Arsenal and its Results*. Translated from the French by H. Lang. Shanghai: Shanghai Evening Courier 1874.
- Golas, Peter, 'Early Ch'ing Guilds', in *The City in Late Imperial China*. Edited by G. William Skinner. Stanford: University of California Press 1977, pp. 555-580.
- Goldfuss, Gabriele, *Vers un bouddhisme du XXe siècle. Yang Wenhui (1837-1911), réformateur laïque et imprimeur*. Paris: Collège de France, Institut des Hautes Études Chinoises 2001.
- Goossaert, Vincent, 'Matériaux et recherches nouvelles sur les corporations chinoises urbaines traditionnelles (des Ming à 1949)', *Revue bibliographique de Sinologie*, 17, 1999, pp. 205-22.
- Gugong cidian* 故宮詞典 (Dictionary of the imperial palace). Edited by Wan Yi 萬依. Shanghai: Wenhui chubanshe 1997.
- Guo Daiheng 郭黛姮, 'Yuanming yuan neigong zeli pingshu' 《圓明園內工則例》評述 (Comments on the Book *Yuanming Yuan Neigong Zeli*), in *Chinese Handicraft Regulations of the Qing Dynasty*, pp. 151-173.
- Guo Dasong 郭大松 and Pan Junling 泮君玲, 'Qingmo shangbu – Nong gong shang bu zhenxing gong shang cuoshi shuping' 清末商部—農工商部振興工商措施述評 (An assessment of the measures for trade and industrial promotion of the Ministry of Commerce/Agriculture, Industry, and Commerce in the Late Qing Dynasty), in *Shandong shifan daxue xuebao (Renwen kexue ban)* 山東師範大學學報 (人文科學版) (Journal of Shandong Normal University, Humanities and Social Sciences), 2004/193 (vol. 49, no. 2), pp. 86-89.

- Guo Rongdong, 'The Silk-Weaving Craftsmen in Suzhou during the Ming and Qing dynasties', in Brian Ranson (ed.), *A Preliminary Study of Craft Guilds in China*. Vol. III: *Application and Transformation of Chinese Guilds – A Case Study of Selected Guilds in Beijing, Jingdezhen, Shanghai and Suzhou*. Hong Kong: David C. Lam Institute for East-West Studies, 1998. *Occasional Paper* 98/12/OP1, pp. 7-18.
- Hansson, Anders, *Chinese Outcasts: Discrimination and Emancipation in Late Imperial China*. Leiden: Brill 1996 (*Sinica Leidensia* 37).
- Hanyu da cidian* 漢語大詞典 (Great Chinese dictionary). General editor Luo Zhufeng 罗竹风. Shanghai: Shanghai cishu chubanshe 1986-1994. 12 vols.
- Hao Yen-p'ing and Wang Erh-min, 'Chinese Views of Western Relations', in *Cambridge History of China*, Vol. 11, pp. 142-201.
- Hartill, David, *Qing Cash*. London: Royal Numismatic Society 2003.
- He Jinsong 何金松, *Hanzi xingyi kaoyuan* 漢字形義考源 (Explorations of the form and meaning of Chinese characters). Wuhan: Wuhan chubanshe 1996.
- Heijdra, Martin, 'The Socio-Economic Development of Rural China During the Ming', in *The Cambridge History of China*, Vol. 8, pp. 417-578.
- Hemeling, K[arl], *English-Chinese Dictionary of the Standard Chinese Spoken Language* (官話). Shanghai: Statistical Department of the Inspectorate General of Customs 1916.
- Hepburn, J.C., *Japanese and English Dictionary*, editions 1867, 1872, 1873 (New York), 1881 (Shanghai), 1887, Maruzen (1903), electronic versions installed on the website of the Meiji Gakuin University, Tōkyō, <http://mgda.meijigakuin.ac.jp/mgda/waei/> [Jan. 2018].
- Hinton, Harold C., *The Grain Tribute System of China (1845-1911)*. Cambridge, Mass.: Harvard University Press 1956.
- Historical Atlas of China: Zhongguo lishi ditu ji* 中国历史地图集. Edited by Tan Qixiang 谭其骧 et al. 8 vols. Beijing: Ditu chubanshe 1982-87.
- Ho, Ping-ti, *The Ladder of Success in Imperial China: Aspects of Mobility, 1368-1911*. New York: Columbia University Press 1962.
- Hofmeister, Karin, Gijs Kessler, and Christine Moll-Murata, 'Conquerors, Employers, and Arbiters: States and Shifts in Labour Relations 1500-2000: Introduction', in *International Review of Social History* 2016, vol. 61, Supplement 24, pp. 1-26.
- Holzer, Rainer. *Das Ch'ien-fu lun des Wang Fu. Aufsätze und Betrachtungen eines Weltflüchtigen*. Heidelberg: Edition Forum 1992 (Würzburger Sinologische Schriften).
- Howland, Douglas R., 'Samurai Status, Class, and Bureaucracy: A Historiographical Essay', *Journal of Asian Studies* 60/2, 2001, pp. 353-380.
- Hsi, Angela Ning-jy Sun, *Social and Economic Status of the Merchant Class of the Ming Dynasty: 1368-1644*. Urbana, University of Illinois, Ph.D. Dissertation 1972.
- Hsi, Immanuel, 'Late Ch'ing Foreign Relations', in *The Cambridge History of China*, Vol. 11, pp. 70-141.
- Hu Xiaopeng 胡小鹏, *Zhongguo shougongye jingji tongshi: Song Yuan juan*. 中国手工业经济通史。宋元卷 (General economic history of the Chinese crafts. Vol. Song and Yuan.). General editor Wei Mingkong 魏明孔. Fuzhou: Fujian renmin chubanshe 2004.
- , 'Yuandai de minjiang' 元代的民匠 (Civilian craftsmen in the Yuan dynasty), *Xibei Shifan daxuwei bao* (*Shehui kexue ban*) 西北师范大学报, 社会科学版 (Journal of the Northwest Normal University, Social Sciences edition), 39/6, Nov. 2002, pp. 63-68.
- , 'Yuandai de xiguan jianghu' 元代的僚官匠戶 (Official craftsmen in the Yuan dynasty), *Xibei Shifan daxuwei bao*, 40/2, March 2003, pp. 77-83.

- Huang Moxi 黃摩西, *Putong baike xin da cidian* 普通百科新大辭典 (General encyclopedic new big dictionary), 1911, electronic edition in database Chinese Text Project (*Zhongguo zhexueshu dianzihua jihua* 中國哲學書電子化計劃) <http://ctext.org/library.pl?if=gb&res=92932> [Jan. 2018].
- Huang, Philip C.C., 'Development or involution in eighteenth-century Britain and China? A review of Kenneth Pomeranz's *The Great Divergence: China, Europe and the Making of the Modern World Economy*', *Journal of Asian Studies* 61, no. 2 (May 2002), pp. 501-538
- Hucker, Charles O., *A Dictionary of Official Titles in Imperial China*. Stanford: Stanford University Press 1985.
- Hudson, Jennifer, *1000 New Designs and Where to Find Them: A 21st-Century Sourcebook*. London: Laurence King Publishing 2006.
- Hummel, Arthur (ed.), *Eminent Chinese of the Ch'ing Period*. Washington, DC: US Government Printing Office 1944. Reprint: Taipei: SMC Publishing 1991.
- Imahori Seiji 今堀誠二, *Chūgoku hōken shakai no kikō: Kisui (Fufuhoto) ni okeru shakai shūdan no jittai chōsa* 中国封建社会の機構: 帰綏(呼和浩特)における社会集団の実態調査 (The structure of the feudal Chinese society: A survey of the actual situation of social groups in Guisui/Hohhot). Tōkyō 1955. Reprint Tōkyō: Kyūko sho'in 2002.
- Imperial Maritime Customs (ed.). I. Statistical Series, 6. *Decennial Reports on the Trade, Navigation, Industries etc. of the Ports open to Foreign Commerce in China and Corea [...], 1882-1891*. Shanghai: Inspector General of Customs, 1896.
- Inoue Susumu 井上進, *Chūgoku shuppan bunkashi: Shomotsu sekai to chi no fūkei* 中国出版文化史: 書物世界と知の風景 (A cultural history of Chinese publishing: The world of books and the landscape of learning). Nagoya: Nagoya daigaku shuppankai 2002.
- Jami, Catherine, 'Europäische Wissenschaft und Technik am Hofe der Kaiser von China', in *Die Verbotene Stadt*, pp. 320-326.
- Janku, Andrea, 'Ironie, Spott und Kritik: Zeitgenössische Ansichten über den Rebellen Kang Youwei', in Heiner Roetz (ed.), *Kritik im alten und modernen China. (Jahrbuch der Deutschen Vereinigung für Chinastudien, 2)*. Wiesbaden: Harrassowitz 2006, pp. 207-223.
- , *Nur leere Reden: Politischer Diskurs und die Shanghaier Presse im China des späten 19. Jahrhunderts*. Wiesbaden: Harrassowitz 2003.
- , 'Preparing the Ground for Revolutionary Discourse: From the Statecraft Anthologies to the Periodical Press in Nineteenth-Century China', *T'oung Pao*, vol. 90, Nos. 1-3, June 2004, pp. 65-121.
- Ji Ruxun 季如迅, *Zhongguo shougongye jianshi* 中国手工业简史 (Short history of Chinese crafts). Beijing 1998.
- Jiangnan 1975: Jiangnan zaochuanchang shi 1865-1949* 江南造船厂史 (History of the Jiangnan Shipyard). Edited by Jiangnan zaochuan changshi bianxie zu 江南造船厂史编写组. Shanghai: Shanghai renmin chubanshe 1975.
- Jiangnan 1983: Jiangnan zaochuan chang changshi 1865-1949* 江南造船厂厂史, 1865-1949.5 (Factory history of the Jiangnan Shipyard, 1865-May 1949). Edited by Shanghai shehui kexueyan jingji yanjiusuo 上海社会科学院经济研究所. Shanghai: Shanghai renmin chubanshe 1983.
- Jiangxi sheng qingongye ting taoci yanjiusuo 江西省輕工業廳陶瓷研究所 (ed.), *Jingdezhen taoci shigao* 景德鎮陶瓷史稿 (A draft history of Jingdezhen porcelain). Beijing: Sanlian shudian 1959.
- Jiaoyu da cidian* 教育大辭典 (Great dictionary of education), vol. 10, *Jin xiandai jiaoyu shi* 近现代教育史 (The history of education in the early modern and modern period), ed. *Jiaoyu da cidian bianzuan weiyuanhui* 教育大辭典编纂委员会编. Shanghai: Shanghai jiaoyu chubanshe 1991.

- Jinsheng 金生, 'Yue Gui de 'zishu nü' he 'bu luojia' 粵桂的'自梳女'和'不落家' ('Self-combing women' and 'not settling down in a family' in Guangdong and Guangxi'), *Dongfang zazhi* 東方雜誌 (Eastern miscellanies), 32/8 (1935/4/16), pp. 89-90.
- Ju Qingyuan 鞠清遠, 'Handai de guanfu gongye' 漢代的官府工業 (Official crafts in the Han dynasty), *Shihuo* 食貨 (Food and Money), 1934/Dec., pp. 1-5.
- , *Tang Song guan si gongye* 唐宋官私工業 (Official and private industries in the Tang and the Song). Shanghai: Xin shengming shuju 1934.
- , *Tō Sō kōgyōshi* 唐宋工業史 (History of the industries in the the Tang and the Song), transl. Fukuzawa Sōkichi 福沢宗吉 from the Chinese *Tang Song guan si gongye* 唐宋官私工業 (Official and private industries in the Tang and the Song, Shanghai 1934). Tōkyō: Fumidō 1950.
- , 'Yuandai xiguan jianghu yanjiu' 元代系官匠戶研究 (Research on the official artisan households in the Yuan dynasty), *Shihuo* 食貨 (Food and currency), vol. 1/9 (1935).
- , 'Yuandai xiguan jianghu yanjiu buji' 元代系官匠戶補記 (Additional notes to the research on the official artisan households in the Yuan dynasty), *Shihuo* 食貨 (Food and currency), vol. 2/2 (1935).
- Katō Shigeshi, 'On the Hang or Associations of Merchants in China, with Especial Reference to the Institution in the T'ang and Sung Periods', *Memoirs of the Research Department of the Tōyō bunko* 8 (1936), pp. 45-83.
- Kehnen, Johannes, *Cheng Kuan-ying – Unternehmer und Reformier der späten Ch'ing-Zeit*. Wiesbaden: Harrassowitz 1975. (*Veröffentlichungen des Ostasien-Instituts der Ruhr-Universität Bochum*. 14.)
- Keightley, David N., 'The Shang: China's First Historical Dynasty', in *The Cambridge History of Ancient China: From the Origins of Civilization to 221 B.C.* Edited by Michael Loewe and Edward L. Shaughnessy. Cambridge: Cambridge University Press, 1999, pp. 232-291.
- Kennedy, Thomas L., *The Arms of Kiangnan: Modernization in the Chinese Ordnance Industry, 1860-1895*. Boulder: Westview Replica 1978
- Kerr, Rose, and Nigel Wood, with Ts'ai Mei-fen and Zhang Fukang, *Ceramic Technology*. Vol. V, pt. 12 of *Science and Civilisation in China*. Cambridge: Cambridge University Press 2004.
- 'Kiautschou', in *Deutsches Kolonial-Lexikon*. Edited by Heinrich Schnee. Leipzig: Quelle & Meyer 1920. 3 vols. Electronic version: Website *Der Bildbestand der Deutschen Kolonialgesellschaft in der Universitätsbibliothek Frankfurt am Main*, <http://www.ub.bildarchiv-dkg.uni-frankfurt.de/Bildprojekt/Lexikon/lexikon.htm> [Jan. 2018].
- King, Frank H. H., *Money and Monetary Policy in China, 1845-1895*. Cambridge, Mass.: Harvard University Press 1965.
- Knapp, Ronald G., *China's Traditional Architecture: A Cultural Geography of the Common House*. Honolulu: University of Hawaii Press 1986.
- , *Chinese Bridges*. Oxford: Oxford University Press 1993.
- , *The Chinese House: Craft, Symbol, and the Folk Tradition*. Oxford: Oxford University Press 1994.
- Kong Jingyuan 孔涇源, *Shougongye yu Zhongguo jingji bianqian* 手工业与中国经济变迁. Ph.D. Diss, Zhongguo shehui kexueyuan (Chinese Academy of Social Sciences) 1987.
- Kuhn, Dieter, *Die Song-Dynastie (960 bis 1279). Eine neue Gesellschaft im Spiegel ihrer Kultur*. Weinheim: Acta Humaniora 1987.
- Kuhn, Philipp A., 'Chinese Views of Social Classification', in Watson, James L. (ed.), *Class and Social Stratification in Post-Revolutionary China*. Cambridge: Cambridge University Press 1984, pp. 16-28.
- , 'The Taiping Rebellion', in *The Cambridge History of China*, Vol. 10, pp. 264-317.
- Kuo Ting-ye, 'Self-strengthening: The Pursuit of Western Technology', in *The Cambridge History of China*, Vol. 10, pp. 491-542.

- Lai Zhengwei 赖正维, 'Ming Qing shiqi Fujian yanhai diqu yu Liuqiu zaochuan hanghai jishu jiaoliu kaoshu' 明清时期福建沿海地区与琉球造船航海技术交流靠述 (A study of technological exchange in shipbuilding and navigation between the coastal areas in Fujian and Ryukyu during the Ming and Qing dynasties), in *Changsha dianli xueyuan xuebao (Shehui kexue ban)* 长沙电力学院学报 (社会科学版) (Journal of the Changsha Institute for Electric Engineering; Social Science Edition), vol 18/4, Nov. 2003, pp. 79-83.
- Lan Yong 蓝勇, 'Qingdai Sichuan tuzhu yimin fenbu de dili tezheng yanjiu' 清代四川土著和移民分布的地理特征研究 (Study on the original population of Sichuan in the Qing dynasty and the geographical characteristics of migrational distribution), in *Zhongguo lishi dili luncong* 中国历史地理论丛 (Collected essays on Chinese historical geography), 1995/2.
- Lane, Frederic, *Venice, A Maritime Republic*. Baltimore: Johns Hopkins University Press 1987.
- Ledderose, Lothar, *Ten Thousand Things: Module and Mass Production in Chinese Art*. Princeton: Princeton University Press 2000.
- Leibo, Steven A., *Transferring Technology to China: Prosper Giquel and the Self-strengthening Movement*. Berkeley: Institute of East Asian Studies, University of California, Berkeley 1985.
- Leonard, Jane Kate, *Controlling from Afar: The Daoguang Emperor's Management of the Grand Canal Crisis, 1824-1826*. Ann Arbor: Center for Chinese Studies, University of Michigan 1996.
- , 'Timeliness and Innovation: The 1845 Revision of the Complete Book on Grain Transport (*Caoyun quanshu*)', in *Chinese Handicraft Regulations of the Qing Dynasty: Theory and Application*, pp. 449-464.
- , *Wei Yuan and China's Rediscovery of the Maritime World*. Cambridge, Mass.: Harvard University Press, 1984.
- Lewin, Günter, *Die ersten fünfzig Jahre der Song-Dynastie in China. Beitrag zu einer Analyse der sozialökonomischen Formation während der ersten fünfzig Jahre der Song-Dynastie (960-ca.1010)*. Berlin: Akademie-Verlag 1973.
- Li Bozhong 李伯重, *Agricultural Development in Jiangnan, 1620-1850*. New York: St. Martin's Press 1998.
- , 'Bagu zhi wai: Ming Qing Jiangnan de jiaoyu ji qi dui jingji de yingxiang' 八股之外: 明清江南的教育及其对经济的影响 (Beyond the eight-legged essay: Education in Ming and Qing Jiangnan and its effect on the economy), *Qingshi yanjiu* 清史研究 (Studies in Qing History), 2004/1, pp. 1-14.
- , *Jiangnan de zaoqi gongyehua (1550-1850)* 江南的早期工业化 (Early industrialization in the Yangzi delta, 1550-1880). Beijing: Shehui kexue chubanshe.
- Li Hua 李华, 'Lun Zhongguo fengjian shehui de hanghui zhidu' 论中国封建社会的行会制度 (On the guild system in the feudal Chinese society), in *Zhongguo ziben zhuyi mengya wenti lunwen ji*, pp. 88-115.
- Li Jingwen 李景文, 'Qingdai Henan shuyuan keshu qianlun' 清代河南书院刻书浅论 (Preliminary discussion of book printing in Qing dynasty academies in Henan province), *Shixue yuekan* 史学月刊 (History Monthly), 1994/5, pp. 102-108.
- Li, Lillian Ming-tse, 'Grain Prices in Zhili Province, 1736-1911: A Preliminary Study', in Rawski, Thomas G., and Lillian M. Li (eds.), *Chinese History in Economic Perspective*. Berkeley: University of California Press 1992, pp. 69-99.
- Li Yunjun 李允俊 (ed.), *Wan Qing jingji shishi biannian* 晚清经济史事编年 (A chronicle of Late Qing economic events). Shanghai: Shanghai guji chubanshe 2000.
- Liang Miaotai 梁淼泰, *Ming Qing Jingdezhen chengshi jingji yanjiu* 明清景德镇城市经济研究 (Study on urban economics of Jingdezhen in the Ming and Qing). Nanchang: Jiangxi renmin chubanshe 1991.
- Liao, W.K. (transl.), *The Complete Works of Han Fei Tzu*. 2 vols. London: Probsthain 1939, 2nd ed. 1959.

