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CHINESE TERMINOLOGIES: ON PRECONCEPTIONS

The word 'terminology' is often used in the general meaning of the 'study of vocabulary in specialized fields', i.e. as being more or less equivalent to the 'lexicology of sciences and techniques'. However, there is a more specific meaning: 'the science of the standardization of vocabularies'. In fact, these definitions overlap since both include the notion of a 'system'; in the first case (lexicology of the sciences) by the nature of its object; in the second case (standardization) by the intention of the 'terminologist'. The translator aims to provide an interpretative synthesis grounded on the whole text that must be dealt with, rather than on the decomposition of sub-units. The lexicologist registers the findings of the translators. The terminologist seeks to understand the concepts in the scientific field considered and to perceive their compositional and logical value.

What is the extent of terminologies? If it is relatively easy to understand what the chemical nomenclature of any language is—the words that enter into linguistic expressions associated to formulae written with symbols—it is not so simple in mathematics, where one must identify the key concepts in a discourse.[1] However, due to the theoretical nature of this science, we may use the following definition: "a mathematical term is related to an explicit definition and, wherever it occurs, it may be replaced by that definition".[2]

In the social sciences, and in many natural sciences, where acceptance by the scientific community as a whole of a single paradigm of definitions is not the rule, the 'terminologist', who is responsible for vocabulary standardization, must seek out solutions that are sufficiently systematic and liable to be accepted by the community. He has a certain authority, derived from the government, academic bodies or publishing groups, but his 'orders' will be ineffective without a minimum consensus. Nevertheless, he must still aim for a high level of rationalization.

For the Chinese language, most of the existing studies deal with the 'lexicology of sciences'. This is necessarily the case for historical

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[1] This is no longer the case in modern mathematics, where the discourse itself consists of formulae; in this study we are looking at the situation prior to 1920.

[2] Cf. François Hominal. 1980. *Terminologie mathématique en chinois moderne*. Paris: Éditions de l'École des hautes études en sciences sociales, p. 10.

research on neologisms introduced during the nineteenth century, as work on standardization started only in the first few decades of the twentieth century. After some scattered initiatives, such as the Standardization Office of the Ministry of Education, directed by Yan Fu 嚴復 (1853–1921), the Republic established a National Bureau of Compilation (*Guoli bianyi guan* 國立編譯館, 1932). Specialized commissions which included a large number of competent scholars were organized either by the Ministry of Education or by publishers. They primarily covered the natural sciences and were very effective. For example, in the field of chemistry a consensus was attained on the principles in 1932 and an official standardization was published in 1953 that is still valid. It remains valid in Taiwan as well, probably because the work was mostly completed before 1949.[3] This was not true for the chemical elements found between 1950 and 1990: they had different names in Peking and Taiwan until 1998 when a standardization agreement was reached.

In fields such as economics or philosophy, where every school has its own theory, the task was left to individual translators, and, at a secondary level, authors of textbooks and dictionaries, journalists, and so forth—with the exception of Marxist terminology, which was under strict control until very recently.

Every field, both in natural and social sciences, is burdened with preconceptions, and the study of Chinese terminologies is no exception. The programme launched by Michael Lackner in Göttingen provides an opportunity to take another look at the facts.

1. PREJUDICES ABOUT THE CHINESE LANGUAGE

Over the last decades there has been much debate among science historians to determine which factors were responsible for the absence of China during the process of the invention of modern science.[4] Influen-

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[3] It is paradoxical that considerable discussions have focused on the choice of Chinese names for chemical elements, where no problem of definition was involved. It was neither a scientific nor even a linguistic debate but rather a political controversy between a community of specialists, who needed to coin new characters (*xinzi* 新字), and a state establishment reluctant to relinquish its control over the writing system.

[4] Although the relevance of this approach has been questioned, it remains a current topic.

tial authors, particularly Joseph Needham, disregarded language as a determining factor. For Needham, geographical factors, mainly hydrological, determined the formation of an economic and social system that favoured technical innovation and blocked the way for real scientific creation. However, among people dealing with the evolution of vocabulary over the last two centuries, no debate nor any questions ensued. It was generally admitted that the Chinese language and the writing system were obstacles to the integration of foreign words expressing modern concepts.

