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THE FORMATION OF BOTANICAL TERMINOLOGY:
A MODEL OR A CASE STUDY?

China has a rich literature dealing with plants. Beginning with the *Shijing* 詩經 (Books of odes), one finds many poetic, lexicographic, encyclopaedic, agricultural and horticultural texts.¹ In regard to this situation, one may consider with Edward Lee Greene that “botany did not begin with the first books on botany, nor with the men who indited them...”, and that

...the most remote and primitive of botanical writers, of whatever country or language, found a more or less extensive vocabulary of elementary botany in the colloquial speech of all.²

By expressing such an opinion in the early twentieth century, Greene reacted against the concept of a science thought to have begun in the sixteenth century, in particular with the German ‘fathers of botany’, as suggested by Julius Sachs (1875) and others.³ At the same time he provided to a certain extent premonitory enlightenment on some aspects of ethno-botany⁴. In order to prevent any ambiguity, I should state more precisely what is meant by ‘botany’ in this paper. A modern dictionary gives the following definition: “(a branch of biology that deals with) plants and plant life in the world”.⁵ With this mean-

¹ Cf. Joseph Needham and Lu Gwei-Djen. 1986. *Science and Civilisation in China. Vol. VI. Part 1: Botany*. Cambridge: Cambridge University Press; Li Hui-Lin. 1959. *The Garden Flowers of China*. New York: The Ronald Press Company.

² Edward Lee Greene. 1983. *Landmarks of Botanical History*. Edited by Frank N. Egerton. 2 vols. Stanford: Stanford University Press, p. 118.

³ Julius Sachs. 1875. *Geschichte der Botanik vom 16. Jahrhundert bis 1860*. Oldenburg, Munich: Cotta, p. xii.

⁴ In the chapter “The Philosophy of Botanical History”, Greene carried on stating that “the chief organs of plants—stem, trunk, branch, leaf, flower, fruit, pod, seed, root, tendril, thorn, and a multitude of others—had been discriminated and named; the organs even known by all who had acquaintance with plants and trees, and the names were everywhere in use. Even the functions of several of the organs had been correctly ascertained before ever a line of botany had been written, most probably even before letters had been invented. The improvement of wild things by cultivation, the propagating of the newly acquired sorts of cuttings, by division of perennial roots, and, in the case of trees, by grafting, are likewise arts that seem to antedate history; as do also the designating of different varieties or species that are evidently nearly akin, by two-fold names, one generic, the other specific or varietal.” Greene 1983, p. 118.

⁵ *Longman Dictionary of the English Language*. 1984. Harlow: Longman.

ing, considered as a science, it is obvious that botany appeared during the Renaissance period in Europe. But this science was not born from nothing and, to better appreciate and analyze its history, it is important to take into account the knowledge of the plant world that people had earlier in history. Moreover, if we wish to appreciate how modern, scientific botany progressively emerged from this previous kind of botany—which we consider as belonging to the field of ethno-biology—we need to drop a rather frequent teleological point of view and adopt an anthropological one.⁶

As far as China is concerned, it is true that one can find an already elaborate botanical terminology in the *Bencao gangmu* 本草綱目 (Classified materia medica) by the physician Li Shizhen 李時珍 (1518–1593), completed in 1578 and published in 1596.⁷ But the first use of the terminology which is our concern today, the one belonging to modern botany, appeared rather late, precisely in 1858 when *Zhiwuxue* 植物學 (Botany) was published in Shanghai. This first book on modern botany written in Chinese and in China was the result of a cooperation between two English Protestant missionaries Alexander Williamson (Wei Lianchen 韋廉臣, 1829–1890) and Joseph Edkins (Ai Yuese 艾約瑟, 1823–1905), and a Chinese scholar, the well-known mathematician Li Shanlan 李善蘭 (1811–1882).⁸ Considering this book as the first landmark for modern botanical terminology in Chinese and using a few terms as examples, I would like to give a rough outline of the elaboration of this vocabulary until it became settled, at around 1920.

1. ELABORATION OF MODERN CHINESE BOTANICAL TERMINOLOGY: THE FIRST STEPS

Before the twentieth century, only a few books on modern botany were published in China: (1) *Zhiwuxue* 植物學 (Botany) by Li Shanlan, A.

⁶ Scott Atran. 1990. *Cognitive Foundations of Natural History*. Cambridge: Cambridge University Press.