- Lin Chaoyi, Philipp Sandner, Isabell Welpé, 'Die 100 innovativsten Unternehmen aus China: Eine empirische Analyse mittels Patentdaten', in *Yearbook of Market Entry Advisory 2014: Asien & Osteuropa als Ausgangspunkt*. Edited by René R. Schleus and Alexander Tirpitz. Berlin: epubli 2014, pp. 149-200.
- Lin Man Houg, *China Upside Down: Currency, Society, and Ideologies, 1808-1856*. Cambridge, Mass.: Harvard University Asia Center 2006.
- Linden, Marcel van der, and Jan Lucassen, *Prolegomena for a Global Labour History*. Amsterdam: International Institute of Social History 1999.
- Liu Dunzhen 刘敦楨, 'Tongzhi chongxiu Yuanmingyuan shiliao' 同治重修圓明園史料 (Historical materials on the renovation of the Garden of Perfect Brilliance in the Tongzhi reign), in *Liu Dunzhenjianzhusi lunwenxuanji* 刘敦楨建築史論文集. Beijing: Xinhua shudian 1997, pp. 25-72.
- Liu, Guanglin William, *Wrestling for Power: The State and the Economy in Later Imperial China, 1000-1770*. Ph. D. Diss., Harvard University 2005.
- , *The Chinese Market Economy, 1000-1500*. Albany: State University of New York Press 2015.
- Liu, Guanglin William and Andrew Wareham, 'England and China Compared, c. 960 to 1100: Taxation and the Economy.' Paper presented at LSE's Global Economic History Seminar and the Global Economies Conference (London, Canada), 2005.
- Liu Guoliang 刘国良, *Zhongguo gongye shi* 中国工业史 (History of Chinese industries). Nanjing: Jiangsu kexue jishu chubanshe 1990-2003. 3 vols.
- Liu Kwang-ching, 'The Military Challenge: The North-West and the Coast', in *The Cambridge History of China*, Vol. 11, pp. 202-273.
- , 'Steamship Enterprise in Nineteenth-Century China', *Journal of Asian Studies* 18, No. 4 (Aug. 1959), pp. 435-355.
- Liu Liya 刘莉亚, *Yuandai shougongye yanjiu* 元代手工业研究 (A Study of the crafts in the Yuan dynasty). Ph.D. Diss., Hebei daxue, Baoding (2004).
- Liu Qiang 劉 薈, 'Qingdai Wuying dian keshu zhi zuzhi yunzuo yu jishu chuangxin tanxi – jiyu jiangzuo zeli zhi kaocha' 清代武英殿刻書之組織運作與技術創新探析—基於匠作則例之考察 (Organization and Techniques of the Imperial Printery in the Hall of Military Fame Wuying dian: An Investigation Based on Regulations and Precedents), in *Chinese Handicraft Regulations of the Qing Dynasty*, pp. 263-283.
- Liu Ta-chung and Yeh Kung-chia, *The Economy of the Chinese Mainland: National Income and Economic Development, 1933-1959*. Princeton: Princeton University Press 1965.
- Liu Yongcheng 劉永成, *Qiaoshou duoneng: Zhongguo gudai shougongye shi* 巧手多能: 中國古代手工業史 (Skilled hands, abundant talents: A history of ancient Chinese crafts). Taipei: Wanquan lou.
- Liu Yung-ch'eng [i.e. Liu Yongcheng], 'The Handicraft Guilds in Soochow During the Ch'ing Dynasty', *Chinese Studies in History* 15 (1981-1982), pp. 113-167.
- Loewe, Michael (ed.), *Early Chinese Texts: A Bibliographical Guide*. Berkeley: Society of the Study of Early China, Institute of East Asian Studies, University of California, Berkeley 1993.
- The Low Countries Journal of Social and Economic History* / *Tijdschrift voor Sociale en Economische Geschiedenis* (TSEG), Special Issue 2015 (12/2) 'Escaping the Great Divergence?', <https://www.tseg.nl/4/volume/12/issue/2/> [Jan. 2018].
- Lu Jiaming 卢家明, 'Ming Qing shiqi Jingdezhen yuqichang 'guanda minshao' zhidu shitan, jian yu Pan Qun, Xu Dixin xiansheng shangque' 明清时期景德镇御器厂'官搭民烧'制度试探—兼与潘群、徐涤新先生商榷 (An exploration of the system 'official forming and private burning' in the Ming and Qing Imperial porcelain manufactory of Jingdezhen: A debate with Pan Qun and Xu Dixin), *Nanchang zhiye jishu shifan xueyuan xuebao* (Journal of the Nanchang Technical Teachers' College), 1994/2, pp. 30-33.

- Lu Shaw, Shio-w-jyu, *The Imperial Printing of Early Ch'ing China, 1644-1805*. San Francisco, Taipei: China Materials Center 1983.
- Lufrano, Richard John, *Honorable Merchants: Commerce and Self-Cultivation in Late Imperial China*. Honolulu: University of Hawaii Press 1997.
- Luo Ergang 罗尔纲, *Luying bingzhi 绿营兵志* (Treatise of the Green Standards). Beijing: Zhonghua shuju 1984, reprint of 1945 edition of Shangwu yinshuguan (*Minguo congshu*).
- Luo Lixing 羅麗馨, *Shiliu shiqi shiji shougongye de shengchan fazhan 十六、十七世紀手工業的生產發展* (The development of sixteenth- and seventeenth-century craft production). Taipei: Daohe chubanshe 1997.
- Lust, John, *Chinese Popular Prints. (Handbuch der Orientalistik, Abt. 4, Bd. 11)*. Leiden: Brill 1996.
- Ma Yong, 'Xiandaihua qidian: Yi ziben zhuyi mengya wei zhongxin de taolun' 现代化起点:以资本主义萌芽为中心的讨论' (The origins of modernity: A discussion focusing on the sprouts of capitalism), *Wenhua xuekan 文化学刊* (Culture Journal) 2015/4, pp. 35-56.
- Maddison, Angus, *Chinese Economic Performance in the Long Run*. Paris: Development Center of the Organisation for Economic Co-operation and Development 1998.
- Maitland, Derek, *Setting Sails: A Tribute to the Chinese Junk*. Hong Kong: South China Morning Post 1981.
- Manchester, William, *Krupp: Zwölf Generationen*. Translated from the English *The Arms of Krupp* by Evelyn Linke et al. Munich: Kindler 1968 (English edition 1964).
- Mann, Susan, 'Household Handicrafts and State Policy in Qing Times', in Jane K. Leonard and John R. Watt (eds.), *To Achieve Security and Wealth. The Qing Imperial State and the Economy, 1644-1911*. Ithaca, N.Y.: East Asia Program, Cornell University 1992.
- , *Local Merchants and the Chinese Bureaucracy, 1750-1950*. Stanford: Stanford University Press 1987.
- , 'Women, Families and Gender Relations', in *The Cambridge History of China*, Vol. 9, pp. 428-472.
- Marks, Robert, *Tigers, Rice, Silk, and Silt: Environment and Economy in Late Imperial South China*. Cambridge: Cambridge University Press 1998.
- , 'China's Population Size During the Ming and Qing: A Comment on the Mote Revision', remarks presented at the annual meeting of the Association of Asian Studies 2002, Washington DC, at http://web.whittier.edu/people/webpages/personalwebpages/rmarks/PDF/Env_panel_remarks.pdf; last accessed 1 July 2011.
- Marmé, Michel, *Suzhou: Where the Gods of all the Provinces Converge*. Stanford: Stanford University Press 2005.
- Mayers, Frederick W., 'The Peking Gazette', in *The China Review* 3/1, 1874, pp. 13-18.
- McDermott, Joseph P., *A Social History of the Chinese Book: Books and Literati Culture in Late Imperial China*. Hong Kong: Hong Kong University Press 2006.
- , 'The Ascendance of the Imprint in China', in Cynthia J. Brokaw and Chow Kai-wing (eds.), *Printing and Book Culture in Late Imperial China*. Berkeley: University of California Press 2005, pp. 55-104.
- Medhurst, W. H. (pseud. 'Typographus sinensis'), 'Estimate of the Proportionate Expense of Xylography, Lithography, and Typography, as Applied to Chinese Printing: View of the Advantages and Disadvantages of Each', *Chinese Repository*, 3 (1835), pp. 246-52.
- Meng Yue, 'Hybrid Science versus Modernity: The Practice of the Jiangnan Arsenal, 1864-1897', in *East Asian Science, Technology and Medicine* 16, 1999, pp. 13-52.
- Meyer-Fong, Tobie, 'The Printed World: Books, Publishing Culture, and Society in Late Imperial China', *Journal of Asian Studies* 66/3, 2007, pp. 787-817.
- Milburn, Heister and Company, *Specifications for a Bureau of Engraving and Printing for the Chinese Government to be erected in Peking, China*. Washington, D.C.: n. p., n.d. (before 1908).
- , *Selections from the Latest Works of Milburn, Heister & Co, Architects, Washington D.C.* Washington, DC: n. p., n.d. (ca 1919).

- Minggen 明根, 'Zhongguo jindai jingjishi yanjiu zongshu' 中国近代经济史研究综述 (1986-1995) 之三 (Overview of studies in Chinese economic history, 1986-1995, Part 3). Installed on Website Zhongguo jingjishi luntan (China Economic History Forum).
- Mittler, Barbara, *A Newspaper for China? Power, Identity and Change in Shanghai's News Media, 1872-1912*. Cambridge, Mass.: Harvard University Press 2004.
- Miyazaki Ichisada, *China's Examination Hell. The Civil Service Examinations of Imperial China*. Translated by Conrad Schirokauer. New Haven: Yale University Press 1981.
- Moll-Murata, Christine, *Die chinesische Regionalbeschreibung. Entwicklung und Funktion einer Quellengattung, dargestellt am Beispiel der Präfekturbeschreibungen von Hangzhou*. Wiesbaden: Harrassowitz 2001 (*Veröffentlichungen des Ostasien-Instituts der Ruhr-Universität Bochum*, 47).
- , 'Maintenance and Renovation of the Metropolitan City God Temple and the Peking City Wall during the Qing Dynasty', in *Chinese Handicraft Regulations of the Qing Dynasty*, pp. 233-263.
- , 'New Editions of Qing Dynasty Handicraft Regulations and Precedents (jiangzuo zeli): Definition and Main Characteristics of the Genre', *Revue Bibliographique de Sinologie*, 2001, pp. 255-271.
- , 'Social Harmony and Social Unrest: Guild Activities in Qing Dynasty Peking', in *A Passion for China*, eds. Chiu Ling-yeong and Donatella Guida. Leiden: Brill 2005, pp. 259-276.
- , 'Chinese Guilds from the Seventeenth to the Twentieth Centuries: An Overview', in *International Review of Social History* 2008, vol. 54, Supplement 16: *The Return of the Guilds*, pp. 209-242.
- Moll-Murata, Christine, and Ulrich Theobald, 'Military employment in Qing dynasty China', in Erik-Jan Zürcher (ed.), *Fighting For a Living. A Comparative Study of Military Labour 1500-2000*. Amsterdam: Amsterdam University Press 2013, pp. 345-382.
- Morohashi Tetsuji 諸橋轍次 et al. (eds.), *Dai Kan-Wajiten* 大漢和辭典 (Great Chinese-Japanese dictionary), 13 vols. Tokyo: Taishukan shoten 大修館書店 1955-1960.
- Morse, Hosea Ballou, *The Gilds of China. With an Account of the Gild Merchant or Co-Hong of Canton*. London: Longmans 1909.
- Mote, Frederick W., 'Chinese society under Mongol rule', in *The Cambridge History of China*, Vol. 6, pp. 616-664.
- Müller-Hofstede, Christoph, and Hartmut Walravens, 'Paris-Peking. Kupferstiche für Kaiser Qianlong', in *Europa und die Kaiser von China, 1240-1816*. Edited by Berliner Festspiele. Frankfurt: Insel 1985, pp. 163-172.
- Mu ryō roku. Nan Sō Rin'an hanchō ki* 夢梁錄。南宋臨安繁昌記 (The dream while the millet porridge [was cooking]: The splendours of the Southern Song), by Wu Zimu 吳自牧, translated and annotated by Umehara Kaoru 梅原郁. Probably 1334. Tōkyō: Heibonsha 2000. (*Tōyō bunko* 674). 3 vols.
- De Munck, Bert, Piet Lourens, and Jan Lucassen, 'The Establishment and Distribution of Craft Guilds in the Low Countries', in *Craft Guilds in the Early Modern Low Countries: Work, Power, and Representation*. Edited by Maarten Prak and Jan Lucassen. Ashgate: Aldershot 2006, pp. 32-73.
- Myers, Ramon, and Wang Yeh-chien, 'Economic Development, 1644-1800', in *The Cambridge History of China*, Volume 9, pp. 563-645.
- Nagasawa Kikuya 長沢規矩也, *Wa kan sho no insatsu to sono rekishi* 和漢書の印刷とその歴史 (The printing of Japanese and Chinese books and its history). Tōkyō: Kyūko sho'in 1982. Vol. 2 of *Nagasawa Kikuya chosakushū* 長沢規矩也著作集 (Collected Works of Nagasawa Kikuya).
- Nagel-Angermann, Monique, 'Nongjia: the Formation of a Special Branch: Sources on Agriculture from Zhou to Nanbei Chao', in *Studies on Ancient Chinese Scientific and Technical Texts: Proceedings of the 3rd ISACBRST*. Edited by Hans Ulrich Vogel, Christine Moll-Murata, and Gao Xuan. Zhengzhou: Daxiang chubanshe 2006, pp. 76-87.

- Naquin, Susan, and Evelyn S. Rawski, *Chinese Society in the Eighteenth Century*. Yale: Yale University Press 1987.
- Needham, Joseph et al. (eds.), *Science and Civilisation in China*. Cambridge: Cambridge University Press since 1954.
- Needham, Joseph, Wang Ling, Lu Gwei-djen, *Science and Civilisation in China*. Volume 4: *Physics and Physical Technology*. Part III: *Civil Engineering and Nautics*. Cambridge: Cambridge University Press 1971.
- Negishi Tadashi 根岸佶, *Shina no girudo no kenkyū* 支那のギルドの研究 (A study of Chinese guilds). Tōkyō: Shibun shoin 1938.
- Ng, Chin-keong, *Trade and Society: The Amoy Network on the China Coast, 1683-1735*. Singapore: Singapore University Press 1983.
- Ni Yiping 倪玉平, 'Caoliang haiyun yu Qingdai yunshuye de bianqian' 漕粮海运与清代运输业的变迁 (Sea transportation of tribute grain and conveyance in the Qing dynasty), *Jiangsu shehui kexue* 江苏社会科学 (Jiangsu Social Sciences) 2002/01, pp. 125-130.
- Nihon kokugo dai jiten* 日本国語大辞典 (Great dictionary of Japanese), 2nd edition. Tōkyō: Shōgakusan 2000-2002. Electronic version on website Japan Knowledge <https://japanknowledge.com/contents/nikkoku/index.html> [via web portal Cross Asia, Jan. 2018].
- Niida Noboru 仁井田陞, *Chūgoku no shakai to girudo* 中國の社會とギルド (The Chinese society and guilds). Tōkyō: Iwanami 1951.
- , 'The Industrial and Commercial Guilds of Peking and Religion and Fellow-Countrymanship as Elements of Their Coherence', *Folklore Studies* IX (1950), pp. 176-206.
- et al. (eds), *Pekin kōshō girudo shiryō shū* 北京工商ギルド資料集 (Collected materials on Peking craft and commercial guilds), in *Tōhōgaku bunken sentā sōkan* 东方学文献センター-叢刊. Edited by Tōkyō daigaku Tōyō bunka kenkyūjo 東京大學東洋文化研究所, Nr. 23 (1975), 25 (1976), 28 (1978), 30 (1979), 33 (1980), 39 (1983).
- Nitobe Inazō 新渡戸稲造 and Takakusu Junjirō 高楠順次郎, *Shinshiki Nichi-Ei jiten* 新式日英辭典 (A new-style Japanese-English Dictionary). Tōkyō: Sanseidō 1905 (1st ed.) – 1911 (7th ed.).
- Ōba, Osamu, 'Sino-Japanese Relations in the Edo Period. Part Ten: On the Matter of Vessels Sailing to Japan', *Sino-Japanese Studies*, vol. 12/2 (2000), 51-64. Web version <http://chinajapan.org/articles/12.2/12.20ba51-64.pdf>, accessed May 2007.
- O'Brien, Patrick, 'Ten Years of Debate on the Origins of the Great Divergence', Website *Reviews in History* (review no. 1008), <http://www.history.ac.uk/reviews/review/1008> [Jan. 2018].
- Okamoto Sae 岡本さえ, *Shindai kinsho no kenkyū* 清代禁書の研究 (A study of book prohibitions in the Qing). Tōkyō: Tōkyō daigaku Tōyō bunka kenkyūjo 1996.
- 'Olisippo Lissabona', copperplate engraving, 16th. c. Website 'Ruas de Lisboa com alguma história. Terreiro do Paço [V]', <http://aps-ruasdelisboacomhistoria.blogspot.nl/2014/09/terreiro-do-paco-v.html>. Installed 24.09.2014, [Jan. 2018].
- Oshima Ritsuko, 'The *Chiang-hu* in the Yüan', *Acta Asiatica* 45 (1983), pp. 69-95.
- Ottema, Nanne, *Chineesche Ceramiek. Handboek geschreven naar aanleiding van de verzamelingen in het museum Het Princessehof te Leeuwarden*. Amsterdam: De Bussy 1943.
- Peng Nansheng 彭南生, *Ban gongyehua: Jindai Zhongguo xiangcun shougongye de fazhan yu shehui bianqian* 半工业化: 近代中国乡村手工业的发展与社会变迁 (Semi-industrialization: The development of modern Chinese village crafts and social change). Beijing: Zhonghua shuju 2007.
- , *Hanghui zhidu de jindai mingyun* 行会制度的近代命 (The fate of the guilds in the modern era). Beijing: Renmin chubanshe 2003.