As recently as 1995 Morris F. Low, in a paper dealing with the modernization of East Asian science and technology, wrote:

> Reardon-Anderson's *The Study of Change* examines how linguistic barriers, and the related problems in conceptualizing science, served to slow the spread of not only chemistry, but other fields of learning as well. Reardon-Anderson shows that Japanese terminology enabled the Chinese to come to terms with Western science. … This suggests that the role of language was crucial to understanding why Japan was able to succeed where China was not.[5]

Although we may draw quite different conclusions from Reardon-Anderson's book[6], for example the dominance of political and social factors, we may consider the above quotation as representative of a widely accepted view.

The first systematic contribution by linguists to this question was provided by Gao Mingkai and Liu Zhengdan who proposed a typology of borrowing in 1958.[7] In their analyses these authors gave priority to the formal relations between the source word in a foreign language and the new Chinese word: imitation of sounds (*yinyici* 音譯詞), translation of the meaning (*yiyici* 意譯詞), transposition of the pattern (*fanyici* 翻譯詞), and hybrids. The study of foreign influences was not well-received in China at the time. Only 2,300 copies were printed, and the dictionary that the team directed by Gao Mingkai

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[5] Cf. Morris F. Low. 1995. "Beyond Modernisation: Towards a Post-Modern History of East-Asian Science and Technology", in: Hashimoto Keizo, Catherine Jami and Lowell Skar (eds.). *East Asian Science: Tradition and Beyond*. Osaka: Kansai University Press, pp. 147–53; 150–1.

[6] James Reardon-Anderson. 1991. *The Study of Change. Chemistry in China, 1840–1949*. Cambridge: Cambridge University Press.

[7] Cf. Gao Mingkai 高名凱 and Liu Zhengdan 劉正埮. 1958. *Xiandai Hanyu wailaici yanjiu* 現代漢語外來詞研究 (A study of loan-words and hybrid words in modern Chinese). Beijing: Wenzi gaige chubanshe.

began compiling in 1958, was published only twenty-six years later, following China's new policy of openness.[8] It is also typical that one cannot find the word *wailaici* 外來詞 (loan-word, literally 'word of foreign origin') in a textbook about the formation of words in Chinese published in 1981.[9]

The typology proposed by Gao and his team is still dominant in China and abroad. The most comprehensive studies were done by Zdenka [Hermanová-]Novotná, who published a set of monographs on "loan-words in modern Chinese" in the 1970s.[10] As a linguist, her analysis is careful and comprehensive; Novotná accepts the hypothesis that the borrowing of words by imitation of the sounds is rather difficult in Chinese and produces words that have no future. Her arguments are historical and linguistic. I will return to language in the next section. She also attempts to support her conclusions by invoking history: first the Buddhist translations (a first phase of phonetic loans followed by a second phase of translations) and, more recently, the short life of phonetic loans coined during the nineteenth century by foreigners. The few survivors of that type seem to prove that this was a rule for the Chinese language. This so-called permanent feature of the Chinese language, grounded in the parallel between Buddhist and nineteenth century translations, does not stand: it is documented only for periods where direct communication was restricted.

Novotná suggested that the rigidity of the Chinese syllable, the poverty of the morphology and the semantic 'pollution' carried by the Chinese characters (graphemes) were the obstacles to the borrowing of foreign words.

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[8] Cf. Liu Zhengdan 劉正埮 , Gao Mingkai 高名凱 et al. 1984. *Hanyu wailaici cidian* 漢語外來詞詞典 (A dictionary of loan-words and hybrid words in Chinese). Shanghai: Shanghai cishu chubanshe.

[9] Cf. Ren Xueliang 任學良 . 1981. *Hanyu zaocifa* 漢語造詞法 (Methods of word-formation in Chinese). Beijing: Zhongguo shehui kexue chubanshe.