⁷ Cf. Georges Métaillé. 1990. “Botanical Terminology of Li Shizhen in *Bencao gangmu*”, in: Hakim Mohammed Said (ed.). *Essays on Science*. Karachi: Hamdard Foundation Pakistan, pp. 140–53.

⁸ Li Shanlan 李善蘭, Alexander Williamson (Wei Lianchen 韋廉臣) and Joseph Edkins (Ai Yuese 艾約瑟). 1858. *Zhiwuxue* 植物學 (Botany). Shanghai: Mohai shuguan (hereafter ZWX).

Williamson and J. Edkins in 1858; (2) *Zhiwuxue qimeng* 植物學啟蒙 (A primer of botany) edited by Robert S. Hart and Joseph Edkins in 1886⁹; (3) *Zhiwu tushuo* 植物圖說 (Plants illustrated and explained) by John Fryer (Fu Lanya 傅蘭雅, 1839–1928) in 1895¹⁰; and (4) *Zhiwu xuzhi* 植物須知 (What must be known about plants), by the same author in 1898¹¹. A Chinese author, Ye Lan 葉瀾 (1875–?), also published—probably soon after the first book by Fryer—a *Zhiwuxue gelüe* 植物學歌略 (Rhymed summary of botany).¹² In the first part of this book, Ye presents the 154 pictures found in *Zhiwu tushuo*, supplemented by a text composed of four character sentences explaining what botany was in a classical didactic manner, similar, for example, to that in medicinal books. The *Zhiwu tushuo* was published again in 1898 under the title *Taixi zhiwuxue* 泰西植物學 (Botany of the Far West) but without any reference to Fryer, as part of a collection of texts outlining Western knowledge entitled *Xifa cexue huiyuan* 西法策學匯源.¹³

I have chosen to consider the translations into Chinese of a few terms for different parts of plants that I think are representative to the study of the formation of modern botanical terminology. First, the terms for leaf and flower, often used in non-technical contexts, and secondly, the various terms for the different elements of the sexual parts of the flower. This second set of highly technical terms was created rather late in Europe, after the discovery of sexuality in plants, between the last decade of the seventeenth and the middle of the eighteenth century.¹⁴ It seems interesting to see how these new concepts were rendered into Chinese.¹⁵ In this way, we may get a complete summary of the different lexical situations met in the introduction of modern botany in China (see Table 1).

⁹ Robert S. Hart and Joseph Edkins. 1886. *Zhiwuxue qimeng* 植物學啟蒙 (Primer of botany). n.p.: Zong shiwusi shu (hereafter ZWXQM).

¹⁰ John Fryer (Fu Lanya 傅蘭雅). 1895. *Zhiwu tushuo* 植物圖說 (Plants illustrated and explained). Shanghai: Yizhi shuhui (hereafter ZWTS).

¹¹ John Fryer (Fu Lanya 傅蘭雅). 1898. *Zhiwu xuzhi* 植物須知 (What must be known about plants). Shanghai: Gezhi shuhshi (hereafter ZWXZ).

¹² Ye Lan 葉瀾. n.d. *Zhiwuxue gelüe* 植物學歌略 (Rhymed summary of botany). Shanghai.

¹³ I would like to thank Shen Guwei for pointing out this fact to me.

¹⁴ Alan G. Morton. 1981. *History of Botanical Science*. London, New York: Academic Press, chap. 7.

¹⁵ For an analysis of one of the morphemes, *rui* 蕊, used in the translation of ‘stamen’ and ‘pistil’, see Georges Métailié. 1994. “A propos du sexe des fleurs: le cas des *rui*”, *Cahiers de Linguistique Asie Orientale* 23, pp. 223–30.