- , 'Wan Qing shougongye jingji zhong de zhengfu xingwei' 晚清手工业经济中的政府行为 (Late Qing government policies with respect to the crafts). *Huazhong shifan daxue xuebao (Renwen shehui kexue ban)* 华中师范大学学报 (人文社会科学版) (Journal of Central China Normal University, Humanities and Social Sciences), 1998/11, vol. 37 no. 6, pp. 48-55.
- , *Zhongjian jingji: Chuantong yu xiandai zhijian de Zhongguo jindai shougongye, 1840-1936* 中间经济: 传统与现代之间的中国近代手工业, 1840-1936 (An Economy of intermediate form: The handicraft industry between tradition and modernity in Modern China, 1840-1936). Beijing: Gaodeng jiaoyu chubanshe 2002.
- Peng Xinwei 彭信威, *Zhongguo huobi shi* 中国货币史 (A history of Chinese currency). Revised edition Shanghai: Shanghai renmin chubanshe 1987.
- , *A Monetary History of China (Zhongguo huobi shi)*, transl. Edward H. Kaplan. Bellingham, WA: Western Washington University Press 1994. 2 vols.
- Peng Zeyi 彭泽益 (ed.), *Zhongguo jindai shougongye shi ziliao, 1840-1949* 中国近代手工业史资料, 1840-1949 (Materials for modern Chinese craft history, 1840-1949). 4 vols. Beijing: Zhonghua shuju 1962, reprint 1984.
- (ed.), *Zhongguo gongshang hanghui shiliao ji* 中国工商行会史料集 (Collection of historical materials on Chinese craft and commercial guilds). 2 vols. Beijing: Zhonghua shuju 1995.
- , 'Qingdai qianqi Jiangnan zhizaoju de yanjiu' 清代前期江南织造局的研究 (A study on the weaving manufactories in the Yangzi Delta in the early Qing dynasty), *Lishi yanjiu* (Historical studies) 1963/4, pp. 91-116.
- , 'Shiji shiji houqi Zhongguo chengshi shougongye shangye hanghui de chongjian he zuoyong' 十九世纪后期中国城市手工业商业行会的重建和作用 (The reestablishment and functions of Chinese urban handicraft and commercial guilds in the second half of the nineteenth century), *Lishi yanjiu* (Historical studies) 1965/1, pp. 71-102.
- Piontek-Ma, Elke, *Der Bericht von Sun Pei über die kaiserliche Seidenmanufaktur von Suzhou im 17. Jahrhundert*. Heidelberg: Edition Forum 1999.
- Pirazzoli-t'Serstevens, Michèle, 'Die Mandschu-Kaiser und die Kunst', in *Die Verbotene Stadt*, pp. 91-102.
- 'Planta de Lisboa Arruinada pelo terremoto de 1755 e com o novo plano de reconstrução dos architectos Eugenio dos Santos de Carvalho e Carlos Mardel'. Lisboa 1909. Website Biblioteca Nacional de Portugal, <http://purl.pt/3999/3/> [Jan. 2018].
- Playfair, George M.H., 'The Grain Transport System of China. Notes and Statistics taken from the "Ta Ch'ing Hui Tien"', *The China Review*, vol. 3 (1875), pp. 354-64.
- Pomeranz, Kenneth, 'Beyond the East-West Binary: Resituating Development Paths in the Eighteenth-Century World', *Journal of Asian Studies* 61, no. 2 (May 2002), pp. 539-590.
- , *The Great Divergence: China, Europe, and the Making of the Modern World Economy*. Princeton: Princeton University Press 2000.
- Pong, David, *Shen Pao-chen and China's Modernization in the Nineteenth Century*. Cambridge: Cambridge University Press 1994.
- Prak, Maarten, 'Corporate Politics in the Low Countries: Guilds as Institutions, 14th to 18th Centuries', in *Craft Guilds in the Early Modern Low Countries: Work, Power, and Representation*. Edited by Maarten Prak and Jan Lucassen. Ashgate: Aldershot 2006, pp. 74-106.
- Puhle, Mathias, *Magedeburg im Mittelalter*. Halle (Saale): Mitteldeutscher Verlag 2005.
- Qi Meiqin 祁美琴, *Qingdai neiwufu* 清代内务府 (The Qing Imperial Household Department). Beijing: Zhongguo renmin daxue chubanshe 1998.
- Qi Xia 漆侠, *Songdai jingjishi - Zhongguo gudai jingjishi duandai yanjiu zhi wu* 宋代经济史-中国古代经济史断代研究之五 (The economic history of the Song dynasty - Research on the

- economic history of ancient China in individual periods, 5). Shanghai: Shanghai renmin chubanshe 1988.
- Qingdai neifu keshu mulu jieti* 清代內府刻書目錄解題 (Annotated bibliography of the printings of the Qing Imperial Household Department). Edited by Gugong bowuyuan tushuguan 故宮博物院圖書館 and Liaoning sheng tushuguan 遼寧省圖書館. Beijing: Zijincheng chubanshe 1995.
- Qingdai yinshua* 清代印刷 (Qing dynasty printing), web page of *Zhongguo keji bolan* 中國科普博覽 (Science Museum of China). <http://www.kepu.net.cn/gb/civilization/printing/evolve/evl600.html> [Jan. 2018].
- Qingshi gao* 清史稿 (Draft History of the Qing). Compiled by Zhao Ersun 趙爾巽 et al. Beijing: Zhonghua shuju 1976-77.
- Qiu Pengsheng 邱澎生, *Shiba, shijiu shiji Suzhou cheng de xinxing gongshangye tuanti* 十八、十九世紀蘇州城的新興工商業團體 (The new associations of merchants and artisans in Suzhou, 1700-1900). Taipei: Guoli Taiwan daxue wenshi congkan 1990.
- Quan Hansheng 全漢昇, *Zhongguo hanghui zhidu shi* 中國行會制度史 (History of the Chinese guild system). Shanghai: Xin shengming shuju 1934, reprint Taipei: Shihuo chubanshe 1976.
- Radunz, Karl, *100 Jahre Dampfschiffahrt. 1807-1907. Schilderungen und Skizzen aus der Entwicklungsgeschichte der Dampfschiffahrt*. Rostock: Volckmann Nachfolger 1907, reprint Kassel: Lieselotte Hamecher 1983.
- Rawski, Evelyn S., *Education and Popular Literacy in Ch'ing China*. Ann Arbor: University of Michigan Press 1979.
- , *The Last Emperors: A Social History of Qing Imperial Institutions*. Berkeley: University of California Press 1998.
- Reed, Christopher A., *Gutenberg in Shanghai. Chinese Print Capitalism, 1876-1937*. Vancouver: UBC Press 2004.
- Reininghaus, Wilfried, 'Stadt und Handwerk: Eine Einführung in Forschungsprobleme und Forschungsfragen', in Karl Heinrich Kaufhold and Wilfried Reininghaus (eds.), *Stadt und Handwerk in Mittelalter und Früher Neuzeit*. Cologne: Böhlau 2000, pp. 1-19.
- , *Gewerbe in der frühen Neuzeit*. Munich: Oldenbourg 1990.
- Rickett, W. Allyn, *Guanzi: Political, Economic, and Philosophical Essays from Early China. Study and Translation*. Princeton: Princeton University Press 1985.
- Rosenthal, Jean-Laurent, and R. Bin Wong, *Before and Beyond Divergence: The Politics of Economic Change in China and Europe*. Cambridge, Mass.: Harvard University Press 2011.
- Rowe, William T., *Hankow. Commerce and Society in a Chinese City, 1796-1889*. Stanford: Stanford University Press 1984.
- , 'Ming-Qing Guilds', *Ming Qing yanjiu*, Sept. 1992, pp. 47-60.
- , *Saving the World. Chen Hongmou and Elite Consciousness in Eighteenth-Century China*. Stanford: Stanford University Press 2001.
- Rudolph, Richard, *A Chinese Printing Manual, 1776*. Los Angeles: Typophiles 1954.
- Ruitenbeek, Klaas, 'Building Regulations (*Zeli*) and their Context', in *Chinese Handicraft Regulations of the Qing Dynasty*, pp. 175-190.
- , *Carpentry and Building in Late Imperial China: A Study of the Fifteenth-Century Carpenter's Manual* Lu Ban jing. Leiden: Brill 1993.
- , 'The Rebuilding of the Three Rear Palaces in 1596-1598,' in Hua Jueming (ed.), *Study on Ancient Chinese Books and Records of Science and Technology*. Zhengzhou: The Elephant Press 1998, pp. 201-209.

- Santangelo, Paolo, 'The Imperial Factories of Suzhou: Limits and Characteristics of State Intervention during the Ming and Qing Dynasties', in Stuart R. Schram (ed.), *The Scope of State Power in China*. London: School of Oriental and African Studies 1985, pp. 269-294.
- , 'Urban Society in Late Imperial Suzhou', in Linda Cooke Johnson (ed.), *Cities of Jiangnan in Late Imperial China*. New York: SUNY Press 1993, pp. 81-116.
- , 'Alcuni aspetti di vita urbana: Suzhou, una metropoli 'moderna' fra il XVI e il XVII secolo', *Ming Qing yanjiu*, September 1992, pp. 1-45.
- Satsuma gakusei 薩摩學生 (A student from Satsuma), *Wayaku Eijiten* 和譯英辭書 (An English-Japanese Dictionary). Shanghai: American Presbyterian Press 1869 (3rd ed.).
- Schäfer, Dagmar, *Des Kaisers seidene Kleider: Staatliche Seidenmanufakturen in der Ming-Zeit (1368-1644)*. Heidelberg: Edition Forum 1998
- Schäfer, Dagmar, and Dieter Kuhn, *Weaving an Economic Pattern in Ming Times (1368-1644): The Production of Silk Weaves in the State-Owned Silk Workshops*. Heidelberg: Edition Forum 2002.
- Scheuring, Hans Lothar, *Die Drachenfluß-Werft von Nanking: Das Lung-chiang ch'uan-ch'ang chih, eine Ming-zeitliche Quelle zur Geschichte des chinesischen Schiffbaus*. Frankfurt a. M.: Haag + Herchen 1987.
- Schierlitz, Ernst, 'Zur Technik der Holztypendrucke aus dem Wu-ying-tien in Peking', *Monumenta Serica* 1, 1935, pp. 17-38.
- Schütte, Hans-Wilm, 'Handwerk', in *Das Große China-Lexikon*. Edited by Brunhild Staiger, Stefan Friedrich, and Hans-Wilm Schütte. Darmstadt: Wissenschaftliche Buchgesellschaft 2003, pp. 289-291.
- , 'Perfektion als Hemmschuh? Anpassungsprobleme im chinesischen Handwerk der späten Qing- und der Republikzeit', in *China: Wege in die Welt. Festschrift für Wolfgang Franke zum 80. Geburtstag*. Edited by Bernd Eberstein and Brunhild Staiger. Hamburg: Institut für Asienkunde 1992, pp. 61-80.
- Shen Yan 沈艳, 'Wan Qing jingshi wenbian xianxiang de lishi wenhua toushi' 晚清经世文编现象的历史文化透视 (The Late Qing phenomenon of statecraft writings seen from the perspective of historical culture), *Jiangnan luntan* 江汉论坛 (Jiangnan Tribune) 2000/1, pp. 58-62.
- Sheng Jun 盛俊, 'Qing Qianlong chao Jiangsu sheng wujia gongzi tongji' 清乾隆朝江苏省物價工資統計 (Statistics on the prices and wages in Jiangsu province in the Qianlong era), *Xuelin* 學林 (Forest of learning), no. 2, 1940.
- Shiba, Yoshinobu, *Commerce and Society in Sung China*. Translated by Mark Elvin. Ann Arbor: Center for Chinese Studies, University of Michigan 1970.
- , 'Ningpo and Its Hinterland', in *The City in Late Imperial China*. Edited by G. William Skinner. Stanford: Stanford University Press 1977, pp. 391-439.
- Shih, Min-hsiung, *The Silk Industry in China*. Translated by E-tu Zen Sun. Ann Arbor: Center for Chinese Studies, University of Michigan 1976.
- Shiue, Carol H., 'Local Granaries and Central Government Disaster Relief: Moral Hazard and Intergovernmental Finance in Eighteenth and Nineteenth-Century China', *The Journal of Economic History*, vol. 64/1 (2004), pp. 100-124.
- Sieyès, Emmanuel Joseph, *Qu'est-ce que le Tiers état?* Edition critique avec une introduction et des notes par Roberto Zapperi. Genève: Droz 1970.
- Smith, Paul Jakob, and Richard von Glahn, *The Song-Yuan-Ming Transition in Chinese History*. Cambridge, Mass.: Harvard University Press 2003.
- So, Billy Kee Long 蘇基朗, *Prosperity, Region, and Institutions in Maritime China: The South Fukien Pattern*. Cambridge, Mass.: Harvard University Press 2000.
- , 'The Trade Ceramics Industry in Southern Fukien During the Sung', *Journal of Sung-Yuan Studies* 24 (1994), pp. 1-20.

- , 'Liang Song Minnan Guangdong waimao ciye de kongjian moshi: Yige bijiao fenshi' 兩宋閩南廣東外貿瓷產業的空間模式：一個比較分式 ('The spatial pattern of the export ceramics industry in Southern Fujian and Guangdong in the Northern and Southern Song dynasties: A comparative submodel'), *Zhongguo haiyang fazhanshi lunwenji* 中國海洋發展史論文集 (Collected essays on the development of Maritime China) 6, 1997, pp. 125-172.
- Sohn, Pow-Key, 'Early Korean Printing', *Journal of the American Oriental Society* 79 (2), 1959, pp. 96-103.
- Song Jianze and Christine Moll-Murata, 'Notes on Qing Dynasty Handicraft Regulations and Precedents (*jiangzuo zeli*), with Special Focus on Regulations on Materials, Working Time, Prices, and Wages', in *Late Imperial China* 23, vol. 2, 2002, pp. 87-126.
- Sources of Chinese Tradition*. Compiled by Wm. Theodore De Bary et al. New York: Columbia University Press 1960.
- Spence, Jonathan, *Ts'ao Yin and the K'ang-hsi Emperor, Bondservant and Master*. New Haven: Yale University Press 1966.
- Stent, George Carter, *Chinese and English Vocabulary*. Shanghai: American Presbyterian Missionary Press 1898.
- Sun Jian 孙健 (ed.), *Beijing gudai jingji shi* 北京古代经济史 (Economic history of Beijing). Beijing: Beijing Yanshan chubanshe 1996.
- Swann, Nancy Lee, *Food and Money in Ancient China: The Earliest Economic History of China to A.D. 25*. Princeton: Princeton University Press 1950.
- Tanaka Shinkichi 田中信吉, Nakagawa Seiichi 中川精吉, Itami Jūtārō 伊丹 重太郎, *Ei-Wa shōgyō shin jī'i* 英和商業新辭彙 (New English-Japanese commercial dictionary). Tōkyō: Dōbunkan 1904.
- Terada Takanobu 寺田隆信, 'Tambogyō ni kansuru hikoku' 踰布業に関する碑刻 (The stele inscriptions about the calendering trade), in his *Sansei shōnin no kenkyū* 山西商人の研究, (Research on the Shanxi merchants). Kyōto: Kyōto daigaku bungakubu nei Tōyōshi kenkūkai 1972, pp. 338-410.
- , 'Soshū no tambogyō no kei'ei keitai' 蘇州の踰布業の経営形態 (The organization of the Suzhou calendering trade), *Tōhoku daigaku bungakubu ken'yū nempō* 東北大学文学部研究年報 (Yearbook of the Faculty of Letters of the Northeastern University) 18 (1967), pp. 121-173.
- 'Terreiro do Paço', topographical map by Francisco and César Goullard [1879]. Website Arquivo municipal de Lisboa C.M.L., http://1.bp.blogspot.com/-4D9HE77U6Yo/VCBCqMiuQhI/AAAAAAAAAK3U/_yxnTv4qlos/s1600/0051_M%2B-%2BP.C-1879.jpg [Jan. 2018].
- Theobald, Ulrich, 'The Second Jinchuan Campaign (1771-1776): Economic, Social and Political Aspects of an Important Qing Period Border War' (Dissertation, Eberhard Karls Universität Tübingen 2010), <http://tobias-lib.uni-tuebingen.de/volltexte/2011/5395/pdf/Theobald.pdf> [Jan. 2018].
- Tong Jiaoying 童教英, *Cong lianyu zhong shenghua: Wode fuqin Tong Shuye* 从炼狱中升华：我的父亲童书业 (Sublimation from purgatory: My father Tong Shuye). Shanghai: Huadong shifan daxue chubanshe 2001.
- Tong Shuye 童书业, *Zhongguo shouongye shangye fazhan shi* 中国手工业商业发展史 (History of the development of the Chinese crafts). Edited by Wang Zhongqian 王仲荦. Jinan: Qi Lu shushe 1981.
- Torbert, Preston M., *The Ch'ing Imperial Household Department: A Study of Its Organization and Principal Functions, 1662-1796*. Cambridge, Mass.: Council on East Asian Studies, Harvard University 1977.
- Tsien, Tsuen-hsuin, *Science and Civilisation in China*. Vol. 5, Part 1: *Paper and Printing*. Cambridge: Cambridge University Press 1985.

