

**Found in Translation: Western Science Books, Maps, and Music in China, 1860s-1920s**

by

**Liangyu Fu**

Bachelor of Arts, Bachelor of Laws, Wuhan University, 2003

Master of Library Sciences, Nanjing University, 2006

Submitted to the Graduate Faculty of the  
Dietrich School of Arts and Sciences in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy

University of Pittsburgh

2013

UNIVERSITY OF PITTSBURGH  
DIETRICH SCHOOL OF ARTS AND SCIENCES

This dissertation was presented

by

Liangyu Fu

It was defended on

April 15, 2013

and approved by

Lester C. Olson, Professor, Department of Communication

Brenton J. Malin, Associate Professor, Department of Communication

Evelyn S. Rawski, Professor, Department of History

Dissertation Advisor: Ronald J. Zboray, Professor, Department of Communication

Copyright © by Liangyu Fu

2013

# **Found in Translation: Western Science Books, Maps, and Music in China, 1860s-1920s**

Liangyu Fu, PhD

University of Pittsburgh, 2013

This dissertation explores a seminal episode in the history of global information flow. It unfolds a socio-cultural history of science books, maps, and sheet music that were originally authored and published in the U.S. and Britain, but which began a new life cycle through translation and printing in China during the late nineteenth and early twentieth centuries when Western learning was introduced into China to an unprecedented degree. By looking at imprints published by and translation activities conducted in diverse institutes such as the Jiangnan Arsenal, the Canton Hospital, and the China Medical Missionary Association, I investigate how Western technical knowledge was communicated to a culture with a radically different language, epistemology, book-making and printing tradition, and convention of viewing.

In this dissertation, I present a multidimensional analysis of translations through discussing their materiality, textuality, visuality, and interculturality. I first examine how the making of the translated page was conditioned by book cultures as different as Western and traditional Chinese ones. Printer-publishers' strategies of adapting special content to the Chinese page resulted in imprints demonstrating hybridized bibliographical properties, found in their paratextual elements. These traces indicated that translations of Western science books, maps, and music stood on the vanguard of the amalgamation of two bookmaking cultures. Furthermore, I analyze translators' diverse textual and visual strategies. While translators strived to adapt Western works for local readers, they also applied their understanding of the original

text, augmented it with updates, and rearranged its organization. The visual representations in translations contributed to the transformation of Chinese visual conventions. Different types of visual modifications were caused by illustrators' indigenizing efforts, their artistic training and workshop practices, contemporary intellectual trends, and their accommodations to new printing and reproduction technologies. Finally, I reveal the mechanism of intercultural, international, and interlingual communication networks—the underlying force that facilitated translation at every stage—which include the collaboration between oral and scribal translators and inter/intra-organizational connections among a wide range of networked agents (e.g., translators, printer-publishers, illustrators, readers, and sponsors). I propose an extension of the “communication circuit” model to encompass new horizons for international and intercultural connections.

## TABLE OF CONTENTS

<b>PREFACE .....</b>	<b>XV</b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
<b>1.1 CHAPTER-BY-CHAPTER DESIGN .....</b>	<b>3</b>
<b>1.2 PREVIOUS SCHOLARSHIP .....</b>	<b>8</b>
<b>1.2.1 History of the Book and Print Culture.....</b>	<b>9</b>
<b>1.2.2 Visual Studies.....</b>	<b>21</b>
<b>1.2.3 Intercultural Communication .....</b>	<b>27</b>
<b>1.2.4 Technology Transfer/Diffusion of Innovation .....</b>	<b>30</b>
<b>1.2.5 Historical Information Science.....</b>	<b>33</b>
<b>1.2.6 Science Translation and Science Publishing .....</b>	<b>36</b>
<b>1.2.7 Missionaries in China .....</b>	<b>40</b>
<b>1.2.8 Map-Making and Cartography; Music Printing and Dissemination.....</b>	<b>43</b>
<b>1.3 SOURCES AND METHODS .....</b>	<b>46</b>
<b>2.0 “ALL HOWEVER IS CONTRARY IN CHINESE”: THE CHANGING FACE OF THE TRADITIONAL CHINESE BOOK DURING AN ERA OF TRANSLATION ....</b>	<b>54</b>
<b>2.1 TWO DIVERGENT BOOKMAKING TRADITIONS .....</b>	<b>60</b>
<b>2.1.1 A Bibliographical Comparison.....</b>	<b>60</b>
<b>2.1.2 Special Cases: Science Books, Maps, and Music .....</b>	<b>67</b>

2.1.2.1	Science Books .....	67
2.1.2.2	Maps .....	69
2.1.2.3	Sheet Music .....	71
2.2	TRANSLATING BETWEEN BOOK CULTURES .....	74
2.2.1	Traditional Chinese Elements Retained.....	78
2.2.2	Practical Problems of Orientating Contents.....	83
2.2.3	Glossaries and Indices .....	89
2.2.4	Solutions to Arranging English-Language Content.....	98
2.2.5	Marginal Spaces.....	102
2.3	NEW PRINTING TECHNOLOGY AND THE MAKING OF TRANSLATIONS .....	107
2.3.1	Alternative Methods of the Book-Making.....	108
2.3.2	New Techniques and New Bibliographical Formats.....	114
2.3.3	Adopting the New While Preserving the Old.....	119
3.0	“HOW MANY DIFFICULTIES I FACED IN COMPLETION OF THIS BOOK”: TRANSLATING THE TEXTUAL.....	127
3.1	SELECTION OF ORIGINAL TEXTS FOR TRANSLATING .....	132
3.1.1	Singling Out from Thousands .....	132
3.1.2	Partial Translation of Books.....	141
3.1.3	Pastiches of Translations .....	144
3.2	CHANGES MADE TO THE ORIGINAL TEXT FOR TRANSLATING .	155
3.2.1	Omission .....	156
3.2.2	Additions .....	163

3.2.3	Adjustments over Different Editions.....	173
3.3	ORGANIZATION OF CONTENT IN TRANSLATIONS .....	177
3.3.1	Division of the Content .....	177
3.3.2	Visual Frameworks that Indicated the Organization of Content.....	188
4.0	DO NOT “SET A COMPASSLESS BOAT INTO THE SEA”: RENDERING THE VISUAL .....	195
4.1	VISUALIZED INFORMATION IN TRANSLATED IMPRINTS .....	202
4.1.1	Viewing to Learn.....	203
4.1.2	“Reference Viewing” and Text-Image Relationship.....	214
4.2	VARIANTS OF ORIGINAL IMAGES IN TRANSLATIONS .....	222
4.2.1	Alterations of Science Illustrations.....	222
4.2.2	Altered Images and Their Potential Influence on Readers’ Reception of Science Knowledge.....	228
4.3	INDIGENIZATION, HYBRIDIZATION, AND AGENTS’ INVOLVEMENT .....	236
4.3.1	West Meets East in Translated Sheet Music.....	237
4.3.2	Adjustments Made in Translated Maps for Chinese Eyes .....	243
4.3.3	Agents’ Involvement in Translated Science Illustrations.....	247
4.4	CHANGES IN THE PRODUCTION OF TRANSLATED VISUAL REPRESENTATIONS.....	253
4.4.1	One Title, Two Looks.....	254
4.4.2	Electrotypography and International Trade of Electrotpe Plates .....	261
4.4.3	Illustration Layouts and New Printing Techniques.....	266



4.4.4	Divisions of Labor and Degrees of Human Intervention.....	271
5.0	“WE CAN DO THIS NOW WITHOUT SERIOUS EMBARRASSMENT”: COMMUNICATION NETWORKS IN THE TRANSNATIONAL PRODUCTION OF KNOWLEDGE .....	277
5.1	INTERACTIONS BETWEEN TRANSLATION TEAM WORKERS .....	280
5.1.1	Collaboration between Oral Translator and Scribal Translator .....	281
5.1.2	The Real-Time Process of Collaborative Translation .....	289
5.1.3	Scribal Translators and the Language Style in Translations .....	298
5.2	THE ESTABLISHMENT OF NETWORKS .....	306
5.2.1	Henry S. Wellcome China Publication Fund: A Case of International Sponsorship .....	306
5.2.2	Acquiring Domestic Aid for Printing and Publishing Translations.....	322
5.3	AN INTERCULTURAL/INTERNATIONAL/INTERLINGUAL “COMMUNICATION CIRCUIT” .....	332
5.3.1	Translators and the Connection between the Two “Cycles” .....	333
5.3.2	“Cross-Readership” and Reception .....	336
5.3.3	Interchangeable Roles.....	344
6.0	CONCLUSION .....	349
	BIBLIOGRAPHY .....	353

## LIST OF TABLES

<b>Table 1.</b> Examples of Alternating Authors in <i>Nei Ke Xue</i> .....	148
<b>Table 2.</b> Comparison of Content Division between the Chinese Translation and the English-language Original.....	180
<b>Table 3.</b> Samples of the China Medical Missionary Association's Budget for Publishing Translations, 1917.....	296
<b>Table 4.</b> Pundit Fee in the Cost Structure.....	296

## LIST OF FIGURES

<b>Figure 1.</b> A <i>ye</i> of the traditional Chinese book .....	65
<b>Figure 2.</b> Horizontally arranged mathematical formulae ( <i>Wu Ti Yu Re Gai Yi Ji</i> , 20a) .....	86
<b>Figure 3.</b> The juxtaposition of “New South Wales” and its Chinese translation ( <i>Shi Jie Gai Zao Hou Huan Qiu Lie Guo Di Tu</i> , illustration 47).....	87
<b>Figure 4.</b> Horizontal music and vertical lyrics together on one page ( <i>Yang Xin Shen Shi</i> , 1).....	89
<b>Figure 5.</b> A table of chemical terms ( <i>Hua Xue Chu Jie</i> , <i>juan</i> 3, appendix, 2b-3a).....	93
<b>Figure 6.</b> Index ( <i>Hua Xue Chu Jie</i> , <i>juan</i> 4, appendix, 2b-3a).....	94
<b>Figure 7.</b> Vocabulary-index ( <i>Quan Ti Chan Wei</i> , <i>mu lu</i> , 1) .....	97
<b>Figure 8.</b> Contiguous last pages of both main text and index ( <i>Fu Ke</i> , page 414b to page 16 of the index).....	101
<b>Figure 9.</b> “ <i>tian tou</i> notes” ( <i>Hua Xue Chu Jie</i> , <i>juan</i> 3, 2a) .....	103
<b>Figure 10.</b> A variant of “heavenly head” and “earthly foot” margins within the <i>ban kuang</i> ( <i>Chan Ke Xue</i> , 140-141) .....	105
<b>Figure 11.</b> An “earthly foot” margin with parenthetical labels of the original author’s name, and example of non-traditional pagination ( <i>Nei Ke Xue</i> , 490-91) .....	107
<b>Figure 12.</b> Portrait-oriented <i>ban kuang</i> ( <i>Fu Ke Xue</i> , 235-36).....	119
<b>Figure 13.</b> Craftsman script ( <i>Ru Men Yi Xue</i> , preface, 1b-2a).....	171

<b>Figure 14.</b> Manuscript-style preface ( <i>Quan Ti Chan Wei</i> , preface by Lin Dingwen, 2a-3b) .....	172
<b>Figure 15.</b> Dual numbering of the page ( <i>Fu Ke Xue</i> , vol. 2, 173/28-174) .....	184
<b>Figure 16.</b> Visual framework of <i>Hua Xue Jian Yuan</i> (juan 2, 24b-25a) .....	190
<b>Figure 17.</b> Font uses in different editions (Left side: <i>Nei Ke Quan Shu</i> , ce/juan 2, 1a; Right side: <i>Nei Ke Xue</i> , 490) .....	191
<b>Figure 18.</b> An unusual way of structuring the content ( <i>Wan Guo Yao Fang</i> , juan 1, 3-4) .....	192
<b>Figure 19.</b> Wall chart used in classroom (Original caption: Class in Minor Surgery, St. John's Medical School, Shanghai), <i>China Medical Journal</i> , 23.5 (1909), between 308 and 309 (recto). .....	211
<b>Figure 20.</b> Three <i>Jiao</i> inside the body ( <i>Lei Jing Tu Yi</i> , juan 3, 52b) .....	217
<b>Figure 21.</b> Heart Meridian of Hand-Shaoyin (Ibid., juan 3, 42a) .....	217
<b>Figure 22.</b> Making Vermilion through Sublimation of Mercury with Sulphur ( <i>Tian Gong Kai Wu</i> , juan 16, 43a) .....	217
<b>Figure 23.</b> Apparatus used for extracting gold ( <i>Bao Zang Xing Yan</i> , juan 1, 29a) .....	220
<b>Figure 24.</b> Original illustration and its letter labels ( <i>Practical Treatise on Metallurgy</i> , 639)....	220
<b>Figure 25.</b> Table of English letters and corresponding Chinese ordinal characters ( <i>Kai Kuang Qi Fa Tu Shuo</i> , front matter) .....	222
<b>Figure 26.</b> Making light carbureted hydrogen ( <i>Principles and Applications of Chemistry</i> , 301) .....	225
<b>Figure 27.</b> Omission of core information in translation ( <i>Hua Xue Jian Yuan</i> , juan 3, 56b) .....	225
<b>Figure 28.</b> Hydrogen burns with volatilized potassium ( <i>Principles</i> , 329) .....	226
<b>Figure 29.</b> Omission of peripheral information in translation ( <i>Hua Xue Jian Yuan</i> , juan 4, 5a) .....	226
<b>Figure 30.</b> Hydrofluoric acid vapor corrodes glass ( <i>Principles</i> , 257) .....	226

<b>Figure 31.</b> Omission of peripheral information in translation ( <i>Hua Xue Jian Yuan</i> , <i>juan</i> 3, 7a)	226
<b>Figure 32.</b> Graduated glass cylinder divided into degrees ( <i>Principles</i> , 338)	226
<b>Figure 33.</b> Omission of peripheral information in translation ( <i>Hua Xue Jian Yuan</i> , <i>juan</i> 4, 15a)	226
<b>Figure 34.</b> Sample page from Penrose's <i>Diseases</i> ( <i>A Text-Book of Diseases of Women</i> , 275)	228
<b>Figure 35.</b> The page with the illustrations in the Chinese version ( <i>Fu Ke Xue</i> , 238)	228
<b>Figure 36.</b> Structure of flame ( <i>Principles</i> , 318)	232
<b>Figure 37.</b> Replacing letters with characters ( <i>Hua Xue Jian Yuan</i> , <i>juan</i> 3, 70b)	232
<b>Figure 38.</b> Combination of neume and <i>gong che</i> notations ( <i>Sheng Shi Ge Jing Jian Yao</i> )	239
<b>Figure 39.</b> Using <i>tian gan</i> characters to represent notes or pitches (Left: <i>La Ba Chui Fa</i> , 2a; Right: <i>Ibid.</i> , 3b)	240
<b>Figure 40.</b> <i>Tian gan</i> characters in a different order ( <i>Sheng Shi Pu</i> , 6-7)	241
<b>Figure 41.</b> Time signatures in Chinese characters ( <i>Sheng Shi Pu</i> , 5)	242
<b>Figure 42.</b> Alternative representation of time signatures ( <i>La Ba Chui Fa</i> , 4b)	242
<b>Figure 43.</b> Map of the Great Britain ( <i>Hai Guo Tu Zhi</i> , <i>juan</i> 4, 24b-25a)	246
<b>Figure 44.</b> Map of Japan ( <i>Hai Guo Tu Zhi</i> , <i>juan</i> 3, 34b-35a)	246
<b>Figure 45.</b> Windlass for raising water from a well ( <i>Le Diverse et Artificieuse Machine</i> , 230)	248
<b>Figure 46.</b> Chinese illustrators' interpretation ( <i>Yuan Xi Qi Qi Tu Shuo Lu Zui</i> , <i>juan</i> 3, 16b)	248
<b>Figure 47.</b> Electrotyped version ( <i>Hua Xue Chu Jie</i> , <i>juan</i> 1, 4a)	257
<b>Figure 48.</b> Base of Brain ( <i>Quan Ti Chan Wei</i> , <i>juan</i> 4, 181a)	259
<b>Figure 49.</b> Side View of the Skull ( <i>Anatomy of the Human Body</i> , 182)	259
<b>Figure 50.</b> Translation of "Side View of the Skull" ( <i>Quan Ti Chan Wei</i> , <i>juan</i> 1, 32b)	259
<b>Figure 51.</b> A "mosaic layout" of illustrations ( <i>He Shi Liao Xue</i> , 526-27)	268

<b>Figure 52.</b> Non-consecutive layout of electrotype illustrations. Numbers from top to bottom, right to left: 34, 36, 37, 38, 35, 39, 41, 40 ( <i>Hua Xue Chu Jie</i> , <i>juan</i> 1, 2b).....	271
<b>Figure 53.</b> “Dr. Mary H. Fulton and the Pundit Translating Medical Text-books from English into Chinese, Hackett Medical College for Women, Canton, January 1911.” See Mary H. Fulton, “ <i>Inasmuch</i> ”: <i>Extracts from Letters, Journals, Papers, Etc.</i> (West Medford, MA: The Central Committee on the United Study of Foreign Missions, 1915), plate between pages 32 and 33...	293
<b>Figure 54.</b> Type set by Wellcome’s staff, sample copy (WA/HSW/OR/D.2, China Publications Fund, Wellcome Library, London) .....	321
<b>Figure 55.</b> The original “Communication Circuit” diagram copied from Robert Darnton, “What is the History of Books?” <i>Daedalus</i> 111.3 (1982): 68, with additions by Liangyu Fu.....	336

## **PREFACE**

Since I started my dissertation research project in 2007, I have been overwhelmed by all kinds of generous help from numerous people and institutions on different continents. Although I believe no words can precisely describe my heartfelt gratitude, and I am yet unable to narrate in detail all the stories behind every name, it is still the loveliest thing to do to write down this acknowledgment note.

First and foremost, I am deeply indebted to my advisors Ronald and Mary Zboray for their enthusiasm, encouragement, insights, and tolerance. They took time discussing with me every idea I had, and reading every piece of my scholarly writing. They always kept faith in me, and tried hard to build my self-confidence in the face of difficult tasks. Their productivity, high quality scholarship, and great efforts made on behalf of their students set a perfect model for my future career trajectory. As dissertation committee members, Lester Olson, Brent Malin, and Evelyn Rawski have helped me in many ways, from structuring the theoretical and literature platform, to providing guidance in their fields of specialty. The Department of Communication at the University of Pittsburgh offered a great environment for learning and scholarly exchange environment. The eleventh floor of the Cathedral of Learning is always full of inspiration and wisdom. My gratitude extends to my mentors, Hsu Cho-yun 許倬雲 and Kai-wing Chow 周啟榮, for every suggestion they gave to me in the past years. My colleagues at the Needham

Research Institute (Cambridge, UK)—Christopher Cullen, Catherine Jami, Mei Jianjun 梅建軍, Jiří Hudeček, among many others—broadened my view of interdisciplinary research. I am also grateful to Ann Jannetta, Bell Yung, Mary S. Lewis, Kellie Robertson, Tsien Tsuen-hsuei 錢存訓, Ferdinand Dagenais, Vivienne Lo, Francesca Bray, Joseph McDermott, Liu Xinmin 劉辛民, Mi Chu Wiens 居蜜, Liu Bing 劉冰, Xu Yan 徐雁, Zhang Zhiqiang 張志強, Wu Yonggui 吳永貴, Ying Jia-Ming 英家銘, Lin Da 林達, Wan Yuan 萬源, and Luo Jia 羅佳, for all the thoughtful conversations in diverse milieus, be it formal or informal, face to face or through electronic communication. I would like to thank Michael Winship, who “discovered” my research first at the 2011 Bibliographical Society of America annual meeting, and eventually, as series editor, offered me a contract for publishing my dissertation. For another large group of scholars whose names I am not able to mention here, I honor them by a very academic act—citing their works.

I greatly benefited from my audiences and respondents who initiated questions and critiques for my research presentations at many conference venues, such as the National Communication Association Convention (2011 and 2010), the Reception Study Society conference (2011), the New Scholar Program of the Bibliographical Society of America (2011), the Society for the History of Authorship, Reading, and Publishing annual conference (2009, 2008, and 2007), the conference of the Center for the History of Print Culture in Modern America at the University of Wisconsin-Madison (2008), and the 12th International Conference on the History of Science in East Asia (2008). Anonymous reviewers of two articles of mine—“Invention and Implementation: New Bibliographical Features in Chinese Translations of Western Science Books, 1860-1920” (published in the *Papers of the Bibliographical Society of America*) and “Indigenizing Visualized Knowledge: Translating Western Science Illustrations in



China, 1870-1910” (published in *Translation Studies*)—provided valuable insights and beneficial critiques that not only made my work better, but also strengthened many aspects of my future dissertation research. Different versions of these two articles have been included in my dissertation. Thanks also go to Kate Sturge and Michela Wolf, the editors of *Translation Studies*, and Trevor Howard-Hill, the late editor of the *Papers of the Bibliographical Society of America*, for their belief in the quality of my scholarship.

The fellowships and travel grants I received in the past few years funded my research trips to the U.S., U.K., and China. I am grateful for financial support from the University of Pittsburgh’s School of Arts and Sciences Graduate Summer Research Fellowship (2007), the Needham Research Institute’s Andrew Mellon Research Fellowship (2009), the University of Pittsburgh’s Chancellor’s Fellowship in Chinese Studies (2010-2011), the Bibliographical Society of America’s Research Fellowship (2011), the Harvard University’s Harvard-Yenching Library Travel Grant (2011), Chiang Ching-kuo Foundation’s Dissertation Research Fellowship (2011-2012), and the University of Pittsburgh’s Andrew Mellon Pre-doctoral Fellowship (2012-2013). I also deeply appreciate the multiple grants offered by the International Studies Funding from my University’s Center of International Studies (2007 and 2010) and China Council’s Graduate Student Pre-dissertation Grant and Conference Participation Travel Grant (from 2008 to 2013).

During my research, I have been fortunate enough to be assisted by many highly professional and kind hearted librarians and archivists in more than twenty institutions in three countries: the Hillman Library (University of Pittsburgh), the Library of the Pittsburgh Theological Seminary, Carnegie Library of Pittsburgh, the Bancroft Library and the East Asian Library at the University of California at Berkeley, the Regenstein Library and the East Asian

Library at the University of Chicago, the Library of Congress (Washington, DC), the National Library of Medicine (Bethesda, Maryland), and Harvard-Yenching Library, Widener Library, Lamont Library, and Gutman Library all at the Harvard University; the British Library, the Wellcome Library (London), the Library and Archive of School of Oriental and African Studies (University College London), St. Bride Library (London), the East Asian History of Science Library at the Needham Research Institute (Cambridge), and the Cambridge University Library; the Shanghai Library, the Bibliotheca Zi-Ka-Wei (Shanghai), the Nanjing Library, Nanjing University Library, Nanjing Normal University Library, Wuhan University Library, and the Provincial Library of Hubei. I am especially grateful to Zhang Haihui 張海惠, John Moffett, Crestina Forcina, Edward Copenhagen, Julianne Simpson, Ma Xiaohe 馬小鶴, Xu Yinong 徐憶農, Hiroyuki N. Good, and Tessa Smart, for their gracious accommodation and “magical” support of my never-ending requests for reading and reproducing primary and secondary sources.

Finally, I owe the most heartfelt thanks to my parents, although I know it is inexpressible, for their unfailing love and support day after day, year after year. To them, this dissertation is dedicated.

## 1.0 INTRODUCTION

For most Chinese readers pursuing Western knowledge during the late nineteenth and early twentieth centuries, opening a translated book meant challenging the mind. In a school, a student touching upon Western chemistry would wonder what “nutrition gas” (養氣 *yang qi*) —the translated words for “oxygen” in his textbooks—was. In a church, a converted Chinese Christian would try to sing with proper intonation by reading the pitch signs in the form of Chinese characters inserted inside Western musical notes on translated sheet music. In a reading room, an intellectual who never traveled abroad would struggle with different versions of translated maps, attempting to understand from a combination of Western and Chinese legends what Britain geographically looked like. These are all signal moments of transcultural knowledge transmission. How was Western technical knowledge communicated to a culture with a radically different language, epistemology, book-making and printing tradition, and convention of viewing?

My dissertation is an in-depth inquiry into science books, maps, and sheet music that were originally authored and published in America and England, but which began a new life cycle through translation and printing in China in the late nineteenth and early twentieth centuries. I entitle it “Found in Translation,” as a play upon the common phrase, “lost in translation.” “Translation” refers both to the end product, a translated imprint that is available to readers, and to the process of translating itself, which, in a broad sense, involves varieties of

human interactions, such as communication between different translators, between sponsor and translator, and between translator and printer-publisher. Thus, the strategies that make the meaning “found” and not “lost” to audiences lie not only on the page, but also beyond the page, in translators’ correspondence and personal writings.

I focus upon science books, maps, and music together because, first of all, books (in general), maps, and music are the three prevalent kinds of imprints available in the time period. Second, the process by which they were produced and their contents are both representative of technology transfer between nations. The dynamic translation process of technical knowledge in this specific historical milieu (1860s-1920s) can be analyzed as a major event in the history of intercultural communication. Why is the time period 1860s-1920s so important? During this time of unprecedented West-East intellectual exchanges, printed matter was the foremost channel for Chinese reading publics to get access to Western technical knowledge. In a sense, understanding those translated imprints is an effective way to grasp the zeitgeist of the era in China. The mode of the West-East transfer of technical knowledge was framed by groundbreaking teams of foreign and native translators, printers, and publishers, who worked intensively and interdependently in China, the United Kingdom, and the United States.

I pursued my research through examining archival materials such as translated imprints, institutional documents, correspondence, and personal writings. But I started with the imprints themselves, and then sought to understand the intercultural negotiations the printed pages represent. I first compared the textual and paratextual parts of both the original English-language versions and the Chinese translated ones, in order to capture the strategies translators, printer-publishes, and illustrators employed to hybridize Western and Chinese print cultures, make the text more readable and understandable, and tailor visual information to Chinese

readers. Then, I sought the possible reasons for why they used these strategies, from three perspectives: 1) a cultural perspective that asks “how was the making of the book page conditioned by book cultures as different as Western and Chinese ones, and how did two book cultures amalgamate to represent advanced technical knowledge?”; 2) a technological perspective that asks “how did Western printing techniques influence the presentation and quality of the textual and the visual?”; 3) an intercultural communication perspective that asks “how did the interactions between oral and scribal translators shape the making of knowledge, and how did the negotiations and compromises among translators, printer-publishers, and sponsors impact the final product?” Through triangulating these perspectives, I present a multidimensional analysis of West-East information flow.

## **1.1 CHAPTER-BY-CHAPTER DESIGN**

In my dissertation, I investigate four issues of translation—materiality, textuality, visibility, and interculturality—with a chapter devoted to each, along with an introduction and conclusion.

The introduction brings forward the main research questions, and provides a literature review of scholarship (see below) related to my topic. It also offers, by way of background information, a general picture of the translation and printing of Western science books, maps, and music in China during the late nineteenth century and early twentieth century.

Chapter 1, “‘All However is Contrary in Chinese’: The Changing Face of the Chinese Traditional Book during an Era of Translation,” discusses the amalgamation of Western and Chinese book cultures as seen in the transformation of bibliographical properties featured in translated science books, maps, and music, which were on the vanguard of this convergence

from the 1860s to the 1920s. First, I examine Chinese traditional conventions of book making, printing, and reading which are preserved in these three types of imprints. They signified the book-making agents' acceptance of and resistance to Western book conventions, which also affected readers' conventions of engagement with a text. In many ways, translations, although derived from Western books, retain characteristics of traditional Chinese books. Before examining these, I first compare traditional Chinese bookmaking, map-making, and music printing, with their Western counterparts. It allows me to introduce operational definitions of what specific features constitute the two different book cultures. Then I situate my research objects—*translated* science books, maps, and music—within the framework of the above mentioned comparison, and examine them for what traditional Chinese traces can be seen in them. The specific examples of science translations cover a broad range of subjects, including chemistry, mathematics, physics, medicine, and geography. I also look at a number of world atlases compiled in China during the early twentieth century and various music books (mainly hymnals) published during the late nineteenth century. I analyze the preservation of traditional Chinese cultural and technological traces in, for example, lineage, binding, marginal spaces, and page formatting. I also highlight the two printing technologies that confronted one another (traditional Chinese woodblock printing and Western-style moveable-type and copperplate printing) and their mark upon translated imprints in terms of both textual and visual components. After establishing what was retained of Chinese bookmaking and printing in translations, I compare translated science books, maps, and music to the traditional Chinese book, in order to highlight the new bibliographical features (e.g., horizontal layout, glossaries, indices, and footnotes) that were brought to translations, or the old features (e.g., marginal space or binding) that were creatively adapted. The hybridized product demonstrates translators' and printer-

publishers' negotiation between old and new. This new product heralded dramatic changes in Chinese visual and reading conventions within the first few decades of the twentieth century.

In Chapter 2, “‘How Many Difficulties I Faced in Completion of This Book’: Translating the Textual,” I delve into the new and creative strategies employed by translators to render Western technical knowledge onto the page as comprehensible text for Chinese readers. In this chapter, a comparison is also conducted, but this time, between translated imprints and their Western original versions. Shifting from the “neologism perspective”<sup>1</sup> that has been well covered by much scholarship in the past, I focus upon translators’ editorial treatments of the Western sources, including their selection of appropriate topics and titles from a huge pool of publications, their remix of parts from various sources to form a translation, their additions and deletions of information from the original version, and their reorganization of the book’s content. The rearrangement of the text reflected not only the translators’ considerations regarding readers’ ease in engaging the translation, but also translators’ own, sometimes superior understanding of the knowledge contained in the original Western versions. Indeed, sometimes translators’ technical and scientific knowledge was more comprehensive and up-to-date than that of the original authors. By adding and omitting text, translators made distinctions between the information which was (and was not) necessary for Chinese readers to understand. For case studies of this transmission of knowledge, I closely look at several translations, some of which were compilations—translators sometimes pieced together parts of different Western texts to create essentially a translated compilation—which representatively reflect the translators’ own criteria for judging what was the most important to translate. Tracing dynamics within the translation process requires delving into evidence beyond the page—namely archival materials

---

<sup>1</sup> For scholarship from this perspective, see the “science translation and science publishing” section in the literature review below.

such as correspondence and publishers' accounts. Specifically, I elaborate on the case of British missionary-scientist John Fryer (1838-1928) and the Jiangnan Arsenal in Shanghai where he served as the leading translator of science and technology books. I also study the translation and publishing activities of the China Medical Missionary Association (CMMA), especially under Sir Henry S. Wellcome's China Publication Fund. By careful reading of archival materials that record traces of intercultural communication processes among relevant agents, such as correspondence and institutional documents, I seek the reasons why and the manner in which agents' inventions were finally fixed on the page.

Chapter 3, "Do Not 'Set a Compassless Boat into the Sea': Rendering the Visual," explores how the differences between book cultures and their social and technological elements shaped the transmission of visualized knowledge, how the meaning of translated illustrations was negotiated, and how the making of the graphic representations was accomplished interculturally during the late nineteenth and early twentieth centuries. First, I identify the purpose of translations' visuality as "viewing to learn," by contextualizing them in China's budding global awareness and gradual opening to outside influences, and explore the printing and publishing strategies that catered to this purpose. I then discuss three categories of translated images—ones with transformation in core information, ones that represent alterations in peripheral information, and ones without any changes. In order to understand the differences between Western images and their Chinese translations, I analyze the nature of science illustrations, cartographic accounts, and music notations, the problem of "visual literacy," and the goals of translators. Furthermore, I contend that illustrators' personal understanding of technical knowledge and artistic training played a significant role in adapting Western images to Chinese visual conventions. The adjustments made to graphic representations may have aided Chinese readers' understanding of



Western new knowledge. Through examining different divisions of labor required by different printing techniques, I argue that even in the face of electrotypography's challenge to human intervention, translators still made some aesthetic choices and balanced them with practical needs.

In Chapter 4 “‘We Can Do This Now without Serious Embarrassment’: Communication Networks in the Transnational Production of Knowledge,” I probe into international and domestic interpersonal networks that created and impacted translated pages. First, I investigate “interdiscourse communication”<sup>2</sup> between teams of oral and scribal translators specializing in Western learning and Chinese written languages, respectively. The collaborative model of translating was prevalent during the late nineteenth century. For one thing, the negotiation and debate that emerged during the translation process shaped the way highly technical knowledge was indigenized. For another, the cost structure of producing translations was much influenced by hiring scribal translators. Second, I will discuss institutional efforts in establishing networks with overseas and domestic sponsors. Sponsors not only provided financial assistance to translation enterprises, but also offered advice about text selection, religious disposition, quality control, and even the material make-up of imprints. Two representative cases will be analyzed: the China Publication Fund of Sir Henry S. Wellcome (1853-1936) that supported the CMMA's translation and publishing of a series of Western medical textbooks and the stock-issuing campaign of Zou Daijun (1854-1908) that facilitated a large-scale map publishing project under the auspices of the Society for Translating and Printing Western Maps. Finally, I will elaborate the bridging of two book production-dissemination circuits—one for Western source books and one for translations of them. Translators played a central role in building an intercultural,

---

<sup>2</sup> Ronald Scollon and Suzanne Wong Scollon, *Intercultural Communication: A Discourse Approach*, 2<sup>nd</sup> ed. (Malden, MA: Blackwell Publishers, 2001).

transnational, and interlingual “communication circuit”<sup>3</sup> through active connections with various agents located both in China and in the West, including printer-publishers, illustrators, readers, sponsors, and shippers.

The conclusion summarizes the major points based on my analysis of these case studies. I also evaluate the position of translated imprints in the construction of a new knowledge system and new reading/viewing conventions in China. Furthermore, I address some new perspectives that can be considered as future directions in exploring the intersection among media history, translation studies, and global information flow.

## 1.2 PREVIOUS SCHOLARSHIP

My dissertation deals with various issues and problems largely not addressed in secondary sources across several fields of inquiry. While the global history of the book provides the main framework of discussion,<sup>4</sup> the specific technical and cultural issues involved in this study require me to engage scholarship on visual studies, intercultural communication, technology transfer, historical information science, science translation and publishing, the history of Christian missionaries, and the history of cartography and music printing.

---

<sup>3</sup> Robert Darnton, “What is the History of Books?” *Daedalus* 111.3 (1982): 65-83.

<sup>4</sup> For overviews of the relevant literature situating this field in communication studies, see Ronald J. Zboray and Mary Saracino Zboray, **Error! Main Document Only.** “Print Culture,” in *Handbook of Communication History*, ed. Peter Simonson, Janice Peck, Robert T. Craig, and John P. Jackson (New York: Routledge, 2012), 181-195; and idem, **Error! Main Document Only.** “The History of the Book,” in *Media History and the Foundations of Media Studies*, ed. John C. Nerone, *The International Encyclopedia of Media Studies*, ed. Angharad Valdivia, vol. 2 (New York: Wiley Blackwell, 2013), 167-93.

### 1.2.1 History of the Book and Print Culture

My dissertation primarily examines the printed translated Western book as a media production in a specific historical time period (1860-1920) that had a profound impact upon Chinese culture and society. Therefore, book history is the foremost field of scholarship that I address and to which I intend to contribute. Generally speaking, book history in the West is quite a young and interdisciplinary field of scholarship, but it has already brought new perspectives to bear upon the material bases of the formation and circulation of ideas. Modern book history was ushered in by Lucien Febvre and Henri-Jean Martin's *The Coming of the Book: The Impact of Printing, 1450-1800* (1958), which attributes the birth of the printed book to technological advances, such as papermaking and printing techniques. The authors had a larger vision of print's role in history, however. "The printed book was more than a triumph of technical ingenuity," they write, "but also was one of the most important agents at the disposal of western civilisation in bringing together the scattered ideas of representative thinkers."<sup>5</sup> Their book, to some extent, thus introduces a holistic view of the book, even though it touches upon only a limited number of elements (the book's visual appearance, costs, printers, booksellers, authors, and geography), and pays too much attention to quantifying data at the expense of macroanalysis. It is a flaw the book shares with Robert Escarpit's *Sociology of Literature* (1958), though the latter opened new vistas for the socio-economic history of the literary imagination.<sup>6</sup> However, Febvre and Martin made possible a fresh take on book study and its role in intellectual history at a crucial time just before Europe's rise to world dominance.

---

<sup>5</sup> Lucien Febvre and Henri-Jean Martin, *The Coming of the Book: The Impact of Printing, 1450-1800* (London, New York: Verso, 1997), 10.

<sup>6</sup> Robert Escarpit, *Sociology of Literature*, trans. Ernest Pick (Painesville, OH: Lake Erie College Press, 1965).

Broad generalizations regarding that rise can be found in Elizabeth Eisenstein's *Printing Press as an Agent of Change* (1979).<sup>7</sup> Her work, at once growing from and critiquing Marshall McLuhan's *Gutenberg Galaxy*,<sup>8</sup> was widely accepted as a milestone work of book history. She brings forward an "unacknowledged revolution" to public attention by analyzing the functions of the printing press (dissemination, standardization, and preservation) in the broader framework of post-Gutenberg Western civilization. She examines the shift from script culture to "print culture" and tries to render its "cumulative" cultural significance ("affecting the transmission of texts over the course of many generations impinged upon historical consciousness") over the long run.<sup>9</sup> Eisenstein's breakthrough insights concerning the cultural function of the book contrast with previous book history research oriented to physical properties and bibliographical features.

She was not alone in this breakthrough. For example, in *The Cultural Uses of Print in Early Modern France* (1987),<sup>10</sup> Roger Chartier examines the cultural history of early modern France through a lens similar to Eisenstein's in terms of one key characteristic of print culture—"diffusion." He writes "Any history of publishing must necessarily also be a history of the diffusion of printed matter."<sup>11</sup> Furthermore, they both pay attention to the function of printing and imprints in forming (or transforming) a culture (although Eisenstein focuses on elite and learned culture, while Chartier shifts to popular culture). The similarities may be due to the fact

---

<sup>7</sup> Elizabeth Eisenstein, *The Printing Press as An Agent of Change: Communications and Cultural Transformations in Early-Modern Europe*, 2 vols. (Cambridge: Cambridge University Press, 1979).

<sup>8</sup> Marshall McLuhan, *The Gutenberg Galaxy: The Making of Typographic Man* (Toronto: University of Toronto Press, 1962).

<sup>9</sup> Elizabeth Eisenstein, "An Unacknowledged Revolution Revisited," *American Historical Review* 107.1 (2002): 88.

<sup>10</sup> Roger Chartier, *The Cultural Uses of Print in Early Modern France* (Princeton: Princeton University Press, 1987), 145-82.

<sup>11</sup> *Ibid.*, 145.

that both scholars were influenced by the earlier *Annales* School's "histoire du livre" group, of which Chartier would become a leader.

However, Eisenstein has also provoked debates among scholars, especially Adrian Johns in his *Nature of the Book* (1998).<sup>12</sup> Compared to Eisenstein who sees the printing press as a communication revolution which served as a tremendous impetus to the Protestant Reformation, the Renaissance, and the Scientific Revolution, Johns looks at a local specific printing history, that of Britain, at the micro-level in order to reveal the social reception of the printed book as a new product and its "greater implications" among authors, publishers, readers, and all communities that were involved in the entire process of the making of knowledge. He points out many problems with print, such as piracy, and comes to the conclusion that the printing press was only an "achievement," as opposed to Eisenstein's appraisal of printing press as a "revolution" and an "agent of change."<sup>13</sup>

These two works not only play an important role in book history scholarship, but also shed light on my own research. Despite the different time period and geographical scope of my research (late-nineteenth-and-early-twentieth-century China), my general take on the printed book is similar to Eisenstein's—print culture effects profound changes in society. It is especially relevant in studying 1) how Western scientific knowledge was transmitted to Chinese readers and 2) the differences between Western printing techniques (and print culture) and their Chinese counterparts. Like Eisenstein, I will broaden my inquiry to go beyond the book itself, to pay special attention to how it was involved in a new print culture brought about by Western printing techniques, and how it shaped the intellectual and social environment. However, regarding her

---

<sup>12</sup> Adrian Johns, *The Nature of the Book: Print and Knowledge in the Making* (Chicago: University of Chicago Press, 1998). For the Eisenstein-Johns debate, see "AHR Forum: How Revolutionary Was the Printing Revolution," *American Historical Review* 107.1 (2002): 84-128.

<sup>13</sup> Johns, *Nature of the Book*, 1-57.

exaggeration of the “revolutionary aspects” of print technology innovations and underestimation of human agencies in inventing or using the technology,<sup>14</sup> I will avoid her tendency toward technological determinism.<sup>15</sup> As Chinese and Western book traditions collided, the outcome was far from determined, as I explain at length below.

Both Eisenstein and Johns provide me with insights into specific issues about science publishing. Johns’s argument about “piracy” and the consequent “corruption” of meaning in printed editions based on microanalysis stimulates me to think comprehensively about the textual instabilities in my project’s translated science books. One of my main research objects—science publications—in general, overlaps with Eisenstein’s and Johns’s foci. I am fascinated by Eisenstein’s and Johns’s contrasting conclusions drawing from the analyses of the same science imprint—Tycho Brahe’s *Astronomiae Instauratae Mechanica*. Eisenstein’s Brahe exemplifies the notion of print’s “fixity” (i.e., greater textual stability) and “dissemination” (i.e., wider spread dispersal, and scattering across space and different languages) and illustrates the instrumental function of the printing revolution which gave rise to modern science (due to an expanded community of researchers being able to have at hand exactly the same texts).<sup>16</sup> Johns’s Brahe, by contrast, represents the corruption of the accuracy of science on printed book pages in the wake of Gutenberg’s press. Johns’s skeptical view of the printed book’s fixity makes me wonder how imported Western printing presses and other printing techniques influenced the spread of scientific knowledge after it was introduced and put to wide use in China during the late nineteenth century and the early twentieth century.

---

<sup>14</sup> Elizabeth Eisenstein, “An Unacknowledged Revolution Revisited,” *American Historical Review* 107.1 (2002): 87. See also Marina Frasca-Spada and Nick Jardine, eds., *Books and the Sciences in History* (Cambridge: University of Cambridge Press, 2000), section 1 (“Triumphs of the Book”), 13-170.

<sup>15</sup> Kevin Roberts and Frank Webster, *Times of the Technoculture: From the Information Society to the Virtual Life* (London: Routledge, 1999), 72-74.

<sup>16</sup> Eisenstein, *The Printing Press as an Agent of Change*, xii.

To what degree did translated science information diverge from its original version? This question has not been thoroughly covered by book history scholarship yet. Eisenstein does discuss it, but mainly in reference to non-science translations, such as that of the Bible from Latin into vernacular languages. She probably ignores science translations because during the early modern period in Europe, most science books were written in Latin, which was commonly mastered as the standard language in science writing within the learned community. Hence, there was little need for translation. Johns barely touches upon the issue of science translation. But when he does, he considers translators' concerns about the possible drop in quality due to over-speedy translations.<sup>17</sup> He also discusses one science author's reluctance to publish an English-language translation of his Latin manuscript until it appeared in print,<sup>18</sup> and one publisher's serious concern over an "unsupervised translation by *any* writer."<sup>19</sup> But still, the translation of science is not Johns's major focus. Other book history scholars have examined the issue of translation, most of whom, however, confined themselves to literary and religious genres.<sup>20</sup> Therefore, the analysis of the accuracy of scientific and technical knowledge transfer through the translation process is one of my contributions to book history scholarship. From my point of view, the process of translation definitely creates modifications of both words and the meaning of Western texts but not necessarily the "corruptions" Johns detects in the reproduction of texts. In other words, the best science translation into Chinese in the nineteenth century would not exactly reproduce the original Western-language texts. For example, the translator may add

---

<sup>17</sup> Johns, *The Nature of the Book*, 181.

<sup>18</sup> *Ibid.*, 515.

<sup>19</sup> *Ibid.*, 519.

<sup>20</sup> For example, Ronald Jenn, "From American Frontier to European Borders: Publishing French Translations of Mark Twain's Novels *Tom Sawyer* and *Huckleberry Finn* (1884-1963)," *Book History* 9 (2006): 235-60; Shef Rogers, "Crusoe among the Maori: Translation and Colonial Acculturation in Victorian New Zealand," *Book History* 1 (1998): 182-95; Kitty Scoular Datta, "Publishing and Translating Hafez under Empire," in *Books without Borders*, vol. 2, *Perspectives from South Asia*, ed. Robert Fraser and Mary Hammond (Basingstoke, UK; New York: Palgrave Macmillan, 2008), 58-71.

extra sentences to explain a translated term which would not be familiar to Chinese audiences. My question would be: how did the translator modify the old text and create new textual and paratextual features to render Western learning successfully so as to make them understood by Chinese readers? How were modifications made through augmenting, illustrating, indigenizing, eliminating, and supplementing? In this dissertation, I look specifically at the translation itself and compare it to its original version, in order to understand the role of the translator(s) in precisely conveying scientific knowledge in new ways. Book history has helped me navigate these problems of translation.

Along with the burgeoning of book history scholarship, came attempts to theorize this field. Eisenstein had already theorized the printing press as a revolutionary communication technology, but Robert Darnton was essentially the first to pursue the theoretical basis for book history scholarship from the perspective of communication studies. Best known for the “communication circuit” that he proposed in his 1982 article, “What is the History of the Book?,”<sup>21</sup> Robert Darnton is (arguably) recognized as the “founder” of book history among American scholars. He analyzes how books become generators of “communication(s)” within social and historical contexts. Here the word “communication” implies a broader view of the book concerning its interactions with factors surrounding it. In Darnton’s framework, all of the seemingly fragmented elements—authors, publishers, printers, suppliers, shippers, booksellers, readers, binders, intellectual influences, publicity, economics, society, politics, and the law—are all relevant to each other. Hence, Darnton’s holistic view of book history set in motion the possibility of synthesizing different perspectives.

---

<sup>21</sup> Robert Darnton, “What is the History of Books?” *Daedalus* 111.3 (1982): 65-83.



However, Darnton's "communication circuit" is far from perfect. It pays too much attention to the mechanism of the "circuit," while downplaying the cultural aspects of the circulation of printed texts. Some scholars have complained that Darnton's schematization of the whole circle of communication excludes many highly relevant dynamics. For example, in analyzing the publishing of civil service examination aids in late imperial China, Kai-wing Chow challenges Darnton's "communication circuit" by proposing a brand-new concept of the "semantic field of the book." He points out that the "circuit" only carries a "relay" of unimpaired meaning among all the elements, and it fails to represent the complexities and varieties of the making of meaning (both encoding and decoding). Thus, the notion of "circuit" is not sufficient to explain the modification, subversion, and negotiation of meaning.<sup>22</sup> In my own research, I absorb Darnton's holistic idea of book communication within Western culture, but stretch it to a West-East intercultural perspective when discussing translations. I pay special attention to how the activities of the elements of the "circuit"—beginning with authors, and then onto publishers, printers, shippers, booksellers, and finally readers, and back to authors again—were conducted between Western culture and Chinese culture, and how the interactions among those elements reflected the conflicts, negotiations, and compromises between Western and Chinese book cultures. Furthermore, I revise the "circuit" by stressing the complicated relationships among some elements. Sometimes, one element does not necessarily follow another as described in the flow of the "circuit." Cross-relations may happen in some circumstances. For example, according to my research, some translators themselves, who were

---

<sup>22</sup> Kai-wing Chow, *Publishing, Culture, and Power in Early Modern China* (Stanford: Stanford University Press, 2004), 154. My translation of this volume into Chinese is now in press at the Commercial Press (Beijing).

also printing-savvy people or good at marketing, seem to be much more than that which is simply described in the “circuit” as the “author.”<sup>23</sup>

The rich body of scholarship on Chinese book history is another indispensable field for my research. A large number of these works emphasize the technological aspects of making Chinese books.<sup>24</sup> A group of scholars (e.g., Zhang Xiumin, Han Qi, Cao Zhi, Xu Yinong, and Xiao Dongfa et.al) offer general historical works on Chinese books and printing, which survey archives and artifacts of successive dynasties or shorter time periods.<sup>25</sup> Zhang Xiumin’s *History of Chinese Printing* (*Zhongguo Yinshua Shi*, first edition published in 1989) has been cited by almost every scholar who touches upon this field. This scholarship focuses more on the book itself (bibliography) and/or the technology of bookmaking (printing, paper making, binding, and book design), both of which are also recurring themes in other milestone monographs such as Thomas F. Carter’s *The Invention of Printing in China and Its Spread Westward* (first edition published in 1925, later revised by Carrington Goodrich),<sup>26</sup> and Tsien Tsuen-hsuei’s *Written on Bamboo and Silk: The Beginning of Chinese Books and Inscriptions* (1962), which was his

---

<sup>23</sup> In the case of translation, “author” mainly refers to the translators in a traditional sense, but not limited to it. “Author” can also refer to an oral or scribal translators in specific historical circumstances, or the maker of illustrations.

<sup>24</sup> Cynthia Brokaw, Christopher Reed, and Tobie Meyer-Fong have reviewed representative academic works on Chinese book history from the pre-modern to the Republican periods. See Cynthia J. Brokaw, “Book History in Premodern China: The State of the Discipline I,” *Book History* 10 (2007): 253-90; Christopher A. Reed, “Gutenberg and Modern Chinese Print Culture,” *Book History* 10 (2007): 291-315; Tobie Meyer-Fong, “The Printed World: Books, Publishing Culture, and Society in Late Imperial China,” *Journal of Asian Studies* 66.3 (2007): 787-817.

<sup>25</sup> Xiumin Zhang, *Zhongguo Yinshua Shi* (*History of Chinese Printing*), enlarged and illustrated edition (Hangzhou: Zhejiang Guji Chubanshe, 2006); idem and Qi Han, *Zhongguo Huozhi Yinshua Shi* (*A History of Chinese Moveable-Type Printing*) (Beijing: Zhongguo Shuji Chubanshe, 1998); Zhi Cao, *Zhongguo Guji Banben Xue* (*An Edition Study of Chinese Rare Books*), 2<sup>nd</sup> ed. (Wuchang: Wuhan University Press, 2007); Yinong Xu, *Zhongguo Gudai Yinshua Tu Zhi* (*An Illustrated Record of Chinese Printing in Historical Periods*) (Yangzhou: Guangling Shushe, 2006); Dongfa Xiao, et.al., *Zhongguo Chuban Tongshi* (*A Comprehensive History of Chinese Publishing*, 9 volumes) (Beijing: Zhongguo Shuji Chubanshe, 2008).

<sup>26</sup> Thomas Francis Carter, *The Invention of Printing in China and Its Spread Westward*, 2<sup>nd</sup> ed. (New York: Ronald Press, 1955).

contribution to Volume V of Joseph Needham's *Science and Civilisation in China*.<sup>27</sup> These works provide a historical picture of early Chinese books, which is especially helpful for me in understanding the degree to which traditional features remained present in later translated books published in totally different circumstances—during a period of extensive knowledge transmission and technology transfer from the West into China. I also consult these technology-oriented works for specific details about Chinese traditional printing techniques. However, the time range of my research is much more recent than that of this scholarship. Given the insufficient study in book history of the late Qing period (late nineteenth century and early twentieth century), my research will enrich the body of literature on the Chinese history of the book by connecting old traditions with modern adaptations. However, I focus more on the book as a product that represents cultural complexities and involves factors beyond the book itself.

Technology transfer as an area of inquiry is touched upon in the scholarship on the Chinese book.<sup>28</sup> Besides illuminating the technological advances and varieties of printing inside China, scholars have also traced its spread (especially movable-type printing) to neighboring countries such as Japan, Korea, and Vietnam (e.g., Zhang Xiumin), and to Western cultures/countries (the most significant research on this was done by Thomas Carter).<sup>29</sup> Moreover, they look at the historical interactions between China and the countries receiving its technologies. More directly beneficial to my research in terms of time range and research questions, scholars such as Fan Muhan and Han Qi, examine how Western printing techniques

---

<sup>27</sup> Tsuen-hsuei Tsien, *Written on Bamboo and Silk: The Beginnings of Chinese Books and Inscriptions*, 2<sup>nd</sup> ed. (Chicago: University of Chicago Press, 2004); idem, *Paper and Printing in Science and Civilisation in China*, ed. Joseph Needham (Cambridge: Cambridge University Press, 1985).

<sup>28</sup> I deal with the general topic in more detail below.

<sup>29</sup> Xiumin Zhang, *Zhang Xiumin Yinshu Shi Lunwen Ji* (An Anthology of Zhang Xiumin's Essays on History of Chinese Printing) (Beijing: Yinshua Gongye Chubanshe, 1988); Thomas Francis Carter, *The Invention of Printing in China and Its Spread Westward*, 2<sup>nd</sup> ed. (New York: Ronald Press, 1955).

were introduced to China during the nineteenth and the early twentieth centuries.<sup>30</sup> These works are among my major references on the technological aspect of printing technology transfer. However, in my research, I pay more attention to cultural aspects, such as how human and institutional agents belonging to different cultures played a role in transferring Western printing techniques to China, and how these techniques influenced Chinese traditional book culture and the country's visual heritage.

Recent scholarship on Chinese books demonstrates a wide variety of perspectives which inspire me to look at the book not merely as an independent object, but as a hub within a communication system. For example, some of this scholarship pays attention to other agents surrounding the actual printing/printers of the book, such as authors, bookstores and booksellers, bibliotheca and book collectors, or private libraries. Book history scholarship on the late imperial period in particular incorporates more cultural, social, and economic analyses, and it combines together several lines of inquiry, such as bibliographical study, the history of printing techniques, and the history of reading. For instance, Kai-wing Chow sees the “paratext” as a reflection of social networks and as a powerful apparatus for subverting orthodox and official ideology in the late Ming and early Qing period.<sup>31</sup> Joseph P. McDermott employs sociological methods to analyze the complicated relationship between books and the academic community, social ties, and technological advances from the eleventh to the nineteenth centuries.<sup>32</sup> Cynthia Brokaw studies the networks of imprint dissemination and distribution and their impact on local

---

<sup>30</sup> Muhan Fan ed, *Zhongguo Yinshua Jindai Shi: Chu Gao (Modern History of Chinese Printing: A First Draft)* (Beijing: Yinshua Gongye Chubanshe, 1995); Qi Han and Yangzong Wang, “Qing Ji zhi Shiyin Shu (Lithography Printing in the Late Qing Period),” *Yinshu Keji (Printing Technology, Taiwan)* 7.2 (1990): 37-42; Qi Han, “Xifang Tongban Shu de Chuanru ji qi Yingxiang (The Introduction and Influence of Western Copperplate Printing in China),” *Yinshu Keji (Printing Technology, Taiwan)* 7.6 (1991): 21-9.

<sup>31</sup> Chow, *Publishing*, (Stanford: Stanford University Press, 2004), 149-240.

<sup>32</sup> Joseph P. McDermott, *A Social History of the Chinese Book: Books and Literati Culture in Late Imperial China* (Hong Kong: Hong Kong University Press, 2006).

popular culture during the late Qing period.<sup>33</sup> Christopher Reed's *Gutenberg in Shanghai* explores how modern Chinese print capitalism was influenced by a "print culture" that was a negotiation between Chinese traditional printing heritages and Western modern printing techniques from 1876 to 1937, a period that overlaps with my own. These works all have a main idea in common—that the book, a seemingly static end product, can never be isolated from its social and cultural contexts and the people involved in its making and consumption. It is an idea that permeates my research.

There is also a group of scholars studying the Chinese book as a visual medium, who converge upon my research on illustrations in translated books. For example, Xu Xiaoman and Wang Fukang provide a general history of Chinese book illustrations,<sup>34</sup> while Anne Burkus-Chasson and Julia K. Murray elaborately analyze the visual field resulting from page-turning,<sup>35</sup> and the selection of media for printing didactic illustrations.<sup>36</sup> Lucille Chia<sup>37</sup> and Cynthia Brokaw<sup>38</sup> offer observations about illustration making and layout in their book-length analyses of regional commercial publishing in southeastern China. Robert Hegel examines the reading of illustrated novels and the functions of images in publishing.<sup>39</sup> However, most of the visual

---

<sup>33</sup> Cynthia J. Brokaw, "Reading the Best-Sellers of the Nineteenth Century: Commercial Publishing in Sibao," in *Printing and Book Culture in Late Imperial China*, ed. Cynthia J. Brokaw and Kai-wing Chow (Berkeley: University of California Press, 2005), 184-231.

<sup>34</sup> Xiaoman Xu and Fukang Wang, *Zhongguo Gudai Chatu Shi (A History of Chinese Illustrations)* (Shanghai: Shanghai Guji Chubanshe, 2007).

<sup>35</sup> Anne Burkus-Chasson, "Visual Hermeneutics and the Act of Turning the Leaf: A Genealogy of Liu Yuan's *Linyan ge*," in Brokaw and Chow, *Printing and Book Culture*, 371-416.

<sup>36</sup> Julia K. Murray, "Didactic Illustrations in Printed Books," in Brokaw and Chow, *Printing and Book Culture*, 417-450.

<sup>37</sup> Lucille Chia, *Printing for Profit: The Commercial Publishers of Jianyang, Fujian (11<sup>th</sup>-17<sup>th</sup> Centuries)* (Cambridge, MA: Harvard University Press, 2002).

<sup>38</sup> Cynthia Brokaw, *Commerce in Culture: The Sibao Book Trade in the Qing and Republican Periods* (Cambridge, MA: Harvard University Press, 2007).

<sup>39</sup> Robert E. Hegel, *Reading Illustrated Fiction in the Late Imperial China* (Stanford: Stanford University Press, 1988).

studies on the Chinese book still focus on artistic and aesthetic aspects. I add to this a consideration of illustration as a problem in communication studies.

These recent forays into the Chinese history of the book are part of a broader trend of research on transnational/intercultural/cross-lingual practices of book-making, circulation, and consumption. The most recent and representative work is Robert Fraser and Mary Hammond's *Books without Borders*.<sup>40</sup> It potentially widens the traditional focus of Western book history scholarship to a global perspective. Many chapters examine the "travel" (or cross-national nature) of the book in the context of the colonial/post-colonial periods and the role of the book in the construction of cultural identities. The main view stressed throughout this work is that there is no territorial boundary fastened upon the book. This argument is especially apt to my research on translated imprints, because each step from the making to the consumption of imprints may possibly happen in different countries, cultures, and languages. In my research, I pay attention to the "afterlife" of the book (i.e., the translation of it) in another cultural atmosphere, which cannot be predicted by its original author(s) and printer/publisher. Moreover, I switch my focus from the perspective of colonialism or post-colonialism, as extensively addressed by already-existing transnational book history scholarship,<sup>41</sup> to the transmission of scientific knowledge through translated books, which is a relatively new subject in this scholarship.

Furthermore, my research also participates in book history as a booming world-wide concern. Recently, more and more countries self-consciously have started to pay attention to their national book history by synthesizing huge amounts of historical archival material in order

---

<sup>40</sup> Robert Fraser and Mary Hammond, eds., *Books without Borders*, vol 1, *The Cross-National Dimension in Print Culture*; vol. 2, *Perspectives from South Asia* (Basingstoke, UK: Palgrave Macmillan, 2008).

<sup>41</sup> For example, Robert Fraser, "School Readers in the Empire and the Creation of Postcolonial Taste," in Fraser and Hammond, *Books without Borders*, 1: 89-106; Roshni Mooneeram, "Shakespeare's Postcolonial Journey," in *ibid.*, 186-98; Harish Trivedi, "The 'Book' in India: Orality, Manu-Script, Print (Post)Colonialism," in *ibid.*, 2:12-33; David Finkelstein, "Book Circulation and Reader Responses in Colonial India," in *ibid.*, 2:100-11; Robert Fraser, "War and the Colonial Book Trade: The Case of OUP India," in *ibid.*, 2:137-50.

to understand their intellectual history and the reading/reception of knowledge among the literate of different social levels. Ongoing national book history projects have been conducted, for example, in the US, the UK, China, Scotland, France, Canada, and Australia.<sup>42</sup> For those projects, the input and output of books is an indispensable part of a general national history. By contrast, I am concerned with transnational history. My research simultaneously explores the dynamics of both the production of translated books in their original locations (mainly the United States and England) and the recipients of those books in China, which few scholars have done yet. Therefore, it aims to contribute to both Anglo-American and Chinese book history.<sup>43</sup>

### 1.2.2 Visual Studies

Visual communication has been a burgeoning field of scholarship. Scholarly writings on visual representation have much relevance for my dissertation, particularly my work on illustrations in translated imprints. Specific topics of interest for me in this area include visual rhetoric, visual conventions, text-image relationships, and genres of images (e.g., scientific illustrations).

The visual representation of technical knowledge can be studied from the perspective of visual rhetoric. According to Sonja K. Foss, in order to make a visual object turn into a communicative artifact—"a symbol that communicates and can be studied as rhetoric," three

---

<sup>42</sup> This information comes from the official website of the Society for the History of Authorship, Reading, and Publishing—<http://www.sharpweb.org>. Some of the national projects for book history have been yielding multi-volume publications, such as *Histoire de L'édition Française* (four volumes, 1989-1991), *A History of the Book in America* (project conducted by the American Antiquarian Society, five volumes, 2000-2009), *The Edinburgh History of the Book in Scotland* (four volumes, 2007-2010), *The Cambridge History of the Book in Britain* (six volumes, 1999-2009), *History of the Book in Canada* (five volumes 2004-), and *History of the Book in Australia* (three volumes, 2001-). Besides these countries, China also launched in 2000 its government-sponsored national project of the history of publishing in China and has finished publishing nine volumes of *Zhongguo Chuban Tongshi* (*A Comprehensive History of Chinese Publishing*) in 2009.

<sup>43</sup> I focus on the Anglo-American tradition and do not explore French, Dutch, or European traditions, because the majority of Western sources for Chinese translations in this time period were published in Great Britain or the United States.

characteristics are required: The image must be “symbolic, involve human intervention, and be presented to an audience for the purpose of communicating with that audience.”<sup>44</sup> In translated technical images from the West to China in the nineteenth century, the presence of the three characteristics is obvious. Some cultural symbols (such as the human body in book illustration, legends on maps, and notations on sheet music) show vestiges of the Chinese visual heritage alongside Western expressions. The process of image translation, a form of human intervention, involves the translator’s “conscious strategies” to use layout, size, and omission to facilitate the understanding of Western visuals. The translated images targeted Chinese reading publics, such as school students, for educational and informative purposes. Therefore, the translated technical images in my research function as rhetorical objects.

Visual rhetoric scholarship brings important issues to view. For example, in *Visual Rhetoric: A Reader in Communication and American Culture*, Olson, Finnegan, and Hope suggest that a significant assumption in which visual rhetoric is grounded is “in practice and in principle, words and images are oftentimes mixed together in rhetorically interesting ways.”<sup>45</sup> In other words, the understanding of the image can never be isolated from its larger textual contexts. Instead, the image is “in precise relation to those contexts that give them shape and meaning.”<sup>46</sup> Briefly speaking, the text-image relationship is a threshold to understanding how different visual heritages and book cultures influenced the making of the book, as well as how a new set of visual conventions in China was formed in the late nineteenth century.

---

<sup>44</sup> Sonja K. Foss, “Theory of Visual Rhetoric,” in *Handbook of Visual Communication: Theory, Methods, and Media*, ed. Ken Smith, et al. (Mahwah, NJ: L. Erlbaum, 2005), 144.

<sup>45</sup> Lester C. Olson, Cara A. Finnegan, and Diane S. Hope, “Visual Rhetoric in Communication: Continuing Questions and Contemporary Issues,” in *Visual Rhetoric: A Reader in Communication and American Culture*, ed. Lester C. Olson, Cara A. Finnegan, and Diane S. Hope (Thousand Oaks, CA: Sage Publications, 2008), 2.

<sup>46</sup> *Ibid.*, 2.



Visual convention is another important concept in my research. Throughout the nineteenth century, Chinese readers had been experiencing a transformation of visual conventions in which the traditional viewing of technical knowledge was “invaded” by the Western way of seeing.<sup>47</sup> But why were some visual conventions lost and others preserved? What factors impacted the change in visual conventions? Charles Kostelnick and Michael Hassett’s *Shaping Information: The Rhetoric of Visual Conventions* offers many insights which help me to look at this issue comprehensively. According to their observations, some important factors that shape and transform conventions include:

discipline-specific communities (“technical, scientific, or business communities in which conventions develop and become formally or informally codified”)

cultural communities (“values, attitudes, and knowledge, including aesthetics, that are shared by members of national or ethnic groups and that shape conventional codes”)

rhetorical factors (“visual strategies that designers deploy in certain typical situations and that readers come to understand and expect”)

and technology-related external practical factors (“opportunities and constraints afforded by the tools used to create, reproduce, and interpret visual language”).<sup>48</sup>

Corresponding to my research concerning a given historical and social milieu, these factors are specified to:

---

<sup>47</sup> John Berger, *Ways of Seeing* (New York: Viking Penguin Inc., 1977).

<sup>48</sup> Charles Kostelnick and Michael Hassett, *Shaping Information: The Rhetoric of Visual Conventions* (Carbondale: University of Southern Illinois Press, 2003), 82-83.

Western and Chinese people who were involved in the disciplines of science, cartography, and musical composition, and who were educated with a set of visual codes;

image translators and readers whose understanding of visual language was shaped through “the cultural lens of their own experiences and values”;<sup>49</sup>

the visual strategies translators employed to make Western knowledge more fluently understood by Chinese readers and, in the process, change their conventions of viewing;

Western-imported printing techniques that reproduced the image differently from Chinese traditional wood-block printing.

These factors intertwined with each other and functioned together as an impetus of the transformation of visual conventions in nineteenth-century China.

Concerning text-image relationships, Roland Barthes and Susan Hagen provide guidance. Barthes proposed in his article “rhetoric of the image” two forms—“anchorage” (the text fixes the meaning of the image, provides the connection between the image and its contexts, and renders relevance to the reader) and “relay” (the text and the image contribute to the overall meaning in a reciprocal relation, in which the sequence of images usually matters, such as in comic-strips). In her article “Visual/Verbal Collaboration in Print: Complementary Differences, Necessary Ties, and an Untapped Rhetorical Opportunity,” Hagen observes four types of visual/verbal collaboration resulted from cohesive and perpetual ties between the text and the image. She extracts rhetorical meaning by weaving text and image together. In review of this scholarship, I can see, on the one hand, that Barthes’s theory provides a general category of text-

---

<sup>49</sup> Ibid., 92.

image relationships mostly based on the examination of photography, advertisements, and comic books. However, instead of this either-or choice of “anchorage” or “relay,” the text-image relationship seems to be conditioned by many other cultural and technical elements that inform the format of translated imprints. On the other hand, Hagen offers more interpretive diversity than Barthes. But her conclusions are based upon the nature of the English alphabet-based language, and, therefore, they may not be applicable to an ideographical language, such as Chinese. I augment this scholarship by discussing the books that were translated from languages as different as English and Chinese, and of which the layout was influenced by book cultures similarly different.

There are also a group of scholars who touch upon the text-image relationship issue in the context of the Chinese language and traditional Chinese science books. Francesca Bray, a distinguished scholar of the Chinese history of science, comments on the text-image relationship issue, but more directly within a Chinese context. She highlights the take of famous Chinese classical scholar Zheng Qiao (1104-1162) on the text-image nexus as a “warp-and-weft” relationship in order to emphasize the significance of images in Chinese culture.<sup>50</sup> Furthermore, some scholars offer case studies of the text-image relationship in specific traditional Chinese science books. For example, in his article “The Representation of Plants: Engravings and Paintings,” Georges Métaillé examines how texts serve the purpose of illustrations by comparing different versions of several series of plant images.<sup>51</sup> When the research on the text-image relationship is specific to any one case study, however, the findings may vary drastically. For

---

<sup>50</sup> Francesca Bray, “Introduction: The Power of *Tu*,” in *Graphics and Text in the Production of Technical Knowledge in China: The Warp and the Weft*, ed. Francesca Bray, Vera Dorofeeva-Lichtmann, and George Métaillé (Leiden: Brill, 2007), 1-2.

<sup>51</sup> Georges Métaillé, “The Representation of Plants: Engravings and Paintings,” in Bray, Dorofeeva-Lichtmann, Métaillé, *Graphics and Text*, 487-520.

instance, Vera Dorofeeva-Lichtmann argues in “Mapless Mapping: Did the Maps of the *Shanhai Jing* Ever Exist?” that there was little necessity for graphic representation in one case of an ancient representation of a place, because the text about it had already contained both “the properties of a *tu* (scheme-map) and elucidation (*shuo*) on this *tu*.”<sup>52</sup> This scholarship helps me to contextualize my research on Chinese science books, and highlights the importance of recognizing the uniqueness of each case as well. Although the already existing scholarship on text-image relationships in Chinese science books almost always centers on traditional imprints, it sheds light on my study on later translated science books—how did traditional Chinese science books influence later ones, translated from Western sources, in their text-and-image relationships?

Prior studies of scientific illustrations have entailed examining the printing process. Most of these articles analyze the making of knowledge not only from the perspectives of the author, the sponsor, the disseminator, and the audience, but also the printing techniques that transfer knowledge into a visible and portable representation. In other words, all the factors that are involved in printing technology are also included in the transfer of knowledge, such as the educational background of block-carvers, the mechanics of the transfer process, and the producing of the woodblock. More broadly speaking, these scholars think modes of technical transfer (e.g., the choice between painting and printing, between copper-plating and wood-blocking) affect the representation and the quality of images. For example, Kai-wing Chow counters the misrepresentation that woodblock printing is incapable of “producing refined and precise scientific illustrations.”<sup>53</sup> Sachiko Kusukawa examines several types of science-

---

<sup>52</sup> Vera Dorofeeva-Lichtmann, “Mapless Mapping: Did the Maps of the *Shanhai Jing* Ever Exist?” in *ibid.*, 261.

<sup>53</sup> Kai-wing Chow, “Reinventing Gutenberg: Woodblock and Movable-Type Printing in Europe and China,” in *Agent of Change: Print Culture Studies after Elizabeth L. Eisenstein*, ed. Sabrina Alcorn Baron, Eric N. Lindquist, and

illustration-making methods before and after the advent of the moveable-type printing press.<sup>54</sup> Michela Bussotti's "Woodcut Illustration: A General Outline" delves into the complications of making scientific illustrations by using woodcut (or wood-blocking).<sup>55</sup> She offers a comparison between European and Chinese traditions by focusing on their somewhat different process of making the woodblocks. Then she brings forward the issue of "the distortion of visual representation by copies that become more and more distant from the original pattern," which, as Elizabeth Eisenstein and others have pointed out, was a problem in Europe, too. Furthermore, Bussotti analyzes the relationship between the quality of illustrations and the printing technique. Finally, she points out that "vivid and realistic representation" and scientific accuracy are actually two different issues. This scholarship provides comprehensive views on the process and production of different techniques used in image printing, and their suitability for various types of technical publishing.

### 1.2.3 Intercultural Communication

In addition to situating this dissertation within book history and visual studies, I plan also to contribute to intercultural communication scholarship. Among numbers of works in this field, Scollon and Scollon's *Intercultural Communication: A Discourse Approach* is the most relevant for my work.<sup>56</sup>

---

Eleanor F. Shevlin (Amherst: University of Massachusetts Press), 176.

<sup>54</sup> Sachiko Kusakawa, "Illustrating nature," in *Books and the Sciences in History*, ed. Marina Frasca-Spada and Nicholas Jardine (Cambridge: Cambridge University Press, 2000), 90-113.

<sup>55</sup> Michela Bussotti, "Woodcut Illustration: A General Outline," in Bray, Dorefeeve-Lichtmann, and Métailié *Graphics and Text*, 461-83.

<sup>56</sup> Scollon and Scollon, *Intercultural Communication: A Discourse Approach*.

Their emphasis is “on people in social interaction with each other,” which, according to their viewpoint, is within the scope of “intercultural” communication. If a research project focuses upon what they describe as “abstract or independently conceived differences between members of different groups,” it can only be called “cross-cultural” communication studies.<sup>57</sup> This definition is important to my research in that translation becomes a form of intercultural communication. Especially during the nineteenth century, when science translation still relied on the cooperation of Westerners and Chinese, translated books not only reflected linguistic, visual, and knowledge exchanges on the page, but also human contacts beyond the page. The working mode of this translation practice requires direct communication with people who come from different cultural backgrounds and are engaged in social interactions with each other as they go through the process of translating. Hence, they found one another’s cultures through translation. This kind of interaction seems to be minimized in today’s professional translation practice that is done in isolation.

Scollon and Scollon propose “interdiscourse communication” as a better alternative to the term “intercultural communication,” which, I think, may more precisely convey the nature of my research into the translation process. The main task of interdiscourse analysis is to examine “the ways in which discourses are created and interpreted when those discourses cross the boundaries of group membership.”<sup>58</sup> In my case study on the collaboration of a team of translators (the oral translator and the scribal translator), the group-membership barrier emerging from the process is not only reflected in the actual non-native language difficulty experienced by the participants (one has mastered English, the other, Chinese) but also, and what is more important, their very understanding of the manifest meaning of the text being translated. On the one hand, the oral

---

<sup>57</sup> Ibid., 13.

<sup>58</sup> Ibid., xii.

translator, the Westerner who reads a Western text in Chinese to a scribal translator, stands for a discourse of Western understanding of scientific “realities.” On the other hand, the scribal translator, a Chinese native scholar who may have some knowledge of Western science but generally has been educated in local ways of science, stands for a discourse of Chinese traditional understanding of science, or at least speaks for the reading public unfamiliar with Western science. Together, they refine a translation. Their discussion of possible meaning, the minimizing of the misunderstanding, and the negotiation of word selection, or neologistic creation reflect the message exchanges between different discourse systems.

Another term featured in intercultural communication scholarship is “hybridity,” which is especially useful to my examination of human interactions behind the making of the end product—translated imprints. Marwan Kraidy’s *Hybridity, Or the Cultural Logic of Globalization* defines “hybridity” as, “rather than a single idea or a unitary concept,” “an association of ideas, concepts, and themes that at once reinforce and contradict each other.”<sup>59</sup> Hybridity presupposes contacts across national borders or cultural boundaries through “the movement of cultural commodities,” or “the movement of people through migration.”<sup>60</sup> Moreover, hybridity is created and articulated through all kinds of communication processes by “social agents with a variety of motivations and objectives.”<sup>61</sup> In my research, I tentatively view translated imprints with technical knowledge as a form of “hybridity,” which represents two book cultures as different as the Western and the Chinese. I notice that the process of creating this “hybridity” did not merely involve one camp—either the Western agents such as translators and printer/publishers, or their Chinese counterparts—but relied on communication between both

---

<sup>59</sup> Marwan M. Kraidy, *Hybridity, or the Cultural Logic of Globalization* (Philadelphia: Temple University Press, 2005), vi.

<sup>60</sup> Ibid., 5.

<sup>61</sup> Ibid., vi.

camps. Therefore, beyond the examination of the textual and paratextual elements which comprise the hybrid product, I pay attention to how communication between Western agents and Chinese ones shape the appearance of the book pages and make the end product suit their purposes respectively.

#### **1.2.4 Technology Transfer/Diffusion of Innovation**

One of the major questions I address in my dissertation is how technical knowledge, including Western printing techniques, was transmitted from the West to China in the nineteenth century. Indeed, knowledge was often transmitted through Western-style printing presses. Therefore, technology transfer becomes another major field of scholarship to which my work potentially contributes.

Everett Rogers's *Diffusion of Innovations* is one of the foremost works in this field. Many of his points resonate with my research. He defines "diffusion of innovation" as the study of "the process by which an innovation is communicated through certain channels over time among the members of a social system."<sup>62</sup> This suggests a dissemination model of technology transfer, rather than a "point-to-point" one, in which "a single group of technical experts transfers the technology to another single targeted group."<sup>63</sup> He points out that communication, basically of the mass-mediated and interpersonal sort, about the innovation plays an indispensable role in stimulating or hindering the process of diffusion. The important role of communication within technology transfer helps us understand the spread of Western printing

---

<sup>62</sup> Everett M. Rogers, *Diffusion of Innovations*, 3<sup>rd</sup> ed. (New York: Free Press, 1983), 5.

<sup>63</sup> Dorothy Leonard-Barton, "The Intraorganizational Environment: Point-to-Point Versus Diffusion," in *Technology Transfer: A Communication Perspective*, ed. Frederick Williams and David V. Gibson (Newbury Park, CA: Sage, 1990), 47.



techniques. The initial coming of Western printing during the first few decades of the nineteenth century in China seemed restricted to a small area and was conducted by a small group of people, because of the dominant use of Chinese traditional wood-block printing and the less-than-enthusiastic reception by local residents of missionaries who used moveable type presses. However, later in the century, the use of Western printing expanded to a larger geographical area and a broader population, which may be attributed to the communication between the Western change agents (“an individual who influences clients’ innovation decisions in a direction deemed desirable by a change agency”) and their Chinese clients.<sup>64</sup> In other words, it is important to know how human interactions led to the technology’s adoption. By reading archival materials, such as correspondence and diaries, I try to capture possible traces of communication between the Western missionaries who ran the press and the Chinese people who were persuaded by those missionaries to use the new technology.

Rogers also mentions the issue of “re-invention,” defined as “the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation,”<sup>65</sup> and the issue of “compatibility,” which refers to the degree to which an innovation is perceived as consistent with existing “sociocultural values and beliefs,” “past experience” or “previously introduced ideas,” and “needs of potential adopters.”<sup>66</sup> My research shows that when Western printing techniques were put into use, there were always adjustments made to maintain traces of traditional Chinese block printing on the pages, such as the “frame of the block,” which visibly separates the text from the margins. Were the Chinese printer-publishers re-inventing Western techniques? Was the change agent/agency aware of the compatibility issue, and how did they

---

<sup>64</sup> Everett M. Rogers, *Diffusion of Innovations*, 3<sup>rd</sup> ed. (New York: Free Press, 1983), 28.

<sup>65</sup> *Ibid.*, 16.

<sup>66</sup> *Ibid.*, 223.

make the technique more compatible to Chinese users? Rogers's framework helps me address these questions.

Among the vast body of technology transfer scholarship that pays attention to global or transnational cases, George Bugliarello's work on the "technological system" is the most useful to my research. For him, a "technological system," is "an entity that is intrinsically shaped by scientific and engineering principles, whereas the rest of society is primarily the embodiment of other principles, complex social motivations, customs, laws and attitudes." A technological system consists of the *techne* (the devices created or used by the system) and the social component ("the designers, manufacturers, operators, users, as well as the financial systems" that "produce... the *techne* and operate... it").<sup>67</sup> Therefore, in the case of transnational technology transfer, there are two already existing systems—the source entity and recipient entity, which respectively include *techne* and people. Specific to my research, the source entity refers to Western printing techniques and Western missionaries who brought these techniques to China, while the recipient entity refers to Chinese traditional wood-block printing and Chinese printer-publishers who had already been very familiar with their own tradition and book culture. In this case, it is obvious that with the "intrinsic differences" between technological systems "arise the issues, conflicts and opportunities associated with technology transfer."<sup>68</sup> How agents navigate these differences is yet another issue addressed in these pages.

There is also a body of work that takes a historical perspective on technology transfer. As I mentioned above in the section on book history scholarship, a group of scholars addressed printing technology transfer from the West to China during the late Qing period. But most of

---

<sup>67</sup> George Bugliarello, "Technology Transfer: A Paradigm," in *East-West Technology Transfer: New Perspectives and Human Resources*, ed. George Bugliarello, Namik K. Pak, Zhores I. Alferov, and John H. Moore (Dordrecht: Kluwer Academic Publishers), 2.

<sup>68</sup> *Ibid.*, 3.

them concentrate, to the virtual exclusion of extrinsic contextual issues, on bare facts surrounding the introduction of each type of technique or each step of transfer. Historians of technology also examine the process of technology transfer in order to follow the development of certain inventions.<sup>69</sup> For example, Joseph Needham's monumental volumes on the Chinese history of science describe the nation's interchanges of printing (and many other technologies) with Europe and other Asian countries. Generally speaking, one important feature of current technology transfer literature is that it reflects an emphasis on interpersonal communication as an important channel, as well as the function of the organization (e.g., companies that create the innovation, agents that bring the innovation to the clients) as a barrier or a facilitator of technology transfer. However, this emphasis mostly concerns relatively contemporary issues, such as joint venturing, patents, and licensing. In my inquiry into printing technology transfer in the late nineteenth and early twentieth century, I join current technology transfer scholars in reflecting the complexities and dynamics of communication, but within a historical period.

### **1.2.5 Historical Information Science**

In his *Historical Information Science: An Emerging Unidiscipline*, Lawrence J. McCrank called for a holistic view on information in history, which is "context sensitive," "multicultural," and should include "the tracking of information through history, production, and formation of production in physical form, its provenance and dissemination, preservation and organization, and its transference, translation, and transmutation across distance and through time, across cultures and in different languages, through technical transformations, and diverse organizations

---

<sup>69</sup> Bruce E. Seely, "Historical Patterns in the Scholarship of Technology Transfer," *Comparative Technology Transfer and Society* 1.1 (2003): 20.

and institutions.”<sup>70</sup> My research well fits in this line of inquiry. I explore the historical dynamics inside the unprecedented wave of West-China knowledge transmission mostly through imprints—materialized forms of knowledge—during the late nineteenth and early twentieth centuries. For example, printer-publishers negotiated Chinese conventions with new bibliographical features. They were brought to translations because of the traditional book’s format which was incompatible with that of the Western book. New imported printing techniques also changed the face of the Chinese book. Translators made a great many adjustments to the original texts and images, in order to indigenize the information for their Chinese readers.

My research addresses issues that have not been sufficiently discussed in this field of study. So far, the scholarly works on the history of information tend to contextualize information within a single culture.<sup>71</sup> Some scholarship on China has explored the history of information management and use during the pre-modern period,<sup>72</sup> while other work has focused upon the establishment of modern libraries pioneered by missionaries since the late nineteenth century, the Western influence on them, and native academics’ involvement in this process.<sup>73</sup>

---

<sup>70</sup> Lawrence J. McCrank, *Historical Information Science: An Emerging Unidiscipline* (Medford, NJ: Information Today, 2000), 593 and 596.

<sup>71</sup> For example, Mary Elizabeth Berry, *Japan in Print: Information and Nation in the Early Modern Period* (Berkeley: University of California Press, 2006); Jason König and Tim Whitmarsh, eds., *Ordering Knowledge in the Roman Empire* (Cambridge: Cambridge University Press, 2007); Toni Weller, *The Victorians and Information: A Social and Cultural History* (Saarbrücken: VDM Verlag, 2009); Ann Blair, *Too Much to Know: Managing Scholarly Information Before the Modern Age* (New Haven: Yale University Press, 2010); Toni Weller, ed., *Information History in the Modern World: Histories of the Information Age* (Basingstoke, UK: Palgrave Macmillan, 2011).

<sup>72</sup> See Tsuen-Hsuei Tsien, “A History of Bibliographic Classification in China,” *Library Quarterly* 22.4 (1952): 307-24; Kuang Neng-fu, “Chinese Library Science in the Twelfth Century,” *Libraries and Culture* 26.2 (1991): 357-71; Shuyong Jiang, “Into the Source and History of Chinese Culture: Knowledge Classification in Ancient China,” *Libraries and the Cultural Record* 42.1 (2007): 1-20.

<sup>73</sup> See Liao Jing, “The Genesis of the Modern Academic Library in China: Western Influences and the Chinese Response,” *Libraries and the Cultural Record* 39.2 (2004): 161-74; Idem, “The Contributions of Nineteenth-Century Christian Missionaries to Chinese Library Reform,” *Libraries and Cultural Record* 41.3 (2006): 360-71; Cheng Huan Wen, “The Impact of American Librarianship on Chinese Librarianship in Modern Times (1940-1949),” *Libraries and Culture* 26.2 (1991): 372-87; P. W. Kuo, “The Evolution of the Chinese Library and Its

However, my dissertation brings transnational and transcultural perspectives to information history. I look at the migration of knowledge from the West to China through a network of agents, including translators, printer-publishers, sponsors, and business firms. The production of translations is not merely a process in which translators singlehandedly rendered the original text into the Chinese language; it is also a process concerning how information they acquired from diverse sources influenced the adaptation of useful information (i.e., that in translations) into another culture. In my dissertation, I delve into how the original source books for translation were selected. In fact, a number of immigrant translators relied on Western agencies' taste or publication catalogues to acquire English-language books directly from the U.S. and the U.K. In some medical translations, translators supplemented the source book with content that related to local diseases and traditional Chinese remedies. They also inserted theses authored by other missionary doctors on special treatments for diseases that frequently appeared in certain areas in China. These kinds of additional information were all obtained from their colleagues and acquaintances in the medical world, whether Western or Chinese. Moreover, the organization of the content was altered in a manner that combined both Chinese and Western methods of separating texts and indicating visual frameworks of text. These aforementioned facets of my research reveal how translators' use of information impacted the transnational information flow through printing and publishing.

### 1.2.6 Science Translation and Science Publishing

The extant scholarship on science translation and science publishing mainly falls into four categories. The first is works of history. These include general works such as Li Nanqiu's research on the history of science translation in China, and Tsien Tsuen-hsuei's work on Western influence on China through translation,<sup>74</sup> along with specific works focusing on a certain time period, such as David Wright's and Zou Zhenhuan's research on the late Qing period,<sup>75</sup> or Xu Zongze's compilation of the Jesuits' publications during the Ming and Qing periods.<sup>76</sup> These works basically provide a general picture of science translation and publishing in different time periods through bibliographical study of the publications, statistical analysis of numbers of publications, and in-depth narration of processes and practices.

The second area of scholarship is on the translation or publishing of one subject of science, such as John Bowers's and Zou Zhenhuan's exploration of medical translations,<sup>77</sup> Chen Shaohua's introduction to translated agricultural books,<sup>78</sup> Yuan Yuan's work on modern physiology books,<sup>79</sup> Zhang Zhongmin's introduction to hygiene book publishing,<sup>80</sup> and David

---

<sup>74</sup> Nanqiu Li, *Zhongguo Kexue Fanyi Shi (History of the Science Translation in China)* (Hefei: Zhongguo Kexue Jishu Daxue Chubanshe, 2006); Tsuen-hsuei Tsien, "Western Impact on China through Translation," *Far Eastern Quarterly* 13.3 (1954): 305-27.

<sup>75</sup> Zhenhuan Zou, "Wanqing Xishu Zhongyi ji dui Zhongguo Wenhua de Yingxiang (Translation of Western Books in Late-Qing China and Its Influence on Chinese Culture)," in *Chubanshi Yanjiu (History of Publishing)*, ed. Zaisheng Ye (Beijing: Zhongguo Shuji Chubanshe, 1994 and 1995), 2:3-28 and 3:1-29; David Wright, "The Translation of Modern Western Science in Nineteenth-Century China, 1840-1895," *Isis* 89.4 (1998): 653-73.

<sup>76</sup> Zongze Xu, *Mingqing jian Yesu Huishi Yizhu Tiya* (An Annotated Bibliography of Works Translated by Jesuits in Ming-Qing Period) (Beijing: Zhonghua Shuju, 1989).

<sup>77</sup> John Z. Bowers, "Chinese Translations of Western Medical Textbooks," *Osler Library Newsletter* 18 (1975): 1-3; Zhenhuan Zou, "Xiyi Yizhu yu Jindai Zhongyi Jie de Fanxing (The Translations of Western Medicine and the Reflection of Modern Academia of Chinese Medicine)," *Journal of East China Normal University (Philosophy and Social Science Version)* 1 (1986): 76-80.

<sup>78</sup> Shaohua Chen, "Jindai Nongye Kexue Jishu Chubanshe de Chubu Yanjiu (A Preliminary Study of Publications on Modern Agricultural Science and Technology)," *Zhongguo Nongshi (Agricultural History of China)* 18.4 (1999): 102-5.

<sup>79</sup> Yuan Yuan, "Jindai Shenglixue zai Zhongguo: 1851-1926 (Modern Physiology in China: 1851-1926)" (PhD diss., Shanghai Jiaotong University, 2006).

Wright's work on chemistry translations.<sup>81</sup> The works in this category focus more on several specific publications on each subject, providing information relating to the original authors, the original English-language version, and the contribution of those translated works to the building of Chinese modern science.

The third area is description of a specific person, publication, or institution, such as seen in Adrian Bennett's, Wang Yangzong's, and Xu Zhenya's work and Ferdinand Dagenais's series of writings on John Fryer,<sup>82</sup> Yang Gen's and David Wright's work on Xu Shou and his son,<sup>83</sup> Knight Biggerstaff's, Wang Ermin's, and David Wright's research on the Shanghai Polytechnic Institution,<sup>84</sup> Zhao Pushan's work on Benjamin Hobson's medical translations,<sup>85</sup> Wang Yangzong's, Fu Liangyu and Zhang Zhiqiang's, and Li San-Pao's analysis of *Gezhi Huibian*,<sup>86</sup>

---

<sup>80</sup> Zhongmin Zhang, *Chuban yu Wenhua Zhengzhi: Wanqing de "Weisheng" Shuji Yanjiu (Publishing and Cultural Politics: A Research of "Hygiene" Publications in Late Qing Period)* (Shanghai: Shanghai Shudian, 2009).

<sup>81</sup> David Wright, *Translating Science: The Transmission of Western Chemistry into Late Imperial China, 1840-1900* (Leiden: Brill Academic Publishers, 2000); idem, "The Great Desideratum Chinese Chemical Nomenclature and the Transmission of Western Chemical Concepts," *Chinese Science* 14 (1997): 35-70.

<sup>82</sup> Adrian A. Bennett, *John Fryer: The Introduction of Western Science and Technology into Nineteenth-Century China* (Cambridge, MA: Harvard University Press, 1967); Yangzong Wang, *Fulanya yu Jindai Zhongguo de Kexue Qimeng (John Fryer and the Science Enlightenment in Modern China)* (Beijing: Science Press, 2000); Zhenya Xu, "Fulanya yu Zhongguo Jindai Huaxue (John Fryer and Chinese Modern Chemistry)," *Journal of Beijing University of Chemical Technology (Social Sciences Edition)* 2 (2001): 55-64; Ferdinand Dagenais, *John Fryer's Calendar: Correspondence, Publications, and Miscellaneous Papers with Excerpts and Commentary* (Version 3) (Berkeley: Center for Chinese Studies, University of California, Berkeley, 1999).

<sup>83</sup> Gen Yang, *Xu Shou he Zhongguo Jindai Huaxue Shi* (Xu Shou and the History of Modern Chemistry in China) (Beijing: Kexuejishu Wenxian Chubanshe, 1986); David Wright, "Careers in Western Science in Nineteenth-Century China: Xu Shou and Xu Jianyin," *Journal of the Royal Asiatic Society* 5.1 (1995): 49-90.

<sup>84</sup> Knight Biggerstaff, "Shanghai Polytechnic Institution and Reading Room: An Attempt to Introduce Western Science and Technology to the Chinese," *Pacific Historical Review* 25.2 (May 1956): 127-49; Ermin Wang, *Shanghai Gezhi Shuyuan Zhi Lue (A History of Shanghai Polytechnic College)* (Hong Kong: Press of the Chinese University of Hong Kong, 1980); David Wright, "John Fryer and the Shanghai Polytechnic: Making Space for Science in Nineteenth-century China," *British Journal for the History of Science* 29.1 (1996): 1-16.

<sup>85</sup> Pushan Zhao, "Hexin Xiyi Wuzhong ji zai Hua Yingxiang (Benjamin Hobson's *Xiyi Wuzhong* and Its Influence in China)," *Jindaishi Yanjiu* 2 (1991): 67-83.

<sup>86</sup> Yangzong Wang, "Gezhi Huibian yu Xifang Jindai Keji Zhishi zai Qing Mo de Chuanbo (The Chinese Scientific and Industrial Magazine and the Introduction of Western Science and Technology in Late Nineteenth-century China)," *Zhongguo Keji Shiliao (China Historical Materials of Science and Technology)* 17.1 (1996): 36-47; Liangyu Fu and Zhiqiang Zhang, "Gezhi Huibian zai Shenbao shang de Toushe (The Reflection of the Chinese Scientific and Industrial Magazine on Shenbao)," *Library and Information* 111.5 (2006): 116-20; San-Pao Li, "Letters to the Editor in John Fryer's Chinese Scientific Magazine, 1879-1892: An Analysis," in *Zhongyang Yanjiu Yuan Jindai Shi Yanjiu Suo Ji Kan (A Collection of Studies of Department of Modern History, Academia Sinica)*

Wang Yangzong's and Shi Gexin's research on the Jiangnan Arsenal in Shanghai and its publications,<sup>87</sup> and Sugita Genpaku's records of translated anatomical books in Japan.<sup>88</sup> In a sense, these works are more specific and focused than the above-mentioned two categories. For example, *Gezhi Huibian*, the first magazine aiming at popularizing Western science and technology for Chinese readers, has not yet been addressed analytically, only descriptively in the first two abovementioned areas. However, for this case, Fu and Zhang's research recovers readers', critics', and booksellers' reflections on the magazine based upon their examination of historical newspaper articles and advertisements. Li's analysis explores the interaction between the readers and the editor (John Fryer) through quantitative and qualitative research on the "Question and Answer" column in the magazine. They allow me to understand science translation and publishing better through a variety of in-depth case studies that explicate individual practices overlooked or merely glossed over by general histories.

The fourth area of scholarship examines the relationship between science publication and culture. Good examples are Fan Xiangtao's analysis of the impact of science translation on Chinese culture in the modern period and Scott Montgomery's examination of science translation in different social and cultural contexts during the past several hundreds of years.<sup>89</sup> These works

---

(Taipei: Academia Sinica, 1974), 729-77.

<sup>87</sup> Yangzong Wang, "Jiangnan Zhizaoju Fanyiguan Shi Lue (A Brief History of the Translation Department of the Jiangnan Arsenal)," *Zhongguo Keji Shiliao (China Historical Materials of Science and Technology)*, 9.3 (1988): 65-74; idem, "Jiangnan Zhizaoju Fanyi Shumu Xin Kao (A New Catalogue of Translated Books of the Jiangnan Arsenal, 1868-1912)," *Zhongguo Keji Shiliao (China Historical Materials of Science and Technology)* 16.2 (1995): 3-18; Gexin Shi, "Jiangnan Zhizaoju Fanyiguan he Jindai Zhongguo de Xi Xue Chuanbo (The Translation Department of the Jiangnan Arsenal and the Transmission of Western Knowledge in Modern China)," *Wenshi Zhishi (Knowledge of Literature and History)* no. 9 (1986): 54-7.

<sup>88</sup> Genpaku Sugita, *Dawn of Western Science in Japan*, trans. Ryozo Matsumoto (Tokyo: Hokuseido Press, 1969). This memoir, finished in 1815, contains Sugita's original Japanese writing on Japanese translations of the Dutch anatomical book.

<sup>89</sup> Xiangtao Fan, *Kexue Fanyin Yingxiang xia de Wenhua Bianqian: Ershi Shiji Chu Kexue Fanyi de Miaoxie Yanjiu (The Influence of Scientific Translation on Cultural Transmission: A Descriptive Study of Scientific Translation in the Beginning of the Twentieth Century in China)* (Shanghai: Shanghai Translation Press, 2006); Scott L.



widen the scope of consideration to incorporate class, religion, institutions (such as schools, churches, publishing houses, and scholarly associations), business relations, and the imperial government and court. These investigators try to understand the cultural contexts surrounding and affecting the adaptation of Western/European words and concepts, adjustment of science works for non-Western audiences, and the creativity of translators. Especially in Montgomery's work, we can see that the author employs a multi-cultural perspective by chronologically examining the "mobility" of science translation within various cultural circumstances, such as those involving the Greek, Arabic, Syriac, and Japanese languages.

In science translation scholarship, we especially see a concentration on nomenclature problems and the unifying of terminology. Such works on late nineteenth and the early twentieth century topics in China include Fan Shouyi's introduction to the history of terminology translation,<sup>90</sup> Chang Hao's exploration of the principles of John Fryer's chemical nomenclature translation,<sup>91</sup> Zhang Jian's analysis on unifying technical terms in modern China,<sup>92</sup> Michael Lackner's, Iwo Amelung's, and Joachim Kurtz's compiled volume on the relationship between lexical change of scientific/technical terms and the emergence of new scientific ideas,<sup>93</sup> and David Wright's take on the Western impact on Chinese translated chemical terms.<sup>94</sup> These works feature a close look at either specific translation techniques (such as the cooperation of

---

Montgomery, *Science in Translation: Movements of Knowledge through Cultures and Time* (Chicago: University of Chicago Press, 2000).

<sup>90</sup> Shouyi Fan, "Dingming de Lishi Yange yu Mingci Shuyu Fanyi (Naming and Translation of Terminology: A Historical Perspective)," *Waijiao Xuayuan Xuebao (Journal of Foreign Affairs College)* no. 1 (2002): 83-94.

<sup>91</sup> Hao Chang, "Zai Chuantong yu Chuangxin zhijian: Shijiou Shiji de Zhongwen Huaxue Yuansu Mingci (Between Tradition and Invention: The Chinese Terms of the Chemical Elements in the Nineteenth Century)," *Huaxue (Chemistry)* 59.1(2001): 51-9.

<sup>92</sup> Jian Zhang, "Jindai Kexue Mingci Shuyu Shending Tongyi zhong de Hezuo, Chongtu yu Kexue Fazhan (Cooperation, Conflicts, and Development in the Course of Examining and Unifying of the Technical Terms in Modern Times)," *Shi Lin (Historical Review)* 2 (2007): 24-35.

<sup>93</sup> Michael Lackner, Iwo Amelung, and Joachim Kurtz, eds, *New Terms for New Ideas: Western Knowledge and Lexical Change in Late Imperial China* (Leiden: Brill, 2001).

<sup>94</sup> David Wright, *Translating Science: The Transmission of Western Chemistry into Late Imperial China, 1840-1900* (Leiden: Brill Academic Publishers, 2000).

oral translator and “transcriber,” and special methods of rendering a Chinese character to an English scientific term), or the contribution of different individuals and institutions to the long process of standardization of scientific terms in China, and the debate and negotiation between different camps of translation agents. Especially for these agents, some authors consider the distinction among three types of institutional actors—the Chinese government, missionary groups, and Chinese scholarly or medical organizations. They also note the viewpoints of individual agents and how they may vary from the organizational outlooks.

Within this field of scholarship, most work is either introductory and basic, or specialized in its analytical focus. My dissertation is both introductory, in terms of surveying translation and publishing organizations (such as the China Medical Missionary Association), which have escaped the notice of previous scholars, and analytical, in terms of closely viewing page layout and the dynamics of making these pages and offering interpretations of these strategies. I focus more than previous scholars on the visual representations, language style, and the arrangement of English and Chinese words on the page. By adopting the holistic mode of book history study, I pay more attention to bookmaking’s human dimensions (such as the negotiation between translators or printer/publishers) and technological influences (such as printing technique and graphic design) and to the reception of science publications in the late Qing period, which were not comprehensively examined by previous scholars.

### **1.2.7 Missionaries in China**

European Jesuits’ arrival in China during the sixteenth century ushered in missionaries’ activities in various fields for hundreds of years. Especially from the beginning of the nineteenth century, Protestant missionaries started to play an intensified role in China. Numerous scholarly works

have discussed Protestant missionaries' influence on religion, education, culture, and politics, ranging from major general historical works, such as the *Cambridge History of China*,<sup>95</sup> to biographies of leading Protestant missionaries' life and work, such as Jonathan Spence's *To Change China: Western Advisors in China, 1620-1960*<sup>96</sup> and Gu Changsheng's *From Robert Morrison to John Leighton Stuart*.<sup>97</sup> These works together offer a comprehensive historical picture of missionaries' participation in reframing Chinese society. They help me extensively understand the nature and the function of missionaries' work and their sentiments towards China and Chinese people.

Among the scholarship on missionaries in China, I particularly pay attention to two bodies of writings which are more closely related to my own research on science translation and printing, especially medical publishing. The first one is on Protestant missionaries' printing and publishing. These works include Adrian Bennett's examination on Young John Allen's compilation and publishing of the newspaper *Wan Guo Gong Bao* (*The Globe Magazine*),<sup>98</sup> Ralph Covell's introduction of W.A.P. Martin's translating and printing of Western works on international law,<sup>99</sup> Ferdinand Dagenais's and Adrian Bennett's description of missionary-scientist John Fryer's service as a translator in Chinese government and a publisher of many science-related imprints,<sup>100</sup> and Su Jing's research on Robert Morrison's printing activities.<sup>101</sup>

---

<sup>95</sup> John K. Fairbank and Kwan-Ching Liu, ed, *Late Ch'ing, 1800-1911* (Volume 11, Part 2) in *Cambridge History of China* (Cambridge: Cambridge University Press, 1980).

<sup>96</sup> Jonathan Spence, *To Change China: Western Advisors in China, 1620-1960* (Boston: Little, Brown and Company, 1969).

<sup>97</sup> Changsheng Gu, *Cong Malixun dao Situleideng: Lai Hua Xinjiao Chuanjiaoshi Pingzhuan* (From Robert Morrison to John Leighton Stuart: Biographies of Protestant Missionaries in China) (Shanghai: Shanghai Shudian, 2005).

<sup>98</sup> Adrian Arthur Bennett, *Missionary Journalist in China: Young J. Allen and His Magazines, 1860-1883* (Athens: University of Georgia Press, 1983).

<sup>99</sup> Ralph R. Covell, *W.A.P. Martin, Pioneer of Progress in China* (Washington, DC: Christian University Press, 1978).

<sup>100</sup> Ferdinand Dagenais, *John Fryer's Calendar: Correspondence, Publications, and Miscellaneous Papers with Excerpts and Commentary*, version 3 (Berkeley: Center for Chinese Studies, University of California, Berkeley,

These works provide a general model of missionaries' publishing practices during the nineteenth century, as well as some special strategies adopted by specific agents. They also help me answer a question concerning the Publishing Committee of the China Medical Missionary Association (CMMA), one of my research foci: To what extent were the printing and publishing activities of the leading members of the CMMA similar to those of their non-medical Protestant missionary predecessors and contemporaries working in China?

This prompts the question: to what extent did the printing and publishing activities of the CMMA *differ* from those of their *medical* Protestant missionary predecessors or contemporaries? Therefore, the second body of scholarship under special examination is on the medical missionary in the nineteenth century. A group of scholars, for example, Xiong Yuezhi, Gu Changsheng, Wang Ermin, Edward Gulick, Harold Balme, Wong Chi-min and Wu Lien-teh, and G. H. Choa, have examined either individual or institutional efforts of Protestant missionaries in practicing medicine, running hospitals, and printing medical books in China.<sup>102</sup> Ma Boying and Zhao Hongjun have provided introductions to the history of Western-Chinese medicine contacts, both of which mention the role played by missionaries.<sup>103</sup> Zhao Pushan, Zou Zhenhuan, and He

---

1999); Adrian A. Bennett, *John Fryer: The Introduction of Western Science and Technology into Nineteenth-century China* (Cambridge, MA: Harvard University Press, 1967).

<sup>101</sup> Jing Su, *Ma Li Xun yu Zhongwen Yinshua Chubanshe* (Robert Morrison and Chinese Printing and Publishing) (Taipei: Taiwan Xuesheng Shuju, 2000).

<sup>102</sup> See, for example, Yuezhi Xiong, *Xixue Dongjian yu Wanqing Shehui* (The Eastward Progress of Western Studies and the Late Qing Society) (Shanghai: Shanghai Renmin Chubanshe, 1995); Changsheng Gu, *Cong Malixun dao Situleideng: Lai Hua Xinjiao Chuanjiaoshi Pingzhuan* (From Robert Morrison to John Leighton Stuart: Biographies of Protestant Missionaries in China) (Shanghai: Shanghai Shudian, 2005); Erming Wang, *Jindai Shanghai Keji Xianqu zhi Renji Yiyuan yu Gezhi Shuyuan* (The Shanghai Hospital and the Shanghai Polytechnic Institute as the Avant-couriers of Science in Modern Shanghai) (Taipei: Yuzhouguang, 2006); Edward V. Gulick, *Peter Parker and Opening of China* (Cambridge, MA: Harvard University Press, 1973); Chi-min Wong and Lien-teh Wu, *History of Chinese Medicine: Being a Chronicle of Medical Happenings in China from Ancient Times to the Present Period* (Tientsin, China: Tientsin Press, Ltd., 1932); G. H. Choa, *"Heal the Sick" was Their Motto: The Protestant Medical Missionaries in China* (Hong Kong: Chinese University Press, 1990); Harold Balme, *China and Modern Medicine: A Study in Medical Missionary Development* (London: United Council for Missionary Education, 1921).

<sup>103</sup> See for example, Boying Ma (etc), *Zhong Wai Yixue Wenhua Jiaoliu Shi* (A History of Medical Communication between China and the West) (Shanghai: Wenhui Chubanshe, 1993); Hongjun Zhao, *Jindai Zhongxi Yi Lunzheng Shi*

Xiaolian have especially researched the translation, printing and publishing of medical books in the nineteenth century by missionaries such as Benjamin Hobson.<sup>104</sup> To answer the question I posed at the beginning of this paragraph, I address a lacuna in the scholarship on the CMMA through systematic examination of its translated books and archival materials related to its publishing activities, including how the CMMA used money supplied by the Wellcome China Publication Fund, a private trust based in England.

### 1.2.8 Map-Making and Cartography; Music Printing and Dissemination

My research encompasses maps and printed music, as well as science books. Numbers of scholars have extensively addressed issues on map-making and music printing, and main themes emerge as mentioned below.

First, in map studies, scholars highlight of the making (or treatment) of geographical knowledge and the political or ideological influence upon maps. Maps are considered as highly involved and powerful epistemological and nationalistic tools for driving the empire/nation into modernization.<sup>105</sup> For example, in her book *Qing Colonial Enterprise: Ethnography and*

---

(The Controversies between Chinese and Western Medicines in Modern China) (Hefei: Anhui Kexue Jishu Chubanshe, 1989).