Table 1: The various lexical choices adopted in China

English term	ZWX (1858)	ZWXQM (1886)	ZWTS (1895)	ZWXZ (1898)	Modern Chinese
leaf	<i>ye</i> 葉	<i>ye</i> 葉	<i>ye</i> 葉	<i>ye</i> 葉	<i>yezi</i> 葉子
petiol	<i>yejing</i> 葉莖	<i>yejing</i> 葉莖	<i>yejing</i> 葉莖	<i>yefu</i> 葉跗	<i>yebing</i> 葉柄
flower	<i>hua</i> 花	<i>hua</i> 花	<i>hua</i> 花	<i>hua</i> 花	<i>hua</i> 花
stamen	<i>xu</i> 須	<i>xu</i> 須	<i>huaxu</i> 花須	<i>huaxu</i> 花須	<i>xiongrui</i> 雄蕊
anther	<i>nang</i> 囊	<i>(xu) nang</i> (須)囊	<i>xutou</i> 須頭	<i>xutou</i> 須頭	<i>yao</i> 藥
pollen	<i>fen</i> 粉	<i>fenjiang</i> 粉漿	<i>huajing</i> 花精 <i>huafen</i> 花粉	<i>huajing</i> 花精	<i>huafen</i> 花粉
filament	<i>(xu zhi) jing</i> (須之)莖	<i>xujing</i> 須莖	<i>xujing</i> 須莖	<i>tuoxian</i> 托線	<i>huasi</i> 花絲
pistil	<i>xin</i> 心	<i>xin</i> 心	<i>huaxin</i> 花心	<i>huaxin</i> 花心	<i>cirui</i> 雌蕊
stygma	<i>(xin zhi) kou</i> (心之)口	<i>guankou</i> 管口	<i>zifangkou</i> 子房口 <i>huaxinding</i> 花心頂	<i>zifangkou</i> 子房口 <i>huaxinding</i> 花心頂	<i>zhutou</i> 柱頭
style	<i>(xin zhi) guan</i> (心之)管	<i>xinguan</i> 心管	<i>huaxinjing</i> 花心莖	<i>huaxinjing</i> 花心莖	<i>huazhu</i> 花柱
ovary	<i>zifang</i> 子房	<i>zifang</i> 子房	<i>huazifang</i> 花子房	<i>huazifang</i> 花子房	<i>zifang</i> 子房
carpel	<i>xinpi</i> 心皮	<i>xinye</i> 心葉	<i>huaxinfen</i> 花心分	<i>huaxinfen</i> 花心分	<i>xinpi</i> 心皮
ovule	<i>peizhu</i> 胚珠	<i>luan</i> 卵	<i>peizhu</i> 胚珠	<i>peizhu</i> 胚珠	<i>peizhu</i> 胚珠

It is obvious at first glance that, when ancient notions — at least from a morphological point of view — are concerned, the traditional vocabulary, which is generally mono- or bisyllabic, is used in the pre-twentieth century texts. Thus, we find *ye* 葉 for ‘leaf’ and *hua* 花 for ‘flower’; and we also find *guo* 果 for ‘fruit’, *shi* 實 for ‘fructification’, *zhongzi* 種子 for ‘seed’ and *gen* 根 for ‘root’. Considering the ‘new’ terminology, the main part of this vocabulary is created by composition, generally following the classical determining-determined struc-

ture, using morphemes taken from the general vocabulary and given a new technical meaning, for instance *xu* 須 ('beard') for 'stamen', *kou* 口 ('mouth' or 'opening') for 'stigma', *xin* 心 ('heart') for 'pistil'.

2. ELABORATION OF MODERN CHINESE BOTANICAL TERMINOLOGY: LOOKING FOR THE TURNING POINT

If one compares the terms in the first three rows of Table 1, created between 1858 and 1898, with modern terminology, one realizes at once that, with the exception of three terms—*xinpi* 心皮 'carpel', *zifang* 子房 'ovary' and *peizhu* 胚珠 'ovule'—all have disappeared today. Puzzled by this situation, and in order to locate the period when things might have changed, I checked various bilingual (English-Chinese and French-Chinese) dictionaries issued in 1904¹⁶, 1910¹⁷, 1914¹⁸ and 1923¹⁹, respectively, and a Chinese textbook of botany published in 1918²⁰, and compared the terminology they employed.

Comparing the terms in the various columns of Table 2 below, and keeping in mind the terms created during the nineteenth century listed in Table 1, it is obvious that something happened between the end of that century and 1914 when the French-Chinese dictionary by Charles Taranzano attests to the existence of the vocabulary that is still in use today, even if, in some cases, it is challenged by other, now obsolete terms.

¹⁶ *Technical Terms. English and Chinese*. 1904. Shanghai: Educational Association of China (hereafter *TTEC*).

¹⁷ *Dictionnaire français-chinois*. 1910. Shanghai: Commercial Press (hereafter *DFC*).

¹⁸ Charles Taranzano. 1914. *Vocabulaire français-chinois des sciences*. Sien-hsien: Imprimerie de la Mission Catholique (hereafter *VFCS*).