[10] Cf. Zdenka Novotná. 1967. "Linguistic Factors of Low Adaptability of Loan-words to the Lexical System of Modern Chinese", *Monumenta Serica* 26, pp. 103–18; id. 1967–1969. "Contribution to the Study of Loan-Words and Hybrid Words in Modern Chinese", *Archiv Orientální* 35, pp. 613–48; 36, pp. 295–325; 37, pp. 48–75; Zdenka Hermanová-Novotná. 1969. *Affix-like Word-Formation Patterns in Modern Chinese*. Prague: Oriental Institute in Academia (*Dissertationes orientales* 21); id. 1974. "Coinage and Structure of Economic Terms in Modern Chinese", *Asian and African Languages in Social Context*. Prague: Oriental Institute in Academia, pp. 45–77; id. 1975. "Morphemic Reproductions of Foreign Lexical Models in Modern Chinese", *Archiv Orientální* 43, pp. 146–71.

1. The syllable

It is true that, due to the lack of consonant clusters in modern Chinese, the introduction of unmodified phonetic borrowing is impossible. To put this point in perspective, one may remark that 'phonetic' loans between European languages using the same alphabet may remain unchanged in the written form, but that spoken words are necessarily different as their phonological systems and rules of spelling are different (e.g. inEnglish and German).

We may also observe that phonetic loans are disregarded in Arabic-speaking countries as well, where the writing is alphabetic (of the consonantal type). In these languages, metaphoric equivalents are preferred to phonetic loans. It is also well-known that the Japanese, who have syllabic writing systems parallel to the Chinese characters, avoided phonetic loans in the first period of their opening to the West, contrary to what is now happening in some technical fields. It has been shown that the modernization of the lexicon of the Japanese language during the Meiji Restoration led to a significant increase of the percentage of *kango* 漢語 , that is, words built up with morphemes of Chinese origin.[11] In the translations from European languages, new Japanese words were almost exclusively of that type.[12]

Our position is that the tendency to prefer translations to phonetic loans is not due to the so-called difficulties of the former but to the facilities of the latter. For the integration of the concepts—our problem here—the proportions of phonetic loans are irrelevant.

2. Morphology and word-formation

As the Chinese language is syllabic and without inflexions, its morphology is often considered poor.[13] This does not imply that the power to generate new words is less effective than in other languages. One may suggest that the reverse is true.

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[11] Cf. Seiju Sujito. 1989. "Lexical Aspects of the Modernisation of the Japanese", in: Florian Coulmas (ed.). *Language Adaptation*. Cambridge: Cambridge University Press, pp. 116–26.

[12] Cf. Hubert Maës. 1975. "La terminologie grammaticale japonaise", *Travaux du Groupe de Linguistique de l'Université Paris* 1, pp. 45–58.

[13] This point may be questioned. It was probably not the case for archaic Chinese. Cf. Mei Tsu-lin. 1996. "Note on the Morphology of Ideas in Ancient Chinese", in: Willard J. Peterson et al. (eds). *The Power of Culture. Studies in Chinese Cultural History*. Hong Kong: The Chinese University Press, pp. 37–46. In Mandarin Chinese,

For nouns[14], which constitute the bulk of the new terminologies, the most productive pattern is compounding. Mandarin Chinese exhibits a high degree of compounding possibilities. It is true that "practically any type of compound can be forged out of any combination of stems".[15] The most striking feature of compounding in Chinese is the isomorphism between syntax and word-formation, up to the point that, in the written form, it is sometimes difficult to decide whether a sequence of syllables is a phrase or a word. All syntactic relationships are found in compounds: *pianzheng* 偏正 (determinative), *lianhe* 聯合 (coordinate), *zhuwei* 主謂 (topic + predicate), *shubin* 述賓 (verb + object), *shubu* 述補 (verb + complement). Any two lexical items concatenable by syntactic rule may constitute a well-formed compound. This feature is not a recent one: it is documented even in the earliest documents written in Chinese available so far, the inscriptions on tortoise-shells and plastrons of bovines (*jiaguwen* 甲骨文)—from the thirteenth to the eleventh century BC.