- Tsing Yuan, 'Urban Riots and Disturbances', in Jonathan Spence and John E. Wills (eds.), *From Ming to Ch'ing: Conquest, Region, and Continuity in 17th-century China*. New Haven: Yale University Press 1979, pp. 279-320.
- 'Union List of Handicraft Regulations of the Qing Dynasty in Chinese and International Collections'. Compiled by Christine Moll-Murata, Song Jianze, and Liu Qiang, in *Chinese Handicraft Regulations of the Qing Dynasty*, pp. 521-559.
- Veit, Veronika, 'Jean-Denis Attiret: Ein Jesuitenmaler am Hofe Qianlongs', in Berliner Festspiele (ed.), *Europa und die Kaiser von China, 1240-1816*. Frankfurt: Insel 1985, pp. 144-155.
- Die Verbotene Stadt. Aus dem Leben der letzten Kaiser von China. Katalog-Handbuch*. Edited by Karin von Welck and Alfried Wiczorek. Mainz: v. Zabern 1997.
- Vittinghoff [Gentz], Natascha, *Die Anfänge des Journalismus in China (1860-1911)*. Wiesbaden: Harrassowitz 2002.
- Vogel, Hans Ulrich, *Chinese Central Monetary Policy and the Yunnan Copper Mining Industry in the Early Qing (1644-1800)*. Ph. D. Dissertation, Universität Zürich 1983.
- , 'Unrest and Strikes at the Metropolitan Mints in 1741 and 1816 and their Economic and Social Background', in *Chinese Handicraft Regulations of the Qing Dynasty: Theory and Application*, pp. 395-422.
- Vries, Peer, 'The California School and Beyond: How to Study the Great Divergence?', *History Compass* 8(7), July 2010, pp. 730-751.
- Wallis, Helen, 'Die Kartographie der Jesuiten am Hof in Peking', in *Europa und die Kaiser von China, 1240-1816*. Edited by Berliner Festspiele. Frankfurt: Insel 1985, pp. 107-121.
- Wang Haiming 王海明, 'Zibenzhuyi mengya gainian fenxi' 资本主义萌芽概念分析 (An analysis of the concept of the sprouts of capitalism), *Dongnan daxue xuebao (Zhhexue shehui kexue ban)* 东南大学学报 (哲学社会科学版) (Journal of Southeast University, Philosophy and Social Science Edition), 2016/4, pp. 24-31.
- Wang Jingyu 汪敬虞, 'Zhongguo jindai shougongye ji qi zai Zhongguo ziben zhuyi shengchan zhong de diwei' 中国近代手工业及其在中国资本主义产生中的地位 ('The modern Chinese handicrafts and their position in the Chinese capitalist production'), *Zhongguo jingjishi yanjiu* 中国经济史研究 (Studies in Chinese economic history), 1988/1, installed on Website *Zhonghua wenshi wang* 中华文史网, <http://www.historychina.net/jj/355619.shtml> [Jan. 2018].
- Wang Rigen 王日根, *Ming Qing minjian shehui de zhixu* 明清民间社会的秩序 (The order of civil society in the Ming and Qing dynasties). Changsha: Yue Lu shushe 2003.
- Wang Shixiang 王世襄 (1963), 'Tan Qingdai de jiangzuo zeli' 谈清代的匠作则例 (A discussion of Qing dynasty handicraft regulations), *Wenwu* 文物 (Cultural objects) 1963/1, pp. 19-25.
- Wang Shixin, 'State Workshops and the Handicraft Industry', in Xu Dixin and Wu Chengming, *Chinese Capitalism, 1522-1840*. Houndsmills: Macmillan 2000, pp. 65-80.
- Wang Siqing 汪思清, *Jingdezhen ciye shi* 景德镇瓷业史 (History of the ceramic industry in Jingdezhen). Shanghai: Zhonghua shuju 1936.
- Wang Yantao 王延涛, 'Chen Chi de jingji sixiang' 陈炽的经济思想 (The economic thought of Chen Chi), *Liaoning keji daxue xuebao* 辽宁科技大学学报 (Journal of the University of Science and Technology Liaoning), 32/2, 2009, pp. 183-187.
- Wei Mingkong 魏明孔 (ed.), *Zhongguo shougongye jingji tongshi* 中国手工业经济通史 (General economic history of the Chinese crafts). Fuzhou: Fujian renmin chubanshe 2004-2005, 4 vols.
- Widmer, Ellen, 'The Huanduzhai of Hangzhou and Suzhou: A Study in Seventeenth-Century Publishing', *Harvard Journal of Asiatic Studies* 1996/36, pp. 77-122.

- Wieg, Peter, *Chinesische See-Dschunken*. Bielefeld: Delius, Klasing & Co. 1984.
- Wilkinson, Endymion, *Chinese History: A Manual*. Cambridge, Mass.: Harvard University Press 2000.
- Will, Pierre-Etienne, R. Bin Wong, James Lee, Jean Oi, and Peter Perdue, *Nourishing the People*. Ann Arbor: University of Michigan Press, 1991.
- Williams, Samuel Wells, *A syllabic dictionary of the Chinese language: Arranged according to the Wu-fang Yuen Yin, with the pronunciation of the characters as heard in Peking, Canton, Amoy, and Shanghai*. Shanghai: American Presbyterian Mission Press, 1874, re-edition 1903.
- Wong, R. Bin, *China Transformed: Historical Change and the Limits of European Experience*. Ithaca, NY: Cornell University Press 1997.
- , 'The political economy of an agrarian empire and its modern legacy', in Timothy Brook and Gregory Blue (eds.), *China and Historical Capitalism*, pp. 210-245.
- Worcester, G.R.G., *The Junks and Sampan of the Yangtze*. Annapolis: Naval Institute Press 1971.
- Wu Baosan 巫寶三 et al. (eds.), *Zhongguo guomin suode 中国国民所得 (一九三三年)* (The national income of China, 1933). Shanghai: Zhonghua shuju 1947.
- , 'Zhongguo guomin suode 1933 xiuzheng', 《中国国民所得, 一九三三》修正(附表) (Revision of *The national income of China, 1933*, with tables), *Shehui kexue zazhi (Beiping)* 社会科学杂志(北平) (Journal of Sociology, Beiping), 1937, 9/2, pp. 92-183.
- Wu Chengming, 'Introduction: On Embryonic Capitalism', in Xu Dixin and Wu Chengming (eds.), *Chinese Capitalism, 1522-1840*. Houndsmills: Macmillan 2000, pp. 1-20.
- Wu Jianyong 吴建雍, vol. 7 of *Beijing tongshi 北京通史* (Comprehensive history of Peking). Edited by Cao Zixi 曹子西. Beijing: Zhongguo shudian 1994. 10 vols.
- Xin Yi 忻怡 and Zheng Ming 郑明 (eds.), *Putuo chuantong muchuan zhizao jiyi 普陀传统木船制造技艺* (Construction techniques of traditional wooden boats in Putuo). Hangzhou: Zhejiang shying chubanshe 2012.
- Xin Yuan'ou 辛元欧, *Zhongguo jindai chuanbo gongye shi 中国近代船舶工业史* (History of the modern shipbuilding industry in China). Shanghai: Shanghai guji chubanshe 1999.
- Xu Dixin 许涤新 and Wu Chengming 吴承明 (eds.), *Zhongguo ziben zhuyi de mengya 中国资本主义的萌芽* (The sprouts of Chinese capitalism). Beijing: Renmin chubanshe 1985.
- Xu Dixin and Wu Chengming (eds.), *Chinese Capitalism, 1522-1840*. Basingstoke: MacMillan Press 2000.
- Xu Jianqing 徐建青, 'Shougongye bian' 手工业编 (Section 'Handicrafts'), in Jiang Taixin 江太新 et al. (eds.), *Zhongguo jingji tongshi. Qingdai jingji juan 中国经济通史. 清代经济卷*. (General economic history of China. Volume 'The economy of the Qing dynasty'). Beijing: Jingji ribao chubanshe, pp. 533-880.
- , 'Qingdai qianqi shougongye jingji' 清代前期手工业经济 (Handicraft economy in the first half of the Qing dynasty), in Wei Mingkong 魏明孔 (ed.), *Zhongguo shougongye jingji tongshi 中国手工业经济通史* (General economic history of the Chinese crafts), *Ming Qing juan 明清卷* (Volume [4], Ming and Qing). Fuzhou: Fujian renmin chubanshe 2004, pp. 317-700.
- Xu Shulan 徐树兰, 'Kepai chuanwu yizhi' 柯拜船坞遗址 (The remains of the Couper dockyard), in Mai Yinghua 麦英豪 and Huang Liusha 黄流沙 (eds.), *Guangzhou shi wenwu zhi 广州市文物志* (Monograph on cultural property in Canton). Guangzhou: Lingnan meishu chubanshe 1990, pp. 61-62.
- Yabuuchi, Kiyoshi 藪内清 (ed.), *Chūgoku chūsei kagaku gjjutsushi no kenkyū 中国中世科学技术史の研究* (A History of Chinese science and technology in the Middle Ages). Tokyo: Kadokawa shoten 1963.

- (ed.), *Sō Gen jidai no kagaku gijutsushi* 宋元時代の科学技術史 (A History of Chinese science and technology in the Song and Yuan dynasties). Kyōto: Kyōto daigaku jimbun kagaku kenkyūjo 1967.
- Yabuuchi Kiyoshi 藪内清 and Yoshida Mitsukuni 吉田光邦 (eds.), *Min Shin jidai no kagaku gijutsushi* 明清時代の科学技術史 (A History of Chinese science and technology in the Ming and Qing dynasties). Kyōto: Kyōto daigaku jimbun kagaku kenkyūjo 1970.
- Yan Yong 严勇, 'Qingdai de guanying sizhi ye' 清代前期的官营丝织业 (The Qing dynasty official silk weaving workshops), *Gugong bowuyuan yuankan* 故宫博物院院刊 (Journal of the Old Palace Museum), 2003/6, (no.110), pp. 82-89.
- Yan Zhongping 嚴中平 et al., *Zhongguo jindai jingjishi tongji ziliao xuanji* 中國近代經濟史統計資料選輯 (Selected statistic material on modern Chinese economic history). Beijing: Kexue chubanshe 1955.
- Yang, Deli, 'The Development of the Intellectual Property in China', *World Patent Information* 2003, vol. 25/2, pp. 131-142.
- Yang Naiji 杨乃济, 'Qianlong Jingcheng quantu kaolue' 《乾隆京城全图》考略 (An investigation of the Complete Map of the Imperial City of the Qianlong period), *Gugong bowuyuan yuankan* 故宫博物院院刊 (Palace Museum Journal), 1984/03, pp. 8-24.
- , 'Qinggong dang'an zhong de dieshi gongliao shili' 清宫档案中的叠石工料事例 (The factual precedents on working time and materials for artificial rock landscapes in the Qing palace archives), *Zijin Cheng* 紫禁城 (Forbidden City Magazine) 2002, 1, pp. 17-19.
- Yang Yuliang 杨玉良, 'Wuying dian xiushuchu ji neiwufu xiushu ge guan' 武英殿修书处及内府修书各馆 (The Wuyingdian printery and the Neiwufu printing halls), *Gugong bowuyuan yuankan* 故宫博物院院刊 (Palace Museum Journal), 1990(01), pp. 28-40.
- Yang Zihui 扬子慧, *Zhongguo lidai renkou tongji ziliao yanjiu* 中国历代人口统计资料研究 (Studies on the materials for Chinese historical demography). Beijing: Gaige chubanshe 1996.
- Ye Dehui 葉德輝, *Shulin qinghua. Shulin yuhua* 書林清話 (Plain talk on books). 書林餘話 (Further talk on books). Changsha: Guangu tang 1920, reprint Taipei 1960.
- Yoneyama Toratarō 米山寅太郎, *Zusetsu chūgoku insatsu shi* 図説中国印刷史 (An illustrated history of Chinese printing). Tōkyō: Kyūko sho'in 2005.
- Yu Haiping 于海平, *Songdai Jiangnan shouongongye fazhan yanjiu* 宋代江南手工业发展研究 (Study on the development of the crafts in the Song dynasty Yangzi delta). Ph.D. Dissertation, Nanjing University 2005.
- Yu Tongyuan 余同元, *Chuantong gongjiang xiandai zhuanxing wenti yanjiu: Yi Jiangnan zaoqi gongyehua guocheng zhong gongjiang jishu zhuanxing yu jiaose zhuanhuan wei zhongxin* 传统工匠现代转型问题研究:以江南早期工业化过程中工匠技术转型与角色转换为中心 (A study on the question of transformation of the traditional artisans to modernity: With special focus on the changing role and the transformation of skills of the artisans in the early industrialization of the Yangzi Delta). Tianjin: Tianjian daxue chubanshe 2012.
- Yü Ying-shih (Yu Yingshi) 余英時, *Zhongguo jinshi zongjiao lunli yu shangren jingshen* 中國近世宗教倫理與商人精神 (Chinese early modern religious ethics and the merchant spirit). Taipei: Lianjing chubanshe 1987.
- 'Zai 20 shiji 30 niandai de Qingdao - Wenhua mingren juju de 'Gudao xianxiang' 在20世纪30年代的青岛--- 文化名人聚居的《孤岛现象》 (Qingdao in the 1930s - the 'island phenomenon' of a dense intellectual population), <http://pan-kai.blog.sohu.com/60534252.html> 2007-08-20 [Jan. 2018].
- Zanden, Jan Luiten van, 'De timmerman, de boekdrukker en het ontstaan van de Europese kenniseconomie: Over de prijs en het aanbod van kennis voor de Industriële Revolutie'. *Tijdschrift voor Sociale en Economische Geschiedenis*, 2005/1, pp. 105-120.

- Zelin, Madeleine, 'The Yung-cheng Reign', in *The Cambridge History of China*, Vol. 9, ed. Willard J. Peterson. Cambridge: Cambridge University Press 2002, pp. 183-229.
- Zeng Ling 曾玲, *Ming Qing Fujian shougongye jingji yanjiu* 明清福建手工业经济研究 (A study on Ming and Qing dynasty handicraft economy in Fujian). Ph.D. Dissertation, Xiamen University 1991.
- Zhang Andong 张安东, 'Qingdai xiuzhi jigou de ren yuan shezhi he ziliao lai yuan - yi Qingdai Huanchao hu fangzhi wei li 清代修志机构的人员设置和资料来源-以清代环巢湖方志为例 (The functions of the personnel for Qing dynasty gazetteer compilations and the origin of the materials - exemplified with the Huangchao Lake gazetteer), *Zhongguo difang zhi* 中国地方志 (Chinese regional gazetteers) 2015/7, pp. 48-56.
- Zhang Shudong 张树栋 et al., *Zhonghua yinshua tongshi* 中华印刷通史 (A complete history of Chinese printing), web version, Beijing/Taipei 1998, http://www.cgan.net/book/books/print/g-history/big5_12/content.htm [Jan. 2018]. Print version Beijing: Yinshua gongye chubanshe 1999.
- Zhang Xiu jun 张秀君, *Handai guanying qiqi ye shengchan jingying zhi yanjiu* 汉代官营漆器业生产经营之研究 (Research on the organization and output of the Han dynasty lacquer industry. M.A. thesis), National Cheng Kung University, Tainan, History and Philology Department 国立成功大学历史语言研究所, 1994.
- Zhang Xiumin 张秀民, *Zhongguo yinshua shi* 中国印刷史 (A history of printing in China). Taipei: Weiwen tushu 1989.
- Zhang Xueyu 张学渝, Li Xiaocen 李晓岑, 'Qingong Zaobanchu chengli ruogan wenti xintan' 清宫造办处成立若干问题新探 (New Research on the Establishment of the Imperial Workshops), *Guangxi minzu daxue xuebao (Ziran kexue ban)* 广西民族大学学报 (自然科学版) (Journal of Guangxi University for Nationalities/Natural Science Edition), 21/4 (Nov. 2015), pp. 6-12.
- Zhang Yiqiang 张毅强 and Tan Bo 弹拔, 'Xin faxian yipi Jiangnan faxingde Xianfeng chaopiao' 新发现一批江南发行的咸丰钞票 (New discovery of a hoard of Xianfeng paper money circulating in Jiangnan), *Zhongguo qianbi* 中国钱币 (Chinese currency) 2001/3, installed on webpage Banknotestudy 纸币网 (*Zhibi wang*), <http://www.banknotestudy.com/blog/index.aspx?a=40&i=3981> [Jan. 2018].
- Zhao Zhongwen 赵忠文, *Zhongguo lishixue da cidian* 中国历史学大辞典 (Great dictionary of Chinese historical studies). Yanji: Yanbian daxue chubanshe 1995.
- Zheng Xuemeng 郑学檬, *Zhongguo qiye shi, Gudaijuan* 中国企业史. 古代卷 (Chinese business history. Volume: Antiquity). Beijing: Qiye guanli chubanshe 2002.
- Zhongguo chuantong gongyi quanji* 中国传统工艺全集 (Complete collection of traditional Chinese handicrafts). General editor Lu Yongxiang 路雨祥, with volumes on Folk handicrafts 民间手工艺 (2007), Research on traditional machines 传统机械调查研究 (2006), Papermaking and printing 造纸与印刷 (2006), Carving 雕塑 (2005), Silk weaving and dyeing 丝绸织染 (2005), Gold, silver, and fine gold crafts and cloisonné 金银细金工艺和景泰蓝 (2004-2005), Ceramics 陶瓷 (2004), Chinese materia medica and fireworks 中药炮制 (2004). Zhengzhou: Daxiang chubanshe.
- Zhongguo cidu Jingdezhen shi ciye zhi. Shizhi er juan* 中国瓷都景德镇市瓷业志市志二卷 (Monograph on the porcelain industry of China's porcelain city Jingdezhen. Vol. 2 of the City Gazetteer), Jingdezhen shi difangzhi bangongshi 中国瓷都景德镇市瓷业志市志二卷 (ed.), 2 vols. Beijing: Fangzhi chubanshe 2004.
- Zhongguo guan zhi da cidian* 中国官职大辞典 (Big dictionary of Chinese official titles). Edited by Yu Lunian 俞鹿年. Haerbin: Heilongjiang renmin chubanshe 1992.
- Zhongguo kexue jishu shi* 中国科学技术史 (History of Science and Technology in China). General editors Lu Jiayi 卢嘉锡, Guo Shuchun 郭书春, and Li Jiaming 李家明. Beijing: Kexue chubanshe, 1991-.