¹⁹ Charles Taranzano. 1923. *Supplément au vocabulaire français-chinois des sciences. Classifications—Tableaux synoptiques*. Sien-hsien: Imprimerie de la Mission Catholique (hereafter *SVFCS*).

²⁰ Ma Junwu 馬君武. 1918. *Zhiwuxue jiaokeshu* 植物學教科書 (Botanical textbook). Shanghai: Shangwu yinshuguan (hereafter *ZWXJKS*).

Table 2: Botanical terms in bilingual dictionaries and botanical texts

English term	TTEC (1904)	DFC (1910)	VFCS (1914)	ZWXJKS (1918)	SVFCS (1923)	Modern Chinese
leaf	ye 葉	ye 葉	ye 葉	ye 葉	ye 葉	yezi 葉子
petiol	yejing 葉莖	yebing 葉柄 yejing 葉莖	yebing 葉柄	yebing 葉柄		yebing 葉柄
flower	hua 花	hua 花	hua 花	hua 花	hua 花	hua 花
stamen	huaxu 花須	xiongrui 雄蕊 huaxu 花須	xiongrui 雄蕊	xiongrui 雄蕊	xiongrui 雄蕊	xiongrui 雄蕊
anther	xutou 須頭	huarui de fenfang 花蕊的 粉房	fennang 粉囊 yao 藥	fennang 粉囊	fennang 粉囊	yao 藥
pollen	huafen 花粉 huajing 花精		huafen 花粉 huajing 花精	fen 粉	huafen 花粉	huafen 花粉
filament	tuoxian 托線		xixian 細線 (hua)si (花)絲	xiongruixian 雄蕊線	huasi 花絲	huasi 花絲
pistil	huaxin 花心	cirui 雌蕊	cirui 雌蕊	cirui 雌蕊	cirui 雌蕊	cirui 雌蕊
stygma	huaxianding 花心頂 zifangkou 子房口		cirui zhi zhutou 雌蕊之柱頭 zifangkou 子房口	cirui zhi zhutou 雌蕊之 柱頭	zhutou 柱頭	zhutou 柱頭
style	xinjing 心莖	huazhu 花柱	ciruizhu 雌蕊柱	cirui zhi jing 雌蕊之莖	huazhu 花柱	huazhu 花柱
ovary	zifang 子房	zifang 子房	guonang 果囊 zinang 子囊	zifang 子房	zifang 子房	zifang 子房
ovule	peizhu 胚珠	weishou zhi zifang 未熟 之子房	peizhu 胚珠	peizhu 胚珠	peizhu 胚珠	peizhu 胚珠

3. SEARCHING FOR THE MISSING LINK

In order to find a possible origin for the modern Chinese vocabulary, which did not exist in the first Chinese treatises on botany, the next step was, logically, to look for a possible Japanese influence and to check early Japanese books on modern botany. Actually, a well-known Japanese scholar, Udagawa Yōan 宇田川榕菴 (1798–1846), who played a key role in the modernization of Japan through his adaptations of many foreign books, mainly from the Dutch, had written a short lapidarian text in 1822, titled *Botanika kyō* 菩多尼訶經 (Canon of botany), which introduced a new science from the West to the Japanese learned reader: botany.²¹ Seven years later another young scholar, Itō Keisuke 伊藤圭介 (1803–1901), published the *Taisei honzō meisō* 泰西本草名疏 (Plant names of the Far West)²², a book consisting of a list of the Japanese and Sino-Japanese names for almost all the Latin binomials Carl Peter Thunberg (1743–1828) had given in his *Flora Japonica* (1784) to the plants he had collected while he was in Japan.²³ This book had been imported into Japan for the first time in 1825.²⁴ In the introduction to his book, Itō Keisuke, explained the Linnean system of classification. Nine years later, in 1834, Udagawa Yōan edited the *Shokugaku keigen* 植學啟原 (Sources of botany), which is probably the first modern botanical treatise published in East Asia.²⁵ The *Sōmoku zusetsu* 草木圖說 (Plants illustrated and explained, 1856) by Inuma Yokusai 飯沼慾齋 (1783–1864) is the first flora of Japan.²⁶ It includes illustrations, botanical descriptions in Japanese, and Japanese and Sino-Japanese names of plants in Japan classified following the Linnean method. The book by Ono Motoyoshi 小野職懿, *Shokugaku yakusen* 植學譯筌 (Dictionary of botany) is an Eng-

²¹ Udagawa Yōan 宇田川榕菴 . 1822. *Botanika kyō* 菩多尼訶經 (Canon of botany). Edo. Reprinted in *Shokubutsu to bunka* 1971.1, pp. 114–119 (hereafter *BK*).