<sup>104</sup> See, for example, Pushan Zhao, “Hexin Xiyi Wuzhong ji zai Hua Yingxiang (Benjamin Hobson’s *Xiyi Wuzhong* and Its Influence in China),” *Jindaishi Yanjiu* 1991 (2): 67-83; Zhenhuan Zou, “Xiyi Yizhu yu Jindai Zhongyi Jie de Fanxing (The Translations of Western Medicine and the Reflection of Modern Academia of Chinese Medicine),” *Journal of East China Normal University (Philosophy and Social Science Version)* 1986 (1): 76-80; Xiaolian He, *Xiyi Dongjian yu Wenhua Tiaoshi* (The Eastward of Western Medicine and Its Cultural Adjustment) (Shanghai: Shanghai Guji Chubanshe, 2006).

<sup>105</sup> See Mary Sponberg Pedley, *The Commerce of Cartography: Making and Marketing Maps in Eighteenth-Century France and England* (Chicago: University of Chicago Press, 2005); Christine Marie Petto, *When France Was King of Cartography: The Patronage and Production of Maps in Early Modern France* (Lanham, MD: Lexington Books, 2007); J. B. Harley, *The New Nature of Maps: Essays in the History of Cartography* (Baltimore: Johns Hopkins University Press, 2001); David Buisseret, *The Mapmaker’s Quest: Depicting New Worlds in Renaissance Europe* (Oxford: Oxford University Press, 2003); Martin Brückner, *The Geographic Revolution in Early America: Maps, Literacy, and National Identity* (Chapel Hill: University of North Carolina Press, 2006); Susan Schulten, *Mapping the Nation: History and Cartography in Nineteenth-Century America* (Chicago: University of Chicago Press, 2012);

*Cartography in Early Modern China*, Laura Hostetler examines the Qing court's cartographic and ethnographic representations of the southwestern minorities during its empire-building period (from the early seventeenth to the mid-eighteenth century).<sup>106</sup> She argues that the Qing state's practice of expansion was not unique but part of a world-wide "early modern" movement. In "New Maps for the Modernizing State: Western Cartographic Knowledge and Its Application in 19<sup>th</sup> and 20<sup>th</sup> Century China," Iwo Amelung examines the intellectual's motivation for developing, surveying, and making Chinese "modern" maps within the context of Western-Eastern knowledge transmission.<sup>107</sup> He claims there is a discontinuity between "early modern mapping efforts" done with the collaboration of eighteenth-century Jesuits and map making activities in the late Qing period. In other words, no heritage of the former was passed down to the latter. Furthermore, and more importantly, he argues that the development of new maps was actually launched by the Chinese themselves. Western influence only played a limited role in this process. In other words, the internal forces weighed more heavily than external pressure in the "modernization" of map-making.

---

Stephanie Leitch, *Mapping Ethnography in Early Modern Germany: New Worlds in Print Culture* (Basingstoke: Palgrave Macmillan, 2010); J. H. Andrews, *Maps in Those Days: Cartographic Methods Before 1850* (Dublin: Four Courts Press, 2009); Dennis Reinhartz, *The Art of the Map: An Illustrated History of Map Elements and Embellishments* (New York: Sterling, 2012); Michael Wintle, *The Image of Europe: Visualizing Europe in Cartography and Iconography Throughout the Ages* (Cambridge: Cambridge University Press, 2009); Laura Hostetler, "Contending Cartographic Claims? : the Qing Empire in Manchu, Chinese, and European Maps," in *The Imperial Map: Cartography and the Mastery of Empire*, ed. James R. Akerman (Chicago: University of Chicago Press, 2009); Philippe Forêt and Andreas Kaplony, eds., *The Journey of Maps and Images on the Silk Road* (Leiden: Brill, 2008); Richard J. Smith, *Mapping China and Managing the World: Culture, Cartography and Cosmology in Late Imperial Times* (Abingdon, Oxon: Routledge, 2013); Cheryl Ann Semans, "Mapping the Unknown: Jesuit Cartography in China, 1583-1773" (PhD diss., University of California, Berkeley, 1990); Alexander V. Akin, "Printed Maps in the Late Ming Publishing Culture: A Trans-Regional Perspective" (PhD diss., Harvard University, 2009).

<sup>106</sup> Laura Hostetler, *Qing Colonial Enterprise: Ethnography and Cartography in Early Modern China* (Chicago: University of Chicago Press, 2001).

<sup>107</sup> Iwo Amelung, "New Maps for the Modernizing State: Western Cartographic Knowledge and Its Application in 19<sup>th</sup> and 20<sup>th</sup> Century China," in Bray, Dorefeeve-Lichtmann, and Métaillié, *Graphics and Text*, 685-726,

Second, except for bibliographical studies of Western music publication during the sixteenth and seventeenth centuries (such as Mary S. Lewis's and Richard Agee's research on Gardano's music printing, and Stanley Boorman's examination of Ottaviano Petrucci<sup>108</sup>), most of the scholarship on music printing treats "music" as a cultural/transcultural production, which reflects dynamics within music transmission and interpretation from different agents, rather than its actual form as sheet music. For example, in *Yellow Music: Media Culture and Colonial Modernity in the Chinese Jazz Age*, Andrew F. Jones analyses a new genre of music generated in the early twentieth century China and contextualizes it with public discourses/debates existing during the "hierarchized music-historical field of the Republican period."<sup>109</sup> He does not merely focus on the research of the modern song *per se*, but penetrates the topic through the textual analysis of the relevant complexities of modernity, politics (such as "the forces of imperialist encroachment and nationalist resistance"), cultural critics, class, and gender issues, which give his research much depth and breadth.<sup>110</sup> In his frame, music is never isolated from its historical and social background. The arrival of Western music in nineteenth-century China came with colonial power and military force. And Western music was then politically and ideologically used for the nation-building project by Chinese musicologists/musicians and critics.

---

<sup>108</sup> Richard J. Agee, *Gardano Music Printing Firms, 1569-1611* (Rochester: University of Rochester Press, 1998); Mary S. Lewis, *Antonio Gardano, Venetian Music Printer, 1538-1569: A Descriptive Bibliography and Historical Study* (New York: Garland, 1988); Stanley Boorman, *Ottaviano Petrucci: Catalogue Raisonné* (New York: Oxford University Press, 2006). See also Hans Lenneberg, ed., *The Dissemination of Music: Studies in the History of Music Publishing* (Lausanne, Switzerland: Gordon and Breach, 1994); idem, *On the Publishing and Dissemination of Music, 1500-1850* (Hillsdale, NY: Pendragon Press, 2003); Kate Van Orden, ed., *Music and the Cultures of Print* (New York: Garland, 2000); Susan Lewis Hammond, *Editing Music in Early Modern Germany* (Aldershot, England: Ashgate, 2007); Rudolf Rasch, ed., *The Circulation of Music in Europe 1600-1900: A Collection of Essays and Case Studies*, 2 vols. (Berlin: Berliner Wissenschafts-Verlag, 2008).

<sup>109</sup> Andrew F. Jones, *Yellow Music: Media Culture and Colonial Modernity in the Chinese Jazz Age* (Durham: Duke University Press, 2001), 16.

<sup>110</sup> Ibid., 16.

In my dissertation, I attempt to find a thread that links maps and music to science books as forms of technology transfer. Specifically speaking, maps, music, and science books all contain much technical knowledge, the translation of which requires precision. However, many more cultural complexities would be involved in the actual translation process, since the translators (most of them were foreign missionaries in the nineteenth century) had to take into consideration Chinese general readers' difficulties in understanding technical knowledge emerging from within a very different knowledge system, and, thus, with a different system of visual representations. In other words, translators may (arguably) sacrifice precision in their translations for the sake of accessibility by Chinese readers. Therefore, I am interested in the conflicts and compromises posed by technology transfer and, what I call, the concomitant "cultural transfer" present under circumstances of Western-Eastern knowledge transmission. Other general research questions are: How were these three types of objects involved with "visual communication" and "translation" in that knowledge transmission? How did the publishing of science books, maps, and music promote the adaptation of modern Western "printing technologies" in China?

### **1.3 SOURCES AND METHODS**

The cultural field of translating Western learning for the Chinese consumption is far too vast to cover comprehensively in a single volume. Nor can I "tell the story" of the unfolding developments in translation history decade by decade from the 1860s to the 1920s. There would be far too much groundwork remaining to be done before that is possible. Instead, the materials I focus upon are rather selective: I sought out particular translations and archival materials that



best afforded insights into the four communication issues (materiality, textuality, visuality, and interculturality) at the heart of this dissertation. And I employed bibliographical, textual, iconological, and cultural-analysis methods to grapple with these issues. As such, my goal is to provide a rough map of the communicative terrain of West-East technical translation in this important period of intercultural contact.

The conventional mode of studying the translated book mostly focuses on translation techniques. One of the most important techniques is the careful selection of words and/or characters or the creation of neologisms in order to convey the meaning expressed in the original language appropriately and aesthetically. For example, most of the scholarship on the translated science book pays attention to terminology translation. The analysis of this technique has also been used to explore the ideology within translated books, especially of law, philosophy, literature, and politics, which representatively record the exchanging of ideas between different societies.<sup>111</sup> This form of analysis asks, for example, “How do some translated words reflect power relations between the colonizer and colonized nation?” The other important technique for facilitating that is evident in the scholarship discussing translation in historical periods involves the cooperation of the two sets of translators—such as Westerners knowledgeable about the subject matter being translated (e.g., science) and well-acquainted with the Chinese language (but not literate enough to write a quality translation on their own), and highly literate and cultured Chinese natives who may not know Western languages. For instance, in the late nineteenth century, Western translators orally (in Chinese) conveyed scientific concepts to their Chinese collaborators who invented ways of getting across those concepts in Chinese writing by

---

<sup>111</sup> For example, see Lydia H. Liu, *Translingual Practice: Literature, National Culture, and Translated Modernity—China, 1900-1937* (Stanford, CA: Stanford University Press, 1995); Lydia H. Liu, ed., *Tokens of Exchange: The Problem of Translation in Global Circulations* (Durham, NC: Duke University Press, 1999).

creating new words or characters, resurrecting obsolete ones, or giving current ones new meaning.

However, my dissertation goes beyond these conventional concerns by addressing the communicational characteristics of translated imprints from the perspectives of book history, visual rhetoric, and intercultural communication. I have adopted the methodology of viewing the book within Robert Darnton's aforementioned holistic "communication circuit." Because the activity of translating involves many other people besides the translators themselves, it becomes necessary to examine materials such as correspondence, diaries, and personal writings that record the action and reaction of agents such as publisher/printers, booksellers, readers, binders, distributors, and the interactions between them. I also incorporate visual rhetoric scholarship, which allows me to examine images and their relationship to the text and the cultural, social, and historical context in which they appear. In this case, I identify the transformation Western images undergo as they are being rendered into Chinese versions of Western texts. I also benefit from intercultural communication scholarship which embeds both text and image within specific cultural backgrounds. This subfield allows me to understand better the cultural phenomenon of how knowledge was transmitted during the late nineteenth and early twentieth centuries in China. It also helps me determine the reasons why there are differences between Western and translated texts and images in that I can compare both Western and Chinese textual-visual heritages, and explore the dynamic of agents who conducted the intercultural activities of translating. Given the above-mentioned methodologies, the conventional approach of simply analyzing the textual and linguistic elements of translated imprints may not be sufficient for my own research. Nonetheless, the translated imprint *per se* as a primary source is still very important to my research, because as the end product of the translation process it contains *prima*

*facie* clues to that process. Beyond the traditional scholarly focus on text, I touch upon paratextual elements. Specifically speaking, every detectable trace of change and invention in paratextual spaces of the translated imprint, such as creative use of marginal space, supplementary annotation, and additional prefaces, reflects the negotiation among all the agents who were involved in the imprint making process.

One of the key concepts I illustrate in my dissertation is the notion of “paratext,” which was systemized first by French literary theorist and critic Gérard Genette. In his book *Paratexts: Thresholds of Interpretation*, Genette calls for scholarly attention to “paratext,” which has long been overlooked as part of the process of interpreting texts. According to his framework, “paratext” refers to “a certain number of verbal or other productions” that consist of the “external presentation of a book,” including prefaces, author(s)’ name(s), titles, illustrations<sup>112</sup>, and other materials that accompany the text spatially. “Paratexts” surround the text “either within the same volume or at a more respectful (or more prudent) distance.”<sup>113</sup> In this way, “paratexts” render supplementary, even substantial meaning to the main text.

In this dissertation I develop and, especially, augment Genette’s notion of “paratext.” After all, Genette’s framework is based on the examination of Western books. Although some features/types of paratexts would be similar in both China and the West, some of the paratextual elements in Genette’s framework may not apply to Chinese book study. For example, compared with their European counterparts, Chinese traditional books, especially from the fifteenth and the sixteenth centuries onward, would contain a number of prefaces in the front of the text, printed or

---

<sup>112</sup> Gérard Genette, *Paratexts: Thresholds of Interpretation*, trans. Jane E. Lewin (New York: Cambridge University Press, 1997), 1, 3. Genette’s book does not have a single chapter that contributes to illustrations. It is not because illustrations are not as significant as other paratextual elements, but because the visual is so different from the verbal that Genette would rather give up discussing both of them in one volume.

<sup>113</sup> Genette, *Paratexts*, 4.

calligraphically written. Sometimes, the number even reached around fifteen. Prefaces identified the social status of the author, his/her personal network, and, of course, to some extent, the value of the book.<sup>114</sup> Another example is the dedication page often seen in the Western book, which mainly reveals the network of patronage or who was influential or important to the author. The Chinese book may contain this information in the prefaces or the title page, but it seems that a single dedication page is rarely seen.

Genette himself realized that what he was doing was “a synchronic and not a diachronic study—an attempt at a general picture, not a history of the paratext.”<sup>115</sup> In other words, he did not consider either historical comparison focusing on the changes in different historical time periods, or cross-cultural comparison focusing on paratextual elements within different book cultures. Even though it is a “general picture,” Genette consulted basically novels and literary works. Science books may contain much fewer examples of paratexts than those types of imprints.

Paratextual elements are especially important when we look at translated books. Arguably, translation is a type of authorship. However, the translator is allowed less flexibility than a poet or a writer, because the conformity to the original text is always the first touchstone of the quality of the translated book. In this case, the paratext is an indispensable “free zone” in which translators and printers may “perform.”

First, due to the characteristic of translated imprints (science books, maps, and sheet music) which are my research objects, I basically conduct a comparative bibliographical study by juxtaposing both Chinese-language translated editions and their original English-language editions. Juxtaposing is a traditional and indispensable methodology of comparative scholarship.

---

<sup>114</sup> Chow, *Publishing, Culture, and Power*, 114.

<sup>115</sup> Genette, *Paratexts*, 13.

Strictly speaking, only through juxtaposing the objects can a comparison be conducted. Within the scholarship of translation, juxtaposing both the original and translated imprints has long facilitated the capturing of the linguistic representation of a word or an idea that is transmitted between cultures. However, in my research, I juxtapose not only the textual aspects, but also the paratextual, especially the visual aspects. My largest undertaking of comparative study took place in the Wellcome Library, London. There I located the publications (mainly medical translations) of the China Medical Missionary Association (CMMA) during the late nineteenth century, especially those printed under the Wellcome China Publication Fund. By examining their title pages<sup>116</sup> and prefaces, I was able to retrieve the exact English-language editions published mostly in England. Juxtaposing both editions made me more sensitive to identifying the changes made in the translation process as it registered on the book's pages, including page layout, vocabulary, omissions from the original version, and newly authored parts. Regarding visual representation, the differences became more evident especially when considering text-image relationships. In conjunction with the methodology of comparative study, close examination of the physical properties (such as page formatting and binding)<sup>117</sup> and other "paratexts" is vital to my research. On the one hand, the translated book as a material medium reflects encountering very different traditions of Chinese and Western cultures of bookmaking. For example, we can sometimes see the combination of both ways of page turning (right-to-left as for the English-language book and left-to-right as for the traditional Chinese book) in different parts of the translated book, because of different visual conventions that are represented in book

---

<sup>116</sup> Most of the publications by the CMMA contain two title pages—a very concise one in Chinese as usually seen in traditional books, and another in English, which extensively illustrates relevant information about the book, such as the original English-language version's title and author's name and profession, and brief introduction to the translator(s).

<sup>117</sup> Broadly speaking, physical property would be a part of the paratextual system. Here I particularly point out physical property in order to emphasize the materiality of the translated imprints.

design. On the other hand, some of the “paratexts” (e.g., title pages, prefaces, marginal space of the page) which *per se* contain text can function as “thresholds of interpretation.”<sup>118</sup> They sometimes provide accounts about those involved in translating. For example, clues about controversies over printing and publishing issues, as well as the treatment of the text, the printer-publisher’s solutions to incompatibilities between Western and Chinese book formatting, and the social/individual reception of the translation all may appear in paratexts.

Besides juxtaposing imprints, I examine archival material in order to understand the underlying mechanics and dynamics of the making of those translated imprints. I have consulted manuscripts (including correspondence, diaries, autobiographies, and miscellaneous papers) and documents of influential organizations involved in translation and publishing.<sup>119</sup> This type of primary source material allows me to delve into the clues to the negotiation of end products beyond the book pages, such as human interactions (e.g., correspondence between translators) within the entire process of translation production and book making, especially in the context of intercultural communication. For example, from reading the correspondence between Sir Henry Wellcome and the leading medical missionaries of the CMMA, I am able to understand the different, even conflicting views inside the CMMA on translation style and the use of language, and the CMMA’s and Wellcome’s opinions on the issues of copyright and illustration printing. It is also worth mentioning that some manuscripts contain important information about the

---

<sup>118</sup> See Gerard Genette, *Paratexts: Thresholds of Interpretation*, translated by Jane E. Lewin (New York: Cambridge University Press, 1997).

<sup>119</sup> I have explored John Fryer Papers at the Bancroft Library, University of California, Berkeley; Henry Solomon Wellcome China Publication Fund archive, Collett Smith and Henry Wellcome correspondence, family letters to Benjamin Hobson, and correspondence between the Benjamin Hobson family and the Robert Morrison family at the Wellcome Library, London; incoming correspondence, pamphlets, and reports concerning the issues of printing technology, setting of presses, translation, and catalogues/records of missionaries’ personal publications inside the London Missionary Society archive, School of Oriental and African Studies, University College of London.

original English-language editions, which was sometimes lacking in many Chinese-language translations during the late Qing period. It greatly facilitates my comparative study.

Furthermore, in order to envision a general picture of translated imprints during the late Qing period, I examined a series of catalogues of printing presses, publishing houses, book stores, educational institutes and organizations, translation agents, and individual works.<sup>120</sup> When scanning these materials, I paid special attention to the techniques by which the translated imprints were printed, the price information, and the scope of different publishing agents. Some of those catalogues not only contained the bibliographical information, but also provided short critiques on the content of a book. Looking at the catalogues creates a sense of the book market in general and provides me with a list of representative books to focus on. I can position the specific imprints I am studying in their larger cultural field.

By tapping into literature from fields of study mentioned above, I envision my dissertation as an interdisciplinary one. These various methodologies have helped me to explore translated science books, maps, and music in a comprehensive manner. Below, I contextualize the making of translations within specific temporal, geographical, and cultural contingencies. I will now consider the different worlds of book and print cultures in the West and in China during the late nineteenth and early twentieth centuries, in order to demonstrate how translations, as physical objects with hybridized features, contributed to the transformation of a society.

---

<sup>120</sup> These include Wang Tao, Xu Weize, Gu Xieguang, John Fryer, Alexander Wylie, some leading missionaries from the London Missionary Society, the Translation Department of the Jiangnan Arsenal, the Library of the Shanghai Polytechnic Institute, the American Presbyterian Mission Church, *En venta à l'Orphelinat de T'ou-sé wé* (Tushanwan Ci Mu Tang), etc.

## 2.0 “ALL HOWEVER IS CONTRARY IN CHINESE”: THE CHANGING FACE OF THE TRADITIONAL CHINESE BOOK DURING AN ERA OF TRANSLATION

Western nations write horizontally, and their method of writing figures and numerating them is in accordance therewith, as well as the processes of addition, subtraction, multiplication and division, as also the writing of equations. This harmony of method suits the motion of the hand acquired in learning to write, and when numbers or equations occur in writing they go naturally into the ordinary lines of writing. All however is contrary in Chinese. Their method of writing in perpendicular lines is directly at variance with our horizontal arrangement of number and equations.... How shall these and other difficulties be remedied?<sup>121</sup>

—— Calvin W. Mateer, 1878

Calvin W. Mateer (1836-1908), an American Presbyterian missionary educator, who moved to China in 1863 and resided there for over forty years,<sup>122</sup> worked extensively in rendering Western

---

<sup>121</sup> Calvin Mateer, “Mathematics in Chinese,” *Chinese Recorder* 9 (September-October 1878): 372-78, qt. on 375. This quote is also included in Ferdinand Dagenais, Peter X. Zhou, and Jean C. Han, eds., *The John Fryer Papers*, 3 vols. (Guilin: Guangxi Normal University Press, 2010) 2: 345.

<sup>122</sup> Calvin Mateer was a native of Pennsylvania and a graduate of the Western Theological Seminary in Pittsburgh. He and his wife Julia Brown Mateer, both sent by the Board of Foreign Missions of the Presbyterian Church in the



arithmetic, algebra, and geometry into Chinese.<sup>123</sup> Although a seasoned translator, he could not help but feel perplexed when faced with translating Western mathematical knowledge for Chinese book pages. The divergence between “perpendicular lines” and “horizontal arrangement,” as Mateer pointed out, was only one among a variety of practical translating problems he encountered. These primarily stemmed from vastly different book traditions in the West and China. Mateer’s confusion was common among his colleagues and peer translators.

When readers open a nineteenth-century translated book today, they will not be able to discern the translator’s complaints emanating from the pages. However, translators found that not only converting Western text into the Chinese language was difficult. So, too, was adapting books’ textual formatting and “paratexts,” such as glossaries, indices, and marginal space, which acted as “thresholds” to the understanding of the main text.<sup>124</sup>

---

United States, arrived in China in 1863. At the beginning of 1864, they relocated to Dengzhou, where they remained until their death. As a renowned educator in China, he founded the later Union College in Shandong Province and promoted secular education after the late 1870s. Besides the translated works, he also published numerous Chinese-language learning books for Westerners. See Gerald H. Anderson, ed., *Biographical Dictionary of Christian Missions* (Grand Rapids, MI: William B. Eerdmans Publishing, 1999), 440; Alexander Wylie, *Memorials of Protestant Missionaries to the Chinese* (Shanghai: American Presbyterian Mission Press, 1867), 269; D. MacGillivray, ed., *A Century of Protestant Missions in China (1807-1907)* (New York: American Tract Society; Shanghai: American Presbyterian Mission Press, 1907), 382-3; and John K. Fairbank, ed., *Late Ch’ing, 1800-1911 (Part I)*, vol. 10, *The Cambridge History of China* (Cambridge: Cambridge University Press, 1978), 576. For a history of Union College (i.e., Shantung Christian University), see William Purviance Fenn, *Christian Higher Education in Changing China, 1880-1950* (Grand Rapids, MI: William B. Eerdmans Publishing, 1976); Jessie G. Lutz, *China and the Christian Colleges, 1850-1950* (Ithaca: Cornell University Press, 1971). For more detailed information about the Mateers, see Daniel W. Fisher, *Calvin Wilson Mateer, Forty-Five Years a Missionary in Shantung, China: A Biography* (Philadelphia: Westminster Press, 1911); Robert McCheyne Mateer, *Character-Building in China: The Life-Story of Julia Brown Mateer* (New York: Fleming H. Revell Company, 1912); Irwin T. Hyatt, “The Missionary as Entrepreneur: Calvin Mateer in Shantung,” *Journal of Presbyterian History* 49 (1971): 303-27; and idem, *Our Ordered Lives Confess: Three Nineteenth-Century American Missionaries in East Shantung* (Cambridge, MA: Harvard University Press, 1976).

<sup>123</sup> MacGillivray, *A Century of Protestant Missions in China*, 392-93.

<sup>124</sup> The concept of “paratext” was thoroughly discussed by French literary theorist Gérard Genette in his *Paratexts: Thresholds of Interpretation*, trans. Jane E. Lewin (New York: Cambridge University Press, 1997). My analysis of “paratexts” differs from Genette’s in that it focuses upon the physical properties of paratextual elements. Indeed, Genette’s book has no single chapter on illustration as paratext. However, he admits that illustration is “an immense continent” of paratext which he has yet to analyze (406). I will focus upon illustrations in Chapter 3.

Western knowledge did not directly come to China. It was channeled through ways such as personal communication and artifact exchange.<sup>125</sup> But during the era of West-China contacts from the sixteenth to the early twentieth centuries, the primary media that carried knowledge was printed matter—books, maps, and sheet music. Continuous importation of Western imprints was carried on through milestone events such as the “Seven thousand books arriving in China” endeavor by which European Jesuits brought new knowledge to the country throughout the late Ming 明 (1368-1644 C.E.) period.<sup>126</sup> More minor acts of importation are recorded in missionaries’ numerous orders of books shipped from Europe or America to China in the late Qing 清 (1644-1912 C.E.) period.<sup>127</sup> These books were used as original sources for translators. Their physical properties as well as their content became a source of perplexity for translators. This was especially true during the late nineteenth and early twentieth centuries, a period of intense contact with other distinct book cultures.

Although traces of Western scribal culture remained in the era of print,<sup>128</sup> Gutenberg’s printing press promulgated a look of the book, which was passed down and is still familiar to today’s readers. But only after much invention and reinforcement did the bibliographical features of the printed book become standardized. At the same time, reading protocols of the

---

<sup>125</sup> David Wright, “The Translation of Modern Western Science in Nineteenth-Century China, 1840-1895,” *Isis* 89.4 (1998): 653.

<sup>126</sup> See Fang Hao, “Ming Ji Xi Shu Qiqian Bu Liuru Zhongguo Kao (Research on the Seven Thousand Western Books Brought to China during the late Ming Dynasty),” *Xin Bei Chen* (New North Morning) 3.4 (1937): 379-82. According to Ji Xiangxiang, the actual number of imported book titles was exaggerated. See his “Jinnige Xie Xishu Qiqian Bu Laihua Shuo Zhiyi (Questioning the Viewpoint on Nicolas Trigault’s Seven Thousand Western Books Brought to China),” *Wen Shi* (Literature and History) 41 (1996): 153-63. For a bibliography of this collection of Western texts and their circulation, see Hubert Verhaeren, *Beitang Tushuguan Cang Xiwen Shanben Mulu* (Catalogue of the Pei-T’ang Library) (repr. Beijing: Guojia Tushuguan Chubanshe, 2002); Noël Golvers, “The Jesuits in China and the Circulation of Western Books in the Sciences (17th-18th Centuries): The Medical and Pharmaceutical Sections in the SJ Libraries of Peking,” *East Asian Science, Technology, and Medicine* 34 (2011): 15-85.

<sup>127</sup> For example, see Ferdinand Dagenais, Peter X. Zhou, and Jean C. Han, eds., *The John Fryer Papers: The First Decade in China, 1861-1871* (Guilin: Guangxi Normal University Press, 2010) 1: 348-52; 375-77; 384-86; 392-99.

<sup>128</sup> On the coexistence of manuscript and print cultures, see David McKitterick, *Print, Manuscript and the Search for Order, 1450-1830* (Cambridge: Cambridge University Press, 2003).

Western book were established. In China, the conventionalization of the book's basic physical properties also went through a long process, beginning before the second-century perfection of paper-making techniques,<sup>129</sup> when bamboo slats and silk scrolls served as primitive forms of books.<sup>130</sup> The advent of woodblock printing in the eighth century and its later development and proliferation during the Song 宋 (960-1279 C.E.) and Ming Dynasties<sup>131</sup> helped to develop the bibliographical properties commonly seen in traditional<sup>132</sup> printed books. The constellation of bibliographical elements of the Chinese book comprised a product different from the Western one. That product, in turn, fostered a convention of viewing and book reading in China that was also distinct. The Chinese book tradition would be ingrained in Chinese quotidian life for centuries. However, what lay on a Chinese common reader's desk drastically changed within only a few decades beginning around the 1860s. By the 1920s, readers could access thoroughly Western-style books with Chinese characters in them. This transitional period marked the process of adapting to Western book culture. Translated imprints represented a potential

---

<sup>129</sup> A primitive type of paper was invented in China before the Christian era. The manufacture of paper significantly improved during the second century. From the third century onward, the use of paper started to gain popularity in China and then spread westward. See Tsuen-hsuei Tsien, *Paper and Printing in Science and Civilisation in China*, ed. Joseph Needham (Cambridge: Cambridge University Press, 1985), 1.

<sup>130</sup> Ibid., 29.

<sup>131</sup> For scholarship on Chinese book history during the Song, Yuan and Ming Dynasties, see Lucille Chia, and Hilde Godelieve Dominique De Weerdts eds, *Knowledge and Text Production in An Age of Print: China, 900-1400* (Leiden: Brill, 2011); Lucille Chia, *Printing for Profit: The Commercial Publishers of Jianyang, Fujian (11<sup>th</sup>-17<sup>th</sup> Centuries)* (Cambridge, MA: Harvard University Press, 2002); Kai-wing Chow, *Publishing, Culture, and Power in Early Modern China* (Stanford: Stanford University Press, 2004); Cynthia J. Brokaw and Kai-wing Chow eds, *Printing and Book Culture in Late Imperial China* (Berkeley: University of California Press, 2005); Zhang Xiumin, *Zhongguo Yinshua Shi (History of Chinese Printing)* (enlarged and illustrated edition) (Hangzhou: Zhejiang Guji Chubanshe, 2006); Hou Yangjun, ed., *Zhongguo Chubanshi (A General History of Chinese Publishing)*, vol. 3-5 (Beijing: Zhongguo Shuji Chubanshe, 2009).

<sup>132</sup> In this work, a "traditional" Chinese book refers to one that was established and popularized during the late imperial period (roughly from the late fourteenth century to the early twentieth century) and apparently not influenced by Western printed book culture and printing technology. Non-traditional variants circulated during this time too. Nowadays, most books published in mainland China are of the same bibliographical format as Western printed books, except some art and specialty books designed to look "traditional," or those with special content, such as reprints of ancient Chinese texts.

convergence of Western and Chinese print cultures through the new bibliographical features developed at this time when numerous Western works were rendered into Chinese.

Making a translated book is always a much more complicated matter than just arranging the translated words into lines on the page and then printing them. What happens if the layout of some pages and sections is incompatible with Chinese conventions of viewing? What happens if some special expressions are almost impossible to render into the Chinese language? What happens if there is no tradition of footnoting, especially when maintaining accuracy is particularly important for the translation? Clearly, the translation of content required the invention and reinvention of bibliographical form. These problems were most obviously pressing for translations of science books (broadly including natural science, applied science and technology, and medicine), but they were also urgent for translations of maps and music in China.

Presentation of modern science in the West became standardized in the midst of the widespread of the printing press.<sup>133</sup> Map-making and music printing also established their own traditions in the West.<sup>134</sup> These three types of imprints were replete with technical languages and symbols, such as formulae in science books, legends in maps, and notes in sheet music, which demanded specific formatting in print. However, the histories and specificities of their Chinese counterparts shared few similarities with them. Translating between two languages as distinct as English and Chinese was difficult enough. But, translating between two highly distinct book cultures that developed from different cultural traditions, made the process more

---

<sup>133</sup> Elizabeth L. Eisenstein, *The Printing Revolution in Early Modern Europe*, 2nd ed. (Cambridge: Cambridge University Press, 2005), 209-85.

<sup>134</sup> For general history of map-making in the West, see J. B. Harley and David Woodward, eds., *The History of Cartography*, vols. 1 and 3 (Chicago: University of Chicago Press, 1987 and 2007). For general history of music printing in the West, see D.W. Krummel and Stanley Sadie, eds., *Music Printing and Publishing (The New Grove Handbooks in Music)* (London: MacMillan, 1990); Hans Lenneberg, *On the Publishing and Dissemination of Music, 1500-1850* (Hillsdale, NY: Pendragon Press, 2003).

demanding. Among all categories of imprints translated in China during the late nineteenth and early twentieth centuries, science books, maps, and music together reveal the discrepancies between Western and Chinese book-making to the highest degree. How did translators and printer-publishers deal with these discrepancies in practice?

This chapter will begin with a comparative look at the bibliographical properties of nineteenth-century Western and traditional Chinese books. Foundational differences between Western and Chinese science, map-making, and music were demonstrated in imprints made in two geographical and cultural regions that were once relatively isolated from one another. Then I will make comparisons between representative Chinese translated imprints and traditional Chinese books. The comparisons will reveal what bibliographical elements were well preserved, how traditional physical properties were creatively adapted, adjusted, even revolutionized, and what new properties were invented to accommodate highly technical knowledge imported from the West. I argue that translated science books, maps, and music were on the vanguard of change regarding the adoption of Western-style books' material features. Moreover, during the late nineteenth and early twentieth centuries, these translations set the stage for a transformation of visual and reading conventions that had been persistent among Chinese audiences for centuries. The appearance of translated imprints, the primary medium that bridged different knowledge systems, was influenced by the technology for producing books—printing and its related techniques, such as papermaking and bookbinding. The period in which the traditional look of Chinese science books, music, and maps was altered, coincided with one in which Western printing techniques proliferated in China and were used in Chinese bookmaking. I will examine how translations were impacted by different printing technologies that sometimes conflicted with each other. The Chinese printer-publisher adopted Western printing techniques,

albeit with resistance and consideration for preserving Chinese book traditions. Thus translated imprints were not just random hybrids of Western and Chinese book cultures, but the end products of strategies and rationales for keeping Chinese traditions alive.

## **2.1 TWO DIVERGENT BOOKMAKING TRADITIONS**

If two reading moments could be randomly captured somewhere in the cosmopolitan West and in urban China during the nineteenth century, the two books involved would be very different from one another in general bibliographical formatting—how the text was arrayed on the page, how pages should be turned, how the sheets were printed and bound, and what the design of a page looked like. Where science books, maps, and music imprints are specifically concerned, there would be even more divergences resulting from cultural differences between China and the West.Paragraph.

### **2.1.1 A Bibliographical Comparison**

Even nineteenth-century Western readers would recognize the typical format of the Western-style printed book that can be seen nowadays, because its main features have been sustained for so long a time. From roughly 1800 onward, printing entered the machine-press period in the West. Steam power was applied “to presswork, to binding, and to composition” to speed the production. Machine-made paper with a smoother surface spread widely to printing establishments, and more varieties of typefaces were available. However, the “fundamental processes” used in the previous era of hand-press printing (1500-1800) were “not altered in any

important way until the electronic revolution of the mid-twentieth century.”<sup>135</sup> Neither were the products’ bibliographical characteristics. The major bibliographical elements which together constitute the Western style, stemmed from persistent writing habits (i.e., horizontally, from left to right), thrived on manuscript culture, and were ultimately standardized by the printing press. Although specific bibliographical features had been undergoing a certain level of alteration over time, the general physical properties of Western books did not dramatically change since the invention and spread of Gutenberg’s printing press.<sup>136</sup> During the nineteenth and the early twentieth centuries, the majority of Western-style movable-typed books shared similar physical properties that easily distinguished them from traditional Chinese books.

The method of making paper by machine was first explored during the 1790s. By the 1830s, machine-made paper had been “commonly used in all kinds of printing,” including book production. Due to the shortage of rags, wood pulp became the main raw material for paper making during the late nineteenth century, although the paper made from wood pulp was not as

---

<sup>135</sup> Philip Gaskell, *A New Introduction to Bibliography* (New Castle, DE: Oak Knoll Press, 1995), 189.

<sup>136</sup> A great deal of scholarship has examined the bibliographical format of Western books and its importance to the making of knowledge. For example, Philip Gaskell offers an exhaustive account of bibliographical features of Western printed books in *A New Introduction to Bibliography*. Elizabeth Eisenstein elaborates upon the standardization of the printed book and the turn to a new tradition of making science books after the invention of the printing press in her *The Printing Revolution in Early Modern Europe*, 209-85. Adrian Johns examines the impact of printing on knowledge making in Europe after the invention of Gutenberg’s printing press in *The Nature of the Book: Print and Knowledge in the Making* (Chicago: University of Chicago Press, 1998). D. F. McKenzie spells out how the material form of the book was an outcome of interactions among multiple agents, and how bibliographical properties became determining factors for the meaning of text in his *Bibliography and the Sociology of Texts* (Cambridge: Cambridge University Press, 1999). Specific bibliographical elements have also been studied, including Ann Blair’s examination of errata lists, annotating, and indexing, and Marina Frasca-Spada’s analysis of compendious footnotes. See Ann Blair, “Errata Lists and the Reader as Corrector,” in *Agent of Change: Print Culture Studies after Elizabeth L. Eisenstein*, ed. Sabrina Alcorn Baron, Eric N. Lindquist, and Eleanor F. Shevlin (Amherst: University of Massachusetts Press, 2007), 21-41; idem, “Annotating and Indexing Natural Philosophy,” in *Books and the Sciences in History*, ed. Marina Frasca-Spada and Nicholas Jardine (Cambridge: Cambridge University Press, 2000), 69-89; Marina Frasca-Spada, “Compendious Footnotes,” *ibid.*, 171-89; Shari Benstock, “At the Margin of Discourse: Footnotes in the Fictional Text,” *Papers of the Modern Language Association (PMLA)* 98, no. 2 (1983): 204-25.

sturdy as that made from rags.<sup>137</sup> Despite the flimsiness of late-nineteenth century paper, it still allowed for printing on both sides, as in previous periods.

Industrialization little affected the look of the page. Each side of the leaf, recto and verso, was designated as one page. Each page had its own number, usually printed in the upper or lower margins. The printed area of pages was surrounded by margins—blank spaces on the top, bottom, left, and right sides of the page. The page numbers were consecutive from recto to verso. Thus pages turned to the left. Due to the Western convention of writing horizontally, the orientation of the words printed was also horizontal, and proceeded from left to right. Lines of words continued downwards from the top of the page to the bottom. A running title, which could include chapter title, section title, or author's name, was frequently printed on the top of every page. For locating content, there could be an index among the back matter or an analytical table of contents in the front. The techniques of binding had not changed much since the sixteenth century (including folding, gathering, sewing, rounding and backing the spine, edge trimming, etc.).<sup>138</sup> Several pages could be printed on a large sheet of paper, which was then folded and cut to be gathered for binding on the remaining folds. Throughout the nineteenth century, the units of hand binding were being mechanized one by one, albeit gradually, until the beginning of the twentieth century.<sup>139</sup>

If we now cross from West to East to look at the traditional Chinese book, striking differences between it and the Western book emerge.

---

<sup>137</sup> Rob Banham, "The Industrialization of the Book, 1800-1970," in *A Companion to the History of the Book*, ed. Simon Eliot and Jonathan Rose (Oxford: Willey-Blackwell, 2009), 274.

<sup>138</sup> P. J. M. Marks, *The British Library Guide to Bookbinding: History and Techniques* (Toronto: University of Toronto Press, 1998), 29.

<sup>139</sup> Gaskell, *A New Introduction to Bibliography*, 235-7.



By the late imperial era, Chinese print culture had matured and the book format had been virtually standardized.<sup>140</sup> Before the implementation of superior techniques of papermaking during the second century C.E., books were composed of engraved bamboo or wood sticks bound together or handwritten silk scrolls. After that, paper was used for handwritten manuscripts and, later, for wood block printed books. During the Song dynasty (960-1279 C.E.), block-printed books started to play an important role in Chinese society as the literary market developed and as civil service exams began to involve more and more literati. By the middle of the Ming period (1368-1644 C.E.), the format and design of printed books became stabilized and familiar to readers through large-scale distribution. The majority of Chinese books published during the Qing period (1644-1912 C.E.) inherited the physical properties of their predecessors that distinguished them from Western books.

Despite the invention of moveable type in the Song period and the introduction of the Western printing press in the early nineteenth-century, the dominant printing technology throughout the late imperial period remained unchanged from earlier times. The publishing of

---

<sup>140</sup> A large number of scholarly works on Chinese book culture discuss Chinese ancient and traditional books' bibliographical characteristics and their variations over time and space. For example, Tsuen-hsuei Tsien, *Written on Bamboo and Silk: The Beginnings of Chinese Books and Inscriptions*, 2nd ed. (Chicago: University of Chicago Press, 2004); idem, *Paper and Printing*; Anne Burkus-Chasson, "Visual Hermeneutics and the Act of Turning the Leaf: A Genealogy of Liu Yuan's *Linyan Ge*," in *Printing and Book Culture in Late Imperial China*, ed. Cynthia J. Brokaw and Kai-wing Chow (Berkeley: University of California Press, 2005), 371-416; Lucille Chia, *Printing for Profit: The Commercial Publishers of Jianyang, Fujian (11th-17th Centuries)* (Cambridge, MA: Harvard University Press, 2002); Cynthia Brokaw, *Commerce in Culture: The Sibao Book Trade in the Qing and Republican Periods* (Cambridge, MA: Harvard University Press, 2007); Robert E. Hegel, *Reading Illustrated Fiction in Late Imperial China* (Stanford: Stanford University Press, 1988); Christopher A. Reed, *Gutenberg in Shanghai: Chinese Print Capitalism, 1876-1937* (Vancouver: University of British Columbia Press, 2004); Alexander Townsend Des Forges, *Mediasphere Shanghai: The Aesthetics of Cultural Production* (Honolulu: University of Hawai'i Press, 2007); Zhang Xiumin, *Zhongguo Yinshua Shi (History of Chinese Printing)* (Hangzhou: Zhejiang Guji Chubanshe, 2006); Cao Zhi, *Zhongguo Guji Banben Xue (An Edition Study of Chinese Rare Books)*, 2nd ed. (Wuchang: Wuhan University Press, 2007); Xu Yinong, *Zhongguo Gudai Yinshua Tu Zhi (An Illustrated Record of Chinese Printing in Historical Periods)* (Yangzhou: Guangling Shushe, 2006); Xu Xiaoman and Wang Fukang, *Zhongguo Gudai Chatu Shi (A History of Chinese Illustrations)* (Shanghai: Shanghai Guji Chubanshe, 2007); Yang Yongde, *Zhongguo Gudai Shuji Zhuangzhen (Book Designs in Ancient China)* (Beijing: Renmin Meishu Chubanshe, 2006); Li Mingjun, *Lidai Shuji Zhuangzhen Yishu (A History of the Art of Book Design in China)* (Beijing: Wenwu Chubanshe, 2009).

the vast majority of books still relied on woodblock printing.<sup>141</sup> While each impression on a composed forme used in the Western printing press produced multiple pages, each impression on the Chinese woodblock produced only one *ye* 頁 (or 葉), a folio-like, one-sided imprint (see Figure 1).<sup>142</sup> Each *ye* included a fixed rectangular area framed by bold lines (*ban kuang* 版框)<sup>143</sup> and a marginal area outside the *ban kuang*. The *ban kuang* functioned for readers as an indication that what was printed inside was the main text and images. Usually no words or images from the main text created extrusions of the *ban kuang* lines into the marginal area except for the character(s) referring to the emperor(s) and the current empire. The top part of the blank area, called “heavenly head” (*tian tou* 天頭), and the bottom part, called “earthly foot” (*di jiao* 地腳), were sometimes used for printing commentaries and annotations. Each column of the main text was demarcated by printed borderlines (*jie hang* 界行).<sup>144</sup> Because Chinese characters ran from top to bottom, the borderlines were vertical. This is one of the most obvious differences between Western and traditional Chinese book cultures: the arrangement of the text in horizontal and vertical order respectively.

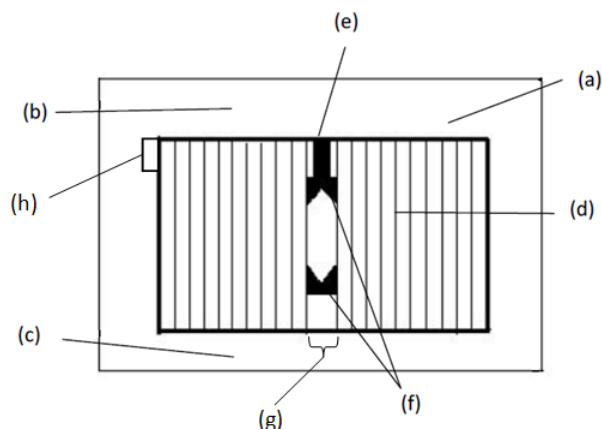
---

<sup>141</sup> Evelyn S. Rawski, “Economic and Social Foundations of Late Imperial Culture,” in *Popular Culture in Late Imperial China*, ed. David G. Johnson, Andrew J. Nathan, and Evelyn S. Rawski (Berkeley: University of California Press, 1985), 17; Lothar Ledderose, *Ten Thousand Things: Module and Mass Production in Chinese Art* (Princeton, NJ: Princeton University Press, 2000), 150-51.

<sup>142</sup> Usually both sides of a woodblock were engraved. Thus every block can make two *ye*.

<sup>143</sup> Variants of *ban kuang* include those with four-sided single lines, those with four-sided double lines, and those with double lines on the left and right sides, and single lines on top and bottom sides. Occasionally, there are no *ban kuang* or *jie hang* printed on the page, but the text is nonetheless arrayed vertically in columns of equal widths to form a rectangular area that approximated the missing *ban kuang*.

<sup>144</sup> Other variations of the term include *hang ge* 行格 and *jie* 界.



**Figure 1.** A *ye* of the traditional Chinese book  
 (a) *ban kuang* (b) *tian tou* (c) *di jiao* (d) *jie hang* (e) *xiang bi* (f) *yu wei*  
 (g) *ban kou* (h) *shu er*—appearing in butterfly bound books only, see “glossaries and indices” section below

Paper for printing the traditional Chinese book was always much thinner than Western paper, and appropriate for printing on only one side.<sup>145</sup> The vertical column with symbols such as “elephant trunks” (*xiang bi* 象鼻) and “fish tails” (*yu wei* 魚尾),<sup>146</sup> which was set in the middle of the rectangular area marked by *ban kuang*, indicated the place to fold the paper in half (towards the unprinted side) to make two symmetrical half *ye*. This column, called “block mouth” (*ban kou* 版口), was similar to the Western “running title.” It always contained the title of the book or book part, volume number, and *ye* number. Instead of the Western way of making, say, a folio gathering by putting each folded sheet one inside another, a Chinese “gathering” was a stack of folded *ye*. The “gathering” was then bound at the folded *ye*’s open end with thread, together with soft paper covers, a method called “thread-stitched binding” (*xian zhuang* 線裝) that was invented at the turn of Northern and Southern Song (roughly the twelfth

<sup>145</sup> Tsien, *Paper and Printing*, 79.

<sup>146</sup> *Xiang bi* is a black inked area in the *ban kou* column. Consequently, *ban kou* with *xiang bi* is called “black mouth” (*hei kou* 黑口). Some *ban kou* are called “white mouth” (*bai kou* 白口), if there is no *xiang bi*. Variants of *yu wei* include single or double *yu wei*, black or white *yu wei* (in outline).

century C.E.) and that prevailed from the mid-Ming period onward until the end of the imperial dynasties.<sup>147</sup> Due to the convention of reading the lines of characters in traditional Chinese books from right to left, the text ran from the first column at the very right side to the last column at the very left side of the printed area. Therefore, if we for a moment treat an open Western book like a Chinese-style one, we would read the end product from the “verso” to the “recto.” And, the normal page-turn of a traditional Chinese book, consequently, was to the right, rather than to the left. The practice of hardcover binding, which had been common in the West, was not undertaken by Chinese printer-publishers until the early twentieth century. Although luxurious materials such as silk were used as book covers before then for some special books and in some areas,<sup>148</sup> the majority of traditional Chinese books were simply covered with relatively thin and soft paper usually of different texture from the paper used for the main text.

Western and traditional Chinese bookmaking also featured different ways of presenting pictorial information, such as illustrations, diagrams, and symbols. For example, traditional Chinese books primarily adopted woodblock to print illustrations, while more varieties of printing techniques were used for image printing in the West. Moreover, the layout of images diverged. For instance, inserting plates—printed by a technique different from the main text and on a different type of paper—was common in the West, but not in China. There are many other differences which will be addressed in greater detail in Chapter 3.

---

<sup>147</sup> Li Mingjun, *Lidai Shuji*, 162. Chinese bookbinding before thread-stitched binding, evolved through different stages, which included the paper roll, and sutra, whirlwind, butterfly, and wrapped-back bindings. See Tsien, *Paper and Printing*, 229. For a specialized study on Chinese bookbinding, see Li Wenyi, “Zhongguo shuji zhuangding zhi bianqian (The Evolution of Chinese Book Binding),” in *Zhongguo Jindai Chuban Shiliao Erbian (The Second Compilation of Historical Materials of Modern Chinese Publishing)*, ed. Zhang Jinglu (Shanghai: Qunlian Chubanshe, 1954), 374-90; Edward Martinique, *Chinese Traditional Bookbinding: A Study of Its Evolution and Techniques* (Taipei: Chinese Materials Center, 1983).

<sup>148</sup> Chow, *Publishing*, 75.

### 2.1.2 Special Cases: Science Books, Maps, and Music

Now that we have seen how, in general, the Western book and the traditional Chinese book differed, we will now turn our attention to the special cases of science books, maps, and music. At a basic level, their physical properties conformed to the abovementioned elements. But due to the specialty of their contents, science books, maps, and music featured their own distinct bibliographical characteristics, when Western imprints are compared to their traditional Chinese counterparts.

#### 2.1.2.1 Science Books

In the Western world, the spread of the printing press spurred the rise of modern science during the late seventeenth century.<sup>149</sup> A system of notating scientific formulae and equations, which was established along with the development of modern science, perhaps was one of the most outstanding features of Western science books. Replete with numbers and special symbols besides the letters of the alphabet, formulae and equations were inserted into the flow of the text, and occupied several lines of space if they were long and complicated enough. Usually a single line of formulae was arranged from left to right, and multiple lines were oriented from top to bottom—all following writing and printing conventions of Western-language texts. For example, flipping the pages of a famous nineteenth-century mathematical book, James Bates Thomson's *Elements of Algebra*, one would see various kinds of basic equations for beginners on almost every page.<sup>150</sup> Similarly, another popular chemistry book in antebellum America, J. L.

---

<sup>149</sup> Eisenstein, *Printing Revolution*, 209-85. Cf. Adrian Johns, *The Nature of the Book: Print and Knowledge in the Making* (Chicago: University of Chicago Press, 1998).

<sup>150</sup> James Bates Thomson, *Elements of Algebra, Being an Abridgment of Day's Algebra, Adapted to the Capacities of the Young, and the Method of Instruction, in Schools and Academies*, 5th ed. (New Haven, CT: Durrie and Peck;

Comstock's *Elements of Chemistry* included many formulae which represented chemical reactions.<sup>151</sup> Some features demonstrate that these books were authored for school use. For instance, sections of questions were positioned at the bottom of the page, where footnotes usually appeared.

Arguably until the late nineteenth century, despite the occasional importation of Western scientific thought, traditional Chinese science was developing on a different track from modern Western science. Thus the ways of representing science were divergent in these two systems. For example, “practices” of ancient Chinese mathematics are difficult to understand through “written records of these practices.” Most treatises on ancient mathematical arts “rarely attempt[ed] to fully explain these practices,” but merely implied them in a narrative form, mainly using standard characters. Adopting a narrative style in writing, the mathematical book “presumably reflects a preference of the literati for the beauty, difficulty, and prestige of classical Chinese writing.”<sup>152</sup> In medieval Chinese algebra texts, one can hardly find an algebraic symbol. It was thought that the Chinese language would be concise enough to explain mathematics, so inserting symbols would, “paradoxically, complicate everything.”<sup>153</sup> However, sometimes symbols were designed. Chinese written expressions based upon the fundamentals of Chinese calligraphy, but entirely unique to mathematics, were invented to refer to numerals. For example, in *Pan Zhu Suan Fa* 盤珠算法 (*Abacus Methods*, 1573), 𠫪 refers to “5,” and 𠫩 to

---

Philadelphia: Smith and Peck, 1844). See John A. Nietz, *The Evolution of American Secondary School Textbooks* (Rutland, VT: C. E. Tuttle, 1966), 52.

<sup>151</sup> J. L. Comstock, *Elements of Chemistry; In Which the Recent Discoveries in the Science are Included, and Its Doctrines Familiarly Explained, Illustrated by Numerous Engravings, and Designed for the Use of Schools and Academies* (Hartford, CT: D. F. Robinson, 1831). Nietz, *Evolution*, 141.

<sup>152</sup> Robert Hart, *The Chinese Roots of Linear Algebra* (Baltimore: Johns Hopkins University Press, 2011), 190.

<sup>153</sup> Jean-Claude Martzloff, *A History of Chinese Mathematics*, trans. Stephen S. Wilson (Berlin: Springer, 1997), 265.

“6.”<sup>154</sup> But these are not the characters normally used for these numbers. There were also variants of symbols developed over time. The majority of the nineteenth-century traditional Chinese mathematical books adopted a set of numerical symbols, especially when many digits combined to display an unusually large number. No matter how odd these invented icons looked to the general Chinese reader, the arrangement of these characters and symbols inside the text conformed to the viewing convention—in vertical columns from top to bottom, with the columns continuing from right to left. This is one reason why Calvin Mateer was puzzled when he was translating Western mathematical books into Chinese, as seen at the beginning of this chapter.

### 2.1.2.2 Maps

During the nineteenth and early twentieth centuries in the West, cartography entered a new era, characterized by large-scale national surveys and the founding of research institutions and societies promoting the understanding and spread of geographical knowledge.<sup>155</sup> More precise methods of surveying, which employed newly refined instruments and applied corrections in “refraction and the curvature of the earth’s surface” were adopted to produce topographical maps of the vast majority of the world’s lands and seas.<sup>156</sup> Most maps at this time used parallels and converging meridians, accompanied by scale measurement and structural designs, such as direction marks and legends. A full set of standardized symbols, which are still familiar to today’s readers, were adopted to represent rivers, lakes, seas, mountains, towns, borders between

---

<sup>154</sup> Ibid., 189. *Pan Zhu Suan Fa* (by Xu Xinlu) is reprinted in Guo Shuchun, ed., *Zhongguo Kexue Jishu Dianji Tonghui: Shuxue Juan* (A Compilation of Classical Works in Chinese Science and Technology: Mathematics), vol. 2 (Zhengzhou: Henan Jiaoyu Chubanshe, 1993).

<sup>155</sup> J. B. Harley, “The Map and the Development of the History of Cartography,” in *The History of Cartography*, vol. 1: *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*, ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press, 1987), 5.

<sup>156</sup> Gerald R. Crone, *Maps and Their Makers: An Introduction to the History of Cartography*, 5th ed. (Kent, UK: Dawson, 1978), 115.

countries or states, and man-made facilities, such as railroads, telephone lines, and post offices. The most popular map printing techniques included copperplates and lithography. For example, S. Augustus Mitchell's *A System of Modern Geography*, a popular American geography book for intermediate learners, was "illustrated by twenty-three copper-plate maps drawn and engraved expressly for this work from the latest authorities." On most of its maps, "comparative latitudes," together with "air-line distances from shore to shore" were displayed.<sup>157</sup>

The Chinese map tradition was established during early imperial period. It shared little with its Western counterpart by the nineteenth century. The latitude and longitude coordinate system had not been adopted. Neither had the Chinese begun to use the technique for "projecting points on the earth's spherical surface to a plane mapping surface," in other words, for rendering curved surfaces onto a flat medium, like paper.<sup>158</sup> This was because the concept of a flat earth, instead of a spherical earth, still prevailed. Accordingly, a mathematical method named *ji li hua fang* 計里畫方 ("counting *li* [a measurement unit of length] and drawing grids") that was established during the third century by Pei Xiu 裴秀 (224-271), continued to be in use until the end of the nineteenth century for making maps.<sup>159</sup> The sheet used for drawing a map was divided into equally-sized squares by vertical and horizontal lines with each side of one square equaling a certain whole number of *li*. This method of map-making was considered more scientific and analytical than the concurrently developed "descriptive" or "pictorial" tradition,

---

<sup>157</sup> See title page and preface of S. Augustus Mitchell, *A System of Modern Geography, Designed for the Use of Schools and Academies; Illustrated by Twenty-Three Copper-Plate Maps Drawn and Engraved Expressly for This Work from the Latest Authorities; and Embellished with Numerous Engravings* (Philadelphia: T. H. Butler, 1881).

<sup>158</sup> Cordell D. K. Yee, "Traditional Chinese Cartography and the Myth of Westernization," in *The History of Cartography*, vol. 2, book. 2: *Cartography in the Traditional East and Southeast Asian Societies*, ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press, 1995), 170.

<sup>159</sup> Timothy Brook, *The Chinese State in Ming Society* (New York: Routledge), 45; Helaine Selin, ed., *Encyclopaedia of the History of Science, Technology, and Medicine in Non-Western Cultures* (Norwell, MA: Kluwer Academic Publisher, 1997), 567-8; David Woo, "Map as Expression: A Study of Traditional Chinese Cartographic Style" (MA thesis, University of Washington, 1981), 38-41.



which was similar to early Western cartography, in that the “thematic emphasis” triumphed over “the concept of spatial accuracy” and scaling.<sup>160</sup> However, no matter which style was applied to map making, signs in Chinese cartography employed more expressive and visual representation in comparison to the Western system of symbology. Moreover, in many cases, rather than using circles or dots to represent cities and towns as in the mid-nineteenth-century Western map, they were represented by rectangles, which were particularly convenient for inserting vertically written toponyms in Chinese characters. Although during the late imperial period an unprecedented scale of foreign contact brought changes to China, Chinese traditional cartography seemed to have not been profoundly influenced by the West until the late nineteenth century. Chinese map-makers were less than enthusiastic about adopting the sixteenth-century Jesuits’ techniques for surveying land and making maps, so few Chinese cartographic practices then bore Western traces.<sup>161</sup> Except that copper-plated maps were occasionally made for the emperor’s court during the Kangxi 康熙 (1662-1722) and Qianlong 乾隆 (1736-1795) reign,<sup>162</sup> the majority of traditional Chinese maps were printed through woodblock, sometimes using multiple impressions to apply two or three colors.

### 2.1.2.3 Sheet Music

Many cultures, in different historical periods, have had their own ways of writing music and designing music imprints utilizing written symbols and signs to indicate, for example, tunes,

---

<sup>160</sup> Woo, “Map as Expression,” 41.

<sup>161</sup> Yee, “Traditional Chinese Cartography,” 170.

<sup>162</sup> Benjamin A. Elman, “The Jesuit Role as ‘Experts’ in High Qing Cartography and Technology,” *Taida Lishi Xuebao (National Taiwan University History Bulletin)* 31 (June 2003): 223-50; Zhang Xiumin, *Zhongguo Yinshua Shi*, 430-5; Wang Qianjin, “Kangxi Chao Tongban Huangyu Quanlan Tu Cehui Yanjiu (Research on the Surveying and Mapping Techniques Adopted in the Making of the Copperplated *Comprehensive Atlas of the Imperial Territory of the Kangxi Reign*)” (PhD diss., The Institute for the History of Natural Science, Chinese Academy of Sciences, 1990); Han Qi, “Xifang Tongbanshu de Chuanru jiqi Yingxiang (The Importation and Influence of the Western Copperplate Method),” *Yinshua Keji (Printing Technology)*, 7.5 (1991): 27-40.

itches, duration, and expression.<sup>163</sup> These symbols and signs, especially forms of notations in all their multiplicity, mark the most visible divergences between nineteenth-century Western and traditional Chinese sheet music publishing.

Most Western sheet music had adopted staff notation by the mid-nineteenth century. Notation was “diastematic in its representation of pitch and duration, which depends upon the conventions of ‘high’ and ‘low’ in the vertical plane and duration moving from left to right horizontally.”<sup>164</sup> In other words, higher pitched notes were placed above lower pitched ones usually on a staff. Besides notes and staves, sheet music also included symbols in the form of letters or words, such as lyrics, some dynamics signs (e.g., *f* for forte) and expression signs (e.g., allegro), or in the form of pictorials, such as clefs, rest signs, key signatures, articulation marks, and ornaments, or in the form of numerals, such as some time signatures (e.g., metronome marks). During the nineteenth century, noting on a five-line staff was the most popular form of notation in music imprints. Neume notes, square rather than oval, on a four-line staff, was a medieval notation system that continued in use especially in Catholic Church services, as exemplified in the commonly-used compilation of Gregorian chants, *Liber Usualis* (*The Book of the Usual*). Another notation format, the shape note system, was used mainly in America. In this system, different shapes (e.g., diamond, oval, square, and triangle) match the solfège syllables (e.g., do, re, and mi). Shape notes were introduced into America in the early nineteenth century, and widely used in the South for congregational singing and for folk hymns. It was also popular in teaching singing in schools, probably because shapes of musical notes could serve as

---

<sup>163</sup> For example, see Walter Kaufmann, *Musical Notations of the Orient* (Bloomington: Indiana University Press, 1967); Richard Rastall, *The Notation of Western Music* (New York: St. Martin’s Press, 1982).

<sup>164</sup> Rastall, *Notation*, 1.

mnemonic aids for quickly mastering the tune.<sup>165</sup> All these notations, together with lyrics and other alphabetical elements, were arranged on the sheet following Western writing and reading conventions—linearly and horizontally from left to right, and top to bottom. Various methods for printing music, such as music type, engraving, stereotype and electrotypes plates, and lithography, were all being used in Europe and America during the nineteenth century.<sup>166</sup>

Chinese sheet music thrived within its own cultural and linguistic heritages with little outside influence. Most systems of notation could find their roots in Chinese characters. They adopted a vertical layout like the traditional Chinese book. *Gong che pu* 工尺譜 (notation of *gong che*), a notation system popular during the Yuan 元 Dynasty (1260-1368) and afterwards,<sup>167</sup> utilized a set of simple Chinese characters, combinations of characters, and combinations of characters and radicals, to indicate pitches. In sheet music for vocal performance using *gong che pu*, characters for lyrics were printed vertically, and *gong che* notes were located at the side of lyrics in smaller font-size. *Jian zi pu* 減字譜 (notation of abbreviated characters), another way of notating which condensed both denotation of pitch and indication of performance instruction in one symbol, usually appeared in tablatures for the *qin* 琴, a Chinese zither. These symbols looked unusual and they were impossible to pronounce out loud. Each of

---

<sup>165</sup> David W. Music, *Introduction to A Selection of Shape-Note Folk Hymns: From Southern United States Tune Books, 1816-61* (Middletown, WI: A-R Editions, 2005), ix-xii. Julia B. Mateer illustrated the advantages of shape notes in her hymn translation-compilation *Sheng Shi Pu*: “Learning to sing the round notes readily and accurately through all their transpositions, is a tedious and difficult task. The object of using these different shapes is to render this task easier. The singer instead of depending entirely upon the position of the note for its name, recognizes it as a glance by the shape. Every transposition of the scale changes the position of the shapes just as it does that of the syllables, so that no matter where *do* occurs, it is written Δ; and no matter where Δ is found, it is read *do* and so of the others... Any one who already sings or plays the common system, can use this with perfect ease. All that is necessary is to disregard different shapes and sing or play as if all the notes were round. Thus we have all the advantage to singers of the Tonic sol-fa system and avoid its inconvenience to players.” See Mateer, preface to *Sheng Shi Pu* (Shanghai: American Presbyterian Mission Press, 1892), 1.

<sup>166</sup> See Maxey Huffman Mayo, “Techniques of Music Printing in the United States, 1825-1850” (MA thesis, University of North Texas, 1988); William Gamble, *Music Engraving and Printing: Historical and Technical Treatise* (New York: Da Capo Press, 1971).

<sup>167</sup> Kaufmann, *Musical Notations*, 69.

them was a conglomerate of Chinese characters for numerals (referring to pitch) and many “abbreviated characters” (parts of character referring to technical details of playing).<sup>168</sup> Because of the “pastiche,” tablature symbols were often larger than regular characters. Additional instructions were printed in petite size under the symbols. The bibliographical format of sheet music, primarily printed through woodblock, was similar to that of a traditional Chinese book. Music was printed inside *ban kuang* and every line was separated by *jie hang*. Paper was folded in the same manner and the “gatherings” were bound at the open end.

## 2.2 TRANSLATING BETWEEN BOOK CULTURES

The earliest systematic practices of translation, those used for Buddhist scriptures,<sup>169</sup> date back to the second century C.E. in China.<sup>170</sup> After that, translations became a significant part of Chinese book history.<sup>171</sup> Translated science books, maps, and music, largely coinciding with the arrival of the Jesuits in China beginning in the late sixteenth century, constituted a considerable portion of translated Western matter.<sup>172</sup> According to Tsien Tsuen-hsuei’s investigation, from the sixteenth century to the eighteenth century, there were 131 titles of science books out of a

---

<sup>168</sup> Ibid., 267-95.

<sup>169</sup> Main languages of original scriptures included Sanskrit and Pali. For the complexities of source languages, see Li Wei, *Zaoqi Hanyi Fojing de Laiyuan yu Fanyi Fangfa Chutan (Preliminary Exploration of the Original Sources and Translation Method of Early Chinese Translation of Buddhist Scriptures)* (Beijing: Zhonghua Shuju, 2011), 33-85.

<sup>170</sup> Victor H. Mair, “Buddhism and the Rise of the Written Vernacular in East Asia: The Making of National Languages,” *Journal of Asian Studies* 53 (1994): 715.

<sup>171</sup> For general accounts of the history of translation in China, see Ma Zuyi, *Zhongguo Fanyi Tongshi (A General Chinese History of Translation)* (Wuhan: Hubei Jiaoyu Chubanshe, 2006); Tsuen-hsuei Tsien, “Western Impact on China through Translation,” *Far Eastern Quarterly* 13.3 (1954): 305-27; Zou Zhenhuan, “Wanqing Xishu Zhongyi ji dui Zhongguo Wenhua de Yingxiang (Translation of Western Books in Late-Qing China and Its Influence on Chinese Culture),” in *Chubanshi Yanjiu (History of Publishing)*, ed. Ye Zaisheng (Beijing: Zhongguo Shuji Chubanshe, 1994 and 1995), 2:3-28 and 3:1-29.

<sup>172</sup> See Xu Zongze, *Mingqing jian Yesu Huishi Yizhu Tiyaoyao (An Annotated Bibliography of Works Translated by the Jesuits during the Ming-Qing Period)* (Beijing: Zhonghua Shuju, 1989).

total of 427 translated works, and 15 titles of maps and music out of 55 titles in the humanities (13 in geography and maps, 2 in music).<sup>173</sup> During China's Self-strengthening Movement in the late nineteenth century, translation of natural science and applied science reached its heyday. According to Xiong Yuezhi's data, from 1860 to 1900, there were in all 555 titles of Western science translations, including 162 titles of natural science (29 percent), and 225 titles of applied science (41 percent). From 1902 to 1904 out of 533 translated works, natural science subjects constituted 21 percent (112 titles), while applied science constituted 11 percent (56 titles).<sup>174</sup> After China was forcibly opened to the West in the 1840s, a mixture of humiliation and curiosity stimulated a greater demand for understanding the foreign conquerors' geography and, consequently, that of the entire world. The preface to *Er Shi Shi Ji Zhong Wai Da Di Tu* 二十世紀中外大地圖 (*Large Maps of Twentieth-Century China and Foreign Countries*) exemplified

---

<sup>173</sup> Tsien, "Western Impact," 307.

<sup>174</sup> Xiong, *Xixue Dongjian*, 11-12, 14. For scholarship on various topics in science translation, see, for example, Li Nanqiu, *Zhongguo Kexue Fanyi Shi* (*History of the Science Translation in China*) (Hefei: Zhongguo Kexue Jishu Daxue Chubanshe, 2006); Adrian A. Bennett, *John Fryer: The Introduction of Western Science and Technology into Nineteenth-Century China* (Cambridge, MA: Harvard University Press, 1967); Wang Yangzong, *Fulanya yu Jindai Zhongguo de Kexue Qimeng* (*John Fryer and the Science Enlightenment in Modern China*) (Beijing: Science Press, 2000); Xu Zhenya, "Fulanya yu Zhongguo Jindai Huaxue (John Fryer and Chinese Modern Chemistry)," *Journal of Beijing University of Chemical Technology (Social Sciences Edition)* 2 (2001): 55-64; Ferdinand Dagenais, *John Fryer's Calendar: Correspondence, Publications, and Miscellaneous Papers with Excerpts and Commentary* (Version 3) (Berkeley: Center for Chinese Studies, University of California, Berkeley, 1999); Knight Biggerstaff, "Shanghai Polytechnic Institution and Reading Room: An Attempt to Introduce Western Science and Technology to the Chinese," *Pacific Historical Review* 25.2 (May 1956): 127-49; Wang Ermin, *Shanghai Gezhi Shuyuan Zhi Lue* (*A History of Shanghai Polytechnic College*) (Hong Kong: Press of the Chinese University of Hong Kong, 1980); David Wright, "The Translation of Modern Western Science in Nineteenth-Century China, 1840-1895," *Isis* 89.4 (1998): 653-73; John Z. Bowers, "Chinese Translations of Western Medical Textbooks," *Osler Library Newsletter* 18 (1975): 1-3; Zou Zhenhuan, "Xiyi Yizhu yu Jindai Zhongyi Jie de Fanxing (The Translations of Western Medicine and the Reflection of Modern Academia of Chinese Medicine)," *Journal of East China Normal University (Philosophy and Social Science Version)* 1 (1986): 76-80; Zhang Zhongmin, *Chuban yu Wenhua Zhengzhi: Wanqing de "Weisheng" Shuji Yanjiu* (*Publishing and Cultural Politics: A Study of "Hygiene" Publications in Late Qing Period*) (Shanghai: Shanghai Shudian, 2009); idem, "Books of Physiology and Hygiene Published in the Late Qing Dynasty and their Readers," *Frontiers of History in China* 4.4 (2009): 604-31; David Wright, "The Great Desideratum Chinese Chemical Nomenclature and the Transmission of Western Chemical Concepts," *Chinese Science* 14 (1997): 35-70; Fan Xiangtao, *Kexue Fanyin Yingxiang xia de Wenhua Bianqian: Ershi Shiji Chu Kexue Fanyi de Miaoxie Yanjiu* (*The Influence of Scientific Translation on Cultural Transmission: A Descriptive Study of Scientific Translation at the Beginning of the Twentieth Century in China*) (Shanghai: Shanghai Translation Press, 2006); Michael Lackner, Iwo Amelung, and Joachim Kurtz, eds., *New Terms for New Ideas: Western Knowledge and Lexical Change in Late Imperial China* (Leiden: Brill, 2001); David Wright, *Translating Science: The Transmission of Western Chemistry into Late Imperial China, 1840-1900* (Leiden: Brill, 2000).

this attitude: "...sadly, our China has sunk to the bottom today! We had good ports, but now occupied by others; we had good mines, but now taken by others. It is the humiliation that we never know anything about others' land. One of the major reasons for our decades of diplomatic failure and insufficient national power is that the maps have never been researched. Thus when something happened [such as armed conflicts and wars], we felt no light, had no controlling power, and found no way to negotiate with others equally and justly."<sup>175</sup> Under these circumstances, translated maps became more and more available to Chinese readers. The Western musical tradition reached the Chinese populace through three channels: the army, new-style schools, and Christian evangelicals, the last of which had the longest history among them.<sup>176</sup> The nineteenth century witnessed the printing of a considerable number of hymnals after Robert Morrison's publication of the first book of Protestant hymns in Chinese in 1818. By 1877, at least sixty-three different titles of Protestant hymnals, some of which were printed in as many as 20,000 copies, had been translated and widely disseminated not only in port towns but also in some inland cities.<sup>177</sup> By the end of the Qing Dynasty, the number of titles even reached over one hundred.<sup>178</sup> The Catholic Church also printed numbers of hymnals in the Chinese language.

However, the importance of translations is not only demonstrated by their quantity or the magnitude of new knowledge channeled interculturally through them. Translations of science

---

<sup>175</sup> Jiang Qipeng, preface to *Er Shi Shi Ji Zhong Wai Da Di Tu* (Shanghai: Xinxue Huishe, 1906), 1. Translated by the author.

<sup>176</sup> Kuohuang Han, *Zi Xi Cu Dong (From the West to the East)* (Taipei: Shibao Chubanshe, 1985). See also Andrew F. Jones, *Yellow Music: Media Culture and Colonial Modernity in the Chinese Jazz Age* (Durham, NC: Duke University Press, 2001), 30.

<sup>177</sup> Jones, *Yellow Music*, 31. For a bibliography of published hymnals, see D. MacGillivray, comp., "A List of Hymn Books," in *The China Mission Year Book: Being "The Christian Movement in China"* (vol. 3), ed. G. H. Bondfield (Shanghai: Christian Literature Society for China, 1912), 253-9. Part of this bibliography was compiled according to Wylie's *Memorials*.

<sup>178</sup> Chen Xiaolu, *Jidu Zongjiao Yinyueshi (A History of Christian Music)* (Beijing: Zongjiao Wenhua Chubanshe, 2006), 518.

books, music, and maps were essential in transforming traditional Chinese books' physical properties; with the new visual conventions they heralded, translations set the stage for attendant transformations in Chinese audiences' way of viewing at the turn of the century. Close attention to the history of the bibliographical presentation of Western scientific knowledge, and map-making and music writing shows a record of extensive negotiations made over traditional bibliographical features and the invention of the new ones.

Compared to the relative considerable stability of Western books' bibliographical characteristics from the mid-nineteenth to the early twentieth century, Chinese books underwent a tremendous amount of change during this time. The thoroughly Western book format was promoted and ultimately accepted as a new convention for publishing books in China during the early twentieth century. From this time onward, Chinese readers would become more and more accustomed to using Western style books. It has been suggested that this reformation, especially the conversion from vertical to horizontal lineage, was primarily a Chinese initiative occurring in the mid-1910s and boosted by the May-Fourth Movement in 1919.<sup>179</sup> However, I argue that translations of science books, maps, and music were on the vanguard of this transformation, which actually started around the mid-nineteenth century and continued for decades. Curiously, the restructuring of the traditional Chinese book format was pioneered by these "peculiar"-looking translated imprints replete with creative adjustments to Chinese bibliographical components, and fraught with a playful hybridization of both Chinese and Western book elements. These odd translations nonetheless forecast the possibility for later changes. Furthermore, the experimental practices of translators and printer-publishers, who might have

---

<sup>179</sup> Zhang Zhiqiang, "Zhongguo Wenzi de Hengpai yu Shupai (Horizontal and Vertical Layouts of Chinese Characters)," in his *Mianbizhai Yanshu Lu (Book Studies of Mianbizhai)* (Nanjing: Jiangsu Jiaoyu Chubanshe, 2001), 260-7.

intentionally or inadvertently made adaptations, allowed the traditional Chinese format to deviate from its track.

### 2.2.1 Traditional Chinese Elements Retained

Revolution does not happen overnight. Neither did the conformation to the Western book style, especially because the Chinese book tradition had been ingrained in reading communities for more than one thousand years. It took several decades. But signs of change first appeared in translations of Western science books, maps, and music, during the 1850s. Yet even in these most “rebellious” imprints, some traditional Chinese bibliographical elements were not abandoned. Sometimes, they were creatively maintained.

A number of translated imprints revived an old binding method, “butterfly binding” (*hudi zhuang* 蝴蝶裝), which first appeared at the end of the Tang Dynasty (618-907 C.E.). It was widely used during later Song and Yuan periods, before “thread-stitched binding” became popular.<sup>180</sup> The major difference between the two is that by using butterfly binding, the one-sided printed paper was folded toward its printed side, not toward the unprinted side as practiced in thread-stitched binding. Instead of needle and thread, glue was applied in narrow strips adjacent to the folding line of the unprinted side of each folded *ye*. The glued column to the right of the folding line is attached to the column to the left of the folding line of the folded *ye* under it. In this case, every *ye* creates two open ends that can be flipped—looking like two wings of a “butterfly.” The viewing sequence remains traditional—from recto to verso in a spread. In contrast to the requirement of turning page to see every full *ye*, no page turning was necessary to

---

<sup>180</sup> Burkus-Chasson, “Visual Hermeneutics,” 373-4.



see the entire *ye* when reading butterfly bound books. If we conceive of this as an open Western book, there would be no marginal space between the two pages. However, the cost of getting this unobstructed full-*ye* view, is that every other page turning results in a blank spread, which consists of two unprinted half *ye*. So occasionally, these blank sides are pasted together.

Although during the late nineteenth and early twentieth centuries, the butterfly binding format was no longer popular, it became a feasible choice for map translations especially when the originals were much larger than the regular-sized Chinese books that would contain them. Let us look at the practicalities of laying out a world map that cannot possibly be squeezed into a half *ye* space in a thread-stitched book. If one prints it on a full *ye*, and folds it in the middle, the Western hemisphere appears only after the turning of the page which contains the Eastern hemisphere. So the entire world can never be seen without interruption caused by the page-turn and by the *ban kou* (the middle column), not unless the reader rips the *ye* off from its bound side. If one wants to display the map on a page spread, the attempt of exhibiting the world at one glance will be virtually unsuccessful, because there will be two *ban kuang* showing on one spread—one on the half *ye* verso and the other on the half *ye* recto. Even if *ban kuang* are eliminated, considerable pressure on the book's spine is needed to see the part of the earth around its meridian that is nearly concealed by the book's gutter. However, compared to thread-stitched bound format, the advantage of the butterfly style is that the full *ye* is displayed without any of the aforementioned disruptions. It seemed to solve the problem of keeping large-sized maps visually intact and user-friendly. Some compilations of translated maps made good use of the antiquated fashion in binding. For example, two representative map imprints *Zui Xin Di Wen*

*Tu Zhi* 最新地文圖志 (*Most Updated Account of Physical Geography*)<sup>181</sup> and *Zhong Wai Yu Di Quan Tu* 中外與地全圖 (*Complete Maps of China and Foreign Countries*)<sup>182</sup> published during the 1910s looked like any butterfly bound books printed roughly nine hundred years before, except that the paper used was machine made and thicker than traditional Chinese paper. Every spread perfectly displayed a single large map.

Another trait of the traditional Chinese book retained in translations was a system of commenting and notating, including those within the text and those in the margins. The convention of inserting in-text commentaries and annotations—using smaller font-sized characters under words or sentences to be explained, was commonly seen in translated science books and in the text illuminating translated maps. In the vertical column of text, the insertion of these kinds of notes interrupts the flow of the main text. Every column can accommodate widthwise two lines of comments or notes. The reason why in-text notes were used in these translations was that they were replete with neologisms or new measurement units, so that immediate references were needed for clarifying. A typical example is *Hua Xue Jian Yuan* 化學鑑原 (*Identifying the Principles of Chemistry*),<sup>183</sup> which was translated by prominent missionary-scientist and translator John Fryer (1839-1928) and his colleague, the celebrated Chinese scientist Xu Shou 徐壽 (1818-1884). It was published in 1871 in Shanghai by the Translation Department (founded in 1868) of the Jiangnan Arsenal, one of the most important translation institutes at that time.<sup>184</sup> The book's in-text notes can be categorized into four types: those

---

<sup>181</sup> Ye Qing and Zhu Baochen, trans., *Zui Xin Di Wen Tu Zhi* (Shanghai: Shanxi Daxuetang Yishuyuan, 1906).

<sup>182</sup> Zou Daijun, trans. and comp., *Zhong Wai Yu Di Quan Tu* (Wuchang: Yudi Xueshe, 1908).

<sup>183</sup> David A. Wells, *Hua Xue Jian Yuan*, trans. John Fryer and Xu Shou (Shanghai: Jiangnan Arsenal, 1872).

<sup>184</sup> Bennett 1967; Wright 2000. For the Jiangnan Arsenal and its translation department, see also Wei Yungong, *Jiangnan Zhizaoju Ji* (*The Records of the Jiangnan Arsenal*) (Shanghai: Wen Bao Shu Ju, 1905); Wang Yangzong, "Jiangnan Zhizaoju Fanyiguan Shi Lue (A Brief History of the Translation Department of the Jiangnan Arsenal),"

offering vernacular names or definitions for scientific names, those indicating the number of related illustrations, those supplementing special notes for conducting experiments, and those converting Western measurement units into Chinese ones. These types can also be seen in a number of medical translations. In translated text attached to maps, details or explanations of names and toponyms were always printed in a smaller font-size, such as in *Xin Zhong Wai Yu Di Quan Tu* 新中外與地全圖 (*New Complete Maps of China and Foreign Countries*). Out-of-text noting utilizes marginal spaces—always the space above the upper side of *ban kuang*—to add remarks and annotations. These notes which are always vertically arranged look similar to the in-text notes. This tradition was commonly maintained in a series of medical translations published by the China Medical Missionary Association, as well as in other science imprints.

*Ban kuang* is one of the most obvious morphological standards distinguishing the traditional Chinese book format from the Western one. The concept of carving *ban kuang* is similar to that of applying the forme in the printing press which confines all the type and images inside boundaries. Although on the Chinese book's *ye*, the *ban kuang*'s bold black lines were visible, on most Western books' pages, boundaries were not explicitly marked by lines. In Western books, even borders are created by full justification of lines of type on the left and right, and by the length of the forme, on the top and bottom. The majority of translated science books, maps, and music preserved the *ban kuang* tradition well, including *Fang Hai Xin Lun* 防海新論 (*New Treatises of Naval Defense*), the sections of translated maps in the multi-volume *Zhong Wai Di Yu Tu Shuo Ji Cheng* 中外地與圖說集成 (*Collection of Illustrated Accounts on Chinese*

---

*Zhongguo Keji Shiliao* (*China Historical Materials of Science and Technology*) 9.3 (1988): 65-74; Shi Gexin, "Jiangnan Zhizaoju Fanyiguan he Jindai Zhongguo de Xixue Chuanbo (The Translation Department of the Jiangnan Arsenal and the Transmission of Western Knowledge in Modern China)," *Wenshi Zhishi* (*Knowledge of Literature and History*) 9 (1986): 54-7; Meng Yue, "Hybrid Science versus Modernity: The Practice of the Jiangnan Arsenal, 1864-1897," *East Asian Science, Technology, and Medicine* 16 (1999): 13-52.

and Foreign Geography), and *Sheng Shi Pu* 聖詩譜 (*Sheet Music of Holy Hymns*).<sup>185</sup> Keeping *ban kuang* intact is an issue worth mentioning, especially for map imprints, because sometimes the originals were printed on sheets that were larger than the size usually used for traditional Chinese books. If directly rendered, in order to keep the details, the map would override the *ban kuang*. Different solutions to this problem are best demonstrated by two editions (1886 and 1894) of *Wan Guo Yu Tu* 萬國輿圖 (*Maps of the Countries All Over the World*),<sup>186</sup> which both maintained *ban kuang*. In the edition individually published, the printer-publisher chose to use larger-sized paper, so that all the maps could be restricted inside printed *ban kuang*. However, in the smaller-sized edition compiled into *Zhong Wai Di Yu Tu Shuo Ji Cheng*, the printer-publisher decided to sacrifice the intactness of the map in order to retain *ban kuang*. This map edition needed to be the same size as the rest of the set of imprints in the compilation. Thus, each map was shown on a spread, but split by two *ban kuang*. This practice can also be seen in notable earlier map translation/compilations from the mid century, such as *Di Li Quan Zhi* 地理全志 (*Complete Records of Geography*) and *Hai Guo Tu Zhi* 海國圖志 (*Illustrated Records of Seas and Countries*).<sup>187</sup> In these cases, the persistence of Chinese conventions took precedence over breaks in the rules.

Exceptions to the *ban kuang* tradition existed, though. The 1915 hymn book in Amoy dialect<sup>188</sup> was printed entirely without *ban kuang*. *Ban kuang* were invaded or even eliminated

---

<sup>185</sup> Viktor Ernst Karl Rudolf Von Scheliha, *Fang Hai Xin Lun*, trans. John Fryer and Hua Hengfang (Shanghai: Jiangnan Arsenal, 1894); Tongkanglu Zhuren, *Zhong Wai Di Yu Tu Shuo Ji Cheng* (Shanghai: Jishan Shuju, 1894); Julia B. Mateer, trans. and comp., *Sheng Shi Pu* (Shanghai: American Presbyterian Mission Press, 1892).

<sup>186</sup> Chen Zhaotong, *Wan Guo Yu Tu* (Shanghai: Tongwen Shuju, 1886). The 1894 edition is included in *Zhong Wai Di Yu Tu Shuo Ji Cheng*.

<sup>187</sup> William Muirhead, *Di Li Quan Zhi* (Shanghai: Mo Hai Shu Guan, 1853); Wei Yuan, *Hai Guo Tu Zhi*, enlarged version (1852).

<sup>188</sup> Alice Wales, *Bong-Hak Tong kap Iu-Ti-Oan e Khim-Pho* (Amoy, 1915). This book was located at the archive of the School of Oriental and African Studies, University of London (Presbyterian Church of England/Foreign

when large-sized illustrations were included in books. For example, in the illustration section of *Ying Cheng Jie Yao* 營城揭要 (*The Essential for Building Barracks and Fortresses*), *ban kuang* were retained, but trespassed by parts of the images. Even the *ban kou*, or middle column, disappeared.<sup>189</sup> An early book from the 1840s, an edition of the medical translation/compilation *Quan Ti Xin Lun*'s 全體新論 (*New Treatise on the Entire Body*) contained seven foldouts without *ban kuang*.<sup>190</sup> One foldout illustrated different parts of the human body. Foldouts were very rare, perhaps nonexistent before this time. In contrast to the edition with the foldout, another one broke down the images into parts and printed each of them on a half *ye* inside its *ban kuang*. Overall, printers were more inclined to retain the *ban kuang* than not.

### 2.2.2 Practical Problems of Orientating Contents

As we have seen, the bibliographical features of traditional Chinese books shared little with their Western counterparts. What happened then, when Western book culture met the Chinese one through translation? The first and foremost challenge emanated from the incongruence between Western horizontality and Chinese verticality of text.

The orientation of the text was especially problematic for science translators because Western science books usually presented mathematical equations and chemical reaction formulae, horizontally, intermingled with letters on book pages. This difficulty was particularly

---

Missions Committee Series, Box 25, Folder 1).

<sup>189</sup> Absence of middle column also happened when long images had to be shown. For example, see the illustration section in *Bing Chuan Pao Fa*, trans. Carl T. Kreyer (*Methods of Artillery on Naval Vessels*) (Shanghai: Jiangnan Arsenal, 1896).

<sup>190</sup> Benjamin Hobson, *Quan Ti Xin Lun* (English title: *Outline of Anatomy and Physiology*) (Canton: Hui'ai Yiguan, 1850). This edition was found at the archive of the School of Oriental and African Studies, University of London. Another edition digitized by the National Library of Australia contains eighteen foldouts.

felt among translators of algebra and geometry.<sup>191</sup> How would they cope? Calvin Mateer, from whom we heard the complaint at the beginning of this chapter, thought the Chinese writing habit was deeply ingrained. So, he proposed that the translators should “adapt the method of writing numbers and equations to the Chinese method of writing in perpendicular lines.”<sup>192</sup> His suggestion was materialized in several science translations. For example, *Hua Xue Jian Yuan* transformed the horizontal formulae into a vertical string of characters by rendering all the symbols into Chinese words. However, Mateer’s approach was not well-received. In lieu of the Sinocized way of representing equations and formulae, one way to arrange these contents was to rotate a complicated formula 90-degrees clockwise to fit into a vertical column marked by *jie hang*, but this was unwieldy. This rotating was also adapted to some English-language words that remained in the text, except that a small number of books made the rotation 90-degree counter-clockwise, as seen in *Wan Guo Yao Fang* 萬國藥方 (*The Prescriptions of Ten Thousand Countries*) and *Ti Gong Xue* 體功學 (*Study of the Body Function*) (See Figure 18).<sup>193</sup> Another way was to maintain the horizontal arrangement on the page but to widen the column to accommodate it. This was the most common way seen in the Jiangnan Arsenal’s publications. For example, *Wu Ti Yu Re Gai Yi Ji* 物體遇熱改易記 (*Record of Changes When Matter Meets Heat*), an 1899 book, contained mathematical formulae in horizontal forms, although their symbols were rendered in Chinese and the rest of the volume’s text was arranged vertically,

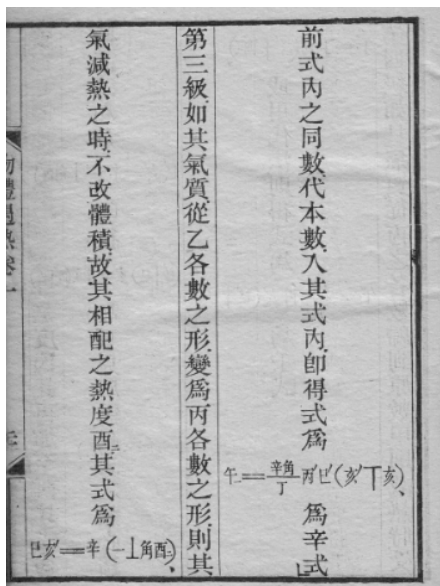
---

<sup>191</sup> Mateer, “Mathematics,” 376-7.

<sup>192</sup> Ibid., 376. This quote is also included in Dagenais, Zhou, and Han, eds., *The John Fryer Papers* 2: 346.

<sup>193</sup> Peter Squire, *Wan Guo Yao Fang*, trans. S. A. Hunter (Shanghai: American Presbyterian Mission Press, 1890); William Dobinson Halliburton, *Ti Gong Xue*, trans. Philip B. Cousland (Shanghai: American Presbyterian Mission Press, 1905). In this infrequently used way of layout, the English words are located outside the *ban kuang*. It was also a perennial problem of how to orient strings of Chinese characters inside Western texts. Various layouts can be seen in nineteenth-century English-language imprints and manuscripts.

according to convention (see Figure 2).<sup>194</sup> This book was the translation of excerpts from Henry Watts's *A Dictionary of Chemistry and Allied Branches of Other Sciences* by John Fryer and Xu Shou. The horizontal format of the mathematical formula not only disrupted the normal flow of the text, but also necessitated more space to accommodate the width.<sup>195</sup> A formula was always many times wider than a single Chinese character, therefore, the presence of a complete mathematical formula made the column much wider than the others. It caused a waste of space, because no matter how wide the column was, only one much narrower vertical series of characters would be fitted in above and below the formula. Moreover, in printing practice, it “required an amount of planning and looking ahead on the part of the printer,” according to Mateer, “which would become quite intolerable in ordinary writing.”<sup>196</sup>



<sup>194</sup> Henry Watts, *Wu Ti Yu Re Gai Yi Ji*, trans. John Fryer and Xu Shou (Shanghai: Jiangnan Arsenal, 1899) 1:20a.

<sup>195</sup> Beside the above mentioned example, the horizontal display of scientific equations was also found in the Jiangnan Arsenal's publications such as *Xing Jun Ce Hui* (*Military Surveying*, translated from Auguste Frédéric Lendy's *A Practical Course of Military Surveying*) and *Suan Shi Ji Yao* (*Compilations and Selections of Mathematical Formulae*, translated from Charles Haynes Haswell's *Mensuration and Practical Geometry*). See, for example, Auguste Frédéric Lendy, *Xing Jun Ce Hui*, trans. John Fryer and Zhao Yuanyi (Shanghai: Jiangnan Arsenal, 1894) 10:7b and 8a; Charles Haynes Haswell, *Suan Shi Ji Yao*, trans. John Fryer and Jiang Heng (Shanghai: Jiangnan Arsenal, 1877), 10b.

<sup>196</sup> Mateer, “Mathematics,” 376. This quote is also included in Dagenais, Zhou, and Han, *John Fryer Papers* 2: 345.

**Figure 2.** Horizontally arranged mathematical formulae (*Wu Ti Yu Re Gai Yi Ji*, 20a)

From the Tsinghua University Library

In translated maps, hybridized orientations always appeared inside the map, when both English and Chinese versions of a toponym were displayed. Translating toponyms was a perennial obstacle for translators. Before the attempt to standardize translated place names, one city could be represented by several different sets of Chinese characters, all referring to the same Western name. That one signified Western name could generate multiple Chinese signifiers often confused readers. Therefore, maintaining English spelling in maps for accuracy became favored by many translators. For example, *Xin Zhong Wai Yu Di Quan Tu* and *Shi Jie Gai Zao Hou Huan Qiu Lie Guo Di Tu* 世界改造後環球列國地圖 (*Maps of All Countries after the Transformation of the World*)<sup>197</sup> both juxtaposed English and Chinese words for toponyms. The translators of the latter atlas dubbed juxtaposition as their “special strategy” because it would be difficult to tell apart “diversified translations of a Western name of place” all by Chinese characters.<sup>198</sup> With English words as annotation, “two pronunciations can be cross referred; ... the meaning of both terms can be learned—isn’t this a way to connect the Chinese and the Western learnings?”<sup>199</sup> In this atlas, most of the juxtapositions were horizontally arranged, on two parallel lines, but running against each other in opposite directions when read—English words, of course, from left to right, and Chinese characters from right to left (See Figure 3). This way of arrangement seemed unique in map imprints.<sup>200</sup> The Chinese characters could have

---

<sup>197</sup> Yaxin Dixueshe, *Xin Zhong Wai Yu Di Quan Tu* (Wuchang: Yaxin Dixueshe, 1929); Yaxin Dixueshe, *Shi Jie Gai Zao Hou Huan Qiu Lie Guo Di Tu* (Wuchang: Yaxin Dixueshe, 1920).

<sup>198</sup> *Li yan* to *Shi Jie Gai Zao Hou Huan Qiu Lie Guo Di Tu*.

<sup>199</sup> Zou Yongxiu, preface to *Shi Jie Gai Zao Hou Huan Qiu Lie Guo Di Tu*, 3.

<sup>200</sup> Listing English and Chinese words in an opposite directions can be found in the table of contents in a small number of imprints, such as Paul Émile Archinard, *Hui Xue Xin Bian* (*A New Compilation of Bacteriology*, English



followed the vertical format. However, placing a horizontal line and a vertical line close enough together for readability would be a too-challenging design. Thus translators placed the characters horizontally, but they were still subject to traditional Chinese left-to-right lineage. This practice has been commonly adopted in Chinese ceremonial writings, such as hanging banners and plaques, and in the horizontal parts of sets of couplets written on paper and often used for spring festival, the traditional holiday that celebrates the lunar New Year. We can still view this kind of horizontal layout, however, as a vertical one—in which every vertical line contains only one character.



**Figure 3.** The juxtaposition of “New South Wales” and its Chinese translation (*Shi Jie Gai Zao Hou Huan Qiu Lie Guo Di Tu*, illustration 47)  
From the Wuhan University Library

The problem of orienting contents was perhaps most unavoidable in sheet music translation. The fundamental reason is that the Western line staffs always run from left to right. It is also impossible to write Western notations one after another vertically. If rotating scientific equations clockwise to fit in vertical lines is awkward, then rotating musical line staffs is unthinkable. Even if there were sheet music like this, how would the reader place the book upright for practicing a musical instrument? How would printers array lyrics for choir rehearsal? There were generally three ways of orienting Western music in Chinese translations. If it was

---

title: *Epitome of Microscopy and Bacteriology*), trans. W. H. Venable (Shanghai: American Presbyterian Mission Press, 1908). However, the difference from the layout in maps is that instead of being rendered on parallel lines, the English and Chinese words were listed on one single horizontal line, starting from the left side and the right side, respectively.

only a lyric book without music staves and notations, all the text was arranged exactly as in the Chinese tradition of verticality. If there were staves and notations, they were displayed as they appeared in original Western sources. And the lyrics in Chinese characters followed the flow of music lines horizontally from left to right, completely in the Western writing style. For instance, *Sheng Shi Pu* and *Sheng Shan Xie Ge* 聖山諧歌 (*Harmonious Songs of Holy Mountains*)<sup>201</sup> used this fashion. When making *Sheng Shi Pu*, Julia Brown Mateer was aware that the design of Western sheet music was incompatible to traditional Chinese visual conventions. Thus she asked for readers' adjustment: "Western music is written horizontally, reading from left to right. Therefore, the translated Chinese lyric had to follow the horizontal order. If there are horizontal lines of Chinese characters in this book, you have to read towards your right."<sup>202</sup> This method seemed even more reasonable for sheet music with lyrics in dialect, which were rendered into Romanization based upon the Western alphabetical convention. Examples include *Bong-Hak Tong kap Iu-Ti-Oan e Khim-Pho*. Another method was that the lyrics or explanatory text in Chinese characters were grouped together on the page and displayed vertically, while the music lines were horizontally laid out. For example, *Yang Xin Shen Shi* 養心神詩 (*Heart-Nourishing Sacred Odes*), Jiangnan Arsenal's *La Ba Chui Fa* 喇叭吹法 (*Methods of Playing the Military Bugle*), and *Sheng Shi Yue Pu* 聖詩樂譜 (*Sheet Music of Holy Hymns*)<sup>203</sup> all represent this way of arranging (See Figure 4).

---

<sup>201</sup> Mateer, *Sheng Shi Pu; Sheng Shan Xie Ge* (Ningbo: The Chinese and American Holy Classic Book Establishment, 1858).

<sup>202</sup> *Sheng Shi Pu*, fan li, 12. Translated by the author.

<sup>203</sup> *Yang Xin Shen Shi* (Fuzhou: Minnan Shengjiao Shuju, 1910); Carl Traugott Kreyer and Cai Xiling, trans., *La Ba Chui Fa* (Shanghai: Jiangnan Arsenal, 188?); *Sheng Shi Yue Pu* (Fuzhou: Romanization Press, 1906). This edition of *Yang Xin Shen Shi* was found at the archive of the School of Oriental and African Studies, University of London (Presbyterian Church of England/Foreign Missions Committee, Box 120, SW, Carruthers Materials).



**Figure 4.** Horizontal music and vertical lyrics together on one page (*Yang Xin Shen Shi*, 1)  
From the Archive of the School of Oriental and African Studies, London

The translation of science books, maps, and music, due to their special bibliographical natures, frequently required an obligatory hybridity of different ways of orienting text, equations, or symbols. This, in a sense, brought some inelegant traits to the page and no small inconvenience, even confusion, to the reader. However, not all the solutions to translation problems were as inefficient as coping with verticality and horizontality in the main text. In fact, translators and printers not only made sufficient and creative use of the Chinese book tradition, but also brought a range of new bibliographical features to the translations. These inventions facilitated the communication of new knowledge, fulfilled cross-cultural interchanges, and represented the incorporation of Western book formatting into the Chinese book tradition.

### 2.2.3 Glossaries and Indices

The listing of terms' explanations was not rare in traditional Chinese books, but they always appeared in the back matter, not in the back matter, where nineteenth-century Western books usually positioned glossaries. Finding devices were not unusual in traditional Chinese books, either. For example, *ban kou*, the middle column of a *ye*, contains general information about the

section to which the *ye* belongs (See Figure 1). When flipping the pages, readers are able to find out about specific parts of the text by scanning *ban kou* area. In butterfly bound books, this area is replaced by *shu er* 書耳 (“book ear,” or *er ge* 耳格, “ear grid”), a small rectangular frame attached to the upper left corner of *ban kuang* (See Figure 1). However, these functional elements are quite different from the index, another useful finding device featured in Western imprints’ paratexts since the early modern period.<sup>204</sup> *Ban kou* or *shu er* require simultaneous coordination—searching while flipping pages. The searching is rather rough and does not allow for specific word, name, or term location. In contrast, indices, especially back-of-the-book indices that had become a “fairly standard” technique by the nineteenth century in the West,<sup>205</sup> provide for a relatively pinpointed search by getting exact page numbers for a specific term’s locations. Searching and locating are done separately. How readers acquire knowledge is related to the design of the book.

During the nineteenth century, many Western science books and atlases included glossaries and indices. In Chinese traditional science and map books, these two elements were largely absent from the book’s back matter. Although the traditional design of book embedded ideas of information searching on its own terms, the “index movement” in China that promoted

---

<sup>204</sup> For example, a variety of indices, such as alphabetical indices of headings and of proper names, and general alphabetical indices, were included in early modern European scholarly compilations. See Ann Blair, *Too Much to Know: Managing Scholarly Information before the Modern Age* (New Haven: Yale University Press, 2010), 133-44. Walter Ong discusses visual/space rhetoric of indices in an era of print in early modern Europe. See his *Orality and Literacy: The Technologizing of the Word* (London: Methuen, 1982), 123-26.

For a history of indices, indexing, and indexers in the West, see Hans H. Wellisch, “The Oldest Printed Indexes,” *The Indexer* 15.2 (1986): 73-82; idem, *Indexing and Abstracting: An International Bibliography* (Santa Barbara, CA: ABC-CLIO, 1980); idem, “Indexing,” in *Encyclopedia of Library History*, ed. Wayne A. Wiegand and Donald G. Davis (New York: Garland Publishing, 1994), 268-70; Helmut Zedelmaier, “*Facilitas Inveniendi*: The Alphabetical Index as a Knowledge Management Tool,” *The Indexer* 25.4 (2007): 235-42; Hazel K. Bell, *From Flock Beds to Professionalism: A History of Index-Makers* (New Castle, DE: Oak Knoll Press, 2008); idem, *Indexers and Indexes in Fact and Fiction* (Toronto: University of Toronto Press, 2001).

<sup>205</sup> Ira Kleinberg, “For Want of an Alphabetical Index: Some Notes Toward a History of the Back-of-the-Book Index in Nineteenth Century America,” *The Indexer* 20.3 (1997): 156-59.

modern back-of-the-book indices did not commence until the late 1920s.<sup>206</sup> However, glossaries and indices were among the new bibliographical features that frequently appeared in science and map translations, especially in the former. They contributed to minimizing confusion over scientific terms and lent the book more reference tools for Chinese readers.

Many science translations during the late nineteenth and early twentieth centuries sported glossaries, most of which were specially tailored to Chinese audiences. For example, in *Fu Ke* 婦科 (*Gynecology*),<sup>207</sup> a translation by the Jiangnan Arsenal, there was an English-Chinese glossary attached at the end of the last volume. Some terms were supplemented with the numbers of the chapter they appeared in the main text. *Ru Men Yi Xue* 儒門醫學 (*Literati's Medicine*),<sup>208</sup> a medical translation of Frederick William Headland's *A Medical Handbook*, also included a glossary at the end of the book. At the end of volume three of *Hua Xue Chu Jie* 化學初階 (*The First Step to Chemistry*),<sup>209</sup> a Chinese version of David Ames Wells's *Principles and Applications of Chemistry*, there was a table of chemical terms consisting of three columns—one containing Chinese-language “vernacular or popular names” (*su ming* 俗名), one carrying Chinese-language “formal names” (*shu ming* 書名) literally translated from chemicals' molecular formulae, such as NaCl, and one showing “Chemical Terms” (not rendered in Chinese characters) which contained English words for those chemicals (see Figure 5). Apparently, this table in *Hua Xue Chu Jie* was designed for comparing different terminologies used to indicate the same chemical, in order to minimize readers' confusion. Creating and maintaining multiple

---

<sup>206</sup> For a history of indices in China, see Wang Yage and Hou Hanqing, “Wan Guoding (1897-1963), Indexing Pioneer,” *The Indexer* 27.3 (2009): 102-5; Liqun Dai, “Book Indexing in China,” *The Indexer* 26.1 (2008): 3-7.

<sup>207</sup> *Fu Ke*, trans. Shu Gaudi and Zheng Changyan (Shanghai: Jiangnan Arsenal, 1900). The original English-language source for *Fu Ke* is unknown.

<sup>208</sup> Frederick William Headland, *Ru Men Yi Xue*, trans. John Fryer and Zhao Yuanyi (Shanghai: Jiangnan Arsenal, 1876).

<sup>209</sup> David Ames Wells, *Hua Xue Chu Jie*, trans. John G. Kerr and He Liaoran (Canton: Boji Yiju, 1871).

sets of names could also fulfill different communities' use. Doctor-translator S. A. Hunter, for example, called for peer translators' attention to the necessity of "a chemical name for the laboratory, a commercial name for the drug-shop, and a vulgar name for the market."<sup>210</sup> This kind of practice was also found in *Chan Ke Xue* 產科學 (*Obstetrics*),<sup>211</sup> a translation published by the Chinese Medical Missionary Association in 1908. But instead of simply juxtaposing English and vernacular or formal Chinese terms, as did *Hua Xue Chu Jie*, the glossary at the end of this two-volume set listed English terms together with three different versions of translated Chinese terms: those in *Yi Xue Ci Hui* 醫學詞彙 (*Medical Vocabulary*, compiled by Philip B. Cousland), its own, and those in *Tai Chan Ju Yao* 胎產舉要 (*Selected Examples of Obstetrics*, translated by Yin Duanmo 尹端模 and John G. Kerr).<sup>212</sup> By designing such glossaries translators not only clarified the differences between English and formal and vernacular Chinese expressions, but also signaled to the reader the distinctions in terms and expressions found among various titles of Chinese science translations in similar fields during the late nineteenth and early twentieth centuries. That these Chinese books mentioned the same terms but translated them differently was due to the lack of a unified standard for translating science terminology at that time. The translators of *Chan Ke Xue* may have assumed that their readers had already encountered medical and obstetrical works, such as *Yi Xue Ci Hui* and *Tai Chan Ju Yao*. Under these conditions, the inclusion of the versions of terms in two other already-published important

---

<sup>210</sup> S. A. Hunter, "Medical Nomenclature," *China Medical Missionary Journal* 3 (1889): 148-157, qt. on 151.