- Zhongguo lidai renming da cidian* 中国历代人名大辞典. Edited by Shen Qiwei 沈起炜 et al. Shanghai: Shanghai guji chubanshe 1999. 2 vols.
- Zhongguo taoci shi* 中国陶瓷史 (History of Chinese porcelain). Edited by Feng Xianming 冯先铭, An Zhimin 安志敏, An Jinhuai 安金槐 et al. Beijing: Wenwu chubanshe 1982.
- Zhongguo ziben zhuyi mengya wenti lunwenji* 中国资本主义萌芽问题论文集 (Collected articles on the problem of the sprouts of capitalism in China). Edited by Nanjing daxue lishixi Zhongguo gudaishi jiaoyanshi 南京大学历史系中国古代史教研室 (Nanjing University, Research and Teaching Section for Ancient Chinese History). Nanjing: Jiangsu renmin chubanshe 1983.
- Zhongguo ziben zhuyi mengya wenti taolunji* 中国资本主义萌芽问题讨论集 (Collected discussions on the sprouts of capitalism in China). Edited by Zhongguo renmin daxue Zhongguo lishi jiaoyanshi 中国人民大学中国历史教研室. Beijing: Sanlian shudian 1957. 2 vols.
- Zhongguo ziben zhuyi mengya wenti taolunji xubian* 中国资本主义萌芽问题讨论集续编 (Collected discussions on the sprouts of capitalism in China). Edited by Nanjing daxue lishixi Zhongguo gudaishi jiaoyanshi 南京大学历史系中国古代史教研室 (Nanjing University, Research and Teaching Section for Ancient Chinese History). Beijing: Sanlian shudian 1960.
- Zhonghua renmin gongheguo Wenhua bu 中华人民共和国文化部, 'Guojiaji fei wuzhi wenhua yichan daibaoxing xiangmu' 国家级非物质文化遗产代表性项目. (Representative items of national-level Intangible Cultural Heritage), website *Fei wuzhi wenhua yichan* 非物质文化遗产 (Intangible Cultural Heritage), http://www.ihchina.cn/5/5_1.html [Jan. 2018].
- Zhonghua wenhua jingcui fenlei cidian. Wenhua jingcui fenlei dian* 中华文化精粹分类辞典. 文化精粹分类 (Classified dictionary on the essence of Chinese culture. Category Cultural essence). Edited by Feng Dabiao 冯大彪 et al. Beijing: Zhongguo guoji guangbo chubanshe 1998.
- Zhongwen da cidian* 中文大辞典 (Great dictionary of the Chinese language), 40 vols. Taipei: Zhongguo wenhua yanjiusuo 1962-1968.
- Zhou Hongyuan 周宏远, 'Ming, Qing 'Baoyuanju' he 'Baoquanju' 明、清"宝源局"和"宝泉局" (Well of Fortune and Fountain of Fortune in the Ming and Qing periods), *Shanxi jinrong* 陕西金融 (Shanxi Finance), May 2000, p. 63.
- Zhou Jiming 周积明, 'Qing zhengfu zai Zhongguo zaoqi gongyehua jinzheng zhong de zuoyong' 清政府在中国早期工业化进程中的作用 (The function of the Qing government in the early phase of China's industrialization). *Shixue yuekan* 史学月刊 (Historical Monthly), 2/1996, pp. 52-90.
- Zhou Shengchun 周生春, Cao Jiangang 曹建钢, Hu Qian 胡倩, 'Zhongguo lishi shang de nongben gong shang mo sixiang yu zhengfu zhengce de shanbian' 中国历史上的农本工商末思想与政府政策的嬗变 (Changes in Chinese historical thought on agriculture as fundamental and crafts and commerce as secondary occupations and corresponding government policies), first published in *Zhejiang daxue xuebao (Renwen shehui kexue ban)* 浙江大学学报人文社会科学版 (Journal of Zhejiang University. Humanities and Social Sciences), 2004, vol. 34/2, pp. 13-22.
- Zhu Cishou 祝慈寿, *Zhongguo gudai gongye shi* 中国古代工业史 (History of Chinese traditional industries). Shanghai: Xuelin chubanshe 1988.
- , *Zhongguo jindai gongye shi* 中国近代工业史 (Industrial history of early modern China). Chongqing: Chongqing chubanshe 1989.
- , *Zhongguo xiandai gongye shi* 中国现代工业史 (Industrial history of modern China). Chongqing: Chongqing chubanshe 1990.
- Zhu Qiqian 朱啓鈐 and Liang Qixiong 梁啓雄 (eds.), *Zhejiang lu* 哲匠錄 (Record of outstanding artisans), *Zhongguo yingzao xueshe huikan* 中國營造學社彙刊 (Bulletin of the Society for Research in Chinese Architecture), No. III/1 (1931/11), pp. 123-162; No. III/2 (1932/6), pp. 125-160; No. III/3 (1932/9), pp. 91-120; No. IV/1 (1933/3), pp. 83-115; No. IV/2 (1933/6), pp. 61-85; No. IV/3-4 (1933/12), pp. 219-258; No. V/2 (1934/6), pp. 75-105; No. VI/2 (1935/12), pp. 115-157; No. VI/3 (1936/9), pp. 150-182.

- Zhu Saihong 朱赛虹, 'Dianben' de fayuandi – Wuying dian xiushuchu' 殿本的发源地 武英殿修书处 (The place of origin of the 'palace editions' – the book production site in the Wuying dian), *Chuban shiliao* 出版史料 (Historical materials on publishing) 2003/4, pp. 58-63.
- , 'Wuying dian keshu shuliang de wenxian diaocha ji bianxi' 武英殿刻书数量的文献调查及辨析 (Research and analysis of the number of Wuying dian imprints), in *Gugong bowuyuan yuankan* 故宫博物院院刊 (Memoirs of the Palace Museum) 3, 1997, pp. 25-32.
- Zhu Shan 朱山, 'Taoci shi shang bei yiwang de ren --- Lao Ge' 陶瓷史上被遗忘的人—老格 (A personality forgotten in porcelain history – Lao Ge), in *Jingdezhen taoci* 景德镇陶瓷 (Jingdezhen's Ceramics), 1995(01), pp. 36-42.
- Zi Ye 子冶, 'Qing ting shiying *Gujin tushu jicheng* jiu dang' 清廷石印《古今图书集成》旧档 (Old archives on the lithographic printing of the *Gujin tushu jicheng* by the Qing court), in *Chuban shiliao* 出版史料 (Materials on the history of publishing), vol. 1, 2003, pp. 61-63.
- Zurndorfer, Harriet T., 'A Guide to the 'New' Chinese History: Recent Publications Concerning Chinese Social and Economic Development Before 1800', *International Review of Social History* 33, 1988, pp. 148-201.
- , 'The Resistant Fibre: Cotton Consumption and Production in Ming and Qing China', in Giorgio Riello and Prasanna Parthasarathi (eds.), *The Spinning World: A Global History of Cotton Textiles, 1200-1850*. Oxford: Oxford University Press and Pasold Research Fund 2009, pp. 43-62.
- , 'Cotton Textile Manufacture and Marketing in Late Imperial China and the 'Great Divergence'', *Journal of the Economic and Social History of the Orient*, 54/5, 2011, pp. 701-738.

Electronic Resources

- Buringh, Eltjo, and Jan Luiten van Zanden, 'Charting the 'rise of the West': Manuscripts and Printed Books in Europe, A long-term perspective from the sixth through eighteenth centuries'. Website *Global Historical Bibliometrics*, International Institute for Social History, <https://socialhistory.org/sites/default/files/docs/projects/books500-1800.pdf> (n.d.) [Jan. 2018].
- Chen Chaoyong et al., 'Regulated wages paid by the state in public construction. Data from *Wuliao jiazhi zeli* (Regulations and precedents on the prices of materials) for 15 Chinese provinces from 1769 to 1795'. The IISH List of Datafiles of Historical Prices and Wages: China. <http://www.iisg.nl/hpw/data.php#china>. Installed 2006 [Jan. 2018].
- Cheongju Early Printing Museum, 'The beginning of metal type printing', website Jikjiworld.net. http://jikjiworld.cheongju.go.kr/app3/jikjiworld/content/english/metal/index.jsp?top=02&sub=0&left=02&url=mn020/mn020_010.jsp [Jan. 2018].
- Cheongju Early Printing Museum, 'Metal types in Korea dynasty', website Jikjiworld.net. http://jikjiworld.cheongju.go.kr/app3/jikjiworld/content/english/metal/index.jsp?top=05&sub=0&left=05&url=mn050/mn050_010.jsp [Jan. 2018].
- 'Chinese Guilds Database'. Compiled by Christine Moll-Murata, Masato Murata and Maïke Düsterhaus, Website *Institutions for Collective Action*, Universiteit Utrecht, installed 2012, https://www.dataverse.nl/dvn/dv/WebsiteICAGuilds/faces/study/StudyPage.xhtml?globalId=hdl:10411/10111&studyListingIndex=4_e65c3494de2f199a14193eeac8ec [Jan. 2018].
- 'Commerce: The Chinese Bureau of Engraving and Printing', website 'Pacific Exchange: China & US Mail', Smithsonian National Postal Museum, exhibition March 2014-Jan. 2015, <http://postalmuseum.si.edu/pacificexchange/index.html> [Jan. 2018].

- 'Databases on Materials, Wages, and Transport Costs in Public Construction in the Qianlong Era', website of the Institute for Sinology and Korean Studies, Universität Tübingen, <http://www.projects.sino.uni-tuebingen.de/shp/databases.html> [Jan. 2018].
- 'Datasets – Guilds – China – Craft guilds: Report on the data collection', Website *Institutions for Collective Action*, Universiteit Utrecht, http://www.collective-action.info/datasets_guilds_craft_China_report [Jan. 2018].
- Dizionario etimologico online*. Edited by Francesco Bonomi, reproduction of Ottorino Pianigiani, *Vocabolario Etimologico della Lingua Italiana*. <http://www.etimo.it/>, installed 2004-2008 [Jan. 2018].
- Dongfang zazhi* 東方雜誌 (The Eastern Miscellany), <http://em.refbook.com.cn:8080/> [Access via platform Cross Asia, Jan. 2018].
- 1833-1949 [Eighteen-hundred thirty-three to nineteen-hundred forty-nine] Chinese Periodical Full-text Databases (Wan Qing qikan, Minguo shiqi qikan quanwen shujuku 晚清期刊、民国时期期刊全文数据库), *Quanguo baokan suoyin* 全国报刊索引, <http://www.cnbkysy.cn/> [Access via platform Cross Asia, Jan. 2018].
- '2013 [Erling shisan] qiujie paimai hui. Zhibi' 2013秋季拍卖会 纸币 (2013 Autumn auction. Paper money), Website of auction house Chengxuan, Beijing 北京诚轩拍卖有限公司, <http://www.chengxuan.com/antiques/70255/> [Jan. 2018].
- 'Exchange Rates Database', Database of the project group 'Monies, Markets, and Finance in China and East Asia 1600-1900', Tübingen University, Institute for Chinese and Korean Studies, www.monieseasia.uni-tuebingen.de/data.html [Aug. 2016].
- 'A Global Collaboratory on the History of Labour Relations in the Period 1500-2000', website of the International Institute for Social History, <https://socialhistory.org/en/projects/history-labour-relations-1500-2000> [Jan. 2018].
- 'Guowuyuan guanyu gongbu diyipi guojiaji Fei wuzhi wenhua yichan minglu de tongzhi' 国务院关于公布第一批国家级非物质文化遗产名录的通知 (State Council notification on the publication of the name list of the first batch of Intangible Cultural Heritage), Despatch no. Guofa (2006) 18, Website Zhonghua renmin gongheguo Zhongyang renmin zhengfu 中华人民共和国中央人民政府 (Central People's Government of the People's Republic of China), http://www.gov.cn/zw/gk/2006-06/02/content_297946.htm, installed 2006-06-02 [Jan. 2018].
- Heilig, Gerhard K. 'Population: China's Population Growth, A.D. 0-2050.' Author website China-profile.com, http://www.china-profile.com/data/fig_pop_0-2050.htm, revised 2011-12-18 [Jan. 2018].
- The IISH List of Datafiles of Historical Prices and Wages: China*. Installed 2006. <http://www.iisg.nl/hpw/data.php#china> [Jan. 2018].
- 'Jingdezhen de fengqing yu meili de zhuanhuo' 景德镇的风情与美丽的传说 (Jingdezhen customs and beautiful legends), Website Sohu.com, <http://auto.sohu.com/20050727/n240199132.shtml>, installed July 2005 [Jan. 2018].
- 'Jinling kejing yinshua jishu' 金陵刻经印刷技艺 (The techniques at the Jinling sutra printing site). Website *The Intangible Cultural Heritage in Jiangsu* of the Jiangsu sheng fei wuzhi wenhua yichan baohu zhongxin 江苏省非物质文化遗产保护中心 (Jiangsu Province Center for the protection of Immaterial Cultural Heritage), <http://www.jsfybh.com/wsz/jrsxgjfwzwhycmlxm/tjy/736.shtml>, installed 2011-06-03 [Jan. 2018].
- Minguo qikan zongji quanwen shujuku* 民国期刊总集全文数据库, website Shanghai Library, <http://www.cnbkysy.com.shanghai.library.erf.sbb.spk-berlin.de/> [Access via platform Cross Asia, Jan. 2018].
- Online Etymology Dictionary*. Edited by Douglas Harper, installed 2001. <http://www.etymonline.com/> [Jan. 2018].