This isomorphism is by no means limited to the Chinese language. Émile Benveniste, who devoted most of his work to the analysis of ancient Indo-European languages, has presented as a general hypothesis the idea that:

> … the nominal composition is a micro-syntax. Each type of compound has to be studied as the transformation of a type of free syntactic speech. …One cannot explain the creation of compound nouns as the simple and immediate junction of two existing signs.[16]

In Chinese, where the process is not blurred by inflections, the isomorphism is patent: the activity of building new words is in continuity

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[13] (*cont.*) there may be morphological devices other than those generally listed, cf. Viviane Alleton. 1994. "Le nombre de syllabes d'un mot est-il pertinent en chinois contemporain?", *Cahiers de Linguistique Asie Orientale* 23, pp. 5–11; and Jerome L. Packard. 1998. *New Approaches to Chinese Word-Formation. Morphology, Phonology and the Lexicon in Modern and Ancient Chinese*. Berlin, New York: de Gruyter.

[14] It is often considered that, when the differences between two languages are large, there is few or no borrowing of verbs. Cf. Louis Deroy. 1956. *L'emprunt linguistique*. Paris: Les Belles Lettres, pp. 70–1.

[15] Cf. Huang Shuanfan. 1989. "Chinese Morphology: Anatomy of a Headless Language", *Proceedings of the Second International Conference on Sinology*. Taipei: Academia Sinica, p. 571.

[16] Émile Benveniste. 1967. "Fondements syntaxiques de la composition nominale", *Bulletin de la Société Linguistique de Paris* 12.1, pp. 15–31; re-edited in: id. 1974. *Problèmes de linguistique générale* 2, Paris: Gallimard, pp. 145–62; 146, 161. [The translation is mine, V. A.]

with speech activity. When, as it is often the case, the morpheme used to create neologisms is taken from the common vocabulary, the resulting word has a kind of pseudo-transparency—'pseudo' because it does not show the meaning of the word but only provides clues that may occasionally help specialists that are already familiar with the corresponding notion to identify it.

The most productive construction is the determinative one (*pianzheng* 偏正), where the determined follow(s) the determining element(s). Most of the disyllabic compound nouns have a noun as determined.[17] This last morpheme is generic, the previous one(s) is/are specific. A generic element may be found in many compounds. Many authors consider that "they have virtually attained the status of affixes".[18]

It seems difficult to discuss the question as a whole, given the current state-of-the-art. It may be wise to first determine which affixes are used in the texts of a given science or technical field (that is, in a terminological system), before considering whether such and such a morpheme has the same formal and semantic features in other fields.

3. Written and spoken forms

When dealing with language contacts, one has to distinguish between situations of direct physical (or audiovisual) contact and instances of written communication.

In every language, the domination of the written form in the formulation of ideas, hypotheses and demonstrations, in the social as well as the natural sciences, would seem to imply that the spoken forms are of secondary importance in those fields. However, in the process of communicating scientific results and technical procedures, the spoken form is also common. Moreover, the written text itself is read, and we know now that even silent reading implies phonetization.

Is the Chinese language specific in these respects? Until now, the focus has been on the process of creation of these forms. To approximate the phonetic form of a foreign word, one has to break this word into segments corresponding to Chinese syllables. In the written form, characters will be chosen for their pronunciation, without any neces-

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[17] Between 86–90 per cent, cf. Huang 1989, p. 574.

[18] Cf. Jerry Norman. 1988. *Chinese*. Cambridge: Cambridge University Press, p. 156, about *xue* 學 'learning'.

sary relation between their meaning and the word in question. To avoid meaning interferences or absurd sequences, it is now recommended that quasi-meaningless characters[19], which are not currently used in contemporary language, be employed. Application of this principle would, over the long term, result in the creation of a syllabary, but it has never been consistently put into practice. Translators of written texts tend to comply with this rule, but every time they find a sequence of characters whose pronunciation and meaning both seem to fit, they are unable to resist the temptation to choose what they feel as 'the best' translation. Moreover, most of the neologisms created on a phonetic basis are not coined by professional translators, but rather by people engaged in technical and commercial activities, whose usage is not systematic in nature.

Do we have to accept the assertion that the specificity of the Chinese writing system gives rise to a general tendency to avoid this kind of phonetic transposition as far as possible? We believe that this position must at least be nuanced.