²² Itō Keisuke 伊藤圭介 . 1976 [1829]. *Taisei honzō meisō* 泰西本草名疏 (Plant names of the Far West). Tokyo: Inoue shoten (hereafter *THM*).

²³ Carl Peter Thunberg. 1784. *Flora Japonica*. Leipzig: Müller.

²⁴ Cf. Ueno Masuzō 上野益三 . 1973. *Nihon hakubutsugaku shi* 日本博物學史 (The history of Japanese natural science). Tokyo: Heibonsha, p. 484.

²⁵ Udagawa Yōan 宇田川榕菴 . 1834. *Shokugaku keigen* 植學啟原 (Sources of botany). 3 vols. Edo: Bosatsurō zōhan (hereafter *SGKG*).

²⁶ Inuma Yokusai 飯沼慾齋 . 1977 [1856]. *Sōmoku zusetsu* 草木圖說 (Plants illustrated and explained). Edited by Kitamura Shirō 北村四郎 . Osaka: Ho-ikusha 1977. (hereafter *SMZS*).

lish-Japanese dictionary, published in 1874 by the Japanese Ministry of Culture.²⁷

Table 3: Botanical terms in the first Japanese treatises on botany

English term	BK (1822)	THM (1829)	SKGK (1834)	SMZS (1856)	SGYS (1874)	Modern Chinese
leaf	<i>ha</i> 葉	<i>ha</i> 葉	<i>ha</i> 葉	<i>ha</i> 葉	<i>ha</i> 葉	<i>ye</i> 葉
petiol		<i>yōhei</i> 葉柄			<i>yōhei</i> 葉柄	<i>yebing</i> 葉柄
flower	<i>hana</i> 花	<i>hana</i> 花	<i>hana</i> 花	<i>hana</i> 花	<i>hana</i> 花	<i>hua</i> 花
stamen	<i>shuzui</i> 須蕊	<i>yūzui</i> 雄蕊	<i>shuzui</i> 須蕊 <i>yūzui</i> 雄蕊	<i>shuzui</i> 須蕊 <i>yūzui</i> 雄蕊	<i>yūzui</i> 雄蕊 <i>shuzui</i> 須蕊	<i>xiongrui</i> 雄蕊
anther	<i>yaku</i> 藥	<i>shitō</i> 絲頭	<i>yaku</i> 藥	<i>yaku</i> 藥	<i>yaku</i> 藥	<i>yao</i> 藥
pollen	<i>kona</i> 粉	<i>kafun</i> 花粉	<i>kafun</i> 花粉	<i>kona</i> 粉	<i>kafun</i> 花粉	<i>huafen</i> 花粉
filament	<i>kan</i> 筭	<i>kashi</i> 花絲	<i>kan</i> 筭	<i>kan</i> 筭	<i>kashi</i> 花絲	<i>huasi</i> 花絲
pistil	<i>shinzui</i> 心蕊	<i>shizui</i> 雌蕊	<i>shinzui</i> 心蕊 <i>shizui</i> 雌蕊	<i>shizui</i> 雌蕊	<i>shizui</i> 雌蕊 <i>shuzui</i> 須蕊	<i>cirui</i> 雌蕊
stygma	<i>chūtō</i> 柱頭	<i>chūtō</i> 柱頭	<i>chūtō</i> 柱頭	<i>tō</i> 頭	<i>chūtō</i> 柱頭	<i>zhutou</i> 柱頭
style	<i>kachū</i> 花柱	<i>kachū</i> 花柱	<i>kachū</i> 花柱	<i>chū</i> 柱	<i>chū</i> 柱	<i>huazhu</i> 花柱
ovary	<i>so</i> 礎	<i>jisso</i> 實礎 <i>ransō</i> 卵巢 <i>shikyū</i> 子宮	<i>ransō</i> 卵巢	(<i>zishi</i>) 子室 <i>jisso</i> 實礎	<i>shibō</i> 子房	<i>zifang</i> 子房
ovule					<i>haishu</i> 胚珠	<i>peizhu</i> 胚珠

²⁷ Ono Motoyoshi 小野職懿 . 1874. *Shokugaku yakusen* 植學譯筌 (Dictionary of botany). Tokyo: Monbusho. Reprinted in: Satō Shichirō 佐藤七郎 et al. (eds.). 1971. *Nippon kagaku gijutsushi taikai* 日本科學技術史大系 (Great anthology of the history of science and technology in Japan). Tokyo: Daiichi hōki shoppā, pp. 44–51 (hereafter SGYS).