<sup>211</sup> David James Evans and W. E. Ashton, *Chan Ke Xue*, trans. Mary W. Niles, John G. Kerr, and Yin Duanmo (Shanghai: Medical Missionary Association of China, 1908)

<sup>212</sup> Philip B. Cousland, comp., *Yi Xue Ci Hui* (English title: *A Lexicon of Medical Terms*) (Shanghai: Medical Missionary Association of China, 1908); W. E. Ashton, *Tai Chan Ju Yao*, trans. Yin Duanmo and John G. Kerr (Canton: Bo Ji Yi Ju, 1893).

works, demonstrated a thoughtful action aimed at achieving as little confusion or misunderstanding as possible.

俗名	書名	CHEMICAL TERMS.
輕燐差		Meta-phosphoric acid (glacial.)
輕燐差		Pyro-phosphoric acid.
輕燐差		Ortho-phosphoric acid (normal acid.)
砒石原質	砒	ARSENIC.
	砒	Arseniated hydrogen.
	砒	Arsenious chloride.
	砒	Arsenious anhydride.
	砒	Arsenious acid.
	銀砒	Silver arsenite.
	銅輕砒差	Cupric-hydrogen arsenite (Scheele's green.)
	砒	Arsenic anhydride.
	輕砒差	Ortho-arsenic acid.
	銀砒差	Silver ortho-arsenite.
	銅輕砒差	Cupric ortho-arsenite.
	砒	Di-arsenicum di-sulphide (Realgar)
	砒	Arsenious sulphide (Orpiment)
	砒	Arsenic sulphide.
	砒	Arsenic Iodide.
	銻	ANTIMONY.
	銻	Antimonous hydride.
	銻	Antimonous chloride.

俗名	書名	CHEMICAL TERMS.
碘		IODINE.
輕碘		Hydriodic acid.
輕碘差		Iodic acid.
淡碘		Iodide of nitrogen.
弗		FLUORINE.
輕弗		Hydro-fluoric acid.
(輕弗)玻璃		Hydro-fluo-silicic acid.
玻弗		Silicon fluoride.
磷		PHOSPHORUS.
輕磷		Phosphorous hydride.
磷		Phosphorous chloride.
磷		Phosphoric anhydride.
輕磷差		Meta-phosphoric acid.
輕磷差		Phosphorous anhydride.
輕磷輕差		Phosphorous acid.
輕磷差		Phosphoric oxide.
輕磷輕差		Hypo-phosphorous acid.

Figure 5. A table of chemical terms (*Hua Xue Chu Jie*, *juan* 3, appendix, 2b-3a)

From the Tsinghua University Library

The index was another new bibliographical element often seen in translated science books. It became indispensable to those books for two possible reasons. First, Western books themselves had indices, and thus the translators chose to include them in order to keep the translation technically intact. Second, sometimes the translators designed new indices that did not appear in the original versions, so as to make the entire book more accessible. For example, at the end of volume four of *Hua Xue Chu Jie*, there was an index with three columns—entries in vernacular Chinese, the *jie* 節 (section, *not* page number) in which the entry occurs, and the entries in English (see Figure 6). The index was divided into several parts, each of which included a different type of chemical. Each part was headed by titles in English and their

Chinese translations, such as “organic acids with inorganic bases,” “organic alkaloids with inorganic acids,” and “organic acids with organic bases.” This index, like most, was not alphabetical, because Romanization of Chinese characters was not widely applied during that time. The criteria of ordering entries under each category were not consistent. Entries were ordered either numerically by *jie*, or by similarity of the first character of expressions. The primitive, even somewhat awkward appearance of this index suggests the difficulties in designing an index for a translated science book. Nevertheless, it demonstrated that translators were already aware of introducing bibliographical properties absent in traditional Chinese books, but that enhanced accessibility and clarified terms in both languages.

ORGANIC ACIDS WITH INORGANIC BASES			ORGANIC ACIDS WITH INORGANIC BASES		
生物酸與金須底合而成鹽	鐵惡西鹽	七十七節	醋強鉛	十四節	Lead Acetate.
	鐵炭淡	四十五節	三底醋強鉛	一百四十六節	“ “ tribasic.
	鐵磷炭淡	九十九節	此醋強銅	二十七節	Copper Acetate.
	輕淡尿鹽		俱醋強釩	五十一節	Aluminium Acetate.
	鈉尿鹽	一百六十一節	是醋強鐵	一百四十九節	Iron Acetate.
	鉀甘松鹽	同上節	生物醋強鉍	同上節	Potassa Acetate.
	鐵甘松鹽		酸醋強鉍	同上節	Soda Acetate.
	輕淡甘松鹽		與醋強輕淡	同上節	Ammonia Acetate.
			金鉍鉍鉍鹽	一百五十八節	Potassa and Soda tartaric.
生物底與非起而合而成鹽			類鉍鉍鉍鹽	七十七節	Potassa bitartrate.
	麼啡輕綠鹽	一百六十五節	底鉍鉍鉍鹽	三十九節	Acetony and Potassa Tartaric.
	麼啡磷養鹽		鐵鉍鉍鹽	百五十九節	Iron Citrate.
	尿底淡養鹽	一百九十二節	合鐵鉍鉍鹽	同上節	Iron and Quinine Citrate.
	先青年磷養鹽	一百七十節	而輕淡鐵鉍鹽	同上節	Iron Anacardio-Citrate.
	先青年輕綠鹽		成鉍鉍鹽	同上節	Eleuth Citrate.
	桂欸磷養鹽	一百六十八節		同上節	Lime Citrate.
	桂欸輕綠鹽			同上節	Magnesia Citrate.
植物底與金須底合而成鹽				三十節	Mercury Cyanide.
	麼啡醋強鹽	一百六十五節	鉍炭淡	七十七節	Potassium Cyanide.
	麼啡美幹油鹽	同上節	鉍鐵(炭淡)	同上節	“ ferri-Cyanide.
	尿底惡西鹽	一百九十二節	鉍鐵(炭淡)	同上節	“ ferro-Cyanide.
	桂欸甘松鹽		輕淡惡西鹽	七十七節	Ammonia cyanide.
			鉍惡西鹽	六十九節	Lime cyanide.

Figure 6. Index (*Hua Xue Chu Jie*, juan 4, appendix, 2b-3a)

From the Tsinghua University Library



*He Shi Liao Xue* 賀氏療學 (*He's Therapeutics*)<sup>213</sup> was a later, much more complex example of indexing. This book, which had three indices, was James H. Ingram's translation of Hobart Amory Hare's *A Text-book of Practical Therapeutics*, published by the China Medical Missionary Association in Shanghai, under the Sir Henry S. Wellcome China Publication Fund. Toward the end of its 1911 second Chinese-language edition printed and bound in pages instead of *ye*, was an eighteen-page Chinese-language index of medicine arranged in ascendant order by the total number strokes in an expression's first character. Following this was an 84-page annotated index of diseases with their English terms, accompanied by page-numbered cross-references for related remedies and pharmaceutical treatments. This index was also ordered by stroke number. At the very end of the book was a 27-page English-language "index of drugs and remedial measures," which was based upon the one in Hare's book, with some addition or deletion of terms. But the two Chinese-language indices required considerable editing and collating work, because the method of arraying and arranging terms was different from English-language texts.<sup>214</sup> To make matters worse, added to the second one were some annotations bearing instructions about particular uses of different medicines, which were not included in the English-language index of the original book. Indices were usually untranslatable. They had to be re-made to employ the Chinese version of terms and phrases as headings. Even if the English-language index was imported, all the locators (page, paragraph, or section numbers) had to be replaced with corresponding numbers in the translated book, and those headings appearing in deleted text had to be removed. Compared with the embryonic form of indices in *Hua Xue*

---

<sup>213</sup> Hobart Amory Hare, *He Shi Liao Xue*, trans. James H. Ingram (Shanghai: China Medical Missionary Association, 1911).

<sup>214</sup> Besides counting the total number of strokes of the first Chinese character, another major method of indexing Chinese-language terms in translations was arranging them according to the first character's radical, as adopted in Peter Squire, *Wan Guo Yao Fang*, trans. S. A. Hunter (Shanghai: American Presbyterian Mission Press, 1890).

*Chu Jie*, these attached in *He Shi Liao Xue* are more developed. Moreover, they occupied in all 129 pages, nearly one fourth of the 560-page main text. Seldom in the West was so much space devoted to an index section. By the early twentieth century, indexing had become customary in a number of science translation publishing institutes such as the China Medical Missionary Association.

In some translations, bilingual vocabularies attached at the end of the book were designed to function as indices. For example, there was a 23-ye “Anatomical Vocabulary in English and Chinese” located after the main text of the medical translation *Quan Ti Chan Wei* 全體闡微 (*Elucidating the Subtlety of the Entire Body*).<sup>215</sup> The English-language terms were alphabetically arranged, with their Chinese equivalents displaying on the opposite side. Ye numbers were intentionally supplemented after each term in order to make the list “serve the purpose also of an Index” (See Figure 7).<sup>216</sup> This format of vocabulary-index also appeared in *Wan Guo Yao Fang* 萬國藥方 (*The Prescriptions of Ten Thousand Countries*).<sup>217</sup>

---

<sup>215</sup> Henry Gray, *Quan Ti Chan Wei*, trans. Dauphin W. Osgood (Foochow: American Board Mission, printed at the Methodist Episcopal Mission Press, 1881). This book was translated from Henry Gray’s *Anatomy of the Human Body*.

<sup>216</sup> H. T. Whitney and C. Hartwell, preface to *Quan Ti Chan Wei*, 1.

<sup>217</sup> Peter Squire, *Wan Guo Yao Fang*, trans. S. A. Hunter (Shanghai: American Presbyterian Mission Press, 1890).

ANATOMICAL VOCABULARY		
IN		
ENGLISH AND CHINESE		
BY		
D. W. OSGOOD, M.D.		
General Terms Alphabetically Arranged		
Bone	骨	九
Cell	生 理	一
Cell wall	膜 蓋	一
Glands lymphatic	腺 結	一 百 七 四
" mucous	無 生 理 結	七
" serous	生 理 結	七
" subcutaneous	結 結	六
" subserous	結 結	七
Haversian canal	管 管	一
Inorganic	生 理	一
Marrow	骨 髓	九
Matter animal	生 理	九
" earthy	地 質	九
Membranes serous	皮 肉	五
" mucous	膜 膜	四
" synovial	膠 液	四
Nucleus	核 核	一
Diastole	體 仁	一
Organic	生 理	一
Ontology	生 理	一
Pericardium	心 包	九
Pericarpium	種 皮	一
Respiration	氣 管	一 百 七 五
Sclera	定 義	一
Synovial bursa	滑 液	一
Tissue albumen	結 膜	三
" cellular	結 膜	三
" white fibrous	白 膜	三
" yellow elastic	黃 膜	三

**Figure 7.** Vocabulary-index (*Quan Ti Chan Wei, mu lu*, 1)  
Courtesy of the Harvard-Yenching Library

Some translated maps featured glossaries, too. For example, at the end of *Zui Xin Di Wen Tu Zhi*, there was a “Physical Geography Glossary of Proper [sic] Names,” listing English terms and names, and their Chinese translations. Sometimes, translated music included a variety of indices. For instance, *Sheng Shi Pu* contained, in all, three indices—an English-language “Index to Tunes of Hymns in *Zan Shen Sheng Shi* 讚神聖詩”<sup>218</sup> and a Chinese-language index of the first lines of hymns, both as front matter, and the “Index of English Names of Tunes” as back matter. Julia Mateer especially pointed out that the first index was prepared “for the convenience of organists in public worship.”<sup>219</sup> Among these, first-line indices always appeared in collections of translated hymns.

<sup>218</sup> *Zan Shen Sheng Shi*, a collection of translated hymns, was one of the major sources of *Sheng Shi Pu*. See A. H. Mateer, preface to *Sheng Shi Pu*, 1.

<sup>219</sup> Mateer, preface to *Sheng Shi Pu*, 1.

## 2.2.4 Solutions to Arranging English-Language Content

In glossaries and indices, the retention of English words seemed to be inevitable. Keeping English words showed their immediate practical value for some situations. In *Ru Men Yi Xue* readers were told in its *fan li* 凡例 (“common example,” referring to the instructional guide), part of a traditional Chinese book’s front matter, that: “The drugs discussed in this book can be purchased from Western pharmacies located in every town. If you do not know English, no problem at all! Just simply point at the drug’s English term (to the pharmacist), and what you want will become available for you shortly.”<sup>220</sup> Similar convenience could have been enjoyed by *Nei Ke Xue*’s “most suitable” readers, “diplomatic envoys who [were to be] sent to the West, where the Western medicine [would] surround them and the Western medical treatment [would] prevail.”<sup>221</sup> In fact, glossaries and indices were the two parts of science translations that were the most saturated with English language. Besides these two, tables of contents sometimes juxtaposed Chinese titles (for chapters and sections) with their English counterparts, such as *Ti Gong Xue* 體功學 and *Shi Shi Bing Li Xue* 史氏病理學 (*Stengel’s Pathology*).<sup>222</sup>

However, the inclusion of both Chinese and English led to technical difficulties of page design, due to the divergent natures of layouts of traditional Chinese and English words (vertical versus horizontal), and distinctions between the two ways of page-turning in traditional Chinese books and Western ones. Therefore, how to make Chinese pages efficiently carry English words became an immediate and intractable problem for translators and printers.

---

<sup>220</sup> *Ru Men Yi Xue*, *fan li*, 2a.

<sup>221</sup> *Zong li* (“general example,” referring to the general guide) to *Nei Ke Xue*, trans. and comp. John G. Kerr (Shanghai: Medical Missionary Association of China, 1908), 3. Translated by the author.

<sup>222</sup> Halliburton, *Ti Gong Xue*; Alfred Stengel, *Shi Shi Bing Li Xue*, trans. P. L. McAll (Shanghai: China Medical Missionary Association, 1913).

The horizontal arrangement of English words in parallel with Chinese characters was preferred in making most glossaries and indices, and some tables of contents that included English titles. Usually the half *ye* was set into multiple columns. Chinese and English terms referring to the same meaning were placed side by side on the same line. The translators of *Hua Xue Chu Jie* mentioned the reasons for horizontality in the book's *fan li*: "For one thing, this way of arranging will help learners to compare and memorize. For another, if the special symbols and English-language terms are sorted into a format that looks like a table, the horizontal arrangement will look very clear and will be very helpful for readers to compare it with many different tables."<sup>223</sup> The translators accommodated Chinese readers' mnemonic needs while naturalizing the flow of their eyesight when reading. On a page with both Chinese characters and a considerable number of English words interwoven together, it would be inefficient in space usage and disruptive to the reading process, if both horizontal and vertical layouts were applied. For the translators, it was an either-or choice. The decision to retain the horizontality of English words meant choosing to sacrifice the verticality of Chinese.

Creating a single page of horizontal text was one thing but designing the layout of multiple pages was another story. There were two major solutions to laying out multiple pages with a number of English words. One was applying Western protocols of page turning to the glossary or index. For example, in an edition of the Jiangnan Arsenal's medical translation *Fu Ke* (*Gynecology*), the glossary was printed entirely following the Western style—reading from recto to verso, turning pages from the right to the left. The vertically arranged main text, however, following the Chinese tradition, read from verso to recto, with pages turning from the left to the right. If we treat this like a Western book, the main text would start from the back

---

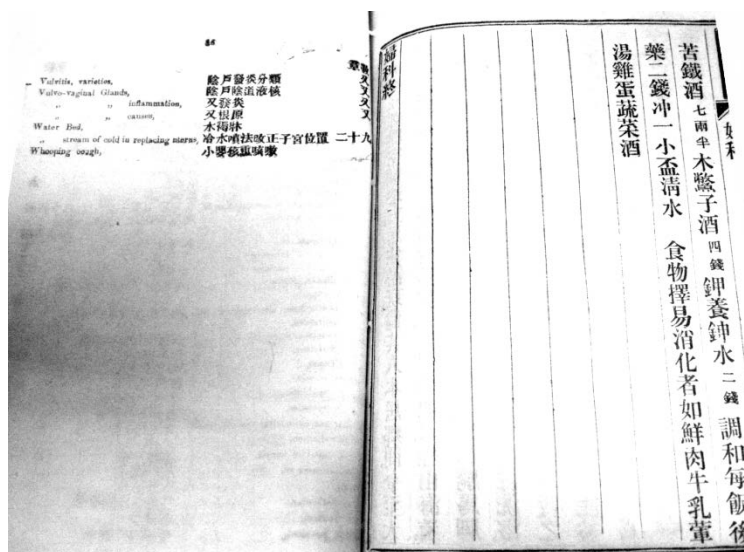
<sup>223</sup> *Hua Xue Chu Jie*, *fan li*, 4b.

cover of the book, while the glossary would begin at the front cover. Their last pages would meet contiguously somewhere inside the book (see Figure 8).<sup>224</sup> Therefore, in this case, one book actually included two book cultures. *Fu Ke* actually looked like a set with two books bound together. *Fu Ke* stands for a juxtaposition of Chinese and Western book-making conventions that were, to a degree, incompatible with each other. This method of combining different page sequencing, helped to preserve the original format of a Western-style glossary while maintaining the look of the main text in as purely a Chinese style as possible, but it somewhat isolated the back matter from the main text. This method was also seen in other translations, such as *He Shi Liao Xue*. Its 27-page English-language “index of drugs and remedial measures” had the opposite page turn from the main text. Thus, as for *Fu Ke*, the readers of *He Shi Liao Xue* could either begin at the front or back covers of the book. Some translated maps and music also adopted this way of arranging those parts loaded with English-language content, such as *Zui Xin Di Wen Tu Zhi*’s “Physical Geography Glossary” and *Chong Ding Zan Shen Sheng Shi Qu Pu*’s 重訂讚神聖詩曲譜 (*Revised Sheet Music of God-Praising Hymns*)<sup>225</sup> English-language paratext section (including title page, prefaces, and table of contents).

---

<sup>224</sup> This edition of *Fu Ke* is located at the Rare Book Department of the Wuhan University Library. For more complexities in binding methods of different copies of *Fu Ke*, see Part 3 of this Chapter. This way of formatting pages can also be found in other publications, such as William Fisher Norris and Charles Augustus Oliver, *Yan Ke Zheng Zhi* (*Cure of Ophthalmological Diseases*), trans. James Boyd Neal, 4th edition (Shanghai: China Medical Missionary Association, 1906). This book, first issued in 1894, was translated from Norris and Oliver’s *A Text-Book of Ophthalmology* (Philadelphia: Lea Brothers, 1893).

<sup>225</sup> Jidujiao Huabei Dahui, *Chong Ding Zan Shen Sheng Shi Qu Pu* (Shanghai: Guangxie Shuju, 1929). Prefaced in 1914.



### 2.2.5 Marginal Spaces

During the era of the printing press, typesetters became highly adept at adjusting the ratio of the main text to the footnote space on the same page. The length of the main text could fluctuate to accommodate even lengthy footnotes. However, in traditional Chinese books, the space for the main text within *ban kuang* was preset already, and the marginal space for printing notes was much smaller than the main text area. Thus, if comments and annotations were prodigious, then creating “in-text notes” was the most feasible way to fit them on the page. These were widely used in annotated ancient writings. Even so, printing smaller font-size characters in marginal space outside *ban kuang*, namely the “heavenly head” and “earthly foot,” was still a convention in Chinese books for supplementary and short notes to the main text. Particularly in translated science books published during the late nineteenth and early twentieth centuries, marginal space was often utilized as well. But the translator’s creative use and design of margins endowed them with new functions.

The “heavenly head” in the chemistry translation *Hua Xue Chu Jie* is one of its bibliographical highlights. Sometimes, it was used for attaching additional information about experiments, such as tips on identifying and selecting laboratory chemicals. Sometimes, it carried references to specific illustrations that were collectively located at the beginning of this book, far from the relevant text. Furthermore, and more essentially, the “heavenly head” was also designed as a space for the equivalent of Western footnotes, what I call “*tian tou* 天頭 notes.” The notating resembled that of Western books published during a similar time—marking a symbol beside targeted words or sentences, then adding a note starting with the same symbol in the margin. *Hua Xue Chu Jie* assimilated this idea of footnote formatting. For example, on page



2a of volume three, there were two different circular symbols inserted in the main text. In the “heavenly head,” accordingly, two notes were printed headed by the same symbols respectively (see Figure 9). Compared with Western footnote formatting, the only difference between these *tian tou* notes and Western footnotes is that they were located above, not under the main text in the page. This is perhaps because the “heavenly head” is set to be more spacious than the “earthly foot” in traditional Chinese books. Thus, *tian tou* are able to accommodate more characters, and thereby optimize the page space better than if notes were placed in the “earthly foot.”



**Figure 9.** “*tian tou* notes” (*Hua Xue Chu Jie*, *juan 3*, 2a)  
From the Tsinghua University Library

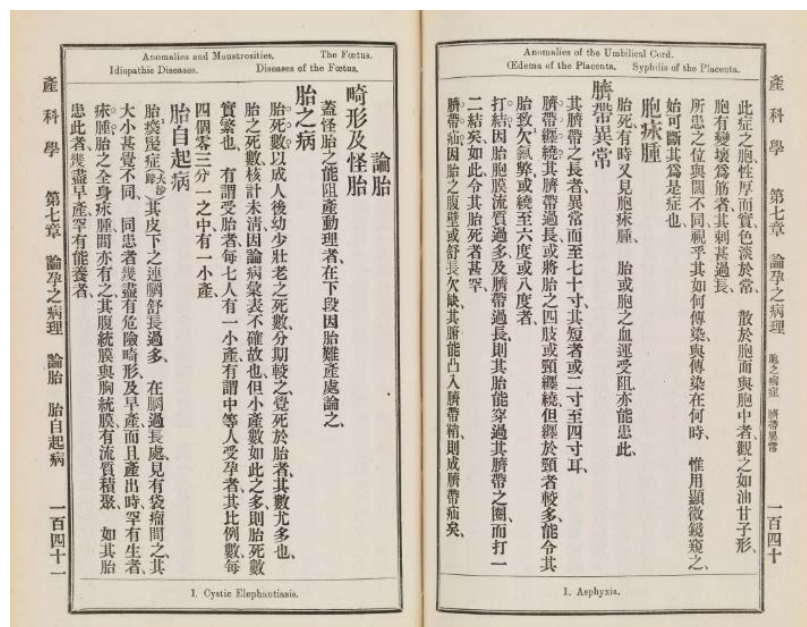
A number of later science translations experimented with marginal spaces in even more creative ways. The obstetrics work, *Chan Ke Xue*, created a variant of the heavenly head and earthly foot margins within the *ban kuang*, by demarcating space distinct from the main text with

horizontal black lines (see Figure 10). This layout looks like multiple registers inside the *ban kuang* appearing in some traditional Chinese imprints.<sup>226</sup> But here in these translations, the upper and lower registers had their distinct use. Although the main text was vertically arranged as in the Chinese convention, the marginal space, which was intentionally set for English words, contained the text in the horizontal order. The upper margin was used for indicating the chapter and section titles, which were similar to running titles on Western pages. The formatting was even the same—horizontally arrayed English words. It reinforced the Chinese-language running title printed in the middle column inside the *ban kuang*. The lower margin served as a space for listing the original English terms for their Chinese translations in the main text. Accordingly, there were subscripts, in the form of Arabic numerals, located near the last character of the Chinese translated term. This design of marginal space not only kept the flow of the main text from being interrupted by the insertion of either sideways or horizontal English words, but also demonstrated that the translators and printers may have been mindful of the potential readers of this book. In this case, readers, the majority of whom were medical school students and instructors, were able to cross-check the terms appearing in the text, in order to develop their bilingual capacity in mastering medical knowledge. Footnoting English medical terminology for each Chinese translation under each page also made the book a useful reference for readers who, in the future, would have to cooperate with foreign medical professionals or prescribe in English. This kind of margin layout was also found in works such as *Nei Ke Xue* 內科學 (*Internal Medicine*), *Fu Ke Xue* 婦科學 (*Gynecology*), *Hu Bing Yao Shu* 護病要術 (*Essential Techniques*

---

<sup>226</sup> Two- or three-register layout sometimes appeared in commercial imprints, especially annotated classics, educational texts, and illustrated novels, produced at publishing centers in south China during the late imperial period. See Cynthia Brokaw, “Reading the Best-Sellers of the Nineteenth Century: Commercial Publishing in *Sibao*,” in *Printing and Book Culture in Late Imperial China*, 184-231, esp. 194-204, 220-21.

of Nursing),<sup>227</sup> and *Hui Xue Xin Bian*. Other translations, such as *He Shi Liao Xue*, shared similar ideas of marginal space design and utilization. But the difference was that the English-language running titles and referential terms were located outside the *ban kuang*, where the “heavenly head” and “earthly foot” were normally seen.



**Figure 10.** A variant of “heavenly head” and “earthly foot” margins within the *ban kuang* (*Chan Ke Xue*, 140-141)

From the Wellcome Library, London

Besides functioning as a space for English terms, the “earthly foot” was also used in science translations that were compiled from multiple sources to attribute parts to their various respective authors. *Nei Ke Xue* was an outstanding example. It was originally compiled and translated as a six-volume set titled *Nei Ke Quan Shu* 內科全書 (*Compendium of Internal*

<sup>227</sup> John G. Kerr, trans. and comp., *Nei Ke Xue* (English title: *A Treatise of the Practice of Medicine for the Use of Students and Practitioners*) (Shanghai: Medical Missionary Association of China, 1908); Charles B. Penrose, *Fu Ke Xue*, trans. Mary H. Fulton (Canton: China Baptist Publication Society, 1907); China Medical Missionary Association, comp., *Hu Bing Yao Shu* (English title: *Manual of Nursing*) (Shanghai: American Presbyterian Mission Press, 1909).

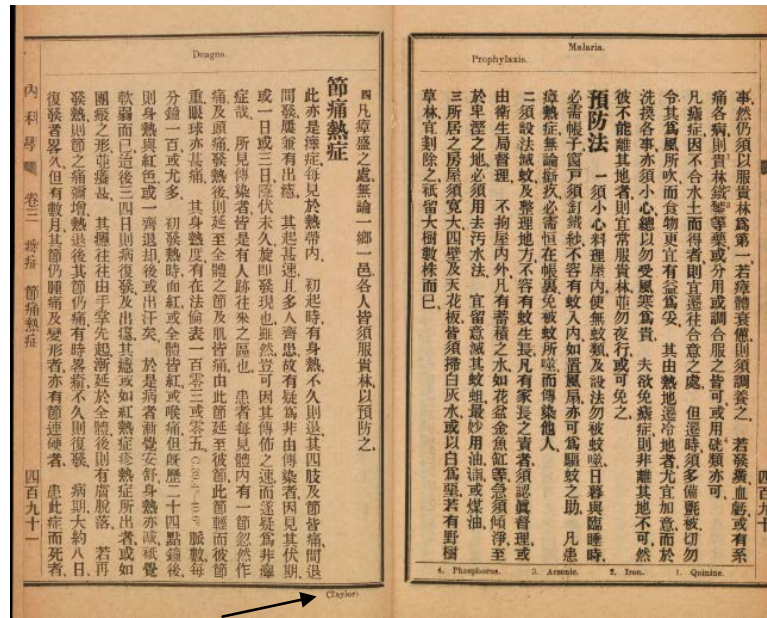
*Medicine*) in 1883 by John G. Kerr (1824-1901), the surgeon and physician in charge of the Medical Missionary Hospital in Canton at that time.<sup>228</sup> The English-language preface of its 1908 version, the one revised and enlarged by Mary West Niles in memory of the late doctor-cum-translator Kerr, revealed the sources of this book: “He [Kerr] used Bartholow, Roberts and Flint in compiling his translation. Taylor has been made the Standard for the Revision, and Bartholow’s *Materia Medica and Therapeutics* has also been consulted and no remedies not there advised have been retained.”<sup>229</sup> These four sources referred to Roberts Bartholow’s *A Treatise on the Practice of Medicine*, Frederick Roberts’s *A Handbook of the Theory and Practice of Medicine*, Austin Flint’s *A Treatise of the Principles and Practice of Medicine*, and Frederick Taylor’s *A Manual of the Practice of Medicine*.<sup>230</sup> Frequently, in the “earthly foot” area of *Nei Ke Xue*, we can see the name, in parentheses, of one of these four authors mentioned above. But the authors alternated in this book. Whenever the author changed, a new name was printed beneath the first column of text leading his section(s) (see Figure 11). There were in all forty-one parenthetical labels of these author’s names found inside this four-volume book. These labels demonstrated that some parts of the book were translated from a single source, while some were from multiple sources. For example, the entire part of “Diseases of the Kidneys” in volume three was rendered from only Roberts’s work. Another part named “Infectious Diseases,” occupying both volumes three and four, combined all four authors’ works.

---

<sup>228</sup> Yin Duanmo, Chinese preface to *Nei Ke Xue*, 2.

<sup>229</sup> Mary West Niles, English preface to *Nei Ke Xue*, 2.

<sup>230</sup> Roberts Bartholow’s *A Practical Treatise on Materia Medica and Therapeutics* was used as a reference for revising the remedies and prescription scattered at the end of every section on different diseases in *Nei Ke Quan Shu*. This book should not be confused with Bartholow’s another publication *A Treatise on the Practice of Medicine*, which was one of the four essential sources for *Nei Ke Xue*’s text.



**Figure 11.** An “earthly foot” margin with parenthetical labels of the original author’s name, and example of non-traditional pagination (*Nei Ke Xue*, 490-91)  
From the Wellcome Library, London

## 2.3 NEW PRINTING TECHNOLOGY AND THE MAKING OF TRANSLATIONS

In the above discussion, I demonstrated how the presentation of highly technical and specialized content in Western science books, maps, and music conflicted with the bibliographical format of traditional Chinese books. Consequently, translations of these three types of imprints began to change the face of traditional Chinese books when bibliographical “disagreements” found practical resolution in the making of book pages. However, these were not the only impetuses to colossal transformation. Another important factor that catalyzed the transformation of the Chinese book tradition through translations merits further investigation—the adoption of new imported printing and binding techniques. During the late nineteenth and early twentieth centuries, quite a few Western book-making techniques were available for printing translations. When faced with these techniques that bore few similarities to traditional Chinese woodblock

printing, translators and printer-publishers expressed complicated reactions. Some of them may have been willing to accept Western techniques because they were available at their affiliation's facilities. Some may have had their own take on different techniques' capacity for making quality imprints. Some may have been awkward in experimenting with a new system of practice. Or some may have felt more attached to the Chinese traditional printing and binding techniques. These considerations were all reflected in the end products. Moreover, these contributed to the emergence of hybrid cultural products. This hybridity was far from a chaotic mingling, but, rather, resulted from a thoughtful and strategic give-and-take.

### 2.3.1 Alternative Methods of the Book-Making

After Jesuits' small-scale introduction of European copperplate to the Kangxi 康熙, Yongzheng 雍正 and Qianlong 乾隆 emperors' courts during the eighteenth century,<sup>231</sup> Western printing technology reentered China with Protestant missionaries' attempt to propagate widely the gospel from the early nineteenth century onward.<sup>232</sup> Various missions built their own presses in their bases throughout China. Besides making Western-language publications by primarily using customary alphabetical type, they made a ceaseless effort to design metal type for Chinese characters. Among these endeavors, two were perhaps the most notable: in the 1830s and 1840s

---

<sup>231</sup> Zhang Xiumin, *Zhongguo Yinshua Shi*, 430-41.

<sup>232</sup> For the history of the Western printing technology in China during the nineteenth century, see Su Jing, *Malixun yu Zhongwen Yinshua Chuban* (Robert Morrison and Chinese Printing and Publishing) (Taipei: Xuesheng Shuju, 2000); Zhang Xiumin, *Zhongguo Yinshua Shi*, 441-74; Wang Jiarong, *Zhongguo Chuban Tongshi: Qingdai Juan* (A General History of the Chinese Publishing: Qing Dynasty), vol. 7 (Beijing: Zhongguo Shuji Chubanshe), 105-28; He Shengnai, "Sanshiwu Nian Lai Zhongguo zhi Yinshuashu (Printing Techniques in China in the Past Thirty-Five Years)," in *Zhongguo Jindai Chuban Shiliao: Chu Bian* (Historical Materials on Modern Chinese Publishing: First Compilation), ed. Zhang Jinglu (1931; Shanghai: Qunlian Chubanshe, 1954), 257-85.

the foundational work of Samuel Dyer (1804-1843), a member of London Missionary Society;<sup>233</sup> and, in the 1850s and especially the 1860s, the groundbreaking innovations of William Gamble (1830-1886), a member of the American Presbyterian Mission).<sup>234</sup> The sets of Chinese type developed and cast by the American Presbyterian Mission Press were sold to a number of mission presses, and purchased by some Chinese publishing houses, such as *Shen Bao* 申報 press, mostly for newspaper printing.<sup>235</sup> Among all kinds of Western printing techniques introduced into China, letterpress and lithography were the most popular ones.<sup>236</sup> Lithography was indigenized more easily than the printing press due to the aesthetic choices of Chinese printer-publishers who wanted to preserve calligraphic and painting traditions in a fast growing printing market.<sup>237</sup> It was most favored for pictorial newspapers<sup>238</sup> and reprinting the classics. By the end of the nineteenth century, Western printing methods had become widely popular in book production in China, but in a different mix than in the West.

During the late nineteenth century, a number of translations of science books, maps, and music were still printed traditionally through Chinese woodblock, especially in Chinese-owned or government-sponsored publishing institutions, such as the Translation Department of the Jiangnan Arsenal in Shanghai. As its chief translator, John Fryer recorded, “the establishment

---

<sup>233</sup> Wylie, *Memorials*, 51-4; Zhang Xiumin, *Zhongguo Yinshua Shi*, 453-6. See also “Chinese Printing,” *Canton Miscellany* 2 (1831): 107-8, reprinted in Xu Haiyan, comp., *Xi Jian Jindai Yingwen Qikan Huibian (A Compilation of Rare English-Language Periodicals in Modern China)*, vol. 1 (Beijing: Guojia Tushuguan Chubanshe, 2010), 130-1.

<sup>234</sup> Gilbert McIntosh, *The Mission Press in China, Being a Jubilee Retrospect of the American Presbyterian Mission Press* (Shanghai: American Presbyterian Mission Press, 1895), 19-24; Wylie, *Memorials*, 249; Zhang Xiumin, *Zhongguo Yinshua Shi*, 457-60.

<sup>235</sup> The phenomenon that Chinese presses adopted Western-made sets of Chinese type was also recorded in “Lun Qian Zi (On Lead Types),” *Shen Bao*, August 5, 1874. Also quoted in Zhang Shudong, Pang Duoyi, and Zheng Rusi, *Jianming Zhonghua Yinshua Tongshi (A Concise General History of Chinese Printing)* (Guilin: Guangxi Normal University Press), 227.

<sup>236</sup> Su Jing, *Malixun*, 274.

<sup>237</sup> Christopher Reed, *Gutenberg in Shanghai: Chinese Print Capitalism, 1876-1937* (Vancouver: University of British Columbia Press, 2004).

<sup>238</sup> The most famous lithographed pictorial newspapers include *Dianshizhai Huabao (Dianshizhai Pictorial)* and *Feiyingge Huabao (Feiyingge Pictorial)*.

where the books are printed in the old-fashioned way from wooden blocks was first merely a small room, but has now grown into a separate range of buildings, and employs upwards of thirty hands as block-cutters, printers, bookbinders, &c., and is superintended by an under-official.”<sup>239</sup> But the Jiangnan Arsenal also fulfilled printing tasks through new printing techniques. It was equipped with a printing press. It owned a set of lead type for Chinese characters, which was designed by its own native Chinese scientist Xu Shou after the type printing room was built in 1873.<sup>240</sup> While traditional Chinese woodblock printing was still in use, a rapidly increasing number of translations using the printing press and lithography adopted by other Chinese printer-publishers. Lithography was especially used for a great deal of reprinting jobs, such as science translations compiled in *Fu Qiang Zhai Cong Shu* 富強齋叢書 (*Anthology of the House of Wealth and Power*) and translated maps selected in *Zhong Wai Yu Di Tu Shuo Ji Cheng*.

The decision of adopting certain printing techniques to publish a translation may have been based upon certain factors. One of them was financial considerations, such as calculating the most profitable outcome based upon the relationship between the printing cost of different techniques and the expected print run of the book. For example, John Fryer once elaborated the reasons why the Jiangnan Arsenal favored traditional Chinese woodblock printing despite the availability of printing press during the late nineteenth century. Although cultural affinity to and practicality of tradition counted, economic motive became an equally important force that led to the Arsenal’s choice:

It may seem strange that with such facilities for printing in Chinese  
by metal type as exist in Shanghai, and with a complete fount of

---

<sup>239</sup> John Fryer, “Science in China, I,” *Nature*, May 5, 1881, 9-11, qt. on 11.

<sup>240</sup> Zhang Shudong, *Jianming*, 227.



such type as well as a good cylinder press on the premises, these books are nevertheless cut on wooden blocks, and printed by hand in the old-fashioned way that existed in China for so many ages before printing was known in Europe. The fact is, however, that as a matter of economy and convenience the old system is preferable. The blocks are all the same size, about eight inches wide, twelve inches long, and half an inch in thickness. Each block represents two leaves or four pages of the book, being engraved on both sides. The blocks for a complete work can thus be stowed away in a very small compass. The cost of engraving a page of these wooden blocks is said to be but little more than the expense of setting up a page of Chinese type and preparing it for the press. An edition of one copy can be printed if no more are required; and thus the expense of keeping a large stock of printed books on hand, some of which might perhaps eventually have to be sold as waste paper when they grew out of date, or revisions had to be made, as is the case among ourselves, is entirely avoided. Any errors or misprints that may be discovered can, as a rule, be corrected on the blocks with but very little trouble. A skilful [*sic*] printer can print by hand five thousand leaves [*ye*] of two pages each in a day, using no press or machinery whatever. He supplies his own tools, and receives as wages about twenty five dollar cents per day.<sup>241</sup>

---

<sup>241</sup> John Fryer, *An Account of the Department for the Translation of Foreign Books at the Kiangnan Arsenal*,

From Fryer's account, we can see that cost per page would not obviously make the woodblock printing a superiority comparing to the Western printing press. But the flexibility of woodblock's print run would prevent printer-publishers from bearing too many stocks produced even at press's regular print run. Besides this financial reason, another factor that affected the choice of production method was the requisites of the translation's content. For example, if a translation or a part of it was replete with Western words, type would naturally be the most suitable choice for printer-publishers. The printing of illustrated parts was a more complicated issue that may have involved aesthetic concerns, the purposes of translating, and the availability of media for reprinting original images (on the complexities of image translation, see Chapter 3). However, the most practical factor may have been the influence of publishing networks. Translated imprints were more likely to be made in printing houses owned and operated by the Westerners. This is because the foreign translators—oral translators (usually Westerners) cooperating with scribal translators, experts on local written communication (usually native Chinese)—were always related with a missionary society or a church, which operated its own press. They either personally had connections to the press or were commissioned by the society/church, so that their manuscript was obliged to be sent to the society/church's own press after completion. Another situation was that the translator was affiliated with a professional society in China, the majority of whose members were Westerners, or shared professional affiliations, be it to a hospital or a school, mostly run by Westerners. If the institution itself did not own a press, its administration might dispatch the job to presses of Westerners with whom they were familiar (for an in-depth discussion of networks among translators, printer-publishers,

---

*Shanghai* (Shanghai: American Presbyterian Mission Press, 1880), 12-3.

and sponsors, see Chapter 4). The direct consequence of sending translations to Westerner-operated presses was the high likelihood that the book would be printed using modern Western techniques.

These presses, which were probably the most significant byproduct of missionaries' evangelical passion, were the headquarters of new printing techniques in China. Most of these houses were equipped with sets of type, machine and hand presses, and other related apparatus, such as that for stereotyping and bookbinding. For example, the Methodist Episcopal Mission Press at Fuzhou 福州, founded in 1862, updated its printing machinery every other year from 1884 to 1893. At the beginning of 1893, it started to use a new Liberty job press purchased from the United States, which allowed vast quantity and high quality printing of various kinds. This house also improved its level of productivity by updating its equipment, in one instance with "a wire stitching machine, punching machine, eye-letting machine, mitering machine, rule and lead cutter, and an Imperial paper cutting machine for the foreign bindery."<sup>242</sup> A new font of music type was added in 1889 for hymnal printing. By 1895, the plant owned six fonts of Chinese type, four fonts of Romanized type, and two fonts of music type, among others. It was also furnished with typesetting, stereotyping, and book-binding equipment.<sup>243</sup> Similarly, by the 1900s, major mission presses, such as the American Presbyterian Mission Press at Shanghai,<sup>244</sup> the Methodist Publishing House at Shanghai, the National Bible Society of Scotland Mission Press at Hankou 漢口, the China Baptist Publication Society Press at Canton, the North China Union College Press at Dengzhou 登州, and the English Presbyterian Mission Press at Swatow

---

<sup>242</sup> McIntosh, *The Mission Press*, 45.

<sup>243</sup> *Ibid.*, 43-4, 46.

<sup>244</sup> For annual statistics from 1844 to 1895 of the American Presbyterian Mission Press, see *The China Mission Hand-Book: First Issue* (Shanghai: American Presbyterian Mission Press, 1896), 317-9.

(Shantou 汕頭), were all well equipped with the latest machinery for typesetting, printing, stereotyping, typecasting, and Western-style book-binding.<sup>245</sup>

### 2.3.2 New Techniques and New Bibliographical Formats

New technology frequently contributes to a new formatting of a medium. The printing press, after it emerged in the West in the 1450s, spurred the birth of the modern printed book that evolved from the manuscript volume. The invention of the telegraph fostered telegram-style messages by abbreviating words and packing meanings into a condensed cluster of text. The Internet resulted in electronic text and hypertext, innovations of traditional formats of printed text.<sup>246</sup> In the case of the cross-cultural production of translated science books, maps, and music in China, the adoption of Western printing and binding technology brought brand new bibliographical formats to the traditional Chinese book in, for example, its page numbering and the layout of a page. They subverted the concept of *ye* as the unit in Chinese woodblock printing, and consequently, the long-established viewing conventions of Chinese audiences. New printing techniques also prompted innovation in the formats of illustrations (see Chapter 3 for a comprehensive analysis).

---

<sup>245</sup> Gilbert McIntosh, "Mission Presses," in *The China Mission Year Book, Being "The Christian Movement in China"*, vol. 1, ed. D. MacGillivray (Shanghai: Christian Literature Society for China, 1910), 351-3, 355-7.

<sup>246</sup> For example, see Timothy C. Campbell, *Wireless Writing in the Age of Marconi* (Minneapolis: University of Minnesota Press, 2006); Kathryn Sutherland, *Electronic Text: Investigations in Method and Theory* (Oxford: Oxford University Press, 1997); Jay David Bolter, *Writing Space: Computers, Hypertext, and the Remediation of Print* (Mahwah, NJ: Lawrence Erlbaum Associates, 2001); Raimonda Modiano, Leroy F. Searle, and Peter Shillingsburg, eds., *Voice, Text, Hypertext: Emerging Practices in Textual Studies* (Seattle: University of Washington Press, 2004); Peter Shillingsburg, *From Gutenberg to Google: Electronic Representations of Literary Texts* (Cambridge: Cambridge University Press, 2006); Marilyn Deegan and Kathryn Sutherland, eds., *Text Editing, Print and the Digital World* (Farnham, UK: Ashgate, 2009); idem, *Transferred Illusions: Digital Technology and the Forms of Print* (Farnham, UK: Ashgate, 2009).

Chinese bookmakers started to adopt Western techniques of binding during the 1900s.<sup>247</sup> But Western methods did not become popular immediately. During the 1900s and the 1910s, both Chinese traditional thread-stitched binding and Western binding coexisted, the former of which may still have been prevalent. For example, the four-volume set of the revised and enlarged edition of *Nei Ke Xue*, a 1908 publication of the Medical Missionary Association of China (Shanghai) printed at the China Baptist Publication Society Press (Canton), was among those which were conventionally bound at the open end of a pile of folded *ye*. However, even within tradition there was novelty. In fact, the pagination of *Nei Ke Xue* doubled. That is to say, instead of numbering an entire folded *ye* as only one page, the middle column inside the *ban kuang* indicated the verso as one page and the following recto as another (see also Figure 11).<sup>248</sup> This way of page-numbering was reflected in the book's exhaustive English-Chinese table of contents, listing titles and page numbers of numerous sections. Because of the compact style of medical textbook writing, many sections were very short. Therefore, more than one section could appear on the same page of the book, or one section could appear on consecutive pages from verso to recto. If the *ye* system was applied, it would not be rare to see the table of contents pointing to the same *ye* number for several sections, these being printed on both sides of one folded *ye*. This situation would have been confusing to readers. Similarly, the 1913 version of *Sheng Shi Pu*, the music translation with many short hymns, adopted this way of page numbering. Every *ye* contained a number of songs ranging from three to eight. There were in all 272 entries in its Chinese-language "Index of the First Line of Hymns," a part of the front matter, and 403 entries in its English-language "Index of English Names of Tunes," a part of the back

---

<sup>247</sup> Wang Jiarong, *Zhongguo Chuban Tongshi: Qingdai Juan*, 125.

<sup>248</sup> Other examples of this way of page numbering include *Sheng Shi Pu*, *Wan Guo Yao Fang*, and William Whitla, *Yi Fang Hui Bian (The Compilation of Medical Prescription)*, trans. D. Duncan Main (Shanghai: Guangxuehui, 1896).

matter. If each page number did not have two numbers, there would be too many entries referring to the same page number. It would be even more difficult to deal with the more-than-twenty first lines of hymns in the Chinese index, as the same first line of lyrics could appear in two hymns either of which were printed on different sides of the same *ye* (which was now marked with consecutive page numbers, without doubled number of a *ye*.)

During the same period, Western binding methods were employed in a number of science translations such as *Chan Ke Xue* (1908), *Fu Ke Xue* (1903 and 1907), and *He Shi Liao Xue* (1907 and 1911). The sheets were folded and gatherings were sewn together in Western fashion, and attached to hard covers. “Turning the pages” of these books now meant flipping actual leaves, not folded *ye* anymore. The look of the entire end product resembled that of a modern Western book, except that the page layout preserved some Chinese traditions, and the page sequence still began from the “back” cover onwards. The reason for binding in this way could be attributed to the use of relatively thicker and heavier Western paper which was sturdy enough for double-sided printing. Thin and soft paper, which was always used in Chinese woodblock printing, was not, and so it was only printed on one side. If it was bound (unfolded) in the Western way, every page turn would lead to a blank page before coming to another page with text. To keep the running of text uninterrupted during page-turning, each *ye* had to be folded (text side out) and bound at the open end. The visual effect was the same as in Western books for which the sheets were printed on both sides and bound at the closed end. Actually, these printer-publishers could have chosen between either Chinese or Western paper. However, printing these richly illustrated books via presses would have demanded the use of Western paper. Its quality was an especially sensitive issue when the printing of translated science books was supervised by discriminating agents. The publishing of a number of the China Medical

Missionary Association's translations, such as *He Shi Liao Xue*, was sponsored by Sir Henry S. Wellcome's Chinese Publication Fund. One memorandum dated 5 January 1909 sent from Wellcome's office to a "Mr. Hamilton," who may have been involved in managing Wellcome's fund, revealed the dynamics of how and why printing paper was prepared and shipped from Britain to the China Medical Missionary Association in Shanghai:

Every precaution is to be taken to see that the paper is properly packed for delivery in good condition in China.

The paper is required to print half-tone blocks along with the ordinary heavy Chinese type, and as we are practically taking the responsibility of adopting this paper instead of that recommended by Messrs Bailliere Tindall & Cox, we must make sure that the paper is prepared with the very greatest possible care and in every way satisfactory, otherwise the responsibility for a badly produced book will rest with us. Specimens of printed and unprinted paper are handed you herewith.<sup>249</sup>

This shipment of paper was made in Britain and was carefully chosen. Before the China-based printer-publishers for the translations acted, the British sponsors of the China Medical Missionary Association had already started to deliberate over this issue and arranged the

---

<sup>249</sup> Memorandum to Mr. Hamilton, January 5, 1909, WA/HSW/OR/D.3, China Publications Fund, Wellcome Library, London (hereafter CPF-WL). Bailliere, Tindall and Cox was a medical and scientific publishing house originally founded in Paris in 1818; it opened branches in London in 1830 and later in New York and Melbourne. Its London business was purchased by Albert Alfred Tindall in 1870. See the introduction to the Archive of Bailliere, Tindall and Cox in the Special Collections at the University of Reading (UK), accessed January 13, 2010, <http://www.reading.ac.uk/special-collections/collections/sc-bailliere.aspx>.

logistics. Sir Henry Wellcome always paid close attention to the quality of publications, both in their content and printing. Thus it was ideal and most reassuring for him that the translations' illustrations came directly from the original plates. This paper was especially intended for printing the electrotyped half-tone illustrations that originally appeared in the English-language versions. But Wellcome also ordered shipments of Western printing paper for publishing text of highly satisfactory quality with metal-cast, heavy moveable type. For example, the statements of account of the Wellcome Chinese Publication Fund, on 11 March 1908, record the expenditure of "120 reams double royal paper" at £64.12.0 and their transportation to Shanghai for the printing of *Luo Ka Liang Shi Wai Ke Xue* 羅卡兩氏外科學 (*Rose and Carless's Surgery*).<sup>250</sup>

Because Western binding techniques and paper were used in translations, and the paper was no longer folded in the traditional Chinese way, the design of the page and the leaf were different. Instead of printing a landscape-oriented *ban kuang* on one unfolded *ye*, each side of a leaf in, for example, *Chan Ke Xue*, *Fu Ke Xue*, and translated map books *Zui Xin Di Wen Tu Zhi* and *Zhong Guo Di Yu Zhi Lüe* 中國地輿誌畧 (*A Concise Record of Chinese Geography*),<sup>251</sup> contained one smaller, portrait-oriented *ban kuang* (see Figure 12). Because of the division of the traditional *ban kuang* into two, the middle column, usually signaling the folding line and holding titles and page numbers, ceased to appear in these books. Instead, a new vertical column was attached to the left-hand side outside of the *ban kuang* on the verso, and to the right-hand side outside of the *ban kuang* on the recto. Due to the adoption of Western printing techniques, the model of generating one page number through one impression was discontinued. The unit of page numbering officially changed from a *ye* to a side of a leaf. And, the Chinese traditional

---

<sup>250</sup> Statement, March 11, 1908, WA/HSW/OR/D4, CPF-WL. *Luo Ka* was the Chinese translation of William Rose and Albert Carless's *A Manual of Surgery for Students and Practitioners*.

<sup>251</sup> Aloysio Richard, *Zhong Guo Di Yu Zhi Lüe*, trans. Sun Wenzhen (Shanghai: Typographia Missionis Catholicae in Orphanotrophio T'ou-Sé-Wè, 1906).



page numbering was no longer compatible with this kind of page design. Consequently, the page number changed with one page turn.

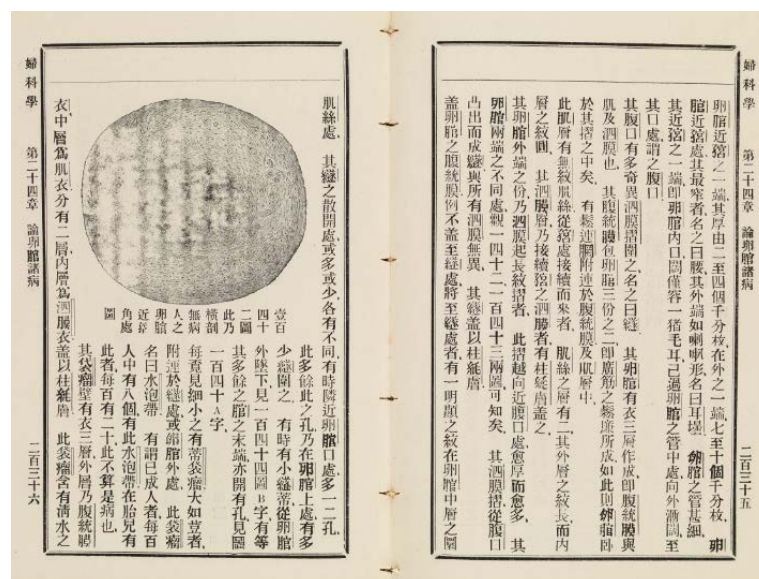


Figure 12. Portrait-oriented *ban kuang* (*Fu Ke Xue*, 235-36)  
From the Wellcome Library, London

### 2.3.3 Adopting the New While Preserving the Old

China during the late nineteenth and early twentieth centuries saw new printing machines were adopted. New type was applied. New binding methods were implemented. And new kinds of paper were used. However, these novelties did not necessarily lead to the birth of a completely new style of book. Although printers were equipped with all these techniques for the making of translations, the Westernization of bibliographical format was not so easily realized. The old look was preserved despite new technological circumstances. While being driven to adopt new sets of techniques to make imprints with new knowledge in it, printer-publishers kept Chinese tradition in mind. This consideration made the production of hybridity more likely. Printer-

publishers chose to balance the traces of both traditional Chinese book formatting and Western bookmaking technology that was essential to a new book format in translations. Thus, these publications epitomized compatibility: they would be able to appeal to Chinese readers by their respect for Chinese conventions, while, at the same time, they would be able to better accommodate special content on book pages by their toleration for Western techniques.

The feature of hybridization among these end products can be found in the contrast between the obvious material features of the book and the flow of its main text. The appearance of the aforementioned translations, which were made by Western techniques, looks Western: hard covers stitched to the spine, each section sewn together, machine made paper printed by a Western press on both sides, and leaves consisting of two consecutively-numbered pages. In contrast to the traditional Chinese thread-stitched bound book, these imprints were called *yang zhuang* 洋装 (“foreign bound” or “foreign costume”) books during the early twentieth century when the character for “foreign,” or *yang* 洋, was always prefixed to imported merchandise or local products made using Western technology. However, if one looks closely, the book still reads from the back cover to the front cover, the pages still turn to the right, and the text still runs vertically—all in agreement with the Chinese tradition.

The hybridized character of translation is better demonstrated by contrasting the book’s back matter with its main text. These two parts of the book adopted two different printing and page numbering methods. This combination was usually seen in those translations which maintained a great many English words in their back matter. For example, in *Ru Men Yi Xue*, the main text was printed traditionally from woodblock, while the eleven-page “Vocabulary of the Chinese Names of Medicines” was printed from the Western press with both alphabetic and Chinese-character type. The vocabulary part adopted the Western page-numbering fashion—the

recto designated with one page number and the verso another. A similar layout can be seen in an edition of Benjamin Hobson's *Nei Ke Xin Shuo* 內科新說 (*A New Treatise on Internal Medicine*) published in 1858.<sup>252</sup> Following the woodblock printed main text was attached a 74-page “Medical Vocabulary in English and Chinese” (*Yi Xue Ying Hua Zi Shi* 醫學英華字釋, *English and Chinese Explanations of Medical Terms*), bearing the same author's name and the same year of publication, but printed on a Western press. The main text and the vocabulary were actually printed at different facilities—the former at the Jiangsu Shanghai Renji Hospital, and the latter at the Shanghai Mission Press. The “Medical Vocabulary” itself was once issued as a standalone publication.<sup>253</sup> The combination of Chinese and Western bookmaking techniques in one book can also be seen in *Hua Xue Chu Jie*. In the book's volumes one and two, there were in all six *ye* of illustrations (four in volume one and two in volume two), grouped at the very beginning of each volume. Different from the woodblock printed main text, they were printed from electrotypes which were obtained directly from the publishing house of the original English version (For a detailed discussion of varieties of printing methods applied to illustrations, see Chapter 3).

In some cases, the format of the whole book represented hybridization. At first glance, the standalone edition of *Yi Xue Ying Hua Zi Shi* mentioned above looks similar to a Western-style paperback book, with the cover opening at the front and the pages turning to the left. But the book used traditional Chinese paper for printing, and still kept every *ye* folded. In this case, readers read the book as a Western one, but the pages they turned were Chinese-style. This is also true in a number of translated hymnals, such as the 1902 edition of one of the most classical

---

<sup>252</sup> This edition was found in the Wellcome Library (London). There are two editions of this title in the Wellcome Library: one with the vocabulary part, and the other without.

<sup>253</sup> This standalone edition can be located at the Archive of the School of Oriental and African Studies, University of London.

and widely-used Amoy dialect hymnal collections *Yang Xin Shen Shi*, titled *Ióng Sim Sîn Si*,<sup>254</sup> which presents both Western page-turning and Chinese folded *ye* together. Its only difference from *Yi Xue Ying Hua Zi Shi* is that it uses Chinese thread-stitched binding and Chinese paper for its cover. Thus, from the outside, *Ióng Sim Sîn Si* looks like a traditional Chinese book—a camouflage to its hybrid nature inside. Furthermore, the translated maps *Zui Xin Di Wen Tu Zhi* and *Zhong Wai Yu Di Quan Tu* discussed earlier in this chapter brought back the idea of antiquated Chinese butterfly binding method to bookmaking. But from their outsides they all appear to be Western-style books, with hard covers and hard spines.

Sometimes, hybridity also emerged from agents' so-called errors. These “errors” are found in some science translations' back matter. For example, the Wuhan University Library's copy of *Fu Ke*, which was brought up previously in this chapter, printed its English-Chinese glossary following the Western way of turning pages from the recto to verso, starting with page one as the last page of a Chinese style book. Therefore, the format of the whole book seemed to be that of a traditional Chinese book and a Western-style book bound together. As shown in Figure 8, the last page of the glossary (Page 16) was located immediately after the last page of the main text (Page 414b). However, the variant copies of the same title reserved at the Shanghai Library and the Tsinghua University Library display hybridity in a different way, because of binders' “mistakes.” In these two copies, the page numbers from the last page of the main text onwards through the glossary to its end proceed as follows: page 414b, then page 2 of the glossary, page 1 of the glossary, then page 4, page 3, page 6, page 5, and so on following the same pattern. Technically speaking, it is an erroneous binding, because when reading the

---

<sup>254</sup> *Xin Ding Yang Xin Shen Shi (New Edition of Heart-Nourishing Sacred Odes)*. This book was found at the Archive of the School of Oriental and African Studies, University of London (Presbyterian Church of England/Foreign Missions Committee Series, Box 25, Folder 1, 1902). For more information on dialectal rendition of music, see Chapter 4.

glossary from either the book's Chinese style back cover, or from the page adjacent to page 414b on a spread of the main text, the pages are not consecutively sequenced. Every spread contained a verso numbered three more than the recto. The printing of the glossary was intended for Western-style reading—the recto followed by the verso—but the binding of this variant was not. It is shown in the colophon that *Fu Ke* was printed at the Jiangnan Arsenal, whose printing facilities were owned and run by Chinese. But the Arsenal may have only printed the main text. The back matter might have been printed at other facilities which had experience in Western-language printing jobs, due to the glossary's recto-to-verso sequencing of each leaf (equivalent to a folded *ye* in this case). However, it is almost certain that the binding was completed by the Chinese binders, because the whole book is thread-stitched bound.

The “mistaken” binding does not necessarily demonstrate that some of the responsible Chinese binders lacked the ability to read the English language or Arabic numerals such that they were incompetent to correct themselves. The “error” is rather because of these binders' cultural inclination to traditional Chinese bookmaking. They resisted practicing two different types of page sequencing methods together in one book. Even if the glossary itself looked far from a traditional Chinese text, the binders wanted, at least, its pages to follow the flow of the Chinese main text. Opposite directions of page turning in the different parts spoiled the holism of the traditional Chinese book. The page sequence of the “erroneously” bound glossary tells us that the binders wished to put the first leaf right after the last page of the main text. They wanted to save their tradition, while the printers put obstacles in their way. The printing of the glossary was intended for Western-style reading—the recto followed by the verso. Accordingly, there could be no “correct” page sequencing given that the Chinese binders insisted on preserving the Chinese page-turning method as much as possible. No matter how hard the binders tried,

consequently-numbered recto and verso would never appear on a spread. The discrepancy between the binders' attempt and the awkward outcome suggests that the recognition of tradition triumphed over compromise with the imported technique, even at the cost of making variant parts of the book.

Hybridized products marked this era of transformation. Regarding translations, hybridization always represented a strategic mixture of the old and the new. It was the response to the epoch's clarion call to incorporate new technology and new formats into Chinese bookmaking. But hybridization was also a mirror on the past, because the preservation of Chinese traces revealed nostalgia for an ingrained bookmaking culture. Therefore, the theme of the story beneath the hybridizing process from the 1860s to the 1920s was actually a balance between the traditional Chinese bookmakers' vision of what a printed translation would look like—a volume with limited exotic appearance, and European and North American immigrant bookmakers' expectations, based on familiarity with their own book culture, of what it would look like—a Western style imprint having Chinese characters on its pages. The hybridized traits appeared outside and inside, in the main body, in back matter, and even throughout the whole book. One significant factor that tipped the balance in favor of the new, was the inevitable force of imported bookmaking technologies in China. But although new technologies seemed to be invincible, they were vulnerable in the face of enduring cultural values about the look of printed vessels of knowledge. “Respect and cherish paper with words” (*jing xi zi zhi* 敬惜字紙), an age-old idiom, reminded younger generations that there was an awe-inspiring connection between the form of the book and the wisdom it carried. That form was a traditional one. Even though during the late nineteenth and early twentieth centuries, book making technology changed in

China and the representation of knowledge changed, the remembrance of convention was hard to change.

Both the content and the bibliographical properties of the translated book were inseparable. The translated book was not merely an end product that carried translated content. It also contained traces of cross-cultural contacts concerning book-making practices. These traces were primarily represented by the amalgamation of Chinese traditional traits with the book's new bibliographical properties that never appeared in traditional Chinese books, or with traditional properties that were creatively adapted. Translated Western science books, maps, and music, no doubt, introduced new knowledge to Chinese readers. But what did the abovementioned bibliographical transformation mean to readers?

By using glossaries and indices, readers were able, at any time, to turn to the end of the book to check terms appearing in the text and locate the relevant page. By being exposed to special text layout with English content, readers were prompted toward horizontal eye movement. By referring to marginal space designed with various purposes, readers could stay on the same page, while verifying knowledge or seeking notes from upper or lower spaces outside the text area. By reading books using a different binding method and thus paginated differently, readers had to get familiar with the opposite page turning direction and the doubled amount of page numbers. Thus, the Western concept of verso and recto was established. In short, the ways new knowledge was presented on pages to invite a different type of readings, signified for Chinese readers new visual conventions. Such visual novelty was essential to the syncretism

between Chinese and Western book cultures during the late nineteenth and early twentieth centuries.

From the inception of incorporating Western bibliographical features into Chinese books around the 1860s until their thorough adoption around the 1920s, only six decades had passed. In a short time, even a single book could have dramatically changed its looks as it underwent various editions. The readers of the 1911 edition of *He Shi Liao Xue* may have found that, when it came to the 1915 one, it was no different from a Western-style book. However, four years earlier, the readers were still exposed to an end product that was as much Chinese as it was Western. This process of change, which has rarely been noticed by scholars, signaled a seminal episode in intercultural book history.



### 3.0 “HOW MANY DIFFICULTIES I FACED IN COMPLETION OF THIS BOOK”: TRANSLATING THE TEXTUAL

When recounting the process of translating Charles Lyell’s *Elements of Geology* into Chinese during the early 1870s, Hua Hengfang 華蘅芳 (1833-1902), himself an accomplished scientist, seemed overwhelmed by anguish.<sup>255</sup> Even though assisted by Daniel Jerome MacGowan (1814-1893),<sup>256</sup> a native English speaker with a solid knowledge of science, Hua still encountered many problems:

I was not very proficient in English, while my Western collaborator did not have comprehensive understanding of the Chinese language. In this book, there were too many varieties of terms. The scientific facts recorded in this book were always beyond my knowledge, and thus, confused me immensely. In addition, I was often lost in inverted syntax, and repetitive and unclear

---

<sup>255</sup> For Hua Hengfang’s life and work, see, for example, Ji Zhigang, *Jiechu de Fanyijia he Shijianjia: Hua Hengfang (Prominent Translator and Man of Action: Hua Hengfang)* (Beijing: Kexue Chubanshe, 2000); Pang Shengnan, *Hua Hengfang* (Beijing: Beijing Kexue Jishu Chubanshe, 1996); Li Yan, *Zhong Suan Shi Luncong (Collected Essays on the History of Chinese Mathematics)*, vol. 4 (Taipei: Taiwan Shangwu Yinshuguan, 1977); Andrea Bréard, “On Mathematical Terminology: Culture Crossing in Nineteenth-Century China,” in *New Terms for New Ideas: Western Knowledge and Lexical Change in Late Imperial China*, ed. Michael Lackner, Iwo Amelung, and Joachim Kurtz (Leiden: Brill, 2001).

<sup>256</sup> For a brief biography and publication list of Daniel Jerome MacGowan, see Alexander Wylie, *Memorials of Protestant Missionaries to the Chinese: Giving a List of Their Publications, and Obituary Notices of the Deceased* (Shanghai: American Presbyterian Mission Press, 1867), 132-34.

expressions. Therefore, I even had to rely on my Western collaborator's facial expression and gestures in order to translate the meaning into Chinese words. How difficult! At the seventeenth *juan*, I suddenly started suffering from diarrhea and got attacked by it many times every day. I felt extremely miserable and even felt my lifeblood had drained. ... The more I was haunted by broken sentences and unintelligible meaning left in the manuscript, the more serious my condition turned to be. ...How many difficulties I faced in completion of this book!<sup>257</sup>

Hua Hengfang's hard work on Lyell's book remained no less challenging even though he had accumulated much experience from his earlier project of translating J. D. Dana's *Manual of Mineralogy*. Indeed, then, Hua had undergone a harsh trial. "Every midnight, my eyes turned blurry, and my spirit turned dim. I closed the manuscript and lay on the bed, frustrated like I was dying."<sup>258</sup> Who can live like this for long?

Hua Hengfang was typical of hundreds of translators working in China during the late nineteenth and early twentieth centuries. The ordeals they experienced in translating primarily resulted from a language barrier—there were no easy counterparts in Chinese for the new terms

---

<sup>257</sup> Hua Hengfang, preface to Charles Lyell, *Di Xue Qian Shi* (*A Simple Explanation of Geology*), trans. Hua Hengfang and D. J. MacGowan (Shanghai: Xiaocangshan Fang, 1896), 1. *Di Xue Qian Shi* was originally published by the Jiangnan Arsenal in Shanghai in 1873. Also quoted in Xiong Yuezhi, *Xixue Dongjian yu Wanqing Shehui* (*The Dissemination of Western Learning and Late Qing Society*) (Shanghai: Shanghai Renmin Chubanshe, 1995), 498. Translated by the author.

<sup>258</sup> Hua Hengfang, preface to J. D. Dana, *Jin Shi Shi Bie* (*Recognizing Metals and Stones*), trans. Hua Hengfang and D. J. MacGowan (Shanghai: Xiaocangshan Fang, 1896), 1. *Jin Shi Shi Bie* was originally published by the Jiangnan Arsenal in Shanghai in 1871. Also quoted in Wang Yangzong, *Fulanya yu Jindai Zhongguo de Kexue Qimeng* (*John Fryer and the Scientific Enlightenment in Modern China*) (Beijing: Science Press, 2000), 37. Translated by the author.

and nomenclatures found in Western language texts. Scholars have long explored the diverse efforts of a Western-learning-related community (e.g., translators, literati, and institutions) to create Chinese-language versions of Western terms, including those concerning science, geography, and music, as well as their attempts to unify the various ways of rendering a term.<sup>259</sup> However, translators faced many more challenges than the struggle to find the best Chinese rendition of every single word. They had to choose what books to translate. In this way, they played an active, somewhat decisive role in publishing. Roger Chartier once emphasized human agents' impact on the life cycle of prints: "The publishing activity that chooses or orders texts, controls the operations by which texts become books, and assures their distribution among buyers is clearly the fundamental process where the interconnection occurs between the history of techniques and the history of production, the sociology of the book trade and the sociology of reading, the physical study of books, and the cultural study of texts."<sup>260</sup> In my study, translators

---

<sup>259</sup> For example, see Michael Lackner, Iwo Amelung, and Joachim Kurtz, eds., *New Terms for New Ideas: Western Knowledge and Lexical Change in Late Imperial China* (Leiden: Brill, 2001); Michael Lackner and Natascha Vittinghoff, eds., *Mapping Meanings: The Field of New Learning in Late Qing China* (Leiden: Brill, 2004); Joachim Kurtz, "New Terms for Telling the Truth: Notes on the Formation of Modern Chinese Logical Terminology, 1886-1911," *East Asian Science, Technology, and Medicine* 20 (2003): 73-91; Lydia H. Liu, ed., *Tokens of Exchange: The Problem of Translation in Global Circulations* (Durham, NC: Duke University Press, 1999); David Wright, *Translating Science: The Transmission of Western Chemistry into Late Imperial China, 1840-1900* (Leiden: Brill, 2000); idem, "The Translation of Modern Western Science in Nineteenth-Century China, 1840-1895," *Isis* 89.4 (1998): 653-73; Wang Yangzong, "Qingmo Yizhi Shuhui Tongyi Keji Shuyu Gongzuo Shuping (A Summarization and Review on the Work of Standardizing Scientific Terminology by the Educational Association of China [formerly the School and Text-Books Series Committee] in the Late Qing Dynasty)," *Zhongguo Keji Shiliao (China Historical Materials of Science and Technology)* 12.2 (1991): 9-19; Wang Shuhuai, "Qingmo Fanyi Mingci de Tongyi Wenti (The Standardization of Translated Terminology during the Late Qing Period)," *Zhongyang Yanjiuyuan Jindai Shi Yanjiusuo Ji Kan (A Collection of Studies of Department of Modern History, Academia Sinica)* 1 (1971): 47-82; Zhang Daqing, "Yixue Mingci de Tongyi: Bo Yi Hui de Gongxian (The Uniformity of Medical Terms in the Early Period: A Review on the Work of the China Medical Missionary Association)," *Zhonghua Yi Shi Zazhi (Journal of Chinese History of Medicine)* 24.1 (1994): 15-19; Zhang Jian, "Jindai Kexue Mingci Shuyu Shending Tongyi zhong de Hezuo, Chongtu yu Kexue Fazhan (Cooperation, Conflicts, and Development in the Course of Examining and Unifying of the Technical Terms in Modern Times)," *Shi Lin (Historical Review)* 2 (2007): 24-35; Chang Hao, "Fu Lanya de Huaxue Fanyi Yuanze he Linian (Fryer's Principles and Ideas in Translation of Chemical Terminologies)," *Zhongguo Keji Shiliao (China Historical Materials of Science and Technology)* 21.4 (2000): 297-306; Fan Shouyi, "Dingming de Lishi Yanghe yu Mingci Shuyu Fanyi (Naming and Translation of Terminology: A Historical Perspective)," *Waijiao Xuayuan Xuebao (Journal of Foreign Affairs College)* 1 (2002): 83-94.

<sup>260</sup> Roger Chartier, "Frenchness in the History of the Book: From the History of Publishing to the History of Reading," *Proceedings of the American Antiquarian Society* 97.2 (1987): 299-329, qt. on 318. See also Leslie

replaced the publisher, and became the agent who “chooses or orders texts.” The translators, but not a publisher, had to first decide what to translate. In this sense, the entire process of translating extended into the preparation phase. What source(s) had been chosen determined what text the translators would be working on, and what scope of new knowledge would be presented to the readers. Translators’ Western knowledge level, language proficiency, and personal/business networks helped them make wise choices. Sometimes, facing a large pool of sources, they had to judge which text was not only the best quality, but also the most appropriate for contemporary readers. Sometimes, they weaved together different parts from multiple sources to create one book. A number of translators themselves were even highly involved in the publishing industry. For example, the majority of the China Medical Missionary Association’s translators served as core members of the Association’s Publication Committee. In some other cases, there were no clear boundaries between the translator and the publisher. Instead, the publisher trusted the translator’s taste and judgment of the original sources, and would not impose any other mediation. In a sense, translators had many identities. Besides being like publishers, translators were also, to some extent, authors. Within the process of producing a translation during the late nineteenth and early twentieth centuries in China, the role of “authorship” of the original Western source was largely missing. Although there was some contact between translators and authors (e.g., the original author was consulted about the updated version of his/her works), it was the translator who took virtual control over the re-creation of the text into a version decipherable to the Chinese. Translators did not necessarily keep faithful to the original text, but formulated alternative texts. They added, deleted, combined, or condensed parts, based upon their intellectual judgment, the needs of local audiences, or even market

---

Howsam, *Old Books and New Histories: An Orientation to Studies in Book and Print Culture* (Toronto: University of Toronto Press, 2006), 53.

expectations. They also made adjustments to out-of-date knowledge in their Western sources. Translators also had to consider how to reorganize the content. In some translated works, the breakdown of the text into manageable-sized portions and the visual framework that indicated divisions and subdivisions of the content, both differed from that of the original Western versions. As Barbara Hochman argues in a different context, the act of providing “paratextual materials” (including prefaces, introductions, and illustrations) to subsequent editions signaled a response to the previous text.<sup>261</sup> In a translation, which is by nature a subsequent edition as well, besides the paratextual material Hochman specifies appended to the Western-language text, all the treatments mentioned earlier in this paragraph also suggest the reception of the source by the translator, who by and large happened to be the first reader of the source text in China during the late nineteenth and early twentieth centuries. The finished translated book thus is a material expression of the translator’s reader-reception of the original, which may be recouped through a meticulous comparison between the two texts. Embedded in the text and its arrangement the translator’s concretized reception inevitably played a significant role in shaping contemporary Chinese mass readers’ approach to the translated book, and thus, those readers’ own textual reception.

In this chapter, I will discuss the aforementioned issues in translating of the text of Western science books, maps, and music into Chinese. These issues include selection of original sources, the changes made to the Western text, and the method of organizing the content. I will analyze the reasons for these processes from the perspectives of authorship (“translatorship” under this circumstance), sponsorship, and readership of these translated imprints.

---

<sup>261</sup> Barbara Hochman, “Sentiment without Tears: *Uncle Tom’s Cabin* as History in the 1890s,” in *New Directions in American Reception Study*, ed. Philip Goldstein and James L. Machor (New York: Oxford University Press, 2008), 255-78.

### **3.1 SELECTION OF ORIGINAL TEXTS FOR TRANSLATING**

The challenges faced by translators actually started before they even thought about *how* to translate. *What* to translate was the first problem to solve.

The total number of publications in any one language is always larger than the number of them that have been translated into another language. There is no need for translating all of them. On a practical level, there were not enough qualified agents in China during the late nineteenth and early twentieth centuries to translate more than a fraction of the extant English language books. Of these, translators needed to determine what texts were appropriate for an audience to whom Western science, maps, and music were still new. Translators' selections can be categorized into three types: a single book as the source of one Chinese translation, a part of a single book as the source, and parts of multiple books as sources. Some selections were made solely by the translators themselves. Thus, their own educational background, taste, and knowledge became the determining factors. Other selections were more or less influenced by outsiders, including trading companies that dealt with international purchases, and sponsors for translation and publishing activities.

#### **3.1.1 Singling Out from Thousands**

Among thousands of Western-language publications, which books to select was the first and foremost issue in the translation process. In most cases, translators themselves played an important role in singling out texts. Occasionally, other agents, such as companies dealing with international business, and sponsors of translation enterprises, affected the choice.

Before native Chinese were able to independently execute translations in the early twentieth century, Western immigrants collaborated with them on a highly technical textual rendition. But more importantly here, these immigrant translators had the decisive power in selecting original texts due to their language competency, high level of literacy, and relatively superior knowledge of Western science, cartography, and music. The majority of Western translators working in China were missionaries. Although they were sometimes more proficient in theology than in science, map making, or music, most of them held college degrees, be it in humanities or social sciences. Some of them obtained master's even doctoral degrees—still rare within the UK and North America—before setting foot in China. For example, by 1910 among missionaries involved in educational enterprise in Zhili 直隸 Province, twenty-four held terminal degrees in their fields of expertise, and seven earned their master's degrees.<sup>262</sup> Even though they might not have been specialists on the topics they chose to translate, it was much easier for them than Chinese literati to get access to Western maps and music, and familiarize themselves with bibliographies of top-tier Western scientific literature. Missionaries' training and devotional practices (i.e., hymn singing) gave them a greater literacy than Chinese in sheet music. So, for distinguishing appropriate editions from the larger pool of Western texts, missionary-translators generally had better qualifications than their Chinese peers.

Within the larger group of missionary translators, the most specialized were medical professionals who were foremost in deciding what Western medical works would be translated into Chinese. Almost all medical missionaries who were active in translating and publishing held the highest degrees in medical science. For instance, the majority of the China Medical Missionary Association's (CMMA) most productive translators graduated with M.D.'s from

---

<sup>262</sup> Missionary Educational Directory for China, Containing a Brief Description of Educational Institutions Connected with Protestant Missions (Shanghai: Educational Association of China, 1910), 15.

prestigious medical schools. John G. Kerr (1824-1901), W. H. Venable, and Mary H. Fulton (1854-1927) received degrees from Jefferson Medical College in Philadelphia, University of Virginia, and Women's Medical College of Pennsylvania, respectively. Many other medical missionary-cum-translators' education backgrounds were similar. For example, Dauphin William Osgood (1845-1880) obtained his M.D. degree from New York University in 1869.

These translators with high levels of professional knowledge made every possible effort to select the best quality original sources and contact Western authors and publishers. For example, Philip B. Cousland (1861-1930), a long-term chair of the Publication Committee of the CMMA, once explained in his preface the reasons for choosing William Dobinson Halliburton's *Handbook of Physiology*, among other books on the topic: "[It is] a widely known English textbook which is likely to be re-issued as time goes on in up-to-date editions, so that the Chinese translations can readily keep pace with it as successive editions may be called for."<sup>263</sup> Furthermore, he had direct contact with the Western authors he translated or the houses that published them, which endowed Cousland's selection with more authority. For instance, he acknowledged John Murray the publisher and William Halliburton for forwarding to him "proof sheets of the latest English edition as they came from the press."<sup>264</sup> When rendering William Osler's *Principles and Practice of Medicine* into Chinese, Cousland expressed thanks, on behalf of the CMMA's Publication Committee, to its author William Osler "for his hearty concurrence in this endeavor to give his book to the Chinese in their own language" and to Sir Patrick Manson "for his kind permission to utilize such portions of his *Tropical Diseases* as seemed

---

<sup>263</sup> Philip B. Cousland, preface to *Ti Gong Xue*, trans. Philip B. Cousland (Shanghai: American Presbyterian Mission Press, 1905), 1.

<sup>264</sup> *Ibid.*, 2.



desirable” in the translation.<sup>265</sup> Similarly, James H. Ingram acknowledged in his translation of *Refraction and How to Refract* that James Thorington (original author) and Messrs. P. Blakiston’s Son & Co. (publisher) both provided “helpful suggestions.”<sup>266</sup> Other medical translators argued for their selections of the literature based upon their familiarity with Western medical education. For instance, J. G. Cormack chose Robert Hutchison and Harry Rainy’s *Clinical Medicine and Clinical Methods* to translate because it was “most generally used by all British students in their study of Clinical Medicine and Physical Diagnosis.”<sup>267</sup> And their selections were recognized. Sir Henry S. Wellcome, the sponsor of the CMMA’s publishing activities, trusted the qualifications of missionary-translators with medical degrees. When initiating his China Publication Fund, Wellcome stated that the titles of original English-language medical books would be “selected by the Association [i.e., CMMA], as Mr. Wellcome may approve.”<sup>268</sup> At the beginning the Fund, Wellcome’s office once invited a British medical professional, Alfred Chune Fletcher, to evaluate the Publication Committee’s first list of books proposed for translation. It was affirmed that “all the medical works recommended by Dr Cousland are excellent from the English point of view, and no doubt the question of their suitability for Chinese medical students has been carefully considered by the committee.”<sup>269</sup> The Association satisfactorily passed the initial test. Afterwards, Wellcome seemed not have had conducted this sort of consultation anymore, but granted the above mentioned translators

---

<sup>265</sup> Philip B. Cousland, preface to *Ou Shi Nei Ke Xue*, translated by Philip B. Cousland (Shanghai: Publication Committee of the China Medical Missionary Association, 1910), 1.

<sup>266</sup> James H. Ingram, preface to *Qu Guang Xue (Refraction)*, trans. James H. Ingram and Chen Guiqing (Shanghai: China Medical Missionary Association, 1914), 1.

<sup>267</sup> J. G. Cormack, preface (dated March 1916) to *Nei Ke Lin Zheng Fang Fa (Clinical Methods of Internal Medicine)*, trans. J. G. Cormack and revised by P. L. McAll and J. G. Cormack (Shanghai: China Medical Missionary Association, 1923).

<sup>268</sup> “Report of the Terminology and Publication Committees of the China Medical Missionary Association for 1908,” WA/HSW/OR/D.1, CPF-WL.

<sup>269</sup> Interoffice mail from L. [Mr. Linstead?] to Mr. Pearson, January 31, 1908, WA/HSW/OR/D.3, CPF-WL.

ultimate power to choose source books. During the Fund's period, Wellcome, the nominal gatekeeper of the CMMA's selections, never disapproved any titles proposed by it.

Diverse agencies, including the Chinese government and international entrepreneurs (e.g., trade companies and Western publishers that dealt with international service), also influenced the selection of texts. John Fryer's experience best represents how outside agencies functioned in this regard. Fryer left the Church Missionary Society after several years in China, and became a "secular missionary."<sup>270</sup> But this might have helped him to get a long-term, contracted job with the Jiangnan Arsenal to work full time for its Translation Department (established in 1868) as the chief translator. The Arsenal, founded in 1865, together with its translation enterprise was fully sponsored by the Chinese government. This sponsorship meant that far from being a free agent, John Fryer had to follow his superiors' orders constantly. The officials in charge of the Arsenal already had a blueprint for how the Translation Department would contribute to the development of the entire Arsenal. Arsenal officials always determined the general topics of the Western books to be obtained for translation. For example, in two large orders for books from London's Smith, Elder & Co. dated March 18 and July 31, 1868, John Fryer mentioned that his request was "commissioned" by the officials.<sup>271</sup> In an August 18, 1868 letter, he expressed the Arsenal's needs more straightforwardly as to purchasing books: "The officials of the Arsenal are very anxious to obtain particulars and statistics respecting the management & working of the Arsenals in England, & especially at Woolwich."<sup>272</sup> Li Hongzhang 李鴻章 (1823-1901), one of the leading statesmen of the Qing government (Viceroy

---

<sup>270</sup> John K. Fairbank, ed., *Late Ch'ing, 1800-1911 (Part I)*, vol. 10, *The Cambridge History of China* (Cambridge: Cambridge University Press, 1978), 579.

<sup>271</sup> Ferdinand Dagenais, Peter X. Zhou, and Jean C. Han, eds., *The John Fryer Papers: The First Decade in China, 1861-1871* (Guilin: Guangxi Normal University Press, 2010) 1: 348-52; 375-77.

<sup>272</sup> *Ibid.*, 378.

of Zhili) who proposed to the Emperor the founding of the Jiangnan Arsenal, commanded the Arsenal several times to translate urgently needed books on Western methods of manufacturing weapons and vessels.<sup>273</sup>

Sometimes, if John Fryer was not very familiar with publications of a specialized nature, or with specific book titles, he would rely on the business firms that took charge of the majority of the Arsenal's international purchases, to select texts from the pool for him. It might not have been a bad solution, because those firms served as a hub of commercial information exchange and the first gate through which foreign goods entered China. They had more business contacts in the West than, of course, John Fryer himself. For example, he was introduced by the foreign firm, Mackenzie & Co., in Shanghai to Smith, Elder & Co., a British publisher, and once asked it to obtain "new works upon and complete as possible" concerning the manufacture of muskets and rifles, and coal and coal mining, while "bearing in mind that they are to be used for the compilation of works on the same subjects in the Chinese language."<sup>274</sup> In another order, Fryer requested the company to seek any book that included information on arsenal rules and regulations in England and the English systems of military drill.<sup>275</sup> After the company received the order, its staff might have sent it to their contacts in Europe. Thus, in these cases, the books finally shipped to Fryer were actually the decisions of book trade agents anonymous to him.

Selecting books without seeing them was potentially problematic for translators. Nonetheless, publication catalogues served as important venues for singling out imprints which were published thousands miles away. The catalogues compiled by Western publishers allowed

---

<sup>273</sup> John Fryer, "Jiangnan Zhizao Zongju Fanyi Xishu Shilüe (An Account of the Department for the Translation of Foreign Books at the Jiangnan Arsenal)," *Gezhi Huibian (Chinese Scientific and Industrial Magazine)* 3.5 (1880):11b.

<sup>274</sup> Dagenais, Zhou, and Han, *John Fryer Papers* 1: 348-52.

<sup>275</sup> *Ibid.*, 378.

immigrant translators in China to know what was available in a relatively fast and convenient way. Within the correspondence between John Fryer and Henry S. King & Co., a London-based publisher and bookseller, Fryer continuously uttered the Arsenal's and his demands for catalogues.<sup>276</sup> For example, on April 13, 1869, he wrote that "the officials of the Arsenal would like to have as many Catalogues of Books from different publishers" as the company could procure. Not only the catalogues of publications, but also "as many illustrated lists of articles and goods," he continued, "which are likely to be of use to [the] Chinese, as you may feel disposed to send. It is by looking over such lists that they come to know about Foreign inventions and eventually become purchasers. Machinery, navigation, naval architecture, gunnery, metallurgy, photography &c are the subjects which Chinese take much interest in, and only want to understand more about them to adopt them on a large scale."<sup>277</sup> On June 3, 1869, Fryer again urged the company to send catalogues: "As many illustrated catalogues as you can send for our library will be very acceptable and no doubt productive of future orders. I have been asked to write to different houses in England & other countries for such catalogues, but I prefer using such as you may feel disposed to send."<sup>278</sup> Evidence shows that Fryer studied catalogues before he made orders. The book lists he drafted in his later correspondence categorized publications by different publishing houses, rather than by themes or authors' names.<sup>279</sup> He even knew from which publisher the firm could get a specific title. On 6 December 1870, Fryer reminded Mackenzie & Co. that the "Weale's Series" on engineering,

---

<sup>276</sup> Henry S. King was the predecessor of Charles Kegan Paul, a renowned British publisher during the late nineteenth and early twentieth centuries. For Henry S. King's life and enterprise, see Chapter 1 ("Henry S. King: Businessman of Letters") of Leslie Howsam, *Kegan Paul, a Victorian Imprint: Publishers, Books and Cultural History* (Toronto: University of Toronto Press, 1998), 15-47.

<sup>277</sup> Dagenais, Zhou, and Han, *John Fryer Papers* 1: 384-86.

<sup>278</sup> *Ibid.*, 392-93.

<sup>279</sup> *Ibid.*, 393-99. In Fryer's the letter to Henry S. King & Co, dated June 3, 1869, the publishing houses listed include W. Mitchell & Co., Clowes & Son, Longman & Co., Hancock, Churchill, Trübner & Co. in Britain, and Lesley, How & Sons, and G Philip & Son in the United States.

also known as “Engineers’ Handbook,” could be “obtained from Virtue & co the present publishers or any other booksellers.”<sup>280</sup>

Although John Fryer’s case suggests that various factors impacted the selection of original texts, he still held his own opinion on this issue. In the late 1870s, he came up with a plan for publishing a series of translated books which, together, would systematically build a broad platform of knowledge, rather than merely cater to urgent needs. The latter was preferred by the Arsenal’s sponsor and officials. To this end, Fryer first intended to translate the eighth edition of *Encyclopedia Britannica* (published from 1853 to 1860). But after studying it, he thought the edition had failed to cover up-to-date theories and technologies, and some volumes’ treatment of topics was too sketchy. While he was waiting for a more updated and comprehensive ninth edition<sup>281</sup> of the *Encyclopedia* to come out, an imperial edict arrived, commanding the Arsenal to give absolute priority to translating the most vital and necessary works—those on machinery, engineering, and military topics.<sup>282</sup> As a civil servant, Fryer had to let go of his dream. But he subverted the government’s absolute will by having the last word about title selection. Even though his superiors had say over general subject matter, they did not designate the exact titles to be translated because most of them had a weak command of English and the state of Western science scholarship. At the practical level, then, the balance of power shifted toward John Fryer, a native English speaker and scholar. Fryer, however, was not a scientist. But he was willing to learn because it was part of his job. The considerable quantities of Western books he ordered for the Arsenal became his own resources for study. He spent long

---

<sup>280</sup> Ibid., 458-59.

<sup>281</sup> The publishing of the ninth edition started in 1875, but did not finish until 1889.

<sup>282</sup> John Fryer, “Jiangnan Zhizao Zongju Fanyi Xishu Shilüe,” *Gezhi Huibian*, June 1880, 3 (5): 12b.

hours every day reading them.<sup>283</sup> Among these imprints, he made the final picks.<sup>284</sup> These and the books that never got translated—the majority—formed the basis of the Arsenal's ever-growing library. Its collection of Western science books, totaling several hundred of volumes, might have been the largest in China by the end of the 1870s.<sup>285</sup>

Generally speaking, the original imprints of Western science, maps, and music that were chosen for Chinese translation included three basic categories. The first was scholarly treatises which served as standard readings for an academic field or incorporated the contemporary discoveries, such as Charles Lyell's geology,<sup>286</sup> John Tyndall's sound and light, William J. Morton and Edwin W. Hammer's X-rays, James Dwight Dana's mineralogy, C. Remigius Fresenius's qualitative chemical analysis, John F. Herschel's astronomy, and John Lindley's botany.<sup>287</sup> The second type was textbooks. Sometimes they might not have reflected the most up-to-date scholarship, but their coverage and organization of knowledge suited a broader range of readers, the majority of whom were school students. Well-known textbooks translated during the late nineteenth and early twentieth centuries included David A. Wells's *Principles and Applications of Chemistry*, and the China Medical Missionary Association's selection of a number of best-quality and often-updated medical textbooks widely used in medical schools in

---

<sup>283</sup> John Fryer to Susy Johnson, July 11, 1868, in Dagenais, Zhou, and Han, *John Fryer Papers* 1: 368. See also David Wright, "John Fryer and the Shanghai Polytechnic: Making Space for Science in Nineteenth-Century China," *British Journal for the History of Science* 29.1 (1996): 6. Besides being afraid of his lack of science knowledge, another reason for Fryer's diligent learning is that he was fearful of competition from his highly qualified peers. See *ibid.*, 7.

<sup>284</sup> Wang Yangzong, *Fulanya yu Jindai Zhongguo de Kexue Qimeng (John Fryer and the Science Enlightenment in Modern China)* (Beijing: Kexue Chubanshe, 2000), 40-1.

<sup>285</sup> Fryer, "Jiangnan Zhizao Zongju Fanyi Xishu Shilüe," 11b. See also John Fryer, "Science in China, I," *Nature*, May 5, 1881, 11.

<sup>286</sup> Charles Lyell's "uniformitarian theory of geology" was recognized as one of the great triumphs of the nineteenth-century British science. See Thomas F. Gieryn, *Cultural Boundaries of Science: Credibility on the Line* (Chicago: University of Chicago Press, 1999), 1.

<sup>287</sup> Alexander Wylie (1815-1887) and Li Shanlan (1811-1882) translated Sir John F. Herschel's *Outlines of Astronomy*. Li also collaborated with Alexander Williamson (1829-1890) and Joseph Edkins (1823-1905) in rendering John Lindley's *Elements of Botany*.

the West. The third type of original texts selected for translating consisted of popular readings. Examples included British publisher W. & A. K. Johnston's Handbook Series and Outline Series for Western science, and numerous popular hymnals.

### 3.1.2 Partial Translation of Books

Singling a book out from thousands was only the first step in translating. It was followed by another, maybe several more steps that concerned the text of the targeted imprint. Translators sometimes did not render the entire text, but choose one part or several to work on, and issued it or them as a single publication—something that may be called “partial translation.” This practice is different from omitting some content when translating. The rule of omission was to retain the integrity of the original text, while leaving out short segments that were not deemed necessary for the translation's target audience. Some reasons for omission and partial translation might have been similar: the level of difficulty of the translation; coverage of topics of certain parts in other translations; and a limited financial budget. However, what is markedly different in partial translation practice is that agents valued only a few parts of one book, treated them as a single entity, and discarded much of the entire original text.

*Hua Xue Jian Yuan* 化學鑑原 (*Identifying the Principles of Chemistry*) and its two “sequels” published consecutively in four-year intervals, all co-translated by John Fryer and Xu Shou, are good examples of the practice of partial translation. These were not literally sequels as one would find for novels or plays, but the Chinese characters (*xu* 續 and *bu* 補) used in their

titles suggested they were like literary works having an ongoing narrative.<sup>288</sup> But they were not. The original text of *Hua Xue Jian Yuan*—David A. Wells’s *Principles and Applications of Chemistry*,<sup>289</sup> first published in 1858 in America—was a comprehensive textbook the main body of which consisted of three sections: Principles of Chemistry (Introduction and four chapters), Inorganic Chemistry (eleven chapters), and Organic Chemistry (ten chapters). However, the focus of the Chinese translation was only inorganic chemistry, which occupied in all 245 pages out of 515 in Wells’s *Principles*, or nearly half of it. *Hua Xue Jian Yuan* was the translation of *Principles* from its page 156 to 396 (241 pages in all), covering all chapters of “Inorganic Chemistry” except Chapter 15 on photography. This excerpt demonstrates a strategic selectivity. The publishing arrangement of *Hua Xue Jian Yuan*’s two “sequels” shows the reasons for the partial translation of Wells’s original text. In 1875, four years after *Hua Xue Jian Yuan* was published, Fryer and Xu collaborated on translating another important work titled *Chemistry, Inorganic and Organic with Experiments, with a Comparison of Equivalent and Molecular Formulae* authored by British scientist Charles Loudon Bloxam (1831-1887).<sup>290</sup> This time they chose only the organic chemistry part of Bloxam’s book to translate in order to complement *Hua Xue Jian Yuan*’s topic coverage. This translation was issued as *Hua Xue Jian Yuan Xu Bian* 化

---

<sup>288</sup> Many Chinese classical novels, such as *Dream of the Red Chamber* and *Journey to the West*, featured several *xu* or *bu* by later novelists. A number of anthologies or compilations also had their *xu* and *bu* that were complementary to the first installment’s coverage. For example, Wang Xiqi (1855-1913) edited *Xiao Fang Hu Zhai Yu Di Cong Chao* (*Geographical Collection of the Xiaofanghu Study*) and its three “sequels”—*Xu Bian*, *Bu Bian*, *Zai Bu Bian*.

<sup>289</sup> David Ames Wells, *Principles and Applications of Chemistry* (New York: Ivison & Phinney, 1858). There were several reprinted editions afterwards.

<sup>290</sup> According to Pan Jixing, the edition of Bloxam’s work that was used as *Hua Xue Jian Yuan Xu Bian*’s original was the first one, published in 1867. See Pan, *Zhongwai Kexue zhi Jiaoliu* (*Science Communication between China and the West*) (Hong Kong: The Chinese University of Hong Kong Press, 1993), 522-3. Besides publishing his research in science journals, Charles L. Bloxam was famous for his textbook writing and editing. In 1854, he and Sir Frederick Augustus Abel published the *Handbook in Chemistry, Theoretical, Practical and Technical*, which was revised in 1867 as *Chemistry, Inorganic and Organic with Experiments, with a Comparison of Equivalent and Molecular Formulae*. In this later title, Bloxam was listed as the only editor. *Chemistry, Inorganic and Organic* appeared in eleven editions in all, the last of which was published in 1923 and edited by his son Arthur George Bloxam and Samuel Judd Lewis. For a brief biography of Bloxam, see the introduction to *The Charles Loudon Bloxam Papers* (London: British Library, 2006).



學鑑原續編 (*The Sequel to Hua Xue Jian Yuan*).<sup>291</sup> This title might have been a little confusing to readers. Although called a “sequel,” its source text had nothing to do with either David A. Wells—the first installment’s original author—or his work. The translators’ preservation of the preceding publication’s title in later translations of the same general subject matter was probably because of *Hua Xue Jian Yuan*’s success on the market: it was among the best-sellers of the Arsenal’s books, and considered as one of the most exquisitely executed translations of Western chemistry during the late nineteenth century in China.<sup>292</sup> Its reputation and popularity would promote the selling of its “sequel.” Later in 1879, the second sequel was added to the “trilogy” of *Hua Xue Jian Yuan*, titled *Hua Xue Jian Yuan Bu Bian* 化學鑑原補編 (*The Supplement to Hua Xue Jian Yuan*).<sup>293</sup> *Bu Bian* was also a partial translation, covering only chapters concerning inorganic chemistry in Bloxam’s publication, the same source for *Xu Bian*. Thus technically speaking, *Bu Bian* and the earlier *Xu Bian* were a real set. *Bu Bian*’s topic was similar to *Hua Xue Jian Yuan*—inorganic chemistry. But the knowledge rendered in *Bu Bian* was more up-to-date than that in Wells’s 1858 work that had not been revised since its initial publication. The translators might have noticed that *Hua Xue Jian Yuan* alone would not fully represent the contemporary scholarship concerning inorganic chemistry. After finishing the

---

<sup>291</sup> Charles L. Bloxam, *Hua Xue Jian Yuan Xu Bian*, trans. John Fryer and Xu Shou (Shanghai: Jiangnan Arsenal, 1875).

<sup>292</sup> *Hua Xue Jian Yuan* was praised by reviewers as “shan ben” (“best-quality version”). See Xu Weize and Gu Xieguang, *Zeng Ban Dong Xi Xue Shu Lu* (*Enlarged Bibliography of Foreign Learnings*), vol. 3, 13b (1902; repr. in Wang Tao and Gu Xieguang, eds., *Jin Dai Yi Shu Mu* [*Bibliographies of Translated Books Published during the Modern Period*] [Beijing: Beijing Tushuguan Chubanshe, 2003], 202). This evaluation might have been originated from Sun Weixin’s top-ranked paper at the Spring 1889 prize essay contest held at Gezhi Shuyuan (Shanghai Polytechnic Institute). He also recommended *Hua Xue Jian Yuan* to be used as the starting text for chemistry students. See Sun Weixin, “Taixi Gezhi zhi Xue yu Jin Ke Fanyi Zhushu Xianglüe Deshi Hezhe Wei Zuiyao Lun (Thesis on Western Modern Science and the Evaluation of the Recent Science Translations),” in *Jichou Gezhi Shuyuan Keyi* (*Shanghai Polytechnic Institute’s Winning Essays in 1889*), ed. Wang Tao (Shanghai: Dawen Shuju), 8b.

<sup>293</sup> Charles L. Bloxam, *Hua Xue Jian Yuan Bu Bian*, trans. John Fryer and Xu Shou (Shanghai: Jiangnan Arsenal, 1879). For details of the publishing of *Bu Bian*, see Pan Jixing, *Zhongwai Kexue*, 523-4.

seemingly complete set—*Hua Xue Jian Yuan* and its *xu bian*, the translators reverted back to the topic of the trilogy's first book.

Like the *Hua Xue Jian Yuan* trilogy, another Jiangnan Arsenal publication, *Wu Ti Yu Re Gai Yi Ji* 物體遇熱改易記 (*Record of Changes When Matter Meets Heat*),<sup>294</sup> also represents partial translation. Its source was the four-volume *A Dictionary of Chemistry and Allied Branches of Other Sciences* compiled by Henry Watts (1815-1884), a colossal reference book with thousands of pages.<sup>295</sup> It was not practical to render the entire source into Chinese, because the *Dictionary* was comprehensive, and a number of topics it covered had already been published by the Arsenal. Thus, the translators selected only one part from Volume Three of the *Dictionary*, a sub-entry beneath “Heat” (122 pages) authored by George C. Foster (1835-1919); they called it “Change of Volume produced by Heat” (31 pages). This short excerpt in Chinese turned out to be a thesis exclusively on thermodynamics, a subject the Arsenal had yet to introduce.

### 3.1.3 Pastiches of Translations

Compared with partial translations, translation as a pastiche of multiple sources was a more common practice during the late nineteenth and early twentieth centuries in China. In fact, this practice dated back to the late Ming period (late sixteenth and early seventeenth centuries) which witnessed the advent of translating Western literature in China. For example, the prominent mechanics book, *Yuan Xi Qi Qi Tu Shuo Lu Zui* 遠西奇器圖說錄最 (*A Record of the Best*

---

<sup>294</sup> Henry Watts, *Wu Ti Yu Re Gai Yi Ji*, trans. John Fryer and Xu Shou (Shanghai: Jiangnan Arsenal, 1899).

<sup>295</sup> Henry Watts, comp., *A Dictionary of Chemistry and the Allied Branches of Other Science*, vol. 5 (London: Longmans, Green, and Co., 1883).

*Illustrations and Descriptions of Wonderful Machines of the Far West*),<sup>296</sup> translated through the collaboration of Swiss Jesuit Johann Terrenz Schreck (1576-1630) and native Chinese scholar Wang Zheng 王徵 (1571-1644), utilized a number of European mechanical publications as its sources, such as *Le Diverse Et Artificiose Machine* (Italian edition, 1588) by Agostino Ramelli (1531-1600) and *Théâtre des Instruments Mathématiques et Mekaniques* (French edition in 1578, Latin edition in 1582) by Jacques Besson (1530-1572).<sup>297</sup>

The reason for making a pastiche translation is complicated. The translators may have conceived of a book on a special topic, but they may not have been able to author a treatise on this independently in Chinese, due to the lack in either proficiency in Chinese language or mastery of Western learning. Moreover, they may not have found any single Western source to satisfy their expectation of the prospective book's coverage and structure. Thus, spreading their focus over multiple sources and assembling the parts of these that would best suit their idea of what the book should cover, became a feasible solution. The production of pastiche translations lent more creativity to the translation process, and resulted in an original volume. Translators' blueprint for the book's topic and structure served as a coherent thread that wove together content from scattered sources—only the parts that fit in the organization would be chosen. It also framed the selection from the pool of possible original sources—only the best section of a book among others discussing the same topic would be selected. In the meantime, translators would have digested and synthesized all the sources available to them on the topic, in order to

---

<sup>296</sup> Johann Terrenz Schreck and Wang Zheng, trans., *Yuan Xi Qi Qi Tu Shuo Lu Zui*, ed. Qian Xizuo (1627; repr. Taipei: Yi Wen, 1968).

<sup>297</sup> *Qi Qi Tu Shuo* was considered to be the first book to introduce Western mechanical knowledge to a Chinese audience. Besides Western-language sources, it also contained a small amount of originally authored content. See Zhang Baichun and others, “*Qi Qi Tu Shuo de Zhishi Laiyuan* (The Sources of *Qi Qi Tu Shuo*),” in *Chuanbo yu Huitong: Qi Qi Tu Shuo Yanjiu yu Jiaozhu* (Transmission and Adaptation: Research and Commentary on *Qi Qi Tu Shuo*), ed. Zhang Baichun and others (Nanjing: Jiangsu Kexue Jishu Chubanshe, 2009), 86-153. See also Ling Wang, *Mechanical Engineering*, part 2 of *Science and Civilisation in China: Physics and Physical Technology*, ed. Joseph Needham (Cambridge, UK: Cambridge University Press, 1965), 4: 211-21.

make wise decisions. Although the content is not directly authored by the translators, their judgment regarding selection and arrangement makes their work original. Originality is also demonstrated in the titles of the pastiche translations. Because of the multiple sources used, it is impossible for the Chinese translation to bear a version of any one book title. In most cases, translators would design a new Chinese title for the pastiche that did not mirror that of any of its Western sources.<sup>298</sup> In pastiche translations, no source serves as the only major source. Every source provides a different number of sections for the translation. When arranged into a book, the different sources were mixed together. Multiple sections from one source book were sometimes neither arranged contiguously, nor in their original order. They alternated with other sources. But far from being randomly placed, each of the sections fell into a logic arrangement.

There are two types of imprints, which seemingly resemble the nature of pastiche translations, but in fact do not qualify. The first type only contained a limited number of sentences directly rendered from the original sources. This type is exemplified by four notable Chinese publications by Benjamin Hobson (1816-1873) on Western medical knowledge during the 1850s.<sup>299</sup> These books based upon his “distillation of what he considered to be the flower of British medical science,”<sup>300</sup> did not exactly quote much from any Western texts. This sort of

---

<sup>298</sup> This practice is not exclusive to pastiche translations. Sometimes, translators designed literary and attractive titles for their work which only used single Western source. For example, *A Practical Treatise on Metallurgy* was creatively provided the Chinese title *Bao Zang Xing Yan*, literally translated as “Treasures Arise from Here.” *Jin Shi Shi Bie*, literally meaning “Recognizing Metals and Stones,” was the Chinese version of the title *Manual of Mineralogy*. For a detailed elucidation of the denotation and connotation of the title *Jin Shi Shi Bie*, see Wang Genyuan and Cui Yunhao, “Guanyu *Jinshi Shibie* de Fanyi, Chubanshe Diben (Some Problems with regard to *Jinshi Shibie*),” *Zhongguo Keji Shiliao (China Historical Materials of Science and Technology)* 11.1 (1990): 91-2.

<sup>299</sup> They are *Quan Ti Xin Lun* (New Treatise on the Entire Body, English title: Outline of Anatomy and Physiology, 1851), *Xi Yi Lüe Lun* (Concise Treatise on the Western Medicine, English title: First Lines of the Practice of Surgery in the West, 1857), *Nei Ke Xin Shuo* (New Treatise on Internal Medicine, English title: Practice of Medicine and Materia Medica, 1858), and *Fu Ying Xin Shuo* (New Treatise on Women and Infants, English title: Treatise on Midwifery and Diseases of Children, 1858).