- Pacific Exchange: China & US Mail*, exhibition March 2014-Jan. 2015, Website Smithsonian National Postal Museum, <http://postalmuseum.si.edu/pacificexchange/index.html> [Jan. 2018].
- 'Plurality of Printing Techniques', Exhibition *Treasures of the Forbidden City: Palace Imprints of the Ch'ing Dynasty* (Huangcheng juzhen : Qingdai dianben tushu tezhan 皇城聚珍.清代殿本圖書特展 (2007)), Website of the Palace Museum, Taibei, Taiwan, http://www.npm.gov.tw/exhg6/forbiddencity/6_en.htm [Jan. 2018].
- Portail lexical*, Centre National de Ressources Textuelles et Lexicales, <http://www.cnrtl.fr/etymologie/>, installed 2007 [Jan. 2018].
- 'Regulated wages paid by the state in public construction. Data from *Wuliao jiazhi zeli* (Regulations and precedents on the prices of materials) for 15 Chinese provinces from 1769 to 1795'. Compiled by Chen Chaoyong et al., *The IISH List of Datafiles of Historical Prices and Wages: China*.
- 'Regulated wages paid by the state in public construction at the capital, 1659-1736, according to the *Huidian shili* (Collected statutes and factual precedents), 1899, and the *Jiuqing yiding wuliao jiazhi* (Prices of materials decided by the nine ministers)'. Compiled by Christine Moll-Murata. *The IISH List of Datafiles of Historical Prices and Wages: China*.
- 'Shachuan' 沙船 (Sandships), Website of Shanghai Jiaotong University (上海交通大学) Digital Ship Museum (*Chuanbo shuzi bowuguan* 船舶数字博物馆) <http://shipmuseum.sjtu.edu.cn/shachuan/shachuaninfo.htm> [Jan. 2018].
- 'Shanghai zui zao de huiguan' 上海最早的会馆 (The earliest guildhouse in Shanghai), website of the Shanghai Archives, Shanghai dang'an xinxi wang 上海档案信息网, http://www.archives.sh.cn/shjy/shzg/201203/t20120313_12691.html, installed 2008-06-10 [Jan. 2018].
- The Shun Pao* [Shenbao] 申报 (1874-1949), website Green Apple Data Center, <http://www.egreenapple.com/> [Access via platform Cross Asia, Jan. 2018].
- Sugihara, Kaoru, 'The State and the Industrious Revolution in Tokugawa Japan', GEHN Working Papers 2/04 (2004). Website of the Global Economic History Network, London School of Economics, <http://eprints.lse.ac.uk/22490/1/wp02.pdf> [Jan. 2018].
- Sun Wujun 孙武军, 'Zhongguo diyi sou lun - Baoshun lun (shang) 中国第一艘轮-宝顺轮 (上)' (The first steamship of China - The steamer Baoshun, 1). Ningbo wenhua baohu wang 宁波文化遗产保护网 (Ningbo cultural protection website), <http://www.nbw.net/info.aspx?Id=2654> [Jan. 2018].
- Tang Bo 唐博, 'Da haishang fengbo' yu Kang Qian shengshi de lishi suming' 《大海商风波》与康乾盛世的历史宿命 ('Scandal about a big overseas trader' and the historical fate of the High Qing in the Kangxi and Qianlong eras). Installed on website http://artx.cn/artx/lishi/20505_3.html [Jan. 2018].
- 'Tong Shuye' 童书业, Website www.guoxue.com 国学 (National studies), maintained by Beijing guoxue shidai wenhua chuanbo youxian gongsi 北京国学时代文化传播有限公司 <http://www.guoxue.com/master/gujiegang/xr-tsy.htm> [Jan. 2018].
- UNESCO, 'Text of the Convention for the Safeguarding of the Intangible Cultural Heritage', [adopted 17 October 2003] Website United Nations Educational, Scientific and Cultural Organisation; Intangible Cultural Heritage; <https://ich.unesco.org/en/convention#art2> Version in Chinese: 'Baohu fei wuzhi wenhua yichan gongyue' 保护非物质文化遗产公约 <http://unesdoc.unesco.org/images/0013/001325/132540c.pdf> [Jan. 2018].
- UNESCO, 'Elements on the Lists of Intangible Cultural Heritage', Website United Nations Educational, Scientific and Cultural Organisation; Intangible Cultural Heritage; <https://ich.unesco.org/en/state/china-CN?info=elements-on-the-lists>, [2008-2016] [Jan. 2018].
- 'Wages for construction workers in public service (c. 1766) in the imperial villa Yuanming yuan Garden of Perfect Brightness outside Peking'. Compiled by Christine Moll-Murata. *The IISH List of Datafiles of Historical Prices and Wages: China*

- 'Wages for armament, military equipment, and shipbuilding workers, 1769 and 1816'. Compiled by Christine Moll-Murata. *The IISH List of Datafiles of Historical Prices and Wages: China*.
- 'Wages for printing and bookbinding in the Peking Imperial Printery Wuying dian (Hall of Military Fame), 1694 to 1851'. Compiled by Christine Moll-Murata. *The IISH List of Datafiles of Historical Prices and Wages: China*.
- 'Wages paid on the free market: various industries, China-wide, between 1735 and 1820'. Compiled by Ma Debin and Zhang Wenliang, revised by Christine Moll-Murata. *The IISH List of Datafiles of Historical Prices and Wages: China*.
- Wagner, Rudolf G., [Review of] 'Gutenberg in Shanghai. Chinese Print Capitalism, 1876-1937. By Christopher A. Reed', in *MCLC Resource Center Publication*, Jan. 2005. *Modern Chinese Literature and Culture*, website maintained by Ohio State University, <http://u.osu.edu/mclc/book-reviews/gutenberg-in-shanghai/> [Jan. 2018].
- Wang Xinghua 王兴华, 'Tong Shuye xiansheng er san shi' 童书业先生二三事 (A few details about Tong Shuye). Website of Shandong University (Qingdao), <http://www.qdxq.sdu.edu.cn/info/1140/3149.htm>, installed 2016-08-11 [Jan. 2018].
- Wang Yuanlin 王元林 and Lin Xingrong 林杏容, 'Nan Yue xianxian - da bianju zhong de hongding hangshang Pan Shicheng' 南粤先贤--大变局中的红顶行商潘仕成 (A wise official of Southern Guangdong - the official and *hong* merchant Pan Shicheng in times of change and crisis), *Panshi zongqin wang* 潘氏宗親网 (Website of the Pan family famous ancestors), <http://www.pans.cn/Info/2006-1/25/0612516240014619.htm>, installed Jan. 2006 [Jan. 2018].
- Woher, Martin, 'Explaining China's Buying Binge', Website *Handelsblatt Global*, 16 March 2016, <https://global.handelsblatt.com/opinion/explaining-chinas-buying-binge-472068> [Jan. 2018].
- World Trade Organization (ed.), *International Trade Statistics 2015*, www.wto.org/statistics [Jan. 2018].
- World Trade Organization (ed.), 'Trade Profiles: China', http://stat.wto.org/CountryProfiles/CN_e.htm [Jan. 2018].
- World Trade Organization (ed.), *World Trade Statistical Review 2016*, https://www.wto.org/english/res_e/statis_e/wts2016_e/wts2016_e.pdf [Jan. 2018].
- Xin Yuan'ou 辛元欧, 'Zhongguo dianxing haichuan' 中国典型海船 (Typical Chinese sea ships), website of Shanghai Transport University (上海交通大学) Digital Ship Museum (*Chuanbo shuzi bowuguan* 船舶数字博物馆), installed 2005, http://shipmuseum.sjtu.edu.cn/zhuanti_detail.asp?zhtid=29 [Jan. 2018].
- Yomiuri Shimbun* 読売新聞, 1874-1989, website Yomidas Rekishikan, <http://erf.sbb.spk-berlin.de/han/Rekishikan/https/database.yomiuri.co.jp/rekishikan/> [Access via platform Cross Asia, Jan. 2018].
- Zurndorfer, Harriet T., 'Confusing Confucianism with Capitalism: Culture as Impediment and/or Stimulus to Chinese Economic Development'. Paper for the Third Global Economic History Network Meeting, 2005. Website of the Global Economic History Network, London School of Economics, <http://www.lse.ac.uk/Economic-History/Assets/Documents/Research/GEHN/GEHNConferences/conf3/Conf3-HZurndorfer.pdf> [Jan. 2018].

Index

- Admiralty Dock 166
Agricultural Experimentation Site nongshi shiyan suo 農事實驗所 97
All-Hankou Guild Alliance Ge huiguan gongsuo lianhe hui 各會館公所聯合會 327
Amelung, Iwo 88, 89
American Banknote Company 237, 238
American Presbyterian Mission Press 253
Amoy. *See* Xiamen
Anfu, Chaozhou prefecture 潮州庵埠廠 188
Anhui 79, 120, 124, 132, 138, 139, 141, 172, 196, 249, 325, 342
Anqing 安慶 138
apprentices 99, 101, 102, 329, 333, 336, 337, 346
Arsenal 137, 146
Arsenal wages 197, 199
artisan households 52
artisan registration 94, 95
artisan style jiangti 匠體 231
Attiret, Denis 254, 269
Audemard 159, 169
Auditing Office jieshen ku 節慎庫 75
- baitang'a 栢唐阿 263
bang 幫 323, 331, 338, 342, 343
banner 263, 264, 265, 266, 267, 278
baofang 報房 234
baogongzhi 包工制 196
baogong 包工 112
Baoquan ju 寶泉局 78, 107
Baoshun 寶順 128
baotou 包頭 329
baoyi jiang 包衣匠 82
Baoyuan ju 寶源局 74, 77, 106
baqi dutong 八旗都統 83, 107
Bei changjie 北長街 80
bei hao 北號 127
Beihe 北河 131
beijiang 北匠 82
Beijing shanhou gongyi ju 北京善後工藝局 315
Beiyang 236
Beiyang guanbao 北洋官報 236
Beiyang Official Newspaper Office 237
Beiyang tiegui guanlu zongju 北洋鐵軌官路總局 237
benye 本業 295
Bergère, Marie-Claire 300
biaojiang 裱匠 264
binders 223, 265, 266, 270, 271, 272, 274, 278
bingjiao 冰窖 75
- Bishu shanzhuang 避暑山莊 88
bochuan 剝船 125, 126
Bodde, Derk 295, 299
Bodolec, Caroline 28
bondservants 79, 82, 229, 264
booi 264
bound labour 60, 349
Boxer Rebellion 143, 315, 356
Bradstock, Timothy 327, 330, 331
brass utensils 95
Bray, Francesca 25, 28, 317
bricklayers zhuanjiang 磚匠 91
brickmakers 113
British Columbia 174
brocade weavers 334
Brokaw, Cynthia 28, 247, 248, 250, 251, 252, 255, 270, 274
Brook, Timothy 62
Bureau for Crafts gongyi ju 工藝局 97
Bureau for Weights and Measures quanheng duliang ju 權衡度量局 97
Bureau of Construction yingshan qingli si 營繕清吏司 74, 77, 106, 111, 335
Bureau of Forestry and Weights yuheng qingli si 虞衡清吏司 74, 77
Bureau of Irrigation and Transportation dushui qingli si 都水清吏司 75, 77
Burger, Werner 28, 77
Burgess, John S. 29, 326, 330, 336, 338
Butterfield and Swire Company 130
buyi 布衣 276
- caichou ku 綵紬庫 75
Caishen hui 財神會 337
caizi jiang 彩子匠 91
calenderers 踹布匠 332
California School 23, 24, 40
candle makers 334
Canton 96, 100, 137, 138, 142, 159, 165, 166, 170, 196, 233, 249, 252, 253, 271, 277, 306, 322, 323, 329, 338, 345, 352
cao bing zhe 操兵者 305
Caochuan zhi 漕船志 183
Caofang chuan 漕舫船 125
Cao Yin 曹寅 229, 232, 264
Capital Apprentice Training Office jingshi yitu xuetang 京師藝徒學堂 97
Capital Business School jingshi shiye xuetang 京師實業學堂 97

- Capital Craft Office shoushan gongyi suo 首善工藝所 97
- capitalism 29
- captive slaves 55
- carpenters 264, 266
- carpenters mujiang 木匠 90
- carpentry shop 112
- Castiglione, Giovanni 254
- caulker 船匠 188, 194
- censorship 247, 256, 257
- chaku 茶庫 80
- Chambers of Commerce 321, 325, 339, 355
- Changsha 324, 333, 338
- Chaozhou 潮州 329
- character carvers 223, 256, 257, 261, 264, 265, 266, 270, 271, 272, 274, 275, 278
- character carvers, female 272, 274, 275
- character carvers' guilds 333
- character carvers, literati 276
- character carver 刻字匠 188
- Chen Bi 陳璧 99
- Chen Chaoyong 陳朝勇 90
- Chen Chi 陳熾 310, 358
- Chengdu 249, 250, 270, 340
- Chengong shiyi 城工事宜 93
- Chenghai 澄海 161
- Chen Hongmou 陳宏謀 87, 170
- Chen Qingmen 陳慶門 305
- Chen Shiqi 陳詩啓 29
- Chen Xiqing 陳耆卿 297
- Chia, Lucille 28, 247
- child labour 272, 274
- China Merchants' Steam Navigation Company 輪船招商局 131
- China Merchants' Steam Navigation Company 輪船招商局 98, 130, 170
- chong bing 充兵 301
- Chongde gongsuo 崇德公所 332
- Chongming sha 崇明沙 128
- Chongming 崇明 134, 161, 163
- Chongqing 163, 193, 249, 250, 270, 324, 327
- Chow Kai-wing 28, 247
- ciku 瓷庫 80, 117
- Cining gong 慈寧宮 81
- cise 次色 118
- civilian artisan households 56
- Cixi 慈禧 71, 98, 99, 109, 353
- clocks 93
- cloisonné 81, 93
- CMSNC. *See* China Merchants' Steam Navigation Company
- coir palm worker 棕匠 188
- Collected Statutes 132, 134, 136, 169, 171, 172, 173, 190
- Commercial Journal Office shangbao guan 商報館 97
- Commercial Law Office shanglü guan 商律館 97
- Commercial Press Shangwu yinshuguan 商務印書館 233, 237, 248
- Company Law 98
- Company Registration Bureau gongsi zhuce ju 公司註冊局 97
- copper 74, 81, 87, 91, 95
- coppersmiths 352
- copyists 256, 273
- corvée 47, 52, 55, 59, 61, 70, 94, 349
- Council of State junji chu 軍機處 72
- Couper shipyard 165
- Court of Imperial Armaments wubei yuan 武備院 81, 83, 105, 106
- Coxinga. *See* Zheng Chenggong
- craft guilds 338, 345, 355
- creative bookkeeping 90
- Dagu 大沽 138
- dali si 大理寺 73
- danghang 當行 50
- dangpiao 當票 261
- dang 黨 338
- Daoguang 88, 89, 113, 158
- Da Qing baochao 大清寶鈔 236
- Da Qing yinshuawu zhuanlü 大清印刷物專律 277
- Deng, Kent 49, 164
- Dengzhou 登州 163
- de Weerd, Hilde 247
- dianben 殿本 214, 232
- dichao 邸鈔 234
- Ding Bing 丁丙 232, 233
- Dingling 定陵 112
- Ding Richang 丁日常 199
- Directorate for Armaments junqi jian 軍器監 51
- Directorate for Construction jiangzuo jian 將作監 51
- Directorate for Imperial Manufactories 51
- Directorate of Waterways dushui jian 都水監 51
- dock workers 斛手 128
- Dongjia hang 東家行 338
- Dorgon 多爾袞 215
- dougan'er ban 豆干兒版 235
- Dragon River Shipyard 龍江船廠 187, 190, 195
- Drège, Jean-Pierre 248
- duangong 鍛工 330
- Duchang 都昌 342
- Duke of Zhou 周公 307
- Dunstan, Helen 24, 26
- dushui jian 都水監. *See* Directorate of Waterways

- dushui qingli si 都水清吏司. *See* Bureau of Irrigation and Transportation
- Dutch guilds 326
- duzhi bu 度支部. *See* Ministry of FinanceMinistry of Finance
- Duzhi bu yinshua ju 度支部印刷局 234
- earth pounders hangwo jiang 夯礮匠 47, 91
- Eberhard, Wolfram 299
- egg ship Danchuan 蛋船 128
- Eight Banners 79, 98, 131
- embroiderers xiuzuo 綉作 77
- Embroidery Office 51
- enamel 92
- England 327
- engravers jianzuo 鏤作 77
- European guilds 324
- exemplars 217, 228, 233
- fanghuying 防护营 195
- fangku 房庫 80
- fanjiang 番匠 50
- Farnham & Co. 165, 166
- Farr, James 38, 355
- female artisans 317
- Fengcheng 豐城 343
- Feng Junguang 馮峻光 170, 199
- Fengtian 134, 136, 158, 159, 163, 164, 324
- Feng Yingjing 馮應京 297
- Feuerwerker, Albert 37, 313, 357
- fish peddlers 336
- five human relationships 293
- Flath, James 248, 276
- Forbidden City zijin cheng 紫禁城 79, 84, 214, 262
- Foshan 佛山 96, 249, 271, 322
- four occupational groups simin 四民 43, 46, 293, 294, 295, 296, 301, 308, 311, 312, 318, 354
- French Revolution 319
- Fuchun/Qiantang River 富春江, 錢塘江 163
- Fujian 76, 79, 87, 90, 96, 100, 113, 133, 135, 138, 158, 159, 165, 168, 172, 173, 174, 183, 184, 188, 189, 194, 198, 222, 228, 235, 247, 248, 249, 271, 324, 325, 329, 342
- Fujian chuanzheng ju 福建船政局 137
- Fujian Navy Yard 76, 137, 147, 166, 194, 195, 199, 201, 233, 316
- Fujian Navy Yard School 353
- Fujian sheng waihai zhanchuan zeli 福建省外海戰船則例 172
- furen 夫人 306
- Fuxi 伏羲 307
- Fuzhou 撫州 342
- Fuzhou 福州 196
- fu 夫 188
- fu 富 305
- Gamble, Sidney 29, 338
- Gansu 235
- ganzeng chuan 趕繒船 182
- Gaochang miao 高昌廟 139
- Gao Tongxuan 高桐軒 276
- geng jing jia shi 耕經稼史 274
- Gengzhi tu 耕織圖 275
- German guilds 326
- Ge Yuanrui 葛元瑞 163
- Ge Yuanxiang 葛元祥 163
- Giquel, Prosper 141, 144, 145
- glass 92
- glazed tiles 75, 93
- Goldfuss, Gabriele 248
- gongbao 公報 235
- gongbu 工部. *See* Ministry of Public Works
- Gongcheng zuofa 工程做法 86
- gongmen chao 宮門鈔 234, 236
- Gong shang tongye gonghui fa shixing xice 工商同業公會法施行細則 339
- Gong shang tongye gonghui fa 工商同業公會法 339
- gongsheng 貢生 263
- gongsuo 公所 322, 323, 329, 330, 342
- Gongye xuetang 工業學堂 146
- gongyi chang 工藝廠 46
- gongyi ju 工藝局 46
- Gongyi xuetang 工藝學堂 146
- gongyi zhuanxi suo 工藝傳習所 46
- gongyi 工役 (corvée) 46
- gongyi 工藝 (crafts) 45
- Gong Zhenlin 龔振麟 170
- Gong Zizhen 龔自珍 298
- gong 工 45, 55, 261, 268, 295, 296, 301, 308
- grain ships 149
- Grand Canal 123, 124, 126, 127, 130, 136, 322, 325
- Grand Secretariat neige 內閣 72, 234
- Grand Storage Office guangchu si 廣儲司 80, 81, 83, 105, 106, 117
- Great Divergence 25, 40
- Green Standards lü/luying 綠營 131
- Gross, Charles 327
- guanbao 官報 235
- guan che chu 官車處 74
- guanfan 官飯 267
- Guang changli zhuangzao lunchuan chang 廣常利裝造輪船廠 167
- guangchu si 廣儲司. *See* Grand Storage Office
- Guangdong 79, 96, 133, 135, 158, 159, 165, 168, 169, 172, 173, 188, 196, 228, 232, 233, 234, 235,