Secondly, if there is a problem with polysyllabic phonetic loanwords, it cannot be a result of the length of the written form (!), but rather the difficulty in entering that sequence of syllables into the rhythm of a spoken sentence—a difficulty that is overcome in everyday language, but not so easily when reading texts—the most common relation with the words we consider here.

To go further, we must ask if phonetic similarity is an advantage for internationalization. For speakers of the source language, it may seem convenient. However, as we have already noticed, this similarity is necessarily remote. We must add that, if a word compounded with 'de-semantized' syllables has the advantage, for a native speaker without knowledge of any foreign language, of avoiding interferences with ancient Chinese notions, for any speaker with some familiarity with foreign languages, it carries another danger, namely that of misinterpretation every time a word is used out of its strict terminological

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[19] Cf. Kratochvil, Paul. 1968. *The Chinese Language Today: Features of an Emerging Standard*. London: Hutchinson.; Christopher D. Godwin. 1979. "Writing Foreign Terms in Chinese", *Journal of Chinese Linguistics* 7.2, pp. 246–67; and the tables provided in some dictionaries, e.g., "Han-Fa yiyin biao" 漢法譯音表 , in: *Fa-Han cidian* 法漢詞典 *Dictionnaire français-chinois*. 1979. Shanghai: Shanghai yiwen chubanshe, p. 1494, which gives a Chinese character for every vowel and consonant of the French language and for their combinations. We have to check if the same list or different lists are given for the other European languages.

context. It is the well-known phenomenon of *faux amis*—for example *reason* in English and *raison* in French. These words, well defined in philosophical and other specific contexts, do not have the same extension in both languages, and in a number of contexts do not correspond exactly to the same definition. The same with German *Immanenz* and French *immanence*.

In any case, the formal relationship between the original word and the new word is relevant only for a short period, not in the long term. When you oppose *malasong* 馬拉松 'marathon' to *dianhua* 電話 'telephone' as, respectively, *yinyici* 音譯詞 to *yiyici* 意譯詞 , what have you said about the inclusion of these words in the language? With more abstract words, two cases must again be clearly distinguished: their use in the context of one school of thought or in a theoretical discourse, and in a more informal general use. In texts about Aristotelian logic, or modal logic, the Chinese term *luoji* 邏輯 , which is a 'phonetic borrowing' (*yinyici*), may be replaced by its definition in the theory considered. However, in the derived and metaphorical uses of everyday language, the equivalence is lost. The point is that this is not specific to the phonetic borrowing: the same is true for the words built with Chinese morphemes in translating foreign words, without reference to the form (*yiyici*). And we must be conscious of the fact that metaphorical use of terms is often observed when one scientific domain borrows words from another.

To conclude this section about the role of the specificities of the Chinese language, we shall suggest that, if translation is preferred to phonetic borrowing, it is not due to certain obstacles inherent in the Chinese language but rather to the remarkable aptitude of this language for composing systematically related sets of terms. In other words, it is not the defects of the goal language that are decisive but rather its qualities.

2. OVERESTIMATION OF TRANS-LINGUISTIC FACTORS

1. The source language

For the introduction of new words in Chinese usage during the nineteenth century, the decisive fact was the use of translations of foreign words by outstanding Chinese intellectuals. Our first example occurred in the middle of the century. Wei Yuan 魏源 (1794–1856), a Chi-

nese of high rank, included works by Protestant missionaries in his collection *Haiguo tuzhi* 海國圖志 (Illustrated account of the maritime countries), and "their neologisms would have probably remained confined to the very narrow circle had not the texts been included in the *Haiguo tuzhi*. Their fate is therefore linked to the diffusion of Wei Yuan's work first in China and then in Japan".[20] A second case is the dramatic increase of new words at the end of the nineteenth century, most of them coined in Japan with morphemes of Chinese origin and accordingly written in Chinese characters. What was new at that time is that they were promoted by Chinese intellectuals[21], such as Liang Qichao 梁啟超 (1873–1929). It is often said that the success of these words, which heretofore had remained almost entirely unnoticed, was due to their use in Japan, whose prestige and influence was great after 1895. I will suggest that such success was mainly due to their usage in important texts written by brilliant Chinese scholars.