<sup>300</sup> Yi-Li Wu, “God’s Uterus: Benjamin Hobson and Missionary ‘Midwifery’ in Nineteenth-Century China” (paper presented at “The Disunity of Chinese Science” conference at the University of Chicago, Chicago, May 10-11, 2002), 4. However, Chan Man Sing and Vicky Law disagreed with Wu’s opinion on Hobson’s texts that they were

paraphrasing made for a mental “pastiche,” one that resided in the translator’s (closer to an author, in this case) mind, but not explicitly represented on the page. Another type is exemplified by *Hua Xue Chu Jie*, the making of which consulted Wells’s *Principles* besides other Western chemistry books.<sup>301</sup> However, it is still considered to be a translation of Wells’s book, because the vast majority of its text and sequencing resembles Wells’s. So it is not a pastiche product. Similarly, although *Ou Shi Nei Ke Xue* (*Osler’s Internal Medicine*) utilized some parts of Patrick Manson’s *Tropical Diseases*, it does not qualify as a pastiche, either, because Manson’s text only occupies a very small portion of the end product. It was mainly translated from William Osler’s *The Principles and Practice of Medicine*.

A number of medical publications can be categorized as pastiche translations. The four-volume *Nei Ke Xue* (1908), based upon four Western sources, is a typical example. Some sections were rendered entirely from one source. “Diseases of the Blood Vessels” in volume two, and “Disorders of Nutrition” and “Diseases of the Nervous System” both in volume four, are all taken from Frederick Taylor’s *A Manual of the Practice of Medicine*. “Diseases of the Kidneys” in volume three is an excerpt from Frederick Roberts’s *A Handbook of the Theory and Practice of Medicine*. Some other sections utilized multiple sources. For instance, “Diseases of the Liver” and “Disease of the Blood” in volume one and “Diseases of the Organs of Circulation” in volume two combined Taylor’s *Manual* and Robert Bartholow’s *Treatise on the Practice of Medicine*. “Diseases of the Organs of Digestion” in volume one and “Diseases of the

---

composed by Hobson and his Chinese collaborators directly in Chinese language. Instead, Chan and Law detected that a number of paragraphs in *Quan Ti Xin Lun* were directly translated from Western sources, such as Jean B. Cruveilhier’s *Descriptive Anatomy* (1841-1842) and William B. Carpenter’s *Animal Physiology* (1847). It is still debatable whether Hobson’s texts were translations or rewritings with a high level of creative license. See Chan and Law, “Guanyu *Quan Ti Xin Lun* (Translating Western Physiology in Late Qing China: The Case of *Quan Ti Xin Lun*)” (paper presented at the 12th International Conference on the History of Science in China, Beijing, China, June 26-30, 2010).

<sup>301</sup> Other sources include H. Bence Jones and A. W. Hofmann, *Manual of Chemistry*, 10th ed. (London: Rolfe and Gillet, 1863). Pan Jixing, *Zhongwai Kexue*, 519.

Organs of Respiration” in volume two merged Taylor’s, Bartholow’s, and Roberts’s works together. Moreover, another “grab bag” section named “Infectious Diseases,” located in both volumes three and four, featured all four authors’ works, including Austin Flint’s *A Treatise of the Principles and Practice of Medicine* (see Table 1). These four English-language works were on the same theme—the practice of medicine—and all of them contained sections that were similarly titled in *Nei Ke Xue*. What to translate may have echoed the translators’ personal preferences based upon their judgment of the quality, consideration of details and length, or suitability of each section or part from the four sources. It may also have been a decision made after extensive negotiations among the translation or editorial teams.

**Table 1.** Examples of Alternating Authors in *Nei Ke Xue*

Page Number in the Chinese Translation	Author’s Name of the English- language Source	Sections of the “Infectious Diseases” part in the Chinese Translation
Volume 3		
352	Taylor	Nature of infection, Prevention of Infection
364	Roberts	Epidemics
366	Flint	Epidemics (continued), Febricular, Typhoid fever
391	Taylor	Typhoid fever (treatment of)
394	Flint	Typhus fever
400	Roberts	Relapsing fever

406	Bartholow	Small-pox, Vaccinia and Vaccination, Chicken-pox, Measles, Rötheln, Scarlet fever, Erysipelas, Diptheria, Mumps, Whooping cough, Influenza, Hay fever, Cerebro-spinal fever
477	Roberts	Malaria, Dengue
Volume 4		
493	Taylor	Beri-beri
495	Bartholow	Cholera
503	Taylor	Plague, Rheumatism, Tetanus, Hydrophobia, Miliary tuberculosis, Scrofula

Pastiche translation sometimes demonstrates combinations of several already-translated texts. Regarding the making of *Chan Ke Xue*, a two-volume set published by the China Medical Missionary Association in 1908, translator Mary W. Niles (1854-1933) revealed that it merged part of David James Evans's *Manual of Obstetrics* and part of William Easterly Ashton's *Essentials of Obstetrics*.<sup>302</sup> Ashton's *Essentials* was translated earlier by John Kerr and Yin Duanmo, and published as *Tai Chan Ju Yao* in 1894, one among Kerr's series of medical textbook translations. At that time, Mary Niles, a specialist in obstetrics, assisted Kerr at the Canton Hospital. They together designated this translation as the standard textbook which was

---

<sup>302</sup> Mary W. Niles, English preface to *Chan Ke Xue*, trans. Mary W. Niles, John G. Kerr, and Yin Duanmo (Shanghai: Medical Missionary Association of China, 1908), 1.

then used in Canton and its vicinity for more than a decade.<sup>303</sup> However, Kerr passed away in 1901 before the Association could ask him to revise his translation for publication in the Association's textbook series. So, the work was handed over to Niles. She considered the revision urgent, because she was afraid that Kerr's translation would be obsolete and abandoned due to advances in medical knowledge. By then, she had translated part of Evans's *Manual*, a book more up-to-date than Ashton's. She rescued Kerr's *Tai Chan Ju Yao* by selecting "a quarter" of it that was still practicable,<sup>304</sup> revising these chapters, and inserting them inside her own translation of Evans. It was "mutually agreed by the representatives of the Canton Medical Missionary Society and the Medical Missionary Association of China" that Niles's final product containing combined texts would replace Kerr's former textbook.<sup>305</sup> In *Chan Ke Xue*, two translated Chinese-language texts intertwined together to form a pastiche. Kerr's text, rather than appearing as a discrete appendix, was scattered throughout Niles's.

Atlases naturally lent themselves to pastiche treatment. There were a number of important atlases printed during the early twentieth century which offered an unprecedented comprehensive selection of sources for making pastiche translations. These atlases were mostly collections of maps of different areas throughout the world. They were rendered from multiple sources published in a broad range of geographical areas. For example, the milestone atlas *Zhong Wai Yu Di Quan Tu*'s<sup>306</sup> featured sources from Germany, Britain, France, Russia, and Japan. This colossal work was initiated between 1886 and 1887, and completed in 1903 by the Society for Translating and Printing Western Maps founded by Zou Daijun 鄒代鈞 (1854-1908)

---

<sup>303</sup> Xu Songcheng, Chinese preface to *Chan Ke Xue*, 1.

<sup>304</sup> *Ibid.*, 1.

<sup>305</sup> Niles, English preface to *Chan Ke Xue*, 1. The conditions of this agreement were also seen in "The Work of the Publication Committee," *China Medical Missionary Journal* 5 (1906): 222; "Report of the Publication Committee of the Medical Missionary Association of China," 3 (1907): 147.

<sup>306</sup> The version I accessed was published in 1908. However, Zou's preface was dated 1903.



in 1895, a prominent cartographer and geographic activist in China.<sup>307</sup> In 1885, Zou obtained the opportunity to accompany a Chinese diplomatic team to Britain and Russia. On his trip, Zou purchased a large number of maps published in various countries, which later became the resources of the Society's map-making projects. In the preface of *Yu Di Quan Tu* dated October 1903, Zou revealed the sources adopted for translating and compiling. For *Yu Di Quan Tu*'s portion on China, besides some Chinese-made maps produced during the high and late Qing that were recognized as high-quality and updated ones, Zou also chose the maps of six provinces (Shengjing 盛京, Zhili 直隸, Shandong 山東, Shanxi 山西, Henan 河南, and Shaanxi 陝西) made by German cartographers, the maps of three rivers (the Yangtze River, the White River, and the West River) and sea coasts by the British Navy, a map of Tibet by the British, the war maps of northeast China (including Shengjing and Shandong) and Korea by the Japanese, and the maps of three provinces in the northeast China, Mongolia, and Xinjiang 新疆 by the Russians. Using the sources recording China's land and geography but made by foreigners demonstrates Zou's high standard of quality set for his compilation. The Chinese-made sources, upon which *Yu Di Quan Tu*'s section of Chinese district maps was based, included Hu Linyi 胡林翼 (1812-1861)'s *Huang Chao Zhong Wai Yi Tong Yu Tu* 皇朝中外一統輿圖 (*Unified Maps of China and Foreign Countries in the Imperial Dynasty*) and the newly made provincial maps submitted by local governments to *hui dian guan* 會典館 ("Office for the Compilation of the Statutes") of the Guangxu 光緒 (1875-1908) Reign, an imperial institute resumed in 1886 and

---

<sup>307</sup> This Society (Chinese name: "Yi Yin Xi Wen Di Tu Gong Hui") was established in 1895. It was the first geographical society in China during the late Qing period. The Society modified its name later in 1898 to "yu di xue she" ("Geographical Society"). The character for "Western" in the society's name may refer to both the conventionally recognized Western world, such as European countries, and China's neighboring countries, such as Japan and Russia, although which (or large part of which) are geographically located in the East.

responsible for a nationwide survey that issued standard maps.<sup>308</sup> Hu's atlas, although a classic in Chinese cartography and once officialized by the government, inherited old editions published more than one hundred years ago. *Hui dian guan*'s maps, although summoned by the emperor's court in response to a national need for precise maps, was only "partially based on modern surveying techniques."<sup>309</sup> While distilling the best from these Chinese-made atlases, Zou had to consult a number of Western-made Chinese maps in order to compensate for the deficiencies of Hu's and *hui dian guan*'s versions among others. It was far from coincidental that the four countries producing area maps of China had all involved themselves in or were preparing for warfare with China, or had colonized parts of China at the time when they were drawing up their maps: Germany owned part of Shandong province; Britain's power penetrated into the inland alongside the Yangtze River; Japan and Russia had long been harassing northeast China and had fought with each other on China's soil over her territory. Having an accurate geography of the targeted country was tremendously strategic to colonizers or those on the offensive in wartime. Their observations and surveys that led to the production of maps, ironically, guaranteed high quality and sophistication. It is a bitter fact that Zou employed these maps, the byproduct of foreign countries' bellicosity, to exhibit to Chinese audience the precise look of their motherland.

Zou Daijun's meticulous selection from various Western sources for compiling *Yu Di Quan Tu*'s portion on foreign countries also shows his pursuit of precision. First and foremost, Zou had a strong preference for maps based upon professional and rigorous surveys. "Survey is

---

<sup>308</sup> During the Qing Dynasty, compilation of statutes (*hui dian*) was conducted in five emperors' reigns: Kangxi (1662-1722), Yongzheng (1722-1735), Qianlong (1736-1795), Jiaqing (1796-1820), and Guangxu. Although a renewed *hui dian* enterprise was already proposed during Tongzhi (1862-1874) Reign, the actual compilation did not commence until 1886. For a comprehensive account of *hui dian* maps produced under Guangxu Reign, see Wang Yifan, "Qingmo Dili Da Cehui: Yi Guangxu Huidian Yutu wei Zhongxin de Yanjiu (Grand Survey during the Late Qing Period: Research on the *Hui Dian Atlases* of the Guangxu Reign)" (PhD diss., Fudan University, 2011).

<sup>309</sup> Iwo Amelung, "New Maps for the Modernizing State: Western Cartographic Knowledge and Its Application in 19<sup>th</sup> and 20<sup>th</sup> Century China," in *Graphics and Text in the Production of Technical Knowledge in China*, ed., Francesca Bray, Vera Dorofeeva-Lichtmann, and Georges Métaillé (Leiden: Brill, 2007), 685-726, qt. on 703.

the prerequisite of map making,” he stated, “it is possible for one country or one town to survey its own land; however, it is unrealistic to survey the whole world so that we have to adopt maps published everywhere in the world.”<sup>310</sup> Meanwhile, Zou was upset by the unreliable quality of world maps published in China before the establishment of the Society of Translating and Printing Western-Language Maps, such as *Ying Huan Zhi Lue* 瀛寰志略 (A Short Treatise on the Ocean Circuits, first published in 1848) by Xu Jiyu 徐繼畲 (1795-1873) and *Hai Guo Tu Zhi* 海國圖志 (Illustrated Treatise on the Sea Kingdoms, first published in 1843) by Wei Yuan 魏源 (1794-1857), despite their high regard and influence during the late nineteenth century.<sup>311</sup> Although all these early geographic accounts were reportedly adapted from Western sources, Zou thought they deviated too much from the originals. Moreover, their scales were too small to allow for a full disclosure of topographical details. He also thought that recent world atlases published by commercial printing shops, including *Wan Guo Yu Tu* and *Zhong Wai Di Yu Tu Shuo*, deserved no attention, because they were extremely rough and flawed. They were merely products made for profit.<sup>312</sup> After thorough evaluation of all the sources available to him, Zou favored German-made atlases, especially those depicting Europe and the Americas, as the sources for his own translation due to their “extremely exquisite” quality and long-standing reputation in the West. However, these atlases did not detail all the territories throughout the world. To eliminate their blind zones, Zou searched for single maps published in other countries. For example, during his trip to the West in 1885, he selected Russian-made maps of Middle

---

<sup>310</sup> Zou Daijun, Preface to *Zhong Wai Yu Di Quan Tu*, 3a.

<sup>311</sup> For detailed research on Xu Jiyu's *Ying Huan Zhi Lue* and Wei Yuan's *Hai Guo Tu Zhi*, see Fred W. Drake, *China Charts the World: Hsü Chi-yü and His Geography of 1848* (Cambridge, MA: East Asia Research Center, Harvard University, 1975); Jane K. Leonard, *Wei Yuan and China's Discovery of the Maritime World* (Cambridge, MA: Harvard University Press, 1984); Jessie G. Lutz, “China's View of the West, A Comparison of the Historical Geographies of Wei Yuan and Xu Jiyu,” *Social Sciences of Missions* 25 (2012): 35-52.

<sup>312</sup> Zou Daijun, “Yi Yin Xiwen Ditu Zhaogu Zhangcheng (Share Issuing Prospectus for Translating and Printing Western Maps),” *Shiwu Bao*, 14 July (lunar calendar, 22 August by Gregorian calendar) 1896.

Asia, British-made maps of Siam, Burma, India, Persia, Afghanistan, Baluchistan, Arab, Australia, South Africa, and Canada, and French-made maps of Vietnam. Curiously, the relationship between the mapped area and the nationalities of their cartographers reflects the political geography of the world during the late nineteenth century: Russia's expansion in Middle Asia, Britain's colonization of vast portions of the world's territories and control over the Commonwealth, and France's domination of Vietnam. Zou seemed to be well informed of the contemporary global order. Ironically again, the best quality maps were made by and for the conquerors.<sup>313</sup>

Zou Daijun's *Yu Di Quan Tu* became a model for subsequent makers of pastiche maps in China. The pastiche map book *Er Shi Shi Ji Zhong Wai Da Di Tu* 二十世紀中外大地圖 (*Grand Maps of China and Foreign Countries in the Twentieth Century*) is also a product of translators' concern about precision. This world atlas was compiled and edited by Zhou Shitang 周世棠 (1871-1941) and Sun Haihuan 孫海環 (1876-1929), lithographed in Osaka, Japan, and distributed by the headquarters of the Society for New Learning in Shanghai and Ningbo. Zhou and Sun stated in the preface of the atlas, dated 1906, that by utilizing multiple sources and choosing only nectar of each source, "we aim for reality, never daring to fabricate."<sup>314</sup> For depicting the three provinces in northeast China, they selected as sources, maps made by Japan's military headquarters and a Russian-made map of Manchuria. *Zhong Wai Da Di Tu*'s maps of the six continents were edited and translated from more than ten English-language or Japanese maps, such as John George Bartholomew's *Twentieth Century Citizen's Atlas of the World*,

---

<sup>313</sup> James R. Akerman, ed., *The Imperial Map: Cartography and the Mastery of Empire* (Chicago: University of Chicago Press, 2009); Laura Hostetler, *Qing Colonial Enterprise: Ethnography and Cartography in Early Modern China* (Chicago: University of Chicago Press, 2001).

<sup>314</sup> Zhou Shitang and Sun Haihuan, *li yan* ("guide to readers"), *Er Shi Shi Ji Zhong Wai Da Di Tu*, 2.

George Philip's *Philips' New Handy General Atlas of the World*, *Times Atlas*, and *Bankoku Shinzu* 萬國新圖 (*New Maps of Ten Thousand Countries*) edited by Onuki Keiji 小貫慶治.<sup>315</sup>

Instead of the more common practice of having Western immigrant translators—part of a team with Chinese collaborators—control the selection, Chinese natives working on their own were the ones who determined the sources for Zhou and Sun's atlases and also for Zou's *Yu Di Quan Tu*. The translation process was completed by all-Chinese teams.

### 3.2 CHANGES MADE TO THE ORIGINAL TEXT FOR TRANSLATING

After a painstaking process of locating and selecting original sources, translators would have to live with the ramifications of their decisions for another long and difficult period of time. In many cases, the translators did not render the source word for word into Chinese, which was, itself, difficult enough. Instead, they made changes to the original text by omitting, supplementing, and adjusting. The final Chinese text presented to the audience was a product mediated with translators' deliberations over renovation and their indigenization of knowledge to make text more accessible.

---

<sup>315</sup> John George Bartholomew, *The Twentieth Century Citizen's Atlas of the World* (London: George Newnes. Ltd., 1903); George Philip, *Philips' New Handy General Atlas of the World* (London: George Philip & Son, 1897); Times, *The Times Atlas* (London: Times, 1896); Onuki Keiji, *Bankoku Shinzu: Nichiei Taishō (Japanese-English New Maps of Ten Thousand Countries)* (Tōkyō : Yoshikawa Hanshichi, 1899). Zhou and Sun's *li yan* mistakenly recorded 小貫慶治 as 小貫慶一 (Onuki Keiichi).

### 3.2.1 Omission

One remarkable feature of many school textbooks published during the late nineteenth century in the West was the “Question” footnote at the bottom of each page. It helped students to summarize the entire page’s information by asking them relevant questions at different levels, from easy, medium, to difficult. It also offered an easy tool for immediately reviewing and checking the knowledge just learned. However, this feature was omitted in most translations of Western textbooks, including two Chinese versions of David A. Wells’s *Principles and Applications of Chemistry*: John Fryer and Xu Shou’s *Hua Xue Jian Yuan* published in Shanghai (1871), and John Kerr and He Liaoran’s 何瞭然 *Hua Xue Chu Jie* published in Canton (1871-1875).<sup>316</sup> Wells’s original text carried page-by-page “Question” footnotes which reflected the goal of the book—“prepared with special reference to the wants of students in Academies, Seminaries, and Colleges.”<sup>317</sup> But coincidentally, Fryer’s and Kerr’s teams together eliminated this feature. The reasons for the omission were manifold. Given the traditional Chinese format of the book page, the Western footnote should be arranged vertically following the text. That would mean placing them in the last several vertical lines towards the left hand side of each half *ye*. But when footnote lines appeared in the half *ye* before page turn, the text on the entire *ye*, which is meant to be an intact unit at the block carving phase despite being later folded into two halves, would be regularly interrupted. Thus, imitating the visual effect of Western pages became impossible. Translators also did not consider using the format of traditional Chinese in-text annotation in smaller font size after each sentence, word, or character that needed

---

<sup>316</sup> The publishing of the four-volume (*ce*) *Hua Xue Chu Jie* spanned nearly five years. The first two volumes were issued in 1871, the third volume in 1872, and the fourth in 1875.

<sup>317</sup> Wells, preface to *Principles and Applications of Chemistry* (New York: Ivison & Phinney, 1858), iii.

explanation. Moreover, since it was technically difficult to control the length of content on one Chinese *ye* (visually equivalent to one Western page) to make it exactly the same as on one Western page, it was equally intricate to insert the questions in vertical columns right after the translation of each English-language page—wherever that might land on the Chinese *ye*—without destroying the flow of text. These technical issues might have accounted for deleting question footnotes. They did not even resort to the *tian tou* space, which usually served as the container for additional comments in the traditional Chinese book and seemed to be the best solution. The more essential reason for deleting questions would be translators’ strategies for expanding the translated book’s audience. Displaying questions frequently inside the text might lead one to consider the book as a pedagogical imprint, especially for a primary school student. This format might not attract those readers who no longer positioned themselves as novice learners whose acquisition of knowledge greatly relied on the printed embodiment of teachers’ instruction. Omitting the very feature that suggested the book’s genre concealed its original identity. By doing so, translators could expect greater audiences than those restricted to primarily science students who were still rare in China in the early 1870s. During the life span of Wells’s *Principles*, the publisher could count on educational markets to make it sell well in America, since basic science courses were required during the mid and late nineteenth century in public schools.<sup>318</sup> However, this plan was not adaptable in China because Western science schooling was still in its infancy at that time. Translators’ subversion of the original text’s purpose at least helped the short-term marketing of their translation.

Another practice of omission rises from translators’ attempts to filter out, what they thought was only the most important and helpful information from the original sources. For

---

<sup>318</sup> John A. Nietz, *The Evolution of American Secondary School Textbooks* (Rutland, VT: C. E. Tuttle, 1966), 1-2.

example, the 1911 edition of *He Shi Liao Xue* eliminated numerous encyclopedia-like entries of medical terms, the decision mostly likely, of its translator James H. Ingram after judging their usefulness given the contemporary status of diseases and foreign medication availability in China. Another example of omission concerns Western typographical design. Wells's *Principles* used different font and type sizes for important summaries of chemical principles, crucial nomenclatures, and major experiments, and for their elucidations. These interpretive paragraphs, printed in smaller type size, appeared on every page, and sometimes were even over ten times longer than the key text above them. Given that the explanatory text occupied the majority of Wells's book, John Fryer and Xu Shou reserved a significant amount of it in *Hua Xue Jian Yuan*. But they shortened some excessively long paragraphs. Small type was adopted not only for elucidations, but also for some relatively subsidiary points of information, which were led by Arabic numerals in the same way the key information was treated. Fryer and Xu, however, translated almost all of them, in order to keep the entire structure of the original book intact. Unlike Fryer and Xu, Philip Cousland coped with smaller-font text in an arbitrary way when translating the sixth edition of Halliburton's *Handbook of Physiology* (1904) into an abridgement, *Ti Gong Xue* (1905). In the preface dated 1904, Halliburton stated the outcome of the cooperation between him and his publisher:

I have taken advantage of the alteration in the size of the page and of the type which Mr Murray has thought wise to adopt, to make considerable changes in the present edition. I have throughout, however, endeavoured to remember that the main object of the work is to supply students with a complete but elementary text-



book. Sections which treat of what may be termed ‘advanced work’ have therefore been made as brief as possible, and have been inserted in small print. The student on reading the book for the first time will find it best to omit these passages. When he has mastered the continuous story told in the large text, he will then be able to study what is given in small type.<sup>319</sup>

The publisher John Murray’s suggestion for using two different sizes of font resulted in a new method of text manipulation in the current edition.<sup>320</sup> Halliburton, for the first time, attempted to differentiate advanced knowledge from the fundamental. He might have never known that his effort facilitated the making of the Chinese edition of his book. It was fortunate for Cousland to adopt the sixth edition of the *Handbook of Physiology*, because he did not have to make a decision concerning knowledge evaluation, but simply omitted all the paragraphs already set in smaller font size. By doing so, Cousland eliminated the more sophisticated information, and thereby made his book more accessible to junior medical students. This truncating also made *Ti Gong Xue* more practical at a basic level. It might have been a little cheaper as well.

However, the work of omitting original text in *Ti Gong Xue* was not brought to an end after cutting the small-type words. Some sections, such as Chapter 16 on electrotonus (i.e., electric currents through nerves, pages 179 to 189 in *Handbook*) and Chapter 50 on comparative

---

<sup>319</sup> W. D. Halliburton, preface to *Handbook of Physiology*, 6<sup>th</sup> ed. (London: John Murray, 1904), vii.

<sup>320</sup> John Murray was a renowned publisher in England since the late eighteenth century for seven generations until it was acquired by Hodder Headline in 2002. For a history of early John Murray, see William Zachs, *The First John Murray and the Late Eighteenth-Century London Book Trade: With a Checklist of His Publications* (Oxford: Oxford University Press, 1998).

physiology of the brain (pages 710 to 713 in *Handbook*), was not included. There were also a large number of condensations. For example, Chapters 9 to 14 on muscle,<sup>321</sup> occupying in all 56 pages (105 to 160), were tightly condensed to comprise less than two leaves (pages 45-48) in the Chinese translation. And those chapters were not marked as in the original source. Cousland explained the reason for these treatments: “This is unavoidable, as some subjects require complicated apparatus and other are hardly needed at the present stage of Chinese medical education.” The availability of other publications covering certain topics was also excuse for not including them in translations—“The gross Anatomy of the Heart and Nervous System has been omitted,” said Cousland, “as the student can always refer to Dr. Whitney’s *Anatomy*.”<sup>322</sup>

Eliminating unnecessary knowledge was also common. The criteria for what was necessary was rather subjective, based upon translators’ personal judgment and vision of the end product. For example, some chapters on toxicology disappeared from *He Shi Liao Xue*, the Chinese translation of Hobart Amory Hare’s *A Text-book of Practical Therapeutics*. Its translator James H. Ingram stated in the preface to the first edition, dated December 1907, that “part of the science of toxicology which treats of the recognition of poisons in the dead body, or in food and drink, belongs to the domain of the chemist, and is not included in this work.”<sup>323</sup> Ingram thought that understanding toxicology was a professional requirement for chemists, rather than medical practitioners and pharmacists, whom he expected to be the major beneficiaries of this book. The loose relationship between the book’s knowledge and Ingram’s target audience marked some parts as unnecessary for translating. The criteria for what was

---

<sup>321</sup> The titles of these five chapters are “Contraction of Muscle,” “Change of Form in a Muscle When It Contracts,” “Extensibility, Elasticity, and Wore of Muscle,” “the Electrical Phenomena of Muscle,” “Thermal and Chemical Changes in Muscle,” and “Comparison of Voluntary and Involuntary Muscle.”

<sup>322</sup> Cousland, preface to *Ti Gong Xue*, 1. “Dr. Whitney’s *Anatomy*” refers to Henry T. Whitney’s *Ti Xue Xin Bian* (*A New Version of Physiology*) published in 1904, a revision of Osgood’s *Quan Ti Chan Wei* (1881).

<sup>323</sup> James H. Ingram, preface to the first edition of *He Shi Liao Xue* (1907), trans. James H. Ingram (Shanghai: China Medical Missionary Association, 1911), 1.

necessary also involved the indigenization of knowledge. Travelling knowledge that was functional in one geographical area or culture might not be in another setting.<sup>324</sup> This was especially true in medical knowledge adaptation. For instance, Philip B. Cousland explained in his translation of William Osler's *Principle and Practice of Medicine*, that "Etiological theories and morbid anatomy have as a rule been condensed and such matter as is only appropriate to the West has been omitted."<sup>325</sup> Cousland also wrote in his letter to Osler: "The condensations and omissions in the book are almost entirely confined to such historical and geographical references as could not be easily grasped by the Chinese student and to some etiological and pathological theories and parts of the pathology and morbid anatomy."<sup>326</sup> *Nei Ke Quan Shu* reveals how the translator-compiler John Kerr omitted from multiple sources on diverse ailments—"All the diseases discussed in this set of volumes are selected from the ones that have cases in China. Among them, there are some only happening in southern and warm lands, and some only in northern and cold lands. We never included and translated any diseases that have not appeared in China."<sup>327</sup> Consequently, all the remedies and prescriptions related with these non-Chinese diseases were neglected. Similarly, in the 1910 edition of *Ou Shi Nei Ke Xue*, "Diseases rare or unknown in China have been dealt with somewhat tersely.... The geographical distribution and incidence in China have been given as far as could be ascertained."<sup>328</sup> Some ailments did not "travel" to China, nor did some medications. In *He Shi Liao Xue*, the translator ignored a

---

<sup>324</sup> Marie-Noëlle Bourguet, Christian Licoppe, and H. Otto Sibum, ed., *Instruments, Travel and Science: Itineraries of Precision from the Seventeenth to the Twentieth Century* (London: Routledge, 2002).

<sup>325</sup> Cousland, preface to *Ou Shi Nei Ke Xue*, 1.

<sup>326</sup> Richard L. Golden, *Osler and Oriental Medicine: A Discursive Review* (Princeton, NJ: Science Press Association, 1982), 7. Original quote from P. B. Cousland to William Osler, July 29, 1910, Osler Library of the History of Medicine, McGill University, Montreal, Canada.

<sup>327</sup> John G. Kerr and Kong Qinggao, trans., *Nei Ke Quan Shu, zong li* ("general instruction") (Canton: Bo Ji Yi Ju, 1882), 2b. Translated by the author. *Nei Ke Quan Shu* was sometimes referred as *Xi Yi Nei Ke Quan Shu* (*Xi Yi* means "Western Medicine.")

<sup>328</sup> Cousland, preface to *Ou Shi Nei Ke Xue*, 1.

number of drugs, especially those with specific brand names that had not been available in China, and those remedial foods and beverages that were common in the West but not applied in China.

Sometimes, omission was not an option, but a requirement—just as what a responsible editor would do to a manuscript containing extraneous materials. A translator's failure to make edits would even incur criticism from keen eyes. The art of removing parts became a criterion by which to judge translators and their work. After acknowledging all the work's merits, a reviewer of S. A. Hunter's *Wan Guo Yao Fang* 萬國藥方 (*The Prescriptions of Ten Thousand Countries*) for the *China Medical Missionary Journal*, ultimately expressed his disappointment: "Nevertheless, ... one can not but feel sorry the author did not allow himself the privilege of excluding those drugs and preparations which are of no practical use, and of augmenting the descriptions of the more important drugs so that the book might be of use to the Chinese."<sup>329</sup> The reviewer conceived translating as not just the work of "scribes" that passively follow the original works, but also an active process that should involve critical evaluation of the practicality of every detail. It was translators' responsibility to amplify the usable content and minimize the non-usable. However, hapless translator S. A. Hunter's faithfulness to the original work made him a target for J. B. Neal's review of the sloppily "edited" book.

---

<sup>329</sup> J. B. Neal, "A Manual of Therapeutics and Pharmacy in the Chinese Language, being in the main a Translation of Squire's 'Companion to the British Pharmacopæia,'" review of *Wan Guo Yao Fang*, translated by S. A. Hunter, *The China Medical Missionary Journal* 5 (1891), 36-38, qt. on 37. *Wan Guo Yao Fang* was mainly translated from Peter Squire's (1798-1884) *Companion to the British Pharmacopæia*.

### 3.2.2 Additions

Omissions from original sources are instantiations of translators' editorial thoughts. But additions of what did not appear in original Western sources showcase translators' creativity, sense of responsibility to readers, and indigenizing efforts.

Translators occasionally supplemented the original Western works with new knowledge. In this case, the version before the Chinese audience was more up-to-date than what Western readers were able to see. *Hua Xue Jian Yuan* is a representative example. This translation introduced four chemical elements that cannot be detected in Wells's *Principles*. In volume three, Fryer and Xu presented Caesium, discovered “ten years ago” (i.e., 1860) by chemist Robert Bunsen (1811-1899), and Rubidium, discovered by Gustav Kirchhoff (1824-1887) in 1861.<sup>330</sup> Also in volume four, they brought in another two elements—Indium, “contained in mines from Germany” and discovered in 1863, and Thallium, isolated by William Crookes (1832-1919) “nine years ago” (i.e., 1861).<sup>331</sup> All these elements were detected by adopting spectroscopy. Although using only less than two *ye*'s space for all four elements' chemical properties, Fryer and Xu gave a more complete picture of the current state of chemistry. It has been speculated that the reason for Fryer and Xu's addition is that they employed a newer edition of Wells's *Principles*.<sup>332</sup> However, based upon my comparison between the first edition in 1858 and some later ones printed in 1862, 1863, 1867, and 1872, I found that they did not bear any

---

<sup>330</sup> Wells, *Hua Xue Jian Yuan*, vol. 3, 16. *Hua Xue Jian Yuan* was published in 1871, but was translated in 1870. Therefore “ten years ago” refers to 1860, but not 1861. In fact, Caesium and Rubidium were discovered by both German chemists Bunsen and Kirchhoff.

<sup>331</sup> For Indium, see Wells, *Hua Xue Jian Yuan*, vol. 4, 8; for Thallium, see vol. 4, 15. Thallium was discovered by British chemist and physicist William Crookes and French chemist Claude-Auguste Lamy (1820-1878) independently in 1861.

<sup>332</sup> Wang Yangzong, “Guanyu Huaxue Jianyuan yu Huaxue Chujie (On Huaxue Jianyuan and Huaxue Chujie),” *Zhongguo Keji Shiliao* 11.1 (1990): 84.

changes in text, except for some slight differences in their title pages.<sup>333</sup> The later English-language editions were all issued as reprints, rather than revisions. Therefore, the addition should be solely credited to the translators' activities. In a sense, Fryer and Xu completed the revision for Wells. This case illustrates translators' responsibility to the integrity of scientific development. Translating did not mean dogmatically following the original. On the contrary, with critical eyes, Fryer and Xu saw a threshold for improving their source. Besides questioning, they had to keep learning and absorbing new academic currents in order to bridge a twelve-year time gap (1858-1870) between the publishing of Wells and the initiation of the Chinese translation. Their sensitivity to new knowledge allowed them to make timely updates.

A number of additions exhibit translators' attempt to indigenize the book's content. For example, *Nei Ke Xue* (1908) included a full-page reprint of the Shanghai Municipal Council's public notices on preventing infectious diseases, such as small-pox, cholera, diarrhea, diphtheria, scarlet fever, measles, consumption (tuberculosis), plague, and malaria. It was placed inside the sections on infection, and appeared on an especially long *ye* with only one side bound into the gathering. Page 359 appeared as a regular half *ye*, while the much longer page 360 contained the notice which could be neatly folded when the book was closed. These notices were issued by the Public Health Department of the Shanghai Municipal Council. The Council, which was

---

<sup>333</sup> All of these editions bear "Entered, according to Act of Congress, in the year 1858, by Ivison & Phinney, in the Clerk's Office of the District Court for the Southern District of New York" and "Electrotyped by T. B. Smith & Son, 82 & 84 Beekman-street, N.Y." on the back of their title pages. The 1858 and 1862 editions also bear "Printed by J. D. Bedford & Co., 115 & 117 Franklin-street" on the back of their title pages. The 1862 and 1863 editions contain "Fifth Edition" on their title pages. The publishing houses of different editions had gone through changes. Those of the 1858 edition are "New York: Ivison & Phinney, 321 Broadway; Chicago: S. C. Griggs & Co., 39 & 41 Lake St; Cincinnati: Moore, Wilstach, Keys & Co; St. Louis: Keith & Woods; Philadelphia: Sower, Barnes & Co.; Buffalo: Phinney & Co; Newburg: T. S. Quackenbush." Those of the 1862 edition are "New York: Ivison, Phinney & Co, 48 & 50 Walker Street; Chicago; Boston: Brown, Taggard & Chase; Philadelphia: Sower, Barnes & Co, and J. B. Lippincott & Co; Cincinnati; Savannah: J. M. Cooper & Co.; St. Louis; New Orleans: Bloomfield, Steel & Co; Detroit: F. Raymond & Co." Those of the 1863 edition are "New York; Chicago." Those of the 1867 edition are "New York: Ivison, Phinney, Blakeman & Co; Chicago: S. C. Griggs & Co." Those of the 1872 edition are "Ivison, Blakeman, Taylor & Co., New York and Chicago."

established in 1854 to function as the “self-government” of the Shanghai International Settlement, started its integrated public health policy-making in 1861, appointed the first officer of public health in 1870, and set up the Department in 1898.<sup>334</sup> These notices went into effect around the time of *Nei Ke Xue*’s publication, as recorded in the 1907 Report of the Council. The Health Officer released two versions of the “Public Health Notice”—the one in the English language for foreigners, and another one for the native Chinese residents in the Settlement. Both of them included “Public Measures” concerning sanitary inspection, nuisances, isolation, and disinfection, and “Individual Measures” regarding food, vegetable and fruit, water, mosquitoes and flies, refuse, yards and drains, spitting, and vaccination.<sup>335</sup> *Nei Ke Xue*’s notice was a combination of the above mentioned Chinese-language “Public Health Notice” and another notice on “prevention of tuberculosis” distributed among the Chinese native population.<sup>336</sup> Being positioned after pages on the transmission of infectious disease and prevention of infection translated from Western sources, the Chinese notices demonstrate that the translators were aware of the universality of public health practices. By juxtaposing the foldable notice with the preceding page that explained how to notify officials about an epidemic’s spread in Britain, the translators encouraged their audiences to learn and follow the instructions on sanitation and prevention at home. The notice even included the address of the Health Officer of the Municipal Council, the Municipal Hospital, and places where residents could receive small-pox vaccinations for free. *Nei Ke Xue* was published and printed first in Shanghai, the origin of this

---

<sup>334</sup> Yu Xinzhong, “Night Soil in Modern China,” in *Health and Hygiene in Chinese East Asia: Policies and Publics in the Long Twentieth Century*, ed. Angela Ki Che Leung and Charlotte Furth (Durham, NC: Duke University Press, 2011), 59.

<sup>335</sup> Shanghai Municipal Council, *Report for the Year 1907 and Budget for the Year 1908* (Shanghai: Kelly & Walsh, Limited, 1908), 66-8. “Public Health Notice for Foreigners” is on 66 and 67. The English translation of “Public Health Notice for Chinese” is on 67, followed by its Chinese version on 68.

<sup>336</sup> *Ibid.*, 81. An English translation of this notice is attached on 82.

notice. The translators might have hoped to promote these methods outside the Settlement through broader dissemination of this book.

Some efforts to indigenize would help readers navigate technical language. During the late nineteenth and early twentieth centuries, Western measurement standards, such as those of length, size, weight, and temperature, were being popularized in China. But even in the West, a translator complained, “it is unfortunate that the weights and measures in common use, by the medical profession, in the United States and England, are not the same.”<sup>337</sup> Likewise, the coexistence of various Western and the traditional Chinese systems created confusion. When books using Western measurement units were brought to China, it was the translator who primarily had to add explanatory text to facilitate the conversion among divergent systems. For example, before the main text commenced in *Yi Fang Hui Bian* 醫方彙編 (*The Compilation of Medical Prescription*, a translation of Sir William Whitla’s *Dictionary of Treatment*),<sup>338</sup> there was an excessively long table of weights and measures in both English and Chinese-language.<sup>339</sup> It offered an exhaustive comparison between the British, Metrics, and traditional Chinese units of measurements, in order “for the readers to familiarize themselves with all the differences.” Therefore, “they are able to follow the prescriptions in this book, and get exact amounts of medication without terrible mistakes.”<sup>340</sup> Similarly, a demonstration of conversion between Chinese and British measurements, such as foot to *chi* 尺, mile to *li* 里, *jin* 觔 to pound, and *liang* 兩 to ounce, is also attached at the end of the volume 2 of *Hua Xue Chu Jie*. In *Ru Men Yi*

---

<sup>337</sup> Ingram, preface to *He Shi Liao Xue*, 1.

<sup>338</sup> William Whitla, *Yi Fang Hui Bian*, trans. D. Duncan Main (Shanghai: Guangxuehui, 1896).

<sup>339</sup> It included “British (Official) Weights and Measures with their Metrical Equivalents,” “Weights and Measures of the Metric System,” “Relation of the Metric Weights to the Weight of the British Pharmacopœia,” “Relation of the Metric Measures to the Measures of the British Pharmacopœia,” “Relation of English to Metric Measures,” “Relation of English to Metric Weights,” “Relation of Metric to English Weights,” “Relation of Metric to English Measures,” “Relation of Fahrenheit to Centigrade Degrees,” and “Relation of Centigrade to Fahrenheit Degrees.”

<sup>340</sup> D. Duncan Main, *fan li*, *Yi Fang Hui Bian*, 2. Translated by the author.



*Xue*, the translators added special notes in the reader's guide to clarify the unit conversion issue. They chose not to render the Western measurement units into Chinese ones for the sake of concision. For example, decimal fractions with many digits would occur after conversion. It would not only generate chaos on the page, but also possible inaccuracies when the drug was weighed. The translators also recommended that Chinese readers purchase, from nearby Western pharmacies, graduated cylinders which were not used in traditional China medical practices for measuring liquids.<sup>341</sup>

The indigenizing effort that made reading about technical knowledge easier can also be represented by a section on Western music instruction in *Sheng Shi Pu*, by Julia Brown Mateer (1838-1898). The wife of the famous missionary Calvin Wilson Mateer (1836-1908) based in north China (especially Shandong Province), she contributed tremendously to music education and music missionary work. Her compiled hymn book *Sheng Shi Pu* was first published in 1872, and revised and enlarged at least three times—in 1892, 1905, and 1913.<sup>342</sup> In fact, it was not only a tune book of selected translated hymns, but an introduction to Western musical principles and notation. The purpose of this hymnal is revealed in Mateer's 1872 Chinese-language preface. First, she realized that introducing only hymns without lessons on Western musical fundamentals, rendered the musical evangelism incomplete: "Recently, some Christians published books on Western music. Although they covered the tunes of hymns, they did not elaborate and clarify every principle and every method."<sup>343</sup> Second and more evidently, she considered pedagogy as the hymnal's outstanding feature: "The original purpose of making this

---

<sup>341</sup> *Ru Men Yi Xue*, fan li, 2a.

<sup>342</sup> For Julia Mateer's contribution to music education and the wide circulation of *Sheng Shi Pu*, see Robert McCheyne Mateer, *Character-Building in China: The Life Story of Julia Brown Mateer* (New York: Fleming H. Revell Company, 1912), 71-2.

<sup>343</sup> Julia B. Mateer, preface to *Sheng Shi Pu*, 2. Translated by the author.

book is to help masters everywhere teach their students and Christian converts to sing hymns, as well as ... to endow Chinese converts, who are able to sing, with a good method. With this method, they can learn to sing, and they can teach their friends to sing, so that people can sing hymns and praise the Father together.”<sup>344</sup> To this end, Mateer drafted, in straightforward and concise colloquial language, a section titled “*Yue Fa Qi Meng*” 樂法啟蒙 (*The Enlightenment of the Methods of Music*) and placed it before the collection of hymns. This section utilized the “Question and Answer” format similar to that of some primary school textbooks and Christian catechisms, accompanied by examples of Western notation, staves, and symbols. This 44-page orientation extensively discussed the basics of Western music and vocal performance, including in all 282 questions, grouped into eighteen topics. Moreover, she supplemented this section with twenty-five short pieces of music for testing knowledge and practicing singing, all using shape notes and the five-line staff. In the majority of the singing exercises, lyrics were simple, repetitive, and sometimes nonsensical. But some of them were traditional Chinese folk songs, transcribed and rearranged by Mateer in the Western manner. These exercises were meant to familiarize readers with the Western presentation of music. By elucidating Western music fundamentals in her translation-compilation, Mateer managed to impart new knowledge to the Chinese audience. This addition might have contributed to the fine sales of *Sheng Shi Pu* in China over forty years.

Adding prefaces to a written work had been sustained in Chinese classical literature since the third century. The preface even developed into a special genre of writing in China.<sup>345</sup> During the late nineteenth and early twentieth centuries, including prefaces as translations’ front

---

<sup>344</sup> Ibid, 6.

<sup>345</sup> Yu Yingshi, “Yuan ‘Xu’: Zhongguo Shuxie Shi shang de Yige Tese (Prefaces: An Outstanding Feature in the History of Chinese Writing),” *Journal of Tsinghua University (Philosophy and Social Sciences)* 24.1 (2009), 5.

matter was a common practice. These prefaces can be categorized into two types—self prefaces and invited ones. The former, either in the English or Chinese languages, provided the book’s genealogy and a list of sundry items that translators wanted the readers to keep in mind, such as terminology, measurement systems, and the methods of using the book. They also contained acknowledgement notes. The latter, always provided by famed Chinese politicians and academics upon request, were only in the Chinese language. They primarily elucidated the importance of the book by putting it into broader historical and contemporary contexts, and applauded the translators. Thus, they were often used to showcase the networking ability of the translators and to promote the imprint. The majority of these two types of prefaces adopted sets of standard “craftsman script” (*jiang ti zi* 匠體字), which became mainstreamed during the mid-sixteenth century for woodblock printing. These characters, with “heavy lines for vertical strokes, lighter lines for horizontal strokes, and a heavy tail at the end of the strokes,” were “more rigid and square in construction” than various calligraphic styles adopted in earlier imprints (see Figure 13).<sup>346</sup> They were directly carved on the woodblock, by using chisels and knives, for example. Every character was equally sized, and each stroke was discretely rendered. However, some translations featured manuscript-style prefaces,<sup>347</sup> which might have been calligraphically handwritten by the preface author (See Figure 14). The original writing was, then, traced by a printer onto the wood block, and carved in a way requiring more effort and skills than *jiang ti zi*. For example, there were two calligraphic prefaces in *Quan Ti Chan Wei* 全

---

<sup>346</sup> Tsuen-Hsueh Tsien, *Collected Writings on Chinese Culture* (Hong Kong: The Chinese University of Hong Kong, 2011), 141. Most movable type for Chinese characters, either the type created by native Chinese during the late imperial period or the one invented by Western immigrant printers during the nineteenth century, also imitated the craftsmen fonts. See *ibid.*, 141.

<sup>347</sup> A large number of lithography imprints and reprints also adopted calligraphic style not only in prefaces, but also throughout the entire book, such as *Zeng Ding Hua Liu Zhi Mi* (1896), *Zhong Wai Di Yu Tu Shuo Ji Cheng*, and *Wan Guo Yu Tu*.

體闡微 (*Elucidating the Details of the Entire Body*),<sup>348</sup> one by Lin Dingwen 林鼎文 dated April 1880, and the other by Dauphin William Osgood (1845-1880), the translator himself, dated around late spring 1880.<sup>349</sup> Mary Fulton's *Pou Fu Li Fa* 剖腹理法 (*The Principles and Methods in Abdominal Surgery*)<sup>350</sup> carried a calligraphic preface dated 1908 by Zhou Zhongyi 周仲彝, who proofread the draft. The translator of *Wan Guo Yao Fang*, S. A. Hunter, might have felt proud when he saw the words "with a preface by Li Hung Chang (Li Hongzhang)" blatantly listed on the book's English-language title page.<sup>351</sup> This calligraphic preface was dated September 1890, when the first version of *Wan Guo Yao Fang* was issued, and was also displayed in later versions. Li's recommendation signified a great deal, because he, being the Viceroy of Zhili 直隸 since 1870, was one of the most prestigious and influential officials in China at that time. The province's name "Zhili" literally meant "directly administrated," indicating geographical and political intimacy with the capital and the emperor. The Viceroy of Zhili was considered to be among the most prestigious positions in the Qing Dynasty bureaucracy. In addition, he was appointed the Superintendent of Trade, and acted as the core of China's foreign policy.<sup>352</sup> The addition of prefaces authored by notable Chinese literati and bureaucrats to translated works resembled traditional practices of native book making, especially

---

<sup>348</sup> Henry Gray, *Quan Ti Chan Wei* (English title: *Anatomy, Descriptive and Surgical*), trans. Dauphin W. Osgood (Foochow: Methodist Episcopal Mission Press, 1881). This translation was published one year after Osgood passed away.

<sup>349</sup> The months and seasons mentioned in this section are all according to the Chinese lunar calendar.

<sup>350</sup> Anna M. Fullerton, *Pou Fu Li Fa*, trans. Mary H. Fulton (Canton, 1909). The cover shows that it was published in 1908.

<sup>351</sup> Peter Squire, *Wan Guo Yao Fang*, trans. S. A. Hunter (Shanghai: American Presbyterian Mission Press, 1890).

<sup>352</sup> For a biography of Li Hongzhang, see Liang Qichao, *Li Hongzhang*, ed. He Zhuo'en (Wuhan: Hubei Renmin Chubanshe, 2004); Samuel C. Chu and Kwang-Ching Liu eds, *Li Hung-Chang and China's Early Modernization* (New York: M. E. Sharpe, 1994); Stanley Spector, *Li Hung-Chang and the Huai Army: A Study in Nineteenth-Century Chinese Regionalism* (Seattle: University of Washington Press, 1964); William Francis Mannix ed., *Memoirs of Li Hung Chang* (Boston: Houghton Mifflin Company, 1913).

during the Ming and early Qing periods.<sup>353</sup> But printing these prefaces in calligraphic form greatly enhanced the visual attraction of a book with Western content. It imitated Chinese literati's manuscript rituals.<sup>354</sup> Handwriting guaranteed authenticity, and catered to traditional Chinese aesthetic values that favored calligraphy.

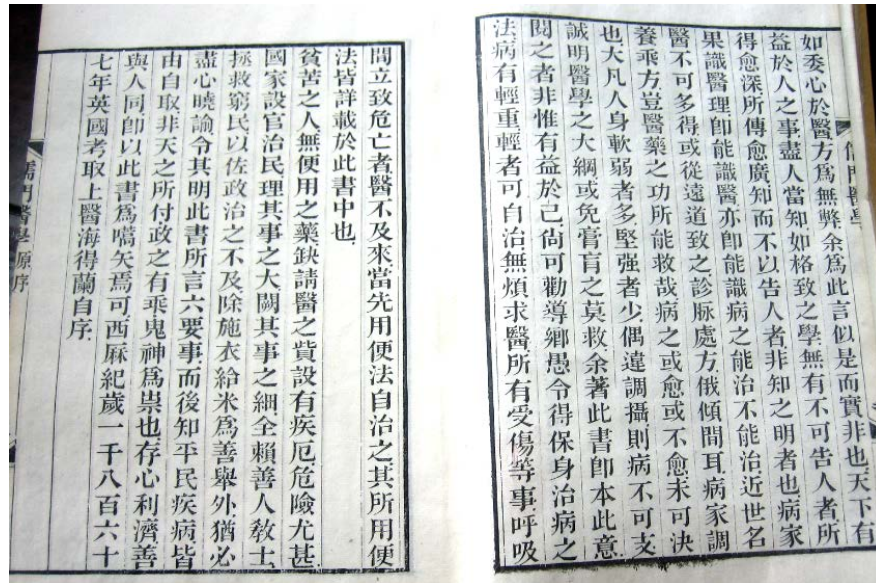


Figure 13. Craftsman script (*Ru Men Yi Xue*, preface, 1b-2a)  
From the Shanghai Library

<sup>353</sup> During the late Ming and early Qing periods, various types of commercial publications, including collections of personal works and anthologies of essays for civil service examination preparation, contained a large number of prefaces authored by “famed literati.” See Chapter 3 (“Commodification of Writing, Examinations, and Publishing”) of Kai-wing Chow, *Publishing, Culture, and Power in Early Modern China* (Stanford: Stanford University Press, 2004), 90-148.

<sup>354</sup> Chow, 27.

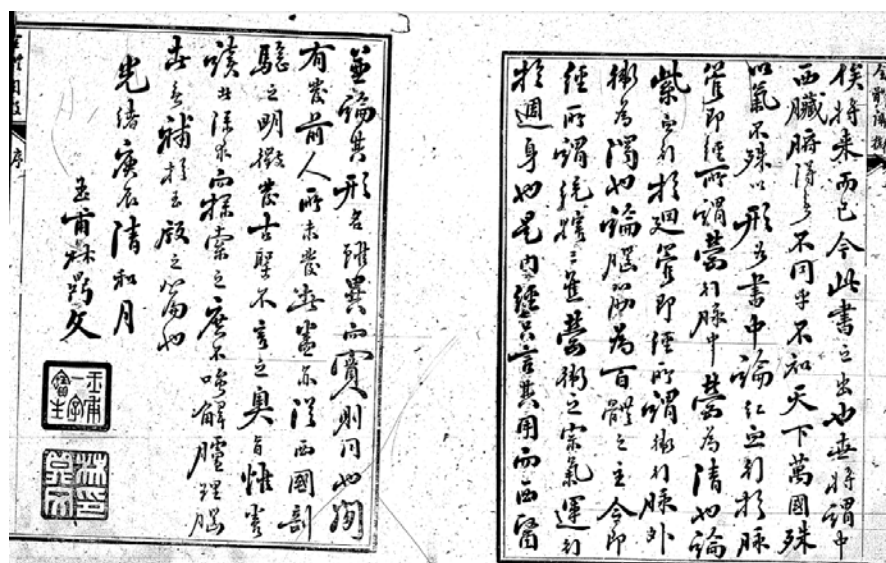


Figure 14. Manuscript-style preface (*Quan Ti Chan Wei*, preface by Lin Dingwen, 2a-3b)

Courtesy of the Harvard-Yenching Library

Retaining the manuscript format for prefaces suggests the preference of the translators or the publisher. Some printer-publishers routinely printed front matter in this style. Coincidentally, many translations bearing John G. Kerr's name sported calligraphic prefaces. One commonality among these books is that the blocks were all carved by and stocked in Canton's Bo Ji Yi Ju 博濟醫局, also known as the Canton Hospital, of which Kerr had taken charge since 1859.<sup>355</sup> For instance, it published *Hua Xue Chu Jie*, with a calligraphic preface by General Bai Changshan 白長善 dated mid-summer in 1871, which preceded two more prefaces written for craftsman font by its two translators of Kerr and He Liaoran. In *Hua Liu Zhi Mi* 花柳

<sup>355</sup> Most of Bo Ji Yi Ju's publications share commonalities in bibliographical features. Their title pages all carry "Yang Cheng Bo Ji Yi Ju Cang Ban (blocks stocked at the Bo Ji Yi Ju in Canton)." One outstanding mark of them is that, unlike those common traditional Chinese books using the consistent quality and color paper for the text, the title pages of Bo Ji Yi Ju's imprints are always in color. This characteristic can also be seen in some of Mo Hai Shu Guan's publications. For general discussion of Bo Ji Yi Ju, see Edward Vose Gulick, *Peter Parker and the Opening of China* (Cambridge, MA: Harvard University Press, 1974); Gerald H. Choa, "Heal the Sick" was Their Motto: *The Protestant Medical Missionaries in China* (Hong Kong: Chinese University Press, 1990).

指迷 (*The Guide through the Labyrinth of Flowers and Willows*),<sup>356</sup> one preface by the co-translator Lin Xiangdong 林湘東 dated February 1876 and another by Kerr himself dated mid-spring 1876 appeared before the main text. A preface also by Lin Xiangdong dated 1875 was added in *Xin Zeng Xi Yao Lue Shi* 西藥略釋 (*Newly Expanded Version of A Concise Explanation of Western Pharmacy*).<sup>357</sup> Furthermore, the 1883 version<sup>358</sup> of Kerr's *Xi Yi Nei Ke Quan Shu* included three calligraphy prefaces all dated in 1883 by Pan Junyou 潘駿猷 (authored in early summer), Li Zongyuan 李宗源 (authored in early spring), and Kong Qinggao (in early spring), who served as the co-translator. It was not yet clearly known whether the calligraphy printed on the page was an exact replica of the preface author's handwriting, or was forged by some related agents. However, including calligraphic prefaces in these translations demonstrated Bo Ji Yi Ju's vision of the importance of incorporating manuscript culture into imprints. Given the prevalence of handwritten prefaces, this vision was, of course, well realized.

### 3.2.3 Adjustments over Different Editions

Each of the abovementioned examples of omissions and additions concerned one edition of a book. But if one looks chronologically at different editions of a title over time, there would be adjustments made by translators, sometimes, in accordance with revisions of the Western source text. For example, *He Shi Liao Xue*'s fourth edition in 1927 (reprinted in 1930) included two sections titled "Tables of Relative Weights and Measures in the Metric and Apothecaries"

---

<sup>356</sup> In Chinese, the characters for "flowers and willows" alluded to venereal disease and other sexually transmitted diseases. *Hua Liu Zhi Mi* was first published by Bo Ji Yi Ju in 1876. The second edition, expanded by Yin Duanmo, was published in 1889.

<sup>357</sup> This edition of *Xi Yao Lue Shi*, translated and compiled by Kerr and Kong Qinggao, was published in 1886. Its first edition came out in 1871, and the second in 1876.

<sup>358</sup> The Chinese title page said carved in 1882. But Mary Niles said its 1883 in the preface in later *Nei Ke Xue*.

Systems (See Oldberg's Manual of Weights and Measures)" and "Prescription Writing," which had been part of Chapter 1 "General Therapeutic Considerations" in Hare's 1904 original English-language text. However, the previous editions of *He Shi Liao Xue*—the first one in 1908, second in 1911, third in 1915 (reprinted in 1921)—did not cover them. As a compensation for the missing tables in the main text, the translator James H. Ingram explained, instead, in the first edition's preface (reprinted in all editions afterwards):

Two systems of weights and measures are used, viz. the Apothecaries' and the Metric.... In the United States the Apothecaries' system is still in use, in which 480 grains make an ounce and there are 12 ounces to the pound. In liquid measure, according to the Apothecaries' system, there are 480 minims to the ounce, the same as in the 'Imperial' system, but there are only 16 ounces to the pint. The size of the grain is the same in both systems, thus in the doses of the stronger drugs and preparations there is no discrepancy; and that which occurs in the less potent drugs and preparations, is seldom sufficient to require adjustment. In the Metric system the approximate equivalents are given in the prescriptions, the prescription symbol is omitted, but the names of the ingredients are put in the genitive case.<sup>359</sup>

---

<sup>359</sup> Ingram, preface to *He Shi Liao Xue*, 1.



These statements, although brief, offered an overview of the differences between measurement systems in the United States and Britain. Ingram did not include the prescription writing section in previous editions probably because he thought it would be too early to introduce the Western format of prescribing, which was replete with Latin terms.

Although Philip B. Cousland aimed for “provid[ing] a work as full as any medical school is likely to need for some time to come,”<sup>360</sup> there were a number of changes made to the three editions of *Ti Gong Xue* published in 1905, 1912, and 1919 (all printed at the American Presbyterian Mission Press), which were primarily based upon different English-language editions of W. D. Halliburton’s *Handbook of Physiology* Cousland adopted for translating. The 1905 edition of *Ti Gong Xue* was the abridged translation of the sixth edition of *Handbook of Physiology*. Until the *Ti Gong Xue*’s 1912 fifth edition, its Chinese title had been supplemented with characters “*Ha Shi*” to indicate Halliburton’s name.<sup>361</sup> This Chinese edition was a mixture of the sixth, seventh, and ninth editions of Halliburton’s text. The ninth edition of Halliburton seemed to be the most recent one available to Cousland. However, he did not manage to finish the revision entirely based upon the ninth edition. The 1912 edition, instead, was an interim product rushed to meet the market demand: “The Fourth Edition having sold out more quickly

---

<sup>360</sup> Cousland, preface to *Ti Gong Xue*, 1.

<sup>361</sup> As the Chinese editions changed their titles, the different editions of the English-language book, coincidentally, also had a story of title changing. Before the fourth edition of *Handbook of Physiology*, the titles all highlighted “Kirkes’ Handbook,” besides Halliburton’s name. John Murray the publisher included a note to the fourth edition dated July 1901 to explain the new treatment to the title: “Three completely revised editions of Kirkes’ Handbook have now been published since the editorship was first undertaken by Professor W. D. Halliburton in 1896. So extensive have been the changes made in these years, that but little remains of the original work, and the Manual has now obtained a higher reputation and a wider popularity than at any time before. In these circumstances it has been suggested by several professional men and other readers of the book that it would be well to drop the time-honoured name of ‘Kirkes,’ and to substitute for it that of the real author of the present volume—Professor Halliburton. Whatever prestige attached to the old title has now been rightly transferred to the new, and we have accordingly decided to adopt this suggestion, and to call the book in future *Halliburton’s Physiology*. I must take this opportunity to call attention once more to the fact that for some years past a so-called edition of *Kirkes’ Physiology* has been circulated in the United States, not only without the authority, but in spite of the repeated public protests, of the owners and editors of the genuine book. It is hoped that the adoption of a new name may enable the public to distinguish between the authorised and the unauthorised editions.”

than was expected, there has not been time to thoroughly revise the book in accordance with the Ninth Edition of Halliburton's Physiology. Most of the important changes in that edition have, however, been incorporated. The Section on Embryology is untouched."<sup>362</sup> Later in 1919, the title *Ha Shi Ti Gong Xue* 哈氏體功學 was altered to *Ha Shi Sheng Li Xue* 哈氏生理學. It meant the same as it did previously, but it demonstrated the new edition's subscription to the newest medical nomenclature. This edition was adapted from the thirteenth edition of Halliburton. Another of Cousland's translations, the 1910 edition of *Ou Shi Nei Ke Xue* adopted two different editions of William Osler's *The Principles and Practice of Medicine*. Cousland stated in the preface that "As the translation of sections II to IX [Specific Infectious Diseases, The Intoxications and Sun Stroke, and Constitutional Diseases] was originally made from the fifth edition [of Osler's *Principles*], it is right to warn those who use the book in teaching, that although it has all been revised in accordance with the seventh edition, yet in a few places the order of the earlier edition is followed."<sup>363</sup> When revising subsequent editions of *Ou Shi Nei Ke Xue*, Cousland not only kept pace with the latest Western edition that was available to him, but also inserted "chapters on the major parasitic diseases of China" which had been authored by Western immigrant physicians.<sup>364</sup> His localizing endeavor made his translations more approachable to students in medical schools, who were eager to know the knowledge usable in China besides the knowledge coming from the West.

---

<sup>362</sup> Cousland, preface to *Ha Shi Ti Gong Xue* (5th edition), 2.

<sup>363</sup> Idem, preface to *Ou Shi Nei Ke Xue*, 1.

<sup>364</sup> John Z. Bowers, "Chinese Translations of Western Medical Textbooks," *Osler Library Newsletter* 18 (1975): 1-3, qt. on 1.

### 3.3 ORGANIZATION OF CONTENT IN TRANSLATIONS

Translators' deliberations on additions to or deletions from the original sources are primarily represented in the translations' specific content. After translating the texts or parts of texts that were to be printed and read, another problem confronted translators: How to structure these mediated texts into an entire volume, given the different methods of dividing and arranging knowledge in Western and traditional China books? It was not as simple as just following the format displayed in the source text. Translators did not copy the Western way without qualification, but negotiated the organization of the original Western text and the traditional Chinese methods.

#### 3.3.1 Division of the Content

*Pian* 篇, *juan* 卷 and *ce* 冊 are the basic units for dividing the content of a traditional Chinese book. The term *pian*, which stands for a piece of writing, be it a thesis, a poem, an anecdote, or prose, was already in use by the Han Dynasty, when the writings were always transferred to relatively small sheets of silk or bamboo slats. The *juan*, once the equivalent of the *pian*, became a usually larger and more lengthy unit since folded sheets of paper were widely adopted for book making during the late Tang and Song periods. *Juan* usually refers to a rationalized assemblage of several passages or pieces of writings based upon coherency of topics, consistency in the number of writings, or similarity of time period.<sup>365</sup> *Juan* is a fairly flexible concept, which may correspond with Western "chapters," "sections," or "parts," but is in fact, a more abstract unit of

---

<sup>365</sup> Cao Zhi, *Zhongguo Guji Banben Xue* (A Bibliographical Study of Chinese Rare Books), 2nd ed. (Wuchang: Wuhan University Press, 2007), 466.

content. *Juan* might be confused with another unit *ce*, because in some situations, they could be both translated as “volume,” which refers to a single bound item in the West. However, in many cases, *juan* is a subdivision of *ce*; then *juan* are created before the printer binds them into a *ce*. It is the *ce* that more closely resembles the “volume.” Except for books with only one *ce*, the *ce* unit usually suggests the division of content into multiple fascicles under one title. In most *shu*, one *ce* holds more than one *juan*, each of which is given a number. Occasionally, in order to regularize the length of every *ce*, a long *juan* can be divided into two parts, so that the second part could migrate to a new *ce*. For example, part one of *juan* three would be named “*juan* three *shang* 上 (up),” and part two would be named “*juan* three *xia* 下 (down).”

Sometimes, *juan* and *ce* are used interchangeably. First of all, in short books which the author does not separate into more than one *juan*, *juan* becomes the equivalent of *ce*. Secondly, when the authors or editors do not create the *juan* divisions, they send the entire work to the printer, who groups the *ye* into several *ce*. But at this point, every *ce* can be called *juan*. In situations in which *ce* divisions determine *juan*, the term *juan* becomes “a virtually meaningless term except as a physical description.”<sup>366</sup> In these cases, *juan* simply equals *ce*.

Compared to a “chapter” in the Western book, *juan* represents more independence. Unlike the consecutive page numbering throughout the entire main body of text in a Western volume with chapters, the first *ye* of every *juan* is numbered one, no matter if it is located in the beginning or the middle of the *ce*. Therefore, it is possible that there are more than one “*ye* one” inside one *ce*. In the West, books are usually not catalogued according to the number of their chapters or themes, but instead, according to the number of their volumes. However in China, *juan* was valued as highly as *ce*, because *juan* represents the provenance of the author or the

---

<sup>366</sup> Robert E. Hegel, *Reading Illustrated Fiction in Late Imperial China* (Stanford: Stanford University Press, 1988), 75.

compiler's thoughts. In the majority of the bibliographies for traditional Chinese books, the total number of *juan* and *ce* are both recorded.

Although *juan* is a concept for organizing the content in traditional Chinese books, it was utilized by some translators to restructure the original Western source or pastiches. The *juan* division was retained in the translations published at native-owned facilities, such as the Jiangnan Arsenal, which were more inclined than immigrant-run presses to preserve the Chinese tradition of content arrangement. For example, after the ten chapters on inorganic chemistry from Wells's *Principles and Applications of Chemistry* were translated as *Hua Xue Jian Yuan*, they were distributed into six *juan* set in four *ce* (see Table 2). In this case, *juan* was not a Chinese equivalent to either "chapter," or "section," the latter being a unit subordinate to "chapter" in *Principles*. The division of six *juan* indicates two considerations of the translators. The first is regularizing the lengths of *ce*. Chapter VI on Non-Metallic Elements in Wells's text is excessively long. In order not to make *ce* 1 disproportionately lengthy, the translators arranged only sections on oxygen, hydrogen, nitrogen, and chlorine in *juan* 2, and left the rest of Chapter VI to form *juan* 3 which was located in the next *ce*. The second consideration is classifying topics together that were considered to be relevant. During the late 1850s, metallic elements were sorted into four classes—"the metals of the alkalies, the metals of the alkaline earths, the metals of the earths, and the heavy metals, or metals proper." The "metals proper" could be again subdivided into two groups "according to the affinity of the metals contained in it for oxygen"—the common (uniting with oxygen) and the noble metals (resisting the action of oxygen).<sup>367</sup> Wells's text devoted one chapter to each of the first three classes and one to each of the two sub-groups in the last class. *Juan* 4 combines all the chapters on the first three classes

---

<sup>367</sup> Wells, *Principles*, 327.

together, while *juan* 5 and 6 concern “common” and “noble” metals respectively. Given the absence of a table of contents and any demarcations between chapters in *Hua Xue Jian Yuan* (it had no notion of chapter division anyway), readers had to rely on the *juan* division to understand the general organization of the book. The coverage of *juan* 4, as a meaningful comprising unit of the book, suggests to the Chinese audience that there were considerable commonalities shared by the metals of the alkalis, the alkaline earths, and the earths. It was, however, not spelled out through the meticulous chapter-by-chapter, topic-by-topic structure of Wells’s text. The joining together of Wells’s three chapters on three metallic elements in the translation might have been due to the commonalities suggested by the names of these three classes—all contained either “alkali” or “earths.” The translators then wanted the readers to see a high level of analogy among these elements’ properties. Another possible reason could be the translators’ perception of these three classes as opposed to the fourth class, also known as the “metals proper.” The phrase “metals proper” was rendered into “*zhen jin* 真金,”<sup>368</sup> literally meaning “genuine metals.” It may be too arbitrary to assert that Fryer and Xu thought other metals were all “false.” But by endowing a class’s name with authenticity, they might have discerned some essential nature that distinguished the “metals proper” from the other three classes. Therefore, it was the dissimilarities held in common by “metals proper” to the others that made the translators group the rest together.

**Table 2.** Comparison of Content Division between the Chinese Translation and the English-language Original

<i>Hua Xue Jian Yuan</i>	<i>Principles and Applications of Chemistry</i>
--------------------------	---

---

<sup>368</sup> Wells, *Hua Xue Jian Yuan*, *juan* 4, 3b.

<i>ce 1</i>	<i>juan 1 (24 ye)</i>	Chapter V: General Principles of Chemical Philosophy (page 156-183)
	<i>juan 2 (68 ye)</i>	Section I-V in Chapter VI: The Non-Metallic Elements, (page 184-253)
<i>ce 2</i>	<i>juan 3 (75 ye)</i>	Section VI-XIV in Chapter VI; Chapter VII: Combustion (page 253-324)
<i>ce 3</i>	<i>juan 4 (34 ye)</i>	Chapter VIII: The Metallic Elements; Chapter IX: The Metals of the Alkalies; Chapter X: Metals of the Alkaline Earths; Chapter XI: Metals of the Earths; Chapter XII: Glass and Pottery (page 324-359)
	<i>juan 5: shang (31 ye)</i>	Chapter XIII: The Common, or Heavy Metals, Section I (page 360-367)
<i>ce 4</i>	<i>juan 5: xia (44 ye)</i>	Chapter XIII, Section II-VIII (page 367-385)
	<i>juan 6 (18 ye)</i>	Chapter XIV: The Noble Metals (page 385-396)

Another example of the *juan* division in the Jiangnan Arsenal's publications can be found in *Ru Men Yi Xue*. Its English-language source Frederick William Headland's *A Medical Handbook* contained a two-part main text—Part I on the Preservation of Health (Light, Heat, Air, Water, Food and Diet, Exercise) and Part II on the Restoration of Health (Index of Diseases, Index of Remedies)—each of which was comprised of a number of theses on different topics. These two parts were divided into three *juan* in the Chinese translation, with *juan* one equaling

to Part I, *juan* two to “Index of Diseases,” and *juan* three to “Index of Remedies.” This adjustment primarily catered to the preference to balance the length of each unit, because Headland’s Part II was nearly two times longer than Part I. Normally *juan* suggests copious coverage by combining several chapters together, if the number of chapters was considerably large in the Western original. But occasionally in the Jiangnan Arsenal’s translations, the *juan* level corresponds to each chapter, such as *Di Xue Qian Shi*’s output of Charles Lyell’s one-volume *Elements of Geology* into thirty-eight *juan* distributed in eight *ce*.

In the above mentioned translations, the independence and significance of *juan* as a Chinese tradition was sustained. Visually, every *juan* reset its first page number to one, and the beginning lines on every first page bore the book’s title, the original author’s name (Chinese translation), and the translators’ names. These features all made it look seemingly as if a new book were commencing. The *juan* unit remained unchanged in these translations’ later reprinted editions, despite that the font sizes changed and, consequently, the character count of every *ye* and the total number of *ce* under one title. For instance, Ri Xin She’s 日新社 (Daily Renewal Society) 1901 lithographic reprint of *Hua Xue Jian Yuan* contains only two *ce* instead of four, but the six *juan* division stays the same as Jiangnan Arsenal’s first edition. So does its 1896 lithographic reprint by Xiao Cang Shan Fang 小倉山房 (Xiao Cang Shan House). Similarly, the reprint from the same press of *Di Xue Qian Shi* squeezed all the eight-*ce* content into two *ce*, but never disrupted the thirty-eight *juan* arrangement.

Different from deliberating over the coverage of every *juan* is a treatment that simply equals *juan* to *ce*. That is to say, *juan* becomes merely a symbolic way of physically separating a large amount of text (usually several chapters in the Western original) from another large amount. It seemed that some translators and printer-publishers did not want to interrupt the



original organization of the Western text by inserting a new level above that of the chapter, such as the teams which made *Ti Gong Xue* (two *ce/juan*), *Nei Ke Xue* (four *ce/juan*),<sup>369</sup> and *Fu Ke Xue* (two *ce/juan*). In these cases, *juan* lost its relative independence in terms of the page numbering fashion. Instead of resetting the pagination as a new *juan* begins, page numbers in these translations were not interrupted by the physical separation brought about by *juan* (here functioned the same as *ce*). The integrity of the pagination resembled their Western originals, which were mostly huge single-volume imprints. However, although the printer-publishers adopted Western-style continuity of the pagination from *juan* to *juan*, they left hints to remind the audience of tradition. In *Fu Ke Xue*'s second *juan/ce*, the first twenty-eight pages (not *ye* in this case) were all signaled by dual numbering. Above the red-colored characters for the numbers from 146 to 173 (*juan* one paused at page 145) were characters for 1 to 28 in black ink. When readers began to read *juan* two, they walked into a buffer zone between old and new. In it, they were notified that a new pagination system had been adopted. It was as if they were being told: "Watch out ahead!" Red ink grabbed the attention to take note of the unfamiliar way. Pages 146 to 173 were the working number designations that were referred to in the table of contents. But the black-ink numbers' location above the red suggests their superiority, and their color connotes their normality. This dual system accompanied readers until page (black)-28/(red)-173. From the next page onward, the red numbers replaced the black ones and thus normalized themselves by turning their color into black. The new way usurped the old. Starting with page 174, there was only one black-colored number displayed on each page (see Figure 15).

---

<sup>369</sup> *Nei Ke Xue* is different from other examples listed here. It was a pastiche translation from multiple sources, but every source is a single-volume imprint. Although the page number in all four *juan* of *Nei Ke Xue* continued from 1 to 634, its earlier edition *Nei Ke Quan Shu* followed the Chinese traditional pagination and reset the page number to 1 at the beginning of each *juan*.

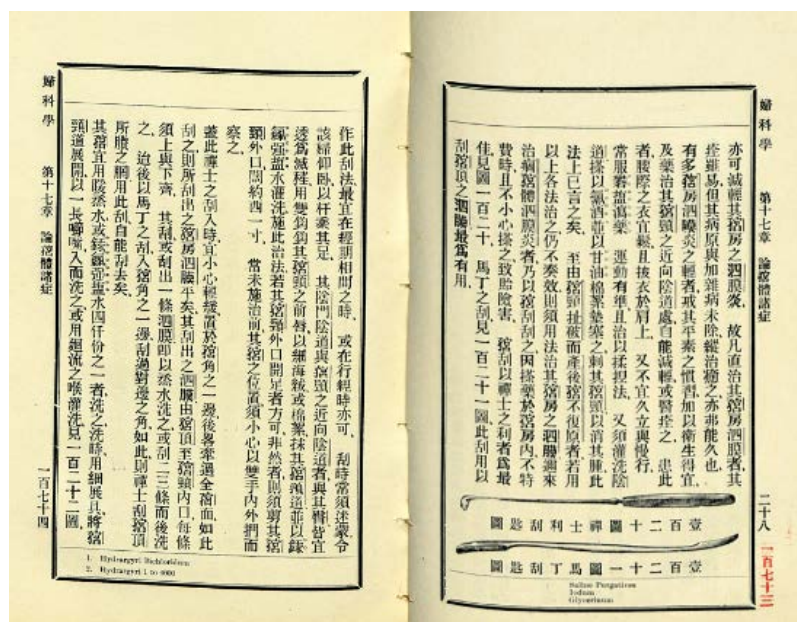


Figure 15. Dual numbering of the page (*Fu Ke Xue*, vol. 2, 173/28-174)  
From the Wellcome Library, London

There are different treatments on the units beneath the *juan* level. For example, the translators of *Hua Xue Jian Yuan* put aside the “chapter” and “section” arrangement in Wells’s *Principles*, but divided its six *juan* into 410 *jie* 節 (fraction), each of which was virtually an equivalent to a point of knowledge headed by consecutive Arabic numerals in *Principles*. This sub-unit to *juan* split every lengthy entity of text into pieces of manageable sizes. The numerical sequence of *jie*, all translated into Chinese characters, was, similarly, not interrupted by their separation into *juan*. All in all, *Hua Xue Jian Yuan*’s structure of content exemplified translators’ strategic manner of give-and-take with original texts—much of the Western system was subverted through the use of the traditional Chinese unit *juan*, while some practicable traces of the original remained. Other translations utilized *zhang* 章 (chapter) inside *juan*, such as *Fu Ke Xue*, to mirror the same chapter division in the Western text.

Some translations did not contain any labeled or numbered sub-units, but the translators were aware of the divisions within *juan*. For instance, although they did not spell out the name

of the sub-unit throughout *Nei Ke Quan Shu* (1883), the translators meant to consider it as *jie*, which itemized and detailed the etiology, pathology, symptoms, and treatment of each disease: “The idea of separating [*juan* into] different *jie* is to clarify the evidence for diagnosis. The ways of diagnosing in Western medicine are different from its Chinese counterpart, which relies only on pulse-taking to tell what the disease is.” By familiarizing themselves with comprehensive observations and various medical methods listed under each disease, practitioners were able to “make sure to recognize all the facts and essentials, then it will be safe enough to apply therapy.”<sup>370</sup> This “noticing-without-naming” treatment of organization was followed by *Nei Ke Quan Shu*’s later enlarged and revised edition *Nei Ke Xue* (1908). This treatment might also have had something to do with the design of the original text. The three Western sources for *Nei Ke Quan Shu* wore three different faces in content structure. Roberts’s *Handbook* (1874 version) was fairly complicated in its structure design. It was comprised of three sections, and each section included a number of chapters (three in Section I, seven in Section II, and eighty-five in Section III). Section III was separated into two parts, with eighteen chapters in Part I, and sixty-seven chapters in Part II. Flint’s *Treatise* (1866 version) only made the situation worse. It included an Introductory Chapter, Part I (ten chapters) and Part II (Introduction, Section First with eleven chapters, Section Second with four chapters, Section Third with thirteen chapters, Section Fourth with ten chapters, Section Fifth with four chapters, and Section Sixth with twelve chapters). Unlike those books with “visible” structures, Bartholow’s *Treatise* (1880 version) did not mark any chapters, sections, or parts, but simply listed general categories of diseases one after another, and filled in each category with specific types of diseases in a simple fashion. This

---

<sup>370</sup> *Nei Ke Quan Shu*, *zong li* (“general instruction”), 1b-2a.

structure simply outlines the content, and looks lucid. But it in fact resulted from Roberts Bartholow's need to condense the book as he stated in the preface:

In the treatment of the various topics, I have attempted to give to each just that amount of consideration to which its importance entitles it, within the limitations imposed by the size of the work. A just harmony and proportion can be secured only by condensing some subjects and displaying others. ... Also, to utilize all available space, chapters have been dispensed with, and the intervals between the sections have been abbreviated as much as possible. Notwithstanding my utmost efforts at condensation, the work has grown beyond the contemplated size.<sup>371</sup>

One of Bartholow's solutions to limited space was inherited by John Kerr. Kerr and his team made the structure of their translation coherent with that of Bartholow's, probably because they preferred the simplicity of his hierarchical design. The visual resemblance is especially seen in the later *Nei Ke Xue*. This might have been part of the reason why Kerr and Mary Niles named the English title of the translation *A Treatise on the Practice of Medicine for the Use of Students and Practitioners*, which was exactly the same as Bartholow's work. The seeming coincidence of the titles of the two books might also relate to Kerr's and Bartholow's affiliation with the same institute—Jefferson Medical College in Philadelphia, from which Kerr graduated and where Bartholow ended up working.

---

<sup>371</sup> Roberts Bartholow, preface to *A Treatise on the Practice of Medicine* (New York: D. Appleton and Company, 1880), vi-vii.

New ways of reorganizing knowledge can also be seen in translations' appendices. For example, in *He Shi Liao Xue*'s (1911) Chinese-language "Index of Diseases and Remedies," the translators not only eliminated some entries from Hare's original text and arrayed all the entries according to the number of strokes of the Chinese name's first character, but also changed the hierarchy of a number of entries. In Hare's index, some diseases were sorted into general and more specific sub-categories that included several conditions. In these cases, the remedy part under the general disease's name especially listed medicines for specific sub-conditions, besides common treatments. But the translators took these sub-diseases out, and promoted them to same level visually as general diseases in the original, such as "Cerebral Congestion" (once under "Congestion" in Hare's version), "Ovarian Neuralgia" (once under "Neuralgia"), and "Lobar Pneumonia" (once under "Pneumonia"), among others. This rearrangement, for one thing, demonstrated that the translators paid particular attention to the worth of some seemingly subordinate diseases in the original index. It, for another and more importantly, alluded to an organ-based alternative to classifying diseases. For instance, "Gastric Acidity" was placed under the "Acidity" heading in Hare's index. However, in the Chinese translation, it was considered as one of the ten gastric diseases listed together. Similarly, "Uterine Hemorrhage" was found adjacent to three other uterus diseases, but not under the general "Hemorrhage" heading any more as in Hare's index. "Irritation of Bladder," instead of being part of "Irritability," appeared right before the entries "Acute Cystitis," "Chronic Cystitis," and "Prostatorrhœa" in the Chinese version, all of which were diseases of the same organ. This connection suggested by spatial intimacy was not reflected in the English-language index, where the locations of "Irritability," "Cystitis," and "Prostatorrhœa" were not nearby to each other. But the Chinese terms for these

diseases all started with the same character referring to the organ, and consequently, occupied a great deal of page space.

### 3.3.2 Visual Frameworks that Indicated the Organization of Content

In those Western books used as sources for Chinese translations, space or graphics were utilized to demarcate chapters and sections. Different hierarchies of content were also indicated by various fonts and font sizes,<sup>372</sup> as exemplified in Wells's *Principles and Applications of Chemistry*: "Four different kinds of type were used to show the headings, the topics, the statements of the principles, and the explanations and experiments."<sup>373</sup> However, these visual cues were not found in most traditional Chinese books. Instead, virtually every vertical column in the body of the text (usually much wider than the leading<sup>374</sup> in Western books) should be occupied by characters, except that blank lines might appear in a half-*ye* of text elucidation that follows a half-*ye* of inserted illustration, or in the half-*ye* at the end of every piece of front matter and every *juan*, if the text is not enough to fill the page. Moreover, the alternating of fonts in the main text did not apply to most Chinese woodblock printed books. In the process of Chinese woodblock printing, the manuscript was first transcribed onto a thin sheet of paper by a calligrapher. The style the calligrapher adopted to copy the text was ultimately materialized on a printed *ye*. During the late imperial period, calligraphers always had to subscribe to *jiang ti zi* (except in some prefaces), which was developed under the influence of woodcarvers. There

---

<sup>372</sup> Adopting diverse type-faces and font sizes inside one imprint was a distinct tradition in the West. Notable examples include James Harrington's *The Commonwealth of Oceana*, published in 1656 in London. J. G. A. Pocock, Introduction to *The Political Works of James Harrington* (Cambridge: Cambridge University Press, 1977), xv ("editorial introduction") and 6 ("historical introduction").

<sup>373</sup> John A. Nietz, *The Evolution of American Secondary School Textbooks* (Rutland, VT: C. E. Tuttle Co., 1966), 144.

<sup>374</sup> "Leading" refers to the distance between horizontal lines of type, measured from baseline to baseline.

were certainly a number of variants of *jiang ti zi*, created by different factions of printers. But this flexibility was not much seen in individual imprints. Due to the equal width between each two vertical borderlines that well accommodated the width of a line of characters throughout the main text in most books, normally no unusually large characters could appear. A smaller character *size* might be adopted to indicate comments and annotations, but the consistency of character *style* throughout the main text was favored.

In lieu of the application of various fonts and demarcations as cues, the visual framework that indicated the organization of content in woodblock imprints highly relied on the layout design. Block printer-publishers of translations passed over Western sources' relatively complex hierarchy of indicators, but applied the layout that was prevalent in the Chinese woodblock convention. In some translations, the columns that contained the heading for a part, a chapter, or a section of text were differentiated from other columns by beginning with a character placed higher than the first ones of other columns, as seen, for example, in *Hua Xue Jian Yuan*. The heading line was formed in two parts: the character strings that indicated the *jie* number, and the terms or phrases that summarized the content of the entire *jie*. The character “*di*” 第 leading the column, which equals the suffixes (“-th,” “-st,” “-nd,” and “-rd”) used to indicate ordinal numbers, was located above the top of the columns containing the *jie*'s content by one character's height (See Figure 16). In some other translations, the heading lines were truncated or indented, such as those in *Hua Xue Chu Jie*, *Di Xue Qian Shi*, and *Jin Shi Shi Bie*. Usually the content started in the column next to the heading. But exceptions can be found in translations such as *Xi Yi Nei Ke Quan Shu*, in which the content started right after the heading in the same column, only with a one-character space between them (See Figure 17, left).

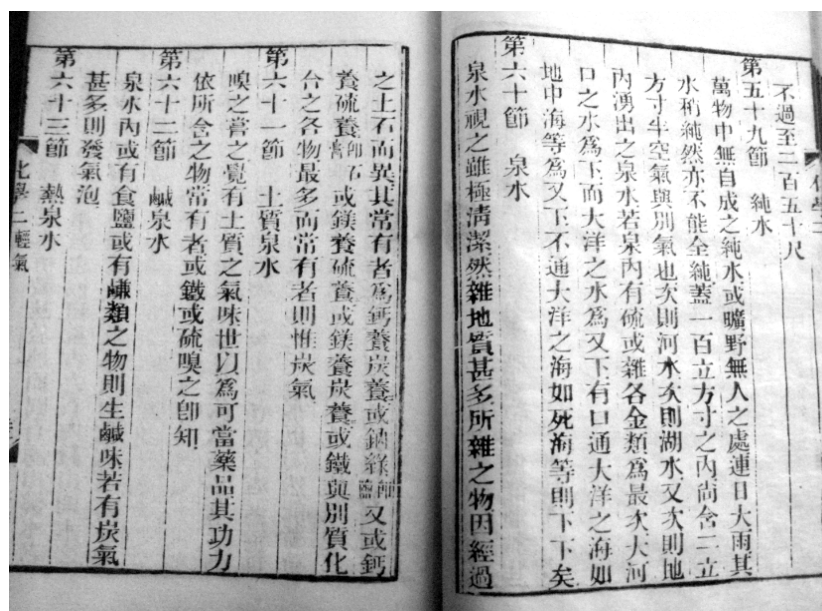
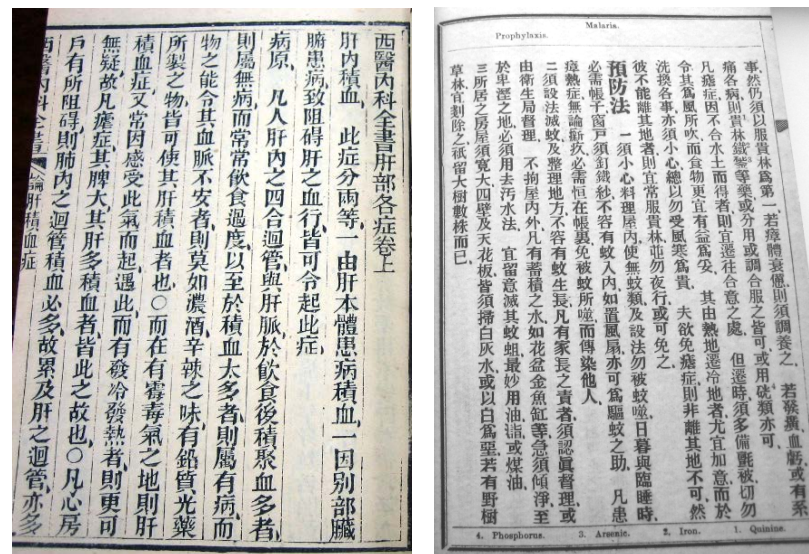


Figure 16. Visual framework of *Hua Xue Jian Yuan* (juan 2, 24b-25a)  
From the Shanghai Library

If translations were produced with movable type, printers would usually take advantage of different sets of Chinese type available in the facilities to indicate the structure of the content. For example, *He Shi Liao Xue* (1911) featured three type-faces. The practice of alternating type fonts and sizes is more clearly demonstrated when one compares the different editions of the same title printed through different methods. *Nei Ke Quan Shu* (1883), produced by woodblock at Bo Ji Yi Ju in Canton, adopted only one style of character throughout the entire body of the text. In contrast, its later revised edition *Nei Ke Xue* (1908), made by the China Baptist Publication Society Press in Canton via the printing press, used two fonts to make the headings distinct from the rest of the text (See Figure 17). However, even some movable type printed translations followed the plainness that was characteristic of traditional woodblock printed books when visually denoting the organization. For instance, the 1905 edition of *Ti Gong Xue*, although printed with movable type, contained only one Chinese font throughout the main text. And “the first line of the text concerning every important term is higher than other lines by a



one-character space.”<sup>375</sup> This edition diverged considerably from the later 1912 and 1919 editions, although all of them were printed at the American Presbyterian Mission Press in Shanghai. Both later editions, whose diversity of fonts did not exceed that of the original English-language source, utilized three typefaces to indicate the chapter and the section. The original had almost twice as many.



**Figure 17.** Font uses in different editions (Left side: *Nei Ke Quan Shu*, ce/juan 2, 1a; Right side: *Nei Ke Xue*, 490)

From the Shanghai Library and the Wellcome Library, London

Printers even designed very unusual ways to hint at the hierarchy of the content. Besides adopting four type fonts in the main text, *Wan Guo Yao Fang* also used the “heavenly head” margin as a visual cue (See Figure 18). Every heading line had characters located outside the upper border of the *ban kuang*. The hierarchical relationship between the heading lines for a title and a heading line for a sub-title, depended on how many characters trespassed the *ban kuang*: the more, the higher the level of heading. For example, on pages 3-4, the column showing *suan*

<sup>375</sup> *Ti Gong Xue*, yi li (“rules for translating”), 1. Translated by the author.

*lei* 酸類 (“acids”), a higher-level concept that covers *qiang suan lei* 強酸類 (“higher acids”) and *yang suan lei* 養酸類 (“lower acids”), contained two characters outside the *ban kuang*. But the lower-level concepts only contained one. In fact, the page design of this book, to some extent, violated the general rule—that all the characters should remain inside the *ban kuang*. However, this design, more or less, visually oriented readers quickly perusing the *tian tou* area to relationships between some terms.

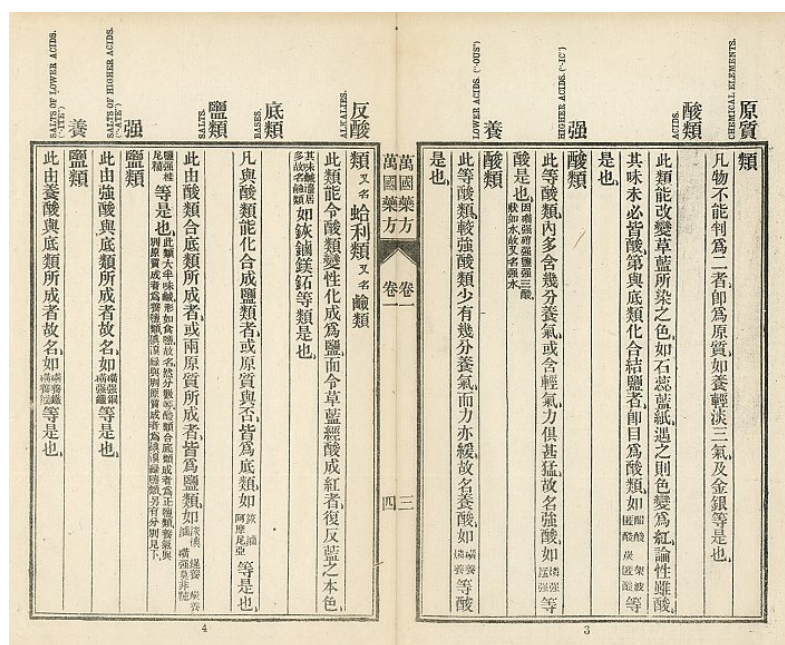


Figure 18. An unusual way of structuring the content (*Wan Guo Yao Fang*, *juan 1*, 3-4)  
From the National Library of Australia

Translating is a tough job. Hua Hengfang, whose laments we heard at the beginning of this chapter, could not agree more with his colleague John Fryer, who once recorded, “The work of translating and compiling scientific books is for the time being perhaps about as dull and unthankful a task as any foreigner could engage in especially in such as secluded place as the Kiangnan [Jiangnan] Arsenal, and under the depressing influences of the climate of this part of

China.” However, Fryer was survived by a large number of well-known translated works that were read, reread, and memorized. What allowed him to reach this achievement? “Nothing but a strong sense of duty and a firm belief that this kind of labour is one of the most effective means, under the Divine Guidance, for bringing about the intellectual and moral regeneration of this great country.” It “has sufficed to render enduring the long and weary years of close and continuous application which it has involved.”<sup>376</sup> As a leading translator in China during the late nineteenth and early twentieth centuries, John Fryer’s sentiments toward translating might have represented those of his colleagues in China.

Translating the textual is not only a linguistic issue that involved selecting Chinese characters or words as counterparts of Western concepts, creating neologisms that would be welcomed and widely used among Chinese readers, authorizing translated terms from a diverse array of possibilities, and rendering Western-language prose about technical knowledge into a reader-friendly Chinese syntax and grammar. More importantly, translating the textual involved translators’ developing a taste for original Western books, judging the quality of books within huge pools of publications on the same topic, strategizing editorial treatments of sources, and forming a vision for a perfect reading experience for Chinese audiences. These elements of translating are not revealed by any single word or sentence in the translation, but can be detected through a close comparison of Western texts and the translated editions of them that culturally immigrated to China. Translators utilized information agents to acquire updates of publishing in the West, then selected the best sources (or parts), or pastiched together the best parts from different sources, for their works. They made omissions depending on the practicality of knowledge in China. They supplemented their translations with localized information to

---

<sup>376</sup> Fryer, “Science in China, II,” *Nature*, May 19, 1881, 54-7, qt. on 56.

indigenize the unfamiliar face of Western knowledge for a new culture. They and printer-publishers together maintained traditional Chinese methods of organizing the content inside a book, but also experimented with the new.

What translators had done in translating the textual, whether they aimed for market success or for personal reputation, shows a reader-oriented process. All in all, making a good translation is rather more a test of responsibility, than linguistic ability, although both of them are essential. Just as a medical translator once alarmed his peers about the solemnity of their work—“Again, I think we can not be too careful in the preparation of text-books in Chinese, especially of those which we propose to have printed and offer to others for use in teaching. ... We owe it to ourselves and our own reputation as teachers of the Chinese, to strive to put forth nothing but what is as good as it is possible for us to make it. ... let us not disgrace ourselves and dishonor our cause by sending our slipshod productions in language, which no well-educated Chinaman will tolerate.”<sup>377</sup> This responsibility was especially felt by those translators of technical knowledge, as they attempted to open new windows to China’s intellectual development.

---

<sup>377</sup> J. B. Neal, “Training of Medical Students and their Prospects of Success,” *China Medical Missionary Journal* 3 (1889): 129-35, qt. on 132.

#### 4.0 DO NOT “SET A COMPASSLESS BOAT INTO THE SEA”: RENDERING THE VISUAL

Translating, as commonly perceived, pertains not only to the text of the original imprints,<sup>378</sup> but also involves the visualized information indicated by all sorts of graphic representations, be it illustrations, maps, and symbols. In the preface to the illustration section in *Zhong Guo Di Yu Zhi Lüe* 中國地輿誌畧 (*A Concise Record of Chinese Geography*), a geographical textbook published in Shanghai in 1906, the translator Sun Wenzhen 孫文楨 (a.k.a., Vincentio Suen)<sup>379</sup> spelled out the intimate relationship between the textual and the visual:

In geography books, textual elucidation and images are both necessary and equally important. If there is only text but not images, it is like that knowing the name of a river or a mountain,

---

<sup>378</sup> Most scholarship on translation pays attention only to the textual. For example, see Lydia H. Liu, ed., *Tokens of Exchange: The Problem of Translation in Global Circulations* (Durham, NC: Duke University Press, 1999). Research on science translation in particular has mainly concerned itself with text. For example, see Scott L. Montgomery, *Science in Translation: Movements of Knowledge through Cultures and Time* (Chicago: University of Chicago Press, 2000); David Wright, *Translating Science: The Transmission of Western Chemistry into Late Imperial China, 1840-1900* (Leiden: Brill, 2000); Michael Lackner, Iwo Amelung, and Joachim Kurtz, eds., *New Terms for New Ideas: Western Knowledge and Lexical Change in Late Imperial China* (Leiden: Brill, 2001); Georgia Petrou, “Translation Studies and the History of Science: The Greek Textbooks of the 18<sup>th</sup> Century,” *Science and Education* 15:7-8 (2006): 823-40; articles included in “Part III: Translation and Science” in Peter Burke and R. Po-Chia Hsia, eds., *Cultural Translation in Early Modern Europe* (Cambridge: Cambridge University Press, 2007); Maeve Olohan and Myriam Salama-Carr, ed., *Science in Translation*, Special issue of *The Translator* 17.2 (2011).

<sup>379</sup> Aloysio Richard, *Zhong Guo Di Yu Zhi Lüe*, trans. Sun Wenzhen (Shanghai: Typographia Missionis Catholicae in Orphanotrophio T’ou-Sé-Wè, 1906).

but not knowing where it is. So it is similar to the situation of setting a compassless boat into the sea. Want the boat not to get lost? How impossible! If there are only images but no text in the book, the feeling is like having your vision extended to as far as thousands of miles, clear and panoramic. However, what are the places of interest there? What are the famous countries and cities there? You have no idea. Imagine that a young beauty standing in the front of you, but with her mouth sealed. How pitiful!<sup>380</sup>

Sun Wenzhen considered the significance of images in the book equivalent to the compass of a vessel. As a translator-scholar who specialized in geography, Sun's fondness and emphasis upon visualized knowledge is understandable, because maps had been prevalent in geographical accounts in China for centuries.<sup>381</sup> But this acknowledgment of images was not unique to his specific works and the time period. Nearly eight centuries ago, Chinese historian Zheng Qiao 鄭樵 (1104-1162) had already called upon contemporary scholars to pay attention to visual knowledge and asked them to follow practices from past generations. "When ancient scholars conducted research," he instructed in his famous encyclopedia of Chinese institutional history, *Tong Zhi* 通志 (*General Treatises*), "they placed the image on their left-hand side and the text on their right-hand side."<sup>382</sup> Alluding to a traditional Chinese contract, he meant that

---

<sup>380</sup> Sun Wenzhen, preface to *Zhong Guo Di Yu Zhi Lue* (Map Section), 1.

<sup>381</sup> Cordell D. K. Yee, *The History of Cartography*, vol. 2, book. 2: *Cartography in the Traditional East and Southeast Asian Societies*, ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press, 1995), 35-202.

<sup>382</sup> My translation of "古之學者為學,有要置圖於左,置書於右." Quoted in Zheng Qiao, *Tong Zhi*, vol. 72, "Tu Pu Lue (Brief Account on Graphic Representations)" (1321, repr. Hangzhou: Zhejiang Guji Chubanshe, 2000), 837. This book was completed in 1161. For a comprehensive account on Zheng Qiao's image theory, see Han Si, "A

images, just like the lender's left half of an agreement, held more power than texts, analogous to the borrower's right half of the contract. His unprecedented recognition of the potency of graphic representations in knowledge acquisition reflects China's time-honored manner of using images for scholarly goals.

By the late imperial period, visibility penetrated into every aspect of Chinese social life, including printing and reading.<sup>383</sup> As an indispensable element of a book's "paratexts," illustrated matter not only served as an accompaniment to the text, but also told its own story. During the late nineteenth and early twentieth centuries, illustrating was still a way to impart knowledge, such as modern science, cartography, and music introduced from the West, especially if it was new to readers. Even in the early stages of the translation movement, the important function of image translation had already been recognized by Chinese activists who promoted Western learning through importing useful technical knowledge. In 1869, one of the administrators of the Jiangnan Arsenal briefed his supervisor on the Arsenal's school devoted to Western learning and offered insightful suggestions for how to make this school serve the Self-Strengthening Movement better. When mentioning the necessity of translating scientific works, he pointed out the relationship between image and text in Western books that impressed him. He wrote "Looking at original Western technological and mathematical works [we see that] ...if the abstruse implications are to be completely understood, [a book] should clearly outline its parts and sections first, but also use illustrated elucidation as a first step for readers to grasp

---

Chinese Word on Image: Zheng Qiao (1104-1162) and His Thought on Images" (PhD diss., Göteborg University, 2008).

<sup>383</sup> For a comprehensive study of Ming-Qing visual culture, see Craig Clunas, *Pictures and Visibility in Early Modern China* (Princeton, NJ: Princeton University Press, 1997). Robert Hegel specifically discusses the reading of illustrated novels in *Reading Illustrated Fiction in the Late Imperial China* (Stanford, CA: Stanford University Press, 1988).

knowledge.”<sup>384</sup> However, despite its importance, translating images remained challenging due to the receiving culture’s own distinct conventions of viewing, book-making, and its related technology.<sup>385</sup> Moreover, given the unfamiliarity of Chinese readers with Western science, maps, and music, the extent to which translated images could help them master new knowledge needs more investigation.

A burgeoning scholarship on the text-image relationship has stressed the importance of visualized information in knowledge representation and transmission.<sup>386</sup> Research specifically on Chinese traditional visual narrative conventions has been established within the broader ranges of Chinese studies.<sup>387</sup> However, most of the existing scholarship deals with the visual

---

<sup>384</sup> Quoted in “Zai Ni Kaiban Xueguan Shiyi Zhangcheng Shiliu Tiao (Sixteen Pieces of Advice on Operating the New School),” in *Guang Fangyan Guan Quan An (Complete Documents of Guang Fangyan Guan)*, ed. Chen Zhengqing (Shanghai: Shanghai Guji Chubanshe, 1989), 123.

<sup>385</sup> Fu Liangyu, “Invention and Implementation: New Bibliographical Features in Chinese Translations of Western Science Books, 1860-1920,” *Papers of the Bibliographical Society of America* 105.4 (2011): 469-502.

<sup>386</sup> See, for example, Roland Barthes, *Image-Music-Text* (New York: Hill and Wang, 1977); Susan M. Hagen, “Visual/Verbal Collaboration in Print: Complementary Differences, Necessary Ties, and an Untapped Rhetorical Opportunity,” *Written Communication* 24.1 (2007): 49-83; Jeanne Fahnestock, “Verbal and Visual Parallelism,” *Written Communication*, 20 (2003): 123-52; Charles Kostelnick and Michael Hassett, *Shaping Information: The Rhetoric of Visual Conventions* (Carbondale: University of Southern Illinois Press, 2003).

<sup>387</sup> See, for example, Julia K. Murray, “Didactic Illustrations in Printed Books,” in *Printing and Book Culture in Late Imperial China*, ed. Cynthia Brokaw and Kai-wing Chow (Berkeley: University of California Press, 2005), 417-50; Hegel, *Reading Illustrated Fiction*; Craig Clunas, *Pictures and Visuality*; Shih-shan Susan Huang, *Picturing the True Form: Daoist Visual Culture in Traditional China* (Cambridge, MA: Harvard University Asia Center, 2012); Ellen Johnston Laing, *Selling Happiness: Calendar Posters and Visual Culture in Early Twentieth-Century Shanghai* (Honolulu: University of Hawai’i Press, 2004); Chen Pingyuan and Xia Xiaohong, *Tuxiang Wanqing: Dianshizhai Huabao (Images of the Late Qing Dynasty: The Dianshizhai Pictorial)* (Tianjin: Baihua Wenyi Chubanshe, 2001).

There is also a body of scholarship on Chinese visual discourses that were influenced by the West. For the Western impact on Chinese depictions of the skeleton, see Catherine Despeux, “Visual Representations of the Body in Chinese Medical and Daoist Texts from the Song to the Qing Period (Tenth to Nineteenth Century),” trans. Penelope Barrett, *Asian Medicine: Tradition and Modernity*, 1.1 (2005): 10-52. For Chinese illustrations under the circumstances of West-East knowledge transmission in the nineteenth century, see Wang Ermin, “Zhongguo Jindai Zhishi Puji Hua Chuanbo zhi Tu Shuo Xingshi: Dianshizhai Huabao Li (The Format of the Combination of Elucidation and Illustration in the Knowledge Popularization during the Modernization Period in China: A Case Study of the Dianshizhai Pictorial),” in Wang Ermin, *Ming Qing Wenhua Shengtai (Culture Ecology of the Ming-Qing Period)* (Taipei: Taiwan Shangwu Yinshuguan, 1997), 227-96; Chen Pingyuan, *Zuo Tu You Shi yu Xixue Dong Jian: Wan Qing Huabao Yanjiu* (“Picture on the Left and History on the Right” and the Eastward Movement of Western Learning: Research on the Pictorials Published in the Late Qing Period) (Hong Kong: San Lian Shudian, 2008). The most representative anthologies on Chinese scientific illustrations include Francesca Bray, Vera Doreffeeve-Lichtmann, and Georges Métaillé, eds, *Graphics and Text in the Production of Technical Knowledge in*



representations and heritages of a single culture. The rarer scholarship on the mechanics of translating images focuses on the cross-cultural transmission of iconic symbols, children's picture books, religious works, or popular pictorial magazines.<sup>388</sup> They address how images in non-science/map/music genres have been adapted for different reading cultures. I found them useful in understanding Chinese readers' reception of socially contextualized images in translated science books, maps, and music. Regarding science image translations in particular, some scholars endeavored to identify the multiple-source origins of images and juxtapose them with their Chinese versions,<sup>389</sup> but have undertaken no sustained analyses of them. Others

---

*China: The Warp and the Weft* (Leiden: Brill, 2007) and Wang Shumin and Vivienne Lo, eds, *Xingxiang Zhongyi* (*Visualizing Traditional Chinese Medicine*) (Beijing: Renmin Weisheng Chubanshe, 2007).