- 237, 245, 249, 251, 270, 271, 323, 324, 325, 329, 342, 343
- Guangdong shixue guan Guangdong School for Practical Studies 廣東實學館 144
- Guang fangyan guan 廣方言館 146
- Guangxi 235, 271, 324, 333
- Guangxu 89, 98, 109
- Guangya shuju 廣雅書局 232
- guanjiang 官匠 82
- guanlun xuetang 管輪學堂 145
- guan shuju 官書局 231
- guanyao 官窯 116
- Guanzi 294
- guan 官 45
- guild registration 335
- guilds 94, 102, 275
- Guizhou 235, 254
- gui 貴 305
- Gujin tushu jicheng 古今圖書集成 168, 219, 221, 222, 224, 253, 259, 263, 277, 285, 352
- Gu Minghai 顧明海 165
- Gu nan shuyuan 古南書院 343
- Guo Fenglin 郭鳳林 112
- Guomindang 339, 345
- Guo Moruo 郭沫若 29
- guozi jian 國子監 73, 263
- Haiguo tuzhi 海國圖志 137, 249, 298
- haijun xuexiao 海軍學校 144
- Han Chinese 213, 263, 264, 267, 277
- Han Dianjia 韓殿甲 199
- handicraft regulations jiangzuo zeli 匠作則例 15, 21, 22, 69, 85, 88, 90, 335
- Han Feizi 296
- hangbang 行幫 342
- Hangzhou 49, 77, 80, 81, 84, 94, 100, 108, 113, 114, 115, 223, 231, 232, 247, 249, 257
- hang 行 46, 321, 338, 342
- Han jiang 漢匠 82
- Hankou 39, 324, 327, 330, 335, 336, 338, 339, 340, 341
- Hanlin Academy 翰林院 263
- Han Yu 296, 305
- hard style yingtǐ 硬體 231
- Hatch, Lorenzo J. 238
- Hebei 120, 250
- He Changling 賀長齡 302
- hegu 和顧 50
- Heilongjiang 159, 163
- hemai 和買 50
- Hemei hui 合美會 337
- Henan 79, 91, 99, 235
- He Xinyin 何心隱 297
- Higher Agricultural School gaodeng nongye xuetang 高等農業學堂 97
- Hinton 124
- Hohhot 324
- Hong Kong 131, 145, 165, 196, 197
- Hongkou 虹口 131, 139
- Honglu si 鴻臚寺 276
- Ho Ping-ti 299
- houyuan zaozuo suo 後苑造作所 51
- huajiang 畫匠 264
- Huangdi 黃帝 307
- Huang Lizhong 黃利中 276
- Huang, Philip C.C. 24
- Huangpu River 黃浦江 139, 163, 165, 200
- Huangpu 黃埔 138, 144, 161
- Huang Zhonghui 黃中慧 315
- Huang Zongxi 黃宗羲 297
- huapao zuo 花炮作 81
- Hua Sui 華燧 222
- Hubei 79, 120, 124, 126, 133, 137, 158, 163, 232, 235, 237, 324, 338, 342
- Hubei guanbao 湖北官報 236
- hubu 戶部. *See* Ministry of Revenue
- Hubu guanpiao 戶部官票 236
- Hucker, Charles O. 73
- Hu Fengdan 胡鳳丹 232
- Hui'an 惠安 159
- huiban 會辦 197
- Huidian 會典 39
- huiguan 會館 322, 330, 340, 342, 346
- huishi yuan 繪事院 145
- Huizhou 249, 276
- Huizhou huiguan 335
- Huizhou merchants 325
- hui 僮 305
- Hunan 79, 87, 124, 126, 133, 137, 138, 158, 163, 171, 183, 191, 196, 197, 235, 322, 324, 333, 338, 342, 343
- Hundred Day Reforms 71, 98, 302, 353
- huoyao ju 火藥局 74, 107
- Imperial Academy 223, 262
- Imperial Household Department neiwufu 內務府 42, 73, 79, 82, 83, 84, 92, 106, 112, 214, 236, 261, 263, 264, 276, 350
- Imperial Porcelain Manufactory 119, 120, 351
- Imperial Silk Weaveries 84, 91, 229, 264
- imperial workshops 85, 91
- Industrial Exhibition Hall quangong chenlie suo 勸工陳列所 97
- Industrial Laboratory gongye shiyan suo 工業試驗所 97
- industrial offices" gongye ge ju 工業各局 100

- industrial training centers gongye gezhong
 chuanxi suo 工業各種傳習所 100
 Industrial Training School gongye xuetang 工
 業學堂 97
 ink carvers 267
 ink makers 267
 Inner Mongolia 324
 Inoue Susumu 247
 Intangible Cultural Heritage 30
 ironsmith 鐵匠 188

 jade 93
 Janku, Andrea 248, 302
 Japan 240, 246, 255
 Japanese Treasury Department 237
 Jesuits 217, 253, 254, 258, 260, 269
 jiabanchuan 夾板船 130
 jia jintie 加津貼 88
 jianeji jiangyi 家內匠役 264
 Jiangbei ting 江北廳 163, 193
 jiangmu 匠目 195
 Jiangnan 76, 100, 113, 121, 189, 222, 231, 234, 235,
 249, 256, 258, 265, 266, 275
 Jiangnan Arsenal 76, 137, 138, 139, 140, 141, 144,
 146, 166, 167, 194, 196, 197, 198, 200, 201, 202,
 233, 234, 316, 325, 329
 Jiangnan san zhizao ju 江南三織造局 113
 Jiangning 江寧 161
 Jiangsu 79, 87, 91, 96, 99, 100, 120, 124, 130, 132,
 134, 139, 141, 158, 161, 163, 183, 184, 222, 228,
 249, 324, 342
 Jiangxi 79, 95, 100, 101, 120, 124, 126, 132, 136, 139,
 141, 158, 163, 171, 172, 184, 228, 232, 235, 249,
 270, 271, 272, 324, 343
 Jiangxi ciye gongsi 江西瓷業公司 119
 Jiangxi Porcelain Company 119
 jiangyi 匠役 46, 266
 Jiangzhen gongguan 江鎮公館 343
 jiangzuo jian 將作監. *See* Directorate for
 Construction
 jiang 匠 45, 55, 112, 188
 Jianyang 建陽 222, 247, 248, 249
 jianyi zhe 踐役者 305
 jiaohua 教化 213
 Jiaozhou 膠州 134, 163
 jiaozi ku 礮子庫 74
 Jiaqing 89
 jiashi xuetang 駕駛學堂 145
 jielì 節禮 333
 Jike gongsuo 劓剮公所 333
 Jilin 158, 163
 Ji'nan 250
 Jin Fu 靳輔 304, 305
 jingbao 京報 234

 jingchang 經廠 217
 jingchao 京鈔 234
 Jingdezhen 景德鎮 80, 81, 108, 113, 115, 117, 119,
 121, 314, 344, 350, 355
 Jinghua yinshuju 京華印書局 233
 Jingnei zhiran ju 京內織染局 81, 83
 Jingshi guan shuju 京師官書局 233
 jingshi wenbian 經世文編 46, 249
 jingshi 經世 301
 Jingyang shuyuan 景仰書院 343
 Jinhua 232
 Jinjiang 晉江 159
 Jin Jian 金簡 223, 224, 229, 263, 264
 jin mo 禁末 296, 306
 jintie 津貼 36
 Jinzhan chang 金磚廠 113
 jiqi zhizao ju 機器製造局 137
 Jiujiang customs 118
 Jiuqing yiding wuliao jiazhì 九卿議定物料價
 值 86, 90
 joiner 安裝匠 188
 journeymen 337
 juben 局本 232
 Junhe'an machine manufacturers 均和安機
 器廠 166
 junqi jian 軍器監. *See* Directorate for
 Armaments
 junxu ku 軍需庫 74
 Ju Qingyuan 鞠清遠 28
 juzhen guan 聚珍館 263
 ju 巨 45

 Kangxi 70, 82, 105, 218, 219, 249, 253, 257, 258,
 260, 275
 Kang Youwei 康有為 302, 310, 353
 kaozhengxue 考證學 258
 Kehnen, Johannes 313
 Kejing chu 刻經處 248
 Kennedy, Thomas 139
 Kezi hang gongsuo 刻字行公所 333
 kiln workers 343
 kinsho/jinshu 禁書 247
 Koreans 264
 Krupp 310
 Kuhn, Dieter 28
 Kuhn, Philip 299, 318

 Laboratory for Chemical Analysis of Ores
 huafen kuangzhi suo 化分礦質所 97
 labour recruitment 329
 Lake Tai 太湖 163, 193
 Lang Tingji 郎廷極 117
 Lao Ge 老格 118
 Laojun miao 老君廟 330

- Laozi 330
 law on patent rights 98
 lead type 233, 236, 259, 273
 leather and fur makers pizuo 皮作 77
 Lei Jinyu 雷金玉 314
 Leonard, Jane Kate 24, 89, 126, 301
 Leping 樂平 343
 lianchuan 練船 145
 Liang Jiang 兩江 169, 172
 Liang Miaotai 梁淼泰 118
 Liang Qichao 梁啟超 319
 liansizhi 連四紙 228
 Liaocheng 250
 Liaohe 遼河 163
 Liaoning 158
 Liaoyang 遼陽 164
 Liaozhai zhiyi 聊齋志異 252
 Li Bozhong 李伯重 62, 171, 189, 190, 252
 Libu zeli 吏部則例 252
 lifan yuan 理藩院 73
 Li Hongzhang 李鴻章 70, 123, 130, 136, 137, 138, 139, 140, 142, 170, 234
 Li Hua 326
 lijn 釐金 110, 334
 limu 櫟木 173
 Lin'an 臨安 51
 lingjin yuan 綾錦院 51
 lingzhi 領制 114
 Lin Jing 林景 167
 Linqing 臨清 113, 163, 322
 Lin Zexu 林則徐 137, 306
 lithographic printing 233, 238, 245, 260, 273
 Liu Bei 劉備 307
 liu ku 六庫 117
 Liuli chang 琉璃廠 74, 112, 234, 249, 261, 265
 Liumen diaobang 六門雕幫 333
 Liuqiu 琉球 189
 Liu Yongcheng 323
 Liu Yongri 劉永日 275
 Li Xiangfu 李祥甫 257
 Liyuan gongsuo 梨園公所 335
 Li Zhaoxiang 李昭祥 184, 185, 187
 Li Zicheng 李自成 215
 London Missionary Society 253
 Longjiang chuanchang zhi 龍江船廠志 183, 184
 Longjiang chuanchang 龍江船廠 147
 Lu Jiayi 盧嘉錫 27
 lunban jiang 輪班匠 58
 lunchuan chang 輪船廠 195
 Lu Yongxiang 路甬祥 27
 Lü Zhenyu 呂振羽 29
 Magang 馬岡 249, 270, 271
 Mai Zhonghua 麥仲華 302, 303
 Major, Ernest 248, 254
 Manchuria 91, 158, 163, 188, 324, 343
 Manchus 213, 223, 229, 256, 259, 263, 264, 277, 278
 Mann, Susan 26, 317
 Manufacturing Storehouse zhizao ku 製造庫 75, 106
 Marx, Karl 29
 Masha 麻沙 249
 mast timber weimu 桅木 173
 Mawei 馬尾 141
 McDermott, Joseph 28, 247
 Mencius 293
 menlian ku 門簾庫 77
 menshen ku 門神庫 77
 merchant guilds and craft guilds 325
 merchants 321, 322, 323, 326, 328, 332, 339, 344
 Mianzhu 綿竹 250
 military artisan households 56
 Ming dynasty 58, 109, 114, 116, 322, 349
 mining policies 95
 Ministries of the Central Government, liubu 六部 103
 Ministry of Agriculture, Industry, and Commerce nong gong shang bu 農工商部 97
 Ministry of Commerce shangbu 商部 96, 97, 98
 Ministry of Finance duzhi bu 度支部 79, 234, 237, 238, 254, 256
 Ministry of Justice xingbu 刑部 103
 Ministry of Personnel libu 吏部 103
 Ministry of Public Works 89
 Ministry of Public Works gongbu 工部 42, 72, 77, 78, 79, 85, 86, 87, 96, 97, 106, 111, 132, 135, 172, 183, 185, 188, 194, 350
 Ministry of Public Works (Song) 51
 Ministry of Revenue hubu 戶部 72, 79, 80, 103, 107, 132
 Ministry of Rites libu 禮部 103
 Ministry of War bingbu 兵部 103, 132, 185, 199
 minjiang 民匠 81, 104
 missionaries 93, 314
 miting 米艇 159
 Mittler, Barbara 248
 Mongolia 93
 Mongols 54, 56, 264
 Morse, Hosea 334, 336
 moye 末業 295
 muchang 木廠 78
 muchang 木場 74
 Mudanjiang 牡丹江 164
 mujiang 募匠 50
 mujiang 木匠 264
 Mu Jinwen 穆近文 276

- muku 木庫 80, 104
 Myers, Ramon 25
- Nagasawa Kikuya 246
 Nanchuan ji 南船紀 183
 nan hao 南號 127
 nanjiang 南匠 82
 Nanjing 58, 80, 81, 84, 94, 113, 114, 115, 121, 136,
 138, 161, 163, 165, 186, 190, 192, 229, 232, 248,
 249, 256, 264, 321
 nanjue 男爵 98
 nanzi 男子 306
 Napoleon Bonaparte 310
 Naquin, Susan 109, 110
 Needham, Joseph 26, 27, 45
 neige 內閣. *See* Grand Secretariat
 nei shisheng 內侍省 51
 neiwufu 內務府. *See* Imperial Household
 Department
 Neiwufu zeliguan 內務府則例館 261
 New Amoy Dock Company 166
 New Policies xinzheng 新政 339, 356, 357
 New Year's posters nianhua 年畫 250, 276
 nianhua 年畫. *See* New Year's posters
 Nian Xiyao 年希堯 117
 Nicholson & Boyd Co. 165
 Niida Noboru 326, 330, 337, 340
 Ningbo 96, 127, 163, 166, 170, 194, 196, 325, 329, 331
 Ningbo huiguan 寧波會館 329
 Ningguta 寧古塔 164
 Niuzhuang 牛莊 164
 Nonggong bu 農工部 339
 Nong gong shang gongyi ju 農工商工藝局 99
 Nongshu 農書 224
 Northern ship traders 127
 Nurhaci 76
- Office of Estimates liaogu suo 料估所 75
 Office of Palace Construction 82, 83
 Office of Palace Construction yingzao si 營造
 司 80, 104, 106, 264, 335
 official artisan households 56
 official examinations 258
 Official Newspaper Office for Commercial
 Affairs shangwu guanbao ju 商務官報局 97
 official supervision and merchant manage-
 ment guandu shangban 官督商辦 130, 170
 Okamoto Sae 247
 opium 70
 Opium War 96, 135, 163, 164, 170, 191
 Oregon pine 174
- packers 343
 paibo 派撥 188
- painter, paint maker 油畫匠 188
 painters huajiang 畫匠 91, 215, 254, 264
 paint makers youjiang 油匠 91
 palace women 98
 Pan Jixing 246
 Pan Shicheng 潘仕成 135, 170, 245
 paoduiying 炮隊營 195
 paper mounters 256, 264, 267
 Peiwen yunfu 佩文韻府 252
 Peking 58, 72, 75, 76, 82, 84, 87, 91, 95, 99, 100,
 101, 102, 106, 108, 113, 117, 220, 229, 233, 234,
 236, 237, 249, 252, 256, 261, 262, 265, 266,
 269, 275, 278, 321, 322, 323, 326, 329, 330,
 333, 335, 336, 337, 338, 339, 341, 343, 346
 Peking Reconstruction Craft Center 315
 Peng Nansheng 彭南生 30, 100, 101, 331
 Peng Zeyi 彭澤益 29, 39, 99, 326
 Piontek-Ma, Elke 28, 91, 95
 Pomeranz, Kenneth 24, 40
 porcelain 115
 porters 夫役 195, 197, 201
 porters 挑力夫 128
 potters' guild 322
 Poyang 鄱陽 343
 Prak, Maarten 327
 Prince Gong (Yixin) 奕訢 109, 123
 printers 232, 237, 238, 248, 249, 254, 256, 257,
 261, 264, 265, 266, 267, 269, 271, 272, 273,
 274, 275, 277, 278
 public and private reconstruction workshops
 gong si jianshe ge gongchang 公私建設各
 工場 101
 publishers 217, 245, 248, 249, 255, 257, 259, 270,
 271, 273, 274, 277, 278
 Pudong 浦東 165
 Puget Sound 174
 Purvis and Company 165
 Puting 溥頤 97
 Puyi 溥儀 109
 pu 僕 305
- Qian Daxin 錢大昕 276
 Qian Hui'an 錢慧安 276
 Qianlong 70, 78, 88, 89, 92, 95, 114, 117, 118, 119,
 218, 219, 223, 251, 254, 256, 267, 269, 275
 qianzi ku 鉛子庫 74
 Qichang 旗昌 130
 qijiang 旗匠 81, 264
 Qijianlong 齊健隆 workshop 300
 Qiji tiechang 旗記鐵廠 139
 qimin ku 器皿庫 80
 Qinding Fujian sheng waihai zhanchuan zeli
 欽定福建省外海戰船則例 87
 Qinding gongzhong zeli 欽定宮中則例 261