Now, if one compares the list of terms in modern Chinese with the various lists from the preceding tables, it seems obvious that the terms which appear in the Japanese botanical dictionary *Shokugaku yakusen* by Ono Motoyoshi (1874) are closer to them than the others. The English entries of this small dictionary of only thirty pages were based on *School Botany*, a book by the English botanist John Lindley²⁸—which, by the way, had also been used as the basis of *Zhiwuxue*.²⁹ The entries include botanical terminology—names and adjectives like ‘bud’, ‘pedicel’ or ‘peltate’, ‘verticillate’—but also names of the main botanical families beginning with Aceraceae. Through the choices of the translations for the English entries, this dictionary made a selective synthesis of the preceding Japanese and Chinese works. Having been edited by the Ministry of Culture, and no longer privately like the previous works, it became normative. It is not by chance that these terms are still in use today, considering the respective status of botanical science in China and Japan at the time. Actually, at the end of the nineteenth century, botany as a science had been known in Japan for more than seventy years; two courses on botany had been inaugurated at the Imperial University, in 1895 and 1896 by Miyoshi Manabu 三好學 (1861–1931) who had studied in Germany.³⁰ Some Japanese botanists were already fellows of the Linnean Society of London, e.g. the grandson of Itō Keisuke, Itō Tokutarō (1865–1941), who had published an article in an English journal³¹, and, in 1886, a report had been sent to the Linnean Society on “The Progress of Botany in Japan”³².

The situation was quite different in China. Until the end of the nineteenth century, botany seems to have been mainly the concern of Western translators. Obviously, plants were not among the subjects that the first Chinese students going abroad were supposed to study in order to strengthen the country. Only after the turn of the century did

²⁸ Cf. Ueno 1973, p. 601.

²⁹ Cf. Pan Jixing 潘吉星. 1984. “Tan zhiwuxue yi ci zai Zhongguo he Riben de youlai” 談植物學一詞在中國和日本的由來 (On the migrations of the term botany between China and Japan), *Da ziran tansuo* 3, pp. 162–72.

³⁰ Cf. Satō Shichirō 佐藤七郎 et al. (eds.). 1971. *Seibutsukagaku* 生物科學 (Biological sciences), in: id. *Nippon kagaku gijutsushi taikai* 日本科學技術史大系 (Great anthology of the history of science and technology in Japan), vol. 15. Tokyo: Daiichi hōki shoppan, p. 102.

³¹ Ito Tokutarō. 1887. “On the History of Botany in Japan”, *Journal of Botany* 25, pp. 225–9.

³² Frederick Victor Dickins. 1887. “The Progress of Botany in Japan”, *Journal of Botany* 25, pp. 147–8.

Chinese students go abroad to study botany. “Beginning in the early 1910s, a few Chinese students had already come to Europe and America to study taxonomic botany”.³³ In 1916, the participation of Chinese botanists in the international world of modern botany actually began with the first descriptions of new species of plants by Qian Chongshu 錢崇澍.³⁴ Prior to this, since 1911, botany was taught in universities and normal schools as part of biological courses relying on Japanese materials.³⁵ So when, at that time, an effective terminological tool in Chinese was needed, botanists found it in a way explained by the missionary Leon Wieger, in his preface to Charles Taranzano’s *Vocabulaire français-chinois des sciences*:

Some twenty years ago a Chinese scientific terminology seemed to many people something which will never be realized ... But it came one day when the so-called unworkable happened to be worked out, and at once. On the basis of the best American or European models, the Japanese had built up their textbooks using, as usual, Chinese characters. Taking back their belongings, the Chinese transcribed these whole textbooks into the Chinese language for the schools of the new era. Then unceasing efforts swelled this first stock ...³⁶