<sup>388</sup> The most representative works concerning the transmission of visual symbols between cultures include Rudolf Wittkower's *Allegory and the Migration of Symbols* (London: Thames and Hudson, 1977). For the translation of illustrations in children's books, see Emer O'Sullivan, "Translating Pictures," in *The Translation of Children's Literature: A Reader*, ed. Gillian Lathey (Clevedon, UK: Multilingual Matters, 2006), 113-21; Riitta Oittinen, "Where the Wild Things Are: Translating Picture Books," *Meta: Translators' Journal* 48.1-2 (2003): 128-41; Iryna Oliynyk, "The Illustrated Story in Translation: Dialogue or Heteroglossia," *Zeszyty* 60 (2009): 162-71. Chen Pingyuan discusses the image translation in the Chinese version of the classical religious novel *Pilgrim's Progress* (John Banyan). See his article "Wan Qing Jiaohui Duwu de Tuxiang Xushi (The Visual Narrative in Christian Readings during the Late Qing Period)," *Xueshu Yanjiu* 11 (2003): 112-26. For the localization of Christian icons into more culturally understandable figures, see Simone Griebmayer, "Spreading the Word with Ink and Brush—Chinese Christian Images," in *Transmission Image: Visual Translation and Cultural Agency*, ed. Mersmann Birgit and Alexandra Schneider (Cambridge: Cambridge Scholars Publishing, 2009), 38-54. For images appearing in popular pictorials during the late nineteenth century but adapted from the Western newspapers and magazines to better entertain and attract a larger Chinese audience, see Julia Henningsmeier, "The Foreign Sources of *Dianshizhai Huabao*, a Nineteenth Century Shanghai Illustrated Magazine," *Ming Qing Yan Jiu* (1998): 59-91.

<sup>389</sup> For example, some scholars carefully investigated the Western sources of illustrations in Benjamin Hobson's (1816-1873) translated/complied medical work *Quan Ti Xin Lun* (*Physiology*) published in China in the 1850s. See Hideshi Matsumoto and Tatsuo Sakai, "Zentaishinron ni keisaisareru kaibōzu no shuten nituite (On the Sources of the Anatomical Illustrations Appearing in Quanti-xinlun)," *Nihon Ishigaku Zasshi* (*Journal of the Japan Society of Medical History*) 55.4 (2009): 463-97; Chan Man Sing, "Quan Ti Xin Lun Chatu Laiyuan de Zai Kaocha, Jian Shuo Wanqing Yiliao Jiaoyu de Zhong Yin Yinyuan (The Pictorial Sources of Benjamin Hobson's *Quan Ti Xin Lun*)," *Ziran Kexue Shi Yanjiu* (*Studies in the History of Natural Sciences*) 30:3 (2011): 257-77; Chan Man Sing and Vicky Law, "Guanyu *Quan Ti Xin Lun* (Translating Western Physiology in Late Qing China: The Case of *Quan Ti Xin Lun*)," paper presented at the 12<sup>th</sup> International Conference on the History of Science in China, Beijing, China, June 26-30, 2010. For other examples, see Dong Shaoxin, *Xing Shen zhijian: Zaoqi Xiyang Yixue Ru Hua Shigao* (*Between the Body and the Spirit: A History of Western Medicine in Early China*) (Shanghai: Shanghai Guji Chubanshe, 2008), Chapter 7 "Xiyang Jiepou Tu de Chuanru, Chuanbo yu Yanbian (The Introduction, Communication, and Transformation of Western Anatomical Images)," 435-60; Zhang Baichun and others, "Qi Qi Tu Shuo de Zhishi Laiyuan (The Sources of *Qi Qi Tu Shuo*)," in *Chuanbo yu Huitong: Qi Qi Tu Shuo Yanjiu yu Jiaozhu* (*Transmission and Adaptation: Research and Commentary on Qi Qi Tu Shuo*), ed. Zhang Baichun and others (Nanjing: Jiangsu Kexue Jishu Chubanshe, 2009), 86-153; Nicolas Standaert and K. U. Leuven, "A Chinese Translation of Ambroise Paré's *Anatomy*," *Sino-Western Cultural Relations Journal* (*Zhongxi Wenhua Jiaoliu Shi*

discussed the social context and intellectual negotiation surrounding illustrations in translations, but not from a comparative perspective.<sup>390</sup>

There has been extensive multidisciplinary research shedding light on translated pictorial depictions in translations by examining the production or use of images, as well as their iconography and design, in diverse historical periods. Inquiring into how science was visualized aesthetically, some scholars attempt to probe the boundary between art and science, and suggest that far from being in opposition to one another, the two intersected in various ways.<sup>391</sup> Other scholars<sup>392</sup> stress modern technology's impact on the visualization of science in terms of a shift from "metaphysical image to mechanical image,"<sup>393</sup> and scientists' grappling with issues of objectivity in scientific representations. In my own research, I found that illustrators' aesthetics played important roles in refashioning images, especially when they opted to modify Western images for Chinese audiences. These images bore cultural traces harking back to the Chinese artistic heritage. Visual imagery also provided opportunities for translators/illustrators to indigenize new knowledge, giving it a less exotic face. However, translators sometimes kept original versions intact, by using newly available printing technologies that allowed for exact reproduction. This, of course, diminished the mediating role of illustrators.

---

*Zazhi/Zhongguo Tianzhujiào Shì Yánjiū* 21 (1999): 9-33.

<sup>390</sup> Daniel Asen, "'Manchu Anatomy': Anatomical Knowledge and the Jesuits in Seventeenth- and Eighteenth-Century China," *Social History of Medicine* 22.1 (2009): 23-44; Larissa Heinrich, *The Afterlife of Images: Translating the Pathological Body between China and the West* (Durham, NC: Duke University Press, 2008).

<sup>391</sup> For example, see John W. Shirley and F. David Hoeniger, eds., *Science and the Arts in the Renaissance* (Washington, D.C.: Folger Shakespeare Library, 1985); Horst Bredekamp, *The Lure of Antiquity and the Cult of the Machine*, trans. Allison Brown (Princeton, NJ: M. Wiener Publishers, 1995); Brian S. Baigrie, ed, *Picturing Knowledge: Historical and Philosophical Problems Concerning the Use of Art in Science* (Toronto: University of Toronto Press, 1996); Caroline A. Jones and Peter Galison, eds, *Picturing Science, Producing Art* (New York: Routledge, 1998).

<sup>392</sup> Lorraine Daston and Peter Galison, "The Image of Objectivity," *Representations* 40 (1992): 81-128; Peter Galison, "Judgment against Objectivity," in *Picturing Science, Producing Art* (New York: Routledge, 1998), 327-59.

<sup>393</sup> Galison, "Judgment against Objectivity," 327-59, qt. on 354.

In this chapter, I compare selected graphic representations in translated Chinese-language science books, maps, and music, with their original Western-language sources, and especially delve into their production in order to uncover the translation dynamics behind the visuals on the page—how “boats” were equipped with “compasses.” Just as compasses guide people through unfamiliar seas, translated images introduced readers to unexplored intellectual territory. On the one hand, the reader had to learn the terrain. I propose that “viewing to learn,” one way among many to engage an image, became, during the late nineteenth and early twentieth centuries, the reader’s primary way of using translated visuals. This way of seeing was especially in keeping with the nation’s new awakening to Western knowledge after the imperial government’s notorious defeats at the hands of Western powers. It was related to the goal of learning. On the other hand, readers, in order to explore the terrain more thoroughly, sometimes required a greater coordination of the guide with the specific features of the new territory. In “reference viewing,” which emerged from one Western tradition of illustration design using alphabetical and numerical labels, images and the main text formed a symbiotic relationship. Such a viewing mode was largely experimented with by Chinese readers of translated scientific and technical images. Throughout, I argue that translators modified Western visual images to make them more comprehensible to Chinese readers. Variant illustrations in translated imprints did not necessarily hinder readers from gaining knowledge, and may in fact have facilitated their grasp of Western science. To be sure, printing techniques could account for some (or no) variations in translated images. However, human agency also came into play. Illustrators drew upon their artistic training and indigenizing efforts to experiment with expressing Western technical knowledge with an eye to Chinese visual idioms. Moreover, the importing of electrotypes, a new technique of reproducing images, transformed the division of labor in woodblock printing,

and brought in adjustments to traditional page layout. The combination of all these elements contributed to the changing of visual conventions in China during the late nineteenth and early twentieth centuries.

Below, I examine the range of visible differences between representative translated science illustrations, maps, and music symbols, and their original versions. I contextualize translated visualized information by showing how audiences were invited to discover new ways of seeing, and how teams of translators and printer-publishers strived to channel visual meanings to their readers by chiming in with their own non-verbal voices. Furthermore, I explore the factors responsible for the deviations, including the purpose of the book, visual literacy, the involvement of illustrators and their collaboration with other translators, and technological intervention.

#### **4.1 VISUALIZED INFORMATION IN TRANSLATED IMPRINTS**

Both the textual and the visual carry knowledge. They are potentially “equal contributors to meaning,” even though specific examples of illustrated imprints might emphasize either one of them.<sup>394</sup> There were various forms of visualized information in Western translated science books, maps, and music. In science books, the majority of non-verbal message were presented through illustrations. These could be originally hand-drawn or machine-mediated (e.g., camera obscura). They could appear as small-sized images scattered throughout pages, as full-page sized plates, or as fold-outs. And they could be variably printed through letter press, copper

---

<sup>394</sup> Susan M. Hagen, “Visual/Verbal Collaboration in Print: Complementary Differences, Necessary Ties, and an Untapped Rhetorical Opportunity,” *Written Communication* 24.1 (2007): 51.

plate, lithography, or photolithography. It was customary to highlight in the title pages of science publications that the book was equipped with a remarkable number of well-made illustrations. Other kinds of illustrations included charts, diagrams, and schematic designs. Except for some textual appendages, maps themselves largely featured visual information, which was contained in demarcations of spaces and boundaries, symbols, scales, legends, and cartouches. In sheet music, the melodic parts were visually represented by notations, staves, and a variety of pictorial signs. Visualized forms of knowledge were also richly presented in translations of Western science, maps, and music. When these pictorial messages were rendered into their Chinese versions, translators and illustrators retained some of the originals unaltered, but changed others. In translating these, they incorporated their own understanding of the originals and considerations of readers. But before delving into these specific dynamics, I must position visual imageries in translations within their Chinese context and examine the ways of seeing and using them.

#### **4.1.1 Viewing to Learn**

The Song Dynasty (960-1279) witnessed an expansion in the use of graphic representations along with the development of cultural production (e.g., that of books and folk art and fine art) and printing technology.<sup>395</sup> It continued into the Ming and Qing periods. Especially, the late-Ming period experienced a “golden age” of woodblock illustrations accompanied by the popularity of vernacular literature and art albums.<sup>396</sup> In the past audiences, or the “imaginary

---

<sup>395</sup> Catherine Despeux, “Visual Representations of the Body in Chinese Medical and Daoist Texts from the Song to the Qing Period (Tenth to Nineteenth Century),” translated by Penelope Barrett, *Asian Medicine: Tradition and Modernity* 1.1 (2005): 11.

<sup>396</sup> Hegel, *Reading Illustrated Fiction*, 291.

audience,”<sup>397</sup> viewed images in different ways and for different purposes. They could look at the pictures in an illustrated novel to follow the plots and narratives. They could see the exquisite reproductions of paintings in fine art work collections to appreciate the aesthetic value. They could examine topographical maps to recognize their travel destinations. They could read a depiction of a body along with acupuncture and moxibustion (a therapy in traditional Chinese medicine) charts inserted nearby to memorize the terms for body parts, meridians, and points and their locations. Moreover, they could observe images that were originally intended to be didactic, such as ones providing moral and ritual instruction.<sup>398</sup> All of these ways had something to do with “viewing to learn,” but it was not often the first and foremost goal. Readers could view images for aesthetic pleasure, for entertainment, or for religious meditation.

Viewing to learn became a major goal set for readers by translators of Western learning during the late nineteenth and early twentieth centuries. It was not an inventive way of utilizing graphic representations, as we have seen, but, by this time, it had become a shared goal among the literate population, who, having genuine interest in Western learning, in a sense, represented greater national concerns or, at least, attempts, and the future trajectory of China on its way to modernization. Translators anticipated that comprehension would ideally be achieved through the combination of text and image, so that visualizations helped to facilitate the effective introduction of new knowledge. In *Hua Xue Chu Jie*’s Chinese-language preface dated August 1870, He Liaoran, a co-translator, emphasized the importance of science illustrations to learning: “There are both illustrations and textual instructions in the book. Scholars, indeed, are able to be intimate with the apparatus and learn to do experiments themselves. Then they can be more

---

<sup>397</sup> Edwin Black, “The Second Persona,” in *Contemporary Rhetorical Theory: A Reader*, ed. John Lucaites, Celeste Michelle Condit, and Sally Caudill (New York: Guilford, 1998), 331-40.

<sup>398</sup> Hegel, *Reading Illustrated Fiction*; Despeux, “Visual Representations”; Murray, “Didactic Illustrations”; Huang, *Picturing the True Form*.

advanced in knowledge. In this case, their learning will not be based upon just empty words.”<sup>399</sup>

Similar recognition can be found in *Chan Ke Xue*’s Chinese preface: “Exquisite illustrations made the understanding of medical knowledge easier.”<sup>400</sup> Viewing to learn also mirrored the yearning of enlightened literati and progressive officials for the opening of their countrymen’s eyes to the rest of the world. China’s military defeats and diplomatic humiliation in the face of Western powers, beginning in the early 1840s and continuing for many decades more, revealed to them the devastating consequences of her isolation and the late Qing imperial court’s blindness to the progress of other nations. This was especially demonstrated in translations of maps. In one of the pioneering translated/compiled world atlases *Hai Guo Tu Zhi* 海國圖志 (*Illustrated Treatise on the Sea Kingdoms*),<sup>401</sup> the author and literati-official Wei Yuan 魏源 (1794-1857) explicitly stated that the dissemination of the maps was for learning from the West, especially during confrontations: “If we do not read this atlas, then we will never know how immense the universe is, and that the earth is round with north pole up and south pole down,” Wei explained.<sup>402</sup> “What is the difference between this atlas and previous world atlases?” he queried. He answered that “Others concerned Chinese people’s view on the West, but this book presented how Western people see the West.” He then asked, “What is the use of this book?” and replies geopolitically: “Attack the foreign countries by adopting foreign methods; Treat foreigners with foreign codes; Learn foreigners’ best techniques then use them to rule foreigners. During periods of war, this book can serve as a very clear reference book, which helps us to

---

<sup>399</sup> He Liaoran, preface to *Hua Xue Chu Jie*, 1a. Translated by the author.

<sup>400</sup> Xu Songcheng, preface to *Chan Ke Xue*, 1. Translated by the author.

<sup>401</sup> Wei Yuan, *Hai Guo Tu Zhi* (Shanghai: Wenxiange, 1898). The first edition (50 *juan*) was published in 1843, and was enlarged in 1847 (60 *juan*) and in 1852 (100 *juan*). The title was reprinted for numerous times.

<sup>402</sup> Wei Yuan, *hou xu* (later preface, dated 1852) to *Hai Guo Tu Zhi*, 3a. Translated by the author.

know the situation of our enemies.”<sup>403</sup> Furthermore, we can see that “viewing to learn” is evident in the considerable number of translations adopted as textbooks in a broad range of new-style schools,<sup>404</sup> such as Hunan Shiwu Academy, the Medical Division of the St. John’s University in Shanghai, Jingshi Tongwenguan 京師同文館 (Imperial Academy for Foreign Languages), and Nanking Union Nurses’ School. All of which offered courses incorporating Western knowledge.<sup>405</sup> Given the pedagogical use of these translations, the graphic representations inside would be employed to assist students’ knowledge acquisition.

Viewing to learn was not only for readers once the book was published, but aided in the work’s preparation prior to its publication. Translators, who beforehand had to master the ideas of the Western source-books, also utilized graphic representations to make sure that they understood the text correctly. In *Yu Feng Yao Shu*’s 御風要術 (*Essential Techniques of Protection against the Wind*)<sup>406</sup> preface, Hua Hengfang recorded the discussion between himself

---

<sup>403</sup> Wei Yuan, *yuan xu* (original preface, dated 1842) to *Hai Guo Tu Zhi*, 2a. Translated by the author.

<sup>404</sup> For Chinese educational reform in the early twentieth century, see Xiaoping Cong, *Teachers’ Schools and the making of the Modern Chinese Nation-State, 1897-1937* (Vancouver: University of British Columbia Press, 2007); Marianne Bastid, *Educational Reform in Early Twentieth-Century China*, trans. Paul J. Bailey (Ann Arbor: Center for Chinese Studies, University of Michigan, 1988); Sally Borthwick, *Education and Social Change in China: The Beginnings of the Modern Era* (Stanford, CA: Hoover Institute Press, Stanford University, 1983).

<sup>405</sup> Hunan Shiwu Academy adopted *Di Xue Qian Shi*, the trilogy of *Hua Xue Jian Yuan*, *Dai Shu Bei Zhi* among a number of translations. See Zhu Youhuan and Gao Shiliang, ed., *Zhongguo Jindai Xuezhishi Liao* (*Sources on Modern Education in China*), vol. 1, pt. 2 (Shanghai: East China Normal University Press, 1991), 304-6. For the medical translations used by St. John’s University, see *ibid.*, vol. 4, 437-8; John Fryer, *The Educational Directory for China* (Shanghai: American Presbyterian Mission Press, 1895), 17-8. John Fryer also stated “It is gratifying to find that some of these translations [by the Translation Department of the Jiangnan Arsenal] have already found their way as text-books in the Peking University [referring to Jingshi Tongwenguan] and in the higher kinds of mission schools. For example, the work on Trigonometry has been used to advantage in Mr. Mateer’s school at Tāngchow.” See Fryer, *An Account of the Department for the Translation of Foreign Books at the Kiangnan Arsenal, Shanghai* (Shanghai: American Presbyterian Mission Press, 1880), 16. The Chinese translations of Western medical textbooks adopted by Nanking Union Nurses’ School included “Hare’s *Therapeutics*, Neal’s *Eye and Skin Diseases*, Fullerton’s *Nursing in Abdominal Surgery*, Porter’s *Anatomy and Physiology*, Evans and Ashton’s *Obstetrics*.” See Lucy A. Gaynor, “Nanking Union Nurses’ School,” *China Medical Journal* 23.5 (1909): 343.

<sup>406</sup> William Radcliff Birt, *Yu Feng Yao Shu*, trans. Carl Traugott Kreyer and Hua Hengfang (Shanghai: Jiangnan Arsenal, 1873). It was translated from *Handbook of the Law of Storms; Being a Digest of the Principal Facts of Revolving Storms* (London: George Philip & Son, 1856).



and Carl Traugott Kreyer (1839-1914),<sup>407</sup> the book's oral translator, on the English-language version before they started to translate it. Hua first heard from Kreyer, once trained in navigation, that the original book was very accurate and detailed about how maritime vehicles could take advantage of wind while avoiding disasters such as storms and hurricanes. Hua pondered the principles Kreyer laid out for him. But it was not enough. He also examined the book's illustrations, and then confirmed that this original text contained "extremely reasonable theories" and was indeed worthy of being introduced to readers. He even regretted that due to his persisting problem of severe seasickness, he was not able to test every important piece of instruction through on-site physical experimentation on the sea.<sup>408</sup> This account shows that Hua was very practical and responsible because he verified the viability of the content before readers finally saw his works. And illustrations played a practical role in helping him both to comprehend new knowledge, and to decide whether the original source was deserving of translation.

Viewing to learn depended upon the capacity of the translated visuals to impart information. In order to facilitate pedagogical and reference use in classrooms and autodidacticism at home (especially of science subjects and maps), a variety of production formats besides the standard book page were employed. These alternative formats became more popular and more widely spread during the late Qing period than ever before. The wall chart, which often contained a variety of images pertaining to a certain subject matter or field of learning, was one of these remarkable formats adopted from the West. In the West, the wall

---

<sup>407</sup> Kreyer, a German immigrant in America, was among the most prolific oral translators at the Jiangnan Arsenal, second only to John Fryer. His translations mainly concerned military-related technology. For a brief account of his life and work, see Takata Tokio, "Jinkaili Zhuanlüe (A Biography of Carl Traugott Kreyer)," *Riben Dongfang Xue (Oriental Studies in Japan)*, vol. 1 (Beijing: Zhonghua Shuju, 2007): 260-76.

<sup>408</sup> Hua Hengfang, Preface to *Yu Feng Yao Shu*, 1a-1b.

chart “explicitly designed to be displayed in the classroom” first came into use there during the 1820s, and entered its nearly fifty-year “golden age” from the 1870s to the 1920s, so Westerners likely introduced it into China where there were few indigenous precedents.<sup>409</sup> In 1877 when the School and Textbook Series Committee<sup>410</sup> was founded in Shanghai with the aim of preparing a series of educational books for elementary and secondary schools in China, the honorary secretary Alexander Williamson reported that one of the prioritized tasks of the Committee was to issue “a series of school maps and a set of botanical and zoological charts for school-room walls.”<sup>411</sup> By 1895, this assignment had been fulfilled with the publication of in all fifty-four sheets of colorful wall charts on a broad range of subjects, mostly concerning Western science.<sup>412</sup> Each chart’s title explicitly indicated its visuality because it contained the Chinese character *tu* 圖, the general term referring to “graphic representations.” *Tu* was combined with the Chinese rendition of a subject matter it concerned, such as *Tianwen Tu* 天文圖 (on astronomy) and *Qiji Guolu Tu* 汽機鍋爐圖 (on steam engines and boilers). Nearly all the original sources for these charts were published in English by W. & A. K. Johnston in

---

<sup>409</sup> Massimiano Bucchi, “Images of Science in the Classroom: Wall Charts and Science Education, 1850-1920,” in *Visual Cultures of Science: Rethinking Representational Practices in Knowledge Building and Science Communication*, ed. Luc Pauwels (Hanover, NH: Dartmouth College Press, 2006), 91.

<sup>410</sup> The Committee was initiated at the General Conference of Protestant Missionaries in China in 1877. Later in 1890, its title was changed to the “Educational Association of China.”

<sup>411</sup> W. J. Lewis, W. T. A. Barber, and J. R. Hykes, ed., *Records of the General Conference of the Protestant Missionaries of China, Held at Shanghai, May 7-20, 1890* (Shanghai: American Presbyterian Mission Press, 1890) Appendix E, 712.

<sup>412</sup> There were in all fifty-four charts spanning twenty-two subject matters as follows: Hydrodynamics (one chart), Hydrostatics (one chart), Mechanical Powers (one chart), Metric System (one chart), Anatomy and Physiology (two charts), Astronomy (four charts), Birds (one chart), Botany (four charts), Chemistry (five charts), Electricity and Magnetism (five charts), Heat (two charts), Invertebrate Animals (one chart), Light (two charts), Mammals (one chart), Mineralogy and Palaeontology (one chart), Reptiles, Amphibians and Fishes (one chart), Zoology and Comparative Anatomy (four charts), Astronomical and Geographical Diagrams (one chart), Geographical Terms (one chart), Model Drawing (twelve charts), Steam Engines and Boilers (two charts), and Properties of Matter (one chart).

Edinburgh.<sup>413</sup> English names and terms, appearing in the original sources, that referred to various illustrated objects were translated into Chinese characters drawn by “professional copyists” in a large font size for printing. On the translation’s page, these were juxtaposed with their English-language counterparts. Each chart measured fifty-by-forty inches, and was priced at \$2.00 if they were mounted for hanging and \$1.65 if not.<sup>414</sup> Charts on some subjects such as Anatomy and Physiology had been “sold in considerable numbers,”<sup>415</sup> and could be “found in most of the important mission schools.”<sup>416</sup> Moreover, every chart on a particular subject was accompanied by a translated handbook that was sold separately.<sup>417</sup> The English-language handbooks were originally authored by professors and scholars to elaborate W. & A. K. Johnston’s wall charts for class use. The majority of their Chinese versions were translated and edited by John Fryer for the School and Textbook Series Committee. He noted the production and potential usage of them: “To make these Hand-books more generally useful they are all illustrated with facsimiles of the charts reduced to the size of the pages by photolithography. They may thus be used either separately as school books, or (what is of course preferable) in connection with the large charts.”<sup>418</sup> The Jiangnan Arsenal also published a total of twenty-seven sets of large hanging maps, including the five-sheet *Da Jiang Tu* 大江圖 (*Chart of the Grand River*, English title: *Charts for Navigation of the Yangtsze*), the seventeen-sheet *Hai Dao Fen Tu* 海道分圖 (*Individual Charts of Marine Roads*, English title: *Charts of Chinese and*

---

<sup>413</sup> John Fryer, *Catalogue of Educational Books, Works of General Knowledge, Scientific and Technical Treatises, &c., &c., &c., in the Chinese Language Translated or Written by John Fryer* (Shanghai: Presbyterian Mission Press, 1894), 4.

<sup>414</sup> These series of charts were sold continuously until at least 1907. The prices had been inflated to \$3.00 for the mounted and \$2.70 for the unmounted. See the advertisement page in the 1907 volume of *Chinese Recorder*.

<sup>415</sup> John Fryer, comp., *Catalogue of Books, Wall Charts, Maps, &c., Published or Adopted by the Educational Association of China (Formerly the School and Text-Book Series Committee)* (Shanghai: Educational Association of China, American Presbyterian Mission Press, 1895), 33.

<sup>416</sup> Fryer, *Catalogue of Educational Books*, 4.

<sup>417</sup> Fryer, *Catalogue of Books, Wall Charts, Maps*, 33.

<sup>418</sup> Fryer, *Catalogue of Educational Books*, 4.

*Neighbouring Coasts*), the single-sheet *Hai Dao Zong Tu* 海道總圖 (*General Chart of Marine Roads*, English title: *General Chart of Chinese and Neighbouring Coasts*), all in 1874, and the four-sheet *Ping Yuan Di Qiu Tu* 平圓地球圖 (*Flat Map of Circular Earth*, English title: *Map of the World in Hemispheres*) in 1876. Most of them were adapted from the British Admiralty, and printed “from copper plates engraved at the Arsenal.” From their publication date until 1880, the purchase record had amounted to 4,774 sheets.<sup>419</sup>

Evidence shows that wall charts were adopted in diverse Chinese classrooms by the early twentieth century. Around 1912, when Cambridge-based British historian G. Lowes Dickinson (1862-1932) visited a school located inland, he recorded that “Inside [the classroom], the walls are hung with drawings of birds and beasts, of the human skeleton and organs, even of bacteria! There are maps of China and of the world.” Dickinson was surprised by his observation because this school was in only “a tiny village in the heart of the country, more than 1000 miles from the coast.”<sup>420</sup> Charts were indeed common in more affluent areas with richer educational resources. A photograph taken in 1909 featured in the *China Medical Journal* depicted one session of the surgery course at the Medical Division of St John’s University in Shanghai (See Figure 19) in which the classroom walls are festooned with several large-sized physiological and medical charts. In *Xue Jiu Xin Tan* 學究新談 (*Pedant’s New Talk*), a late-Qing exposé novel, an old-fashioned pedant, Xia Yangxi 夏仰西, was invited to observe classes conducted at a new-style “Strengthening China” (*qiang hua* 強華) secondary school where physiology and hygiene courses were taught. He walked in a physiology class and saw “quite a few wall charts, all of which vividly depicted the shapes of limbs and trunk, skeleton, and viscera of the human

---

<sup>419</sup> Fryer, *An Account of the Department*, 19.

<sup>420</sup> G. Lowes Dickinson, *Appearances: Notes of Travel, East and West* (New York: Doubleday, Page & Company, 1914), 62.

body.”<sup>421</sup> Similar scenes happened in a class of geosciences when Xie saw instructional charts replete with varieties of rocks.<sup>422</sup> The pedagogical demonstration of wall charts stretched private viewing of book illustrations to a public dimension.



**Figure 19.** Wall chart used in classroom (Original caption: Class in Minor Surgery, St. John's Medical School, Shanghai), *China Medical Journal*, 23.5 (1909), between 308 and 309 (recto).

The publishing and distribution of large-sized charts of collected graphic representations mainly aided in-classroom teaching and learning. Usually the display of these charts was for groups. Sometimes, however, they were intended to attract individual readers for personal studying and reference at home. For example, in 1853, the scholar and bibliophile, Ye Zhishen 葉志詵 (penname Suiweng 遂翁, 1779-1863), compiled together all 271 physiological illustrations appearing in Benjamin Hobson's *Quan Ti Xin Lun*, and arranged them into eight

---

<sup>421</sup> Wu Meng, *Xue Jiu Xin Tan*, in *Wanqing Xiaoshuo Daxi (Grand Collection of Late-Qing Fiction)*, ed. Wang Xiaolian et al. (Taipei: Guangya, 1984), 21. Translated by the author. It is also quoted in Zhang Zhongmin, “Wanqing Chuban de Shengli Weisheng Shuji ji qi Duzhe (Books of Physiology and Hygiene in Late Qing Dynasty and Their Readers),” *Shi Lin (Historical Review)* 23.4 (2008): 34. *Xue Jiu Xin Tan* was serialized in the late-Qing biweekly *Xiu Xiang Xiao Shuo (Tapestry Portrait Novel)* from issue 47 to 72 (1905-1906).

<sup>422</sup> Wu Meng, *Xue Jiu*, 22.

long scrolls, titled *Quan Ti Fen Tu* 全體分圖 (*Divided Illustrations of the Entire Body*).<sup>423</sup> One of the most exquisitely made and most popular private reprints in Canton area, Ye's illustrations seemed to be the only edition authorized and praised by Hobson himself.<sup>424</sup> They could have been used as instructional hanging charts for the schoolroom. But Ye proposed an alternative use: "[Readers at home can] put them near your chair for the convenience of contemplating and surveying; [you can] also present them as a gift to people who want to deeply explore the principles of medicine."<sup>425</sup> Ye did not suggest that autodidacts consult Hobson's book when viewing chart images, however, perhaps because he assumed the scrolls' buyers had already learned enough Western medicine. Whatever the case, these charts served as a general reference tool imparting basic knowledge of the body. The scrolls helped readers memorize terms, and assay physiological proportions, and visualize shapes of organs and bones. They could have become a resource for readers who acquired some medical knowledge elsewhere but who wanted visual reinforcement of that knowledge, especially if it was acquired from texts lacking illustrations. This case shows the possibility of book illustrations acting independently of their textual context, and, when grouped together outside of the covers of a book functioning differently from the way they did when they were anchored inside the text.

Some traits of visual representations in original imprints particularly contributed to effective learning, such as the use of color. Some Chinese printer-publishers of Western translations, especially those of medical works such as *Yan Ke Zheng Zhi* 眼科症治 (*Cure of*

---

<sup>423</sup> Ye Zhishen, *Quan Ti Fen Tu* (Canton), 1853. The scrolls are located at the archive of the School of Oriental and African Studies, London. First published in 1851, Hobson's *Quan Ti Xin Lun* had three major versions and numerous commercial and private reprints. Ye's scrolls were based upon the second version (Hui'ai Yi Guan, 1853). See Chan and Law, "Guanyu *Quan Ti Xin Lun*"; Chan Man Sing, "*Quan Ti Xin Lun* de Zhuanyi yu Zaoqi Banben (The Translation and Early Editions of *Quan Ti Xin Lun*)," *Zhongguo Dianji yu Wenhua Luncong* (*Chinese Classics and Culture Essay Collection*) 13 (2011): 159-79.

<sup>424</sup> Hobson, preface to *Xi Yi Lüe Lun* (*Concise Treatise on the Western Medicine*, English title: *First Lines of the Practice of Surgery in the West*) (Shanghai: Renji Yiyuan, 1857), 1a; Hobson, *li yan* (general guide) to *ibid.*, 1b.

<sup>425</sup> Ye, *Quan Ti Fen Tu*, the eighth scroll.

*Ophthalmological Diseases*), *Lu Jun Wei Sheng Ti Yao* 陸軍衛生提要 (*An Epitome of Military Medicine*), *Ha Shi Sheng Li Xue* 哈氏生理學 (*Halliburton's Physiology*), and *Ge Shi Xi Tong Jie Pou Xue* 格氏系統解剖學 (*Gray's Systematic Anatomy*), strove to keep the color effect.<sup>426</sup>

While they featured colored illustrations and plates, making knowledge appear more discernable and attractive to readers, the majority of translations were still black and white because non-color printing was less expensive and not as demanding of labor. Readers, book reviewers, and bibliographers were sensitive to the elimination of original colors in translations. For example, the renowned intellectual and reformer, Liang Qichao 梁啟超 (1873-1929), criticized in his famous guide to reading Western translations *Du Xi Xue Shu Fa* 讀西學書法 (*Methods of Reading Books on Western Learning*) the elimination of color in *Jin Shi Shi Bie*'s illustrations. He complained: "Even though this is an illustrated book, it equals to the one without images!"<sup>427</sup>

Liang might have exaggerated the necessity of colored images by disparaging the function of black-and-white ones. But he possibly had seen the source book *Manual of Mineralogy* (J. D. Dana) and found that only color illustrations were able to convey the complexity of the knowledge in this case. Whether right or wrong, his judgment demonstrated the high expectations that highly literate men familiar with Western books, brought to translated visual material. Color, which supposedly facilitated learning, was definitely one of their expectations. Similar commentary was shared by Xu Weize and Gu Xieguang in their *Zeng Ban Dong Xi Xue*

---

<sup>426</sup> William Fisher Norris and Charles Augustus Oliver, *Yan Ke Zheng Zhi*, trans. James Boyd Neal, 4th edition (Shanghai: China Medical Missionary Association, 1906); Zhao Shifa trans. and comp., *Lu Jun Wei Sheng Ti Yao* (Shanghai: China Medical Missionary Association, 1909); William Dobinson Halliburton, *Ha Shi Sheng Li Xue*, trans. Philip B. Cousland, 7th edition (Shanghai: China Medical Missionary Association, 1919); Henry Gray and Robert Howden, *Ge Shi Xi Tong Jie Pou Xue*, trans. L. M. Ingle and Chen Tso Ting, 2nd edition (Shanghai: China Medical Missionary Association, 1929). In the last title *Ge Shi*, the translator admitted that the cost problem of reproducing color illustration made the printer-publisher omit color "where possible without prejudice to the clearness of the illustrations." See Ingle, preface to *Ge Shi*, 1.

<sup>427</sup> Liang Qichao, *Du Xi Xue Shu Fa*, 3a.

*Shu Lu* 增版東西學書錄 (*Enlarged Bibliography of Foreign Learning*): “It [*Jin Shi Shi Bie*] is the most useful book for mineralogists. But it is a pity that different colors that were adopted to highlight the original illustrations were removed in the translated version.”<sup>428</sup>

During the late nineteenth and early twentieth centuries, visualized knowledge that helped readers familiarize themselves with Western learning was constantly mentioned in translations’ prefaces. These might note why illustrations were retained from the source books, how they were produced, and, more essentially, why translators thought images of various contents and formats were important to readers. Even though images, in general, did not occupy much space on translations’ pages, their presence was a proof of translators’ expectation for their books to become effective and user-friendly learning aids.

#### 4.1.2 “Reference Viewing” and Text-Image Relationship

By the late imperial period, China had developed multiple “ways of seeing” graphic representations and visual objects.<sup>429</sup> However, scholarship has not stressed the role of the text-image relationship in developing these modes of viewing. The way illustrations on the page were designed invited a certain way of reading them. By incorporating this overlooked dimension of the text-image relationship into my examination of visual representations in

---

<sup>428</sup> Xu Weize and Gu Xieguang, *Zeng Ban Dong Xi Xue Shu Lu*, juan 3, 23a (1902; repr. in Wang Tao and Gu Xieguang, eds., *Jin Dai Yi Shu Mu* (*Bibliographies of Translated Books Published during the Modern Period*) (Beijing: Beijing Tushuguan Chubanshe, 2003), 212.

<sup>429</sup> Concerning the “ways of looking” in late Imperial China, Craig Clunas has elaborated upon Ming elites’ manners of viewing paintings (in the format of the hand scroll, hanging scroll, and album leaf), which included discriminating based upon quality (or “tell[ing] truth from false”), contemplating, and reading (with vision moving). Every “act of viewing” of painting in the Ming-Chinese setting, Clunas argues, was an “act of social interaction.” See Clunas, *Pictures and Visuality*, 111-133. Emma Teng augmented Clunas’s breakthrough category of “ways of looking” by extending case studies to map viewing in Qing China, and introducing more varieties of manners including surveying, imperial inspection, visual identification, and looking as pleasure. See Teng, “Texts on the Right and Pictures on the Left,” in *Writing and Materiality in China*, ed. Judith T. Zeitlin, Lydia H. Liu, and Ellen Widmer (Cambridge, MA: Harvard University Press, 2003), 451-87.



translations, I found that a type of, what I call, “reference viewing,” was prevalent. By “reference viewing,” I mean the way readers coordinated text and image specifically by looking back and forth at the main text and its corresponding images. This way of viewing was common in Western source imprints but new to Chinese readers of translations that retained the reference viewing options of their original Western sources. The key technique that opened these options utilized letters and numerals to mark each component of an image needing elucidation, and referred readers to the supporting passage of the main text. In this manner, images “talked” to readers by directing their eyes to new territory on the printed page. It fostered a text-and-image dependency well beyond many other mediated viewing techniques.

Placing some form of lettering inside or close to an image was traditional in both China and the West.<sup>430</sup> By the late imperial period in China, many illustrations, such as those representing body meridians, acupuncture, anatomy, physiology, and physiognomy, included words. In some cases, images and words—either explanatory text or simply descriptive terms—were fused in the same space with no clear demarcation between them. In a sense, such images were “coded representations.”<sup>431</sup> For example, in Figure 20 from a Ming-period illustrated medical book *Lei Jing Tu Yi* 類經圖翼 (*Appended Illustrations to the Lei Jing*) by Zhang Jiebin 張介賓 (1563-1640),<sup>432</sup> the cutaway-like depiction of the torso was separated into three parts, within each of which there were words naming the corresponding part and explaining its function. In this illustration, the image is coded by the inside text, which is essential for

---

<sup>430</sup> Adding a caption to the image was more common in traditional Chinese science and technology books, including (but not limited to) those concerning botany, agriculture, materia medica, metallurgy, and mining.

<sup>431</sup> Catherine Despeux, “Visual Representations of the Body in Chinese Medical and Daoist Texts from the Song to the Qing Period (Tenth to Nineteenth Century),” trans. Penelope Barrett, *Asian Medicine: Tradition and Modernity*, 1.1 (2005): 47.

<sup>432</sup> *Lei Jing Tu Yi* was originally published in 1624. Figure 21 and 22 are from its version included in *Si Ku Quan Shu* (*Complete Collection of Books in Four Divisions*). *Lei Jing* (*Categorization of Canon*) was Zhang’s comprehensive study of the ancient medical text *Huang Di Nei Jing* (*Yellow Emperor’s Inner Canon*).

understanding the image. In some other cases, words were not positioned in the interior of each visually identifiable unit, but were connected to other symbols—usually simple lines—and appeared as verbal inscriptions outside the referred section of image. This way of arbitrating text and image can be seen in the indications of acupuncture points on a meridian in Figure 21. Sometimes, the lines connecting image and word could even vanish. Figure 22, from Song Yingxing's 宋應星 (1587-1666) encyclopedic work of Chinese science and technology *Tian Gong Kai Wu* 天工開物 (*The Exploitation of the Works of Nature*), is of this kind.<sup>433</sup> Characters for all the instructions and terms were put adjacent to the indicated areas, without any connecting lines. In the West, the curling banderole or scroll, a Christian icon once “ubiquitous in Renaissance art,” was borrowed by illustrators of secular science as one of earliest devices for carrying verbal inscriptions. But it soon gave its way to “flat, easier-to-read labels.”<sup>434</sup> No matter where words were located—either inside or directly outside of the image—pictorial messages were provided with textual clarification. Certainly these images were designed to accompany the main text, and the relevant main text elucidates the image more systematically and extensively. However, the more explanatory the verbal inscription intertwined with or placed adjacent to the image was, the more auxiliary the corresponding main text became.<sup>435</sup> Thus, it was possible that the reader would view an entire image as a complete, discrete unit.

---

<sup>433</sup> Originally printed in 1637, *Tian Gong Kai Wu* was one of the most important comprehensive works on traditional Chinese science and technology. Figure 23 is from its version included in *Xu Xiu Si Ku Quan Shu* (*Sequel to Complete Collection of Books in Four Divisions*).

<sup>434</sup> Edgerton, “Renaissance Development,” 172.

<sup>435</sup> The images discussed here primarily refer to scientific and technical ones distributed inside volumes. My analysis may not be applicable to illustrations for artistic and narrative purposes, and albums or individual *juan* within a title which only contained illustrations.



(left) **Figure 20.** Three *Jiao* inside the body (*Lei Jing Tu Yi*, *juan 3*, 52b)  
 (middle) **Figure 21.** Heart Meridian of Hand-Shaoyin (*Ibid.*, *juan 3*, 42a)  
 (right) **Figure 22.** Making Vermilion through Sublimation of Mercury with Sulphur (*Tian Gong Kai Wu*, *juan 16*, 43a)

From the Shanghai Library

Although the abovementioned form of labeling illustrations with words appears to be similar to labeling illustrations with numbers and letters to generate reference viewing, the two are different. Both broke down their images into parts, but labeling visual units with numbers and letters offered new opportunities to reinforce the relation between the main text and the image so that, on a practical level, it became impossible to segregate them from each other. This kind of labeling with numbers and letters was common in the West but not in China prior to the era of translation. While some Western scientific and technical illustrations bearing numbers and letters referred readers to captions instead of the main text, a large number of them did not. In these cases, readers would not learn the actual name and specifics of each numbered or initialed unit unless they referred back to the specific location in the main text. This process of “reference viewing” could be repeated many times until all the entities referred to by the labeled units were

understood. The labels, in and of themselves, did not present any essential information, instead “tie[d] visually-mediated knowledge ... to discourse.”<sup>436</sup>

By the nineteenth century, this technique had been widely seen in Western books, especially those regarding medicine, mechanics, and engineering. But to my knowledge, based upon observation of traditional Chinese books, it only appeared in translations of Western science. Remarkable early examples (published in late Ming and early Qing period) include the Manchu translation-compilation titled *Ge Ti Ciowan Lu Bithe* 格體全錄 (*Complete Record of Anatomy*, also known as “Manchu Anatomy”) overseen by French Jesuit Dominique Parrenin (1665-1741), and Johann Schreck and Wang Zheng’s translation *Yuan Xi Qi Qi Tu Shuo Lu Zui*. In the former, body parts were given Manchu labels, which directed readers to the linguistic elucidation beneath the image. In the latter, capital letters that were in the original plates were rendered into Chinese ordinal characters. Schreck and Wang sometimes even eliminated labels or provided new ones in order to alter the thematic emphases in the original plates and to facilitate a new collaboration between the main text and the image in translation.<sup>437</sup> With this treatment, translators re-interpreted, re-constructed, and re-wrote Western knowledge through the visual—a topic often overlooked in the scholarship on translation studies and the history of science exchanges between the West and China.

---

<sup>436</sup> Asen, “‘Manchu Anatomy,’” 39-40.

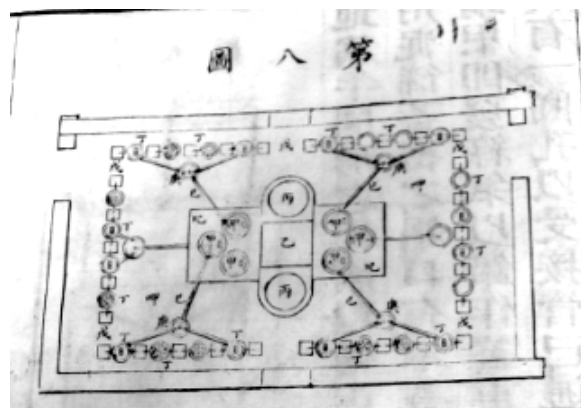
<sup>437</sup> For example, Ramelli’s textual elucidation on Plate 85 stressed how different gear wheels worked together to lift the water bucket, and in the illustration, eight letters were marked on all the gear wheels (plus the bucket) in order to facilitate the understanding of the system. However, the Chinese textual version paid more attention to the crank handle, which, accordingly, was the only part marked in the translated version by ordinal characters. In addition, Plate 188 depicted the gear train of a bookwheel that would never let the book fall from its lectern while the wheel was revolved. But no letter labels were seen in this illustration. Surprisingly in the Chinese version, translators autonomously attached four labels to different parts of the machine, all of which were discussed in the main text. For illustrations, see Agostino Ramelli, *The Various and Ingenious Machines of Agostino Ramelli*, trans. Martha Teach Gnudi and Eugene S. Ferguson (New York: Dover Publications, 1987), 230 (Figure 45) and 333; Johann Terrenz Schreck and Wang Zheng, *Yuanxi Qiqi Tushuo Luzui* (Chengdu: Lailutang, 1830), *juan* 3, 16b (Figure 46) and 52a.

Due to a robust increase in the number of science translations and the variety of subjects translated during the late nineteenth and early twentieth centuries, labeling in the Western manner was frequently adopted. Accordingly, “reference viewing” became strengthened as a reading/viewing protocol among Chinese audiences. Labels in the format of Chinese ordinal characters bridged more intimately the main text and visual representations, organizing them into an entire semantic entity. It was particularly useful in mediating images that portrayed structures, processes, and abstract concepts. For example, Figure 23 from *Bao Zang Xing Yan* 寶藏興焉 (*Treasure Rises from the Mountain*),<sup>438</sup> a reproduction of Figure 24, illustrated how different parts of an “apparatus used for extracting gold” worked together: “...the chlorine gas is produced in the vessels, a [*jia* 甲 showing in Figure 23], each having a separate fire-place communication with the chimney, b [*yi* 乙]; c [*bing* 丙] are pans for warming water in winter time up to 25 C°, which is used for moistening the schlich; d [*ding* 丁] are pots for lixiviating the schlich, eight of which are placed in a long row and four in a short one; each four forms a battery, and between each battery a passage e [*wu* 戊] is left open leading to the hearth...”.<sup>439</sup> Readers could not understand the name and function of each part of this apparatus without constantly checking the corresponding text. In *Hua Xue Jian Yuan*, English letters marked in the original image to indicate the different parts of the flame (see Figure 36) were rendered into Chinese characters (see Figure 37). Similarly, in this case, readers were compelled to move their eyes to the main text to find out the term for each region—*zhong xin qi zhi* 中心氣質 (indicated by *jia* 甲, i.e., “a”—“innermost cone”), *nei ceng sheng guang zhi chu* 內層生光之處 (indicated

<sup>438</sup> William Crookes, *Bao Zang Xing Yan*, trans. John Fryer and Xu Shou (Shanghai: Jiangnan Arsenal, 1884).

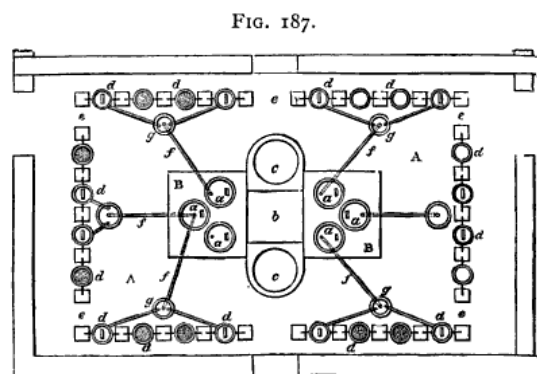
<sup>439</sup> William Crookes and Ernst Röhrig, *A Practical Treatise on Metallurgy, Adapted from the Last German Edition of Professor Kerl's Metallurgy* (London: Longmans, Green, and Co., 1868), 639; Crookes, *Bao Zang Xing Yan*, 29a-b.

by *yi* 乙, i.e., “b”—“luminous cone, or the flame proper”), and *wai ceng* 外層 (indicated by *bing* 丙, i.e., “c”—“another film, or casing”)—and the elucidation.<sup>440</sup>



(left) **Figure 23.** Apparatus used for extracting gold (*Bao Zang Xing Yan*, *juan* 1, 29a)

From the Shanghai Library



(right) **Figure 24.** Original illustration and its letter labels (*Practical Treatise on Metallurgy*, 639)

Labeling in translations was facilitated by a set of ten *tian gan* 天干 (“heavenly stem”) characters and twelve *di zhi* 地支 (“earthly branch”) characters, both of which were traditionally used as a Chinese tradition for ordinal numbers.<sup>441</sup> Images in translations concerning mechanical engineering oftentimes carried a wide range of ordinal characters, due to the illustrators’ meticulous breakdown of the apparatuses into their parts. For instance, *Kai Kuang Qi Fa Tu Shuo* 開礦器法圖說 (*An Illustrated Treatise on the Machinery and Methods in Mining*)<sup>442</sup> used so many labels that the translators even presented readers a table that juxtaposed the English letters appearing in images (this translation adopted the original plates) and their Chinese-

<sup>440</sup> David Ames Wells, *Hua Xue Jian Yuan*, trans. John Fryer and Xu Shou (Shanghai: Jiangnan Arsenal, 1871), *juan* 3, 70b; David Ames Wells, *Principles and Applications of Chemistry* (New York: Ivison & Phinney, 1858), 318.

<sup>441</sup> Collocating one *tian gan* character and one *di zhi* character has been a perennial method in China of recording months, days, hours, and years.

<sup>442</sup> George Guillaume André, *Kai Kuang Qi Fa Tu Shuo*, trans. John Fryer and Wang Shushan (Shanghai: Jiangnan Arsenal, 1899). It was translated from *A Descriptive Treatise on Mining Machinery, Tools, and Other Appliances Used in Mining* (London: E. & F. N. Spon, 1877).

character counterparts appearing in the main text (see Figure 25). The capital letters A to J correlated with *tian gan* characters, while K to V correlated with *di zhi* characters. W, X, Y, and Z were represented respectively by *wu* 物 (“substance”), *tian* 天 (“heaven/celestial”), *di* 地 (“earth”), and *ren* 人 (“human”), four essential and interrelated concepts in ancient Chinese philosophy. The Chinese equivalents for small letters were late Qing period creations, and combined each of the above-mentioned ordinal characters with the radical “口” (placed to the left) so as to distinguish them from the capital letters.<sup>443</sup> While these symbols were not legitimate Chinese characters, they were extensively employed in translations of mathematics and technology during the late Qing period. Although alternative sets of characters were sometimes used for labeling illustrations,<sup>444</sup> the chart in *Kai Kuang Qi Fa Tu Shuo* represented the dominant way that made “reference viewing” possible.

表號記字西各內圖

A	B	C	D	E	F	G	H	I	J	K	L	M
甲	乙	丙	丁	戊	己	庚	辛	壬	癸	子	丑	寅
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
卯	辰	巳	午	未	申	酉	戌	亥	物	天	地	人
a	b	c	d	e	f	g	h	i	j	k	l	m
甲	乙	丙	丁	戊	己	庚	辛	壬	癸	子	丑	寅
n	o	p	q	r	s	t	u	v	w	x	y	z
卯	辰	巳	午	未	申	酉	戌	亥	物	天	地	人
a	b	c	d	e	f	g	h	i	j	k	l	m
甲	乙	丙	丁	戊	己	庚	辛	壬	癸	子	丑	寅

<sup>443</sup> When reproducing images with either capital or small letters exclusively, only characters without “口” radical would be used. Sometimes original illustrations’ capital and small letters were reversed in translated versions, so that “a” was replaced by 甲 instead of 呬.

<sup>444</sup> For example, see series of characters indicating different facets of crystals in J. D. Dana, *Jin Shi Shi Bie*, trans. Hua Hengfang and D. J. Macgowan (Shanghai: Jiangnan Arsenal, 1871), 18b and 19a.

**Figure 25.** Table of English letters and corresponding Chinese ordinal characters (*Kai Kuang Qi Fa Tu Shuo*, front matter)

Courtesy of the Harvard-Yenching Library

## 4.2 VARIANTS OF ORIGINAL IMAGES IN TRANSLATIONS

Translation transforms letters, words, or characters into different linguistic symbols.<sup>445</sup> But, in illustrated books, the textual and the visual are conjoined entities; the illustrations may or may not change in accordance with the new linguistic rendering. During the late nineteenth and early twentieth centuries, original visual representations were given different types of treatment by translators, ranging from significant revision to minor modification. These treatments reflected translators/illustrators' consideration of visual literacy conventions, their designation of the book's purposes, and their vision of the potential readership. Below, I discuss science illustrations as a representative form of the visual, and examine the changes made to translated versions, the reasons for them, and the possible influence of them upon readers' knowledge acquisition.

### 4.2.1 Alterations of Science Illustrations

As a synthesis of both scientific facts and aesthetic sense, science illustrations contain what I call “core information” and “peripheral information.” Core information refers to science-related content (such as the nature of matter, the process of experiments, and the visualization of abstract concepts). It is often explained by textual elaboration. Peripheral information includes details

---

<sup>445</sup> In a number of books, some parts (such as terms) may remain the same or become translated only when a solution is discovered. Or the original version are intentionally kept.



inessential to the expression of a scientific practice or theory, such as setting, decorations, background design, and attire on human figures. There are three types of illustrations in Chinese translated science books: ones in which the core information was altered; those in which the peripheral information was transformed, added, or omitted; and those in which no changes can be detected.

In early science translations in China during the late sixteenth and early seventeenth centuries, it was not unusual to see alterations of core and peripheral information. For example, *Yuan Xi Qi Qi Tu Shuo Lu Zui*, which we briefly encountered in Chapter 2, as one of the predecessors of pastiche translation, is a “warehouse” of image modifications that has attracted much scholarly attention.<sup>446</sup> A considerable number of illustrations in this book adjusted core information, such as the number of machine parts, their shapes and proportion, the relation between them, and the handling of the machine. Peripheral details in the majority of *Qi Qi Tu Shuo*’s illustrations were also transformed. Compared to core information, peripheral information is seemingly trivial. However, certain changes to peripheral information demonstrate that pains were taken to adapt Western images to accommodate Chinese audiences’ visual conventions. All characters depicted—drivers, workers, even passers-by—were changed from foreign to Chinese. Decorative features of architecture were given a local appearance. In

---

<sup>446</sup> For example, Samuel Y. Edgerton discussed the drastic incongruence between the “windlass for raising water from a well” illustration in Agostino Ramelli’s *Le Diverse et Artificiose Machine* and its two versions of Chinese translations appearing in different editions of *Qi Qi Tu Shuo*. He asserted that the Chinese versions of mechanical illustrations were rarely workable and intelligible due to illustrators’ lack of “systematical chiaroscuro” and “linear perspective,” and their inability to comprehend mechanical knowledge. He utilized this example to reinforce his larger argument that without the development of new artistic skills, the path of science would never have led to significant discoveries and even the Scientific Revolution. The point, however, was challenged by Michael S. Mahoney in the same volume of essays. See Samuel Y. Edgerton, Jr., “The Renaissance Development of the Scientific Illustration,” in *Science and the Arts in the Renaissance*, ed. John W. Shirley and F. David Hoeniger (Washington, D.C.: Folger Shakespeare Library, 1985), 168-97, especially 189-94. Bert S. Hall recapitulated the Edgerton-Mahoney debate in his “The Didactic and the Elegant: Some Thoughts on Scientific and Technological Illustrations in the Middle Ages and Renaissance,” in *Picturing Knowledge: Historical and Philosophical Problems Concerning the Use of Art in Science*, ed. Brian S. Baigre (Toronto: University of Toronto Press, 1996), 24.

addition, the illustrator(s) eliminated unnecessary settings or backgrounds (usually describing the European situation where or when the machine was used), to keep the page looking as simple and non-Western as possible.<sup>447</sup> These practices were not unique to *Qi Qi Tu Shuo*, but were common to illustration translation and making throughout the early stage of West-East intercultural knowledge transmission in the sixteenth and seventeenth centuries.<sup>448</sup>

The alteration of core information was still often seen in a large number of science translations printed during the late nineteenth and early twentieth centuries, including the chemistry book *Hua Xue Jian Yuan*.<sup>449</sup> The original English-language version of *Hua Xue Jian Yuan*, entitled *Principles and Applications of Chemistry*, by economist and scientist David Ames Wells in 1858, immediately became popular for American high schools and colleges, and was reprinted several times.<sup>450</sup> The execution of the engravings in the translated version differs from those in the original. In Wells's edition (e.g., Figure 26), the lines are clear, the black color even, and the three-dimensional effect well-expressed. In contrast, a number of illustrations in *Hua Xue Jian Yuan* lack image articulation. The illustrations miss some details that contain core information. For example, Figure 27 shows how light carbureted hydrogen may be obtained "by stirring the mud at the bottom of stagnant pools, and collecting the gas as it rises by means of an

---

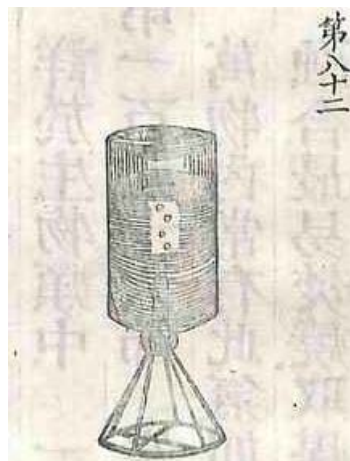
<sup>447</sup> Zhang Baichun et al., 123. I used this book as one of the sources for the illustration comparison.

<sup>448</sup> For example, in *Ren Shen Tu Shuo* (*Illustrated Explanation of Human Body*), a seventeen-century translation of Ambroise Paré's *Anatomie Universelle du Corps Humain*, the human bodies were all given Chinese faces and Chinese-style costume accessories. Standaert and Leuven selected and juxtaposed several examples of illustrations from two versions of manuscripts of *Ren Shen Tu Shuo* and the Dutch version of Ambroise Paré's works. See Standaert and Leuven, "Chinese Translation." Other examples see Paola Demattè, "Christ and Confucius: Accommodating Christian and Chinese Beliefs," in *China on Paper: European and Chinese Works from the Late Sixteenth to the Early Nineteenth Century*, ed. Marcia Reed and Paola Demattè (Los Angeles: Getty Research Institute, 2007), 29-52.

<sup>449</sup> David Ames Wells, *Hua Xue Jian Yuan*, trans. John Fryer and Xu Shou (Shanghai: Jiangnan Arsenal, 1871).

<sup>450</sup> Wang Yangzong, *Fu Lanya yu Jindai Zhongguo de Kexue Qimeng* (*John Fryer and Modern Science in China*) (Beijing: Kexue Chubanshe, 2000), 55.

inverted bottle and tunnel.”<sup>451</sup> In Figure 27, however, the stagnant pool, which is a prerequisite of this experiment, is omitted.



(left) **Figure 26.** Making light carbureted hydrogen (*Principles and Applications of Chemistry*, 301)

(right) **Figure 27.** Omission of core information in translation (*Hua Xue Jian Yuan*, juan 3, 56b)

From the Nangjing Library

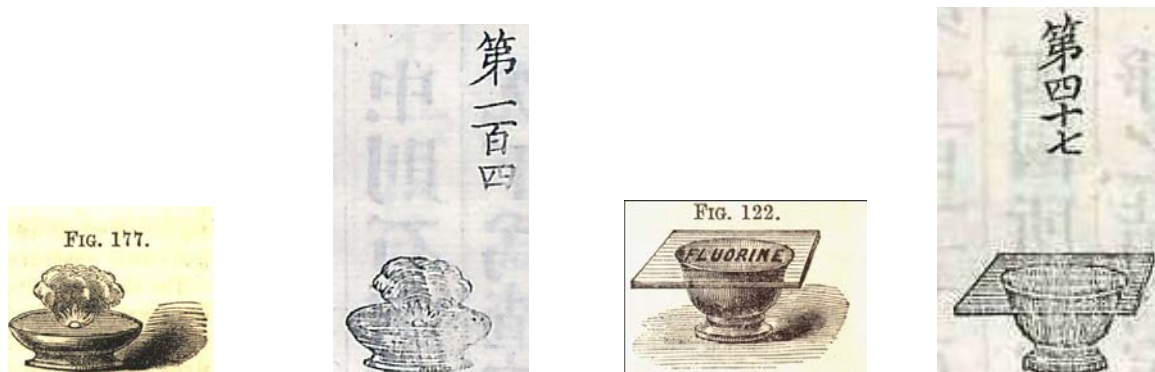
Changes in peripheral information can also be detected in *Hua Xue Jian Yuan*. For example, Figure 28 depicts one of the properties of potassium: “by throwing a small piece of the metal upon the surface of water, in which case a part of the water is immediately decomposed..., the liberated hydrogen...burns in connection with a portion of the volatilized metal, with a beautiful rose-red flame.”<sup>452</sup> In Figure 29, taken from the translated version, the shadow of the vessel is left out, which is not essential to this phenomenon. Similarly, Figure 31 copies almost exactly the experiment illustrated in Figure 30, which shows “the peculiar action of hydrofluoric acid vapor upon glass.”<sup>453</sup> But, the term “fluorine” disappears from the piece of wax-coated

<sup>451</sup> David Ames Wells, *Principles and Applications of Chemistry* (New York: Ivison & Phinney, 1858), 300.

<sup>452</sup> *Ibid.*, 328.

<sup>453</sup> *Ibid.*, 257.

window-glass, and the shadow of the vessel vanishes as well.<sup>454</sup> The Arabic numerals in Figure 33 were erased from the “graduated glass cylinder, or tube, divided into degrees”<sup>455</sup> in Figure 32.



(from left to right)

**Figure 28.** Hydrogen burns with volatilized potassium (*Principles*, 329)

**Figure 29.** Omission of peripheral information in translation (*Hua Xue Jian Yuan*, juan 4, 5a)

From the Nangjing Library

**Figure 30.** Hydrofluoric acid vapor corrodes glass (*Principles*, 257)

**Figure 31.** Omission of peripheral information in translation (*Hua Xue Jian Yuan*, juan 3, 7a)

From the Nangjing Library



(left) **Figure 32.** Graduated glass cylinder divided into degrees (*Principles*, 338)

(right) **Figure 33.** Omission of peripheral information in translation (*Hua Xue Jian Yuan*, juan 4, 15a)

<sup>454</sup> This kind of elimination of three-dimensional effect seen through cross-cultural comparison between the original Western version and its Chinese translation can also be seen in the diachronic comparison between early- and late-nineteenth-century Western chemistry illustrations. The trend happening in the West was that “a richer pictorial language had given way to something more like geometry” and more “diagrammatic.” See David Knight, “Illustrating Chemistry,” in *Picturing Knowledge*, 147.

<sup>455</sup> *Ibid.*, 338.

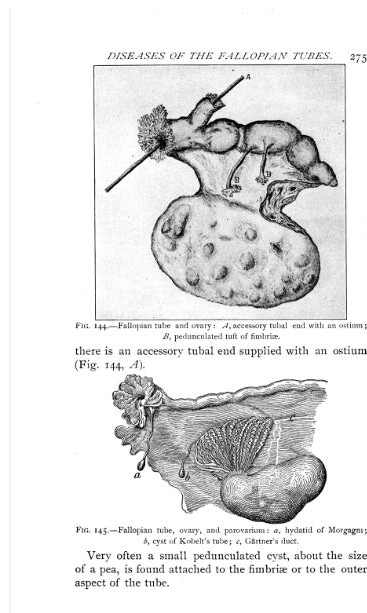
*Fu Ke Xue* 婦科學 (*Gynecology*)<sup>456</sup> is a good example of a translated book with no image alterations. It was a medical textbook in two volumes translated for Chinese students. The original edition, titled *A Text-Book of Diseases of Women* (the fifth edition),<sup>457</sup> was authored by Charles B. Penrose, Professor of Gynecology at the University of Pennsylvania, and was rendered in 1907 into the Chinese language by Mary H. Fulton, who was once a member of the China Medical Missionary Association. *Fu Ke Xue* was richly illustrated (with the same 225 images as in the original), as the translator stated in the preface to the Chinese edition: “Since many illustrations are considered necessary for English-speaking scholars, it is even more necessary in China where dissection is, as yet, not permitted.”<sup>458</sup> Figure 34 is an excerpt from Penrose’s *Diseases of Women*. Little differentiates the illustrations in the Chinese counterpart from those in the original, as can be seen in Figure 35. If not for the different languages used in the textual parts and some variations in the quality of image reproduction, one cannot tell the original from the translated. (This category of images will be discussed later in the section on the production of translated illustrations.)

---

<sup>456</sup> Charles B. Penrose, *Fu Ke Xue*, trans. Mary H. Fulton (Canton: China Baptist Publication Society, 1907).

<sup>457</sup> Penrose, *A Text-Book of Diseases of Woman*, 5th ed. (Philadelphia: W. B. Saunders, 1904). For bibliographical information of the original source of *Fu Ke Xue*, see Hartmut Walravens, *Catalogue of Chinese Books and Manuscripts in the Library of the Wellcome Institute for the History of Medicine* (London: The Wellcome Trust, 1994), 17.

<sup>458</sup> Mary H. Fulton, preface to *Fu Ke Xue*, i. While not permitted by custom, a few dissections did take place in China. See Frank Dikötter, *The Discourse of Race in Modern China* (Stanford: Stanford University Press, 1992), 41-8.



(left) **Figure 34.** Sample page from Penrose's *Diseases (A Text-Book of Diseases of Women, 275)*  
 (right) **Figure 35.** The page with the illustrations in the Chinese version (*Fu Ke Xue, 238*)  
 From the Wellcome Library, London

## 4.2.2 Altered Images and Their Potential Influence on Readers' Reception of Science Knowledge

Whether or how much translated science images were changed, and whether core or peripheral information was transformed, one question of practical value regarding the readers of these books persists: Did these alterations hinder readers from understanding the scientific facts being relayed? It is unfair to say, without qualification, that only exact reproductions can convey scientific precision, and that any alteration will play a negative role in readers' reception. Many scholars of literary translation have doubted the existence of absolute faithfulness in translations and have questioned the "correctness" of a translation. They contend that the unique social,

historical, and literary contexts of the receiving culture shape the practice of translation, and thus the identity of the translated work.<sup>459</sup>

This insight also applies to science image translations. Scientific visual representations *per se* are not exact reproductions of reality, but are made to facilitate knowledge transmission in more “understandable and accessible” ways.<sup>460</sup> They record the “state of human understanding”<sup>461</sup> rather than impeccably replicate objective matter. A historical scientific image’s claims to “objectivity” must be subjected to criticism according to Daston and Galison, because the involvement of science image-makers was always subjective.<sup>462</sup> The channeling of meaning in science illustrations is achieved by “framing” (viewing the whole object without cropping), “focusing” (removing non-relevant information and retaining the part of interest), then “filtering” (simplifying the focused information and reducing complexities).<sup>463</sup> Similarly, the image translation process also includes re-framing, re-focusing, and re-filtering, but of a ready-made representation. Since the original illustrations were not direct representations of the material world, the translated images with alterations are not necessarily further removed from “reality”—a relative term when science images are concerned. The various methods of modification, such as omitting certain information as shown above in *Hua Xue Jian Yuan*, may not have diminished the reception and appreciation of Western science among Chinese audiences.

In fact, translators who made alterations to science images likely had the state of readers’ visual literacy in mind. Visual literacy is “the ability to understand the communication of a

---

<sup>459</sup> Edwin Genzler, *Contemporary Translation Theories* (Clevedon, UK: Multilingual Matters, 2001), 125-7.

<sup>460</sup> Luc Pauwels, ed., *Visual Cultures of Science: Rethinking Representational Practices in Knowledge Building and Science Communication* (Hanover, NH: Dartmouth College Press, 2006), viii.

<sup>461</sup> Brian Ford, *Images of Science: A History of Scientific Illustration* (New York: Oxford University Press, 1993), 2.

<sup>462</sup> Lorraine Daston and Peter Galison, “The Image of Objectivity,” *Representations* 40 (1992): 81-128

<sup>463</sup> Richard Mason, Tony Morphet, and Sandra Prosalendis, eds., *Reading Scientific Images: The Iconography of Evolution* (Cape Town: HSRC Press, 2006), 13.

visual statement”<sup>464</sup> and, “in its most basic sense..., deals with the shared meaning of the creators and consumers of visual messages.”<sup>465</sup> But under cross-cultural circumstances, “creators” (illustrators of the original imprints) and “consumers” (reading publics of the translated versions) do not always share meaning due to their different cultural and linguistic backgrounds. In this case, during the translation process, the illustrator of the translated imprint, who is the first “consumer” (i.e., reader) of the original images, but within the new cultural setting, plays a role as a mediator. He may have had to study the originals on his own, or may have been helped by the translation team in mastering highly technical details. During this time, he may have encountered some difficulties in comprehending, which he, by utilizing his own power as a craftsman, could hope to spare the reading public. He thus closes the gap of visual understanding by reducing the amount of possible incomprehensibility to readers after him and shaping their understanding through “the cultural lens of their own experiences and values.”<sup>466</sup> When *Hua Xue Jian Yuan*, a book on the vanguard of introducing Western chemistry to China was published, the majority of Chinese readers had yet to develop a sufficient visual literacy<sup>467</sup> for Western scientific imagery. Reducing the unnecessary details to keep the illustrations plain and even austere helped to minimize the confusion that new, imported matter could engender. To this end, the boundary between core and peripheral information was sometimes permeable.

---

<sup>464</sup> Deborah Curtiss, *Introduction to Visual Literacy: A Guide to the Visual Arts and Communication* (Englewood Cliffs, NJ: Prentice-Hall, 1987), 3.

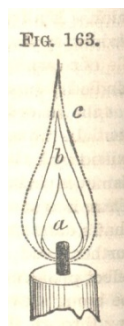
<sup>465</sup> Elizabeth Burch, “Media Literacy, Aesthetics, and Culture,” in *Handbook of Visual Communication: Theory, Methods, and Media*, ed. Ken Smith and others (Mahwah, NJ: L. Erlbaum, 2005), 503-17, qt. on 503.

<sup>466</sup> Charles Kostelnick and Michael Hassett, *Shaping Information: The Rhetoric of Visual Conventions* (Carbondale: University of Southern Illinois Press, 2003), 92.

<sup>467</sup> Jean Trumbo addressed visual literacy as a general framework that includes the literacy needs of the scientists, science communicators, and the public. But she did not intend to distinguish among these groups. See Trumbo, “Visual Literacy and Science Communication,” *Science Communication* 20.4 (1999): 409-25. In this study, there was vast incongruence between “scientists” and “the public” due to the cross-cultural circumstances, and “science communicators” especially played a vital role in bridging the cultural clashes. Therefore, I discuss visual literacy of different groups separately.



The core parts of an original illustration could possibly have been perceived by the illustrators to be only peripheral and thus removable, because textual elucidation spelled out the information. For example, the text related with Figure 27 in *Hua Xue Jian Yuan* clearly explained that a “stagnant pool” was required for performing the experiment, but it was omitted in the translated illustration. Chinese readers knew what water looked like, but not the specific usage of the apparatus—an inverted bottle over a funnel. By removing the lines indicating water and the pool’s shadowy bottom, the apparatus, which was novel to Chinese readers, was thus highlighted and made more intelligible. Other peripheral information illustrations omitted included English words and Arabic numerals, which were certainly incomprehensible to most Chinese readers. Sometimes, these indicators were not replaced, as in Figure 31. The word “fluorine” was not shown on the glass, but it in fact was just one of many words that could have demonstrated the effect of scratching the wax-coated glass and letting the hydrofluoric acid vapor corrode the uncoated tracks. So, the appearance of this somewhat arbitrary word could have been misleading. Sometimes, the Western signs were replaced with their Chinese counterparts. For example, in Figure 37, Chinese characters representing the words “first,” “second,” and “third,” are used to point to the three-part structure of a flame, instead of the English letters “a,” “b,” and “c” (Figure 36). These practices served as “lubricants” for readers’ reception of Western learning. After all, for those viewers with no previous knowledge of Western science, translated illustrations nonetheless imparted a general impression of it, although they did not follow every detail of the originals.



(left) **Figure 36.** Structure of flame (*Principles*, 318)

(right) **Figure 37.** Replacing letters with characters (*Hua Xue Jian Yuan*, juan 3, 70b)

From the Nangjing Library

When discussing the alteration of visual information, we also have to consider comprehensively the translator's intentions and the book's readership and general use. John Fryer's series of science translations for the Jiangnan Arsenal is a good example of how a publishing institution mediated the reading public's needs with the management of quality in translation. For example, the title page of Wells's *Principles*, a school textbook, tells us that the book contained 240 illustrations "with the double purpose of rendering the study of the science more intelligible and attractive to the pupil, and of facilitating the instructions of teachers, especially of those not enjoying the advantage of large apparatus."<sup>468</sup> This didactic purpose was maintained by Fryer and Xu in their translation. Indeed, *Hua Xue Jian Yuan* was listed in a catalogue of educational books among 69 other titles of the Jiangnan Arsenal's publications, which were similarly pedagogical and mostly translated from English-language science textbooks.<sup>469</sup> To clarify the purpose of publishing these science translations, Fryer wrote in the catalogue's introduction:

<sup>468</sup> Wells, iii-iv.

<sup>469</sup> John Fryer, *Catalogue of Educational Books*, 7-11.

The original intention was to prepare a series of treatises in the various branches of Western learning that should bear some resemblance to the 'Encyclopædia Britannica,' as well as be generally useful for educational purposes. This idea has, however, been considerably modified, both to keep up with modern discoveries and inventions and to provide more complete information on subjects which the Chinese feel themselves most in need of. Yet as the work goes on year after year a valuable Encyclopædia is gradually coming into general use. Its popularity is to be seen in the many pirated editions of some of the books that have been made by photo-lithography in small characters and sold at absurdly small prices.<sup>470</sup>

This statement shows that the readership of this series had shifted from students of Western learning to a more general audience. According to Adrian Bennett, the "chief beneficiaries" of this series may have been "Chinese literati" with a strong and genuine interest in Western knowledge during the late nineteenth century. In fact, this shift of targeted audience was necessary, because Fryer's translations were rarely adopted by the Arsenal for training technicians (who presumably relied upon oral instruction or apprenticeships). He had to find other outlets outside the Arsenal to sell the translations.<sup>471</sup> *Hua Xue Jian Yuan* was even once

---

<sup>470</sup> Fryer, *Catalogue of Educational Books*, 8.

<sup>471</sup> Fryer, *An Account of the Department*, 16-17: "Strange to say, there are schools which have existed for several years in the Kiangnan Arsenal where these books are published, and which teach such subjects as Naval

used to demonstrate experiments at the Shanghai Polytechnic Institute for an assembled non-academic public interested in learning chemistry, as recorded by Luan Xueqian 樂學謙, a former instructor at the Institute.<sup>472</sup> Similarly, selected translations were adopted by Calvin Mateer to distribute to participants attending his public lectures on electricity. Broader audiences, the majority of whom were not scientific or technical professionals, were probably not, under these circumstances, too censorious of the illustrations. After all, the general reader's goal of tackling a science translation was to understand only the very basic principles of Western science and to engage a new way of thinking about nature and the world. In this case, whether the illustrations were perfectly copied, or translated with an economy of detail, was immaterial to general readers, as long as the images were instrumental and serviceable to understanding.

Science demonstrations and experiments could largely compensate for meaning that was possibly lost in the relay of visualized knowledge. It was especially true of situations in which subjects, such as chemistry and medicine, were taught at schools. Educators of Western science in China stressed the importance of conducting experimentation in conjunction with theoretical studies. For example, medical professor James Boyd Neal insisted that “only by practical work in the laboratory can a useful knowledge of Chemistry be gained.”<sup>473</sup> His standpoint, which was later candidly expressed in his translation *Hua Xue Bian Zhi* 化學辨質 (*Identifying Chemical*

---

Architecture, Marine Engineering, Military Science, etc., without making any use of these translations. They are taught by foreigners who neither speak nor write Chinese, to scholars who had to begin with no knowledge of foreign languages. The fact that such classes are carried on in close proximity to this Department would seem to furnish a strong proof of the uselessness of the whole work of translation.” See also Adrian Arthur Bennett, *John Fryer: The Introduction of Western Science and Technology into Nineteenth-Century China* (Cambridge, MA: Harvard University Press, 1967), 41.

<sup>472</sup> Luan Xueqian, “Gezhi Shuyuan Jiao Yan Huaxue Ji (Records of Teaching and Demonstrating Chemistry in the Shanghai Polytechnic Institute).” The entire article was cited in Zhang Zhun, “Sanshinian qian Wuguo Kexue Jiaoyu zhi Yiban (Science Education in China during the Past Thirty Years),” *Ke Xue* 8.4 (1923): 430-2.

<sup>473</sup> J. B. Neal, “Training of Medical Students and their Prospects of Success,” *CMMJ* 3 (1889), 129-135, qt. on 132.

*Substances*), was also applauded in this book's review.<sup>474</sup> During the late nineteenth century, a number of new style schools in China started to import laboratory apparatuses and substances for students' hands-on work and teachers' demonstrations in class, and sometimes, to the public. Although practical training of this sort was not widespread, these progressive schools, furnished with equipment, were able to replicate some of the processes illustrated in translations. Due to the limitation of resources for conducting experiments, only students in selected schools and participants in rare public science demonstrations were able to observe these versions of illustrations that were brought to life. In the nineteenth century, public display of scientific experiments and related lectures were already common at metropolitan cities in the West.<sup>475</sup> In China, the popularization of Western science through these ways was only in its incipient stages during the last few decades of the nineteenth century. However, educators tried to promote the extra-textual viewing experience among a larger audience. For example, John Fryer once enthusiastically supported the staging of public lectures with scientific demonstrations at the Shanghai Polytechnic Institute. He regretted that there were not as many people as expected attending the first gathering, and suggested that the Institute invite literati and officials in authority to join the next exhibition: "Science experimentation is no longer new in the West, but our lectures may be the first chance for Chinese people to even watch it."<sup>476</sup> Through experiments, visualized knowledge was expressed and perceived in a more direct way.

---

<sup>474</sup> J. J., "化學辨質," review of *Hua Xue Bian Zhi*, trans. by James B. Neal, *CMMJ* 10 (1896): 268-9, qt. on 268: "This manual is intended specially for laboratory work, and we agree with the translator when he says that if Chinese students are to acquire a practical knowledge of Chemistry they must acquire it by work in the laboratory rather than by theoretical study. We are inclined to think, however, that in this book too little is said on the subject of Chemical theory. While it is quite true that experimental work is of supreme importance in the study of Chemistry, it is nevertheless absolutely necessary that the beginner should be well grounded in Chemical theory."

<sup>475</sup> Richard D. Altick, *The Shows of London* (Cambridge, MA: Harvard University Press, 1978), 363-74; Ronald J. Zboray and Mary Saracino Zboray, *Everyday Ideas: Socioliterary Experience among Antebellum New Englanders* (Knoxville: University of Tennessee Press), 215-16.

<sup>476</sup> Luan Xueqian, "Gezhi Shuyuan." Translated by the author.

Demonstrations enhanced the stationary visual effect on the page that captured only one scene or moment in time, and gave depictions of scientific experiments a greater dynamic and sense of the sequential. Readers, who benefited from having access to science equipment, were not dependent upon printed illustration alone to supplement textual knowledge. In cases where readers could observe scientific demonstrations, the eliminated or altered core and peripheral information in translated images would not negatively influence the perception of new knowledge.

### 4.3 INDIGENIZATION, HYBRIDIZATION, AND AGENTS' INVOLVEMENT

Books, end products always seeming to appear static, can never be isolated from their social and cultural background and the people involved in their making. And the making of translated books is more complicated than that of non-translated books. For example, in most historical circumstances prior to the mid-nineteenth century, the original author(s) and illustration maker(s) had little control over the “afterlife” of their books—how their works were brought to other countries or cultures and how they were translated. During the late nineteenth and early twentieth centuries, there were some cases of this kind of control among Western authors or publishing houses whose works were translated into Chinese, but still not many.<sup>477</sup> Therefore, translators and illustrators were left enough space for indigenizing Western visual imagery into

---

<sup>477</sup> For example, R. T. Shields noted in his translation’s preface that “Dr. [W. H.] Lewis and Messrs. Lea & Febiger” gave permission to make the Chinese version of their book. See Shields, preface to *Ge Shi Xi Tong Jie Po Xue* (*Gray’s Systematic Anatomy*), 1st ed., trans. R. T. Shields (Shanghai: China Medical Missionary Association, 1923), 1. Similarly, Laurence M. Ingle stated that Messrs. Longmans Green and Co., the publishers of the English edition, gave him permission to translate. See Ingle, preface to *Ge Shi Xi Tong Jie Po Xue*, 2nd ed., trans. Laurence M. Ingle and Chen Tso Ting (Shanghai: China Medical Missionary Association, 1929), 1.

the forms that reflected the Chinese visual heritage and its traditions of representing technical knowledge. Consistently throughout this time period, we can see a certain degree of hybridization of both Western and Chinese styles in the graphic representations. This hybridization demonstrates agents' keenness in rendering technical images a more familiar and easy-to-learn face. Moreover, the illustrators' knowledge background and artistic training shaped their mediation on the original images.

#### 4.3.1 West Meets East in Translated Sheet Music

Western sheet music contained varieties of visual symbols, the most characteristic of which was notes. Although some translators chose to retain the original appearance of notes on staves, others preferred to combine Chinese vestiges with the Western system, or sometimes replaced it with Chinese elements. For example, *Sheng Shi Ge Jing Jian Yao* 聖事歌經簡要 (*Selection of Service Motets*) represents a marriage of the Western and Chinese notation systems (see Figure 39). It was a collection of hymns (including twenty-three Masses and six paragraphs of scripture as postscript) published in 1861 without any clue of compiler, editor, and publisher.<sup>478</sup> But due to the use of the four-line staff and neume notes in use from the medieval period onward, we can safely infer that this hymn book was issued by Catholic missionaries in China.<sup>479</sup> The anonymous compiler of *Sheng Shi Ge Jing Jian Yao* claimed in the Chinese-language preface

---

<sup>478</sup> *Shanghai Yinyue Zhi (Record of Music History in Shanghai)*, 459.

<sup>479</sup> This tradition has been passed down. For example, some twentieth-century editions of *Liber Usualis* (*The Book of the Usual*), the book of Gregorian chants commonly-used in the Catholic Church services, still used four-line staves and neumes. A 1997 edition notes: "For the proper execution of the Chant, the manner of forming the notes and of linking them together, established by our forefathers and in constant and universal use in the Middle Ages, is of great importance and is recommended still as the norm for modern Editors." "Preface to the Vatican Edition of the Roman Chant," in *The Liber Usualis with Introduction and Rubrics in English*, ed. Benedictines of Solesmes (Great Falls, MT: St. Bonaventure Publications, 1997), x. This edition was originally published in 1953 by Desclée & Co. Publishers (Tournai, Belgium).

that: “Many Chinese converts and friends would feel especially challenged to learn hymns because they do not know the Latin language. In this motet selection, the original Latin lyrics were transliterated into Chinese characters. The pitch of each note was indicated by the Chinese traditional *gong che* notational symbols, so those who were familiar with the *gong che* system could conveniently learn the melody.”<sup>480</sup> This statement suggests that the aim of this book was to facilitate the learning of hymns by those people versed in traditional Chinese music.

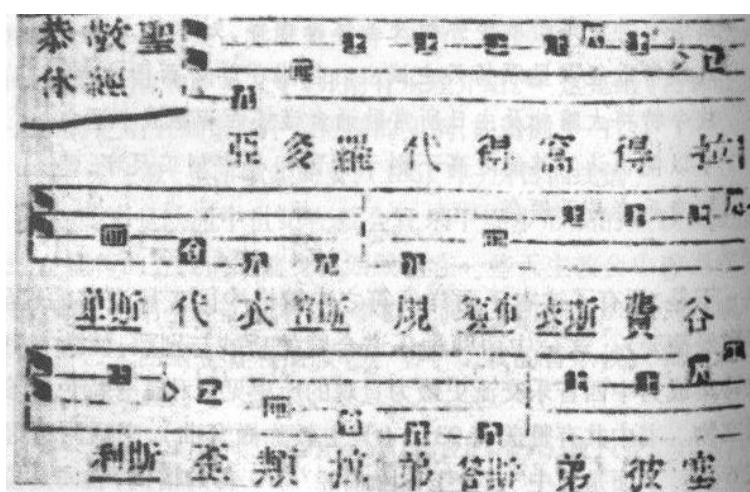
We can see from the sample page of this woodblocked hymnal that within every neume note (inked black quadrangle) there is an embedded *gong che* note (represented by Chinese characters). Each combined symbol looks like a typeset Chinese character but in intaglio. The usual inked and un-inked areas are reversed. In other words, the character appeared as white on a square black background. Traditionally, the *gong che* notes were arrayed vertically, and did not fluctuate according to the highness and lowness of the pitch. But in this example, the *gong che* notes follow the “winding” route of the neume notes. Furthermore in this example, the Western equivalent of every transcribed *gong che* character does not match the pitch indicated by the neume note that shares the same location on the staff line. For example, the third note on the first line of music in Figure 38 can be sung as either C or F depending on whether one follows the neume part of the note or the *gong che* part. However, intervals between every two consecutive *gong che* notes are the same as that between neume notes. Thus the melody remains the same despite the two different keys. The font size of the *gong che* notes is much smaller than that of the characters used for the lyrics in order to fit inside the neume notes perfectly. Although the line staff and notes were introduced into China during the early Qing period, the system was not widely disseminated until the early twentieth century. By the end of the

---

<sup>480</sup> Tao Yabing, *Mingqing jian de Zhongxi Yinyue Jiaoliu* (*The Music Communication between China and the West during the Ming-Qing Period*) (Beijing: Dongfang Chubanshe, 2001), 133.



nineteenth century, Chinese people who possessed the ability to read the four-or-five-line staff and Western notation were few and far between.<sup>481</sup> Comparatively, at least a number of traditionally educated literati were capable of reading the *gong che* notes. Therefore, the incorporation of a Chinese traditional notation system into translated music writing provided yet another shortcut to mastering the melody. It also shows that the translators might have wished to disseminate Catholic hymnals to learned population in China.

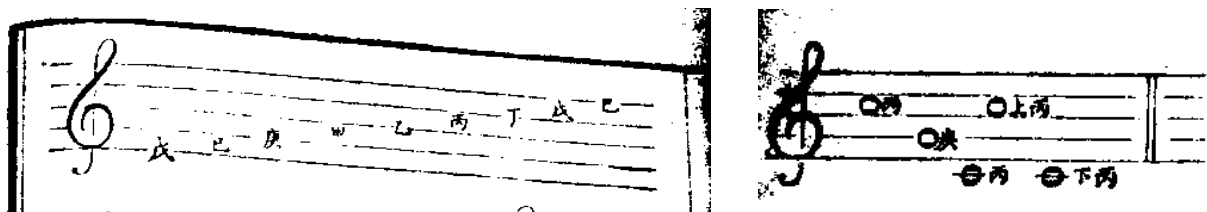


**Figure 38.** Combination of neume and *gong che* notations (*Sheng Shi Ge Jing Jian Yao*)  
From the Shanghai Library

Combination is one musical translation strategy; replacing and juxtaposing are others. Although the Western notations were retained for transcribing most tunes in translated music, translators sometimes substituted notes or alphabet referring to the notes, which appeared in those books' introductions, with Chinese characters. For instance, in *La Ba Chui Fa*, a translation of instructions for playing the bugle, the first seven of the ten *tian gan* characters—*jia* 甲, *yi* 乙, *bing* 丙, *ding* 丁, *wu* 戊, *ji* 己, *geng* 庚—were marked on every line and every space on

<sup>481</sup> Mateer, preface to *Sheng Shi Pu*, 1.

the five-line staff to indicate the location of the seven notes in the C major scale starting from middle C (see Figure 39 left). Besides entirely replacing Western notes, the characters could also stand side by side with their corresponding notes as seen in Figure 39 (right). A clearer and thorough juxtaposition can be seen in *Sheng Shi Pu*'s introduction to sheet music (see Figure 40), in which alphabet and *tian gan* characters, characters and shape notes, were closely arranged to correspond easily with one another.<sup>482</sup> Within traditional Chinese contexts, the *tian gan* characters were commonly applied to represent ordinal numbers. In *La Ba Chui Fa*, the character *jia* (meaning “the first”) was equivalent to “A” (*la*). Therefore, the C scale started from *bing* (counterpart of “C,” or *do*) onwards, and eventually rolled back to *yi* (counterpart of “B,” or *si*)—*bing, ding, wu, ji, geng, jia, yi*—exactly the same pattern as the Western system that used alphabet to record notes (C, D, E, F, G, A, B). In this case, the order of *tian gan* characters corresponded to that of English letters, despite the fact that “A” only appeared as the sixth note out of seven in the scale. However, the standard was not unified. In *Sheng Shi Pu*, the order of notes overruled instead. The scale began from the first *tian gan* character *jia*, although the first note was originally linked to “C” and not “A.”



**Figure 39.** Using *tian gan* characters to represent notes or pitches (Left: *La Ba Chui Fa*, 2a; Right: Ibid., 3b)  
From the Wuhan University Library

<sup>482</sup> *Tian gan* characters were also associated with the names of different scales in *Sheng Shi Pu*. For example, G major scale was translated to *wu* major scale.



Figure 40. *Tian gan* characters in a different order (*Sheng Shi Pu*, 6-7)  
From the Shanghai Library

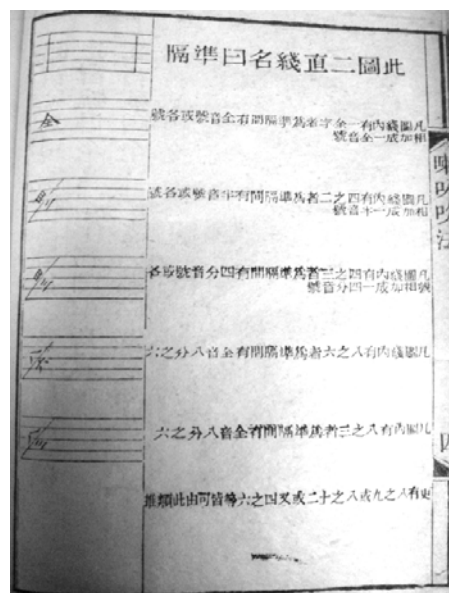
Another kind of symbol that was replaced with Chinese characters in some music translations was the time signature. And the replacement was usually consistent throughout the entire book. The majority of modern Western time signatures consisted of two Arabic numbers,<sup>483</sup> the bottom of which represented the note value, and the top of which referred to the number of these note values appearing in each measure. In *Sheng Shi Pu*, for example, the “specific time” signature  $\frac{3}{4}$  (three crotchets or quarter notes in one measure) was rendered into *san* 三 (three) at the top and *si* 四 (four) at the bottom (see Figure 41). However, *La Ba Chui Fa* presented an alternative way of translating time signatures (see Figure 42). Translators substituted the “common time” symbol  $\text{C}$  (four quarter notes in one measure, also displayed in  $\frac{4}{4}$ ) with the Chinese character *quan* 全 (entire or complete). And they inserted a slash between two Chinese characters in every “specific time” signature. However, the locations of the top and the bottom numbers as shown in the original Western format were reversed. For instance, “ $\frac{3}{4}$ ,” supposedly translated into  $\frac{三}{四}$  ( $\frac{3}{4}$ ), was in fact written as  $\frac{四}{三}$  ( $\frac{4}{3}$ ). This inversion

<sup>483</sup> The “common time” and “alla breve” signatures were presented by pictorial symbols rather than combination of Arabic numbers.

was not a mistake, but an action that respected the protocol for rendering mathematical fractions (or the operation of division) in all of the Jiangnan Arsenal's publications. Translators of *La Ba Chui Fa* might have viewed the format of time signatures as a fraction. The Arsenal's translators, such as John Fryer and Jiang Heng of *Suan Shi Ji Yao* (1877), reversed the positions of numerator and denominator, possibly in order to adapt to smooth the viewing of the vertical line. Although concerning music but not mathematics, *La Ba Chui Fa* conformed to this treatment accorded to mathematical translations, which became the standard in the Arsenal.



**Figure 41.** Time signatures in Chinese characters (*Sheng Shi Pu*, 5)  
From the Shanghai Library



**Figure 42.** Alternative representation of time signatures (*La Ba Chui Fa*, 4b)  
From the Wuhan University Library

### 4.3.2 Adjustments Made in Translated Maps for Chinese Eyes

Map translation transferred the end products of Westerners' surveys to a version that was understandable to Chinese audiences. Asking Chinese readers to comprehend a fully Western-made map was like asking them observe the world through foreign eyes. Translators preferred that this not happen, but they nonetheless respected their source maps. How would they manage this quandary and provide maps for Chinese eyes? Some map translators' indigenizing efforts featured Chinese interpretations of the prime meridian. Others utilized Chinese map symbology that was persistent, as we have seen in Chapter 1, until the late Qing period despite the Jesuits' introduction of Western cartography into China at the sixteenth century and the high Qing courts' subsequent adoption of it.

The prime meridian, a line of longitude set to be zero degree (also known as "zero meridian"), had been a relatively fluid concept before it was standardized and approved as a result of international negotiation in 1884. The diversity of choices of location for the prime meridian suggested differing perceptions of the symbolic center of the world. Repeatedly, throughout history, designating the prime meridian demonstrated nationalists' endeavors to provide "a new baseline for imagining the nation's geographic framework."<sup>484</sup> In the majority of Chinese-made maps during the late Qing period that adopted latitude and longitude,<sup>485</sup> including

---

<sup>484</sup> This cartographic act was especially applied to newly independent colonies. For example, Martin Brückner discussed the "Meridian of Philadelphia" set in *A Map of the United States of America* (1784), one of the earliest national maps published in the United States. See Brückner, *The Geographic Revolution*, 116-8. See also Mathew Edney, "Cartographic Culture and Nationalism in the Early United States: Benjamin Vaughan and the Choice for a Prime Meridian, 1811," *Journal of Historical Geography* 20 (1994): 384-95. For a brief history of local time and meridian setting in the United States, see Chapter 1 "True Time and Place" of Ian R. Bartky, *Selling the True Time: Nineteenth-Century Timekeeping in America* (Stanford: Stanford University Press, 2000), 7-18.

<sup>485</sup> As Chapter 1 showed, some maps superimposed latitude and longitude onto the grid map. This was a suspicious treatment that mixed two different perceptions of land surface—spherical and flat—together in one cartographic representation.

those issued by *hui dian guan* (see Chapter 2) during the late nineteenth century, it was the empire's capital Beijing that set the benchmark of meridians. Faced with imported maps, some translators, such as those of *Hai Guo Tu Zhi* and *Wan Guo Yu Tu*, inevitably opted to retain the location of the prime meridian in the original versions, routinely Greenwich in Great Britain (see Figure 43). Chen Zhaotong 陳兆桐, the translator of *Wan Guo Yu Tu* pointed out the reason for this in the *fan li* section: "This book is drawn in accordance with the British atlases...; recently the navigators universally adopted the British nautical charts" for the placement of the prime meridian.<sup>486</sup> However, a large number of map translations published by nationalistic individuals and geographic societies during the early twentieth century reconsidered the prime meridian issue. For example, although Greenwich had been recommended as the standard among diverse choices (e.g., El Hierro, Paris, Saint Petersburg) in the West at the "International conference held at Washington (U.S.) for the purpose of fixing a prime meridian and a universal day" in October 1884 (also known as the "Prime Meridian Conference"),<sup>487</sup> Zou Daijun, geographer and nationalist activist stated in 1903, that "since these are the world maps produced by Chinese, the prime meridian should set through Beijing, the capital of China; now in this atlas, no matter what countries and places, all are adapted to new degrees of longitude according to zero degree at *jing shi wu men* 京師午門 ("Meridian Gate of the Forbidden City")."<sup>488</sup> Similar emphasis upon a national meridian can be seen in the *li yan* ("general guide") to *Shi Jie Gai Zao Hou Huan Qiu Lie Guo Di Tu*: "The prime meridian in this atlas runs through Beijing. Greenwich is also listed,

---

<sup>486</sup> Chen Zhaotong, "*fan li*," *Wan Guo Yu Tu* (Shanghai: Tongwen Shuju, 1886), 2b.

<sup>487</sup> Zou mistakenly recorded the year as 1885 in the preface. For the international community's negotiations over the prime meridian, see Ronald R. Thomas, "The Legacy of Victorian Spectacle: The Map of Time and the Architecture of Empty Space," in *Functions of Victorian Culture at the Present Time*, ed. Christine L. Krueger (Athens, OH: Ohio University Press, 2002), 18-36.

<sup>488</sup> Zou Daijun, preface (dated October 1903) to *Zhong Wai Yu Di Quan Tu*, trans. and comp. Zou Daijun (Wuchang: Yudi Xueshe, 1908), 4b.

but the emphasis is our own country.”<sup>489</sup> It was a reasonable adjustment because this translation was targeted for world geography courses taught in middle schools and teachers’ schools, which both strongly promoted nationalistic-orientated education in the early twentieth century.

Some translators and illustrators also replaced Western map symbols with traditional Chinese ones. Maybe these agents were more comfortable with the latter. But after all, they wanted to accommodate Chinese visual preferences by adopting the accepted symbol system. *Hai Guo Tu Zhi* was an outstanding example, although most of its visual renditions were not perfectly accurate, at least by today’s standards for cartography. For instance, in Figure 43, a map of Great Britain, many major cities were signaled by small hollow squares or rectangles which always appeared in traditional Chinese maps. Signs for mountains derived from the descriptive style of Chinese artistic representations. Another Chinese convention was maintained as well: virtually no border lines between domestic regions were articulated. While the Western-style graticules of parallels and converging meridians (instead of rectangular scaling grids) were retained from the original versions, they were, in general, nevertheless, more decorative than informative. Furthermore, the visual expression of geography conformed to Chinese style of representation. It is obviously demonstrated in Figure 44, a cartographic representation of Japan, in which space was “distorted” in order to balance roughly the dimensions of every major administrative area, and thereby elide some miniscule regions. Considering that the real territory of Japan was slim and long, these “distortions” might also have aimed to stretch the map to cover more space on the sheet. In this case, latitude and longitude become almost meaningless.

---

<sup>489</sup> Yaxin Dixueshe, “li yan,” *Shi Jie Gai Zao Hou Huan Qiu Lie Guo Di Tu* (Wuchang: Yaxin Dixueshe, 1920).

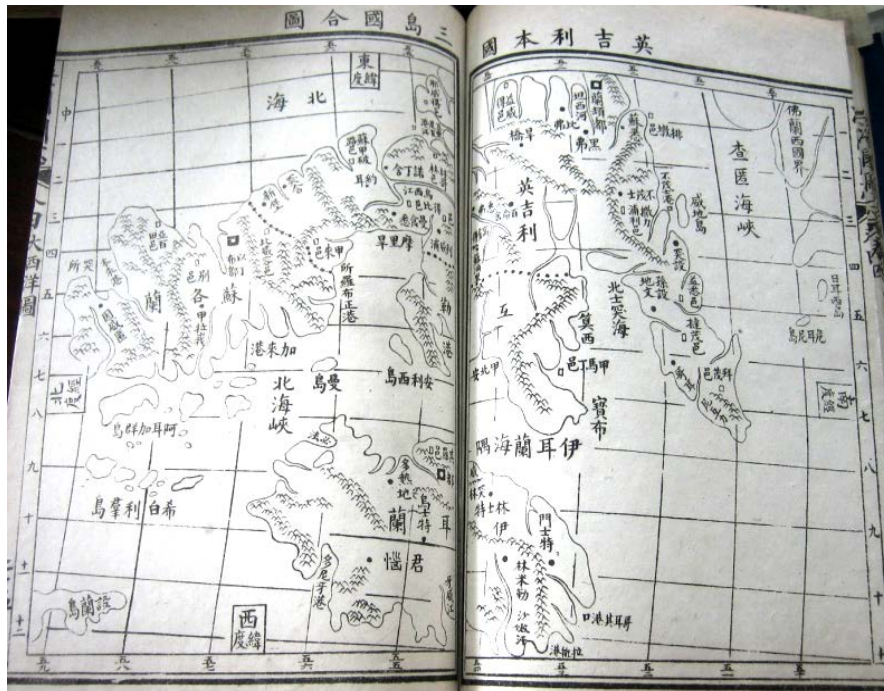


Figure 43. Map of the Great Britain (*Hai Guo Tu Zhi*, juan 4, 24b-25a)  
From the Shanghai Library

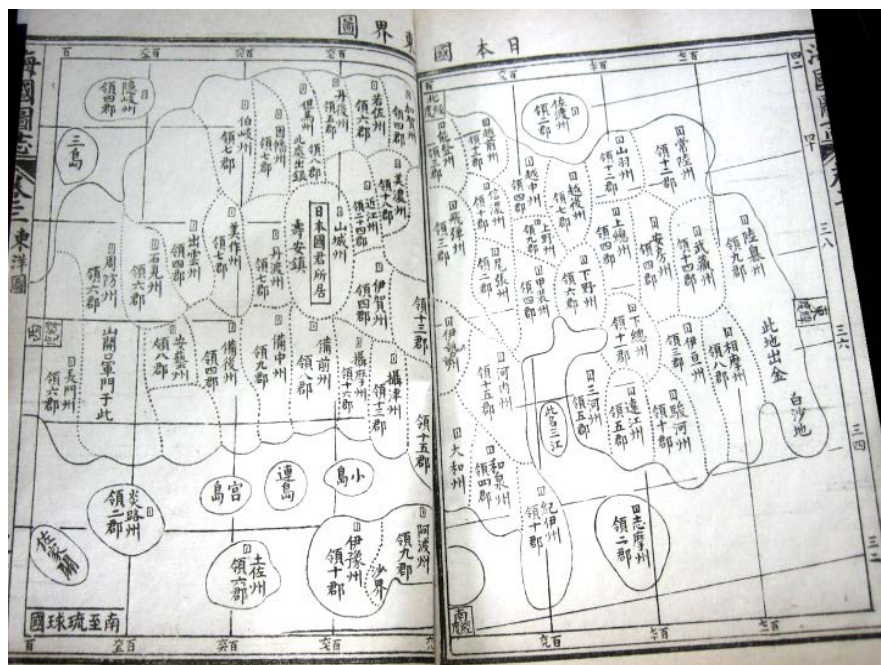


Figure 44. Map of Japan (*Hai Guo Tu Zhi*, juan 3, 34b-35a)  
From the Shanghai Library



### 4.3.3 Agents' Involvement in Translated Science Illustrations

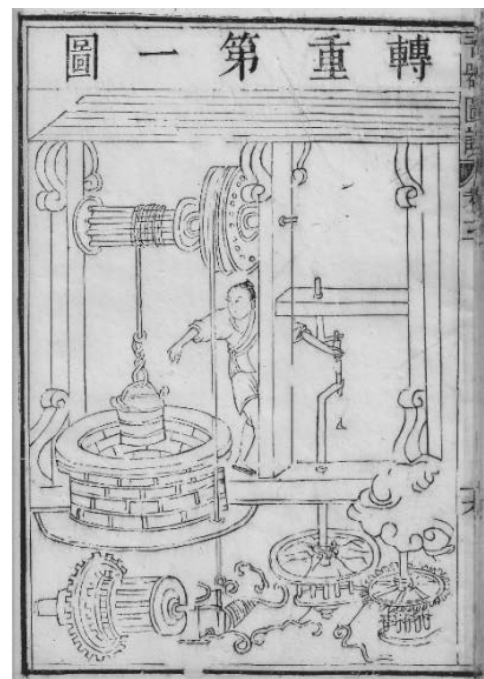
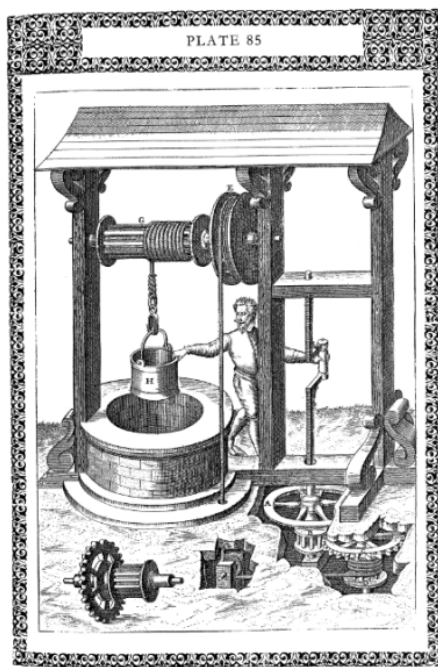
As the first readers in the receiving culture of an un-translated text, translators initialized the reproduction of meaning, and, by manifesting their own understanding of the source text on the translated page, influenced the new reading public's reception of the book. Illustrators did the same. They supplemented the world of words with the material products of their visualizing skills and their own perceptions of the original images. Illustrators' working relationship with text translators, as well as their artistic training and educational background played a defining role in framing the visual presentation that finally appeared in translated science books.