- Qingdao 青島 166, 255, 273, 279, 283, 354
 qiqiao 乞巧 317
 Qiushi tang 求實堂 144
 Qiu village 虬村 276
 Qiuxin jiqi lunchuan zhizao chang 求新機器輪
 船製造廠 167
 quan gong 勸工 301
 quan gong chang 勸工場 101
 Quan gong qiang guo shuo 勸工強國說 310
 Quan Hansheng 全漢昇 29
 Quanzhou 泉州 58, 159, 174, 189
 qugong 渠工 197
 qukou 驅口 55
- Raozhou 饒州 343
 rattan worker 籐匠 188
 Rawski, Evelyn 109, 110
 Reed, Christopher 28, 221, 248, 254, 260, 273
 Rehe 87, 88
 religious communities 334
 River Administration 88
 Rixia jiuwen kao 日下舊聞考 252
 rope maker 繩匠 128, 188
 rotational leadership 330
 Rowe, William 39, 327
 Ruitenbeek, Klaas 28
 Ruyi guan 如意館 93
- sail makers 制蓬匠 128, 191, 194
 sand ship Shachuan 沙船 128, 130, 163, 168,
 190, 325
 Santangelo, Paolo 121
 Sanzi jing 三字經 252, 272
 satin duan 緞 114
 sawyer 鋸匠 188, 194
 scaffolders dacao jiang 搭材匠 91
 Schäfer, Dagmar 28
 Schütte, Hans Wilm 344
 sea prohibition 海禁 95, 157, 167, 168
 Searching for Novelty Machine and Steamship
 Construction Company 167
 Section for Craft and Industrial Affairs
 (gongwu si 工務司) 97
 Section for Overseeing the Works jianzao chu
 監造處 263
 Section of Proofreading jiaodui shuji chu 校對
 書藉處 263
 self-strengthening ziqiang 自強 70, 76, 96, 121,
 123, 138, 143, 158, 170, 231, 261, 277, 298, 300, 352
 Shaanxi 235
 Shachuan 沙船. *See* sand ship
 shamu 杉木 128, 159
- Shandong 76, 79, 82, 93, 100, 101, 113, 124, 126,
 127, 132, 134, 136, 158, 163, 164, 165, 169, 171,
 173, 174, 234, 236, 248, 322
 shang ba hang 上八行 315, 327
 shangbu 商部. *See* Ministry of Commerce
 Shangchuan huiguan 商船會館 325
 Shang dynasty 47
 Shanghai 102, 130, 131, 138, 139, 142, 145, 161, 163,
 165, 166, 169, 170, 174, 192, 194, 196, 197, 199,
 233, 235, 237, 247, 248, 249, 254, 255, 261, 273,
 276, 277, 323, 324, 325, 329, 331, 333, 339,
 340, 341, 344
 Shanghai Maritime Customs 140
 Shangren tuanti zhengli weiyuanhui 商人團體
 整理委員會 340
 shangren 商人 112, 354
 shangse 上色 118
 Shangwu yinshuguan 商務印書館. *See*
also Commercial Press
 Shantou 汕頭 165
 Shanxi 234, 265, 266, 342
 Shanxi merchants 325
 shanzi jiang 山子匠 88, 91
 shaofu jian 少府監 51
 Shaoxing 紹興 329
 sha 杉 173
 She district 歙縣 276
 Shen Baojing 沈保靜 199
 Shen Baozhen 沈葆楨 140, 196, 199
 Shenbao 申報 235, 247
 Shengjing 76, 132, 188, 217, 264
 Sheng Kang 盛康 302, 303
 Sheng Xuanhuai 盛宣懷 302
 Shennong 神農 307
 Shen Qiyan 沈起元 304
 she 社 344
 shiliang jiang 食糧匠 91, 350
 shi nong gong shang 士農工商 300, 301, 303
 shipbuilders 329
 shipbuilding 72, 76, 85, 87, 90, 95, 108
 ship carpenter 艦匠 188
 shipwrights 128, 171, 187, 194, 325, 329
 shixiang jiang 食餉匠 81
 shoemakers' guild 337
 shougongye 手工業 43, 44
 shougong 手工 44, 45
 shouyi 手藝 44
 shufang 書坊 250, 332
 Shufang 書坊 (in Fujian) 249
 shuimo wu 水磨務 51
 shuishi 水師 132
 shukogyōsha 手工業者 44
 shukogyō 手工業 43

- Shunde 順德 249, 271
 Shun 舜 307
 Shuye shanghui 書業商會 333
 shuyuan 書院 323, 342
 shuzuo 書作 263
 Sibao 四堡 248, 251, 252, 259, 271, 272, 274, 354
 Sichuan 79, 87, 100, 101, 136, 158, 163, 193, 235,
 249, 250, 254, 270, 272, 324, 327, 338, 340
 Siku quanshu 四庫全書 222, 223, 231, 256
 Silk Brocade Office 51
 silk-loom god 322
 silk weavers 113, 322, 338
 silk weaving 72, 81, 85, 91, 92, 120, 351
 silversmiths yinzuo 銀作 77
 simin 四民. *See* four occupational groups
 Siming gongsuo 四明公所 329
 Siming muye changxing hui 四明木業長興會
 325, 329
 simin 四民 303
 sinjeku 264
 sinong si du quyuan 司農寺都曲院 51
 sishi 司事 195, 197
 Six Ministries 73, 80
 skilled workers 工匠 195
 skill qiao 巧 296
 slavery 60
 slaves 82
 socialism 29
 soft style 軟体 231
 Song dynasty 48, 50, 62, 63, 109, 115, 349
 Song guilds 322
 Songhua jiang 松花江 158, 163
 Songjiang 松江 275
 songmu 松木 128
 Song Weichen 宋煒臣 167
 Songyun 松筠 137
 song 松 173
 Southeast Asia 167
 Southern ship traders 127
 spinning 71, 98, 99
 stage model of development 29
 Stalin, Joseph 29
 statecraft 298, 301, 302, 303, 306, 308, 311, 313,
 315, 316
 State Farms Bureau tuntian qingli si 屯田清
 吏司 75
 state manufactories (Song) 51
 stone masons shijiang 石匠 91
 sturdy labourer 壯夫 188
 sub-contractual system 196
 Subei bang 蘇北幫 330
 sula 蘇拉 263, 266
 Suzhou 80, 81, 84, 94, 95, 100, 102, 108, 113, 114, 115,
 121, 135, 161, 163, 165, 247, 249, 250, 256, 270,
 275, 322, 323, 324, 328, 332, 333, 334, 336, 341
 Suzhou Metal Tile Manufactory 113
 Taicang 太倉 161
 Taigu 太古 130
 Taihe dian 太和殿 214
 tailor caifengjiang 裁縫匠 188
 tailors' guild 337
 Tainan Official Silver and Cash Bill General
 Office 237
 Taiping 127, 130, 138, 158, 165, 170
 Taiping rebellion 96, 231, 236
 Taiping troops 118
 Taiwan 133, 140, 157, 168, 173, 189, 254
 tai 臺 305
 tanchang 炭廠 51
 Tang Dafu 湯達甫 257
 Tang guilds 322
 Tang Ying 唐英 118, 341
 tanku 炭庫 80, 104
 Taocheng 陶成 341
 Taohuawu 桃花塢 250
 Taoqing 陶慶 341
 taoyin 套印 232
 third estate 319
 Thomas Hunt and Company 139, 194, 196
 Three Silk Weaveries 113, 114
 Tiangong kaiwu 天工開物 116, 125
 Tianjin 100, 101, 127, 130, 131, 136, 138, 163, 165,
 166, 169, 250, 253
 Tianjin experimental manufactory Tianjin
 shixi gongchang 天津實習工廠 101
 Tianlin muchang 天林木廠 112
 Tianquan muchang 天泉木廠 112
 tidiao 提調 197
 tidu 提督 132
 tieku 鐵庫 80, 104
 tielimu 鐵力木 161, 168
 tiezuo 鐵作 81
 tilers wajiag 瓦匠 91
 timber yard 112
 titang 堤塘 234
 tiyong 體用 121
 tobacco processors 334
 Tong'an sou 同安艘 159
 Tong'an 同安 159
 tonggong 童工 195
 tonggong 童工 (child labour) 198
 tonggong 銅工 (copper smith) 310
 Tongmao 同茂 131
 tong shang 通商 301
 Tong Shuye 童書业 31

- Tongwen guan 同文館 233
 Tongzhi 109, 112, 115, 119, 218, 261
 Tongzhou 通州 127, 130, 131, 136
 tongzi ku 銅字庫 263
 touxia 投下 55
 touyi 頭役 188
 Trademark Bureau shangbiao ju 商標局 97
 traditional craftsmanship chuantong
 shougongyi 传统手工艺 30
 training centers for vagrants (youmin 遊民) 101
 Tsien Tsuen-hsuei 232, 246
 tuan 團 321, 338
 tuntian 屯田 125
 Tushujicheng qianyin shuju 圖書集成鉛印書
 局 259
 Tu Wei-ming 23
- Uighur masters 93
 unfree labour 47, 62
 Unskilled workers 小工 195
- Vittinghoff, Natascha 248
 vocational schools 69, 98, 101, 103
 vocational training 357
 Vogel, Hans Ulrich 27, 28, 77, 220
 Vries, Peer 40
- wages 24, 36, 53, 61, 82, 86, 87, 90, 92, 94, 171,
 184, 191, 197, 219, 265, 267, 268, 273, 278, 329,
 345, 351
 Arsenal wages 199, 201
 Wagner, Rudolf G. 248
 Wang Boxin 王柏心 306
 Wang Daokun 汪道昆 297
 Wang Peixun 王沛恂 305
 Wang Shixiang 王世襄 85
 Wangxia 253
 Wang Yeh-chien 25
 Wang Zhen 王禎 224
 Wanping xian min 宛平縣民 266
 Wanshou shan 萬壽山 83
 Wanshou shengdian 萬壽盛典 275
 Wan(yuan) xian 萬(源)縣 163, 193
 weaving 71, 91, 92, 94, 98, 99
 Weber, Max 23, 26, 327, 336
 wei dao 未到 266
 Wei family 魏氏 343
 weighing masters 秤手 127
 wei jiang de mian 維匠得免 54
 Wei Mingkong 魏明孔 31, 40
 weiyuan 委員 195, 197
 Wei Yuan 魏源 137, 298, 302
 Wenchang association 文昌會 333
 Wenchang huiguan 文昌會館 333
- Wenchang miao 文昌廟 275
 Wenjin ge 文津閣 88
 Wenlin Gonghui 文林公會 333
 wensi yuan 文思院 51
 wenxiu yuan 文繡院 51
 Wenzhou 溫州 163
 Whampoa. *See* Huangpu
 Widmer, Ellen 247
 Wittfogel, Karl August 327
 Wong, Roy Bin 23, 40, 110, 111
 wooden ox 307
 Worcester 192, 194
 working day gong 工 185, 186, 188, 190
 work promotion places quan gong chang 勸工
 場 101
 work shifts 47
 workshops in Buddhist temples 52
 wubei yuan 武備院. *See* Court of Imperial
 Armaments
 Wu Chengming 吳承明 29, 40
 Wujiang district 吳江縣 163
 Wuliao jiazhi zeli 物料價值則例 87, 90, 91,
 231, 351
 Wu Prefecture 吳郡 322
 Wuxi bang 無錫幫 329
 Wuxi 無錫 165
 Wuying dian juzhenban chengshi 武英殿聚珍
 版程式 223, 228
 Wuying dian juzhenban shu 武英殿聚珍版書
 223, 286
 Wuying dian Palace Workshop Wuying dian
 zaoban chu 武英殿造辦處 215
 Wuying dian xiushu chu 武英殿修書處 215
 Wuying dian 武英殿 81, 214, 217, 218, 219, 220,
 222, 223, 224, 229, 234, 252, 259, 261, 262,
 263, 264, 265, 266, 269, 275, 278
- xia ba hang 下八行 315
 Xiamen 廈門 159, 165, 168, 169, 170, 172, 189
 Xianfeng 109, 112
 Xianghe muchang 祥和木廠 112
 Xiangsheng 祥生 165
 xiao chaoting 小朝廷 84
 xiaohuang ku 硝磺庫 74
 Xiehua shuju 擲華書局 233
 Xihua men 西華門 80, 214, 229, 263
 Xijia hang 西家行 338
 Xinjiang 74, 91, 93, 136, 138, 140
 Xin Yuan'ou 新元歐 166
 Xinza 新聞 165
 xiushu chu 修書處 263, 267
 xixin chang 惜薪廠 74
 Xixue guan 西學館 144
 Xuanwu men 宣武門 237

- Xu Chengxuan 許承宣 305
 Xu Dixin 徐淦新 29, 40
 Xuebu tushuju 學部圖書政局 234
 Xue Fucheng 薛福成 307, 308, 309, 310, 311
 Xuexie hang 靴鞋行 337
 Xu Gao 徐杲 314
 Xu Jianqing 徐建青 40, 112, 120
 Xuwan 許灣 249, 259, 270, 271, 272

 Yanghang maoyi zhangcheng 洋行貿易章程 170
 yanghang 洋行 169
 Yanghu pai 陽湖派 305
 Yangliuqing 楊柳青 250, 276, 300
 Yang Shixiang 楊士驥 275
 Yang Wenhui 楊文會 248
 Yangxin dian zaoban chu 養心殿造辦處 81, 82, 83, 92, 106, 117, 217
 yangyuan 洋元 197
 Yangzhou 223, 229, 231, 249
 Yangzhou shiju 揚州詩局 229, 231
 Yangzhou 揚州 161, 163
 Yangzi 126, 127, 158, 161, 163, 170, 171, 193
 Yangzi Delta 126, 171
 Yangzi jiqichang 揚子江機器廠 167
 Yantai 煙臺 165
 Yan Zhongping 嚴中平 29
 yaohu 窯戶 113
 Yao 堯 307
 ya 牙 305
 Yellow River 70, 76, 126, 127
 Yesong 耶松 165
 Yihe yuan 頤和園 83
 yingbang 英鎊 197
 Ying Baoshi 應寶時 130, 199
 yingshan (qingli) si 營繕(清吏)司. *See* Bureau of Construction
 Yingzao fashi 營造法式 86
 yingzao si 營造司. *See* Office of Palace Construction
 Ying Zuxi 應祖錫 308, 312
 yinshou 印手 333
 Yinshua zongju 印刷總局 277
 yinshu xuetaang 印書學堂 272
 yinya 姻婭 305
 yinyuan 銀圓 238
 yipu 藝圃 145
 yishu xuexiao 藝術學校 144
 yitu 藝徒 145, 198
 Yizheng 儀征 161
 Yoneyama Toratarō 246
 Yongle dadian 222, 223
 Yongzheng 70, 82, 83, 85, 89, 95, 117, 218, 219, 257, 260, 297, 298

 yong 備 306
 youhua zuo 油畫作 80, 104
 youtong 幼童 198
 Yuan dynasty 54, 349
 Yuan Mei 袁枚 276
 yuanmen bao 轅門報 235
 yuanmen chao 轅門抄 235
 Yuanming yuan chaitan ku 圓明園柴炭庫 80
 Yuanming yuan 圓明園 79, 91, 112, 254
 yuanqi 圓器 342
 Yuan Shikai 袁世凱 233, 234, 236
 Yuechi 岳池 250, 270, 272
 Yu family 余姓 343
 yuheng qingli si 虞衡清吏司. *See* Bureau of Forestry and Weights
 Yun Jing 惲敬 305, 311
 Yunnan 87, 95, 99, 136, 137, 232, 235, 324
 Yunnan copper mines 95
 Yuntaishan 96
 yushu chu 御書處 263, 267, 285, 287
 Yü Ying-shih 23
 Yu 禹 307

 Zaifeng 載灃 109, 238
 zai guan renyi 在官人役 200
 Zaizhen 載振 97
 zeli 則例 36, 39, 85
 Zeng Guofan 曾國藩 70, 123, 138, 139, 140, 231, 307
 Zhang Heng 張衡 307
 Zhang Jian 章謙 305
 Zhang Shudong 231, 232, 235, 246
 Zhang Xiumin 231, 232, 246, 249, 257, 275
 Zhang Yuanlong 張元隆 163, 169
 Zhang Zhidong 233, 236
 Zhangzhou 漳州 96, 159, 174, 189, 329
 zhaomu jiang 招募匠 265
 Zhao Nanxing 趙南星 297
 Zhapu 乍浦 161
 Zhejiang 79, 87, 95, 96, 100, 124, 126, 127, 128, 130, 133, 138, 158, 161, 163, 171, 174, 183, 184, 228, 232, 235, 249, 324, 325, 329, 342, 343
 Zhejiang hongbang muye gongsuo 浙江紅幫木業公所 325, 330
 Zhejiang lu 哲匠錄 314
 Zheng Chenggong 鄭成功 95, 133, 157, 168
 Zheng Guanying 鄭觀應 313
 Zheng Zhidao 鄭至道 297
 Zhenjiang 223, 231
 zhepei zuo 折配作 263
 Zhibao tang 至寶堂 333
 Zhili 79, 87, 91, 94, 100, 101, 126, 130, 132, 136, 140, 158, 163, 165, 184, 233, 234, 268, 275, 286, 324, 325
 Zhili guan shuju 直隸官書局 233

- zhizao ju 製造局 137
 zhizao xuetaang 製造學堂 145
 zhizao xuexiao 製造學校 144
 zhongben yimo 重本抑末 295
 zhongnong yishang 重农抑商 295
 Zhongxing genglu 269
 Zhou Kai 周凱 305
 Zhuang Tinglong 莊廷鑑 257
 Zhuanyun zhai 篆雲齋 261, 262, 265, 268, 288
 Zhu Cishou 祝慈寿 31, 36, 40, 112
 Zhuge Liang 諸葛亮 307
 Zhu Gui 朱圭 275
 zhuoling chang 濯靈廠 78
 zhuoqi 琢器 342
 Zhu Puzhai 朱朴齋 163, 167
 Zhu Zhiyao 朱志堯 167
 zhuzhi 竹紙 228
 zhuzuo jiang 住作匠 58
 zibe 126
 zidi 子弟 305
 ziqiang 自強. *See* self-strengthening
 Ziyi gongsuo 梓義公所 (Carpenters' guild) 102
 zongban 總辦 197
 Zongli yamen 總理衙門 73, 123, 136, 219, 260
 zuanfu 鑽夫 171
 Zunftkampf 326
 zuofang 作坊 315
 zuofa 做法 86
 Zuo Zongtang 左宗棠 70, 123, 138, 144
 zuo 作 321
 Zurndorfer, Harriet 23, 28, 37