CONCLUSION

When studying any technical terminology, it is necessary to try to find out for which purpose this terminology was created and under which conditions. In China, until the middle of the nineteenth century, the many texts on plants dealt with materia medica, agriculture, horticulture, poetry or philosophy. The purpose of this literature, which can be qualified as ‘traditional’ or ‘cultural’ botany, was in no way the study of plants as biological objects. Plants were considered in their relationship to man. Thus, when botany as a biological science was introduced by foreigners it apparently did not raise much interest

³³ William J. Haas. 1988. “Botany in Republican China: The Leading Role of Taxonomy”, in: John Z. Bowers, J. William Hess and Nathan Sivin (eds.). *Science and Medicine in Twentieth-Century China: Research and Education*. Ann Arbor: The University of Michigan, Center for Chinese Studies, pp. 31–64; p. 38.

³⁴ Cf. Haas 1988, p. 32.

³⁵ Cf. Hu Xiansu 胡先驕. 1937. “Ershi nian lai Zhongguo zhiwuxue zhi jinbu” 二十年來中國植物學之進步 (The progress of botany in China during the last twenty years), in: Liu Xian (ed.). *Zhongguo kexue ershi nian* 中國科學二十年 (Twenty years of Chinese science). Beijing: Zhongguo kexueshi, pp. 192–200; p. 192.

³⁶ VFCS, p. iii. [Translation is mine, G.M.]

among Chinese scholars. Some forty years of ‘maturation’ were required for this science to become accepted. In Japan, the situation was quite different. In 1741, the shogun Tokugawa Yoshimune 德川吉宗 (1684–1751), impressed by the illustrations of a botanical book from the European Renaissance, the *Cruydt-Boeck* (first edition 1544) by Dodoenus, summoned Noro Genjō 野呂元丈 and two other physicians to learn the Dutch language in order to understand what was written in this book. This was the first step of a growing interest in Western knowledge of plants. On the other hand, Chinese books on plants, mainly *materia medica*, had been imported regularly and they were well read and often translated, or more precisely, transposed into Japanese and adapted to the Japanese ecological context. The technical vocabulary of these Chinese texts was analyzed in the unpublished study of Hattori Hanchū 股部範忠, *Yakuho zusan* 藥園圖艦 (Illustrated record of the herb garden, 1726/27).³⁷ This research work about Chinese technical texts surely helped the translators of the botanical texts that arrived later from the West to create a new terminology deeply rooted in Chinese linguistic structures. This new vocabulary evolved through many publications—botanical which have been quoted above but also pharmacological—for more than half a century until an official normative terminology was established with Ono Motoyoshi’s bilingual dictionary. Some forty years later, when young Chinese botanists returning from Europe or America needed a Chinese vocabulary, they found it ready for use in Japanese publications. One must not lose sight of the fact that the scientific community in the field of botany in China at this time was extremely small, working mainly on taxonomy.³⁸ This fact explains probably why terminology was borrowed at once and globally. A paradoxical fact is that the terms coined in China by Li Shanlan and Williamson for ‘ovary’, ‘carpel’ and ‘ovule’ were actually ‘borrowed’ in the same way as the others which had been invented by Japanese scholars. These loan-words had previously been borrowed and integrated into the Japanese vocabulary and found their way back to China. Meanwhile, their

³⁷ Cf. Georges Métaillé. 1993. “Sources for Modern Botany in China during Qing Dynasty”, *Japan Review* 4, pp. 1–13.

³⁸ Cf. Bi Liejue 畢列爵. 1965. “Dui zhiwuxue jiaokeshu zhong youguan Zhongguo zhiwuxue shi de jidian yijian” 對植物學教科書中有關中國植物學史的幾點意見 (Some suggestions on the history of botany in China in botanical textbooks), *Xinxiang shifan xueyuan xuebao* 6.3, pp. 38–45; 41.

meaning may have evolved following the scientific progress, as in the case of *xibao* 細胞 ‘cell’, analyzed in detail by Shen Guowei.³⁹

If the case of botany can be used as a model to explain how other terminologies have been created in modern Chinese, it is only within the framework of the same social and historical context of previously unexisting or embryonal scientific fields which emerged rather suddenly.

³⁹ Shen Guowei 沈國威 . 1997. “*Shokugaku keigen* (1834) to *Zhiwuxue* (1858) no goi” 植學啟原と植物學の語彙 (The vocabulary in *Principles of Botany and Botany*), *Kokugo goishi kenkyūkai* 57, pp. 1–6.