Was the illustration a product of group negotiation or individual mandate? Sometimes, the text translator and the illustrator made efforts together—just like the oral translator and transcriber who collaborated—to interpret the original image collectively before redrawing it. After reading the original book, the team of translator and illustrator may have come up with their own rendition of images that best served their mutual understanding of the text. Sometimes, the translation team sent out images, as was customary among sixteenth-and-seventeenth-century Chinese printer-publishers, to a professional painter who made a profit from his work. These professionals, however, could lack scientific knowledge, which resulted in their exerting a degree of artistic license with the illustration.<sup>490</sup> For example, the openings on the

---

<sup>490</sup> Moreover, the final presentation on printed pages would deviate from the professional painter's drawings. The gap of knowledge that existed between illustrators and block carvers was especially apparent in commercial publishing from the fourteenth to seventeenth centuries. It was possible that block prints originally drawn by highly educated professionals were produced by skilled, but not necessarily educated artists who were involved in large-volume commercial printing. See Robert E. Hegel, *Reading Illustrated Fiction in the Late Imperial China* (Stanford: Stanford University Press, 1988), 278. Out of all the Jianyang (in southern China) medical printer-publishers, only two individuals engaged in medical practices. See Lucille Chia, *Printing for Profit: The Commercial Publishers of Jianyang, Fujian (11<sup>th</sup>-17<sup>th</sup> centuries)* (Cambridge, MA: Harvard University Press, 2002), 231. However, the relay of work from painters to block carvers could be removed. Among the Ming-period engravers, a very small number of exceptional ones were able to draw illustrations on their own. See Zhang Xiumin, *Zhongguo Yinshua Shi (History of Chinese Printing)* (Hangzhou: Zhejiang Guji Chubanshe, 2006), 667.

ground in order to facilitate the cutaway view of the entire machine (Figure 45) illustrated in Agostino Ramelli's (1531-1600) *Le Diverse et Artificiose Machine* (*The Various and Ingenious Machines*) (1588), were transformed to swirl-shaped decoration and iconographical cloud (Figure 46) in the Chinese translation titled *Yuan Xi Qi Qi Tu Shuo Lu Zui* 遠西奇器圖說錄最 (*A Record of the Best Illustrations and Descriptions of Wonderful Machines of the Far West*) (1627). In some cases, if the translation team could not hire an artist to redraw for them, they may have resorted to someone who was knowledgeable about science, but awkward in drawing. Or the team may have been left to its own devices.



(left) **Figure 45.** Windlass for raising water from a well (*Le Diverse et Artificiose Machine*, 230)

Courtesy of Dover Publications

(right) **Figure 46.** Chinese illustrators' interpretation (*Yuan Xi Qi Qi Tu Shuo Lu Zui*, juan 3, 16b)

From the Needham Research Institute

Hua Hengfang hinted at least one connection between translator and illustrator in his preface of *Di Xue Qian Shi*: "The illustrations in the original book were extremely exquisite.

Even professional painters were intimidated by being asked to make a copy of these images. Luckily, Mr. Zhao Hong 趙宏 visited me in time, and volunteered to become the illustrator of this book. He made refined delineations, and hired skillful craftsman to carve them on woodblock. It took in all two years from the time that Zhao's illustrations were sent off to be carved until they were finally finished."<sup>491</sup> From this statement, one can only speculate that Hua might have provided his friend Zhao with necessary information to comprehend the original images before copying them. Unfortunately, there is no further substantial evidence on collaboration between translators and illustrators during the production of science publications, although the close cooperation between different role-players in the textual translation process, i.e., oral translator and transcriber, was extensively recorded. Absent such direct evidence for collaborative illustrations, we can only assume that images in *Hua Xue Jian Yuan*, for example, were redrawn by the illustrators acting on their own.

There were two types of roles played by the Jiangnan Arsenal's illustrators—*mo tu* 摹圖 and *hui/hua tu* 繪/畫圖—as displayed in the publications' provenance record.<sup>492</sup> The character for *tu* roughly refers to "graphic representation," while the characters for *mo* and *hui/hua* have both traditionally referred to the verb "to paint." But *mo* particularly means copying an image or a piece of calligraphy by following its lines or strokes on a superimposed transparent sheet of paper. *Mo tu* thus suggests considerable reliance on original artifacts. Comparatively, the usage of *hui/hua* is more generic, and can refer to a variety of painting activities, especially the creation of original painting. Among the Arsenal's science translations that listed illustrators' names, only two had *mo tu* artists; one, curiously, mentioned a *mo hui* illustrator, an ambiguous term

---

<sup>491</sup> Hua Hengfang, preface to *Di Xue Qian Shi* (Shanghai: Xiaocangshan Fang, 1896), 1.

<sup>492</sup> Illustrators' and proofreaders' names were usually contained on the last page of each *juan* in Jiangnan Arsenal's science translations.

combining both characters.<sup>493</sup> All the others mentioned *hui tu*, besides one *hua tu*. In a sense, it demonstrated that the Arsenal's illustrators were generally given more flexibility in reinterpreting the source books' illustrations. Illustrators for the Arsenal did not always have to replicate every detail of the original illustration, as done in *mo tu* style.

But whatever the case—*mo* or *hui/hua*—illustrators' backgrounds become especially important in analyzing the image alterations in translations. The way illustrators translated images was largely based upon the personal training they received both in the arts and the sciences. As Bert S. Hall has argued, "Pictures are very apt to mislead...not merely because they are difficult to copy, but because they are themselves untrustworthy representatives of the immediate experience contained in observation."<sup>494</sup> The illustrators' training gave them individual "ways of seeing"<sup>495</sup> that influenced the manner in which they visually presented an object.

"Human art," or "handcraft, skill, art and technics,"<sup>496</sup> had long been involved in representing nature and therefore virtually rewriting its visual discourse over time. The same holds true for the translation process. Illustrators, too, influenced the representation of the natural and practical sciences by bringing to bear their individual training in the arts and sciences. A good case is that of Cao Zhongxiu 曹鍾秀 (1839-1908), the illustrator of *Hua Xue*

---

<sup>493</sup> Cao Zhongxiu was listed as *mo tu* in *Qi Xiang Xian Zhen* (*Machinery and Phenomenon Displayed in Reality*) and *Qi Ji Bi Yi* (*Necessary Instruction for Steam Machine*). Zhu Yi was listed as *mo hui* in selected *juan* of *Kai Mei Yao Fa* (*Essential Methods of Coal Mining*).

<sup>494</sup> Bert S. Hall, "The Didactic and the Elegant: Some Thoughts on Scientific and Technological Illustrations in the Middle Ages and Renaissance," in *Picturing Knowledge: Historical and Philosophical Problems Concerning the Use of Art in Science*, ed. Brian S. Baigre (Toronto: University of Toronto Press, 1996), 6.

<sup>495</sup> John Berger, *Ways of Seeing* (New York: Penguin, 1979).

<sup>496</sup> Horst Bredekamp, *The Lure of Antiquity and the Cult of the Machine*, trans. Allison Brown (Princeton: M. Wiener Publishers, 1995), 66.

*Jian Yuan* and many other Jiangnan Arsenal publications.<sup>497</sup> According to the genealogy of the Cao Family of Shanghai, he specialized in image-making for the Arsenal's science translations for nearly forty years, after having assisted Westerners in drawing the design of the facility in 1865. His name appeared as illustrator in more than fifty science translations.<sup>498</sup> Although the genealogy applauded Cao's skill "in Western ways of painting,"<sup>499</sup> there is no direct evidence of his training in that or in Western technical drawing that was considered to have excelled in "its mathematically precise rendering of the objective world" and "practical and utilitarian value."<sup>500</sup> Instead, Cao was proficient in Chinese traditional painting before he worked for the Arsenal, and was mentored by Qian Hui'an 錢慧安,<sup>501</sup> a famous and creative brushwork painter of the Shanghai school, who specialized in female characters, natural scenery, folk tales, and New Years' paintings.<sup>502</sup> There are no clues about whether Cao received any science training, either. Cao's background was not unique to the Arsenal's illustrators. Sha Ying 沙英 (1835-1878), Zhao Hong 趙宏, and Zhu Yi 朱彝, whose names often appeared as illustrators for the Arsenal's publications,<sup>503</sup> were all trained as Chinese traditional painters. Sha was a master of

---

<sup>497</sup> Cao Zhongxiu also illustrated for translated science books such as *Hua Xue Jian Yuan Xu Bian*, *Hua Xue Jian Yuan Bu Bian*, *Hua Xue Fen Yuan* (*Analyzing the Principles of Chemistry*), *Qi Xiang Xian Zhen*, *Xi Yi Zhi Xin* (*Understanding Innovations of Western Technology*), *Qi Ji Bi Yi*, *Nei Ke Li Fa* (*Principles and Methods of Internal Medicine*), *Wu Ti Yu Re Gai Yi Ji*, and *Bao Zang Xing Yan*.

<sup>498</sup> Cao Hao et al., *Shanghai Cao Shi Zupu* (*The Genealogy of the Cao Family of Shanghai*) (Shanghai: Chong Xiao Tang, 1925), *juan* 4, 25a.

<sup>499</sup> *Ibid.*, *juan* 3, 51b.

<sup>500</sup> Mayching Kao, "The Beginning of the Western-Style Painting Movement in Relationship to Reforms in Education in Early Twentieth-Century China," *New Asia Academic Bulletin* 4 (1983): 376.

<sup>501</sup> Yang Yi, *Haishang Molin* (*The Ink Forest of Shanghai*) (Shanghai: Shanghai Guji Chubanshe, 1989), 51.

<sup>502</sup> Huang Jiasha, "Hai Pai Huajia Qian Hui'an yu Yangliuqing Nianhua (Shanghai Painter Qian Hui'an and Yangliuqing New Year's Painting)," *Shanghai Gongyi Meishu* (*Shanghai Applied Arts*) 3 (2003): 5-8; Ka Bo Tsang, *More than Keeping Cool: Chinese Fans and Fan Painting* (Toronto: Royal Ontario Museum, 2002), 71; Lusheng Pan and Jialu Tang, *Chinese Festivals: New Year Paintings and Holiday Celebrations* (San Francisco: Long River Press, 2000), 32. Qian Hui'an was elected the president of the Charity Society of the Yu Garden Painters and Calligraphers in 1909. See Yang Yi, *Haishang*, 72-4.

<sup>503</sup> Sha Ying's illustrating works include *Guang Xue* (*Optics*) and *Jin Shi Shi Bie*. Zhao Hong's include *Ce Hou Cong Tan* (*Collective Writing Concerning Measuring the Weather*), *Xing Jun Ce Di* (*Measuring the Land for Troop*

female portraits and scrolls of flowers and birds,<sup>504</sup> Zhao was an accomplished landscape painter,<sup>505</sup> and Zhu was an expert on flowers.<sup>506</sup> Like Cao Zhongxiu, Sha, Zhao, and Zhu probably were not schooled in science. Because of their traditional training, perhaps, in most of the Jiangnan Arsenal translations, a general sense and scheme of the original illustrations were more than adequately conveyed, while sometimes, important details were omitted—an aesthetic judgment not only pleasing to the Chinese eye, but also communicatively effective in its “simplification.”

Being unequipped with Western art skills, such as “systematic chiaroscuro” and “linear perspective,” which, according to Samuel Edgerton, were essential for illustrating Western science,<sup>507</sup> did not become a barrier for the Jiangnan Arsenal’s illustrators. Thanks to their traditional Chinese artistic training, they were able to reduce the foreignness of Western images by expressing the heritage of Chinese painting and printing in their translated illustrations. One could hardly see in the translated versions carefully-rendered shading and perspective, which were vital to the aesthetic appeal of three-dimensional representations in English-language science books. Instead, the majority of translated images were made through line drawing. Line drawing may seem less dramatic, but it was prevalent in Chinese traditional painting and imprints. It possessed many advantages for Chinese science illustrators, addressing an audience “initiated” in the aesthetic conventions of line drawing<sup>508</sup>—for them, it transformed complicated

---

March), *Di Xue Qian Shi, Ye Jin Lu (Records of Metallurgy)*, and *Fang Hai Xin Lun (New Thesis on Coastal Defense)*.

<sup>504</sup> Yang Yi, *Haishang*, 67.

<sup>505</sup> Zhao’s short bio is originally recorded in *Yiling Huazheng Lu*, and included in Yu Jianhua, comp., *Zhong Guo Mei Shu Jia Ren Ming Ci Dian (Dictionary of the Names of Chinese Artists)* (Shanghai: Shanghai Renmin Meishu Chubanshe, 1981), 1278.

<sup>506</sup> Yang Yi, *Haishang*, 76.

<sup>507</sup> Edgerton, “Renaissance Development,” 189-93.

<sup>508</sup> Brian S. Baigrie, ed., *Picturing Knowledge: Historical and Philosophical Problems Concerning the Use of Art in Science* (Toronto: University of Toronto Press, 1996), xx.

visual information into its simplest form and eliminated distractive details. And Chinese carvers were more accustomed to working with line drawing. Ultimately, three-dimensional realism was not then the aesthetic choice of illustrators, nor of the readers for whom the appreciation of line drawing had been normalized.

The skills and even aesthetic sensibilities of illustrators were so highly regarded by the Jiangnan Arsenal that their names were printed in many books they illustrated in the manner of artists and engravers who were credited in a number of sixteenth-and-seventeenth-century Chinese illustrated books.<sup>509</sup> This is evidence that they were considered to be autonomous artists. It was previously not a common practice to list illustrators' names separately in translated science books, even in all other types of translated imprints.

#### **4.4 CHANGES IN THE PRODUCTION OF TRANSLATED VISUAL REPRESENTATIONS**

However, the heyday of science translation illustrators was coming to an end by the 1900s amid technological changes. They would no longer intervene into the presentation of visualized knowledge. Their names disappeared from most translated science books with illustrations, including those published by the China Medical Missionary Association (such as *Fu Ke Xue*) and those printed by the American Presbyterian Mission Press and the China Baptist Publication Society. The ebb in science illustrators' names accompanied the waning of altered illustrations by the turn of the century. While some illustrations continued to show transformation and

---

<sup>509</sup> Michela Bussotti, "Woodcut Illustration: A General Outline," in *Graphics and Text in the Production of Technical Knowledge in China: The Warp and the Weft*, ed. Francesca Bray et al. (Leiden: Brill, 2007), 473.

adaptation, increasingly others were virtually identical to the originals, such as those in the aforementioned *Fu Ke Xue*. The use of electrotypes—durable and unalterable replicas, created by electrochemical process, of typeset and illustrated pages—accounted for the change.<sup>510</sup> Compared to textual translation, pictorial translation was more prone to be affected by this technique. Over centuries, reproduction methods for mass dissemination, such as wood engraving, copperplate, and lithography, played an important role in shaping the visual language of science.<sup>511</sup> Machine-created images particularly led to a new phase of science visualization during the nineteenth century in the West.<sup>512</sup> In China, however, in lieu of mechanical methods of *creating* science images at this time period, mechanical ways of *reproducing* them, instead, affected translations.

#### 4.4.1 One Title, Two Looks

Different methods were utilized to reproduce illustrations in translated books. For most woodblock-printed books, such as those published by the Jiangnan Arsenal from the 1860s to around the 1890s, illustrators were hired to copy the original versions. Their redrawn images were then carved onto the block by craftsmen. During that time and later on, however, a number of movable type-printed science books started to adopt electrotypes, the majority of which had been furnished in the original publishing houses in the West, to print illustrations. The

---

<sup>510</sup> A similar and earlier printing technology, stereotypography, was not widely used in China at this time.

<sup>511</sup> For example, see Martin J. S. Rudwick, “The Emergence of a Visual Language for Geological Science 1760-1840,” *History of Science* 14 (1976): 149-95, esp. 152-58; Cordell D. K. Yee, “Chinese Cartography among the Arts: Objectivity, Subjectivity, Representation,” in *The History of Cartography*, vol. 2, book 2: *Cartography in the Traditional East and Southeast Asian Societies*, ed. J. B. Harley and David Woodward (Chicago: University of Chicago Press, 1995), 137-8.

<sup>512</sup> Lorraine Daston and Peter Galison, “The Image of Objectivity,” *Representations* 40 (1992): 81-128; Peter Galison, “Judgment against Objectivity,” in *Picturing Science, Producing Art*, ed. Caroline A. Jones and Peter Galison (New York: Routledge, 1998), 327-59.



adoption of such printing techniques immediately determined the materiality of illustrations. When one compares different translated versions of the same image or examines varied styles of pictorials in one book, one can see that reproduction methods matter.

The effects can be seen in two contrasting 1871 Chinese versions of Wells's *Principles*, translated respectively by John Fryer in Shanghai and John Kerr in Canton, the images of the former printed with woodblock and the latter from electrotypes. Fryer advertised the Jiangnan Arsenal's series of science translations by dubbing the quality of their illustrations "as nearly as native engravers could copy the pictures."<sup>513</sup> Even so, as we can see from *Hua Xue Jian Yuan*, one of the most famous Arsenal publications, this is not the case. By what technique this title was printed is not immediately apparent. Evidence shows that the book, like most of the Arsenal's imprints, was printed by woodblock, which was the most longstanding way of printing in China. First of all, the Arsenal's timeline of adopting new printing techniques verifies that *Hua Xue Jian Yuan* was not printed by modern Western methods. By 1871, the year that *Hua Xue Jian Yuan* was published, lithography and photolithography had not yet been used in book printing in the Arsenal's workshop.<sup>514</sup> Moreover, the first movable type printing room was founded in the Arsenal two years after the book was published.<sup>515</sup> A second piece of more direct evidence is on the copyright page which displayed a seal of the Arsenal containing the word *qin ban* 鋟板, an equivalent to "carving the wood block."<sup>516</sup> Furthermore, John Fryer revealed that

---

<sup>513</sup> Fryer, *Catalogue of Educational Books*, 7.

<sup>514</sup> Zhang Shudong, Pang Duoyi, and Zheng Rusi, *Jianming Zhonghua Yinshua Tongshi (A Concise General History of Chinese Printing)* (Guilin: Guangxi Normal University Press, 2004), 205-11.

<sup>515</sup> Zhang Binglun, "Guanyu Zhongguo Ren Zi Zhu Qian Huozhi Wenti de Taolun (The Discussion about the Casting of Lead Movable Type by Chinese People)," *Zhongguo Yinshua (China Printing)* 7 (2003): 66-70.

<sup>516</sup> However, even though its illustrations might not have been carved as meticulously as their Western counterparts, Chinese engravers had been capable of making exquisite fine art woodblock images for hundreds of years. For example, highly refined effects were rendered in the seventeenth-century art book *Shizhuzhai Shu Hua Pu (Calligraphic and Pictorial Album of the Ten Bamboo House)* and *Jieziyuan Hua Zhuan (Manual of the Mustard Seed Garden)*. Kai-wing Chow challenged European narratives that misrepresented woodblock printing by alleging

the book images were mainly hand drawn for wood engravers only with a few exceptions: “in case of steel engravings, such as those accompanying the last edition of Herschel’s ‘*Outlines of Astronomy*,’ translated by Mr. Wylie, the illustrations have been printed in England from the original plates. The various charts have been printed from copper plates engraved at the Arsenal.”<sup>517</sup>

Curiously, *Hua Xue Jian Yuan* had a “twin”—another translated version of Wells’s *Principles* but with a different title, *Hua Xue Chu Jie*, translated by missionary-cum-medical-practitioner John Glasgow Kerr and chemist He Liaoran.<sup>518</sup> It was published a little earlier than the Arsenal’s version in the same year, 1871, in Canton. Just as the translation styles of text varied drastically between the two versions, so did their illustrations. For example, Figure 47, like Figure 27, is a rendition of Figure 28 taken from Wells’s original book. But it is obvious that Kerr’s pictures were the exact facsimiles of the originals. A book review of the first two *ce* of Kerr’s translation showed how this was done: “It is in two vols. profusely illustrated with 115 drawings from electrotype plates obtained from New York,”<sup>519</sup> where the publisher (Iverson & Phinney) and the electrotyping shop (T. B. Smith & Son) were both located.

---

it was inferior to copperplate illustration making. See Kai-wing Chow, “Reinventing Gutenberg: Woodblock and Movable-Type Printing in Europe and China,” in *Agent of Change: Print Culture Studies after Elizabeth L. Eisenstein*, ed. Sabrina Alcorn Baron et al. (Amherst: University of Massachusetts Press, 2007), 169-92. Michela Bussotti also argued that despite the relatively simple “Oriental black and white wood-cut method,” “the finest details” and “minute drawing” can nonetheless be seen. See Bussotti, “Woodcut Illustration,” 478.

<sup>517</sup> Fryer, *An Account of the Department*, 12.

<sup>518</sup> David Ames Wells, *Hua Xue Chu Jie*, trans. John G. Kerr and He Liaoran (Canton: Boji Yiju, 1871).

<sup>519</sup> Editor, “Manual of Chemistry in Chinese,” *Chinese Recorder* 4.1 (June 1871), 26.



**Figure 47.** Electrotyped version (*Hua Xue Chu Jie*, juan 1, 4a)  
From the Nanjing Library

While one source book, namely the above-mentioned *Principles*, could yield two translations with entirely different looks, a single translation could contain images produced by two radically different reproduction techniques. For example, the 265 electrotyped illustrations displayed in Dauphin William Osgood's posthumous publication *Quan Ti Chan Wei* 全體闡微 (*Elucidating the Subtlety of the Entire Body*, English title: *Descriptive and Surgical Anatomy*)<sup>520</sup> were printed from both foreign and locally made plates. On the one hand, a small portion of the illustrations were reproduced directly from the plates furnished in the United States, such as that in Figure 48. Translators rarely imposed a visual mediation upon this type of image. One "impracticability," stated in *Quan Ti Chan Wei*'s preface, was "to replace the figures on the foreign plates with Chinese numbers; accordingly corresponding figures have been inserted in the text."<sup>521</sup> On the other hand, 167 electrotype plates used to print the images in *Quan Ti Chan Wei* were locally made by Rev. W. S. Holt of the American Presbyterian Mission Press in Shanghai, which was not the printing house that published the translation. These plates were made "from the engravings furnished" by other artists for Holt's use. This commissioned job not

<sup>520</sup> Henry Gray, *Quan Ti Chan Wei*, trans. Dauphin W. Osgood (Foochow: American Board Mission, printed at the Methodist Episcopal Mission Press, 1881). This book was translated from Henry Gray's *Anatomy of the Human Body*.

<sup>521</sup> H. T. Whitney and C. Hartwell, preface to *Quan Ti Chan Wei*, 1.

only involved a relaying of jobs among the workforce, but also the cooperative relationship between missionary presses. The original image was first copied by an artist/draughtsman, and then transferred to and carved by an engraver on the woodblock. Afterward, Rev. Holt produced electrotpe plates from these engravings. Wood engravings themselves could have certainly been used in letterpress, the method by which the textual part of *Quan Ti Chan Wei* was produced.<sup>522</sup> The reason why the printer-publisher took this extra step to make electrotyped duplications may have been that he deemed plates more suitable, in this case, than woodblocks to withstand intense pressure on paper, and thus, they would last longer.<sup>523</sup> However, this engraving-to-plate model of image making was very unusual in China during the late nineteenth century. In fact, given that during the electrotyping process virtually no details would be omitted from the block engraving, these 167 illustrations can nevertheless be categorized as illustrator-mediated, just as were the majority of woodblocks that bore variations from their original sources.<sup>524</sup> In Figure 50, the rendition of Figure 49, manuscript-style Chinese characters replaced all English terms—a remarkable signal of agents’ intervention via the creation of local plates based upon local engravings. But, in general, making electrotpe plates locally for translations was very rare at that time.

---

<sup>522</sup> Woodcuts were adopted in most earliest illustrated imprints in Europe during the fifteenth century. During the movable type printing process, woodcuts and later wood engravings were “made approximately the same height as type so that they could be combined and printed with it.” Since then, pieces of woodblocks were commonly inserted in the composed formes for printing illustrated books in the West until the end of the nineteenth century. See Michael Twyman, *The British Library Guide to Printing: History and Technology* (London: The British Library, 1998), 15.

<sup>523</sup> These plates were used until the second and enlarged translation of Gray’s *Anatomy* (completed by H. T. Whitney and based upon D. W. Osgood’s *Quan Ti Chan Wei*, therefore also known as Osgood-Whitney version) was issued in 1902.

<sup>524</sup> If not specified otherwise, the term “electrotpe plates” in this study refers to ones that were produced by the original printer-publishers in the West.

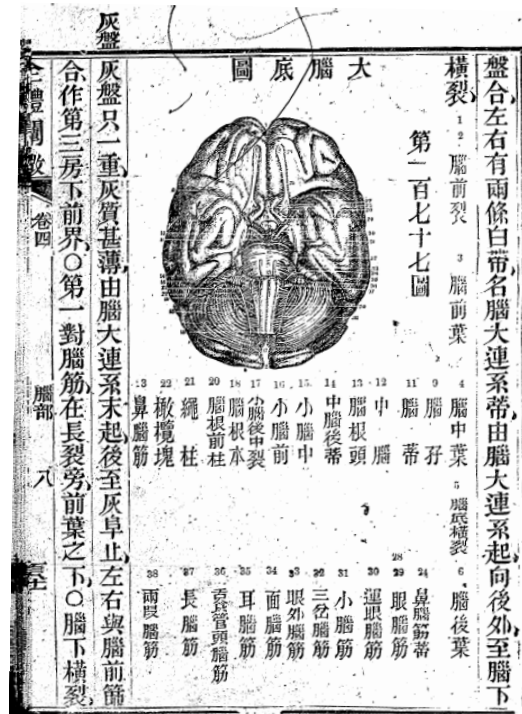
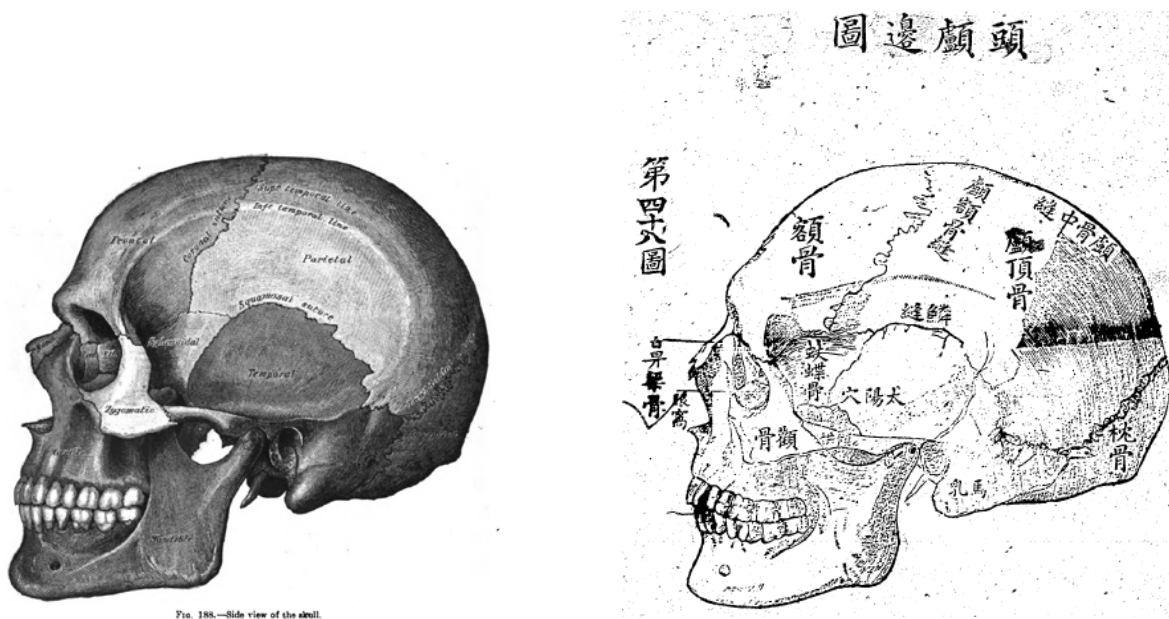


Figure 48. Base of Brain (*Quan Ti Chan Wei*, juan 4, 181a)  
Courtesy of the Harvard-Yenching Library



(left) Figure 49. Side View of the Skull (*Anatomy of the Human Body*, 182)  
(right) Figure 50. Translation of "Side View of the Skull" (*Quan Ti Chan Wei*, juan 1, 32b)  
Courtesy of the Harvard-Yenching Library

Most electrotpe plates used in science translations were imported from the West. Probably the most dramatic difference between locally made woodblock and imported electrotpe reproduction is that the latter virtually foreclosed making edits to the original visual representations. Woodblock reproduction placed the original version totally at the Chinese illustrators' disposal, while electrotyping allowed only very minor changes, mainly made by cutting out peripheral parts of the plates, such as those containing letters or numbers.

How did readers react to the disparity between mediated or un-mediated imagery? Materials that recorded readers' reception of science translations' illustrations are scarce. The scant evidence I located from book reviews and other contemporary printed sources, represents diverse reactions. Most of these were from readers who did not remark on modifications. It is understandable that readers, who might not have had the opportunity of observing the original illustrations, were silent about variations (or lack thereof). Instead, they commented only on the quality of what was presented to them in translation. For instance, Liang Qichao remarked in his annotated bibliography *Du Xi Xue Shu Fa* that the "illustrations and diagrams were clear and articulating" in *Tan Tian* 談天 (*Discussion on the Universe*), and he was "pleased by the exquisite and amazing illustrations" in *Tian Wen Tu Shuo* 天文圖說 (*Illustrated Treatise on Astronomy*).<sup>525</sup> The authors of another bibliography *Zeng Ban Dong Xi Xue Shu Lu* expressed similar attitudes towards many titles of translation, and acknowledged that audiences were offered great assistance from illustrations in understanding the principles explained by the text.<sup>526</sup> However, one Western reader of Chinese-language translations, who was a specialist in the book's subject matter and had compared the original to the Chinese-language version,

---

<sup>525</sup> Liang Qichao, *Du Xi Xue Shu Fa*, 4a. As discussed before, Liang Qichao had seen the original illustrations of *Jin Shi Shi Bie* for sure, since he was disappointed by the elimination of color effect in the translated version. But there is no substantial evidence indicating that he saw original imprints of many other translations he annotated.

<sup>526</sup> For example, see Xu Weize and Gu Xieguang, *Zeng Ban Dong Xi Xue Shu Lu*, *juan* 3, 1b, 2a, 12b, 18b, and 20b.

seemed to appreciate the accuracy made possible by using original plates. The reviewer of the first edition of *Yan Ke Zheng Zhi* (1894) applauded the illustrations' faithfulness to Norris and Oliver's *A Text-book of Ophthalmology*: "... the plates are the same as in the original work, and are a most valuable addition to the translation."<sup>527</sup> This type of response defending the "authenticity" of Western medical imagery may have resulted from his training in Western medicine and affection for Occidental visual conventions, which framed his predisposition against edits imposed upon extant images. For him, only one look, that which was identical to the original, would be the best. I suspect that his opinion represented that of a number of his colleagues. For one thing, he moved within a relatively small circle of immigrant medical translators in China. For another, English-speaking reviewers of Chinese medical translations published primarily in a very small number of professional journals (e.g., *The China Medical Missionary Journal*) and therefore targeted their arguments to the small number readers involved in the same kind of translating enterprise. So, in this way, reviewers provided suggestions to peers.

#### **4.4.2 Electrotypography and International Trade of Electrotypes Plates**

The circulation of printing resources within groups of both Western and Eastern printer-publishers in the past was not novel. During the early modern period, European and Chinese printer-publishers alike "would reuse, rent, and trade woodblocks" in order to "cut cost or to obtain extra cash flow."<sup>528</sup> This practice was still seen in bookmaking in China even in the early

---

<sup>527</sup> A. D., "Review of *Yan Ke Zheng Zhi*, a New Book on Diseases of the Eye, Translated by J. B. Neal, M.D.," *China Medical Missionary Journal* 10 (1896): 80-1, qt. on 81.

<sup>528</sup> Kai-wing Chow, *Publishing, Culture, and Power in Early Modern China* (Stanford: Stanford University Press, 2004), 250.

twentieth century.<sup>529</sup> However, by the late nineteenth and early twentieth centuries, domestic or intra-continental trading took a cross-continental turn. At that time, a number of foreign translators or translation establishments that employed foreigners in China imported electrotypes plates from the West where electrotyping was extensively adopted and preferred.

Electrotypography originated from experiments in galvanization, which made use of “the electro-deposition of metal on to a mould in order to make a printing surface.” Invented in 1839, it was mainly used in England for illustration printing.<sup>530</sup> By the beginning of the twentieth century, electrotyping made copies of large and small wood engravings in, for example, illustrated works, periodicals, and newspaper titles. However, in England the large-scale application of electrotyping to letterpress printing—not only for illustrations, but for type (and its combination with images)—occurred much later than in the United States.<sup>531</sup> There this technique was pioneered by Joseph Alexander Adams (1803-1880), once an accomplished wood-engraver, and his first electrotypes imprint was published in the April 1841 *American Repertory*.<sup>532</sup> Because it considerably simplified the process of reproducing images and text, and the plates were more durable, electrotyping superseded letterpress and stereotyping, and spread widely to trade books and periodicals, such as *Harper’s Magazine* and *Frank Leslie’s Illustrated Newspaper*, beginning in the early 1850s.<sup>533</sup> The popularity of electrotypes illustrations in the

---

<sup>529</sup> For example, the translator of *Ge Shi Xi Tong Jie Po Xue* (1923) stated that “in order to reduce the cost of the book many of the old woodcuts of former editions have been utilized. Many illustrations have been borrowed from Dr. Gillison’s translation of Cunningham’s Practical Anatomy and from Drs. Cochran and Hsieh’s translation of Heath’s Practical Anatomy.” R. T. Shields, preface to *Ge Shi*, 1. The “former editions” included Osgood’s 1881 translation of Gray’s Anatomy, Osgood-Whitney enlarged translation in 1902, and the 1910 abridged version titled *Essential of Anatomy* and its 1916 revision.

<sup>530</sup> Philip Gaskell, *A New Introduction to Bibliography* (Winchester, UK: Oak Knoll Press), 206.

<sup>531</sup> Arnold Philip, *The Electro-Plating and Electro-Refining of Metals* (New York: D. Van Nostrand Company; London: Crosby Lockwood and Son, 1902), 130.

<sup>532</sup> Herbert Heinrich, “The Discovery of Galvanoplasty and Electrotyping,” *Journal of Chemical Education* 15.12 (1938): 572.

<sup>533</sup> Gaskell, *New Introduction*, 206; Joshua Brown, *Beyond the Lines: Pictorial Reporting, Everyday Life, and the Crisis of Gilded Age America* (Berkeley: University of California Press, 2002), 39. See also the quote in “The



American publishing industry can be exemplified by a banner advertisement on the cover of *Publisher's Weekly* in 1892 hailing: "Illustrations are used to a greater extent to-day than ever.... *Publishers cannot afford to make new engravings when electrotypes of good illustrations, in every way suitable, can be purchased for one-tenth as much.*"<sup>534</sup>

In China, the circumstances surrounding this imported reproduction technique were different than in the United States. There is little substantial evidence of the extensive use of electrotyping in illustration making by native Chinese printer-publishers themselves before the turn of the century. The American Presbyterian Mission Press, which Irish American printer William Gamble (1830-1886) headed, first experimented with electrotype in China in 1859.<sup>535</sup> But the electrotype plate making process proved relatively slow and expensive at that time.<sup>536</sup> Moreover, it was mainly for making single Chinese characters,<sup>537</sup> not as its normal use in England and the United States, where electrotyping was employed to make the durable duplicate of either illustration engravings or formes of type and engravings in letterpress.

---

Electrotype, or Casting by Electricity," *New Yorker* 10.5 (October 17, 1840): 77. "The art of wood-engraving has reached perhaps the highest state of perfection that it will attain. The finesse works in wood are as costly as steel plates, and are preferred because they can be printed on a common letter press page. They want durability, however, and it has been found impossible successfully to multiply copies of them by the stereotype process, because the subdivision of type metal, by melting, is not sufficiently minute. Electrotype duplicates however, may be produced to any extent that will give as fine impressions as the originals."

<sup>534</sup> *Publishers Weekly*, March 26, 1892, cover.

<sup>535</sup> Endymion Wilkinson, *Chinese History: A Manual*, Revised and Enlarged version (Cambridge, MA: Harvard University Press, 2000), 452. See also Tsien, *Paper and Printing*, 192.

<sup>536</sup> Fan Muhan, *Zhongguo Yinshua Jindai Shi: Chu Gao* (First Draft of Chinese History of Modern Printing) (Beijing: Yinshua Gongye Chubanshe), 82; Shi Meicen, *Zhongguo Yinshua Fazhan Shi* (History of the Development of Printing in China) (Taipei: Taiwan Shangwu Yinshuguan), 175.

<sup>537</sup> William Gamble's electrotyping process to cast Chinese type was recorded as follow: "The character was first cut on such suitable material as boxwood. An electro was next taken from the character itself, or through the medium of a wax mould. This mould was next put into the depositing trough containing the copper solution. After several days, when the copper deposit was thick enough, it was trimmed and fixed in a brass holder. On account of the length of time allowed for depositing, the thickness of the copper rendered unnecessary the ordinary backing of the 'shell.' By this process the characters were more finished and possessed more of the caligraphic [*sic*] excellence prized by the Chinese than could be obtained by steel punches." See McIntosh, *Mission Press*, 20. Although we learned beforehand that a large number of electrotype plates were prepared at the American Presbyterian Mission Press in Shanghai for *Quan Ti Chan Wei* in 1881, there was hardly any similar cases of locally experiment on electrotyping illustrations.

Although electrotyping was not prevalent in image making in China, the importation of plates offered printer-publishers an alternative to reproducing images through woodblock or lithography. For printing translations, electrotype plates provided a readymade form of visual reproduction. During the late nineteenth and early twentieth centuries when electrotype manufacture was in its prime in the West, Chinese printer-publishers were able to take advantage of available international shipping to obtain plates mainly from the United States, where “the practice of trading in sets of plates continued throughout the century.”<sup>538</sup> For example, illustrations in the 1907 translation *Fu Ke Xue* (e.g., Figure 35) were printed from American electrotype plates. The evidence is found in physician-translator Mary H. Fulton’s preface: “I most cordially thank ... Dr. Charles B. Penrose ... for so promptly and generously sending me the electro-plates.”<sup>539</sup> This statement reveals the intervention of the translator into the book-publishing process and shows direct contact between the original author and the translator. More regular and extensive inter-continental communication (e.g., through postal service, steam packets, railroads, and telegraph cables) in the early twentieth century made this possible.<sup>540</sup> In addition, the ability to print with electrotype plates in Chinese publishing houses had to be obviously a prerequisite. I detected upon more careful scrutiny of Figure 35, and a number of other illustrations from *Fu Ke Xue*, a little impairment of the plates, especially on the edges, probably due to the repeated high pressure of printing and the wear-and-tear of a cross-Pacific shipment from America to China.

---

<sup>538</sup> Gaskell, *New Introduction*, 206.

<sup>539</sup> Fulton, preface to *Fu Ke Xue*, i.

<sup>540</sup> Daqing Yang, *Technology of Empire: Telecommunications and Japanese Expansion in Asia, 1883-1945* (Cambridge, MA: Harvard University Press, 2010), 17-84; Dwayne R. Winseck and Robert M. Pike, *Communication and Empire: Media, Markets, and Globalization, 1860-1930* (Durham, NC: Duke University Press, 2007), 113-41; Erik Baark, *Lightning Wires: The Telegraph and China’s Technological Modernization, 1860-1890* (Westport, CT: Greenwood Publishing Group, 1997); Zhang Yi, *Zhonghua Youzheng Shi (History of Chinese Postal Service)* (Taipei: Dongda Tushu Gongsi, 1996), 195-266.

Facilitated by the inter-continental trade of electrotype plates, this way of reproducing was increasingly adopted. It was used, for example, in *Hua Xue Chu Jie* and some of the Jiangnan Arsenal's publications, such as *Fu Ke*, *Chan Ke*, and *Kai Kuang Qi Fa Tu Shuo*. It was also widely used in the China Medical Missionary Association's translations, especially those sponsored by the Wellcome China Publication Fund, including *Fu Ke Xue*. For instance, the Fund's account on payment in respect of translating William Rose and Albert Carless' *Manual of Surgery* recorded a £46.0.6 cheque on December 28, 1908 "for a/c of Bailliere Tindall & Cox for electros."<sup>541</sup> In *He Shi Liao Xue*'s English-language prefaces to the first edition (dated 1907) and to the second edition (dated 1911), James H. Ingram stated: "The translator wishes to acknowledge the kind assistance of the author, Dr. Hare, and of the publishers of the original work, Lea Brothers & Co., of Philadelphia, who furnished the illustrations at cost thus materially improving the book, both as regards usefulness and appearance."<sup>542</sup> As a notable publisher of medicine in the United States, Lea Brothers<sup>543</sup> was actively involved in furnishing electrotype plates for Chinese agents. The firm was even acknowledged by *Quan Ti Chan Wei*'s translators for preparing and sending plates at "the reasonable rate."<sup>544</sup> In addition, by 1877 when the School and Text Book Series Committee was founded, it had obtained from Messrs. Wm. Collins, Sons & Co. "electros of all the illustrations in their valuable series of school books" at half price, and from Messrs. Nelson and Sons certain plates at a reduced price.<sup>545</sup> These

---

<sup>541</sup> Account statement, December 28, 1908, WA/HSW/OR/D.4, China Publications Fund, Wellcome Library, London.

<sup>542</sup> Ingram, preface to *He Shi Liao Xue*, i.

<sup>543</sup> The company was formerly named H. C. Lea, and later changed to Lea & Febiger.

<sup>544</sup> H. T. Whitney and C. Hartwell, preface to *Quan Ti Chan Wei*, 1.

<sup>545</sup> Alexander Williamson, "Report of the School and Text Book Series Committee (1877)," in *Records of the General Conference of the Protestant Missionaries of China Held at Shanghai, May 7-20, 1890*, ed. W. J. Lewis, W. T. A. Barber, and J. R. Hykes (Shanghai: American Presbyterian Mission Press, 1890), 714. The committee was also granted "electrotypes and pictures valued at £231" by the London Religious Tract Society. These materials were very likely to be related to advancing evangelical Christianity. International trade of plates was also found in

imported images were very much evident in the Committee's future translations of Western textbooks for primary and secondary school.

#### 4.4.3 Illustration Layouts and New Printing Techniques

Printing with original plates endowed the illustrations in Chinese translations with as much resemblance as possible to their English versions. However, it also somewhat transformed page layout. By looking at how illustrations were now anchored within the text on a page, readers had to relinquish their presupposition of where images should be placed. Moreover, adopting electrotypes to duplicate illustrations occasionally caused problems in image layout when the main text was reproduced from woodblock. It was because of the incompatibility between the two printing techniques.

The layouts of illustrations most commonly seen in traditional Chinese books include the *shang tu xia wen* 上圖下文 model (illustrations occupying the top portion of the *ban kuang* space above the text) and the *cha tu* 插圖 model (an illustration occupying an entire page).<sup>546</sup> The *shang tu xia wen* format appeared in Jian'an during the Yuan Dynasty (1271-1368 C.E.) and was prevalent until the mid-Ming period.<sup>547</sup> It was used not only for single works of fiction and story collections, but also for nonfiction works, such as medical books.<sup>548</sup> By the early sixteenth century, *cha tu*, usually in the form of half-*ye* (full-page) illustrations, appeared in books. It was

---

newspaper publishing. For example, Young John Allen (1836-1907), the chief editor of *Jiao Hui Xin Bao* (English title: *Church News*), took advantage of second-hand Western plates to produce the illustrated Bible stories column (1868-1869). See Chen, "Wan Qing Jiao Hui," 116.

<sup>546</sup> Other less common layouts included *shang wen xia tu* (text occupying the top portion of the *ban kuang* space above the illustration) and grid illustration (equally dividing half-*ye* space inside the *ban kuang* into four, six, or nine squares, and filling small-sized illustrations into each grid). See Xu Xiaoman and Wang Fukang, *Zhongguo Gudai Chatu Shi* (*A History of Chinese Illustrations*) (Shanghai: Shanghai Guji Chubanshe, 2007), 334-8.

<sup>547</sup> Zhang Xiumin, *Zhongguo Yinshua Shi*, 356.

<sup>548</sup> Chia, *Printing for Profit*, 207.

initially meant to supplement the *shang tu xia wen* in a genre of vernacular literature called *ping hua* 平話.<sup>549</sup> But it became extensively used in books of all types, as more complicated woodblock art developed.<sup>550</sup> During the late nineteenth and early twentieth centuries, these types of layout were maintained in some science translations, when the source books' illustrations were redrawn and carved for woodblock printing. However, with the availability of original electrotypes, the situation changed. The printer-publishers now had no control over the size of images. It was typical that Western science books contained a large number of small, irregularly-sized illustrations. If this was the case, in order to coordinate the positions of images with the text, the printer-publishers of translated versions had to insert the small images inside the flow of the text because they would not fit neatly into the *shang tu xia wen* or *cha tu* models. These images instead were surrounded by words at least along two sides. This type of "mosaic layout" was rarely presented in traditional Chinese books, but was popular in science translations with electrotypes, such as *Fu Ke Xue* and *He Shi Liao Xue* (see Figure 51).

---

<sup>549</sup> Hegel, *Reading Illustrated Fiction*, 179. Zhang Xiumin indicated in his book that the change from *shang tu xia wen* to *cha tu* can also be traced by different locations of imprints. Jianyang editions frequently adopted the *shang tu xia wen* layout. However, Nanjing editions modified it and started the *cha tu* design. See Zhang Xiumin, *Zhongguo Yinshua Shi*, 247-8.

<sup>550</sup> Hegel, *Reading Illustrated Fiction*, 183.

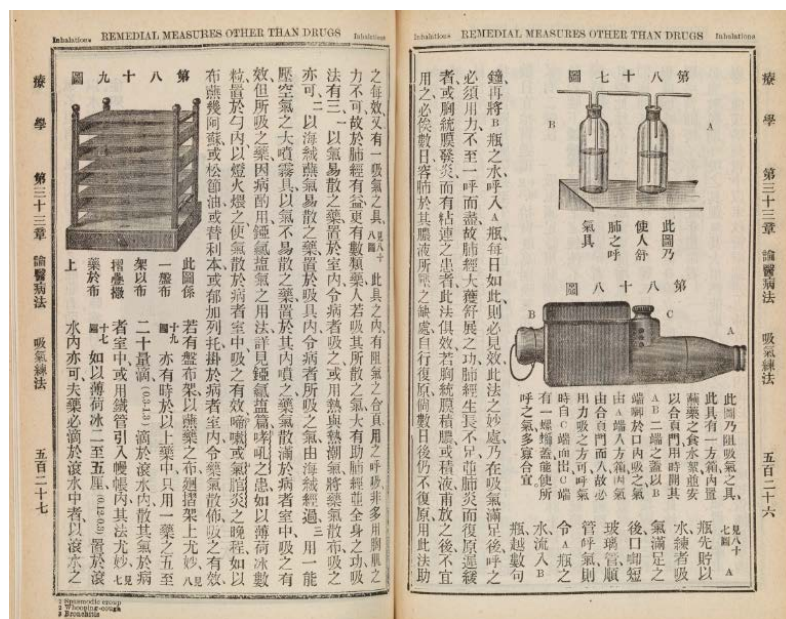


Figure 51. A “mosaic layout” of illustrations (*He Shi Liao Xue*, 526-27)  
From the Wellcome Library, London

Whether to position images inside the book or to accumulate them together is another issue concerning layout. In addition to insertion, sometimes in traditional Chinese books, the half or full-page illustrations were grouped into single fascicles separated from the text and/or in the beginning of the book. This layout was adopted in a number of novels, art books, and some medical and materia medica imprints. The physical separation of illustrations from the main text suggested not only that the number of illustrations was large, but also that these illustrations could be examined and appreciated on their own.<sup>551</sup> They were likely to be designed “as an independent unit” instead of joining the text as parts of “unified semiotic units.”<sup>552</sup> Although they had at hand the image layout in original Western imprints as a reference, translators and

<sup>551</sup> Chia, *Printing for Profit*, 215. *Bencao Gangmu* (*Systematic Materia Medica*) authored by Li Shizhen (1518-1593) is a typical example. This colossal work compiled abundant medical matters from almost all the materia medica works from the *shen nong* (*Husbandman*) onwards. The publisher sorted the illustration into three fascicles and placed them at the very beginning of the book.

<sup>552</sup> Anne Burkus-Chasson, “Visual Hermeneutics and the Act of Turning the Leaf: A Genealogy of Liu Yuan’s *Lingyan ge*,” in *Printing and Book Culture in Late Imperial China*, ed. Cynthia J. Brokaw and Kai-wing Chow (Berkeley: University of California Press, 2005), 371-416, qt. on 375.

printer-publishers made their own choices either to group images together or scatter them on pages (the latter was common in original source books), especially if their printing technique would allow it. The majority of science translations followed the original layout and distributed images throughout the entire book. This way was exemplified in the 1890 version of *Ge Zheng Quan Shu* 割症全書 (*A Complete Thesis of Surgery*), an imprint consisting of a translated portion of the original text printed from new blocks, along with a newly added portion.<sup>553</sup> Illustrations were included in both. James B. Neal, a medical book reviewer, not only recognized the “great improvement” in the reprinted illustrations, but also commended the layout: “The cuts have also this very great merit, that they appear in the body of the text, instead of being bound all together in the front or back of the book.”<sup>554</sup> In contrast, the translators of *Hua Xue Chan Yuan* 化學闡原 (*Illuminating the Principles of Chemistry*) opted to compile all the illustrations together, instead. It was printed using movable type for the text and woodblocks for the images.<sup>555</sup> As the preface indicated, “the illustrations carried in the original books were located at different sections of the text; now they are all collected in one place for simplicity and easiness.”<sup>556</sup> The grouping together was not a matter of space-saving economy.

---

<sup>553</sup> John G. Kerr, *Ge Zheng Quan Shu*, enlarged version (Canton: Boji Yiju, 1890).

<sup>554</sup> James B. Neal, “Dr. Kerr’s New Surgery 割症全書,” review of *Ge Zheng Quan Shu*, translated by John G. Kerr, *CMMJ* 5 (1891), 171-173, qt. on 173.

<sup>555</sup> Anatole Billequin and Wang Zhongxiang, trans., *Hua Xue Chan Yuan* (Beijing: Tongwenguan, 1882). The copyright page shows that this book was a *ju zhen* edition printed at Tongwenguan (the Imperial Academy for Foreign Languages). *Ju zhen*, literally meaning “accumulating gems,” was bestowed by the Emperor Qianlong in 1773 as the name of wooden types that were produced by the Imperial Printing Office at Wuying Palace for printing the vast series *Wu Ying Dian Ju Zhen Ban Cong Shu* (including 134 titles in more than 2300 *juan*). Since then, *ju zhen* became the substituted term for movable type, especially referring to that used in imperial projects. See Tsien, *Paper and Printing*, 209; Zhang Xiumin, *Zhongguo Yinshua Shi*, 589-95; Jing Yu, “Qingdai Yinshua Shi Xiaoji (An Account on the History of Printing during the Qing Dynasty),” in *Zhongguo Jindai Chubanshiliiao Erbian*, 341. Due to the imperial identity of *Hua Xue Chan Yuan*’s printer-publisher, it could take advantage of the special term *ju zhen*. Note that the book was printed through metal type, but not wooden type which *ju zhen* used to suggest.

<sup>556</sup> Fan li, *Hua Xue Chan Yuan*. Translated by the author.

Indeed, each of the forty-five images occupied only part of a half *ye* (with elucidating text beneath it) in the book's three last *juan*.

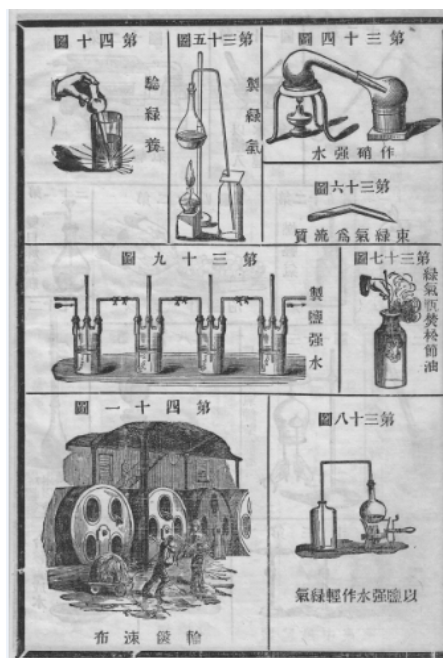
It was no problem for translators and printer-publishers to apply their preference of image layout to translated books, provided that printing techniques for the text and images in the same book were compatible with each other. However, incompatible techniques would bring about difficulties. For example, at first glance, the electrotpe images in Kerr's translation *Hua Xue Chu Jie* seemed impeccably reproduced, but their layout drastically diverged from that of the original and Fryer's translated version, both of which contained illustrations embedded in the text. Eighty-two electrotpe illustrations were clustered together in a separate section at the beginning of its volume one, and thirty-three in volume two.<sup>557</sup> Artistic consideration may have accounted for the decision, because this layout revived the abovementioned Chinese tradition of gathering images together. But the more essential reason was the adoption of woodblock for the main text and electrotpe plates for illustrations. It was not feasible to cut away part of a woodblock and insert a same-sized plate. More importantly, woodblocks required manually applying light pressure on the paper, while electrotpe plates could only be printed by machine presses exerting much greater force. Thus the electrotpe images could not appear within the main text of *Hua Xue Chu Jie*. Even though all the illustrations were collected in a separate part, printer-publishers still had trouble organizing them sequentially. The arrangement of multiple illustrations on each page did not follow a certain order, but depended on how differently sized small plates could be assembled together to perfectly fit the size of a half-*ye* space. Therefore, it

---

<sup>557</sup> Only the first two volumes (1871) of *Hua Xue Chu Jie* used electrotpe plates to print illustrations. The subsequently published volumes three (1872) and four (1875) both contained woodcuts instead. But they were still grouped at the beginning of each volume, probably in order to keep the format consistent throughout four volumes.



is not rare that consecutively numbered illustrations were not even close to each other (see Figure 52).



**Figure 52.** Non-consecutive layout of electrotype illustrations. Numbers from top to bottom, right to left: 34, 36, 37, 38, 35, 39, 41, 40 (*Hua Xue Chu Jie*, juan 1, 2b)  
From the Tsinghua University Library

#### 4.4.4 Divisions of Labor and Degrees of Human Intervention

Before the manuscript was handed to the printer-publisher, the world of words and images revolved around the translator. They had power over the selection and augmentation of original visual representations. Some chose to include all the illustrations from the original versions, while some selected only the most necessary ones or even added newly made ones according to the translators' take on the texts' level of comprehensibility. In the case of John Fryer's *Hua Xue Jian Yuan*, intellectual currents played a crucial role in the book's coverage of illustrations. It contained twenty-four illustrations not in Wells's edition. Most of them elaborated iron, lead, and copper making. This is no surprise since the government's translators were dedicated to the

Self-Strengthening Movement's mission to advocate industry. It also eliminated nine illustrations of abstract phenomena, such as molecular structures, which were relevant to pure learning, but of minor import for the movement.

During the book manufacturing process, different printing techniques required different divisions of labor, a key factor in the making of translated visual representations. Before 1900 in China, woodblock printing (xylography), which was the most persistent technique for creating illustrations, and lithography, which became the favorite of many Chinese printer-publishers soon after it was introduced in the nineteenth century, were among the major methods of making illustrations. Usually, woodblock printing demanded a more complicated division of labor than lithography. During the sixteenth century in Europe, when the technique of wood engraving had greatly advanced, the typical way of printing illustrations included the following steps: "a draughtsman draws the picture, another traces it on to the wood-block and then the carpenter or the sculptor cuts the wood-block."<sup>558</sup> In China, collaboration was also the case in making translated science illustrations, except that a craftsman who traced the picture was not always involved. The division of labor in Chinese woodblock printing had been established by the Song period.<sup>559</sup> Before a printer and a binder acted, a copyist, usually a professional calligrapher, transcribed the manuscript onto a thin and semi-transparent sheet of paper,<sup>560</sup> and pasted it, with the written side down, onto a block ready for a carver. No extra labor was needed for the step that involved tracing written words and images onto a block. Sometimes, the procedures from

---

<sup>558</sup> Sachiko Kusakawa, "Illustrating Nature," in *Books and the Sciences in History*, eds. Marina Frasca-Spada and Nicholas Jardine (Cambridge: Cambridge University Press, 2000), 92.

<sup>559</sup> Zhang Xiumin, *Zhongguo Yinshua Shi*, 656.

<sup>560</sup> This blank sheet is "ruled into columns and spaces with a centre line in each column," known as *hua ge* 花格 ("variegated space"). See Tsien, *Paper and Printing*, 197.

copying through to binding were all carried on by only one literate craftsman.<sup>561</sup> All visual representations, including illustrations and diagrams, were “drawn on the same paper, by an experienced draughtsman, and cut at the same time and on the same blocks as the characters with which they are interspersed.”<sup>562</sup> In contrast to xylography, lithography eliminated the engraver thereby reducing the number of production roles, because it allowed the illustrator to paint on the surface of stone directly. In this case, what the illustrator drew was exactly what was printed off. Lithography saved printers from “the laborious and difficult process of re-engraving.”<sup>563</sup>

No matter how advanced and refined the effects achieved by woodblock and lithography could be, after all, they both required agents’ participation in drawing or carving. In this relay of work, any intended emendations by laborers would result in a modified translation of visual representations. So would any of their misunderstandings and mistakes. However, printing with electrotypes changed the situation. Translators, for sure, still held the power of choosing corresponding plates for the parts of texts they selected to translate, just as John Fryer did when he eliminated some original illustrations. But electrotypes dramatically reduced the amount of human intervention, because the original images could be directly adopted to print during the process of translating illustrations. This way of reproduction, on the one hand, led to exact replicas of original images, but on the other hand, mainly accounted for the decline of illustrators and carvers, both of whom once served as indispensable agents in book making. The only traces of mediation that remained on the illustrations printed from imported plates were their

---

<sup>561</sup> Chow, *Publishing*, 60.

<sup>562</sup> Fryer, *An Account of the Department*, 12.

<sup>563</sup> Tsuen-hsuei Tsien, *Paper and Printing*, part 1 of *Science and Civilisation in China: Chemistry and Chemical Technology*, ed. Joseph Needham (Cambridge: Cambridge University Press, 1985), 5: 192. For labor’s role in illustration production by using lithography, photolithography, and photomechanical techniques during the nineteenth century in the West, see Tom Gretton, “Signs for Labour-Value in Printed Pictures after the Photomechanical Revolution: Mainstream Changes and Extreme Cases around 1900,” *Oxford Art Journal* 28.3 (2005): 371-90.

positioning within the book and the rendering of their captions into Chinese, which would be undertaken by printer-publishers and translators respectively.

By the early twentieth century, visual representation in Chinese-language translations was transformed. This was part of the mainstream of modernizing visual experience in China, such as photography and motion pictures. The adoption of Western printing techniques, such as electrotypography, contributed to this process by mechanizing tasks which humans used to perform. Even so, some translators were still able to intervene into image translation as electrotype plates made their way into China by preserving some traditional Chinese aesthetic values and expressing contemporary intellectual currents. But, when human intervention into image translation (i.e., in the manner of redrawing or remaking) decreases, the degree of indigenization will also be negatively affected.

In China, the old cliché “one picture triumphs over thousands of words” (一畫勝千言) has always referred to how images convey complex meanings to readers. I attempted to provide another angle for interpreting this adage. Not only are “thousands of words” communicated when an image is viewed; thousands more, which explain the process of its making, remain hidden beneath the image, especially when it had been rendered interculturally. Digging up these words will help further our understanding of the creative yet culturally-bound work of translators.

I have examined the differences between selected visual representations appearing in Chinese translations published during the late nineteenth and early twentieth centuries, and their original Western-language sources. I showed how these visible differences can prompt one to

think about the underlying reasons for them, and characterized visual knowledge transmission between two cultures in its complexities. I argued that many Western scientific images, music symbols, and maps were indigenized to give them a more familiar appearance to Chinese readers. Adoption of diverse reproduction methods, especially electrotypes obtained through inter-continental trade, accounted for some of the variations in translated science illustrations in particular, and for the decrease in human involvement into translated image making. However, illustrators' artistic and scientific training, as well as their attempts to preserve some traditional Chinese aesthetic values and to express contemporary intellectual currents, was ultimately responsible for the altered images. Variant representations in translated books did not necessarily hinder Chinese readers from gaining knowledge, and may in fact have facilitated their grasp of Western learning and helped them "viewing to learn."

Zheng Qiao, who celebrated the power of visual representation—the all important "left half of an agreement"—not only summarized the way ancient scholars used images, but also highlighted the function of illustrations in knowledge acquisition. He reminded contemporaries to juxtapose both images and text in order to "explore the phenomenon from the image, and investigate the principles from the text."<sup>564</sup> However, the situation of translated books was not as simple as that which Zheng described. Regarding the textual, Chinese readers had to perceive Western knowledge through writings that were modified by translators' understanding. It was possible that the "principles" contained in the text were variant versions of the original. Furthermore, we cannot take for granted that visual images, supposedly immediate and straightforward presentations of knowledge on book pages, were brought to Chinese readers any more easily, in a plug-and-play manner, than the text. Chinese readers were not always pitched

---

<sup>564</sup> Zheng Qiao, *Tong Zhi*, 837.

the same images as the readers of the original Western books. But they were, instead, invited to see more indigenized, accommodating, and perhaps, more engaging versions. Western and Chinese readers might have asked each other: “Was what you could see that which I could see?” “Was what you understood that which I understood?” The answer may remain a mystery. The process of translating and reproducing images makes this issue fraught with contingencies, as we can see from this chapter. But it is always certain that human agents mediated visual representations in translated imprints. All in all, translators, illustrators, printer-publishers, and the changing methods of image reproduction together joined forces to equip many “boats” with much-needed and well-functioned “compasses.” Through this enterprise, they, in addition, helped to transform traditional Chinese visual conventions.

## **5.0 “WE CAN DO THIS NOW WITHOUT SERIOUS EMBARRASSMENT”: COMMUNICATION NETWORKS IN THE TRANSNATIONAL PRODUCTION OF KNOWLEDGE**

On May 7, 1918, Robert Beebe, on behalf of the Publication Committee of the China Medical Missionary Association (CMMA), wrote to J. Collett Smith who worked in Sir Henry S. Wellcome’s London office, thanking Wellcome for his generous donation underwriting medical translation in China. “We can do this now without serious embarrassment,” Beebe explained.<sup>565</sup> Wellcome’s sponsorship—evinced by this surprisingly large contribution acquired from a fundraising campaign launched by the CMMA— exemplifies the fruits of translators’ networking efforts. During the late nineteenth and early twentieth centuries, translators of highly technical knowledge seemed to have struggled with much “serious embarrassment.” “Who can help me if I am not capable of translating all by myself?” “How can we get enough money to keep things moving?” These were all practical but haunting questions for translators like Robert Beebe. After all, translation work at that time was not, and could not be done merely at home or in solitude. In seeking help for their enterprise, translators relied upon dynamic networked communication across intercultural, international, linguistic differences.

---

<sup>565</sup> Robert Beebe to J. Collett Smith, May 7, 1918, WA/HSW/OR/D.4, China Publications Fund, Wellcome Library, London (hereafter CPF-WL).

This chapter takes a close look at how communication networks linking translators to various scholarly, professional, religious, and readership communities shaped the flow of knowledge and the production of translations. A remarkable feature of the real-time translation process at that time is that most translations were completed through collaboration between oral translators (i.e., Westerners who were knowledgeable about the subject matter being translated and well-acquainted with the Chinese language but not literate enough to write a quality translation on their own), and scribal translators (Chinese natives who, though highly literate and cultured, may not have thoroughly mastered Western languages). Their teamwork was replete with intercultural communication (or “interdiscourse communication”<sup>566</sup>), such as potential discussion, negotiation, and even debate over virtually every important concept and term appearing in the original text.

As I will discuss, to navigate these issues and to solve practical problems regarding printing and publishing of translated works, translators tried in every way to weave networks of expertise and financial support. Their efforts to do so have been largely overlooked by previous scholars.<sup>567</sup> Indeed, in this chapter, sponsorship is emphasized and viewed as a key structural

---

<sup>566</sup> Ronald Scollon and Suzanne Wong Scollon, *Intercultural Communication: A Discourse Approach*, 3rd ed. (Malden, MA: Blackwell Publishers, 2012), xiii.

<sup>567</sup> Some work exists on other kinds of turn-of-the-twentieth-century Chinese networks beyond those devoted to the production of translations, in fields such as journalism and business, or in those involving knowledge circulation or the standardization of terminology. See, for example, David Luesink, “Dissecting Modernity: Anatomy and Power in the Language of Science in China” (PhD diss., University of British Columbia, 2012); “Individual Itineraries and the Circulation of Scientific and Technical Knowledge in East Asia (16<sup>th</sup>-20<sup>th</sup> Centuries),” an international conference organized by Catherine Jami and held in Paris, November 26-28, 2012; Zhongping Chen, *Modern China's Network Revolution: Chambers of Commerce and Sociopolitical Change in the Early Twentieth Century* (Stanford: Stanford University Press, 2011); Yong Zhang Volz, “Transplanting Modernity: Cross-Cultural Networks and the Rise of Modern Journalism in China, 1890s-1930s” (PhD diss., University of Minnesota, 2006); Natascha Vittinghoff, “Social Actors in the Field of New Learning,” in *Mapping Meaning: The Field of New Learning in Late Qing China*, ed. Michael Lackner and Natascha Vittinghoff (Leiden: Brill, 2004), 75-118, esp. 106-113. She also discusses newspapermen's network in “Useful Knowledge and Appropriate Communication: The Field of Journalistic Production in Late Nineteenth Century China,” in *Joining the Global Public: Word, Image, and City in Early Chinese Newspapers, 1870-1910*, ed. Rudolf G. Wagner (Albany: State University of New York Press, 2007), 47-104, esp. 51-66.



feature of translation networks. This kind of connection to either financial donors as exemplified by Sir Henry Wellcome in the Wellcome China Publication Fund case, or share purchasers in Zou Daijun's stock-issuing campaign for the Society for Translating and Printing Western Maps, were originally generated by translators' outreach efforts, and then the sponsorship relation itself generated momentum to continue or undertake massive projects. In his *Translation, Rewriting and the Manipulation of Literary Fame*, André Lefevere defines patronage (persons or institutes) as one control factor that "operates mostly outside the literary system" but can "further or hinder the reading, writing, and rewriting of literature." Patronage's influence on literature, argues Lefevere, concentrates upon "the ideology of literature" more than its poetics.<sup>568</sup> But in my case study of Sir Henry Wellcome's sponsorship for the CMMA, I found that he kept a keen eye on the maintenance of the all-around excellence of Chinese medical translations, ranging from text selection, language use, political and religious disposition, to even material quality.

By providing an overview of the activities related to translation production, I propose an intercultural, international, and interlingual "communication circuit" that situates translation within a holistic picture of book history during the late nineteenth and early twentieth centuries. Ever since Robert Darnton introduced, in 1982, the milestone concept of "communication circuit"<sup>569</sup> as an integrated structure of interactions involved in producing, distributing, and receiving books, numerous critics have questioned it and have provided alternatives to this model based upon analyses of scenarios rooted in different social, historical, and geographical

---

<sup>568</sup> André Lefevere discusses patronage in his *Translation, Rewriting and the Manipulation of Literary Fame* (London: Routledge, 1992), 15-9, qt. on 15. Nevertheless, he only focuses on literary translation, not other genres. His viewpoint has been augmented through examination of sponsorship cases in the Chinese context by Lawrence Wang-chi Wong. See his chapter "Quanli yu Fanyi: Wanqing Fanyi Huodong Zanzhuren de Kaocha (Power and Translation: An Examination of Sponsors for Translation Activities during the Late Qing Period)," in his *Fanyi yu Wenxue zhijian (Between Translation and Literature)* (Nanjing: Nanjing University Press, 2011), 44-82.

<sup>569</sup> Robert Darnton, "What is the History of Books?" *Daedalus* 111.3 (1982): 65-83.

contexts.<sup>570</sup> Here, I do not attempt to modify or re-model the concept of “communication circuit” *per se*, but augment it by stretching the “circuit” of the original Western book to encompass, in its published translated form, an intercultural, international, and interlingual scope—the afterlife cycle of the original source books. I pay attention to immigrant translators’ roles as connectors between the two cycles, that of its original life in the West and the new one its translation found in China. They functioned in a multi-channel and open-ended manner in establishing cross-circuit relationships, such as directly contacting the author, printer-publisher, suppliers, shippers, and readers of the Western source book. Via these and other relationships through the communication circuit, translators intervened signally in the transnational production of knowledge.

## 5.1 INTERACTIONS BETWEEN TRANSLATION TEAM WORKERS

One of the many ancient Chinese terms for “translator” is *she ren* 舌人, literally meaning “tongue people.” It was originally designated to a group of professionals who orally interpreted exchanges between the emperor’s court and “barbarians” coming to pay tribute as early as the Zhou Dynasty (1122-221 B.C). Although *she ren* at the outset was a somewhat derogatory term for describing this profession, it later became a general title for both translators of written texts and oral expressions and remained in use until the end of the nineteenth century.<sup>571</sup> The

---

<sup>570</sup> For major critiques on “communication circuit” model, see Kai-wing Chow, *Publishing, Culture, and Power in Early Modern China* (Stanford: Stanford University Press, 2004), 154-56; Christine Pawley, *Reading Places: Literacy, Democracy, and the Public Library in Cold War America* (Amherst: University of Massachusetts Press, 2010), 15-6; James Secord, *Victorian Sensation: The Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation* (Chicago: University of Chicago Press, 2000), 126.

<sup>571</sup> The derogatory nature of this term in early China mainly resulted from the emperors’ courts’ conceptions of the

interesting aspect of this term is that it straightforwardly points to verbal activities featured in the job of textual translators—people with skillful “tongues.” So, oral communication was not only requisite for interpreters who had to be verbally adept. During the late nineteenth and early twentieth centuries, oral interaction permeated the translation process undertaken by teamed translators, producing written knowledge. Today it may be difficult to imagine that the making of a printed translation required constant and real “tongue” work, because in these days most translations tend to be written in solitude, with a translator facing non-responsive companions—the source text and a number of lexical aids and other reference books. However, over one hundred years ago, a much more dynamic scenario of people interacting and working simultaneously together was widely seen in the production of highly technical translated knowledge in China. And, this mode of collaboration largely influenced the language and composition style of the final product.

### 5.1.1 Collaboration between Oral Translator and Scribal Translator

The translation process may involve varieties of collaboration. A translator may send his or her manuscript to another veteran colleague for suggestion and editing, and may sometimes contact the original author(s) to get advice.<sup>572</sup> Each member of a team of translators may be assigned chapters of the book on which to work individually.<sup>573</sup> Then they may meet regularly to

---

inferiority of other ethnicities, and, thus, their languages. The translators who dealt with these people and knew their languages were considered insignificant and given relatively low rank in officialdom. For more discussion of the term *she ren*, see Wong, *Fanyi yu Wenxue*, 5-6; Li, *Zhongguo Kexue Fanyishi*, 35.

<sup>572</sup> Examples see Chapter 2.

<sup>573</sup> Although not widely seen during the late nineteenth and early twentieth centuries, this mode was adopted in the translation of some relatively large and meticulously detailed books. For example, J. G. Cormack acted as the general editor of the three-year project *Luo Ka Liang Shi Wai Ke Xue* (*Rose and Carless's Surgery*), while the entire translation was distributed to British, American, Swiss and Chinese doctors, including Cormack himself, J. E.

coordinate their progress and discuss some technical issues. But in terms of communicative intimacy, these above mentioned collaborative relationships could not parallel the level of collaboration between oral translator and scribal translator that characterized the translation of highly technical knowledge during the late nineteenth and early twentieth centuries. An oral translator was usually a Westerner, knowledgeable in the subject matter to be rendered, but not very well-versed in traditional Chinese book language. His or her complementary counterpart, a scribal translator, was in general a native scholar, who was well-educated and highly proficient in literate writing and composition, but who might not have been as familiar (although genuinely interested and somewhat informed) with Western learning as the oral translator. They sat down face to face, discussed and debated, while translating. They worked shoulder to shoulder to contribute to the Chinese-language version of new Western knowledge.

This ancient method of translating in China, the collaboration between oral translators and scribal translators, can be seen in the rendering of Buddhist sutras as early as the fourth and fifth centuries. In the hope of producing a flawless religious translation, the job was divided into several carefully relayed posts: monks who recited the text in the original language, those who listened and orally translated the recited text into literary Chinese, those who copied down the rough oral translation as a draft, and those who then elaborated, refined, checked, and further revised the draft (some posts might have been taken by the same monks). The finalized writing was subsequently submitted to the Dharma-master for approval.<sup>574</sup> Sixteenth- and seventeenth-

---

Kuhne, W. E. Macklin, F. Sanger, Mary Fulton, T. M. Li, E. T. Hsieh, A. Morley, and E. J. Peill. See J. G. Cormack, Editor's Preface (dated September 1912) to *Luo Ka Liang Shi Wai Ke Xue*, trans. J. G. Cormack, et al. (Shanghai: China Medical Missionary Association, 1913), 1. In the production of the 1910 version of *Ou Shi Nei Ke Xue*, in all six Chinese writers participated in the composition of this sizable book, each of whom took care of a number of chapters. See *Yi li* ("Guide to the Translation") to *Ou Shi Nei Ke Xue*, trans. Philip Cousland (Shanghai: China Medical Missionary Association, 1910).

<sup>574</sup> For the method of Buddhist translation, Li Wei, *Zaoqi Hanyi Fojing de Laiyuan yu Fanyi Fangfa Chutan* (*Preliminary Exploration of the Original Sources and Translation Method of Early Chinese Translation of Buddhist*

century Jesuits, who introduced Christian doctrine and Western learning into China, could not themselves “claim all the glory” of the textual products of translation. A large number of renowned native scholars were acknowledged in prefaces to many translations, for the significant role they played in turning Jesuits’ awkward written Chinese into elegant literary prose. The ordinary method of collaboration was that “the Jesuit translator explained the European texts orally to his Chinese collaborator, who set down the Chinese version in writing; the text was subsequently examined jointly, until a final translated text was agreed upon.”<sup>575</sup>

Until the early twentieth century, translations of Western science relied on this kind of collaboration between the oral translator and the scribal translator. One obvious reason for this method was both sides’ language inadequacies: the Western translator did not master stylistic elegance of Chinese-language writing, while the Chinese translator could not reach a thorough understanding of English-language texts. Tremendous differences between the two languages already caused translators’ frustration, but content fraught with highly technical knowledge made the translation job even more demanding. For example, many original terms in English had no existing counterparts in Chinese. To create them required the Western translator’s lengthy oral explanation, the Chinese translator’s fabrication of neologisms, and further discussion between the collaborators. When the oral explanation of a term seemed within the periphery of the

---

*Scriptures*) (Beijing: Zhonghua Shuju, 2011), 4-5 and 179-84; Li Nanqiu, *Zhongguo Kouyi Shi* (*A History of Interpretation in China*) (Qingdao: Qingdao Chubanshe, 2002), 279-301; Tang Yongtong, *Hanwei Liangjin Nanbeichao Fojiao Shi* (*A History of Buddhism in the Han, Wei, Jin, and Southern and Northern Dynasties*) (Beijing: Zhonghua Shuju, 1963); David Wright, “The Translation of Modern Western Science in Nineteenth-Century China, 1840-1895,” *Isis* 89.4 (1998): 653-73, esp. 654-55.

<sup>575</sup> R. Po-Chia Hsia, “The Catholic Mission and Translations in China, 1583-1700,” in *Cultural Translation in Early Modern Europe*, ed. Peter Burke and R. Po-Chia Hsia (Cambridge: Cambridge University Press, 2007), 46. The Jesuits’ role was called *kou yi* (“oral translation”) or *shou* (“to teach”), and the Chinese scholars’ role was mentioned as *bi shou* (“received writing”) or *yan* (“to elaborate”). See Tsuen-hsuei Tsien, “Western Impact on China through Translation,” *Far Eastern Quarterly* 13.3 (1954): 307. For a general history of collaborative translation by Jesuits and Chinese literati, see Ma Zuyi, et al., *Zhongguo Fanyi Tongshi: Gudai Bufan* (*A History of Translation in China: Before 1912*) (Wuhan: Hubei Jiaoyu Chubanshe, 2006), 302-44.

Chinese translator's mental inventory of terms, he had to further examine references and then discuss with the Western translator whether his finding matched the meaning of the original. These contingencies certainly entailed much time and labor. Particularly, when highly specialized dictionaries were not yet available for lending standardized lexical support,<sup>576</sup> the Chinese counterpart of a technical term could best be achieved through oral negotiation. It is hard to imagine that this much effort did not stem from translators' adamant striving for accuracy—however elusive that goal may have been.

The roles of the oral translator and the scribal translator were not always equally represented when their joint work was mentioned by contemporaries, although the title page always included both translators' names, and the oral translator him/herself always expressed thankfulness to the scribal translator in prefaces. For example, medical works completed by John Kerr and his scribal translators were always referred to by doctor-translators, such as Mary Fulton and Mary Niles, as "Kerr's." Just like Kerr's scribal translators, a large number of other scribal translators did not get proper credit either. This way of titling a book was also prevalent in various imprint advertisements and book reviews (especially the English-language ones), as if the scribal translator was not worth mentioning.<sup>577</sup> The oral rendition of original text's meaning seemingly had more weight in the translation process, compared to the mere linguistic

---

<sup>576</sup> Some lexical references were available. For example, John Fryer compiled and published four Chinese-English specialized vocabularies of technical terms primarily drawing upon the Jiangnan Arsenal's translations: *Huaxue Cailiao Zhong Xi Mingmu Biao* (*Vocabulary of Names of Substances Occurring in Various Works on Chemistry; Chiefly in "Bloxam's Chemistry," First Edition*) (1885), *Xiyao Dacheng Yaopin Zhong Xi Mingmu Biao* (*Vocabulary of Names of Materia Medica Occurring in the Translation of "Royle's Manual of Materia Medica, and Therapeutics"*) (1887), *Jinshi Zhong Xi Mingmu Biao* (*Vocabulary of Mineralogical Terms Occurring in the Manual by J. D. D. and A. M.*) (1883), and *Qiji Zhong Xi Mingmu Biao* (*Vocabulary of Terms Relating to the Steam Engine*) (1890). A number of notes on translating medical terminology and lists of suggested way of rendering English terms were published on the *CMMJ*. But they were not universally adopted by the translation circle in China.

<sup>577</sup> John Fryer seemed to be an exception. In his account, he meticulously listed the scribal translator ("Chinese writer" named by Fryer) of every translation published by the Jiangnan Arsenal. See Fryer, "A List of Published Works," in his *Account of the Department*, 22-31.

implementation. However, what the scribal translator contributed to the end product was far more than catching words “in the air”<sup>578</sup> and turning them into the written form, which by all means already made for a challenging business. He was not just a supporting wordsmith, as suggested by his title, ensuring the quality of writing and copy editing. His post was created not just to compensate for his Western collaborator’s stylistically unsatisfactory writing. He was required to attain special qualifications, and was responsible for much more.

Beyond being a well-trained writer “untiring in [his] effort[s] to render every expression clear and concise,”<sup>579</sup> the ideal scribal translator was an expert on the subject matter to be translated. Hua Hengfang, an achieved pioneer scientist in China and one of the principle Chinese translators at the Jiangnan Arsenal, once argued, retrospectively, from his own translation experience: “A scholar without high specialization in mathematics can never be qualified as a scribal translator of mathematical translations.”<sup>580</sup> This summary certainly proved true, at least to the renowned mathematician-cum-translator Li Shanlan 李善蘭 (1811-1882), from whom Hua learned the collaborative method for translating Western books. Both Li and Hua were among leading scholars of mathematics in China at that time, and authored their own books in this field.<sup>581</sup> David Duncan Main (1856-1934) revealed that Liu Mingzhi 劉銘之, his

---

<sup>578</sup> John Durham Peters, *Speaking into the Air: A History of the Idea of Communication* (Chicago: University of Chicago Press, 1999).

<sup>579</sup> James H. Ingram, preface to *Qu Guang Xue*, trans. James H. Ingram and Chen Guiqing (Shanghai: China Medical Missionary Association, 1914), 1. This book was translated from James Thorington, *Refraction and How to Refract, Including Sections on Optics, Retinoscopy, the Fitting of Spectacles and Eye-Glasses, Etc*, 5th edition (Philadelphia: P. Blakiston’s Son & Co., 1910).

<sup>580</sup> Hua Hengfang, *Xuesuan Bitan (Notes on Mathematical Studies)* (Wuxi: Jingui Huashi, 1885), *juan* 12, 16b.

<sup>581</sup> Li Shanlan’s thirteen monographs on mathematics were included in his 24-*juan* anthology *Zeguxi Zhai Suanxue (Mathematical Books of the Zeguxi House)* (repr. Shanghai: Shanghai Guji Chubanshe, 2002). For Li Shanlan’s achievement in mathematics, see Horng Wann-Sheng, “Li Shanlan: The Impact of Western Mathematics in China during the Late 19th Century” (PhD diss., City University of New York, 1991); Yang Ziqiang, *Xueguan Zhong Xi: Li Shanlan Zhuan (A Master of Both Chinese and Western Learning: A Biography of Li Shanlan)* (Hangzhou: Zhejiang Renmin Chubanshe, 2006); Wang Yusheng, *Zhongguo Jindai Kexue de Xianqu: Li Shanlan (Pioneer of Modern Science in China: Li Shanlan)* (Beijing: Kexue Chubanshe, 2000). Besides translating, Hua Hengfang authored six

student, friend, colleague, and collaborator in the project of *Yi Fang Hui Bian* 醫方彙編 (*The Compilation of Medical Prescription*), was a seasoned doctor. As one of the first graduates (class of 1889) of the medical training school affiliated with the Guangji Hospital 廣濟醫院 (Hospital of Universal Benevolence) founded by Main in Hangzhou, Zhejiang Province, Liu remained in residency at the Hospital until 1910. He was also an influential medical author.<sup>582</sup> During the preparation of *Yi Fang Hui Bian*, Liu, after his busy days in the hospital, meticulously transcribed Main's oral words, and then reviewed every segment of transcription as it was completed, accumulated these segments, and mailed them from Hangzhou to the American Presbyterian Mission Press in Shanghai on a regular basis.<sup>583</sup> Liu's medical background facilitated the teamwork with Main. Liu occasionally even translated some parts of the book on his own. Scribal translators well armed with professional knowledge greatly improved the technical accuracy of translations. This was widely acknowledged by Western translators in their prefaces to collaborative medical imprints. For example, as W. H. Venable recorded, his teacher Mao Peizhi 毛培之 (listed as the scribal translator) and assistant Wu Xinhuang 吳欣璜 (1880-1940, listed as the proofreader) offered "helpful suggestions regarding the terminology" throughout *Hui Xue Xin Bian* 穢學新編 (*A New Compilation of Bacteriology*).<sup>584</sup> Thomas Gillison also stated that during the production of the 1914 version of *Yao Liao Xiang Yao* 藥料詳

---

mathematical theses which were collected and published as *Xingsu Xuan Suangao* (*Mathematical Drafts of the Xingsu House*) (Wuxi: Liangxi Huashi, 1882).

<sup>582</sup> For a brief biography of Liu Mingzhi, see Wang Jian'an and Zhang Suzhan, *Bainian Mingyuan Bainian Pinzhi: Cong Guangji Yiyuan dao Zheyi Eryuan* (*One Hundred Years' History of a Celebrated Hospital: From Guangji Hospital to the Second Affiliated Hospital to Zhejiang University College of Medicine*) (Hangzhou: Zhongguo Meishu Xueyuan Chubanshe, 2009), 157-9.

<sup>583</sup> D. Duncan Main, *fan li* (guide) to *Yi Fang Hui Bian*, 2nd ed., trans. D. Duncan Main (Shanghai: Guangxuehui, 1899), 1-3, information on 3. Translated by the author.

<sup>584</sup> W. H. Venable, preface to *Hui Xue Xin Bian*, trans. W. H. Venable (Shanghai: American Presbyterian Mission Press, 1908), 1. This book was translated from Paul Émile Archinard, *Microscopy and Bacteriology: A Manual for Students and Practitioners* (Philadelphia: Lea Brothers & CO., 1903).



要 (*Detailed Essentials of Material Medica*), his writer Zhao Qixun 趙齊巽 paid attention to not only the literary style, but also many technical details.<sup>585</sup>

In some circumstances, beyond the time spent with the oral translator, the scribal translator had to handle additional details, making for a greater work load than that of his collaborator. Hua Hengfang, who teamed with John Fryer in translating Western mathematical books, recorded his extra, specialized responsibilities. These were passed down from his predecessors, and would have been shared by his contemporaries. When Hua was young, he observed how Alexander Wylie and Li Shanlan conducted translation at the Mohai Shuguan 墨海書館 (London Missionary Society Mission Press) and later applied the method to four mathematical translations he undertook with John Fryer.<sup>586</sup> Scribal translator Li substituted any orally rendered mathematical symbols, equations, formulae, terms, or large numbers that he could not immediately translate into Chinese counterparts such as *tian gan* and *di zhi* characters (see Chapter 3), with circles or other notes that marked places needing extra work after the teamwork was completed. These notes were not touched until the second round, which was conducted solely by the scribal translator, but not through his collaboration with the oral translator.<sup>587</sup> The scribal translator had to prepare in advance a form that juxtaposed Western mathematical symbols, terms, and numerals with their Chinese-language counterparts. This form, aiming at accurate translations, was for the scribal translator's later retrieval of correct Chinese counterparts when rewriting formulae and equations that were fraught with non-Chinese

---

<sup>585</sup> Thomas Gillison, preface to *Yao Liao Xiang Yao*, trans. Thomas Gillison and Zhao Qixun (Shanghai: China Medical Missionary Association, 1914), 2. This book was translated from J. Mitchell Bruce, *Materia Medica and Therapeutics* (London: Cassell and Company, 1907).

<sup>586</sup> These four translations are *Dai Shu Shu* (1872), *Wei Ji Su Yuan* (1874), *San Jiao Shu Li* (1878), and *Dai Shu Nan Ti Jie Fa* (1879). According to Hua, at least two other mathematical translations, *Shu Xue Li* (Fryer and Zhao Yuanyi, 1879) and *Suan Shi Ji Yao* (Fryer and Jiang Heng, 1877), were produced by using the same method.

<sup>587</sup> Hua, *Xuesuan*, *juan* 12, 17a-18b.

elements. The scribal translator's extra work simplified the first-round team work, since the oral reading of a complicated bulk of equations would only cause confusion and would mean a longer-time in cross-checking between two translators. Moreover, the scribal translator's concentration in solitude on skipped content could help to achieve a relatively high level of accuracy. Hua insisted that drastic differences between Chinese and English syntaxes created obstacles to mathematical translations. For example, when more than one equation or cluster of symbols was inserted into one sentence, it became highly possible that the sequence of equations and symbols in the translated version diverged from that in the original book. In the second round, the scribal translator made sure everything was in right order, so that the following proofreading would not be too onerous.

In the early twentieth century, Chinese scholars started to translate books concerning Western learning independently. For example, the early-1920s catalogues of the native-owned *shangwu yinshuguan* 商務印書館 (the Commercial Press, founded in 1897) shows that approximately half of its science textbooks were translated by local intellectuals. Some of these translators even became authorities in translating certain subject matter.<sup>588</sup> The collaborative model with oral translator and scribal translator gradually became obscure as a new cadre of translators arose, who were capable of mastering Western languages and of specializing in Western learning. But the CMMA, at least, continued to use the old model in medical translation as late as the 1930s.

---

<sup>588</sup> Li, *Zhongguo Kexue Fanyishi*, 421-29.

### 5.1.2 The Real-Time Process of Collaborative Translation

Usually the manner by which collaborative translation in science was carried on did not resemble that of dictation in which one person reads the text out loud, while the other is busy recording, word for word, in silence. When two translators sat down face to face, neither became a passive receiver of information. Instead, discussion and debate ensued. It was a lively process—a good example of intercultural communication. These interactions between translators demonstrated their striving for a more accurate relay of Western technical knowledge, and the incorporation of their own interpretations of the original text. Moreover, the communicative aspects of collaborative translation enabled scribal translators to deepen their understanding of the subject matter as much as they could, with direct help from oral translators who played, somewhat, the role of a teacher. In this way, new knowledge channeled through the text in the translation, which was revised and finalized largely by the scribal translator. The end product was the “fruit” of his learning which in turn, was passed on to his readers so that they could learn. In fact, besides translating, most of these scribal translators were active agents in transferring Western learning to China in other ways, such as lecturing and researching.

The veteran translator Hua Hengfang described the real-time process of collaborative translation as *dui yi* 對譯. The character *dui* 對 literally means “face-to-face,” but also suggests that comparison, contradiction, and even confrontation may happen since each side holds his or her own opinion while difficulties are being solved. In the preface to *Jin Shi Shi Bie*, Hua vividly recalled his *dui yi* experience with Daniel Jerome Macgowan:

Mr. Macgowan was the one who knew mineralogy the best. But he was a medical doctor, and the Arsenal could not invite him to come to work at its Translation Department. So I physically went to his home every day, and *dui yi* this book with him during his spare time. Among the mineralogical substances discussed in this book, some already had their Chinese names; some had not; some had their Chinese names, but I did not know and was not able to quickly investigate and find out. Every time one matter was translated, we had to debate many times. ... Mr. Macgowan had limited mastery of the Chinese language which would only allow him to barely communicate. Sometimes he was not capable of selecting the right words to express his idea. Then he resorted to other words hard to conceive of using. It made the translation process extremely difficult and the proofreading extremely complicated.<sup>589</sup>

Obviously within this repeated *dui yi* process, both the oral translator and the scribal translator were equally active and responsive. The major reasons for their discussion and debate are two-fold. The first is the language barrier: the oral translator had problems in linking ideas to appropriate Chinese words, and the scribal translator was uncertain about corresponding Chinese terminology. The second is the conceptual imbalance. The scribal translator's familiarity with certain subject matter, if there was a certain level, usually concerned the subject matter as it had

---

<sup>589</sup> Hua Hengfang, preface to *Jin Shi Shi Bie*, trans. Hua Hengfang and D. J. Macgowan (Shanghai: Xiaocangshan Fang, 1896), 1. Translated by the author.

developed in the Chinese context; this did not often parallel with the oral translator's background in Western science. Therefore, the question "Is X (in Chinese) the same as Y (in English)?" might have often been brought to the table for discussion. It was not until both the denotative and connotative meanings of X and Y were fully explained and understood by both translators that an answer could be given. If unfortunately—it happened very frequently—there was no existing X to match Y and a neologism had to be invented, detailed explanation and even debate regarding the lexical suitability and practicality of proposed expressions became indispensable. The two-fold reasons for *dui yi* are described in John Fryer's account of the working model at the Translation Department at the Jiangnan Arsenal: "The foreign translator... consult[s] with him [scribal translator] wherever a difficulty arises as to the way the ideas ought to be expressed in Chinese, or explain[s] to him any point that happens to be beyond his comprehension."<sup>590</sup> One may wonder that the case of Macgowan and Hua, their difficult experiences with *dui yi*, might have been an extreme one. Macgowan was indeed not well versed in Chinese, and Hua was not a specialist in mineralogy, but more of a mathematician. The match was by no means the best. However, even when a seemingly perfect team—John Fryer, who was highly proficient in both spoken and literary Chinese, and Xu Shou, who possessed relatively deeper understanding of chemistry than most Chinese scholars—worked together to render series of Western chemistry texts, constant discussion and debate were still essential. After all, the translation of Western technical knowledge was different at this time, from the translation of Western fiction for which there was a wider range of flexibility in recording words and sentences spoken by the oral translator, adjusting the meaning, and even rewriting the scenes and plots, and much less verbal exchange of ideas within the translation process. For highly conscientious translators, the

---

<sup>590</sup> Fryer, *Account of the Department*, 12.

rendition of new technical knowledge required abundant interpersonal and intercultural communication to ensure the faithful transfer of scientific principles and applications from the original text to the translated version.

Besides the textual accounts mentioned above that recorded the collaborative process of translation, a historical photograph taken in 1911 also reveals how translating work was conducted in real time. Figure 53 depicts Mary H. Fulton, the oral translator who was a medical doctor affiliated with the China Medical Missionary Association, and her so-called “pundit,” the scribal translator and Chinese scholar who was an expert on written communication and had a working knowledge of medicine. They are sitting face to face in an office at the Hackett Medical College for Women.<sup>591</sup> Fulton is perusing the original English book, which is now in her hands, to get a general idea of every part. She quickly renders a sentence in her mind into Chinese, and reads it out loud to the “pundit,” who records what she says, and refines it to be a highly readable Chinese text. The “pundit” has to constantly interact with her to come up with neologisms for terms, to double check if his understanding of meaning is correct—it is especially important for medicine—and to discuss which parts from the original text can go and which would be supplemented.

---

<sup>591</sup> Established in 1899 (initially named Kwangtung Medical School for Women) in Canton (Guangzhou) by Mary Fulton and expanded in 1905 with the donation from Mr. E. A. K. Hackett at Indiana, U.S., the Hackett Medical College for Women was the first medical college for women in China. For a history of the College, see Pang Suk Man, “‘To Save Life and Spread the True Light’: The Hackett Medical College for Women in China (1899-1936)” (MA thesis, Hong Kong Baptist University, 1998); Guangqiu Xu, *American Doctors in Canton: Modernization in China, 1835-1935* (New Brunswick, NJ: Transaction Publishers, 2011), 131-86.



**Figure 53.** “Dr. Mary H. Fulton and the Pundit Translating Medical Text-books from English into Chinese, Hackett Medical College for Women, Canton, January 1911.” See Mary H. Fulton, *“Inasmuch”: Extracts from Letters, Journals, Papers, Etc.* (West Medford, MA: The Central Committee on the United Study of Foreign Missions, 1915), plate between pages 32 and 33.

The process of cooperative translation represents a form of “interdiscourse communication,” in which “discourses are created and interpreted when those discourses cross the boundaries of group membership.”<sup>592</sup> The group-membership barrier emerging from the procedure is not only reflected in the actual non-native language difficulty experienced by the participants, but also, and what is more important, in their very understanding of the manifest meaning of the text being translated. On the one hand, the oral translator, the Westerner who reads a Western text in Chinese to the scribal translator, stands for a discourse of Western understanding of scientific principles and application. On the other hand, the scribal translator, a Chinese native scholar who may have some knowledge of Western science but generally has been educated in locally-developed science, stands for a discourse of Chinese traditional

---

<sup>592</sup> Scollon and Scollon, *Intercultural Communication*, xiii. The notion of “interdiscourse communication” was proposed by Ronald and Suzanne Scollon as a better alternative to the term “intercultural communication.”

understanding and practice of science, or at least speaks for the reading public the majority of whom was unfamiliar with Western science. Together, they refine a translation. Their discussion and debate over possible meaning, the minimizing of the misunderstanding, and the negotiation of word selection or neologistic creation are fraught with the message exchanges between different discourse systems.

The scribal translator/pundit's importance to Mary Fulton's project is demonstrated in this photograph. But this importance can also be evaluated through information collected from rare budget sheets for proposed translations found at the Wellcome Library which houses materials concerning the Wellcome China Publication Fund (see the third section for more details of the Fund). These sheets, which were sent by the China Medical Missionary Association to its London-based sponsor for translation publishing, Sir Henry S. Wellcome, provide examples of the distribution of costs. The data in Table 3 are collected from the budget sheets for medical translations received by the Wellcome office on July 13, 1917. They suggest the high percentage of the scribal translator(s)' salary in the entire cost of the translation production. The "pundit fees" per one hundred pages for four proposed translations are \$125.26, \$170.94, \$184.62, and \$150.53 (Table 4). Pundit fees varied based upon factors such as the wage levels in different regions, the seniority of the pundits, and the difficulty of the project. "Punditry" as defined by the CMMA was a broader range of work than that of the typical scribal translator, since indexing was considered the pundit's responsibility. In most cases, pundits performed only one of the two tasks, scribal translating or indexing. Nonetheless, "transcribing and/or revising translations" comprised the essential part of the pundits' job. Some relatively large translation projects were accomplished by more than one pundit. In Table 4 we see that 33.43%, 26.31%, 30.38%, and 34.78% of the total budget for each of four proposed publications



would be spent on pundits' salaries. The medical-doctors-cum-oral-translators' work for the CMMA's publications was virtually voluntary, without any salary dispensed by the Fund. This percentage slightly fluctuates, in part because the illustration cost, the printing method, and the print run influence the cost structure and, consequently, the ratio of pundit fee to the entire budget. Nevertheless, the expenditure on pundit(s)' salary falls in the range of roughly 1/4 to 1/3 of the total cost. The production costs of some individual works may not have conformed to this ratio; for example, subsequent editions of a title usually required lower pundit fees than the first edition. But this ratio applies to most of the Wellcome Fund's end-of-year account records that cover a number of forthcoming and published translations. For example, the 1913 summary of the Wellcome Fund lists \$656.50 as the pundit fee, comprising 23.65% of the entire spending of the year \$2775.5. Out of \$5353.09 spent on the Fund's account in 1914, 30.50% (\$1632.5) was allocated to pundits' salary.<sup>593</sup>

---

<sup>593</sup> Original data are all retrieved from WA/HSW/OR/D.3, CPF-WL.

**Table 3.** Samples of the China Medical Missionary Association's Budget for Publishing Translations, 1917  
(WA/HSW/OR/D3, CPF-WL)

Title of proposed publication	<i>Materia Medica and Therapeutics</i> , Vol. 2	<i>Stengel's Pathology</i> , Vol. 1	<i>Stengel's Pathology</i> , Vol. 2	Hutchison and Rainy's <i>Clinical Methods</i>
Numbers of copies to be printed	2000	2000	1900	1600
Numbers of pages and illustrations	479 pp., no illus.	234 pp., 100 illus., 3 in color	455 pp., 175 illus., 4 in color	504 pp., 150 illus., 8 in color
<b>Fees of Chinese pundits for transcribing and/or revising translations, and indexing, etc</b>	<b>\$600</b>	<b>\$400</b>	<b>\$840</b>	<b>\$758.67</b>
Paper	\$679.60	\$1052.54	\$1741.97	\$1321.26
Illustrations, lithographing, typesetting, electrotyping and/or stereotyping, printing				
Binding and mounting	\$379.80			
Advertising and placing on the market for sale	\$93.60	\$48	\$141.20	\$67.37
Office and general expenses of the Committee	\$23.95	\$20	\$41.96	\$33.24
<b>Total Cost</b>	<b>\$1794.95</b>	<b>\$1520.54</b>	<b>\$2765.13</b>	<b>\$2181.04</b>

**Table 4.** Pundit Fee in the Cost Structure

Title of proposed publication	<i>Materia Medica and Therapeutics</i> , Vol. 2	<i>Stengel's Pathology</i> , Vol. 1	<i>Stengel's Pathology</i> , Vol. 2	Hutchison and Rainy's <i>Clinical Methods</i>
<b>Pundit fee per 100 pages</b>	\$125.26	\$170.94	\$184.62	\$150.53
<b>Pundit fee percentage of the total cost</b>	33.43%	26.31%	30.38%	34.78%

The mode of collaborative translation conducted by oral translators and scribal translators was deemed to be the most practical way of rendering highly technical knowledge into Chinese during late Qing period, considering the lack of experts who were well versed in both Western learning and Western languages. However, this mode still incurred some pungent criticism targeting the awkwardness in the relay of meaning. Ma Jianzhong 馬建忠 (1845-1900), a notable diplomat and linguist,<sup>594</sup> once bluntly remarked: “Oral translation relies upon Westerners who merely know basic Chinese. Those who listen to oral renditions of the text are only able to roughly describe what the Westerners would like to express. Of the parts that are not quite understood, those listeners mix up the original meaning with their own opinion and judgment.”<sup>595</sup> Ma’s grievances were not based upon mere fancy. Some translations of less-than-satisfactory quality by all means deserved his criticism upon the qualification of translators. However, given the limited human resources during his time, translations could never be perfect. In general, translators tried their best, and ushered this mode of collaboration through to its most remarkable, yet final peak in Chinese history of translation.

---

<sup>594</sup> Besides many other identities, Ma Jianzhong was also a linguist, who authored *Mashi Wentong* (*Ma’s Grammar*), the first serious and systematic study on the grammar of the Chinese language by a native scholar. For a biography of Ma, see Banno Masataka, *Chūgoku Kindaika to Ba Kenchū* (*Chinese Modernization and Ma Jianzhong*) (Tōkyō: Tōkyō Daigaku Shuppankai, 1985); Xue Yuqin, *Jindai Sixiang Qianqizhe de Beiju Juese: Ma Jianzhong Yanjiu* (*Tragic Role of Intellectual Pioneers in Modern China: A Research on Ma Jianzhong*) (Beijing: Zhongguo Shehui Kexue Chubanshe, 2006); Okamoto Takashi, *Ba Kenchū no Chūgoku Kindai* (*Ma Jianzhong’s Modern China*) (Kyōto-shi: Kyōto Daigaku Gakujutsu Shuppankai, 2007).

<sup>595</sup> This remark was made in Ma’s 1894 proposal to the emperor’s court concerning the urgent need for establishing training institutions for translation experts in China. See Ma Jianzhong, “Ni She Fanyi Shuyuan Yi (Proposal for Establishing Translators’ Training Schools),” in *Zhongguo Jinxiandai Chuban Shiliao* (*Historical Materials on Modern Publishing in China*), vol. 1, ed. Zhang Jinglu (Shanghai: Shanghai Shudian Chubanshe, 2003), 30.

### 5.1.3 Scribal Translators and the Language Style in Translations

During the collaborative translation process, scribal translators took almost all the responsibility for language execution. Most oral translators, who were also missionaries, were not sufficiently skilled in literary Chinese to finish a project independently. The Preparation of Missionaries Appointed to China, a report of a nine-person committee appointed by the Board of Missionary Preparation presented at its fourth annual meeting in New York in December 1914, spelled out the language requirements for the China mission. Although published in 1914 as part of the effort to professionalize missionaries' training, these guidelines synthesized missionaries' prior preparatory experiences at home and on the field. Speaking was made an absolute priority, for missionaries' evangelical work relied heavily on oral communication. No systematic study of and practice in writing literary Chinese was required. The candidates for mission service in China were not encouraged to study Chinese grammar because it was considered to have had "comparatively little to do with learning to speak a language." Thus, it is safe to speculate that when they arrived they were fairly incompetent in written Chinese. Besides intensive study of spoken Chinese under the instruction of local teachers during the first several years of their residency in China, missionaries established a familiarity with terminology and diction virtually by reading, on their own, "Chinese periodicals and occasional government documents of importance," together with some selections from the Classics, from which they memorized quotes for public use, some of the latest books issued from Chinese presses, and standard belles lettres for enriching vocabulary.<sup>596</sup> Lacking specialized training in writing, missionaries' proficiencies in colloquial and written languages were remarkably imbalanced. Even the most

---

<sup>596</sup> Harlan P. Beach, Ernest D. Burton, et al., *The Preparation of Missionaries Appointed to China* (New York: Board of Missionary Preparation, 1914), 16-7; 26-7.

accomplished missionary scholars, such as Alexander Wylie, were “incapable of writing the literary language with any degree of grace.”<sup>597</sup>

It is hard to imagine today what exact kind of oral Chinese was listened to by the scribal translator during the procedure of translation. But it is not hard to imagine how difficult the scribal translator’s job was. Even the most tolerant scribal translators would feel frustrated when swamped—albeit in their native language—by fragmented phrases, incomplete sentences, strange expressions, and unknown words flooding them. Since the oral translator would not have prepared a full-fledged rendition of each sentence but would have only familiarized himself with the main idea of the book before working together with the scribal translator, real-time translation almost counted on the oral translator’s impromptu performance. Spontaneity could only make more difficult the scribal translator’s recording, rewriting, and revision. So did the highly technical characteristic of the translated text. In this case, turning the script into an acceptable written format was shouldered by the scribal translator.

Different language styles were presented in Chinese translations published during the late nineteenth and early twentieth centuries, including classical, semi-classical (incorporating some colloquial elements, and generally easier to understand than classical Chinese), and colloquial. Christian materials were often translated into spoken languages. Regarding renditions of Western hymnals’ lyrics, there were only two types: those written in classical Chinese and those in the colloquial style.<sup>598</sup> Targeting audiences that were not highly literate is the obvious reason for translators’ preferences for colloquial prose. For example, Julia Mateer made a special note in *Sheng Shi Pu* to address this issue: “This book adopts colloquial Mandarin but not classical

---

<sup>597</sup> Paul A. Cohen, “Christian Missions and Their Impact to 1900,” in *Late Ch’ing, 1800-1911 (Part I)*, vol. 10, *The Cambridge History of China*, ed. John K. Fairbank (Cambridge: Cambridge University Press, 1978), 578-9.

<sup>598</sup> William Munn, “Hymnology in the Chinese Church,” in *The China Mission Year Book 1912*, ed. G. H. Bondfield (Shanghai: Christian Literature Society for China, 1912), 245.

Chinese. This consideration especially caters to pupils and less-educated Christian converts.”<sup>599</sup> Unlike the dichotomized treatment of language style found in translated hymnals, the vast majority of science translations avoided purely colloquial writing, since they were treated as serious scholarly works. However, a number of productive translators did not fully advocate classical literary Chinese, and emphasized readability of the text. They argued that classical Chinese should not become a barrier to a smooth transfer of scientific meaning from Western sources, to Chinese words. For instance, Hua Hengfang once stated: “Translators should not pursue the antiquity and elegance of the translated text at the expense of the original meaning.”<sup>600</sup> *Nei Ke Xue*’s translators, who pursued a high level of straightforwardness, articulation, and fidelity in presenting Western medicine in Chinese, elaborated in the book’s guide the unsuitability of adopting a literary style for medical writing: “If this book followed the style of traditional Chinese medical books, which constantly used poetic language and verse, paid too much attention to harmonious rhyme, and showed off writers’ skills, its pages would look like a hide-and-seek game, aimed at entertaining people. But entertaining is not the original purpose of exploring and discussing medicine.”<sup>601</sup> Published later, in 1912, *Luo Ka Liang Shi Wai Ke Xue* represented translators’ efforts to unify different styles of Chinese in order to “avoid on the one hand stiff ‘Wen-li’ [i.e., classical Chinese] and on the other an easy colloquialism which would not be acceptable or understood in some districts.”<sup>602</sup> However, these translators’ principles and practices in language execution did not apply to all translations of Western learning. “Poetic” science writing appeared intermittently throughout many texts, especially early ones. This might have been result of scribal translators’ former training in classical

---

<sup>599</sup> Fan li, *Sheng Shi Pu*, 11. Translated by the author.

<sup>600</sup> Hua, *Xuesuan*, juan 12, 18b.

<sup>601</sup> *Quan shu zong li* (general guide to the entire book), *Nei Ke Xue*, 1. Translated by the author.

<sup>602</sup> Cormack, preface to *Luo Ka Liang Shi*, 1.

Chinese, ingrained habits of writing, or their literary bias. When traditionally trained and highly educated literati served as scribal translators, the language style was more inclined to classical Chinese.

Scribal translators' style was even present in an oft-overlooked corner of translations: book titles. One extraordinary example is the Jiangnan Arsenal's *Bao Zang Xing Yan* 寶藏興焉 translated from William Crookes's *Practical Treatise on Metallurgy*.<sup>603</sup> The Chinese title, literally meaning "treasure rises from it [the mountain],"<sup>604</sup> originally had nothing to do with metallurgy. But this four-character phrase was taken from *Zhong Yong* 中庸 (*Doctrine of the Mean*), one of the Four Books that articulated the essence of Confucian philosophy.<sup>605</sup> It was likely an inspiration for the Chinese literati-translator, who had almost certainly mastered this Confucian canon required for traditional education. He was ingeniously aware that the book's subject matter could be illustrated in a title by an alternative and more denotative interpretation of "bao zang xing yan." Another example of a title with roots in antiquity is *Qi Xiang Xian Zhen*

---

<sup>603</sup> *Bao Zang Xing Yan* (1884) listed William Fairbairn as the original author. However, according to Wang Yangzong, William Fairbairn contributed to the English-language text only what became *juan* 6 (on iron making) in the translated version, which was published before as *Zao Tie Quan Fa* (*Complete Methods of Iron Making*, translated by John Fryer and Xu Shou) by the Arsenal in 1874. See Wang Yangzong, "Jiangnan Zhizaoju Fanyi Shumu Xinkao (A New Examination of the Translations Published by the Jiangnan Arsenal)," *Zhongguo Keji Shiliao* (*China Historical Materials of Science and Technology*) 16.2 (1995): 8. The author of the source book, William Crookes (1832-1919), was a notable British chemist and physicist. He initiated (Ernst Röhrig collaborated with him later) the translation and adaption from Bruno Kerl's German-language *Handbuch der Metallurgischen Hüttenkunde*, and published the English text in two volumes in 1868. Therefore, *Bao Zang Xing Yan* was actually a translation of a translation (with one other source included). For more biographical details of William Crookes, see William Hodson Brock, *William Crookes (1832-1919) and the Commercialization of Science* (Aldershot: Ashgate, 2008).

<sup>604</sup> James Legge's translation of the entire sentence is "The mountain now before us appears only a stone; but when contemplated in all the vastness of its size, we see how the grass and trees are produced on it, and birds and beasts dwell on it, and precious things which men treasure up are found on it."

<sup>605</sup> *Zhong Yong* was originally included in *Li Ji* (*Book of Rites*), one of the Five Classics of the Confucian canon, as its chapter 31. During the Song Dynasty, *Zhong Yong* was selected and treated as an individual writing that illustrated the foundation of Confucianism. In late imperial China, the Four Books, including *Zhong Yong*, and Five Classics officially became compulsive reading for the civil service examinations. See Kai-wing Chow, "Writing for Success: Printing, Examinations, and Intellectual Change in Late Ming China," *Late Imperial China* 17.1 (1996): 120-157; Benjamin Elman, *A Cultural History of Civil Examinations in Late Imperial China* (Berkeley: University of California Press, 2000), Appendix.

器象顯真, literally meaning “machinery and phenomenon are displayed in reality” (the original text’s English title is *The Engineer and Machinist’s Drawing Book*).<sup>606</sup> The first two characters *qi* and *xiang* came from *yi zhi qi zhe shang qi xiang* 以製器者尚其象, one of the four phrases that characterized the ways of the sage in ancient *Yi Jing* 易經 (*Book of Changes*), one of the Five Classics of Confucianism.<sup>607</sup> This phrase originally meant that the person who manufactured utensils (*zhi qi*) should value *xiang*, the forms of *yi* phenomenon or emblematic figures of hexagrams. In later period, it was abbreviated as *zhi qi shang xiang* 製器尚象, an idiom that indicated one essence of technological innovation in traditional China. Accordingly, *xiang*, which manufacturers should have followed, was shifted to apply to natural phenomena and human society.<sup>608</sup> The scribal translator utilized the interconnected concepts of *qi* and *xiang* which originated in Confucian classics, to allude to, on the one hand, the inseparable relationship between machinery manufacture and drawing, as the first sentence in *Qi Xiang Xian Zhen* points out: “Making machines starts with technical drawing.”<sup>609</sup> On the other hand, *qi* may more specifically refer to drawing tools, and *xiang* to the visual products of these tools. But no matter which interpretation applies, this kind of treatment that connected the traditional and the imported shows that there was some playfulness in title translation.

---

<sup>606</sup> V. Leblanc and Jacques-Eugène Armengaud, *Qi Xiang Xian Zhen*, trans. John Fryer and Xu Jianyin (Shanghai: Jiangnan Arsenal, 1872 and 1879).

<sup>607</sup> “The *Yi* has four ways of the sage: for those who wish to speak would appeal to the judgments, for those who favor action would appeal to changes; for those who wish to manufacture would take *xiang* (forms of the *yi* phenomenon) seriously, those who wish to do divination take the divination seriously.” See Chung-ying Cheng, “The *Yi-Jing* and *Yin-Yang* Way of Thinking,” in *Routledge History of World Philosophies: History of Chinese Philosophy*, ed. Bo Mou (New York: Routledge, 2009), 81.

<sup>608</sup> For the *zhi qi shang xiang* theory in the Chinese history of technology and its resurgence during late Qing’s Self-Strengthening Movement, see Liu Keming, *Zhongguo Jishu Sixiang Yanjiu: Gudai Jixie Sheji yu Fangfa* (*Research on Chinese Technological Thoughts: Machine Design and Its Methods Developed in Ancient China*) (Chengdu: Bashu Shushe, 2004); Wang Qian and Jin Fu, *Zhongguo Jishu Sixiangshi Lun* (*An Intellectual History of Chinese Technology*) (Beijing: Kexue Chubanshe, 2004).

<sup>609</sup> V. Leblanc and J. Armengaud, *Qi Xiang Xian Zhen*, trans. John Fryer and Xu Jianyin (Shanghai: Jiangnan Arsenal, 1872), *juan* 1, 1.



A good scribal translator was truly a blessing to any translation project. But it was particularly difficult to find one. On the first day of 1908, Philip B. Cousland did not celebrate the New Year, but kept worrying about the CMMA's translation production. One of his greatest concerns was the recruiting of competent Chinese scribal translators. In a letter he sent that day to Sir Henry S. Wellcome who sponsored the CMMA's publication committee, Cousland wrote:

I do not need to deal in detail with most of the points you refer to as we are entirely at one with you as to their importance. We are anxious that the translations should be clear and yet in good Chinese literary style. To have the work well done from the scientific side it is necessary that the translation be made by experienced Europeans or Americans, and to provide for the literary side we employ as good Chinese scholars as our limited finances allow. It is extremely hard to find just the right men. Chinese style is changing now in the direction of greater simplicity and directness. Pundits who can render scientific ideas into easy graceful Chinese are almost impossible to obtain.<sup>610</sup>

Cousland firmly believed that high-quality could never be achieved without executing the language appropriately. No matter how well-developed the "scientific ideas" were, the capacity of the pundit ultimately determined the readability of the translated ideas. Unfortunately, Cousland was oftentimes disappointed by the slim possibility of acquiring competent help in

---

<sup>610</sup> Cousland to Wellcome, January 1, 1908, WA/HSW/OR/D.1, CPF-WL.

writing Chinese. Cousland himself was a victim of poor scribal translation. Later in a letter to Sir William Osler dated July 29, 1910 concerning translation of his *Principles and Practice of Medicine*, Cousland lamented: “So far medical translation by Chinese who have studied medicine in English is not satisfactory. They are not good Chinese scholars, they translate in too slavishly a literal manner and their acquaintance with English idiom is not always sufficient.”<sup>611</sup>

Scribal translators’ tasks were arduous but sometimes thankless ones. For example, Shang Baochen 尚寶臣, a medical doctor in Shandong Province who frequently collaborated with James B. Neal in translation production,<sup>612</sup> was criticized for his writing style. Despite the strengths of Shang’s work on *Yan Ke Zheng Zhi* (1895), a reviewer for the *China Medical Missionary Journal* did not entirely commend the book due to Shang’s writing style. Moreover, Shang seemed to be singled out, although without being named:

... Dr. Neal has been unfortunate in his choice of a Chinese writer, and the book abounds with obscure phrases and unnecessary characters, such as we usually see in Chinese literary essays, written on nothing in particular, but which are altogether out of place in a book intended to convey definite information on an important subject. There can be no doubt that Dr. Neal made the subject of this treatise plain enough to his writer, for the first draft

---

<sup>611</sup> Richard L. Golden, *Osler and Oriental Medicine: A Discursive Review* (Princeton, NJ: Science Press Association 1982), 5. Original quote from P. B. Cousland to William Osler, July 29, 1910, Osler Library of the History of Medicine, McGill University, Montreal, Canada.

<sup>612</sup> Neal and Shang’s collaborative translations include *Pi Fu Zheng Zhi* (*Treatment for Skin Diseases*, translated from Jay Frank Schamberg’s *Diseases of the Skin*) and *Hua Xue Bian Zhi* (*Identifying Chemical Substances*, translated from Frank Clowes’s *A Treatise on Practical Chemistry and Qualitative Analysis*, supplemented with one chapter from George Fownes’s *Manual of Chemistry, Theoretical and Practical*).

of the book was used in instructing his own class of students before being put in to its present form, and any defect would then have been discovered; but, it is not easy to make a Chinese understand that a book—especially a medical or scientific book—should be written with the one object of instructing the reader, and not for the purpose of showing off the writer’s cleverness in the use of obsolete characters, or the “depth” of his Wen-li [classical Chinese].<sup>613</sup>

Besides being too lavish in his style of writing, Shang Baochen was also pointed out to be “very irregular” in his writing style, and even erroneous in some parts of the book.<sup>614</sup> To assess the general writing quality of *Yan Ke Zheng Zhi*, the reviewer and his colleagues conducted a survey among several students and teachers who were “accustomed to read both native and foreign medical works.” The conclusion was disappointing: all participants declared that the translation was “‘difficult to understand,’ and therefore of little use as a text book for students.” No matter how responsible Neal actually was for the project, his scribal translator became the scapegoat for its failings.

Upon reading the cruel comments, Shang Baochen may well have felt that his work was not appreciated. But scribal translators’ endeavors were, in general, highly recognized by their collaborators. As John Fryer clearly stated “...the native writers...as a rule, are able to detect

---

<sup>613</sup> A. D., “眼科證治, A new book on Diseases of the Eye,” review of *Yan Ke Zheng Zhi*, translated by J. B. Neal, *CMMJ* 10 (1896), 80-1, qt. on 81.

<sup>614</sup> The reviewer cited an example of Shang’s mistake regarding measurement units: “on page 67, the student is warned not to remove too much skin from the eyelid, lest it be rendered too short to cover the ball; ‘a piece one inch long and half an inch wide will suffice!’” Ibid., 81.

errors of any importance themselves,” and they, “it must be acknowledged, take great pains to make the style as clear and the information as accurate as possible.”<sup>615</sup> Scribal translators were the lynchpin of the translation network.

## **5.2 THE ESTABLISHMENT OF NETWORKS**

As discussed above, translation was not done in solitude during the late nineteenth and early twentieth centuries. It was, at least, a two-person show, that often featured the printers and illustrators within the publishing house who worked with the translators. Pairs of translators might have formed out of their institutional connections, mutual scholarly interests, shared geographical bases, circle of personal references. Networks did not only exist within the translation partnership. Translators and printer-publishers also widened their networks to include outside donors, funding institutions, and project associates. Numerous nexuses in these larger-scale networks provided immediate financial support to complete the intellectual and material production of translations. But beyond providing practical assistance, they exerted a cultural influence upon the translation enterprise.

### **5.2.1 Henry S. Wellcome China Publication Fund: A Case of International Sponsorship**

During the late Qing period, translation projects attracted patronage in various forms, the majority of which were domestic investments from political and literary elites.<sup>616</sup> Although

---

<sup>615</sup> Fryer, *Account of the Department*, 12.

<sup>616</sup> Wong, “Quanli yu Fanyi.” Some of these domestic “sponsors” only offered non-monetary support.

organizational and individual purchases of translations (common ways of providing post-publishing support) involved some foreign elements (e.g., Western customers who lived and ran business in China), formal international sponsorships were few and far between.<sup>617</sup> As one of the most significant producers of medical translations, the Publication Committee of the China Medical Missionary Association (CMMA) sought more powerful funding agents to maintain its philanthropic-oriented enterprise and to supplement subsidies for its publishing schedules from not-for-profit sales and small donations.<sup>618</sup> To this end the CMMA successfully networked with Henry S. Wellcome (1853-1936),<sup>619</sup> a celebrated American-British pharmaceutical entrepreneur based in London, and established a long-term patronage relation with him through the Wellcome China Publication Fund. For nearly three decades beginning in 1908, Wellcome remained the major foreign sponsor of the CMMA, and influenced the production of Chinese medical translations on his own terms.

Philip B. Cousland, who appeared primarily as a medical translator in previous chapters, “met” Henry S. Wellcome through a fundraising campaign launched in 1907. Soon after it, Cousland would be surprised by a remarkable public-relations opportunity during his service to the Publication Committee of the CMMA. The Committee was established in 1905 for the purpose of translating a series of Western medical textbooks and issuing a medical journal in the

---

<sup>617</sup> There were only a few cases of formal international sponsorships in religious translation. See John T. P. Lai, “Institutional Patronage: The Religious Tract Society and the Translation of Christian Tracts in Nineteenth Century China,” *The Translator* 13.1 (2007): 39-61.

<sup>618</sup> The Publication Committee’s financial reports were periodically published in *CMMJ-CMJ*. Some pamphlet versions of these reports are kept at the Wellcome Library.

<sup>619</sup> For Wellcome’s life, especially his medical philanthropy and humanism, see Helen Turner, *Henry Wellcome: The Man, His Collection and His Legacy* (London: The Wellcome Trust and Heinemann, 1980); Robert Rhodes James, *Henry Wellcome* (London: Hodder and Stoughton, 1994); Frances Larson, *An Infinity of Things: How Sir Henry Wellcome Collected the World* (Oxford: Oxford University Press, 2009). Nigel Allan narrates a brief history of Wellcome’s China Publication Fund. See Allan, introduction to *Catalogue of Chinese Books and Manuscripts in the Library of the Wellcome Institute for the History of Medicine*, by Hartmut Walravens (London: The Wellcome Trust, 1994), vii-viii.

Chinese language (the official journal of the CMMA was in English).<sup>620</sup> Cousland was soon after invited to join the Committee as its permanent Editorial Secretary. After negotiation with the CMMA, he agreed to relocate from the Chaozhou and Swatow (Shantou) area in southern China to Shanghai for this new appointment, which started in 1907 with salary provided by the Presbyterian Church of England.<sup>621</sup> During the early years of the Committee, finance seemed to be a pressing issue. Through a vigorous fundraising effort, a total amount between \$2,000 and \$3,000 was collected from members of the CMMA and their friends between 1905 and 1907. Although it had been sufficient for the Publication Committee at its infancy, this sum would be “quite inadequate for the larger work of the future.” In early 1907, the Committee issued a solicitation for funds in both English and Chinese. These funds would help them obtain the initial capital to get off to a good start and, in the future, become a self-supporting medical translation and publishing enterprise.<sup>622</sup> Cousland drafted the English language version of this appeal, dated April 18, in which he estimated that the Committee would need \$5,000.<sup>623</sup>

Several months later, on September 2, 1907, Cousland personally petitioned Henry S. Wellcome in London. Just how many other possible donors Cousland contacted remains unknown. But he should have had high hopes for getting something positive back from, at least, Wellcome, for Cousland’s letter explained in great detail the Committee’s situation and plan. Cousland made it clear what he expected from Wellcome: “A staff of experienced doctors both

---

<sup>620</sup> For the purposes of establishing the Publication Committee, see the “Publication Committee, Editorial Secretary’s Report” (addressed at the triennial conference of the CMMA), *CMMJ* 1910 (2): 152.

<sup>621</sup> “A Chinese Editor for the Association,” *CMMJ* 1907 (May), 133. For a long time, Cousland only knew southern dialects due to his base of activities. When translating William Osler’s *Principles and Practice of Medicine*, he had to rely on a student helper to transfer his dialectal oral translation into Mandarin. In 1907, Cousland also served as the chair of the Terminology Committee of the CMMA. On his salary, see “Publication Committee, Editorial Secretary’s Report,” 153. See also “Report of the Terminology and Publication Committees of the China Medical Missionary Association for 1907,” WA/HSW/OR/D.3, CPF-WL.

<sup>622</sup> “Report of the Publication Committee of the Medical Missionary Association of China,” *CMMJ* 1907 (May): 147.

<sup>623</sup> Cousland, “Medical Publications in Chinese,” *CMMJ* 1907 (May): 150.

men and women has been gathered who willingly give what time they can snatch from their onerous hospital and other duties to the translation of suitable books. What is needed are the funds to pay their Chinese pundits and the expenses of printing and publishing.” He even attached a preliminary budget for each book under consideration for translating. At the end of this appeal, he skillfully related the endeavor the CMMA made to promote Western-style medical education in China and expand hospital services to a prospective pharmaceutical market with a consequently increasing demand that would greatly interest Wellcome as a pharmaceutical merchant.<sup>624</sup> Cousland’s outreach effort indeed bore fruit. On November 8, 1907, Wellcome sealed his response and put it in the mail.

Wellcome’s first letter was an enthusiastic and practical one, not only agreeing to provide “substantial financial assistance,” but also offering his own opinion regarding the publishing of Chinese translations, such as general quality, term rendering, language choice, and text selection. This positive response set the tone for Wellcome’s continuing sponsorship of the CMMA. In fact, Wellcome had long been familiar with the names of the CMMA’s officers and their “admirable work.”<sup>625</sup> He was, however, not simply a sympathizer who lent emotional support, but “an informed and realistic benefactor.”<sup>626</sup> He expected that with his financial backing, the CMMA would be able to make more of a difference in promoting “the knowledge of modern scientific medicine and surgery” among the Chinese people and in “awakening the minds of the people to the material advantages of Western ideas.”<sup>627</sup> Likewise, Cousland knew well Wellcome’s reputation outside of business, as a philanthropist, patron of scientific activities, and collector of medical artifacts. He especially noted that Wellcome kindly supported medical

---

<sup>624</sup> Cousland to Wellcome, September 2, 1907, WA/HSW/OR/D.4, CPF-WL.

<sup>625</sup> Wellcome to Cousland, November 8, 1907, WA/HSW/OR/D.4, CPF-WL.

<sup>626</sup> Allan, introduction to *Catalogue*, vi.

<sup>627</sup> Wellcome to Cousland, November 8, 1907, WA/HSW/OR/D.4, CPF-WL.

missionaries and did philanthropic work outside the West (e.g., in Egyptian Soudan).<sup>628</sup> An anxious man who cared about the CMMA's future had knocked at the door of a wealthy man who was prepared to offer help to the enterprise run by a society he admired. In this situation, the affirmative answer was almost guaranteed.

Wellcome acted quickly to fulfill his promise by sending his first donation of £500 (as shown in a receipt in the CMMA's account, £500 was converted to a sum of \$5714.90)<sup>629</sup> to the CMMA early in 1908. As an outcome of negotiation between Shanghai and London for approximately two years, Wellcome's sponsorship was finally formalized in 1910 as "The Henry S. Wellcome China Publication Fund" (also called the "Trust Fund") with a total initial sum of £1000. The "deed and regulations for the administration" which was officially approved and signed on November 11, 1910, defined the purpose, usage, and management of the Wellcome Fund. It was a special revolving fund for publishing and re-publishing Chinese translations of approved "books, treatises, pamphlets, charts, anatomical atlases, prints, and/or other publications on medical, surgical, bacteriological, chemical, pharmaceutical, nursing, and allied subjects."<sup>630</sup> The net profit from sale, at the price that would secure a moderate margin of net profit (20% or 25%, suggested by Wellcome), of the first set of approved books would be continuously added to the Fund and utilized for reprinting those titles, publishing succeeding editions of those titles, as well as issuing first editions of new translations.<sup>631</sup> Since the Wellcome Fund was intended to be, in general, under the control of the CMMA, a board of

---

<sup>628</sup> Cousland to Wellcome, September 2, 1907, WA/HSW/OR/D.4, CPF-WL.

<sup>629</sup> See "Henry S. Wellcome Fund" section in "Report of the Terminology and Publication Committees of the China Medical Missionary Association for 1908," WA/HSW/OR/D.1, CPF-WL. The receipt signed by Cousland and dated October 10, 1908 is located in folder WA/HSW/OR/D.2, CPF-WL.

<sup>630</sup> "Deed and Regulations for the Administration," WA/HSW/OR/D.4, CPF-WL.

<sup>631</sup> "Report of the Terminology and Publication Committees of the China Medical Missionary Association for 1908," WA/HSW/OR/D.1, CPF-WL. See also the "Deed and Regulations." The Deed cited verbatim the language used in Wellcome's letter to Cousland, August 28, 1908, WA/HSW/OR/D.1, CPF-WL.



trustees and an executive committee consisting only of the CMMA's members were set up for the Fund's management. By the time the deed was signed, Cousland had become the CMMA's President, while concurrently holding posts as the Editorial Secretary and Treasurer of the Publication Committee.<sup>632</sup> He, together with his CMMA colleagues Oliver T. Logan, then Vice President, and Cecil J. Davenport, then Secretary and Treasurer, formed the first board of trustees of the Fund. Three other colleagues, Henry Boone, George Stuart, and Arthur Cole, made up the first executive committee. Although it was not until late 1910 that Wellcome and the CMMA had finished negotiating the Fund, the CMMA's publishing activities had been assisted by Wellcome in prior years. In 1908 through several sets of correspondence between Wellcome and Cousland, a proposal of five publications was preliminarily approved, four of which were original Western texts to be translated, including Hobart Amory Hare's *A Text-book of Practical Therapeutics*, William Hale-White's *Materia Medica, Pharmacy, Pharmacology and Therapeutics*, Robert Hutchinson and Harry Rainy's *Clinical Methods*, and William Rose and Albert Carless's *Manual of Surgery*.<sup>633</sup> Hare's *Therapeutics*, a "face" made familiar to us in previous chapters, took the lead in these schedules and was issued in 1908, becoming the first medical translation that was published under the Wellcome Fund.

Henry Wellcome's £1000 Trust Fund, although seemingly small for a publishing agent in terms the British pound's purchasing power today, was an astronomical amount which gave the

---

<sup>632</sup> Before becoming the President, Cousland had been appointed as the Secretary and Treasurer of the CMMA. It was always the situation that these three posts formed the board of trustees.

<sup>633</sup> "Report of the Terminology and Publication Committees of the China Medical Missionary Association for 1908," WA/HSW/OR/D.1, CPF-WL. Another approved publication was *An English-Chinese Lexicon of Medical Terms* compiled for the Terminology Committee by Philip Cousland who at that time was also the chair of the Terminology Committee of the CMMA. It was issued by the Publication Committee in June 1908. Although not translated directly from any single original English-language text, this lexicon drew upon previous medical translations and tremendously contributed to the standardization of medical terminology in China. Thus Sir Wellcome approved it as a title under his Fund. In the 1908 report, the publishing of the Lexicon was considered one of the most significant events in 1908 that made the year "mark[ed] in the history of the introduction of medical science into China."

Publication Committee the “utmost confidence” in carrying on their work.<sup>634</sup> The amount of the Fund tremendously exceeded any previous contribution. For example, between January 1909 and June 1910, the second most generous single donation made (£200 from the China Emergency Committee, equivalent to \$2242.9) was only one fifth the amount of Wellcome’s. Most gifts given during this time period were small—£10 or £20.<sup>635</sup> From 1906 to 1909, each major local mission board was asked to offer £20 annually.<sup>636</sup> In 1906, among all subscriptions to the funds of the Publication Committee, the largest amount was £25, from the Edinburgh Medical Missionary Society and Dr. A. H. F. Barbour respectively. Others ranged from £1 to £5.<sup>637</sup> Back to 1905, the birth year of the Committee, a gift of £13.5.11 (\$135.62) from Valeria Penrose headed the donation list.<sup>638</sup> Wellcome’s contribution not only turned out to be financial relief for the fledgling Publication Committee, but held the record for being the largest donation received by the Committee in the 1910s and 1920s.

The mode of management of the Wellcome Fund drastically changed around the late 1910s. At the beginning of the sponsorship, the CMMA had to keep a separate account for the Fund and frequently report to London in order to fulfill the agreement with Wellcome. By April 1 of every year, the CMMA should have had prepared a “full and complete statement” and sent it to Wellcome’s office, which recorded all the money received and expended in connection with the Fund, all money investments and other properties belonging to the Fund, titles of publications issued during the year, number of copies sold of each publication, and number of copies in

---

<sup>634</sup> Robert Beebe to J. Collett Smith (Wellcome’s representative), May 7, 1918, WA/HSW/OR/D.4, CPF-WL.

<sup>635</sup> “Financial Statement of the Publication Committee of the China Medical Missionary Association in Account with the Presbyterian Press and Dr. Cousland, from January, 1909, to June, 1910,” *CMJ* 24.4 (1910): 284.

<sup>636</sup> “Publication Committee, Editorial Secretary’s Report,” *CMJ* 24.2 (1910): 151.

<sup>637</sup> “Subscription to the Funds of the Publication Committee of the C. M. M. A., 1906,” *CMJ* 21.3 (1907): 135.

<sup>638</sup> “Publication Fund,” *CMMJ* 19.6 (1905): 256.

stock.<sup>639</sup> For nearly ten years beginning in 1908, the trustees and executive committee of the Fund worked together with the Publication Committee to keep the Fund running smoothly. However in mid-1917, a negotiation concerning the future of Wellcome's sponsorship was initiated by the CMMA. On June 12, 1917, Robert Beebe, then Treasurer of the Publication Committee and Acting Secretary and Treasurer of the CMMA, wrote to Wellcome and explained the difficulties they were facing. The board of trustees was filled by whoever served as the CMMA's President, Vice President, and Secretary and Treasurer, posts which were "liable to change every two years." Besides serving short-term positions, these officers were also doctors tied up by exacting schedules and oftentimes spread over vast distances. They, as well, probably had little experience in managing a trust. These factors made it difficult for those doctor-officers to perform their important but onerous duties as trustees. Moreover, the Wellcome Fund only paid for three kinds of expenditures—Chinese pundits, book making (including paper, illustrations, lithographing, typesetting, electrotyping and/or stereotyping, printing, binding, and mounting), and advertising<sup>640</sup>—but did not cover foreign translators' salaries and costs that maintained the basic management of the Fund: "[It paid] nothing for travelling expenses of the Publication Committee which is obliged to come together occasionally from widely separated places. There is no provision to cover any necessary expense the trustees may incur in looking after the interests of the Fund. There is no provision for expense of audit, account books or clerical work, except an allowance of 5% on the net profits from the sale of publications." Beebe's correspondence was on behalf of the Publication Committee and authorized by the CMMA after discussing all the above-mentioned problems at its biennial meeting. After Beebe expressed in his letter deep gratitude for Wellcome's generosity, he presented two potential

---

<sup>639</sup> "Deed and Regulations."

<sup>640</sup> Ibid.

solutions to the problems he mentioned, as proposed by the CMMA: either modifying the Trust or discontinuing the Trust's work with the request that Wellcome "turn over its publications to the Publication Committee on as favorable terms as possible."<sup>641</sup> This letter seemed to have been intended to sound out Wellcome's thoughts. In his response, Wellcome showed sympathy and consideration. He preferred the former solution, a not-too-radical choice that allowed him to compromise. Wellcome's constructive attitude was, again, welcomed. But his preferences did not match the inclinations of the CMMA.

On October 3, 1917, Beebe delivered to Wellcome the CMMA's advice on the trust based upon thorough discussion at the previous meeting of the Publication Committee. The "most desirable arrangement," the CMMA suggested, would be that Wellcome "turn the funds of the Trust over to the Publication Committee as a gift," so that the responsibilities shouldered by the trust and "the extra amount of work involved in keeping separate accounts and transferring expenses and profits to and from the accounts of the Trust" would be discontinued. The Trust Fund, consequently, would become part of the Publication Committee's general-fund account. However, the Fund would remain a permanent feature of the CMMA's publishing enterprise, and all the translations financed by Wellcome would still credit the Fund on their title pages (see below for details).<sup>642</sup> In this round of negotiation, the CMMA showed that it wanted to extricate itself from a great managerial burden. After further correspondence and discussion, Wellcome eventually agreed to the CMMA's plan for transferring the Fund. The 1910 Deed and Regulations for the Administration became void when the October 22, 1921 Deed of Revocation went into effect. From then on, the connection between the CMMA and Wellcome became loose, although some general communication (e.g., reporting important issues, sending copies of

---

<sup>641</sup> Beebe to Wellcome, June 12, 1917, WA/HSW/OR/D.4, CPF-WL.

<sup>642</sup> Beebe to J. Collett Smith, October 3, 1917, WA/HSW/OR/D.4, CPF-WL.

publications) was maintained and Wellcome's name kept appearing on the translations being financially supported.<sup>643</sup>

Sir Henry Wellcome passed away in 1936, at which time the already disaster-ridden China was enveloped in the shadow of the imminent Sino-Japanese war. The publishing activities of the Publication Committee (a subordinate unit of the Chinese Medical Association)<sup>644</sup> were vitally impacted during the war period from 1937 to 1945. So was the maintenance of Wellcome's patronage. Laurence M. Ingle's translation of Alexander Miles and David Wilkie's *Operative Surgery*,<sup>645</sup> in press in 1936 and published in May 1937, was the last book sent to Wellcome's office that contained the Fund's designation. Virtually no other traces can be found. After nearly thirty years the Wellcome China Publication Fund was meeting an untimely end.

An appreciated and approachable patron, Henry Wellcome respected the CMMA's autonomy in their translation and publishing affairs. But at the same time he made his financial assistance conditional by "reserving sufficient voice," especially at the early stage of the sponsorship. Wellcome's "voice" was multifold, primarily concerning text selection, religious content screening, material quality control, and dialect and language style.

---

<sup>643</sup> After 1921, the number of letters between the CMMA and Wellcome dropped considerably.

<sup>644</sup> The CMMA was formed in 1886. In 1925 it became the Missionary Division of the China Medical Association. In 1932, the China Medical Association and the National Medical Association of China unified to form the Chinese Medical Association. Noted that the CMMA is not the Medical Missionary Society (instituted in 1836 and organized in 1838), which was active primarily in South China and whose work was continued by the Canton Medical Missionary Society. See William Warder Cadbury and Mary Hoxie Jones, *At the Point of a Lancet: One Hundred Years of the Canton Hospital, 1835-1935* (Shanghai: Kelly & Walsh, 1935), appendix D; "Medical Missionary Society," Ricci Roundtable, accessed January 25, 2011, <http://ricci.rt.usfca.edu/institution/view.aspx?institutionID=375>. For a general account of different medical associations in China during the late nineteenth and early twentieth centuries, see Xu, *American Doctors in Canton*, 35-8.

<sup>645</sup> Alexander Miles and David Wilkie, *Mai Wei Er Shi Wai Ke Shou Shu Xue* (Miles and Wilkie's *Operative Surgery*), trans. Laurence M. Ingle (Shanghai: Translation Department of the Chinese Medical Association, 1937). This is the last book published by the Fund listed in the catalogue sheet found in WA/HSW/OR/D.5, CPF-WL.

Wellcome considered the quality of the original text to be of “the first importance” in medical and other scientific translation. He believed that the texts to be selected for translation should be essential to developing Western medicine in China, “thoroughly reliable,” updated with “the latest proved advances in knowledge,” and featuring concise and simple presentation.<sup>646</sup> In Chapter Two, we briefly learned that the educational background and professional qualifications of the CMMA’s translators facilitated the selection of medical texts most suitable for translation. The fact is that Wellcome never raised any objection to the CMMA’s choices. However, it was a provision set by Wellcome that he should have had approved those Western works personally or “by reference to an agreed authority” before the works began to be translated. Moreover, “some competent authorities” should be hired to condense excessively lengthy parts in Western books.<sup>647</sup> Philip Cousland might have had misunderstood this condition, and thought that Wellcome’s final approval was on the manuscripts of translations rather than the originals. He thus explained to Wellcome the difficulties in finding a qualified judge on Chinese-language medical translations, either among English Sinologists who usually did not share vocabulary with medical doctors and “appreciate the rigidity of the scientific mould,” or among Chinese native scholars who “would throw down most of our books in despair being completely puzzled by the nomenclature.” In order to avoid the situation in which Wellcome, after reading his comments, would be under the impression that the CMMA did not allow any criticisms of their translations, Cousland suggested that one or two medical professionals who were not involved in translating a certain text, or some nonmedical experts who were experienced in science translation, could be invited to review the

---

<sup>646</sup> Wellcome to Cousland, November 8, 1907, WA/HSW/OR/D.1, CPF-WL.

<sup>647</sup> Ibid.

manuscript.<sup>648</sup> Cousland's worry finally turned out to be unfounded. On August 28, 1908, Wellcome confirmed that he did not intend to have Chinese manuscripts submitted to him for approval, despite his determination to chime in "some voice in the approval of works proposed to be translated."<sup>649</sup>

Henry Wellcome did not allow any evangelical content to appear in the medical translations he sponsored. As early as in his first letter dated November 1907 in response to Philip Cousland's fundraising appeal, Wellcome pointed out that the translated works "should be free from any religious matter which could reasonably be objected to by people of any creed or religious denomination."<sup>650</sup> This rule was reiterated in the official Deed of the Trust. It looked like a simple formality. But it was a demanding requirement set for the CMMA. First and foremost, a group of missionaries were asked to avoid mentioning "God" in their writings. Although medical missionaries were involved in secular work, their medical profession was intertwined with Christian belief. Western medicine's journey to China during the nineteenth century had been led by and largely integrated with Christianity.<sup>651</sup> The goal of their medical mission was twofold: healing ("to cure the sick") and teaching ("to preach the Reign of God").<sup>652</sup> Usually patients, besides being physically treated for suffering and diseases, were also offered various opportunities to understand Christianity, such as morning and evening worship, preaching, and supplies of tracts and bibles.<sup>653</sup> This duality of hospital work can be best

---

<sup>648</sup> Cousland to Wellcome, January 1, 1908, WA/HSW/OR/D.1, CPF-WL.

<sup>649</sup> Wellcome to the CMMA, August 28, 1908, WA/HSW/OR/D.1, CPF-WL.

<sup>650</sup> Wellcome to Cousland, November 8, 1907, WA/HSW/OR/D.1, CPF-WL.

<sup>651</sup> Paul Ulrich Unschuld, *Medicine in China: A History of Ideas* (Berkeley: University of California Press, 1985), 149.

<sup>652</sup> Donald MacAlister, preface to *China and Modern Medicine*, by Harold Balme (London: The Livingstone Bookshop, 1921), 7. From 1921 to 1927, Harold Balme was the President (formerly Dean of the School of Medicine) of Shantung (Shandong) Christian University at Jinan, China.

<sup>653</sup> For example, see *Report of the Medical Missionary Hospital at Swatow, Under the Care of William Gauld, M.D* (printed at Hong Kong, 1866), 9.

summarized by the consensus statement raised at the China Centenary Missionary Conference held at Shanghai in 1907—“Medical missions [are recognized by the Conference] as not merely an adjunct to, but as an integral and co-ordinate part of, the missionary work of the Christian Church.”<sup>654</sup> Similarly, in their written works printed for Chinese readers regarding Western medicine, a large number of medical missionaries availed themselves of every opportunity to evangelize. For example, Benjamin Hobson’s famous five-title series of medical translations and compilations contained many parts that were saturated with religious disposition. *Hu Bing Yao Shu* 護病要術 (*Essential Techniques of Nursing*, English title: *Manual of Nursing*), a handbook prepared by the members of the Central China Branch of the CMMA, began with an introduction which emphasized that the profession of nursing emerged along with “the development of Christian civilization” and the qualifications of a nurse should accord with Christian morality.<sup>655</sup> Even though in some cases the main text of translations was exempted from religious expression, their paratexts were not. For instance, John G. Kerr, who later served as the first president of the CMMA (founded in 1886), mentioned the word “Creator” many times in his Chinese-language preface, dated mid-autumn 1870, to *Hua Xue Chu Jie*, in order to attribute to the power of God, the enthrallment of learning chemistry. Xu Songcheng 許頌澂, a Chinese literati-official and Christian sympathizer, praised in his preface to *Chan Ke Xue* “the spirit of God” that guided medical doctors’ disaster relief work in southern China.<sup>656</sup> While it is not documented how the members of the CMMA reacted to Wellcome’s “religion-free” challenge, Cousland, on behalf of

---

<sup>654</sup> “Medical Work Resolutions,” in *China Centenary Missionary Conference Records: Held at Shanghai, April 25 to May 8, 1907*, ed. Centenary Conference Committee (Shanghai: Methodist Publishing House, 1907), 625. See also Balme, *China and Modern Medicine*, 33. The conference commemorated the one hundred anniversary of Protestant missionaries’ work in China pioneered by Robert Morrison in 1807.

<sup>655</sup> George A. Stuart, “Manual of Nursing 護病要術,” in *Shen Bao* 申報, compiled by the Central China Branch of the China Medical Missionary Association, *CMMJ* 20.2 (March 1906), 86. The first edition of *Hu Bing Yao Shu* was published in 1905, and the second was in 1909.

<sup>656</sup> Xu Songcheng, preface to *Chan Ke Xue*, 2. Translated by the author.



the CMMA, finally promised to Wellcome: “We do not plan to have any religious teaching in these books. They are to be purely scientific.”<sup>657</sup> This decision probably involved a significant compromise.

Like everyone else of his kind, Wellcome wanted to be a proud sponsor. He wished his funded translations to be not only purchased by mission societies, but widely disseminated on the open market, and adopted by Chinese government schools. Therefore from the very beginning, he held high expectations for the quality of his future products: “My experience has led me to form a decided opinion that translations into oriental languages should be of a very high standard.”<sup>658</sup> Besides conventional control over the general level of translated content, Wellcome’s concern for quality extended to the material properties of publications. This made him stand out from most patrons of literary translation who kept a watchful eye usually on the ideology of literature rather than other aspects.<sup>659</sup> We briefly saw in Chapter One that Wellcome’s office acted as a discriminating agent in selecting appropriate paper for printing, and facilitated the international transportation of printing supplies. This intervention exerted direct influence on the bibliographical format of the end products, which differed from that of traditional Chinese books. More importantly, it represented Wellcome’s enthusiasm in helping the CMMA to envisage producing imprints that ideally combined “lowest practicable cost” with “good material and workmanship.”<sup>660</sup> Great effort was made to achieve this level of perfection. The paper selection process for the 1911 translation of William Rose and Albert Carless’s *Manual of Surgery* is exemplary. In 1907, the CMMA decided to translate *Surgery* and

---

<sup>657</sup> Cousland to Wellcome, January 1, 1908, WA/HSW/OR/D.1, CPF-WL.

<sup>658</sup> Wellcome to Cousland, November 8, 1907, WA/HSW/OR/D.1, CPF-WL.

<sup>659</sup> Lefevere, *Translation, Rewriting and the Manipulation*, 15.

<sup>660</sup> Wellcome to Cousland, November 8, 1907, WA/HSW/OR/D.1, CPF-WL.

approached Baillière, Tindall and Cox in London, the publisher of the original book,<sup>661</sup> for copyright and publishing help. But different opinions emerged. The publisher insisted that they provide paper to the CMMA so that the illustrations could print well. However, the CMMA considered it “an impossible condition” because the publisher’s paper was prohibitively expensive. In this case the printing cost would soar, and the CMMA would be “handicapped in all future editions” of this translation.<sup>662</sup> After hearing of this situation, Wellcome’s office arranged a special session for the head printer of the CMMA, who was on furlough in England in 1908, to scrutinize four different kinds of paper.<sup>663</sup> Cecil J. Davenport (1863-1926), then Vice President of the CMMA and an active member of the Publication Committee, was also on furlough at that time and participated in deciding on the appropriate paper. He met with Wellcome’s staff on December 10, 1908, to make suggestions on book pricing and to present evaluations on each paper sample on behalf of the head printer. After careful comparison, the head printer believed that “Dickinson’s Reliable” paper excelled the other three due to its combined characteristics of proper “bulk” (thickness and weight), opacity, color, price, and capacity for printing both half-tone and Chinese characters. A Mr. Brooks, possibly a paper expert invited to offer professional observation, also preferred this paper. Wellcome’s office thus endorsed the CMMA’s recommendation and started to plan the shipment to Shanghai.<sup>664</sup> In addition to the paper quality, Wellcome also paid attention to standardizing the Fund’s credit line on the title page of sponsored translations. On September 15, 1909, Mr. E. F. Linstead at Wellcome’s office was notified to have the words now displayed in Figure 54 set in type, in a

---

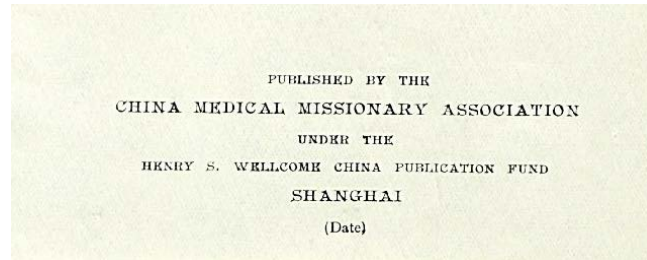
<sup>661</sup> Its publisher in the United States was William Wood and Company at New York.

<sup>662</sup> Cousland to Wellcome, January 1, 1908, WA/HSW/OR/D.1, CPF-WL.

<sup>663</sup> Wellcome to Cousland, November 6, 1908, WA/HSW/OR/D.1, CPF-WL.

<sup>664</sup> Interoffice mail from L. [Mr. Linstead?] to Mr. (George E.) Pearson, summarizing the points mentioned in Linstead’s interview with Dr. Davenport, December 8, 1908, WA/HSW/OR/D.3, CPF-WL.

font similar to the one employed in the books already published under the Fund. The job was to be due in six days. Afterwards the sample was examined by Wellcome's staff and mailed to the CMMA to reproduce.<sup>665</sup> In 1934, Wellcome asked the CMMA to add the word "Sir" in the front of the fourth line in order to reflect his knighthood, bestowed in 1932.<sup>666</sup>



**Figure 54.** Type set by Wellcome's staff, sample copy (WA/HSW/OR/D.2, China Publications Fund, Wellcome Library, London)

Last but not least, Wellcome concerned himself with the language adopted in medical translations. Wellcome wanted the CMMA to adopt "the universal Kwan Hua (Mandarin)."<sup>667</sup> Because of his limited knowledge of Chinese, he was probably confused by the word "Kwan Hua" which means "Mandarin," a reference primarily to the spoken language, although it had been utilized in vernacular literature.<sup>668</sup> More experienced with the Chinese language landscape and the translation enterprise, Cousland pointed out that Mandarin was not very commonly used in the south so that the people there would not easily comprehend the text that employed it in

<sup>665</sup> "S. M." to Linstead, September 15, 1909, WA/HSW/OR/D.2, CPF-WL.

<sup>666</sup> Allan, introduction to *Catalogue*, viii.

<sup>667</sup> Wellcome to Cousland, November 8, 1907, WA/HSW/OR/D.1, CPF-WL.

<sup>668</sup> Vernacular literature was developed during the Yuan-Ming-Qing period. Its language was called *bai hua* ("written vernacular Chinese"). For a history of vernacular literature in China, see Hu Shi, *Baihua Wenxueshi: Shangjuan (History of Vernacular Literature: Volume One)* (Taipei: Hushi Jinianguan, 1969); W. L. Idema, *Chinese Vernacular Fiction: The Formative Period* (Leiden: Brill, 1974); Liangyan Ge, *Out of the Margins: The Rise of Chinese Vernacular Fiction* (Honolulu: University of Hawaii Press, 2001); Yuan Jin, "The Origin of the Westernized Vernacular Chinese *Baihuawen*: A Re-evaluation of the Influence of Western Missionaries on Chinese Literature," trans. Wang Keyou, *Frontiers of Literary Studies in China* 3.2 (2009): 247-69.

prose. Moreover, Cousland assumed that Wellcome preferred a style for translation that was more accessible; and of course, the spoken language was less formal and easier to understand than the written literary style of classical Chinese. Cousland specified that the CMMA intended to conform to classical Chinese while making the language style as simple as possible.<sup>669</sup> After hearing from Cousland, Wellcome widely consulted his Chinese-language-savvy relatives and friends about this issue, including Sir Walter Caine Hillier (1849-1927), a renowned British diplomat, Sinologist, author or coauthor of Chinese linguistics, and lexicographer.<sup>670</sup> Mandarin was recommended by these professionals as a better choice than classical Chinese for advertising printed matter. But for the text of translated works, they agreed that classical Chinese was, without a doubt, the right choice for educated medical students.<sup>671</sup>

### 5.2.2 Acquiring Domestic Aid for Printing and Publishing Translations

It was always a disappointing situation when translators found that their project's future would be jeopardized by financial need. As we have seen above, the CMMA launched a fundraising campaign, to support their monograph translating. Besides exhausting local connections, they also reached potential sponsors in members' home countries. But Zou Daijun, a Chinese native in charge of publishing an extensive series of more than six hundred translated maps, had few international connections to call upon for funding. Instead, he came up with a no less creative idea: issuing stock.

---

<sup>669</sup> Cousland to Wellcome, January 1, 1908, WA/HSW/OR/D.1, CPF-WL.

<sup>670</sup> Walter Hillier's most important works included *A Progressive Course Designed to Assist the Student of Colloquial Chinese as Spoken in the Capital and the Metropolitan Department* (1886) with Thomas Francis Wade (Chinese title: *Yu Yan Zi Er Ji*), *The Chinese Language and How to Learn It: A Manual for Beginners* (1907), and *An English-Chinese Dictionary of Peking Colloquial* (1910).

<sup>671</sup> Interoffice mail from L. [Mr. Linstead] to Mr. Pearson, January 31, 1908, WA/HSW/OR/D.3, CPF-WL.

When the Society for Translating and Printing Western Maps was founded in 1895, Zou Daijun expected that his project would eventually create 90,000 square *cun* (approximately 154,500 square inches) of map. In order to guarantee the highest possible quality, every craftsman would paint at most 60 square *cun* every day. If the entire work load was distributed to ten craftsmen, of which number the Society was capable of hiring, this project would have lasted for no fewer than five years, including a large amount of time spent on meticulous proofreading and print making. Zou calculated the expenditure of the project and concluded that workers' salary and special printing paper imported from the West would cost the most. Together with various fees related to translation, printing, decoration, proofreading, drawing tools, and rent for facilities, this project would be "extremely expensive, and could not be done by only one person" and at a time.<sup>672</sup> Thus it had to be split to three stages. Facing this grim situation, Zou had no choice but to act quickly and seek financial sources for the Society. He turned to the share, a small item that brought a great deal of hope to a large translation program.

Issuing stock was indeed still a novel idea in publishing enterprises during the late nineteenth century in China.<sup>673</sup> Although Zou called it "stock," it was in fact different from what

---

<sup>672</sup> Zou Daijun, "Yi Yin Xiwen Ditu Zhaogu Zhangcheng (Share Issuing Prospectus for Translating and Printing Western Maps)," *Shiwu Bao*, 22 August 1896 (14 July 1896 by the Chinese Lunar Calendar). Note that all dates appearing in this study have been converted from the Chinese Lunar Calendar to the Gregorian Calendar.

<sup>673</sup> China's first joint-stock enterprise that followed the Western model—"China Merchants' Steam Navigation Company (lunchuan zhaoshangju)"—was founded in 1872. During the late nineteenth century, the majority of stocks were issued by mining, transportation, energy, and some light-industry companies. For details of late Qing stock-issuing practices, see Lu Bowei, "Guandu Shangban Yangwu Qiye Gufenpiao Yanjiu (Research on Stock Issuing of the Government-Supervised and Merchant-Managed Modern Enterprises during the Self-Strengthening Movement)," *Suzhou Daxue Xuebao: Zhexue Shehui Kexue Ban (Journal of Suzhou University: Philosophy and Social Sciences Version)* no. 4 (1995): 90-7; Tian Yongxiu, "1862-1883 nian Zhongguo de Gupiao Shichang (The Chinese Stock Market from 1862 to 1883)," *Zhongguo Jingjishi Yanjiu (Researches in Chinese Economic History)* no. 2 (1995): 57-70; Zhu Yingui, "Jindai Zhongguo de Diyipi Gufenzhi Qiye (The First Joint-Stock Companies in Modern China)," *Lishi Yanjiu (Historical Research)* no. 5 (2001): 19-29.

The stock issuing practice in the Chinese publishing industry became more and more ordinary since the beginning of the twentieth century. For example, the political newspaper *Eshi Jingwen (The Alarm of Russian Invasion)*, established in 1903) advertised its share issuing prospectus in 1904 as the press decided to expand it to *Jingzhong Ribao (Alarm Daily)*. Many publishing houses and printing presses in Shanghai publicly issued stock shares in

we call stock today. The Society was neither a business company nor a joint-stock corporation, but basically a not-for-profit academic organization. Moreover, Zou wanted to issue stock in order to collect money sufficient money for just one project. What was similar to today's practice is that the Society promised returns on shareholders' initial investments and a bonus after the books were put on the market. Incentive was also offered to "brokers." They could get one share (or half share) gratis as a commission for selling ten shares (or five shares).<sup>674</sup> In general, Zou strategically employed modern business concepts to help conduct his cultural projects.

The issuing of limited stock began soon after the Society's inception. Zou primarily drew upon his interpersonal relations relying on his family members, friends, and colleagues to buy it.<sup>675</sup> In order to attract more attention, the Society's stock officially went public in the summer of 1896. *Shiwu Bao* 時務報 (*Newspaper of Current Affairs*, also known as *Chinese Progress*), one of the most influential political newspapers,<sup>676</sup> was selected as the major venue to advertise this event. It was a wise choice. For one thing, eminent political critic Wang Kangnian

---

order to raise capital for entrepreneurial development. See Chen Weiguo, *Zhenxi Lao Shanghai Gupiao Jianshang Lu* (*Collection of Rare Stock Notes in Shanghai*) (Shanghai: Shanghai Yuandong Chubanshe, 2007), 252-71.

<sup>674</sup> "Ditu Gonghui Gaobai (Announcement from the Society for Translating and Printing Western Maps)," *Shiwu Bao*. The Society changed its name to *yudi xueshe* ("Geographical Society") in 1898. See Zou Daijun, "Zhi Wang Kangnian Shu (Letter to Wang Kangnian), October 19, 1898," in *Wang Kangnian Shiyong Shuzha* (*Correspondence from Wang Kangnian's Teachers and Friends to Him*), ed. Shanghai Library, vol. 3 (Shanghai: Shanghai Guji Chubanshe, 1986), 2766.

<sup>675</sup> For example, Miao Quansun's (1844-1919) diary recorded some purchases of shares. Miao Quansun, "Diary on June 25, 1895," in *Yifeng Laoren Riji* (*Diaries of Miao Quansun*), vol. 2 (Beijing: Peking University Press, 1986), 745.

<sup>676</sup> *Shiwu Bao* lasted for about two years until the summer of 1898. For a history of *Shiwu Bao*, see for example Ge Gongzhen, *Zhongguo Baoxue Shi* (*A History of Chinese Newspapers*); Fang Hanqi, *Zhongguo Xinwen Shiye Tongshi* (*A General History of Chinese Journalism*) (Beijing: Renmin University Press, 1992), 553-75; Tang Zhijun, *Wuxu Shiqi de Xuehui he Baokan* (*Academic Societies and Periodicals during the Period of the Hundred Days Reform*) (Taipei: Taiwan Commercial Press, 1993), 143-211; Pan Kwang-che, "Shiwu Bao he Ta de Duzhe (*Shiwu Bao* and Its Readers)," *Lishi Yanjiu* (*Historical Research*) 5 (2005), 60-83; Seungjoo Yoon, "Literati-Journalists of the *Chinese Progress* (*Shiwu Bao*) in Discord, 1896-1898," in *Rethinking the 1898 Reform Period: Political and Cultural Change in Late Qing China*, ed. Rebecca E. Karl and Peter Zarrow (Cambridge, MA: Harvard University Press, 2002), 48-76.

汪康年 (1860-1911), who was the owner and one of the founders of *Shiwu Bao*, was also Zou's friend; he supported Zou's map translation agenda. For another, *Shiwu Bao* positioned itself as an outlet for reformists who aimed at a profound and comprehensive transformation of late-Qing politics, bureaucracy, economy, and education. Map translation and publishing had been considered part of epistemological reform; it helped transform traditional world views that emphasized China-centrism. Reformists felt that in this way maps also benefited China's pursuit of modernization and the academy. So, by publicizing in *Shiwu Bao* the Society could reach a large number of like-minded supporters. The Society's first announcement was published in the August 22 1896 issue of *Shiwu Bao*.<sup>677</sup> Similar advertisements appeared in *Xiang Bao* 湘報 (*Hunan Newspaper*) in 1897.<sup>678</sup> While one full share was priced at 50 *yuan*, half shares at 25 *yuan* were also available for those who were less affluent but willing to help. The Society intended to issue four hundred shares to accrue, in all, 20,000 *yuan* as the initial capital for the project. This advertising campaign, together with previous "private placement" selling, earned positive feedback especially from a circle of literati-activists who enthusiastically advocated political reform of the late Qing government. Some of them made constructive suggestions regarding the Society's marketing strategies. Some not only purchased shares themselves but also persuaded others to do so. Others helped to promote sales and even served as middle-men.<sup>679</sup> The success of the stock-raising campaign was gratifying at the beginning, but only limited to areas such as Shanghai (the home city of *Shiwu Bao* Press), Hubei, and Hunan.

---

<sup>677</sup> Zou Daijun, "Yi Yin Xiwen."

<sup>678</sup> The advisement was found in *Xiang Bao*, 2-14 (1897).

<sup>679</sup> Notable figures among these literati-activists include Wu Dexiao (?-1900) and his son Wu Qiao (1866-1897), Huang Zunxian (1848-1905), Chen Sanli (1853-1937), Zhang Yuanji (1867-1959), and Tang Weizhi (1865-1954). Their various types of support for Zou's fundraising campaign are recorded in correspondence with Wang Kangnian. For example, see "Letter from Wu Dexiao to Wang Kangnian, [exact date unknown]," "Letter from Wu Qiao to Wang Kangnian, [exact date unknown]," "Letter from Wu Qiao to Wang Kangnian, [exact date unknown]," and

Successful as it was, the stock-issuing venture only lasted for approximately eight months. In April 1897, the Society ceased to trade shares with the public. The immediate cause might have been the change of printing methods from lithography to copperplate. At the initial stage, of the project, the Society's maps were reproduced through lithograph, but the quality was not satisfactory and incurred patrons' complaints.<sup>680</sup> The decision to switch to copperplate improved the quality. However, this started a negative chain reaction. Due to skyrocketing costs, even with income from shares already sold, the Society still could not make ends meet. As the deficit grew more severe, the stock looked weaker and weaker, and, therefore, fewer customers would be interested in investing. The fact is that until June 1897, only 118 shares had been recorded as sold, including those that were complimentary, and the large number at half price.<sup>681</sup>

Facing the dim financial prospect, the Society grasped at straws. It enlisted the influential Zhang Zhidong 張之洞 (1837-1909), one of the "four famous officials in late Qing." As a practitioner and promoter of the Self-Strengthening Movement and avid advocate of education, Zhang obviously understood the vital significance of Zou's grand map project. He thought that maps would open up the school curriculum, fortify the military defense of the country, and therefore stabilize the livelihood of the people. Coincidentally, Zhang also had a strong impact on the formation of *Shiwu Bao*, to which Zou resorted for promoting his stock

---

"Letter from Zhang Yuanji to Wang Kangnian, May 7, 1896," in *Wang Kangnian Shiyong Shuzha*, 1: 382-3, 459, and 468; 2:1690.

<sup>680</sup> For example, Wu Dexiao and Xia Zengyou (1863-1924) once expressed their disappointment about the printing quality of sample maps mailed to them. See "Letter from Wu Dexiao to Wang Kangnian, March 18, 1896" and "Letter from Xia Zengyou to Wang Kangnian, [exact date unknown]," in *Wang Kangnian Shiyong Shuzha*, 1: 391; 2: 1319.

<sup>681</sup> "Ditu Gonghui Gaobai (Announcement from the Society for Translating and Printing Western Maps)," *Shiwu Bao*, February 1897.



issuing plan.<sup>682</sup> Zhang promised to donate, in installments, 4000 *yuan* in total to support the Society; he paid the first 1000 *yuan* in 1896.<sup>683</sup> Furthermore, he powerfully intervened into the Society's sale of stock in 1900, although sales to the public had been long terminated. On January 17, 1900, Zhang Zhidong, at that time the Viceroy of Huguang (governing Hubei and Hunan provinces from 1889 to 1907),<sup>684</sup> one of the eight Viceroys of China proper during the Qing Dynasty,<sup>685</sup> issued an order to Hubei Shanhou Ju 湖北善後局 (Reconstruction Bureau of Hubei Province) to pressure government institutions to purchase the Society's publications and stock. Official memorandums were subsequently distributed from the Bureau to governmental schools, maritime customs, military units, and other relative bureaus inside Hubei.<sup>686</sup> The

---

<sup>682</sup> Seungjoo Yoon discovered that *Shiwu Bao* was “an extension of the private bureaucracy” of Zhang Zhidong, who was ideologically much more conservative than radical advocates of political reform. Yoon argues that the discourses created in the newspaper favored the augmenting of the “statecraft ideal within Confucian tradition” more than the establishment of a thoroughly Westernized “public sphere.” It suggests that Zhang Zhidong and his institutional configuration of *Shiwu Bao* held the upper hand in handling the ideological conflicts among writers associated with it. See Yoon, “Literati-Journalists of the *Chinese Progress*,” 48-76.

<sup>683</sup> Zhang Zhidong's donation was recorded in Wu Qiao, “Letter to Wang Kangnian, December 17, 1896,” in *Wang Kangnian Shiyong Shuzha*, 1: 516-7.

<sup>684</sup> Zhang Zhidong was a powerful official for many years during the late Qing period. Before moving to the Huguang post, Zhang serviced as Viceroy of Liangguang (governing Guangdong and Guangxi provinces) from 1884 to 1889. Intermittently from 1894 to 1896 and from 1902 to 1903, he was also the acting Viceroy of Liangjiang (governing Jiangxi, Anhui, and Jiangsu area). In 1907, he was appointed as a member of the Grand Council. For Zhang's career in late Qing officialdom, see Seungjoo Yoon, “The Formation, Reformation, and Transformation of Zhang Zhidong's Document Commissioners, 1885-1909” (PhD diss., Harvard University, 1999). For a biography of Zhang Zhidong, see Feng Tianyu and He Xiaoming, *Zhang Zhidong Pingzhuan (A Critical Biography of Zhang Zhidong)* (Nanjing: Nanjing University Press, 1991). Specifically for his important role in establishing modern industry in China, see for example Zhu Congbing, *Zhang Zhidong yu Yue Han Tielu: Tielu yu Jindai Shehui Liliang de Chengzhang (Zhang Zhidong and the Canton-Hankow Railway: Railway and the Growth of Social Power during the Modern Period)* (Hefei: Hefei Gongye Daxue Chubanshe, 2011); Zhang Shi, *Cangliang de Beiyang: Zhang Zhidong yu Zhongguo Gangtie Gongye (Desolate Silhouette: Zhang Zhidong and the Steel Industry of China)* (Beijing: Commercial Press, 2010); Daniel H. Bays, *China Enters the Twentieth Century: Chang Chih-tung and the Issues of a New Age, 1895-1909* (Ann Arbor: University of Michigan Press, 1978). For his contribution to modern education, see for example William Ayers, *Chang Chih-tung and Educational Reform in China* (Cambridge, MA: Harvard University Press, 1971); Su Yunfeng, *Zhang Zhidong yu Hubei Jiaoyu Gaige (Zhang Zhidong and the Educational Reform in Hubei)* (Taipei: Zhongyang Yanjiuyuan Jindaishi Yanjiusuo, 1976); Cai Zhensheng, *Zhang Zhidong Jiaoyu Sixiang Yanjiu (Research on Zhang Zhidong's Education Thought)* (Shenyang: Liaoning Jiaoyu Chubanshe, 1994).

<sup>685</sup> In 1906, the Viceroy of Dongsansheng (in charge of Fengtian, Jilin, and Heilongjiang provinces in northeast China) was added to the list of eight.

<sup>686</sup> Zhang Zhidong, “Zha Bei Shanhouju Chi Ge Shuju, Ge Ying, Ge Shuyuan, Xuetao Gouzhi Zhongwai Quandi Yutu (Letter to the Hubei Resettlement Bureau on Ordering All Sub-bureaus, Armies, Colleges, and Schools to Purchase Zhongwai Quandi Yutu) (dated December 17 by lunar calendar, and January 17, 1900 by Gregorian

Society's stock again found a market, however, this time through Zhang Zhidong, the person who held the cards. Political power and governmental influence ostensibly held sway. In truth, purchases by force were reluctantly paid. Zhang should have had gathered 1,500 *yuan* from the sale of thirty shares. But all the government departments that received the Bureau's notifications were barely willing to pay half price. What was more, the final amount confirmed by Zou Daijun even shrank from an already-reduced sum of 750 *yuan* to only 500 *yuan*.<sup>687</sup> It is regrettable that Zou's stock issuing program finally reached an anticlimactic end. Nevertheless, his courageous and novel scheme represents translators' enterprising endeavors in networking.

Finding financial aid was an urgent issue for translators, since without money a project, such as Zou Daijun's map series mentioned above, could not even get off the ground. But it would be equally annoying to translators with a completed manuscript in hand to learn they could not find a place to publish their work. During the late nineteenth and early twentieth centuries, a number of establishments were capable of conducting both translating and printing businesses. For example, Mohai Shuguan (London Missionary Society Mission Press) in Shanghai hired editors and translators, provided offices, and even living spaces for them, and printed their works using its own facilities. The Jiangnan Arsenal owned a printing workshop which undertook bookmaking projects for the Arsenal's Translation Department. Translators affiliated with these types of double-purpose institutes enjoyed considerable occupational security. However, some translators and organizations still had to worry about seeking a place to print. For instance, although the CMMA featured a publication committee, it did not handle any actual printing jobs. It only supervised imprints' quality. In these cases, creating and

---

calendar)," in *Zhang Zhidong Quanji (Complete Works of Zhang Zhidong)*, ed. Yuan Shuyi, Sun Huafeng, and Li Bingxin, vol. 5 (Shijiazhuang: Hebei Renmin Chubanshe, 1990), 3947-8.

<sup>687</sup> Zou Daijun, "Letter to Wang Kangnian, June 13, 1900," in *Wang Kangnian Shiyong Shuzha*, 3: 2799.

maintaining partnerships with printing presses becomes another important aspect of networking for translators.

During the 1900s and 1910s, the CMMA's medical translations were mainly sent to the American Presbyterian Mission Press (APMP) in Shanghai to print. The CMMA had been maintaining good working relationships with the APMP, long the flagship printer among mission presses in China because of its yearly output, modern machinery, printing quality, and management.<sup>688</sup> It also handled the production of the CMMA's official journal and other brochures. Moreover, the CMMA's account with the APMP was regularly published in the *CMMJ -CMJ*. Within the city of Shanghai, in addition to the APMP, the CMMA sometimes used, but only infrequently, Kelly and Walsh, Ltd, a commercial printing house.<sup>689</sup> Meanwhile,

---

<sup>688</sup> The APMP's predecessor, the Chinese and American Holy Classic Book Establishment, was founded in 1844 in Macau, and moved to Ningbo in 1845. The Establishment was renamed as the APMP in 1858 under supervision of William Gamble. In 1860, the APMP relocated to Shanghai and undertook business for over sixty years. The APMP was suspended after trading its printing equipment to the Commercial Press in 1927 and 1928. For a history of the APMP, see Gilbert McIntosh, *The Mission Press in China, Being a Jubilee Retrospect of the American Presbyterian Mission Press* (Shanghai: American Presbyterian Mission Press, 1895). During the 1860s, mainly due to the APMP's enterprising superintendent and robust growth, the London Missionary Society Mission Press in Shanghai lost competition and was forced to close down. Only its Hong Kong branch was continued. See Rev. Dr. Mullens, *Report of the China Mission of the London Missionary Society* (London: Printed by W. Stevens, 1866), 32-5.

<sup>689</sup> The following edition was printed at Kelly and Walsh: Henry Gray and Robert Howden, *Ge Shi Xi Tong Jie Po Xue* (*Gray's Systematic Anatomy*), 2nd ed., trans. Laurence M. Ingle and Chen Tso Ting (Shanghai: China Medical Missionary Association, 1929). It was translated from *Gray's Anatomy, Descriptive and Applied* (23rd edition, edited by Robert Howden). The CMMA's journal *CMMJ* was also printed at Kelly and Walsh from 1887 to 1907. Founded in 1876 in Shanghai, Kelly and Walsh was one of the major multi-industry foreign firms based in Shanghai (with branches in Hong Kong, Singapore, and Japan) during the late nineteenth and early twentieth centuries. Its wide-ranging business primarily included publishing (printing, bookbinding, and book selling), imprints (school and miscellaneous books, newspapers, and magazines) importing, stationery manufacturing, tobacco product distribution, entertainment management, and department store ownership. Imprints produced by Kelly and Walsh were virtually all in the English language but with a few exceptions, such as the medical translation mentioned above. Its early publications featured dictionaries, government reports, translations of Chinese literary works, and English-language books issued in China. For a history of Kelly and Walsh, especially its printing and publishing enterprise, see Calvin H. T. Wong, "Biefa Yanghang Kao: Jian Lun Jindai Zhongguo Zhishi Fenzi yu Biefa Yanghang (An Examination on Kelly and Walsh: Perspective on the Relation between Chinese Intellectual and Kelly and Walsh Ltd)," in *Jiuxue Xinzhi Ji: Xianggang Chengshi Daxue Zhongguo Wenhua Zhongxin Shi Zhounian Lunwenji* (*Collection of Traditional Studies and New Knowledge: Proceeding in Honor of the Tenth Anniversary of the Chinese Civilisation Centre at the City University of Hong Kong*), ed. Cheng Pei-kai and Fan Jiawei (Guilin: Guangxi Normal University Press, 2008), 213-56; idem, "Qingmo Minshu Shanghai de Xishudian Biefa Yanghang (Kelly and Walsh—A Western Bookstore in Shanghai during the Late Qing and Early Republic Period)," *Wenshi*

the CMMA cooperated trans-regionally even trans-nationally with presses. For example, the China Baptist Publication Society Press in Canton is on the list of the CMMA's non-local printers.<sup>690</sup> In order to meet the sponsor's high expectations, several titles of under the Wellcome Fund were dispatched to the Fukuin Printing Co., Ltd located at Yokohama, Japan because its printing facilities could produce books of more satisfactory quality.<sup>691</sup> However, the situation changed in the early 1920s. The business connection with Japan terminated due to "labor troubles and the tremendous rise in the cost of everything" there. At the same time commercial presses no longer cared to handle the CMMA's works because the processes of printing color plates on glossy paper, or printing both plates and type on the same page as was commonly the case for their translations, was troublesome and expensive. More importantly, the print runs were always significantly smaller than, say, mass-market paperbacks. Even though mission presses remained highly cooperative with the CMMA, their capacity was limited, and, moreover, most of their annual budget of work was scheduled with various mission societies' evangelical printing.<sup>692</sup> Confronting this difficulty, the CMMA's strategy was, on the one hand, maintaining as much as possible, previous connections with presses in Shanghai (their strongest

---

*Zhishi (Knowledge of Literature and History)* 12 (2011): 35-43; Sun Yiming, "Biefa Yinshuguan yu Jindai Zhongxi Wenhua Jiaoliu (Kelly and Walsh and the Modern Sino-West Cultural Exchange)," *Xueshu Yuekan (Academic Monthly)* 7 (2008): 103-9.

<sup>690</sup> For instance, it handled the printing of *Nei Ke Xue* (1908).

<sup>691</sup> John Z. Bowers, "Chinese Translations of Western Medical Textbooks," *Osler Library Newsletter* 18 (1975): 2. The CMMA titles printed at Yokohama include the 1910 edition of *Ou Shi Nei Ke Xue* and the 1913 edition of *Shi Shi Bing Li Xue (Stengel's Pathology)*.

<sup>692</sup> Gilbert McIntosh, "Mission Presses," 352-8. The data listed below concerning the productivity of major mission presses are illuminating although they only cover the period up to 1910: The Methodist Mission Press (Foochow) produced from twenty to thirty-two million pages annually; the National Bible Society of Scotland Mission Press (Hankow) issued approximately 4,000,000 Testaments and Scripture fragments, and 22,000,000 Christian books and tracts from 1885 to 1910; The Foochow College Press of the American Board of Commissioners for Foreign Missions annually averaged from 1892 to 1903 (inclusive) 756,176 pages, and from 1904 to 1909 1,506,946 pages; The China Baptist Publication Society Press (Canton) issued approximately 15,000,000 pages of Christian literature in Chinese in 1910; The Canadian Methodist Mission Press (Szechwan) produced 2,400,267 books and tracts (19,785,344 pages) in 1909; The North China Union College Press (Tungchow) issued a grand total of 8,166,000 pages from December 1905 to January 1910 (including 3,523,452 pages printed during 1909); The Hinghwa Mission Press (Fukien) had nearly two million pages of output in 1910.

base), Hankou, and Beijing, and on the other hand, trying to find other printing resources. The main office of the Publication Committee had relocated from Shanghai to Jinan (Shandong Province) in 1920. In order to save a large amount of time spent sending proofs through the mail especially during the war period when transportation routes were disrupted, the Committee approached the closest printing facility—the Shantung (Shandong) Christian University’s (also known as the Cheeloo University) press. But the output capacity of the press was rather disappointing: there was “only a small hand press doing two pages at a time.” The CMMA did not give up however. Instead, they actively sought financial help to buy more advanced equipment, including an 8-or-16-page cylinder press that was compatible with the city’s electric current system, and cutting and binding machines.<sup>693</sup> This attempt also deepened the friendly relationship between the Committee and the press.

Through investigating the networking effort of the CMMA and the Society for Translating and Printing Western Maps, we can see how important communicative interconnectivity was among all procedures of making a translation. International and domestic agents were recruited and stimulated. The translation production utilized and cultivated a multitude of social ties, either ongoing or newly established ones. Networking, on one hand, brought in monetary benefit. On the other hand, it also brought about cultural complexities. But whatever the case, translation had become a networked business during the late nineteenth and early twentieth centuries.

---

<sup>693</sup> Cousland to Wellcome, May 16, 1922, WA/HSW/OR/D.3, CPF-WL.

### 5.3 AN INTERCULTURAL/INTERNATIONAL/INTERLINGUAL “COMMUNICATION CIRCUIT”

As Robert Darnton argues in his milestone essay “What is the History of Books,” book production generates social connections between publishers, authors, printers, shippers, and readers, for example, which form a “communication circuit” (see Figure 55, bottom).<sup>694</sup> But due to the geographical limitation of the cases he analyzed, his synthesis primarily focuses upon Western Europe—not on East Asia or other parts of the world. Books, however, can travel a cross-cultural distance. They can be translated. The object of his study, the Western book, represents, in my work, the source book for Chinese translations. Through translation, a book starts a new cycle, an “afterlife,” in new cultural, national, and lingual contexts (see Figure 55, top). In this chapter I propose an extension of Darnton’s model to encompass new horizons for the Western source book. Translators, besides being pivotal factors in the new cycle, act as generators of interconnection between the two cycles, and hubs within the international information flow. In this study, most Western immigrant translators’ roles went far beyond just the typical textual rendering: they contacted original authors for suggestions and permission to translate their works, arranged for the selection and shipping of illustration plates from source books’ printer-publishers, asked European shippers for customized delivery service of original texts, and consulted with readers of source publications. Furthermore, these translators’ dual identities as both readers (of the source book), within the original circuit, and as “authors” (of the translation) within the afterlife circuit, insure that the two circuits, although thriving on tremendously different geographical, cultural, and historical circumstances, are not exclusive to

---

<sup>694</sup> Darnton, 65-83.

each other. In addition, the new cycle of translations merits mention for its distinctive characteristics concerning their readership and production.

### 5.3.1 Translators and the Connection between the Two “Cycles”

Around the 1890s and the 1910s, translators might have been content with a minor surge in public visibility. More and more attention was given to who translated Western works. Julia Mateer recorded in the preface of *Sheng Shi Pu* that there was “an increasing desire on the part of those using hymns to know the names of the translator.”<sup>695</sup> In order to satisfy users’ curiosity, Mateer attached the translators’ initials to each hymn. A fashion of including more direct identification of translators sprang up in various venues. Their names replaced the original authors’ name in catalogues, book reviews, advertisements, and other media and personal writings. It was a common practice in science and medical publishing circles that a translator’s rendition of an author’s work was referred to as his (the translator’s name) *Chemistry*, or *Physics*.<sup>696</sup> Through these ways, translators’ identity was, at that time, temporarily upgraded to authorship. Their significance paralleled that of the original authors. However, this designation of them as authors hardly characterized their full resume.

Immigrant translators not only acted within the cycle of translated books as the “author substitute,” fundraisers for their projects, and intermediaries between their manuscripts and domestic printing presses, just to name a few of the roles. But they also fostered external connections to at least five elements within the first cycle, that of the source book—authors, publishers, shippers, suppliers, and readers (see Figure 55). As demonstrated in Chapters 2,

---

<sup>695</sup> Julia Mateer, preface to *Sheng Shi Pu* (1908), 1.

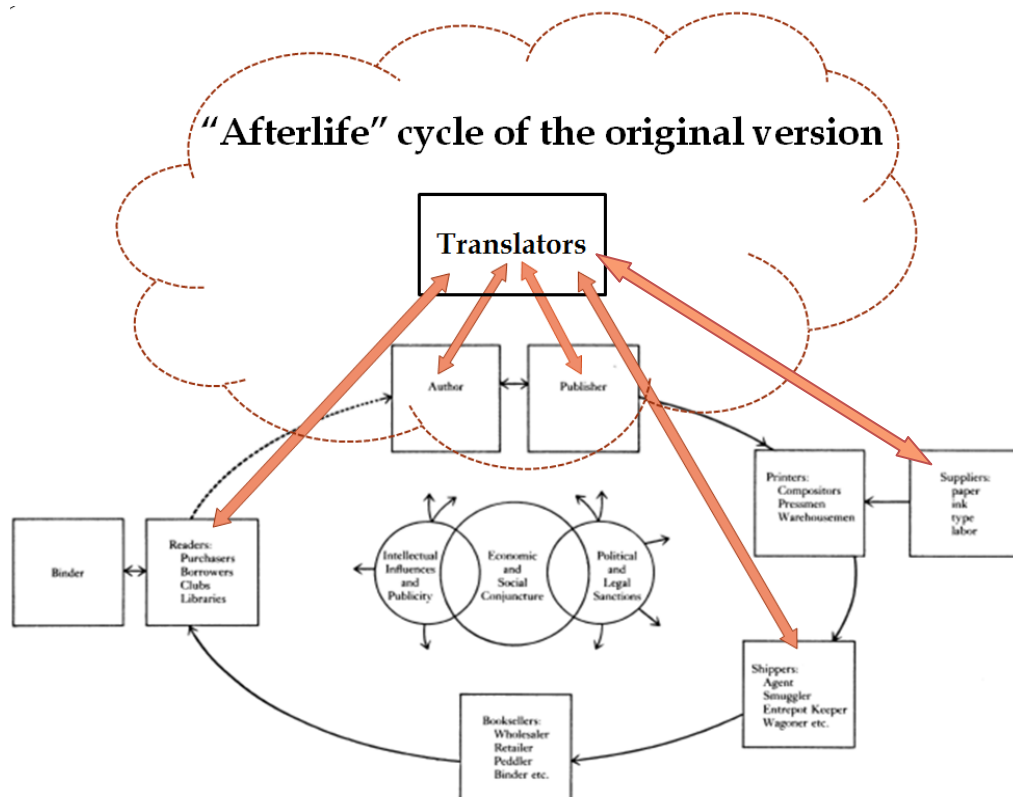
<sup>696</sup> J. J., “化學辨質,” review of *Hua Xue Bian Zhi*, trans. by James B. Neal, *CMMJ* 10 (1896): 268-9, qt. on 268.

Three, and Four, familiar figures, such as John Fryer, Philip B. Cousland, Mary H. Fulton, James H. Ingram, and Cecil J. Davenport, are among these internationally networked translators. Original authors and publishers were contacted usually for information concerning the most updated version of certain books, and other administrative matters. An outstanding achievement of translator-initiated communication is the procuring of the intercontinental supplies of original science and medical illustration plates and the permissions to use them in Chinese translations. Western shippers were contacted primarily during the text selection process to provide a sufficient pool of Western books. Suppliers of printing paper were approached to provide paper samples for examination, purchase, and shipment. Moreover, a group of readers of the original source books who resided and worked in China and who shared a professional circle with translators were networked by them (see next section). Although no single translator was versatile and vigorous enough to maintain all five sorts of connections while bearing the onerous work of translating, their collective efforts to reach authors, publishers, shippers, suppliers, and readers, were extensively recorded in late-nineteenth and early-twentieth-century book prefaces, reviews, and correspondence.

Several factors contributed to the interconnection between the original circuit and the “afterlife” circuit of a book. Immigrant translators might have taken advantage of their identity as foreigners in China, who were better informed of their home countries and more adept in communicating in their native manner to make connects with Western publishing agents. They might also have shared a similar professional background (especially in science and medicine) with original authors, be it study in the same field, holding comparable institutional titles, or having membership in the same academic society. These could lubricate the discussion of translation- and publishing-related issues. While translators’ personal networks no doubt



facilitated the establishment of intercultural, international, and interlingual connections, the local institutions with which they were affiliated, such as the Jiangnan Arsenal, the CMMA, the School and Textbook Series Committee, and the Canton Hospital, also played significant roles. For example, John Fryer, the CMMA's translators, the Series Committee's translators, and John Kerr, communicated extensively with external agents on behalf of the above mentioned institutes and in doing so, gained for themselves, institutional status. In this case, negotiation had escalated to an inter-organizational and reciprocal level, where it was more possible for an individual translator to push forward negotiation with institutional support than by struggling alone. In addition to institutional support, available channels of cross-continental information flow and material exchange (e.g., postal and telegraph service, maritime and land transportation) lent a practical hand to those translators.



**Figure 55.** The original “Communication Circuit” diagram copied from Robert Darnton, “What is the History of Books?” *Daedalus* 111.3 (1982): 68, with additions by Liangyu Fu.

### 5.3.2 “Cross-Readership” and Reception

Translators’ textual work is the starting point of the “afterlife” cycle of the Western source book in China. But their inherent affinity to the original book naturally meant that the new cycle, in its inception, overlapped with the original cycle. Immigrant translators themselves were readers of the original book, no matter how they retrieved the book, either through domestic distribution while they were still in their home countries or through international shipment after they moved to China. On the one hand, their interchangeable identity, as translator/reader, demonstrates how readers of the original book potentially crossed cycles. On the other hand, it suggests the complexities surrounding readership of translations. Among these readers were a group of Western professionals whose situation was similar to that of immigrant translators: they also worked and lived in China, and they also had read the original Western-language books. But they also read the Chinese translated versions as well. Sometimes, reading translations was a requirement of their job (e.g., teacher at general and professional schools). Sometimes, they could not avoid being invited to read translations because they were part of the community network of foreign residents—the translators might have been their friends, working partners, or colleagues in the same academic, professional, or missionary society. Furthermore, some of these immigrant readers, who probably turned out to be translators themselves of other titles, authored a special type of book review—those of Chinese translations—for English-language periodicals published in China such as the *Chinese Recorder*, *North China Herald*, and the *CMMJ*.

These reviews of translations are especially seen in the *CMMJ* which was targeted towards highly professional readers.<sup>697</sup> Every volume of the *CMMJ* issued from 1887 to 1905 featured a set of reviews of Chinese-language medical translations, written in English by the CMMA members for the purpose of exchanging ideas among Western doctors in China. Based upon their reading experience of the original text and the translated one, these review authors were able to offer detailed comparisons between the two; comparisons were not likely to be made in reviews by Chinese native readers at that time. These reviewers, from a standpoint of those who studied and applied knowledge in the original book, presented insightful critiques on the text selection and errors generated in translations. They, as keen observers and arbiters of the quality of translations, also extensively commented on the execution of language and the bibliographical features of the translation. Moreover, they provided collective feedback from the users of translations—the reviewers’ students or colleagues. However, after 1900, the *CMMJ*’s book review column was primarily concerned with new Western medical publications, as were most standard medical journals published in the West. Even so, a number of *CMMJ* reviewers, besides summarizing original titles’ content for their Western colleagues in the medical field, paid attention to the books’ the translatability and adoptability in China.

Diverse types of readers presented a variety of stands and reactions. Immigrant readers, although a special group worthy of further examination, were after all not the main readership of

---

<sup>697</sup> In the inaugural issue of the *CMMJ*, H. W. Boone, at that time the Vice President of the CMMA, stated the purpose of establishing a medical missionary journal: “Medical missionaries are sometimes looked down upon by other medical men in China, simply because they do not know them and their work.... In our quarterly Medical Journal, we have now, for the first time, an organ in which to express ourselves, to report upon our work, and to enable us to garner the constantly increasing mass of observations and experience for the good of our own body and of the world in general.” The editor solicited contributions from “all Medical Practitioners in China, Corea, Japan, and Siam.” These statements all indicate the journal’s targeted readers. See H. W. Boone, “The Medical Missionary Association of China: Its Future Work,” *CMMJ* 1.1 (1887): 1-5, qt. on 1. Larissa N. Heinrich also mentions the readership of the *CMMJ* in her *The Afterlife of Images: Translating the Pathological Body between China and the West* (Durham: Duke University Press, 2008), 90-1.

Chinese translations. Chinese readers, as native speakers and the primary beneficiaries of translated knowledge, commented on the translations from different perspectives. In those reviews and annotated bibliographies authored by native readers—mostly literati at the turn of the twentieth century—comparisons between original and translated versions were virtually absent, due to their limited means to acquire and directly read Western-language books. But native scholarly writings that mentioned translations compared Western and Chinese concepts and theories. This kind of comparison is even seen in late-Qing fiction. For instance, in a medical novel titled *Yi Jie Jing* 醫界鏡 (*The Mirror of the Medical Circle*) published in 1906, the ideas in the Jiangnan Arsenal's translation *Ru Men Yi Xue* and Benjamin Hobson's translation-compilation *Quan Ti Xin Lun* are compared to traditional Chinese medical theories. In this novel, Western medical translations are deemed of no great use because their concepts, supposedly, had been already elaborated in traditional Chinese medicine. Thus Chinese doctors who learned Western medicine are thought to be only flaunting their “privileged” knowledge and skills.<sup>698</sup>

Chinese literati, made judgments about translated science and maps (rarely music), on behalf of their elite group of readers, in their historical and political commentaries. For example, Liang Qichao pointed out in his 1923 essay on Chinese history since the Self-Strengthening Movement, that although weapon manufacture and heavy industries developed during “the first

---

<sup>698</sup> See Rulin Yiyi, *Yi Jie Jing*, in *Zhongguo Jindai Guben Xiaoshuo Jingpin Daxi* (*Selection of Orphan Editions of Modern Chinese Fictions*), vol. 5 (Hohhot: Neimenggu Renmin Chubanshe, 1998), 93-4; 143-4; 148-51. According to Tian Ruohong, Rulin Yiyin is the penname of Lu Shi'e (1878-1944), A novelist-cum-medical doctor, and *Yi Jie Jing* was originally titled *Weishen Xiaoshuo* (*Hygiene Novel*). For an analysis of this novel and its author, see Tian Ruohong, *Lu Shi'e Xiaoshuo Kaolun* (*Research on Lu Shi'e's Novels*) (Shanghai: Shanghai Sanlian Shudian, 2005), 80-9. However, Xie Renmin argues that Rulin Yiyin is not Lu Shi'e from Qingpu, but in fact Yu Wen Yao from Jiangyin. Furthermore, *Yi Jie Jing* is not an original work, but a reproduction with slight adaption from Yu's novel *Yi Jie Xian Xing Ji* (*Exposure of the Medical Field*). See Xie Renmin, “‘Rulin Yiyin’ Fei Lu Shi'e Kao (An Examination of Rulin Yiyin and Lu Shi'e),” *Shinmatsu Shōsetsu Kara* (*Communication on Late Qing Fictions*) 100 (2011): 13-6.

phase” (before the 1894-to-1895 Sino-Japanese war), the Chinese intellectual circle was “hardly influenced” by Western thought. However, “the most memorable” intellectual concern of this phase, argued Liang, was the series of science translations issued by the Jiangnan Arsenal. He remarked:

From today’s perspective, these books look outmoded and superficial. But among the translators were some who were truly dedicated to scholarship. In essence owing to them, these translations could be brought into being at that time. This is because Chinese intellectuals could not speak foreign languages then and none of those who spoke foreign languages was a qualified intellectual. Therefore, these translations indeed cut a “bloody path” for the Chinese native “Western-learning-experts-cum-Western-language-fools” of the second phase [from 1895 to the late 1910s].<sup>699</sup>

In the last sentence of this quote, Liang is referring with chagrin, to his own generation of “experts-cum-fools,” whose Western language abilities could never parallel their learning of imported knowledge—the knowledge that was transferred into their native language by intrepid translators who cut a “bloody path,” or blazed a new trail for the good of the masses. In general, Liang highly praised the inspiration and opportunities for learning furnished by the Arsenal’s

---

<sup>699</sup> Liang Qichao, “Wushinian Zhongguo Jinhua Gailun (An Outline of China’s Evolution over the Past Fifty Years),” in *Yinbingshi Wenji Dianjiao (Punctuation and Collation of Collected Works of Liang Qichao)*, ed. Wu Song, Lu Yunkun, et al. (Kunming: Yunnan Jiaoyu Chubanshe, 2001), 3249-50. Translated by the author.

publications.

However, fiction writers, as the author of *Yi Jie Jing* mentioned above, had markedly different opinions of the same set of translations. The translations Liang celebrated turn out to be useless in a genre of literary works: late-Qing exposé novels that aimed at “revealing social abuses and indicting political corruption” in the crisis-ridden era.<sup>700</sup> In the thirtieth chapter of one of the most famous exposés *Er Shi Nian Mu Du zhi Guai Xian Zhuang* (*Bizarre Happenings Eyewitnessed over Two Decades*) published in the 1900s,<sup>701</sup> the author Wu Jianren (1866-1910, formerly known as Wu Woyao) presented a poignant dialogue between a fictional figure Yi-lu, an Arsenal informant, and the narrator:

[Yi-lu replied] “...the translator of books in the Language School [affiliated to the Jiangnan Arsenal] is paid two or three hundred taels a month. At the same time, a Chinese is employed to help him in his translation work. He can do no more than a few hundred words a day. When a book is finished, the translation expenses are formidable.”

---

<sup>700</sup> David Der-wei Wang, *Fin-de-Siècle Splendor: Repressed Modernities of Late Qing Fiction, 1848-1911* (Stanford, CA: Stanford University Press, 1997), 183. For analyses and critiques regarding the late-Qing exposés, see for example, Wang, *Fin-de-Siècle Splendor* (Chapter 4 “Abject Carnival: Grotesque Exposés”); Chen Pingyuan, *Ershi Shiji Zhongguo Xiaoshuo Shi* (*A History of the Twentieth-Century Chinese Novels*) (Beijing: Peking University Press, 1989); Lu Xun, *Zhongguo Xiaoshuo Shi Lue* (*Brief History of Chinese Fiction*) (Beijing: Renmin Wenxue Chubanshe, 1973). Lu Xun notably denominates the genre as *qianze xiaoshuo*, literally meaning satirical novels or tales of excoriation.

<sup>701</sup> The first forty-five chapters of this novel was serialized in the pioneer fiction magazine *Xin Xiaoshuo* (*New Fiction*, chief edited by Liang Qichao) from 1903 to 1905. Wu Jianren continued writing until the 108<sup>th</sup> chapter. The publishing of the entire manuscript spanned from 1906 to 1910 (eight volumes) by Guangzhi Shuju in Shanghai. An English-language abridged translation by Liu Shih Shun was issued in 1975. See Wu Woyao, *Vignettes from the Late Ch'ing: Bizarre Happenings Eyewitnessed over Two Decades*, trans. Shih Shun Liu (Hong Kong: Chinese University of Hong Kong, 1975). A number of literature scholars have case studied this fiction. For example, see Wang, *Fin-de-Siècle Splendor*, 188-91; Patrick Hanan, *Chinese Fiction of the Nineteenth and Early Twentieth Centuries: Essays by Patrick Hanan* (New York: Columbia University Press, 2004), 165-82.

“Which books are translated?” I asked.

“Everything under the sun,” Yi-lu replied, “including astronomy, geography, mechanics, mathematics, sound, light, electricity and chemistry.”

“All these books are good,” I said, “Let’s buy a set or two tomorrow and read them to increase our knowledge.”

“Nothing doing,” said Yi-lu. “I’ve read all the translations. With the exception of the book on astronomy, which I don’t understand, I’ve found all those on sound, light, electricity and chemistry to be incomplete. They fail to shed light on the most important points. If you wish to read them to collect material for chitchat, it will be all right, but if you intend to learn anything from them, it’s impossible.”

“The high pay is indeed wasted,” I said, “if the results are so unsatisfactory.”

“No wonder,” said Yi-lu. “Anybody translating technical books must be well versed in the technical subjects involved and must know both Chinese and the foreign language well enough. Otherwise the translations will be far from thorough. Just imagine, all these translations are done by the same man. How can you expect him to know everything thoroughly, from astronomy, geography, mechanics, mathematics, sound, light, electricity to chemistry? Some foreigners specialize in one subject for a whole

lifetime, and yet they may fail to pass an examination and depend on their children or friends to continue their studies and pass the examination. How can one expect to do a good job easily just by translating works at random? I'm sure that a great many terms are not clarified at all. With two men using different languages doing the work together, there is an additional barrier dividing them."

"Let me read the books at random," I said. "It would be nice to collect material from them for our conversations, if for no other object."<sup>702</sup>

To Yi-lu, the Translation Department of the Jiangnan Arsenal was practically good for nothing. Their hiring arrangements, translation processes, and the quality and usability of the final publications, were, to him, horrible. What is more, the entire Arsenal is a target of sarcasm for its incompetent management, squandering of financial allocations, and embezzlement. Concerning the authenticity of Yi-lu's testimony, one should notice that the authors of late-Qing exposés, a "Chinese brand of grotesque realism," usually chose to express emphatically the real by "exaggeration, disfiguration, and metamorphosis."<sup>703</sup> Given this inclination, this dialogue would be a somewhat distorted and one-sided story. However, despite this mode of exposé, the criticism of the Arsenal was based upon considerable firsthand experience.

In fact, Yi-lu's words give outlet to the critical voice of the author, Wu Jianren, who was the very insider of the Jiangnan Arsenal's translation and publishing business. Wu spent his

---

<sup>702</sup> Wu, *Vignettes from the Late Ch'ing*, 141-2. For the original Chinese text, see Wu Jianren, *Er Shi Nian Mu Du zhi Guai Xian Zhuang*, punctuated by Song Shijia (Shanghai: Shanghai Guji Chubanshe, 2001), 186-7.

<sup>703</sup> Wang, *Fin-de-Siècle Splendor*, 185.



early years as a student of Western mechanical drawing at the Arsenal. He later became a drawing technician, and was familiar with the Arsenal's illustrators for translations. Wu also had a flair for the practical—he even once built a small-sized navigable model ship on his own. But frustrated by his unrecognized talents, he finally left the Arsenal for literary pursuits.<sup>704</sup> As the one who first attempted to realize his ambition inside the institution but at last alienated himself from it, Wu Jianren's criticism might be subjective. However, he represented an alternative opinion that diverged from Liang Qichao's.

It seems as if the Arsenal's chief translator John Fryer had already predicted the negative reaction of the "Yi-lu"s of China and its relay to the "I"s who were interested in learning about translation work. Fryer believed that ordinary Chinese readers condemned translations as useless because they found "the nomenclature unintelligible to themselves or their Chinese friends, teachers, or writers." He also detected that not only Chinese, but also foreign readers had treated the Arsenal's publications in this same way. Fryer defended the value of his colleagues' enterprise by pointing out that translators could not totally control the way readers used the books: "Every new term being explained or defined only when first used, it would of course be useless for an ordinary Chinaman to begin in the middle of such a work and expect to understand everything he read."<sup>705</sup>

---

<sup>704</sup> Wei Shaochang, comp., *Wu Jianren Yanjiu Ziliao (Research Materials on Wu Jianren)* (Shanghai: Shanghai Guji Chubanshe, 1980), 11, 19, and 25.

<sup>705</sup> Fryer, *Account of the Department*, 9.

### 5.3.3 Interchangeable Roles

In previous sections, we have seen that immigrant translators acted as both readers in the source book circuit and “authors” in the new cycle of translations. Interchangeability of roles not only exists across cultural, national, and lingual boundaries, but also characterizes teams of translator producers and translation institutes. For example, switching posts can be widely seen in the Jiangnan Arsenal. Besides composing translations such as *Suan Shi Ji Yao*, Jiang Heng 江衡 also served as proofreader for a number of other books.<sup>706</sup> Like Jiang, Zhao Yuanyi 趙元益 (1840-1902), a prolific medical translator, also proofread other publications, including the trilogy of *Hua Xue Jian Yuan*.<sup>707</sup> Sha Ying 沙英, an illustrator we have seen in Chapter Three, proofread the text for Hua Hengfang and Daniel Macgowan’s *Di Xue Qian Shi*, and inspected his colleague Zhu Yi’s 朱彝 illustrations produced for *Kai Mei Yao Fa* 開煤要法 (*Essential Methods of Coal Mining*). Qiu Ruilin 邱瑞麟 was involved in both image making and proofreading primarily for translations that concerned artillery.<sup>708</sup> As has been demonstrated, translators, such as the CMMA’s Philip Cousland and the Map Society’s Zou Daijun, served concurrently as

---

<sup>706</sup> Translations proofread by Jiang Heng include *Fang Hai Xin Lun*, *Yu Feng Yao Shu*, *Jin Shi Shi Bie*, *Ye Jin Lu* (*Records of Metallurgy*), and *Hua Xue Fen Yuan* (*Analyzing Principles of Chemistry*).

<sup>707</sup> Zhao Yuanyi’s medical translations include *Ru Men Yi Xue*, *Xi Yao Da Cheng*, *Fa Lü Yi Xue* (*Forensic Medicine*). He also proofread *Qi Ji Bi Yi*.

<sup>708</sup> Qiu illustrated *Ke Lu Bo Pao Shuo* and *Ke Lu Bo Pao Cao Fa*. He proofread military translations such as *Pao Zhun Xin Fa*, *Ke Lu Bo Pao Dan Zao Fa* and *Ke Lu Bo Pao Dan Zao Fa Fu Tu*, and *Bing Yao Zao Fa*. The only non-military proofreading done by him is *Qi Xiang Xian Zhen*. Qiu’s translation expertise is on the manufacture and operation of the Krupp cannon. Krupp, based in Essen, Germany, was a major manufacturer of ammunition and armaments in Europe during the nineteenth and early twentieth centuries. For a history of the Krupp family and their industry, see William Manchester, *The Arms of Krupp, 1578-1968* (Boston: Little, Brown and Company, 1968). For a detailed account on Krupp’s impact on Chinese military development and business interactions between Krupp and China, see Qiao Wei, Li Xisuo, and Liu Xiaoqin, *Deguo Kelubo yu Zhongguo de Jindaihua* (*Germany’s Krupp and China’s Modernization*) (Tianjin: Tianjin Guji Chubanshe, 2001). For a critical analysis of translations on the Krupp cannon published during the late Qing period, see Zou Zhenhuan, “Kelubo Huopao yu Kelubo Pao Shu de Fanyi (Krupp Cannon and Its Related Translations in Chinese),” *Zhongguo Keji Shiliao* 11.3 (1990), 31-4.

outreach and communication specialists for their affiliated institutions' translation and publishing projects.

Moreover, translators' versatility reached outside of translation institutes. They, on the one hand, lived in a "socially hybrid environment that constantly forced/enabled them to cross borders between different professional, social, and national groups." For instance, as a significant "social actor" in the field of Western learning, Li Shanlan developed and maintained inter-institutional and personal networks that integrated diversified circles, be it scientists, Chinese officials, foreigners, and book and newspaper publishers.<sup>709</sup> But on the other hand, and more essentially, the majority of practitioners only moonlighted in translation while holding other occupations, such as school teacher, college professor, missionary, organization administrator, and medical doctor. There were a very small number of full-time translators, such as John Fryer. Most institutes could not afford to hire full-time translators, a rare luxury. The majority of translators bore dual or even triple responsibilities simultaneously. For example, Daniel J. Macgowan, whose main job was resident doctor in Shanghai, translated science books with Hua Hengfang only during his spare time, so that they always had to coordinate schedules. While working for the Arsenal, Zhao Yuanyi, himself a traditional literati-doctor, also initiated a translation-related enterprise. In 1897, Zhao co-founded with his fellow townsmen (from Yanghu 陽湖, Jiangsu Province) *yishu gonghui* 譯書公會 ("The Translation Society"), served as the Society's vice director, and participated in the publication of *Yi Shu Gong Hui Bao* 譯書公會報 (*The Translation Society Weekly Edition*, October 1897-May 1898) which compiled excerpts from important foreign periodicals, serialized longer works mainly regarding politics, history,

---

<sup>709</sup> Natascha Vittinghoff, "Social Actors in the Field of New Learning," in *Mapping Meaning: The Field of New Learning in Late Qing China*, ed. Michael Lackner and Natascha Vittinghoff (Leiden: Brill, 2004), 75-118, qt. on 111-2.

biographies, social movements, and military affairs, and included some independently authored articles by Chinese intellectuals as well.<sup>710</sup>

All the CMMA-member translators were also medical doctors. Their translating work for the Publication Committee was entirely voluntary (excluding their Chinese pundits), and had to be done “under pressure of many other duties which is the lot of every Medical Missionary in China,” as J. G. Cormack claimed.<sup>711</sup> Mary Fulton also complained about completing a manuscript with “many trepidations.” She could only steal time from her hospital and college work, and was under constant pressure to hasten the publication of the translation.<sup>712</sup> As the former chair of the Publication Committee, James Neal admitted that lack of time was common among the CMMA translators: “No member of the committee can devote one quarter of his time to the work connected with this publication business, nor has the committee any power to compel men to do work which it thinks desirable to have done, nor has it funds to pay the expenses of meeting from time to time to consult about what is best to do.”<sup>713</sup> For these part-timer translators, to send out manuscripts on time always seemed a vexation. To be sure, it was counterproductive to CMMA’s schedule of publishing. However, their time spent on activities of professional societies, medical practices, and educational services nurtured opportunities of building a network with the like-minded, facilitated collaboration and idea exchange, and benefited communications with a wide range of agents. These outside contacts no doubt acted as

---

<sup>710</sup> For Zhao Yuanyi’s life and career, his contribution to Sino-West medical knowledge exchange, and his involvement in the Translation Society, see Jiang Qingbai, *Mingqing Sunan Wangzu Wenhua Yanjiu* (A Cultural Study of Prominent Families in Ming-Qing Southern Jiangsu) (Nanjing: Nanjing Normal University Press, 1999), 249-50, 301-02; Zhao Pushan, “Zhao Yuanyi he Ta de Bishu Yishu (Zhao Yuanyi and His Medical Translations),” *Zhongguo Keji Shiliao* no. 1 (1991): 69-74; Li Nanqiu, “Zhao Yuanyi yu Xifang Jindai Yiyaoxue de Chuanru (Zhao Yuanyi and the Importation of Modern Western Medicine and Pharmacology),” *Zhonghua Yishi Zazhi* (Chinese Medical History Journal) 13.3 (1983): 175-76; idem, *Zhongguo Kexue Fanyishi*, 359-60.

<sup>711</sup> J. G. Cormack, preface to *Luo Ka Liang Shi Wai Ke Xue* (1913).

<sup>712</sup> Mary H. Fulton, preface to *Fu Ke Xue*, trans. Mary H. Fulton (Canton: China Baptist Publication Society, 1907), 1.

<sup>713</sup> James Neal, “[Letter] From the Publication Committee (dated January 17, 1907),” *CMMJ* no. 2 (1907): 85.

intangible boosts to the vitality of the translations' life cycle and its interconnection with the source book cycle.

Few are willing to face the prospect of "serious embarrassment" before embarking on an enterprise. So too were translators at the turn of the twentieth century. If a condition for beginning a translation was the guarantee that all "embarrassments" would be prevented, nothing would have been produced. Thus, it would be impossible for contemporary readers to access translated pages, and of course, for me today to chew over these pages and the human dynamics they represent.

"We can do this [translation enterprise] now without serious embarrassment."—Robert Beebe's proud statement denotes that with Henry Wellcome's sponsorship, the CMMA could resume translation work without monetary troubles. Beebe's gratitude would have been expressed by his peers and colleagues to the various characters who had helped in many ways to make translation possible: "We can do this now" thanks to collaboration between immigrant and local translators sitting side-by-side behind the same desk; "We can do this now" owing to financial aid pledged by individuals or institutions aware of the importance of translation; "We can do this now," they may have said, when international or domestic agents cooperated through financial assistance, and technical and moral support.

Translation represents communication. That communication was not limited to the sense that translated words and images could bridge knowledge from afar and readers at home. In fact during the late nineteenth and early twentieth centuries, the process of translation production featured human communication with intercultural characteristics at every stage, from the

selection of appropriate Western source texts through to the printing and distribution of the final product. Meanwhile, translation thrived on an interculturally and internationally networked community that lent practical support to solve imminent problems—to lessen “embarrassment.” All in all, the making of translations not only suggests “a seminal episode of intercultural book history” as demonstrated in Chapter One, but also contributes a luminous chapter to the history of global communication.

## 6.0 CONCLUSION

In this dissertation, I took a holistic view of Chinese translations of Western scientific, topographic, and musical works that were published during the late nineteenth and early twentieth centuries. To begin with, I focused upon their materiality, the first distinct feature we see when we open translations and turn the page. Translators' and printer-publishers' strategies of adapting special content to the Chinese page resulted in imprints demonstrating hybridized bibliographical properties, found in their page layout, pagination, marginal spaces, among other paratextual elements. These "strange-looking" traces indicated that translations of Western science books, maps, and music stood on the vanguard of the amalgamation of traditional Chinese and Western bookmaking cultures. Then I continued to discuss translators' diverse textual strategies. Immigrant translators utilized their foreign connections to obtain a pool of original texts and selected the most appropriate ones based upon their professional training and knowledge. Besides the additions and deletions they made to translations, I found an unusual practice, which I called "pastiche of translations": alternating parts taken from multiple sources. While translators strived to adapt Western works for local readers, they also applied their understanding of the original text, augmented it with updates, and rearranged its organization. Furthermore, I looked at the visual representations in translations which, on the one hand, fulfilled readers' learning objectives, and, on the other hand, contributed to the transformation of Chinese visual conventions. Different types of modifications displayed in translated science

illustrations, maps, and sheet music were caused by illustrators' indigenizing efforts, their artistic training and workshop practices, contemporary intellectual trends, and their accommodations to new printing and reproduction technologies. Finally, I revealed the mechanism of intercultural, international, and interlingual communication networks—the underlying force that facilitated translation at every stage. Oral and scribal translators negotiated and debated over words and sentences during their face-to-face collaboration. International and domestic sponsors responded to financial requests and actively participated in the production process. By interacting with many foreign agents, translators played a pivotal role in bridging the “communication circuit” of the original Western book and that of the translated book. Throughout this dissertation, I not only provided comparative studies of static bibliographical properties, text, and images through juxtaposing source books and their Chinese translations, but also investigated the dynamics of interpersonal, inter-organizational, and international communication recorded in correspondence, diaries, reports, newspapers, and magazines, which facilitated and created these products introducing new information to Chinese readers.

Having discussing four keywords of translations—“materiality,” “textuality,” “visuality,” and “interculturality,” I also realize that there are other approaches my dissertation could not fully develop due to considerations of space. For example, in Chapter 3, I briefly mentioned the visual consumption of wall charts and science demonstrations in public venues as alternative ways of knowledge dissemination beyond book distribution. Actually, these “alternatives” can tell their own stories. Although personal reading of printed matter was still a major method of accessing to the Western learning, the late-Qing period featured an unprecedented encounter with the public display and spectacles of science. Viewing science went beyond the personal study. With the help of printed matter, how did public display, public observation, and public



dissemination play a significant role in configuring the visual culture of science in China during the nineteenth and early twentieth centuries? Moreover, reception studies promise another fruitful approach, which is less-researched but critical in examining Sino-Western intellectual exchanges. In Chapter 4, I offered some examples of Chinese readers' diverse reactions towards translations of Western learning by utilizing late-Qing *exposé* novels, book reviews, and published writings. A more systematic survey of archival sources (especially published and manuscript diaries) needs to be done in order to further our understanding of the degree to which individual readers accepted and absorbed foreign knowledge. Such an inquiry into reception is necessary for a comprehensive evaluation of historical translation enterprises in this time and place.

Over one hundred years have passed between the activities described in this dissertation and today. Translation continues playing a significant role in international and intercultural knowledge transmission. But the entire picture has been changed. Translation is now a fast-changing and highly industrialized business, assisted by computer technology and communication technology that has revolutionized the way the world is connected. New translators have been "handed over" the work that used to be done by the protagonists in this dissertation. Now new translators can easily and quickly obtain original texts. They have so many resources, printed and electronic, at their disposal to aid the translation process. They all have much better English ability than scribal translators did. They do not need to worry how to format text and images on the page. In a word, the previous working environment and methods are no more. However, without the endeavors and experiments by those awkward yet hopeful predecessors, how far would and could later generations of translators go? As we open again and appreciate an intercultural scroll presented collectively by many names appearing in this

dissertation, perhaps an observation John Fryer once made is particularly apt: “Every translation or compilation of a useful book, if carefully done, will remain as a permanent benefit to the country. The translator may be dead and gone and generation after generation of Chinese will come and go and make use of his work which will live on as a memorial of his industry.”<sup>714</sup>

---

<sup>714</sup> Ferdinand Dagenais, Peter X. Zhou, and Jean C. Han, eds., *The John Fryer Papers*, 3 vols. (Guilin: Guangxi Normal University Press, 2010) 2: 601.

## BIBLIOGRAPHY

### Primary Sources

#### Archives

American Board of Commissioners for Foreign Missions, Research Publications Incorporation, and Houghton Library. *Papers of the American Board of Commissioners for Foreign Missions (Microfilm)*. Woodbridge, CT: Research Publications International, 1982-1985.

American Board of Commissioners for Foreign Missions, Research Publications Incorporation, and Houghton Library. *Papers of the American Board of Commissioners for Foreign Missions: Guide to the Microfilm Collection*. Woodbridge, CT: Research Publications International, 1982-1985.

Collett Smith and Henry Wellcome Correspondence (July 1917), at the Wellcome Library. On the accounts of Henry Wellcome China Publication Fund.

Family letters to Benjamin Hobson MD (1841-1871) at the Wellcome Library. Benjamin Hobson (1816-1873) was a British surgeon, who came to China in 1839 as a medical missionary, and was on the vanguard of publishing translated and compiled works on Western medicine in Chinese. He was also the son-in-law of Robert Morrison.

Henry Solomon Wellcome China Publication Fund Archive (1907-1921) at the Wellcome Library. Including correspondence between Sir Wellcome (1853-1936) and the China Medical Missionary Association, account information (invoices, payments, balances), and important documents.

John Fryer Papers (correspondence, diaries, miscellaneous) at the Bancroft Library, University of California, Berkeley. John Fryer (1839-1928), a British missionary who arrived in China in 1861, was one of the most important missionary-scientists working mostly as a science translator and especially for the Chinese government in the late nineteenth century. He was once the leading oral translators in the Translation Department of the Jiangnan Arsenal, Shanghai.

London Missionary Society Archive (1840-1890) at the School of Oriental and African Studies, University College, London. Including incoming correspondence, pamphlets, reports, etc. I focus on the materials that contain the issues of printing technology, setting of presses, translation, and catalogues/records of missionaries' personal publications.

## Periodicals

*China Medical Journal* It was founded in 1887 in Shanghai, by the China Medical Missionary Association, with the original title of *China Medical Missionary Journal*, and edited by John Glasgow Kerr.

*Chinese Recorder* It was established by American missionary Stephen Livingston Baldwin in 1868 and published by the American Presbyterian Mission Press.

*Dianshizhai Huabao (Dianshizhai Pictorial)* It was circulated in the form of a pictorial as a weekly supplement to *Shenbao*, published from 1884 to 1898.

*Dongxi Yang Kao Mei Yue Tongji Zhuan (Eastern Western Monthly Magazine)* It was the first domestically-published Chinese-language magazine. It was started by German missionary Karl Friedrich August Gützlaff (1803-1851) in Canton in 1833, and printed until 1838. It focused on Western culture, ethics, and scientific knowledge.

*Gezhi Huibian (Chinese Scientific Magazine/Chinese Scientific and Industrial Magazine)* It was one of the earliest and most famous magazines that aimed at popularizing Western science and technology in China. It was edited by John Fryer and published from 1876 to 1892.

*Jiaohui Xinbao (Church News)* and *Wanguo Gongbao (A Review of the Times/The Globe Magazine)* *Jiaohui Xinbao* was the predecessor of *Wanguo Gongbao*, edited by Young John Allen (1836-1907), an American missionary who was famous for his newspaper, translations, and education activities in China. The former started from 1868, and changed its title to the latter in 1874, together with the change of main content from the evangelical to the non-religious one. *Wanguo Gongbao* was published until the death of Young John Allen in 1907.

*North China Herald* It was the first English newspaper published in Shanghai in 1850, containing news, announcements, reports, advertisements, etc.

*Shenbao (Shanghai Journal)* It was the most famous commercial newspaper in modern China with the longest history, continuously published in Shanghai from 1872 by an English merchant Ernest Major to 1949. *Shenbao* was a rich resource for understanding every aspect of life in China, especially in Shanghai during its early years.

*Shiwu Bao (Newspaper of Current Issues)* It was an influential Chinese-owned newspaper publicizing the “Hundred Day’s Reform” movement in late Qing period, and was published from 1896 to 1898. Some issues contain advertisements of map publishing projects and science translation columns.

*Zhong Xi Wen Jian Lu (Peking Magazine)* It was a general newspaper (also covering science and technology) edited by W.A.P Martin, Joseph Edkins, and John Burdon in Beijing,

with a short period only from 1872 to 1875. It was considered to be the predecessor of *Gezhi Huibian*.

### Chinese-Language Imprints

Aleni, Guilio. *Xing Xue Cu Shu (An Outline of Theology and Physiology)*. Shanghai: Ci Mu Tang, 1873. It was a reprint of an Italian Jesuit, Guilio Aleni's (1582-1649) work. I also look at the physical property of this book. It was printed at a famous orphan press operated by French church, Tushanwan Ci Mu Tang.

*Bing Chuan Pao Fa*. Translated by Carl T. Kreyer. Shanghai: Jiangnan Arsenal, 1896.

*Ce Di Hui Tu (Measuring and Map-Making)*. Translated by John Fryer and Xu Shou. Shanghai: Jiangnan Arsenal, 1876.

Central China Branch of the China Medical Missionary, comp. *Hu Bing Yao Shu (Manual of Nursing)*. Shanghai: Publication Committee, China Medical Missionary Association, 1909.

*Chan Ke (Obstetrics)*. Translated by Shu Gaodi and Zheng Changyan. Shanghai: Jiangnan Arsenal, 1905.

*Chan Ke Xue (Manual of Obstetrics)*. Translated by Mary W. Niles. Shanghai: Medical Missionary Association of China, 1908.

Chen, Zuoqin. *Wan Guo Yu Tu*. Shanghai: Tongwen Shuju, 1886.

Chevalier, Stanislas. *Huang Chao Zhi Sheng Di Yu Quan Tu (Complete Provincial Atlases of the Empire)*. Shanghai: En venta à l'Orphelinat de T'ou-sé wé, 189?.

China Inland Mission. *A Collection of Familiar Melodies Comprising Generally Known Tunes for All the Hymns in the "Song Chu Sheng Ko"...Except Those Which are Contained in "Sacred Songs and Solos."* Shanghai: American Presbyterian Mission Press, 1899.

China Medical Missionary Association, comp., *Hu Bing Yao Shu*. Shanghai: American Presbyterian Mission Press, 1909.

Cousland, Philip B. *Yixue Cihui (An English-Chinese Lexicon of Medical Terms)*. Shanghai: China Medical Missionary Association, 1917.

*Dixue Qian Shi (Elements of Geology)*. Translated by Daniel Jerome Macgowan and Hua Hengfang. Shanghai: Jiangnan Arsenal, 1871.

*Dian Xue Tu Shuo (An Outline of Electricity)*. Translated and compiled by John Fryer, John. Shanghai: School and Textbook Series Committee, 1887.

- Fang Hai Xin Lun*. Translated by John Fryer and Hua Hengfang. Shanghai: Jiangnan Arsenal, 1894.
- Fryer, John. "Jiangnan Zhizao Zongju Fanyi Xishu Shilüe." (Account of the Translation Department of the Jiangnan Arsenal) *Gezhi Huibian (Chinese Scientific and Industrial Magazine)*, June 1880, 3:5.
- \_\_\_\_\_. "Science in China." *Nature*, May 5 (1881): 9-11; May 19 (1881): 54-57.
- \_\_\_\_\_. *Tianwen Xuzhi (An Outline of Astronomy)*. Shanghai: School and Textbook Series Committee, 1883.
- \_\_\_\_\_. *Shengxue Xuzhi (An Outline of Acoustics)*. Shanghai: School and Textbook Series Committee, 1887.
- \_\_\_\_\_. *Shuixue Xuzhi (An Outline of Hydrics)*. Shanghai: School and Textbook Series Committee, 1891.
- \_\_\_\_\_. *Guangxue Xuzhi (An Outline of Optics)*. Shanghai: School and Textbook Series Committee, 1895.
- \_\_\_\_\_, ed. *Gezhi Shuyuan Xixue Kecheng (Western Science Courses at Shanghai Polytechnic College)*. Shanghai: Shanghai Polytechnic College, 1895.
- \_\_\_\_\_, ed. *Quan Ti Xu Zhi (An Outline of Physiology)*. Shanghai: School and Textbook Series Committee, 1894.
- Fu Ke (Gynecology)*. Translated by Shu Gaodi and Zheng Changyan. Shanghai: Jiangnan Arsenal, 1900.
- Fu Ke Xue (A Textbook of Diseases of Women)*. Translated by Mary H. Fulton. Canton: China Baptist Publication Society, 1903, 1907.
- Gao, Wenjin. *Gailiang Waike Tushuo (Improved Edition of An Illustrated Discussion of External Maladies)*. Suzhou, Shanghai: Sao Ye Shan Fang Shufang, 1834 (prefaced).
- Ge Zheng Quan Shu (A Complete Account of Surgery)*. Translated by John G. Kerr. Canton: Yangcheng Boji Yiyuan, 1890.
- Gospel Songs of Praise: A Selection of Hymns and Tunes for the Native Sabbath School and Prayer Meeting*. Shanghai: American Presbyterian Mission Press, 1877.
- He Shi Liao Xue (A Text-book of Practical Therapeutics)*. Translated by James H. Ingram. 2nd Edition. Shanghai: China Medical Missionary Association, 1911.
- He Shi Liao Xue (A Text-book of Practical Therapeutics)*. Translated by James H. Ingram. 3rd Edition. Shanghai: China Medical Missionary Association, 1916.

- Heu, B. *Gospel Hymns with Notes and Words in Mandarin*. Shanghai: American-Chinese Publication House, 1901.
- Hobson, Benjamin. *Quan Ti Xin Lun (Outline of Anatomy and Physiology)*. Canton: Hui'ai Yiguan, 1851.
- \_\_\_\_\_. *Quan Ti Xin Lun (Outline of Anatomy and Physiology)*. Jiangsu, Shanghai: Mohai Shuguan, 1851.
- \_\_\_\_\_. *Quan Ti Fen Tu (Itemized Illustrations of Anatomy and Physiology)*. Printed by Ye, Suiweng, 1853.
- \_\_\_\_\_. *Bowu Xinbian (A New Compilation on Natural Philosophy)*. Shanghai: Mohai Shuguan, 1855.
- \_\_\_\_\_, and Guan Maocai. *Xi Yi Lüe Lun (First Lines of the Practice of Surgery in the West)*. Shanghai: Renji Yiguan, 1857.
- \_\_\_\_\_. *Yixue Ying Hua Zi Shi (A Medical Vocabulary in English and Chinese)*. Shanghai: Shanghai Mission Press, 1858.
- \_\_\_\_\_. *Nei Ke Xin Shuo (Practice of Medicine and Materia Medica)*. 1858.
- \_\_\_\_\_. *Fu Ying Xin Shuo (Treatise on Midwifery and Diseases of Children)*. Jiangsu, Shanghai: Renji Yiguan, 1858.
- Hua, Hengfang. *Xue Suan Bitan (Written Conversations on Studying Mathematics)*. Vol. 6. Xi'an: Weijing Kanshuchu, 1897.
- Huaxue Cailiao Zhongxi Mingmubiao (Vocabulary of Names of Substances Occurring in Various Works on Chemistry: Chiefly in "Bloxam's Chemistry")*. Shanghai: Jiangnan Arsenal, 1885.
- Hua Xue Chan Yuan*. Translated by Anatole Bellequin and Wang Zhongxian. Beijing: Jingshi Tongwenguan, 18??. Anatole Bellequin (1837-1894) was a French chemist and worked in Jingshi Tongwenguan in Beijing as a chemistry lecturer.
- Hua Xue Chu Jie (Principles and Applications of Chemistry)*. Translated by John G. Kerr and He Liaoran. Canton: Yangcheng Boji Yiyuan, 1870. It was one of the two Chinese translations of the same English book.
- Hua Xue Jian Yuan (Principles and Applications of Chemistry)*. Translated by John Fryer and Xu Shou. Shanghai: Jiangnan Arsenal, 1871.
- Hua Xue Jian Yuan Bu Bian (Chemistry, Inorganic and Organic with Experiments, with a Comparison of Equivalent and Molecular Formulae)*. Translated by John Fryer and Xu Shou. Shanghai: Jiangnan Arsenal, 1879.

- Hua Xue Jian Yuan Xu Bian (Chemistry, Inorganic and Organic with Experiments, with a Comparison of Equivalent and Molecular Formulae)*. Translated by John Fryer and Xu Shou. Shanghai: Jiangnan Arsenal, 1875.
- Huang Chao Zhi Sheng Di Yutu (Provincial Atlases of the Empire)*. Shanghai: Dianshizhai, 1885.
- Hui Xue Xin Bian (Epitome of Microscopy and Bacteriology)*. Translated by W. H. Venable. Shanghai: American Presbyterian Mission Press, 1908.
- Jidujiao Huabei Dahui. *Chong Ding Zan Shen Sheng Shi Qu Pu*. Shanghai: Guangxie Shuju, 1929.
- Ka Luo Liangshi Waikexue (A Manual of Surgery for Students and Practitioners)*. Translated by Philip B. Cousland. Shanghai: Publication Committee, China Medical Missionary Association, 1913.
- Kai Kuang Qi Fa Tu Shuo (A Descriptive Treatise on Mining Machinery, Tools, and Other Appliances Used in Mining)*. Translated by John Fryer and Wang Shushan. Shanghai: Jiangnan Arsenal, 1899.
- Laba Chui Fa (Instruction for Military Bugle)*. Translated by Carl Traugott Kreyer and Cai Xiling. Shanghai: Jiangnan Arsenal, 188?.
- Liang, Qichao. *Du Xixueshu Fa (Ways of Reading Books on Western Studies)*. Shanghai: Shiwu Baoguan, 1896.
- Liu, Yan, and Ma Zhenglin. *Li Dai Yangge Tu (Maps of Geographical Changes during Past Dynasties)*. Nanjing: Jinling, 1872.
- Mateer, Julia Brown. *Sacred Song Tunes, Added Subsequent Printing*. Shanghai: May Wah Book House Printing, 1913.
- \_\_\_\_\_. *Shengshi Pu (Sheet Music of Sacred Songs)*. Shanghai: May Wah Shu Guan, 1907.
- Moncrieff, Edward T. R., trans. and comp. *Suan Fa Quan Shu*. Victoria: London Mission Press, 1852.
- Muirhead, William. *Di Li Quan Zhi*. Shanghai: Mo Hai Shu Guan, 1853.
- Nei Ke Xue (A Treatise of the Practice of Medicine for the Use of Students and Practitioners)*. Translated and Compiled by John G. Kerr. Shanghai: Medical Missionary Association of China, 1908.
- Ou Shi Neikexue (The Principles and Practice of Medicine)*. Translated by Philip B. Cousland. Shanghai: Publication Committee, China Medical Missionary Association, 1910.
- Poletti, P, comp. *Hua Ying Wan Zidian/A Chinese and English Dictionary, Arranged According to Radicals and Sub-radicals*. Shanghai: American Presbyterian Mission Press, 1905.



- Pou Fu Li Fa (Nursing in Abdominal Surgery and Diseases of Women)*. Translated by Mary H. Fulton and Zhou Zhongyi. Canton: Rouji Nü Yiyuan, 1909.
- Qiu Kuang Zhinan (The Prospector's Handbook)*. Translated by John Fryer and Pan Song. Shanghai: Jiangnan Arsenal, 1899.
- Quan Ti Chan Wei (Anatomy of the Human Body)*. Translated by Dauphin W. Osgood. Foochow: Methodist Episcopal Mission Press, 1881.
- Schreck, Johann Terrenz, and Wang Zheng, trans., *Yuan Xi Qi Qi Tu Shuo Lu Zui* (1627). Taipei: Yi Wen, 1968.
- Shanghai Gezhi Shuyuan Cangshulou Shumu (The Library Catalogue of the Shanghai Polytechnic Institute)*. Shanghai, 1907.
- Shanghai Municipal Council. *Report for the Year 1907 and Budget for the Year 1908*. Shanghai: Kelly & Walsh, Limited, 1908.
- Sheng Shan Xie Ge*. Ningbo: The Chinese and American Holy Classic Book Establishment, 1858.
- Shenjiang Zhongxi Shuyuan. *Baxian Bei Zhi (A Complete Guide to Trigonometry)*. Shanghai: American Presbyterian Mission Press, 1903.
- Shenjiang Zhongxi Shuyuan. *Dai Xing He Can (Analytic Geometry)*. Shanghai: American Presbyterian Mission Press, 1903.
- Smith, Charles Edwin. *Hymns of Praise, with Music: For the Use of the Christian Church in China*. Shanghai: Methodist Publication House, 1910.
- Suan Shi Ji Yao (Mensuration and Practical Geometry)*. Translated by John Fryer and Jiang Heng. Shanghai: Jiangnan Arsenal, 1877.
- Ti Gong Xue (Handbook of Physiology)*. Translated by Philip B. Cousland. Shanghai: China Medical Missionary Association, 1905.
- Tongkanglu Zhuren. *Zhong Wai Di Yu Tu Shuo Ji Cheng*. Shanghai: Jishan Shuju, 1894.
- Tushanwan Ci Mu Tang Yinshu Guan. *Tushanwan Ci Mu Tang Yinshu Guan Tushu Jiamu Biao (The Price List of the Books Printed by En venta à l'Orphelinat de T'ou-sé wé)*. Shanghai: Tushanwan Ci Mu Tang, 1917.
- Wales, Alice. *Bong-Hak Tong kap Iu-Ti-Oan e Khim-Pho*. Amoy: 1915.
- Wan Guo Yaofang (Companion to the British Pharmacopœia)*. Translated by S. A. Hunter. Shanghai: American Presbyterian Mission Press, 1890.
- Wang, Qingren. *Yi Lin Gai Cuo (Correcting the Errors in the Forest of Medicine)*. Beijing: Sanhuai Tang, 1830.

- Wang, Tao. *Gezhi Shuyuan Ke Yi (Examination Essays of Shanghai Polytechnic College)*. Shanghai: Tao Yuan, 1887-1893.
- \_\_\_\_\_, ed. *Gezhi Shuyuan Keyi (China Prize Essay Contest)*. Shanghai: Shanghai Polytechnic College, 1886-1893.
- \_\_\_\_\_, Gu Xieguang, etc., eds. *Jindai Yishu Mu (Bibliography of Translated Books in Modern China)*. Beijing: Beijing Tushuguan Chubanshe, 2003.
- Wang, Yunwu, He Songling, Yu Xiangsen, and Xia Cuiruo. *Biaozhun Han Yi Waiguo Renming Diming Biao (Proper Names with Standard Chinese Equivalents)*. Shanghai: Shangwu Yinshu Guan (Commercial Press), 19??.
- Wei, Yungong. *Jiangnan Zhizaoju Ji (The Historical Archive of the Jiangnan Arsenal)*. Shanghai: The Jiangnan Arsenal, 1905.
- Weisen zum Gesangbuch der Deutschen Missionen in Süd-China/Tunes to the Hymnbook of German Missions in South China*. Shanghai: American Presbyterian Mission Press, 1913.
- Woodruff, A. *The Memorial Hymn Book*. Shanghai: Presbyterian Mission Press, 1888.
- Wu Ti Yu Re Gai Yi Ji (A Dictionary of Chemistry and the Allied Branches of Other Science)*. Translated by John Fryer and Xu Shou. Shanghai: Jiangnan Arsenal, 1899.
- Xing Jun Ce Hui (A Practical Course of Military Surveying)*. Translated by John Fryer and Zhao Yuanyi. Shanghai: Jiangnan Arsenal, 1894.
- Xiong, Yuezhi, ed. *Wanqing Xinxue Shumu Ti Yao (Annotated Bibliography of Books on New Studies in the Late Qing Period)*. Shanghai: Shanghai Guji Chubanshe, 2007.
- Xiyao Dacheng Yaopin Zhongxi Mingmubiao (Vocabulary of Names of Materia Medica Occuring in the Translation of "Royle's Manual of Materia Medica and Therapeutics)*. Shanghai: Jiangnan Arsenal, 1887.
- Xu, Weize. *Dongxixue Shumu (Bibliography of Chinese and Western Studies)*. Shanghai: Jiangnan Arsenal, 1899.
- \_\_\_\_\_. *Zengban Dongxixue Shumu (Extended Bibliography of Western Studies)*. Shanghai, 1902.
- Xuebu Bianyi Tushuju. *Xue Bu Tu Shu Ju Yu Di Cong Shu*. Beijing: Xuebu Bianyi Tushuju, 1907-1908.
- Yaxin Dixueshe. *Xin Zhong Wai Yu Di Quan Tu*. Wuchang: Yaxin Dixueshe, 1929.
- \_\_\_\_\_. *Shi Jie Gai Zao Hou Huan Qiu Lie Guo Di Tu*. Wuchang: Yaxin Dixueshe, 1920.
- Yan Ke Zheng Zhi (A Text-Book Of Ophthalmology)*. Translated by James Boyd Neal. Shanghai: China Medical Missionary Association, 1906.

- Ye, Qing, and Zhu Baochen, trans. *Zui Xin Di Wen Tu Zhi*. Shanghai: Shanxi Daxuetang Yishuyuan, 1906.
- Yi Fang Hui Bian (Dictionary of Treatment)*. Translated by D. Duncan Main. Shanghai: Guangxuehui, 1896.
- Ying Lei Tu Shuo (An Illustrated Guide of Military Camps)*. Translated by Carl Traugott Kreyer and Li Fengbao. Shanghai: Jiangnan Arsenal, 1876.
- Zhou, Shitang, and Sun Haihuan, eds. *Ershi Shiji Zhong Wai Da Ditu (Large Maps of China and Foreign Countries in the Twentieth Century)*. Shanghai, Ningbo: Xin Xue Hui She, 1906.
- Zhu, Kebao. *Chouren Zhuan San Bian (The Third Supplement of Biographies of Mathematicians and Astronomers)*. 1886. Taibei: Taiwan Shangwu Yinshuguan, 1965.
- Zia, H. L. *Association Hymnal with Music: Community Songs*. Shanghai: Association Press of China, 1900.
- Zou, Daijun, ed. *Zhong Wai Yu Di Quan Tu (Complete Atlases of China and Foreign Countries)*. Wuchang: Yu Di Xueshe, 1908.
- \_\_\_\_\_. “Yi Yin Xiwen Ditu Zhaogu Zhangcheng (Rules of Raising Capital by Floating Shares for Translating and Printing Western Maps).” *Shiwu Bao*, July 14, 1896.

### English-Language Imprints

- André, George G. *A Descriptive Treatise on Mining Machinery, Tools, and Other Appliances Used in Mining*. London: E. & F. N. Spon, 1877. It was the original English version of John Fryer and Wang Shushan’s *Kai Kuang Qi Fa Tu Shuo* (1899).
- Ashton, William Easterly. *Essentials of Obstetrics Arranged in the Form of Questions and Answers Prepared Especially for Students of Medicine*. 3rd Edition. London: Henry Kimpton, 1896. One of the original English versions of Mary Niles’s *Chan Ke Xue*.
- Comstock, J. L. *Elements of Chemistry; In Which the Recent Discoveries in the Science are Included, and Its Doctrines Familiarly Explained, Illustrated by Numerous Engravings, and Designed for the Use of Schools and Academies*. Hartford: D. F. Robinson & CO, 1831.
- Eyster, Nelia Blessing. *A Beautiful Life: Memoir of Mrs. Eliza Nelson Fryer, 1847-1910*. Berkeley, CA: Press of Lack Bros., 1912.
- Fenwick, Samuel. *The Student’s Guide to Medical Diagnosis*. London: John Churchill and Sons, 1869.

- Foster, George. "Changes of Volume Produced by Heat." In *A Dictionary of Chemistry and the Allied Branches of Other Sciences, Second Supplement*, compiled by Henry Watts. London: Longmans, Green, and Company, 1875. It was the original English version of John Fryer and Xu Shou's *Wuti Yu Re Gai Yi Ji* (1899).
- Fryer, John. *An Account of the Department for the Translation of Foreign Books at the Kiangnan Arsenal, Shanghai*. Shanghai: American Presbyterian Mission Press, 1880.
- \_\_\_\_\_. *Catalogue of Educational Books, Works of General Knowledge, Scientific and Technological Treatise*. Shanghai: Presbyterian Mission Press, 1894.
- \_\_\_\_\_, comp. and ed. *The Educational Directory for China: An Account of the Various Schools and Colleges Connected with Protestant Missions*. Shanghai: Educational Association of China, 1895.
- Gee, Nathaniel Gist, comp. and ed. *The Educational Directory for China: An Account of the Various Schools and Colleges Connected with Protestant Missions*. Soochow: Educational Association of China, 1905.
- Griffin, John Joseph. *Chemical Handicraft: A Classified and Descriptive Catalogue of Chemical Apparatus*. London: J. J. Griffin and Sons, 1877. It was the original English version of John Fryer's *Huaxue Qi*.
- Guy, William A. *Principles of Forensic Medicine*. 5th Edition. London: Henry Renshaw, 1881. It was the original English version of John Fryer's *Fa Lü Yi Xue*.
- Halliburton, W. D. *Handbook of Physiology*. 6th Edition. London: John Murray, 1904. It was the original English version of Cousland's *Ti Gong Xue*.
- Hare, Hobart Amory. *A Text-Book of Practical Therapeutics*. 10th Edition. London: Henry Kimpton, 1905. It was the original English version of James Ingram's *He Shi Liao Xue*.
- Harley, John. *Royle's Manual of Materia Medica and Therapeutics*. 6th Edition. London: J. & A. Churchill, 1876.
- Headland, Frederic William. *A Medical Handbook, Comprehending Such Information on Medical and Sanitary Subjects as is Desirable in Educated Persons*. London: Seeley, Jackson, & Halliday, 1861. It was the original English version of John Fryer's *Ru Men Yi Xue*.
- Johnston, James F. W. *The Chemistry of Common Life*. Edinburgh: William Blackwood and Sons, 1859. It was the original English version of John Fryer and Luan Xueqian's *Huaxue Weisheng Lun* (1890).
- Martin, W. A. P. *Lore of Cathay; Or, The Intellect of China*. New York; Chicago: Fleming H. Revell Company, 1912.

- McIntosh, Gilbert, comp. *The Mission Press in China: Being a Jubilee Retrospect of the American Presbyterian Mission Press, with Sketches of Other Mission Presses in China, as well as Accounts of the Bible and Tract Societies at Work in China*. Shanghai: American Presbyterian Mission Press, 1895.
- Mitchell, S. Augustus. *A System of Modern Geography, Designed for the Use of Schools and Academies; Illustrated by Twenty-Three Copper-Plate Maps Drawn and Engraved Expressly for This Work from the Latest Authorities; and Embellished with Numerous Engravings*. Philadelphia: T. H. Butler, 1881.
- Morgan, Evan. *The Chinese Speaker: Readings in Modern Mandarin*. Shanghai: Christian Literature Society and Kelly and Walsh, LTD., 1916. It was a textbook for foreigners living in China.
- Morrison, Eliza A. *Memoirs of the Life and Labours of Robert Morrison*. London: Longman, Orme, Brown, and Longmans, 1839.
- Negretti, Enrico Angelo Lodovico, and Joseph Warren Zambra. *A Treatise on Meteorological Instruments: Explanatory of Their Scientific Principles, Method of Construction, and Practical Utility*. London: Negretti and Zambra, 1864. It was the original English version of John Fryer and Jiang Heng's *Ce Hou Qi Shuo*.
- Noad, Henry Minchin. *The Student's Text-Book of Electricity*. London: Lockwood and Company, 1867. It was the original English version of John Fryer and Xu Jianyin's *Dian Xue* (1879).
- Penrose, Charles. *A Text-Book of Diseases of Women*. 3rd Edition. Philadelphia: W. B. Saunders, 1900. It was the original English version of Fulton's *Fu Ke Xue*.
- Perkins, Estella L, and Henry D. Porter. *Our Medical Missions in China*. Boston: American Board, the Woman's Board of Missions, 1916.
- Taylor, Frederic. *A Manual of the Practice of Medicine*. 7th Edition. London: J. & A. Churchill, 1904. It was one of the original English versions of John Kerr's *Nei Ke Xue*.
- Thomson, James Bates. *Elements of Algebra, Being an Abridgment of Day's Algebra, Adapted to the Capacities of the Young, and the Method of Instruction, in Schools and Academies*. 5th Edition. New Haven: Durrie & Peck; Philadelphia: Smith & Peck, 1844.
- Tyndall, John. *Sound: A Course of Eight Lectures Delivered at the Royal Institution of Great Britain*. London: Longmans, Green, and Company, 1869. It was the original English version of John Fryer and Xu Jianyin's *Sheng Xue* (1874).
- Wells, David A. *Principles and Applications of Chemistry*. New York: Ivison, Phinney, Blakeman, 1858. It was the original English version of John Fryer and Xushou's *Huaxue Jianyuan*.

Wylie, Alexander. *Memorials of Protestant Missionaries to the Chinese: Giving a List of Their Publications, and Obituary Notices of the Deceased*. Shanghai: American Presbyterian Mission Press, 1867.

### Secondary Sources

Adas, M. "A Field Matures: Technology, Science, and Western Colonialism." *Technology and Culture* 38.3 (1997): 478-87.

Agee, Richard J. *Gardano Music Printing Firms, 1569-1611*. Rochester: University of Rochester Press, 1998.

Akerman, James R., ed. *The Imperial Map: Cartography and the Mastery of Empire*. Chicago: University of Chicago Press, 2009.

Amelung, Iwo. "New Maps for the Modernizing State: Western Cartographic Knowledge and Its Application in 19<sup>th</sup> and 20<sup>th</sup> Century China." In *Graphics and Text in the Production of Technical Knowledge in China*, edited by Francesca Bray, Vera Dorofeeva-Lichtmann, and Georges Métaillé, 685-726. Leiden: Brill, 2007.

Andrews, Bridie Jane. "The Making of Modern Chinese Medicine, 1895-1937." PhD diss., University of Cambridge, 1996.

Arnheim, R. *Visual Thinking*. Berkeley: University of California Press, 1969.

Asante, Molefi Kete, Yoshitaka Miike, and Jing Yin, eds. *The Global Intercultural Communication Reader*. New York: Routledge, 2008.

Asen, Daniel. "'Manchu Anatomy': Anatomical Knowledge and the Jesuits in Seventeenth- and Eighteenth-Century China." *Social History of Medicine* 22.1 (2009): 23-44.

Baark, Erik. *Lightning Wires: The Telegraph and China's Technological Modernization, 1860-1890*. Westport, CT: Greenwood Press, 1997.

\_\_\_\_\_, Aant Elzinga, and Bergt-Erik Borgström. *Technological Change and Cultural Impact on Asia and Europe—A Critical Review of the Western Theoretical Heritage*. Lund, Sweden: Research Policy Institute, University of Lund, 1980.

Baigre, Brian S. *Picturing Knowledge: Historical and Philosophical Problems Concerning the Use of Art in Science*. Toronto: University of Toronto Press, 1996.

Balme, Harold. *China and Modern Medicine: A Study in Medical Missionary Development*. London: United Council for Missionary Education, 1921.

- Barnett, Suzanne Wilson, and John King Fairbank, eds. *Christianity in China: Early Protestant Missionary Writings*. Cambridge, MA: Harvard University Press, 1985.
- Baron, Sabrina Alcorn, Eric N. Lindquist, and Eleanor F. Shevlin, eds. *Agent of Change: Print Culture Studies after Elizabeth L. Eisenstein*. Amherst: University of Massachusetts Press; Washington, D.C.: In association with the Center for the Book, Library of Congress, 2007.
- Barthes, Roland. *Image-Music-Text*. New York: Hill and Wang, 1977.
- Bennett, Adrian A. *John Fryer: The Introduction of Western Science and Technology into Nineteenth-century China*. Cambridge, MA: Harvard University Press, 1967.
- \_\_\_\_\_. *Missionary Journalist in China: Young J. Allen and His Magazines, 1860-1883*. Athens: University of Georgia Press, 1983.
- \_\_\_\_\_. *Research Guide to the Chiao-hui Hsin-pao (The Church News), 1868-1874*. San Francisco: Chinese Materials Center, 1975.
- \_\_\_\_\_. *Research Guide to the Wan-kuo Kung-pao (The Globe Magazine), 1874-1883*. San Francisco: Chinese Materials Center, 1976.
- Bennett, Milton J. *Basic Concepts of Intercultural Communication: Selected Readings*. Yarmouth, ME: Intercultural Press, 1998.
- Berg, Marc en Annemarie Mol. *Differences in Medicine: Unraveling Practices, Techniques, and Bodies*. Durham, NC: Duke University Press, 1998.
- Berger, John. *Ways of Seeing*. New York: Viking Penguin Inc., 1977.
- Bernstein, Jane A. *Music Printing in Renaissance Venice: The Scotto Press, 1539-1572*. New York: Oxford University Press, 1998.
- Berry, Mary Elizabeth. *Japan in Print: Information and Nation in the Early Modern Period*. Berkeley: University of California Press, 2006.
- Benstock, Shari. "At the Margin of Discourse: Footnotes in the Fictional Text." *Papers of the Modern Language Association (PMLA)* 98.2 (1983): 204-25.
- Biggerstaff, Knight. "Shanghai Polytechnic Institution and Reading Room: An Attempt to Introduce Western Science and Technology to the Chinese." *Pacific Historical Review* 25.2 (1956):127-49.
- Blair, Ann. *Too Much to Know: Managing Scholarly Information Before the Modern Age*. New Haven: Yale University Press, 2010.
- Boorman, Stanley. *Ottaviano Petrucci: Catalogue Raisonne*. New York: Oxford University Press, 2006.

- Bourguet, Marie-Noëlle, Christian Licoppe, and H. Otto Sibum, eds. *Instruments, Travel and Science: Itineraries of Precision from the Seventeenth to the Twentieth Century*. London: Routledge, 2002.
- Bowers, John Z. "Chinese Translations of Western Medical Textbooks." *Osler Library Newsletter* (McGill University, Montreal, Canada) 18 (1975): 1-3.
- Bray, Francesca, Vera Dorefeeve-Lichtmann, and Georges Métailié, eds. *Graphics and Text in the Production of Technical Knowledge in China: The Warp and the Weft*. Leiden: Brill, 2007.
- Brokaw, Cynthia J. *Commerce in Culture: The Sibao Book Trade in the Qing and Republican Periods*. Cambridge, MA: Harvard University Press, 2007.
- \_\_\_\_\_. "Book History in Premodern China: The State of the Discipline I." *Book History* 10 (2007): 253-90.
- \_\_\_\_\_, and Kai-wing Chow, eds. *Printing and Book Culture in Late Imperial China*. Berkeley: University of California Press, 2005.
- Brown, L. A. *Innovation Diffusion: A New Perspective*. New York: Methuen, 1981.
- Bruckner, Martin. *The Geographic Revolution in Early America: Maps, Literacy, and National Identity*. Chapel Hill: University of North Carolina Press, 2006.
- Buck, Peter. *American Science and Modern China, 1876-1936*. New York: Cambridge University Press, 1980.
- Bugliarello, George, Namik K. Pak, Zhores I. Alferov, and John H. Moore, eds. *East-West Technology Transfer: New Perspectives and Human Resources*. Dordrecht: Kluwer Academic Publishers, 1996.
- Bührig, Kristin, Juliane House, and Jan D. ten Thije, eds. *Translational Action and Intercultural Communication*. Manchester, UK; Kinderhook, NY: St. Jerome Publication, 2009.
- Buisseret, David. *Monarchs, Ministers and Maps: The Emergence of Cartography as a Tool of Government in Early Modern Europe*. Chicago: University of Chicago Press, 1992.
- Burke, Kenneth. *A Rhetoric of Motives*. Berkeley: University of California Press, 1969.
- Cao, Zhi. *Zhongguo Guji Banben Xue (An Edition Study of Chinese Rare Books)*. 2nd Edition. Wuchang: Wuhan University Press, 2007.
- \_\_\_\_\_. *Zhongguo Yinshuashu de Qiyuan (The Origin of Chinese Printing)*. Wuchang: Wuhan University Press, 1994.
- Carbaugh, Donal, ed. *Cultural Communication and Intercultural Contact*. Hillsdale, NJ: L. Erlbaum Associates, 1990.



- Carey, James W. *Communication as Culture: Essays on Media and Society*. New York: Routledge, 1989.
- Carr, Jean Ferguson, Stephen L. Carr, and Lucille M. Schultz. *Archives of Instruction: Nineteenth-Century Rhetorics, Readers, and Composition Books in the United States*. Carbondale: Southern Illinois University Press, 2005.
- Carter, Thomas Francis. *The Invention of Printing in China and Its Spread Westward*. 2d ed., L. Carrington Goodrich. New York: Ronald Press, 1955.
- Cartwright, Lisa. *Screening the Body: Tracing Medicine's Visual Culture*. Minneapolis: University of Minnesota Press, 1995.
- Chan, Man Sing, and Vicky Law. "Guanyu *Quan Ti Xin Lun* (Translating Western Physiology in Late Qing China: The Case of *Quan Ti Xin Lun*)." Paper presented at the 12<sup>th</sup> International Conference on the History of Science in China, Beijing, China, June 26-30, 2010.
- Chang, Hao. "Fu Lanya de Huaxue Fanyi Yuanze he Linian (Fryer's Principles and Ideas in Translation of Chemical Terminologies)." *Zhongguo Keji Shiliao (China Historical Materials of Science and Technology)* 21.4 (2000): 297-306.
- \_\_\_\_\_. "Zai Chuantong yu Chuangxin zhijian: Shijiou Shiji de Zhongwen Huaxue Yuansu Mingci (Between Tradition and Invention: The Chinese Terms of the Chemical Elements in the Nineteenth Century)." *Huaxue (Chemistry)* 59.1(2001): 51-9.
- Charter, Vernon, and Jean DeBernardi. "Towards a Chinese Christian Hymnody: Processes of Musical and Cultural Synthesis." *Asian Music* 29.2 (1998): 83-113.
- Chartier, Roger. *The Cultural Uses of Print in Early Modern France*. Translated by Lydia G. Cochrane. Princeton, NJ: Princeton University Press, 1987.
- \_\_\_\_\_. "Frenchness in the History of the Book: From the History of Publishing to the History of Reading." *Proceedings of the American Antiquarian Society* 97.2 (1987): 299-329.
- Chen, Chaomei. *Mapping Scientific Frontiers: The Quest for Knowledge Visualization*. London: Springer-Verlag, 2003.
- Chen, Hui-hung. "The Human Body as a Universe: Understanding Heaven by Visualization and Sensibility in Jesuit Cartography in China." *Catholic Historical Review* 93.3 (2007): 517-52.
- Chen, Pingyuan, and Xia Xiaohong. *Tuxiang Wanqing: Dianshizhai Huabao (Images of the Late Qing Dynasty: The Dianshizhai Pictorial)*. Tianjin: Baihua Wenyi Chubanshe, 2001.
- \_\_\_\_\_. "Wan Qing Jiaohui Duwu de Tuxiang Xushi (Visual Narrative of the Religious Reading Materials Published during the Late Qing Dynasty)." *Xueshu Yanjiu* 11(2003): 112-26.

- Chen, Shaohua. "Jindai Nongye Kexue Jishu Chubanshu de Chubu Yanjiu (A Preliminary Study of Publications on Modern Agricultural Science and Technology)." *Zhongguo Nongshi (Agricultural History of China)* 18.4 (1999): 102-5.
- Chen, Wei. "Zhongguo Jidujiao Shengshi Fazhan Gaikuang (The Development of Christian Hymns in China: An Outline)." *Journal of the Central Conservatory of Music* 3 (2003): 35-9.
- Chia, Lucille. *Printing for Profit: The Commercial Publishers of Jianyang, Fujian (11<sup>th</sup>-17<sup>th</sup> Centuries)*. Cambridge, MA: Harvard University Press, 2002.
- \_\_\_\_\_, and Hilde Godelieve Dominique De Weerdt, eds. *Knowledge and Text Production in An Age of Print: China, 900-1400*. Leiden: Brill, 2011.
- Chinese University of Hong Kong, Chong Ji College, Chinese Music Archive. *Zhongguo Yinyue Ziliaoshi Cangpin Mulu (Holdings of the Chinese Music Archives, Music Department, Chung Chi College, the Chinese University of Hong Kong)*. Hong Kong: Chong Ji Xueyuan Zhongguo Yinyue Ziliaoshi, 1974.
- Choa, G. H. "Heal the Sick" was Their Motto: The Protestant Medical Missionaries in China. Hong Kong: The Chinese University Press, 1990.
- Chouland, L. *History and Bibliography of Anatomic Illustration*. Translated by Mortimer Frank. New York: Hafner, 1962.
- Chow, Kai-wing. *Publishing, Culture, and Power in Early Modern China*. Stanford: Stanford University Press, 2004.
- Chun, Doris Sze. "John Fryer, the First Agassiz Professor of Oriental Languages and Literature, Berkeley." *Chronicle of the University of California* 3 (2005): 1-18.
- Clunas, Craig. *Pictures and Visuality in Early Modern China*. Princeton, NJ: Princeton University Press, 1997.
- Covell, Ralph R. W.A.P. Martin, *Pioneer of Progress in China*. Washington, DC: Christian University Press, 1978.
- Crary, Jonathan. *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*. Cambridge, MA: MIT Press, 1992.
- Crone, Gerald R. *Maps and Their Makers: An Introduction to the History of Cartography*. 5th Edition. Kent, UK: Dawson, 1978.
- Crouch, Archie R, et al, eds. *Christianity in China: A Scholars' Guide to Resources in the Libraries and Archives of the United States*. Armonk, NY: M. E. Sharpe, 1989.
- Crummer, Leroy. "Early Anatomical Fugitive Sheets." *Annals of Medical History* 5.3 (1923): 189-209.

- Dagenais, Ferdinand. "John Fryer's Early Years in China: I. Diary of His Voyage to Hong Kong." *Journal of the Hong Kong Branch of Royal Asiatic Society* 29 (1989): 252-301.
- \_\_\_\_\_. "John Fryer's Early Years in China: II. First Impressions of Hong Kong and the Chinese People." *Journal of the Hong Kong Branch of Royal Asiatic Society* 30 (1990): 146-68.
- \_\_\_\_\_. "John Fryer's Early Years in China: III. Account of Three Days Excursion on the Mainland of China." *Journal of the Hong Kong Branch of Royal Asiatic Society* 36 (1996): 129-45.
- \_\_\_\_\_. *John Fryer's Calendar: Correspondence, Publications, and Miscellaneous Papers with Excerpts and Commentary*. Version 3. Berkeley: Center for Chinese Studies, University of California, 1999.
- \_\_\_\_\_, ed. *John Fryer's Berkeley Years: Documents Illustrating His Life and Tenure as First Agassiz Professor of Oriental Languages and Literature, 1896-1914*. Berkeley: Center for Chinese Studies, University of California, 2004.
- Danky, James P., and Wayne A. Wiegand, eds. *Print Culture in a Diverse America*. Urbana: University of Illinois Press, 1998.
- Darnton, Robert. "First Steps toward a History of Reading." In *Reception Study: From Literary Theory to Cultural Studies*, edited by James L. Machor and Philip Goldstein, 160-79. New York; London: Routledge, 2001.
- \_\_\_\_\_. *Literary Underground of the Old Regime*. Cambridge, Mass.: Harvard University Press, 1982.
- \_\_\_\_\_. "What is the History of Books?" In *The Book History Reader*, edited by David Finkelstein and Alistair McCleery, 2d ed., 9-26. London; New York: Routledge, 2006.
- Dernberger, Robert F. "The Transfer of Technology to China." *Asian Quarterly* 3 (1974): 229-52.
- Despeux, Catherine. "Visual Representations of the Body in Chinese Medical and Daoist Texts from the Song to the Qing Period (Tenth to Nineteenth Century)." Translated by Penelope Barrett. *Asian Medicine: Tradition and Modernity*, 1.1 (2005): 10-52.
- Dickenson, Victoria. *Drawn from Life: Science and Art in the Portrayal of the New World*. Toronto: University of Toronto Press, 1998.
- Dikötter, Frank. *Exotic Commodities: Modern Objects and Everyday Life in China*. New York: Columbia University Press, 2006.
- Dikovitskaya, Margarita. *Visual Culture: The Study of the Visual after the Cultural Turn*. Cambridge, MA: MIT Press, 2005.
- Doheny-Farina, S. *Rhetoric, Innovation, Technology: Case Studies of Technical Communication in Technology Transfers*. Cambridge, MA: MIT Press, 1992.

- Dong, Shaoxin. *Xing Shen zhijian: Zaoqi Xiyang Yixue Ru Hua Shigao (Between the Body and the Spirit: A Historical Draft of Early Western Medicine in China)*. Shanghai: Shanghai Guji Chubanshe, 2008.
- Dosi, Giovanni, Renato Giannetti, and Pier Angelo Toninelli, eds. *Technology and Enterprise in a Historical Perspective*. Oxford: Clarendon Press; New York: Oxford University Press, 1992.
- Duggan, Mary Kay Conyers. *Italian Music Incunabula: Printers and Type*. Berkeley: University of California Press, 1992.
- Edgerton, Samuel Y., Jr. "The Renaissance Development of the Scientific Illustration." In *Science and the Arts in the Renaissance*, edited by John W. Shirley and F. David Hoeniger, 168-97. Washington, D.C.: Folger Shakespeare Library, 1985.
- Eisenstein, Elizabeth L. "An Unacknowledged Revolution Revisited." *American Historical Review* 107.1 (2002): 87-105.
- \_\_\_\_\_. *The Printing Revolution in Early Modern Europe*. Cambridge: Cambridge University Press, 1983.
- \_\_\_\_\_. *The Printing Press as an Agent of Change: Communications and Cultural Transformations in Early-Modern Europe*. Cambridge: Cambridge University Press, 1979.
- Elkins, James. *Visual Studies: A Skeptical Introduction*. New York: Routledge, 2003.
- Elliot, Simon, and Jonathan Rose, eds. *A Companion to the History of the Book*. Oxford: Willey-Blackwell, 2009.
- Elman, Benjamin A. *A Cultural History of Modern Science in China: New Histories of Science, Technology and medicine*. Cambridge, MA: Harvard University Press, 2006.
- \_\_\_\_\_. *On Their Own Terms: Science in China, 1550-1900*. Cambridge, MA: Harvard University Press, 2005.
- \_\_\_\_\_. "The China Prize Essay Contest and the Late Qing Promotion of Modern Science." Paper presented at the 7th conference on "The New Significance of Chinese Culture in the 21st Century," National Taiwan University, Taipei, Taiwan, December 28-31, 2003.
- \_\_\_\_\_. "The Jesuit Role as 'Experts' in High Qing Cartography and Technology." *Taida Lishi Xuebao (National Taiwan University History Bulletin)* 31 (June 2003): 223-50.
- Enomoto, Yasuko. *Yueren zhi Du, Shanghai: Xiyang Yinyue zai Jindai Zhongguo de Faren* (Gakujin no Miyaku, Shanghai: Kindai Chûgoku ni Okeru Seiyô Ongaku no Juyô; Metropolis of Musicians, Shanghai: The Beginning of Western Music in Modern China). Translated by Jin Peng. Shanghai: Shanghai Yinyue Chubanshe (Shanghai Music Publishing House), 2003.

- Fahnestock, J. "Verbal and Visual Parallelism." *Written Communication* 20 (2003): 123-52.
- Fairbank, John K. ed. *Late Ch'ing, 1800-1911 (Part I)*, vol. 10, *The Cambridge History of China*. Cambridge: Cambridge University Press, 1978.
- Fan, Fa-ti. *British Naturalist in Qing China: Science, Empire, and Cultural Encounter*. Cambridge, MA: Harvard University Press, 2004.
- Fan, Muhan, ed. *Zhongguo Yinshua Jindai Shi: Chu Gao (Modern History of Chinese Printing: A First Draft)*. Beijing: Yinshua Gongye Chubanshe, 1995.
- Fan, Shouyi. "Dingming de Lishi Yange yu Mingci Shuyu Fanyi (Naming and Translation of Terminology: A Historical Perspective)." *Waijiao Xuayuan Xuebao (Journal of Foreign Affairs College)* no. 1 (2002): 83-94.
- Fan, Xiangtao. *Kexue Fanyin Yingxiang xia de Wenhua Bianqian: Ershi Shiji Chu Kexue Fanyi de Miaoxie Yanjiu (The Influence of Scientific Translation on Cultural Transmission: A Descriptive Study of Scientific Translation in the Beginning of the Twentieth Century in China)*. Shanghai: Shanghai Translation Press, 2006.
- Fang, Hao. *Zhongxi Jiaotong Shi (History of Communication between China and the West)*. Taipei: Zhonghua Wenhua Chuban Shiwu Weiyuanhui, 1953.
- . "Ming Ji Xi Shu Qiqian Bu Liu Ru Zhongguo Kao (Research on the Seven Thousand Western Books Brought to China during the late Ming Dynasty)." *Xin Bei Chen* 3.4 (1937): 379-82.
- Feng, Tianyu. *Xinyu Tan Yuan: Zhong Xi Ri Wenhua Hudong yu Jindai Hanzi Shuyu Shengcheng (The Origin of Neologism: The Interaction of Chinese, Western, and Japanese Cultures and the Formation of Modern Chinese Terms)*. Beijing: Zhonghua Shuju, 2004.
- Feng, Zhijie. *Zhongguo Jindai Keji Chuban Shi Yanjiu (Research on the History of Science Publishing in Modern China)*. Beijing: Zhongguo Sanxia Chubanshe, 2008.
- Ford, Brian J. *Images of Science: A History of Scientific Illustration*. New York: Oxford University Press, 1993.
- Frasca-Spada, Marina, and Nick Jardine, eds. *Books and the Sciences in History*. Cambridge; New York: Cambridge University Press, 2000.
- Fraser, Robert, and Mary Hammond, eds. *Books without Borders*. Basingstoke, UK; New York: Palgrave Macmillan, 2008.
- Fu, Liangyu. "Jiangnan Zhizaoju Fanyiguan Fanyi Xishu Fangfa Kao." (Research on the Method of Western Science Translation in the Translation Department of the Jiangnan Arsenal) *Journal of Educational Media & Library Science (Taiwan)* 43.1 (2005): 119-27.

- \_\_\_\_\_, and Zhiqiang Zhang. "Gezhi Huibian zai Shenbao shang de Toushe (The Reflection of the Chinese Scientific and Industrial Magazine on Shenbao)." *Library and Information* 111.5(2006): 116-20.
- \_\_\_\_\_. "Invention and Implementation: New Bibliographical Features in Chinese Translations of Western Science Books, 1860-1920," *Papers of the Bibliographical Society of America* 105.4 (2011): 469-502.
- \_\_\_\_\_. "Indigenizing Visualized Knowledge: Translating Western Science Illustrations in China, 1870-1910." *Translation Studies* 6.1 (2013): 78-102.
- Fuery, Patrick, and Kelli Fuery. *Visual Cultures and Critical Theory*. London: Arnold, 2003.
- Fyfe, Gordon, and John Law, eds. *Picturing Power: Visual Depiction and Social Relations*. London: Routledge, 1988.
- Gamble, William. *Music Engraving and Printing: Historical and Technical Treatise*. New York: Da Capo Press, 1971.
- Gao, Fujin. "Yang Yule" de Liuru: Jindai Shanghai de Wenhua Yule Ye (The Inflow of Foreign Entertainment: The Enterprises of Culture and Entertainment of Modern Shanghai). Shanghai: Shanghai Renmin Chubanshe, 2003.
- Gascoigne, Bamber. *How to Identify Prints: A Complete Guide to Manual and Mechanical Processes from Woodcut to Ink Jet*. 2nd Edition. London: Thames and Hudson, 2004.
- Gaskell, Philip. *A New Introduction of Bibliography*. New Castle, Del.: Oak Knoll Press; London: St. Paul's Bibliographies, 1995.
- Genette, Gerard. *Paratexts: Thresholds of Interpretation*. Translated by Jane E. Lewin. New York: Cambridge University Press, 1997.
- Gieryn, Thomas F. *Cultural Boundaries of Science: Credibility on the Line*. Chicago: University of Chicago Press, 1999.
- Gilbert, Marc Jason. "Paper Trails: Cultural Imperialism from the Late Nineteenth Century as Seen through Documents, Literature and Photographs." *World History Connected* 3.1 (2005), <http://www.historycooperative.org/journals/whc/3.1/gilbert.html>.
- Ginzburg, Carlo. *The Cheese and the Worms: The Cosmos of a Sixteenth-Century Miller*. Translated by John and Anne Tedeschi. Baltimore: Johns Hopkins University Press, 1980.
- Golden, Catherine J. *Book Illustrated: Text, Image, and Culture, 1770-1930*. New Castle, DE: Oak Knoll Press, 2000.

- Gombrich, Ernst Hans. *Art and Illusion: A Study in the Psychology of Pictorial Representation (Millennium Edition, with a New Preface by the Author)*. Princeton: Princeton University Press, 2000.
- Goodall, Norman. *A History of the London Missionary Society, 1895-1945*. London: Oxford University Press, 1954.
- Goodsell, Fred Field. *The American Board in China, 1830-1950: Review and Appraisal*. Boston?: United Church Board for World Ministries, 1969.
- Gregory, Richard Langton. *Illusion in Nature and Art (Edited by R. L. Gregory and E. H. Gombrich, with Contributions by Colin Blakemore)*. London: Duckworth, 1973.
- Gu, Changsheng. *Cong Malixun dao Situleideng: Lai Hua Xinjiao Chuanjiaoshi Pingzhuan* (From Robert Morrison to John Leighton Stuart: Biographies of Protestant Missionaries in China). Shanghai: Shanghai Shudian, 2005.
- Gulick, Edward V. *Peter Parker and Opening of China*. Cambridge, MA: Harvard University Press, 1973.
- Gudykunst, William B, ed. *Cross-Cultural and Intercultural Communication*. Thousand Oaks, CA: Sage Publications, 2003.
- \_\_\_\_\_, ed. *Theorizing about Intercultural Communication*. Thousand Oaks, CA: Sage Publications, 2005.
- \_\_\_\_\_, and Bella Mody, eds. *Handbook of International and Intercultural Communication*. Thousand Oaks, CA: Sage Publications, 2002.
- Hagen, Susan M. "Visual/Verbal Collaboration in Print Complementary Differences, Necessary Ties, and an Untapped Rhetorical Opportunity." *Written Communication* 24.1 (2007): 49-83.
- Han, Jianmin. "Wanqing Kexue Tushu Chuban Yanjiu (Research on Science Books Publishing in Late Qing Period)." PhD diss., Shanghai Jiaotong University, 2006.
- Han, Qi. "Xifang Tongban Shu de Chuanru ji qi Yingxiang (The Introduction and Influence of Western Copperplate Printing in China)." *Yinshu Keji (Printing Technology, Taiwan)* 7.6 (1991): 21-9.
- \_\_\_\_\_, and Michela Bussotti, eds. *Zhongguo he Ouzhou: Yinshua Shu yu Shuji Shi (Chine et Europe: Histoires de Livres)*. Beijing: The Commercial Press, 2008.
- \_\_\_\_\_, and Yangzong Wang. "Qing Ji zhi Shiyin Shu (Lithography Printing in the Late Qing Period)." *Yinshu Keji (Printing Technology, Taiwan)* 7.2 (1990): 37-42;
- Hannaway, Owen. *Chemists and the Word: The Didactic Origins of Chemistry*. Baltimore: Johns Hopkins University Press, 1975.

- Hanson, Marta E. "Jesuits and Medicine in the Kangxi Court (1662-1722)." *Pacific Rim Report* 43 (2007): 1-10.
- \_\_\_\_\_. "On Manchu Medical Manuscripts and Blockprints: An Essay and Bibliographic Survey." *Saksaha: A Review of Manchu Studies* 8 (2003): 1-32.
- Harley, J. B., and David Woodward, eds. *The History of Cartography*. Vol. 1: *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*. Chicago: University of Chicago Press, 1987.
- \_\_\_\_\_, and David Woodward, eds. *The History of Cartography*. Vol. 2 Book 2: *Cartography in the Traditional East and Southeast Asian Societies*. Chicago: University of Chicago Press, 1995.
- Harris, J. R. *Essays in Industry and Technology in the Eighteenth Century: England and France*. Brookfield, VT: Ashgate, 1995.
- Hart, Robert. *The Chinese Roots of Linear Algebra*. Baltimore: Johns Hopkins University Press, 2011.
- He, Shengnai. "Sanshiwu Nian Lai Zhongguo zhi Yinshuashu (Printing Techniques in China in the Past Thirty-Five Years)." In *Zhongguo Jindai Chuban Shiliao: Chu Bian (Historical Materials on Modern Chinese Publishing: First Compilation)*, edited by Zhang Jinglu, 257-85. Shanghai: Qunlian Chubanshe, 1954.
- He, Xiaolian. *Xiyi Dongjian yu Wenhua Tiaoshi (The Eastward of Western Medicine and Its Cultural Adjustment)*. Shanghai: Shanghai Guji Chubanshe, 2006.
- Headrick, D. R. *The Tools of Empire: Technology and European Imperialism in the Nineteenth Century*. New York: Oxford University Press, 1981.
- Heartz, Daniel. *Pierre Attaignant, Royal Printer of Music: A Historical Study and Bibliographical Catalogue*. Berkeley: University of California Press, 1969.
- Hegel, Robert E. *Reading Illustrated Fiction in the Late Imperial China*. Stanford: Stanford University Press, 1988.
- Heinrich, Larissa N. *The Afterlife of Images: Translating the Pathological Body between China and the West*. Durham: Duke University Press, 2008.
- Helmets, Marguerite. *The Elements of Visual Analysis*. New York: Pearson Longman, 2006.
- Herrlinger, R. *History of Medical Illustration*. London: Pitman, 1970.
- Hilaire-Pérez, Liliane, and Catherine Verna. "Dissemination of Technical Knowledge in the Middle Ages and the Early Modern Era: New Approaches and Methodological Issues." *Technology and Culture* 47.3 (2006): 536-65.



- Ho, Hoi-lap. *Protestant Missionary Publications in Modern China, 1912-1949: A Study of Their Programs, Operations, and Trends*. Chicago: University of Chicago Press, 1979.
- Horne, C. Silvester. *The Story of the L.M.S, 1795-1895*. London: London Missionary Society, 1895.
- Hostetler, Laura. *Qing Colonial Enterprise: Ethnography and Cartography in Early Modern China*. Chicago: University of Chicago Press, 2001.
- Howsam, Leslie. *Old Books and New Histories: An Orientation to Studies in Book and Print Culture*. Toronto: University of Toronto Press, 2006.
- Hu, Weiqing. *Cong Jiaoyu dao Fuyin (From Education to the Gospel)*. Taibei: Yuzhouguang, 2006.
- Huang, Wenjiang. *James Legge: A Pioneer at Crossroads of East and West*. Hong Kong: Hong Kong Educational Publication Company, 1996.
- \_\_\_\_\_. *Kua Wenhua Shiye de Jindai Zhongguo Jidujiao Shi Lunji (Anthology of History of Christianity in Modern China from a Cross-Cultural Perspective)*. Taibei: Yuzhouguang, 2006.
- Huttman, W. "On Chinese and European Maps of China." *Journal of the Royal Geographical Society* 14 (1844): 117-24.
- Inkster, Ian. *Science, Technology and the Late Development Effect: Transfer Mechanisms in Japan's Industrialisation, circa 1850-1912*. Tokyo: Institute of Developing Economies, 1981.
- Irwin, Richard Gregg. *John Fryer's Legacy of Chinese Writings*. Berkeley: Center for Chinese Studies, University of California, 1999.
- Jandt, Fred Edmund. *An Introduction to Intercultural Communication: Identities in a Global Community*. Los Angeles: Sage, 2010.
- Jay, Martin. "Introduction to Show and Tell." *Journal of Visual Culture* 4.2 (2005): 139-43.
- Ji, Zhigang. *Jiechu de Fanyijia he Shijianjia: Hua Hengfang (Prominent Translator and Man of Action: Hua Hengfang)*. Beijing: Kexue Chubanshe, 2000.
- Johns, Adrian. "How to Acknowledge a Revolution." *American Historical Review* 107.1 (2002): 106-125.
- \_\_\_\_\_. *The Nature of the Book: Print and Knowledge in the Making*. Chicago: University of Chicago Press, 1989.
- Jones, Andrew F. *Yellow Music: Media Culture and Colonial Modernity in the Chinese Jazz Age*. Durham, NC: Duke University Press, 2001.

- Kaestle, Carl F., and Janice A. Radway, eds. *Print in Motion: The Expansion of Publishing and Reading in the United States, 1880-1940*. Chapel Hill: University of North Carolina Press, 2009.
- Kao, Mayching. "The Beginning of the Western-Style Painting Movement in Relationship to Reforms in Education in Early Twentieth-Century China." *New Asia Academic Bulletin* 4 (1983): 373-97.
- Kaufmann, Walter. *Musical Notations of the Orient*. Bloomington: Indiana University Press, 1967.
- Keeler, N. "Inventors and Entrepreneurs." *History of Photography* 26.1 (2002): 26-33.
- Kelly, Louis G. *The True Interpreter: A History of Translation Theory and Practice in the West*. New York: St. Martin's Press, 1979.
- Kemp, Martin. "The Mark of Truth: Looking and Learning in Some Anatomical Illustrations from the Renaissance and Eighteenth Century." In *Medicine and the Five Senses*, edited by W.F. Bynum and Roy Porter, 85-121. Cambridge: Cambridge University Press, 1993.
- Kevles, Bettyann Holtzmann. *Naked to the Bone: Medical Imaging in the Twentieth Century*. New Brunswick, NJ: Rutgers University Press, 1999.
- Kim, Young Yun. *Becoming Intercultural: An Integrative Theory of Communication and Cross-Cultural Adaptation*. Thousand Oaks, CA: Sage Publications, 2001.
- King, Hyatt A. *Four Hundred Years of Music Printing*. London: Trustees of the British Museum, 1964.
- König, Jason, and Tim Whitmarsh, eds. *Ordering Knowledge in the Roman Empire*. Cambridge: Cambridge University Press, 2007.
- Kostelnick, Charles, and Michael Hassett. *Shaping Information: The Rhetoric of Visual Conventions*. Carbondale: University of Southern Illinois Press, 2003.
- Kraidy, Marwan M. *Hybridity, or the Cultural Logic of Globalization*. Philadelphia: Temple University Press, 2005.
- Kraus, Richard Curt. *Pianos and Politics in China: Middle-Class Ambitions and the Struggle over Western Music*. New York: Oxford University Press, 1989.
- Krummel, D. W., and Stanley Sadie, eds. *Music Printing and Publishing (The New Grove Handbooks in Music)*. London: Macmillan, 1990.
- Kuhn, Dieter. "Silk Weaving in Ancient China: From Geometric Figures to Patterns of Pictorial Likeness." *Chinese Science* 12 (1995): 77-114.

- Kuhn, Thomas S. *The Structure of Scientific Revolutions*. 2<sup>nd</sup> ed. Chicago: University of Chicago Press, 1970.
- Kuriyama, Shigehisa. *The Expressiveness of the Body and the Divergence of Greek and Chinese Medicine*. New York: Zone Books, 1999.
- Lackner, Michael, and Natascha Vittinghoff, eds. *Mapping Meanings: The Field of New Learning in Late Qing China*. Leiden; Boston: Brill, 2004.
- \_\_\_\_\_, Iwo Amelung, and Joachim Kurtz, eds. *New Terms for New Ideas: Western Knowledge and Lexical Change in Late Imperial China*. Leiden: Brill, 2001.
- Laing, Ellen Johnston. *Selling Happiness: Calendar Posters and Visual Culture in Early Twentieth-century Shanghai*. Honolulu: University of Hawai'i Press, 2004.
- Lambert, Susan. *The Image Multiplied: Five Centuries of Printed Reproductions of Paintings and Drawings*. London: Trefoil Publications, 1987.
- Lee, Dominic S. F. *The American Missionaries, the Mandarins and the Opium War, Canton, China (Circa 1839)*. Anchorage: Little Susitna Press, 2000.
- Lee, Leo Ou-fan. *Shanghai Modern: The Flowering of a New Urban Culture in China, 1930-1945*. Cambridge, MA: Harvard University Press, 1999.
- Ledderose, Lothar. *Ten Thousand Things: Module and Mass Production in Chinese Art*. Princeton, NJ: Princeton University Press, 2000.
- Lefevre, Andre. "Introduction: Comparative Literature and Translation." *Comparative Literature* 47 (1995): 1-10.
- Lefèvre, Wolfgang, ed. *Picturing Machines, 1400-1700*. Cambridge, MA; London, UK: MIT Press, 2004.
- Lenneberg, Hans. *On the Publishing and Dissemination of Music, 1500-1850*. Hillsdale, NY: Pendragon Press, 2003.
- Lester, Paul M. *Visual Communication: Images with Messages*. Belmont, CA: Wadsworth Publishing, 1995.
- Leung, Angela Ki Che, and Charlotte Furth, eds. *Health and Hygiene in Chinese East Asia: Policies and Publics in the Long Twentieth Century*. Durham, NC: Duke University Press, 2011.
- Lewis, Mary S. *Antonio Gardano, Venetian Music Printer, 1538-1569: A Descriptive Bibliography and Historical Study*. New York: Garland, 1988.
- Li, Mingjun. *Lidai Shuji Zhuangzhen Yishu (A History of the Art of Book Design in China)*. Beijing: Wenwu Chubanshe, 2009.

- Li, Nanqiu. *Zhongguo Kexue Fanyi Shi (History of the Science Translation in China)*. Hefei: Zhongguo Kexue Jishu Daxue Chubanshe, 2006.
- \_\_\_\_\_. *Zhongguo Kexue Fanyi Shiliao (Historical Primary Sources of Science Translation in China)*. Hefei: Zhongguo Kexue Jishu Daxue Chubanshe, 1996.
- Li, San-Pao. "Letters to the Editor in John Fryer's Chinese Scientific Magazine, 1879-1892: An Analysis." In *Zhongyang Yanjiu Yuan Jindai Shi Yanjiu Suo Ji Kan (A Collection of Studies of Department of Modern History, Academia Sinica)*, 729-77. Taipei: Academia Sinica, 1974.
- Li, Yan. *Zhong Suan Shi Luncong (Collected Essays on the History of Chinese Mathematics)*. Vol. 4. Taipei: Taiwan Shangwu Yinshuguan, 1977.
- Liao, Jing. "The Contributions of Nineteenth-Century Christian Missionaries to Chinese Library Reform." *Libraries and the Cultural Record* 41.3 (2006): 360-71.
- Lie, Rico. *Spaces of Intercultural Communication: An Interdisciplinary Introduction to Communication, Culture, and Globalizing/Localizing Identities*. Creskill, NJ: Hampton Press, 2003.
- Liu, Lydia H., ed. *Tokens of Exchange: The Problem of Translation in Global Circulations*. Durham, NC: Duke University Press, 1999.
- \_\_\_\_\_. *Translingual Practice: Literature, National Culture, and Translated Modernity—China, 1900-1937*. Stanford, CA: Stanford University Press, 1995.
- Lock, Margaret, and Judith Farquhar, eds. *Beyond the Body Proper: Reading the Anthropology of Material Life*. Durham, NC: Duke University Press, 2007.
- Lockhart, William. *The Medical Missionary in China: A Narrative of Twenty Years' Experience*. London: Hurst and Blackett, 1861.
- Lodwick, Kathleen L. *Crusaders against Opium: Protestant Missionaries in China, 1874-1917*. Lexington: University Press of Kentucky, 1996.
- \_\_\_\_\_, comp. *The Chinese Recorder Index: A Guide to Christian Missions in Asia, 1867-1941*. Wilmington, DE: Scholarly Resources Inc., 1986.
- Lovett, Richard. *The History of the London Missionary Society, 1795-1895*. London: Oxford University Press, 1899.
- Lü, Liangzhi. *Zhongguo Dituxue Shi (History of Chinese Cartography)*. Beijing: Topography Press, 1984.
- Lutz, Jessie Gregory. *China and the Christian Colleges, 1850-1950*. Ithaca, NY: Cornell University Press, 1971.

- Ma, Boying, Gao Xi, and Hong Zhongli. *Zhong Wai Yixue Wenhua Jiaoliu Shi* (A History of Medical Communication between China and the West). Shanghai: Wenhui Chubanshe, 1993.
- Ma, Zuyi. *Zhongguo Fanyi Tongshi* (A General Chinese History of Translation). Wuhan: Hubei Jiaoyu Chubanshe, 2006.
- MacGillivray, D. ed. *A Century of Protestant Missions in China (1807-1907)*. New York: American Tract Society; Shanghai: American Presbyterian Mission Press, 1907.
- Manghani, Sunil. *Image Critique and the Fall of the Berlin Wall*. Bristol, UK; Chicago: Intellect, 2008.
- \_\_\_\_\_, Arthur Piper, and Jon Simons, eds. *Images: A Reader*. London; Thousand Oaks, CA: Sage Publications, 2006.
- Marks, P. J. M. *The British Library Guide to Bookbinding: History and Techniques*. Toronto: University of Toronto Press, 1998.
- Martin, W. A. P. *A Cycle of Cathay: Or China, South and North*. Taipei: Ch'eng Wen Publication Corporation, 1966.
- Martzloff, Jean-Claude. *A History of Chinese Mathematics*. Translated by Stephen S. Wilson. Berlin: Springer, 1997.
- Mayo, Maxey Huffman. "Techniques of Music Printing in the United States, 1825-1850." MA thesis, University of North Texas, 1988.
- McCrank, Lawrence J. *Historical Information Science: An Emerging Unidiscipline*. Medford, NJ: Information Today, 2000.
- 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.
- \_\_\_\_\_. "Chinese Lenses and Chinese Art." *Kaikado Journal* 19 (Spring 2001): 9-29.
- McKenzie, D.F. *Bibliography and the Sociology of Texts*. Cambridge: Cambridge University Press, 1986.
- McKitterick, David. *Print, Manuscript and the Search for Order, 1450-1830*. Cambridge: Cambridge University Press, 2003.
- McLuhan, Marshall. *Understanding Media: The Extensions of Man*. New York: McGraw-Hill, 1964.
- \_\_\_\_\_. *The Gutenberg Galaxy: The Making of Typographic Man*. Toronto: University of Toronto Press, 1962.
- \_\_\_\_\_. *Laws of Media: The New Science*. Toronto: University of Toronto Press, 1988.

- Meggs, Philip B. *A History of Graphic Design*. 3rd Edition. New York: John Wiley & Sons, 1998.
- Melvin, Sheila, and Jindong Cai. "Music Voyage." In *Rhapsody in Red: How Western Classical Music Became Chinese*, 45-88. New York: Algora: 2004.
- Mersmann, Birgit, and Alexandra Schneider, eds. *Transmission Image: Visual Translation and Cultural Agency*. Newcastle upon Tyne: Cambridge Scholars, 2009.
- Meyer-Fong, Tobie. "The Printed World: Books, Publishing Culture, and Society in Late Imperial China." *Journal of Asian Studies* 66.3 (2007): 787-817.
- \_\_\_\_\_. "Site and Sentiment: Building Culture in Seventeenth-Century Yangzhou." PhD diss., Stanford University, 1998.
- Millward, James A. "'Coming onto the Map': 'Western Regions' Geography and Cartographic Nomenclature in the Making of Chinese Empire in Xinjiang." *Late Imperial China* 20.2 (1999): 61-98.
- Mirzoeff, Nicholas. *The Visual Culture Reader*. London; New York: Routledge, 2002.
- Mitchell, W. J. Thomas. "The Pictorial Turn." In *Picture Theory: Essays in Verbal and Visual Representation*, 11-34. Chicago: University of Chicago Press, 1994.
- \_\_\_\_\_. *Iconology: Image, Text, Ideology*. Chicago: University of Chicago Press, 1986.
- Mittler, Barbara. *A Newspaper for China?: Power, Identity, and Change in Shanghai's News Media, 1872-1912*. Cambridge, MA: Harvard University Press, 2004.
- Montgomery, Scott L. *Science in Translation: Movements of Knowledge through Cultures and Time*. Chicago: University of Chicago Press, 2000.
- \_\_\_\_\_. *The Scientific Voice*. New York: Guilford Press, 1996.
- Mostow, Joshua S, Norman Bryson, and Maribeth Graybill, eds. *Gender and Power in Japanese Visual Field*. Honolulu: University of Hawai'i Press, 2003.
- Murdoch, John E. *Album of Science: Antiquity and the Middle Ages*. New York: Charles Scribner's Sons, 1984.
- Na, Shiping. "Ming Qing Hanyi Kexue Tushu yu Jindai Zhongguo (Science Books Translated in Chinese in the Ming and Qing Ages and China in Modern Times)." *Tushuguan Xuekan (Journal of Library Science)* 24.3 (2002): 63-4.
- Needham, Joseph. *Science and Civilisation in China*. Cambridge: Cambridge University Press, 1954-2000.
- Neubert, Albrecht. *Translation as Text*. Kent: Kent State University Press, 1992.

- Neuliep, James W. *Intercultural Communication: A Contextual Approach*. Boston: Houghton Mifflin, 2000.
- Nietz, John A. *The Evolution of American Secondary School Textbooks*. Rutland, VT: C. E. Tuttle, 1966.
- Niu, Yahua. "Zhong Ri Jieshou Xifang Jiepo Xue zhi Bijiao Yanjiu (A Comparative Study on Western Anatomy in China and Japan)." PhD diss., Northwestern University (China), 2005.
- Olson, David R. *The World on Paper: The Conceptual and Cognitive Implications of Writing and Reading*. New York: Cambridge University Press, 1994.
- Olson, Lester C. *Benjamin Franklin's Vision of American Community: A Study in Rhetorical Iconology*. Columbia: University of South Carolina Press, 2004.
- \_\_\_\_\_, Cara A. Finnegan, and Diane S. Hope, eds. *Visual Rhetoric: A Reader in Communication and American Culture*. Thousand Oaks, CA: Sage Publications, 2008.
- \_\_\_\_\_. "Intellectual and Conceptual Resources for Visual Rhetoric: A Re-examination of Scholarship Since 1950." *Review of Communication* 7.1 (2007): 1-20.
- Ong, Walter J. *Orality and Literacy: The Technologizing of the World*. New York: Methuen, 1982.
- \_\_\_\_\_. *Ramus, Method, and the Decay of Dialogue: From the Art of Discourse to the Art of Reason*. Cambridge, MA: Harvard University Press, 1983.
- Orden, Kate van. *Music and the Cultures of Print*. New York: Garland, 2000.
- Pacey, Arnold. *Technology in World Civilization: A Thousand Year History*. Cambridge, MA: MIT Press.
- Pan, Jixing. *Zhongwai Kexue zhi Jiaoliu (Science Communication between China and the West)*. Hong Kong: The Chinese University of Hong Kong Press, 1993.
- Pan, Yutian. *Zhongxi Wenxian Jiaoliu Shi (A History of Book Communication between China and the West)*. Beijing: Beijing Tushuguan Chubanshe, 1999.
- Pang, Shengnan. *Hua Hengfang*. Beijing: Beijing Kexue Jishu Chubanshe, 1996.
- Panofsky, Erwin. *Meaning in the Visual Arts: Papers in and on Art History*. Woodstock, NY: Overlook Press, 1974.
- \_\_\_\_\_. *Studies in Iconology: Humanistic Themes in the Art of the Renaissance*. New York: Harper and Row, 1972.

- Pauwels, Luc, ed. *Visual Cultures of Science: Rethinking Representational Practices in Knowledge Building and Science Communication*. Hanover, N.H.: Dartmouth College Press, 2006.
- Pawley, Christine. *Reading Places: Literacy, Democracy, and the Public Library in Cold War America*. Amherst: University of Massachusetts Press, 2010.
- Perdue, Peter. "Boundaries, Maps, and Movement: Chinese, Russian, and Mongolian Empires in Early Modern Central Eurasia." *International History Review* 20.2 (1998): 263-86.
- Portelli, Alessandro. *The Order has Been Carried Out: History, Memory, and Meaning of a Nazi Massacre in Rome*. New York: Palgrave Macmillan, 2003.
- Propen, Amy. "Visual Communication and the Map: How Maps as Visual Objects Convey Meaning in Specific Contexts." *Technical Communication Quarterly* 16.2 (2007): 233-54.
- Ramsey, Matthew, ed. *Exploring Visual Culture: Definitions, Concepts, Contexts*. Edinburgh: Edinburgh University Press, 2005.
- Rasch, Rudolf, ed. *Music Publishing in Europe 1600-1900: Concepts and Issues Bibliography*. Berlin: BWV, 2005.
- Rastall, Richard. *The Notation of Western Music*. New York: St. Martin's Press, 1982.
- Rawski, Evelyn S. *Education and Popular Literacy in Ch'ing China*. Ann Arbor: University of Michigan Press, 1979.
- \_\_\_\_\_. "Economic and Social Foundations of Late Imperial Culture." In *Popular Culture in Late Imperial China*, edited by David Johnson, Andrew J. Nathan, and Evelyn S. Rawski, 3-33. Berkeley: University of California Press, 1985.
- Reardon-Anderson, James. *Chemistry in China, 1840-1949*. Cambridge: Cambridge University Press, 1991.
- Reed, Christopher A. *Gutenberg in Shanghai: Chinese Print Capitalism, 1876-1937*. Vancouver: UBC Press, 2004.
- \_\_\_\_\_. "Gutenberg and Modern Print Culture: The State of the Discipline II." *Book History* 10 (2007): 291-315.
- Renner, Frederick M. *Interpretatio: Language and Translation from Cicero to Tytler*. Amsterdam: Rodopi, 1989.
- Robert, K.B., and J.D.W. Tomlinson. *The Fabric of the Body: European Traditions of Anatomical Illustration*. Oxford: Clarendon Press, 1992.



- Robinson, Douglas. *Western Translation Theory, from Herodotus to Nietzsche*. 2nd ed. Manchester: St. Jerome, 2002.
- Rogers, Everett M. *Diffusion of Innovations*. 3rd Edition. New York: Free Press, 1983.
- \_\_\_\_\_. A Prospective and Retrospective Look at the Diffusion Model. *Journal of Health Communication* vol.9 suppl. 1 (2004): 13-9.
- \_\_\_\_\_, and F. Floyd Shoemaker. *Communication of Innovations: A Cross-Cultural Approach*. New York: Free Press, 1971.
- Rose, Gillian. *Visual Methodologies: An Introduction to the Interpretation of Visual Materials*. London; Thousand Oaks, CA: Sage, 2001.
- Russell, Daniel S. *Emblem and Device in France*. Lexington, KY: French Forum, 1985.
- Samovar, Larry A., and Richard E. Porter, eds. *Intercultural Communication: A Reader*. 8th Edition. Belmont: Wadsworth Publishing Corporation, 1997.
- Schaffer, Mark E, ed. *Technology Transfer and East-West Relations*. New York: St. Martin's Press, 1985.
- Schlereth, Thomas J., ed. *Material Culture Studies in America*. Nashville, Tenn.: American Association for State and Local History, 1982.
- Schulte, Rainer, and John Biguenet, eds. *Theories of Translation: An Anthology of Essays from Dryden to Derrida*. Chicago: University of Chicago Press, 1992.
- Scollon, Ronald, and Suzanne Wong Scollon. *Intercultural Communication: A Discourse Approach*. 2nd Edition. Malden, MA: Blackwell Publishers, 2001
- Screech, Timon. *The Western Scientific Gaze and Popular Imagery in Later Edo Japan: The Lens within the Heart*. Cambridge: Cambridge University Press, 1996.
- \_\_\_\_\_. *The Lens within the Heart: The Western Scientific Gaze and Popular Imagery in Later Edo Japan*. Honolulu: University of Hawai'i Press, 2002.
- Seely, Bruce E. "Historical Patterns in the Scholarship of Technology Transfer." *Comparative Technology Transfer and Society* 1.1 (2003): 7-48.
- Selzer, Jack, and Sharon Crowley, eds. *Rhetorical Bodies*. Madison: University of Wisconsin Press, 1999.
- Semans, Cheryl Ann. "Mapping the Unknown: Jesuit Cartography in China, 1583-1773." PhD diss., University of California, Berkeley, 1987.
- Semati, Mehdi, ed. *New Frontiers in International Communication Theory*. Lanham, MD: Rowman & Littlefield, 2004.

- Shanghai Wenhua Yishu Bianzuan Weiyuanhui, and Shanghai Yinyue Zhi Bianjibu. *Shanghai Yinyue Zhi (Historical Records of Shanghai Music)*. Shanghai: Shanghai Wenhua Yishu Bianzuan Weiyuanhui, and Shanghai Yinyue Zhi Bianjibu, 2001.
- Shen, Fuwei. *Zhongxi Wenhua Jiaoliu Shi (A History of Intercultural Communication between China and the West)*. Shanghai: Shanghai Renmin Chubanshe, 2006.
- . *Xifang Wenhua yu Zhongguo (Western Culture and China)*. Shanghai: Shanghai Jiaoyu Chubanshe, 2003.
- Sheng, David Shuan-en. *A Study of the Indigenous Elements in Chinese Christian Hymnody*. D.M.A. dissertation (church music), University of Southern California, June 1964.
- Shi, Gexin. “Jiangnan Zhizaoju Fanyiguan he Jindai Zhongguo de Xi Xue Chuanbo (The Translation Department of the Jiangnan Arsenal and the Transmission of Western Knowledge in Modern China).” *Wenshi Zhishi (Knowledge of Literature and History)*, no. 9 (1986): 54-7.
- Shen, Guowei. “Yiming ‘Huaxue’ de Dansheng (The Creation of the Term ‘Chemistry’ in Chinese).” *Ziran Kexueshi Yanjiu (Studies in the History of Natural Sciences)* 19.1 (2000): 55-71.
- Silverman, Kaja. *The Threshold of the Visible World*. New York/London: Routledge, 1996.
- Skelton, R. A. *Maps: A Historical Survey of Their Study and Collecting*. Chicago: University of Chicago Press, 1972.
- Smith, Ken, et al., eds. *Handbook of Visual Communication: Theory, Methods, and Media*. Mahwah, NJ: L. Erlbaum, 2005.
- Smith, Marquard, and Joanne Morra, eds. *Visual Culture: Critical Concepts in Media and Cultural Studies*. New York: Routledge, 2006.
- . “Visual Culture Studies: Questions of History, Theory, and Practice.” In *A Companion to Contemporary Art Since 1945*, edited by Amelia Jones, 470-89. Malden, MA; Oxford, UK: Blackwell Publishing, 2006.
- Smith, Richard Joseph. *Chinese Maps: Images of “All Under Heaven.”* Oxford: Oxford University Press, 1996.
- Speert, Harold. *Obstetrics and Gynecology: A History and Iconography, Revised Third Edition of Iconographia Gyniatrix*. New York, London: Parthenon Publishing Group, 2004.
- Spencer, Jonathan. *To Change China: Western Advisors in China, 1620-1960*. Boston: Little Brown, 1969.
- Spencer-Oatey, Helen, and Peter Franklin. *Intercultural Interaction: A Multidisciplinary Approach to Intercultural Communication*. Basingstoke, UK: Palgrave Macmillan, 2009.

- Standaert, Nicolas, and K. U. Leuven. "A Chinese Translation of Ambroise Paré's *Anatomy*." *Sino-Western Cultural Relations Journal (Zhongxi Wenhua Jiaoliu Shi Zazhi/Zhongguo Tianzhujiao Shi Yanjiu)* 21 (1999): 9-33.
- Stark, Miriam T., Brenda J. Bowser, and Lee Horne, eds. *Cultural Transmission and Material Culture: Breaking Down Boundaries*. Tucson: University of Arizona Press, 2008.
- Stormer, Nathan. "Embodying Normal Miracles." *Quarterly Journal of Speech* 83 (2): 172-91.
- Stross, Randall E. *The Stubborn Earth: American Agriculturalists on Chinese Soil, 1898-1937*. Berkeley: University of California Press, 1986.
- Sturken, Marita, and Lisa Cartwright. *Practices of Looking: An Introduction to Visual Culture*. 2nd Edition. New York: Oxford University Press, 2009.
- Su, Jing. *Ma Li Xun yu Zhongwen Yinshua Chuban (Robert Morrison and Chinese Printing and Publishing)*. Taipei: Taiwan Xuesheng Shuju, 2000.
- Sugita, Genpaku. *Dawn of Western Science in Japan*. Translated by Ryozi Matsumoto. Tokyo: Hokuseido Press, 1969.
- Sun, Banghua. "Yu Hua Chuanbo Xi Xue de you yi Changshi: Fulanya zai Shanghai suo Bian *Gezhi Huibian* Shu Lun." (Another attempt of Disseminating Western Knowledge in China: A Discussion of John Fryer's *Chinese Scientific and Industrial Magazine* in Shanghai) *Journal of East China Normal University (Philosophy and Social Sciences Edition)* no.5 (1994): 58-63.
- Szto, Peter P. "Cultural Context and Social Technology Transfer: The Case of Canton, China." *International Journal of Social Welfare* 16 (2007): 55-64.
- Tao, Yabing. *Mingqing jian de Zhongxi Yinyue Jiaoliu* (Music Communication between China and the West during the Ming-Qing Period). Beijing: Dongfang Chubanshe (Orient Publishing House), 2001.
- Tebbel, John William. *A History of Book Publishing in the United States*. Vol. 2. *Expansion, 1865-1919*. New York: R.R. Bowker, 1979-1981.
- Teng, Ssu-yü, and John K. Fairbank. *China's Response to the West: A Documentary Survey, 1839-1923 (With a New Preface)*. Boston: Harvard University Press, 1979.
- Thrower, Norman Joseph William. *Maps and Civilization: Cartography in Culture and Society*. Chicago: University of Chicago Press, 1999.
- Tooley, R. V. *Maps and Map-Makers*. New York: Crown, 1978.
- Tsien, Tsuen-hsuei. *Written on Bamboo and Silk: The Beginnings of Chinese Books and Inscriptions*. 2nd Edition. Chicago: University of Chicago Press, 2004.

- \_\_\_\_\_, and Joseph Needham. *Paper and Printing* (Part I of Volume V: *Chemistry and Chemical Technology in Science and Civilisation in China*). Cambridge: Cambridge University Press, 1985.
- \_\_\_\_\_. “Western Impact on China through Translation.” *Far Eastern Quarterly*, vol.13, no. 3 (1954): 305-27.
- \_\_\_\_\_. *Collected Writings on Chinese Culture*. Hong Kong: The Chinese University of Hong Kong, 2011.
- Veesser, H. Aram, ed. *The New Historicism*. New York: Routledge, 1989.
- Wagner, Rudolf G. *Joining the Global Public: Word, Image, and City in Early Chinese Newspapers, 1870-1910*. Albany: State University of New York Press, 2007.
- Wakeman, Frederic Jr. and Wen-hsin Yeh, eds. *Shanghai Sojourners*. Berkeley: Institute of East Asian Studies, 1992.
- Wakeman, G. *Victorian Book Illustration: The Technical Revolution*. Detroit: Gale Research, 1980.
- Waley-Cohen, Joanna. “China and Western Technology in the Late Eighteenth Century.” *American Historical Review* 98.4 (1993): 1525-44.
- Wang, Erming. *Jindai Shanghai Keji Xianqu zhi Renji Yiyuan yu Gezhi Shuyuan* (The Shanghai Hospital and the Shanghai Polytechnic Institute as the Avant-couriers of Science in Modern Shanghai). Taipei: Yuzhouguang, 2006.
- \_\_\_\_\_. *Shanghai Gezhi Shuyuan Zhi Lue* (A History of Shanghai Polytechnic College). Hong Kong: Press of the Chinese University of Hong Kong, 1980.
- \_\_\_\_\_. “Zhongguo Jindai Zhishi Puji Hua Chuanbo zhi Tu Shuo Xingshi: Dianshizhai Huabao Li (The Illustration Narrative Form of Knowledge Popularization in Late Qing China: A Case Study of the Dianshizhai Pictorial).” *Zhongguo Keji Shiliao* (China Historical Materials of Science and Technology) 11.1 (1990): 89-96.
- Wang, Genyuan, and Yunhao Cui. “Guanyu Jinshi Shibie de Fanyi, Chuban he Diben (Some Problems with regard to Jinshi Shibie).” *Zhongguo Keji Shiliao* (China Historical Materials of Science and Technology) 11.1 (1990): 89-96.
- Wang, Hsiu-yun. “Stranger Bodies: Women, Gender, and Missionary Medicine in China, 1870s-1930s.” PhD diss., University of Wisconsin, Madison, 2003.
- Wang, Jiarong. *Zhongguo Chuban Tongshi: Qingdai Juan* (A General History of the Chinese Publishing: Qing Dynasty). Beijing: Zhongguo Shuji Chubanshe.
- Wang, Lixin. *Meiguo Chuanjiaoshi yu Wanqing Zhongguo Xiandaihua: Jindai Jidu Xinjiao Chuanjiaoshi zai Hua Shehui Wenhua he Jiaoyu Huodong Yanjiu* (American Missionaries

- and Modernization in Late-Qing China: A Research on Social, Cultural, and Educational Activities of Protestant Missionaries in Modern China*). Tianjin: Tianjin Renmin Chubanshe, 1997.
- Wang, Shuhuai. *Jidujiao yu Qing Ji Zhongguo de Jiaoyu yu Shehui (Christianity and Chinese Education, Society in the Late Qing Dynasty)*. Taibei: Yuzhouguang, 2006.
- Wang, Xin. "Cong Zhongxi Yinyue Bijiao Kan Jidujiao Shengshi Yinyue Zhongguohua (Sinicization of Christian Sacred Music from the Perspective of Comparative Study of Chinese and Western Music)." *Tianfeng (Heavenly Wind)* 11 (2006): 36-8.
- Wang, Xuan. "Judujiao Zanmeishi zai Jindai Zhongguo de Chuanbo jiqi Yingxiang (The Communication and Influence of Christian Hymns in Modern China)." *Huang Zhong (Journal of Wuhan Conservatory of Music)* Supplement Volume (2006): 63-68.
- Wang, Yangzong. *Fulanya yu Jindai Zhongguo de Kexue Qimeng (John Fryer and the Science Enlightenment in Modern China)*. Beijing: Science Press, 2000.
- \_\_\_\_\_. "Gezhi Huibian yu Xifang Jindai Keji Zhishi zai Qing Mo de Chuanbo (The Chinese Scientific and Industrial Magazine and the Introduction of Western Science and Technology in Late Nineteenth-century China)." *Zhongguo Keji Shiliao (China Historical Materials of Science and Technology)*, 17.1 (1996): 36-47.
- \_\_\_\_\_. "Guanyu Huaxue Jianyuan yu Huaxue Chujie (Huaxue Jianyuan and Huaxue Chujie)." *Zhongguo Keji Shiliao (Historical Archives of Chinese Science)*, 11.1 (1990): 84-8.
- \_\_\_\_\_. "Jiangnan Zhizaoju Fanyiguan Shi Lue (A Brief History of the Translation Department of the Jiangnan Arsenal)." *Zhongguo Keji Shiliao (China Historical Materials of Science and Technology)*, 9.3 (1988): 65-74.
- \_\_\_\_\_. "Jiangnan Zhizaoju Fanyi Shumu Xin Kao (A New Catalogue of Translated Books of the Jiangnan Arsenal, 1868-1912)." *Zhongguo Keji Shiliao (China Historical Materials of Science and Technology)*, 16.2 (1995): 3-18.
- Weller, Toni, ed. *Information History in the Modern World: Histories of the Information Age*. Basingstoke, UK: Palgrave Macmillan, 2011.
- Weller, Toni. *The Victorians and Information: A Social and Cultural History*. Saarbrücken: VDM Verlag, 2009.
- Wendorf, Richard, ed. *Articulate Images: The Sister Arts from Hogarth to Tennyson*. Minneapolis: University of Minnesota Press, 1983.
- Wickliff, Gregory, A. "Light Writing: Technology Transfer and Photography to 1845." *Technical Communication Quarterly*, 15.3 (2006): 293-313.
- Widmer, Ellen. "The Huanduzhai of Hangzhou and Suzhou: A Study in Seventeenth-century Publishing." *Harvard Journal of Asiatic Studies*, 56.1: 77-122.

- Williams, Frederick, and David V. Gibson, eds. *Technology Transfer: A Communication Perspective*. Newbury Park, CA: Sage, 1990.
- Wilson, Ming, and Stacey Pierson, eds. *The Art of the Book in China: Colloquies on Art & Archaeology in Asia No.23 (Held June 13<sup>th</sup>-15<sup>th</sup>, 2005)*. London: School of Oriental and African Studies, University of London, 2006.
- Wittkower, Rudolf. *Allegory and the Migration of Symbols*. London: Thames and Hudson, 1977.
- Wong, Chi-min, and Lien-teh Wu. *History of Chinese Medicine: Being a Chronicle of Medical Happenings in China from Ancient Times to the Present Period (Zhongguo Yi Shi)*. Tientsin, China: Tientsin Press, Ltd., 1932.
- Wong, R. Bin. "The Search for European Differences and Domination in the Early Modern World: A View from Asia." *American Historical Review* 107.2 (2002): 447-69.
- Woo, David. *Map as Expression: A Study of Traditional Chinese Cartographic Style*. Seattle: University of Washington, 1981.
- Wright, David. *Translating Science: The Transmission of Western Chemistry into Late Imperial China, 1840-1900*. Leiden: Brill Academic Publishers, 2000.
- \_\_\_\_\_. "Careers in Western Science in Nineteenth-Century China: Xu Shou and Xu Jianyin." *Journal of the Royal Asiatic Society*, 5.1 (1995): 49-90.
- \_\_\_\_\_. "John Fryer and the Shanghai Polytechnic: Making Space for Science in Nineteenth-century China." *British Journal for the History of Science*, 29.1 (1996): 1-16.
- \_\_\_\_\_. "The Great Desideratum Chinese Chemical Nomenclature and the Transmission of Western Chemical Concepts." *Chinese Science* 14 (1997): 35-70.
- \_\_\_\_\_. "The Translation of Modern Western Science in Nineteenth-Century China, 1840-1895." *Isis* 89.4 (1998): 653-73.
- Wu, Hongcheng. "Yangwu Yundong Shiqi Xi Xue Jiaokeshu Bian Yi Wenti Yanjiu (Study on the Problems of Compiling and Translating the Western Textbooks during the Period of Westernization Movement)." *Journal of Linyi Normal University*, 26.5 (2004): 32-6.
- Wu, Hung, and Katherine R. Tsiang, eds. *Body and Face in Chinese Visual Culture*. Cambridge, MA: Harvard University Press, 2005.
- Wu, Yi-Li. "God's Uterus: Benjamin Hobson and Missionary 'Midwifery' in Nineteenth-Century China." Paper presented at the conference of "The Disunity of Chinese Science," University of Chicago, Chicago, May 10-11, 2002.
- Xia, Yanzhou. *Zhongguo Jinxindai Yinyue Shi Jianbian (A Brief History of Music in Modern and Contemporary China)*. Shanghai: Shanghai Music Press, 2004.

- Xiong, Yuezhi. *Xixue Dongjian yu Wanqing Shehui* (The Eastward Progress of Western Studies and the Late Qing Society). Shanghai: Shanghai Renmin Chubanshe, 1995.
- Xu, Ling. "Jindai Jidujiao Yinyue dui Xuetang Yuege de Yingxiang (The Influence of Modern Christian Music on School Music)." *Journal of Bohai University* 3 (2007): 147-50.
- Xu, Xiaoman, and Fukang Wang. *Zhongguo Gudai Chatu Shi* (A History of Chinese Illustrations). Shanghai: Shanghai Guji Chubanshe, 2007.
- Xu, Yinong. *Huozi Ben* (Movable-typed Editions). Nanjing: Jiangsu Guji Chubanshe, 2003.
- . *Zhongguo Gudai Yinshua Tu Zhi* (An Illustrated Record of Chinese Printing in Historical Periods). Yangzhou: Guangling Shushe, 2006.
- Xu, Zhenya. "Fulanya yu Zhongguo Jindai Huaxue (John Fryer and Chinese Modern Chemistry)." *Journal of Beijing University of Chemical Technology (Social Sciences Edition)*, 2 (2001): 55-64.
- Xu, Zongze. *Mingqing jian Yesu Huishi Yizhu Tiya* (An Annotated Bibliography of Works Translated by Jesuits in Ming-Qing Period). Beijing: Zhonghua Shuju, 1989.
- Xue, Bing. *Chatu Ben* (Illustrated Editions). Nanjing: Jiangsu Guji Chubanshe, 2002.
- Yan, Zonglin. *Zhongxi Jiaotong Shi* (History of Communication between China and the West). Guilin: Guangxi Normal University Press, 2007.
- Yang, Gen. *Xu Shou he Zhongguo Jindai Huaxue Shi* (Xu Shou and the History of Modern Chemistry in China). Beijing: Kexuejishu Wenxian Chubanshe, 1986.
- Yang, Lijun, Daliang Zhao, and Yuan Yao. "Gezhi Huibian de Keji Neirong ji Yiyi (Scientific and Technological Contents and Significance of the Chinese Scientific and Industrial Magazine)." *Journal of Liaoning Institute of Technology*, 2 (2003): 73-5.
- Yang, Yongde, and Ning Yang. *Zhongguo Gudai Shuji Zhuangzhen* (Chinese Traditional Book Decorations). Beijing: Renmin Meishu Chubanshe, 2008.
- Yee, Cordell D. K. *Zhongguo Dituxue Shi* (Cartography in the Traditional East and Southeast Asian Societies). Translated by Daozhang Jiang. Beijing: Beijing University Press, 2006.
- Ye, Xiaoqing. *The Dianshizhai Pictorial: Shanghai Urban Life, 1884-1898*. Ann Arbor: Center for Chinese Studies, University of Michigan, 2003.
- Yeh, Wen-hsin, ed. *Becoming Chinese: Passages to Modernity and Beyond*. Berkeley: University of California Press, 2000.
- , ed. *Landscape, Culture, and Power in Chinese Society*. Berkeley: Institute of East Asian Studies and Center for Chinese Studies, University of Berkeley, 1998.

- Yu, Yingshi. "Yuan 'Xu': Zhongguo Shuxie Shi shang de Yige Tese (Prefaces: An Outstanding Feature in the History of Chinese Writing)." *Journal of Tsinghua University (Philosophy and Social Sciences)* 24.1 (2009): 5-12.
- Yuan, Yuan. "Jindai Shenglixue zai Zhongguo: 1851-1926 (Modern Physiology in China: 1851-1926)." PhD diss., Shanghai Jiaotong University, 2006.
- Zachs, William. *The First John Murray and the Late Eighteenth-Century London Book Trade: With a Checklist of His Publications*. Oxford: Oxford University Press, 1998.
- Zboray, Ronald J., and Mary Saracino Zboray. *Everyday Ideas: Socioliterary Experience among Antebellum New Englanders*. Knoxville: University of Tennessee Press, 2006.
- \_\_\_\_\_. *Literary Dollars and Social Sense: A People's History of the Mass Market Book*. New York: Routledge, 2005.
- Zeitlin, Judith T., Lydia H. Liu, and Ellen Widmer, eds. *Writing and Materiality in China: Essays in Honor of Patrick Hanan*. Cambridge, MA: Harvard University Asia Center for Harvard-Yenching Institute, 2003.
- Zhang, Baichun. "The Introduction of European Astronomical Instruments and the Related Technology into China during the Seventeenth Century." *East Asian Science, Technology, and Medicine* 20 (2003): 99-131.
- \_\_\_\_\_, et al. *Chuanbo yu Huitong: Qi Qi Tu Shuo Yanjiu yu Jiaozhu (Transmission and Adaptation: Research and Commentary on Qi Qi Tu Shuo)*. Nanjing: Jiangsu Kexue Jishu Chubanshe, 2009.
- Zhang, Binglun. "Guanyu Zhongguo Ren Zi Zhu Qian Huozi Wenti de Taolun (A Discussion about the Casting of Lead Movable Types by Chinese People)." *Zhongguo Yinshua (China Printing)*, no. 7 (2003): 66-70.
- Zhang, Hailin. *Jindai Zhongwai Wenhua Jiaoliu Shi (A Modern History of Cultural Exchanges between China and Other Countries)*. Nanjing: Nanjing University Press, 2003.
- Zhang, Jian. "Jindai Kexue Mingci Shuyu Shending Tongyi zhong de Hezuo, Chongtu yu Kexue Fazhan (Cooperation, Conflicts, and Development in the Course of Examining and Unifying of the Technical Terms in Modern Times)." *Shi Lin (Historical Review)* 2 (2007): 24-35.
- Zhang, Jinglu. *Zhongguo Jinxiandai Chuban Shiliao (Historical Archives of Publishing in Modern China)*. Vol. 1. Shanghai: Shanghai Shudian, 2003.
- Zhang, Shudong, Duoyi Pang, and Rusi Zheng. *Jianming Zhonghua Yinshua Tongshi (The Concise General History of Chinese Printing)*. Guilin: Guangxi Nomal University Press, 2004.



- Zhang, Xiumin. *Zhongguo Yinshua Shi (History of Chinese Printing)*. Enlarged and Illustrated Edition. Hangzhou: Zhejiang Guji Chubanshe, 2006.
- \_\_\_\_\_. *Zhongguo Yinshua Shu de Faming jiqi Yingxiang (The Invention and Influence of Chinese Printing)*. Beijing: Renmin Chubanshe, 1958.
- \_\_\_\_\_. *Zhang Xiumin Yinshu Shi Lunwen Ji (An Anthology of Zhang Xiumin's Essays on History of Chinese Printing)*. Beijing: Yinshua Gongye Chubanshe, 1988.
- \_\_\_\_\_, and Qi Han. *Zhongguo Huozi Yinshua Shi (A History of Chinese Moveable-Type Printing)*. Beijing: Zhongguo Shuji Chubanshe, 1998.
- Zhang, Zhong. "The Transfer of Network Technologies to China, 1860-1898." PhD diss., University of Pennsylvania, 1989.
- Zhang, Zhongmin. *Chuban yu Wenhua Zhengzhi: Wanqing de "Weisheng" Shuji Yanjiu (Publishing and Cultural Politics: A Research of "Hygiene" Publications in Late Qing Period)*. Shanghai: Shanghai Shudian, 2009.
- Zhang, Zhiqiang. "Zhongguo Wenzi de Hengpai yu Shupai (Horizontal and Vertical Layouts of Chinese Characters)." In his *Mianbizhai Yanshu Lu (Book Studies of Mianbizhai)*, 260-7. Nanjing: Jiangsu Jiaoyu Chubanshe, 2001.
- Zhao, Hongjun. *Jindai Zhongxi Yi Lunzheng Shi (The Controversies between Chinese and Western Medicines in Modern China)*. Hefei: Anhui Kexue Jishu Chubanshe, 1989.
- Zhao, Pushan. "Hexin Xiyi Wuzhong ji zai Hua Yingxiang (Benjamin Hobson's Xiyi Wuzhong and Its Influence in China)." *Jindaishi Yanjiu* 2 (1991): 67-83.
- Zou, Zhenhuan. *Wanqing Xifang Dilixue zai Zhongguo: Yi 1815 zhi 1911 Nian Xifang Dilixue Yizhu de Chuanbo yu Yingxiang wei Zhongxin (Western Geography in China: Research on the Transmission and Influence of Translated Western Geography Books from 1815 to 1911)*. Shanghai: Shanghai Guji Chubanshe, 2000.
- \_\_\_\_\_. "Xiyi Yizhu yu Jindai Zhongyi Jie de Fanxing (The Translations of Western Medicine and the Reflection of Modern Academia of Chinese Medicine)." *Journal of East China Normal University (Philosophy and Social Science Version)* 1 (1986): 76-80.
- \_\_\_\_\_. "Wanqing Xishu Zhongyi ji dui Zhongguo Wenhua de Yingxiang (Translation of Western Books in Late-Qing China and Its Influence on Chinese Culture)." In *Chubanshi Yanjiu (History of Publishing)*, edited by Zaisheng Ye, Volume 2 and 3, 3-28 and 1-29. Beijing: Zhongguo Shuji Chubanshe, 1994 and 1995.