It is clear that the Japanese mediation is an important factor, as systematization was far more advanced, for historical reasons we will discuss later. However, the Japanese language was not involved in the process, not only because the morphemes of Chinese origin were used, but, on a deeper level, because a word is either borrowed in isolation and its meaning determined by the paradigm in which it enters the goal language, or a set of words is borrowed as a terminological systematic subsystem. One may speak of 'importation' if and only if the whole notional and linguistic complex is introduced in the language of reception. Even in this last case, given that the exploitation of the compositional value of morphemes of Chinese origin is the same in both languages, we may suggest that the Japanese mediation was a historical fact of great importance, but quite irrelevant from a linguistic point of view—semantically as well as formally.

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[20] Federico Masini. 1993. *The Formation of Modern Chinese Lexicon and its Evolution towards a National Language: The Period from 1840 to 1898*. Berkeley: Journal of Chinese Linguistics (Monograph Series, no. 6). Translated by Huang Heqing 黃河清 . 1998. *Xiandai Hanyu cihui de xingcheng—shijiu shiji Hanyu wailaici yanjiu* 現代漢語詞匯的形成—十九世紀漢語外來詞研究 . Shanghai: Hanyu da cidian chubanshe, p. 25.

[21] For the use of the word 'intellectuals' in a Chinese context, cf. Tatiana Fisac (ed.). 1997. *Los intelectuales y el poder en China*. Madrid: Trotta. Cf. also "Du lettré à l'intellectuel: la relation au politique". 1984. *Extrême-Orient Extrême-Occident* 4; and Frederic Wakeman. 1972. "The Price of Autonomy: Intellectuals in Ming and Ch'ing Politics", *Daedalus* 101, pp. 35–70.

The case of the 'return loans' is interesting: these words were first used in dictionaries compiled by Protestant missionaries in China, then introduced in Japan by the builders of the new terminologies. They were then borrowed again by Chinese, who labelled them 'made in Japan'. This episode of great historical interest is linguistically irrelevant, too, as these words were previously unsuccessful in China. They were included in dictionaries whose basic goal was the production of tools for translating foreign words in Chinese, not in any way to attest to any Chinese usage[22]: these words were not part of the Chinese language.

2. *The impact of translation on the Chinese vocabulary*

The Chinese, and sinologists as well, are often tempted to consider that the Chinese case is in every respect unique. They treat the transformations of the Chinese vocabulary as a specific phenomenon. We must remark that the transformations that occurred during the last two centuries have required, in Europe itself and later all over the world, a tremendous effort in terminological creation. For example, when certain scientists laid the foundations of the science of chemistry at the end of the eighteenth century, they created an entirely new terminology both in French and English, with new words and specific rules of composition and derivation. They did not borrow from one of these two languages to include terms in the other: they all followed the basic principles of the new science.[23] What occurred later, when these new concepts of the transformations of inanimate matter were introduced in China, was strictly parallel.

As for quantity, the transformations of the Chinese lexicon during the last decades are presented as producing an overflow of new words of foreign origin. This is true but quite normal in the modern world: according to the estimations of the International Council of the French Language, at the present time the French also receive an 'avalanche' of new concepts and words from foreign sources, around 4,000 per

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[22] The first exception is Ada Haven Mateer. 1922 [1913]. *New Terms for New Ideas. A Study of the Chinese Newspaper.* Shanghai: Presbyterian Mission Press.

[23] As they were formulated by Guyton de Morveau, Lavoisier, Bertholet and Fourcroy in 1787. Cf. Louis Bernard Guyton de Morveau. 1787. *Méthode de nomenclature chimique proposée par MM. de Morveau, Lavoisier, Bertholet et Fourcroy.* Paris: Cuchet.

year, mainly from the United States. These concern new products, techniques and activities, but also more abstract concepts.

The phenomenon is not even a modern one. The following affirmation of George P. Murdoch, quoted by Wang Gungwu, deserves reflection although it is difficult to prove or disprove:

> … it is doubtful whether there is a single culture known to history or anthropology that had not owed at least ninety per cent of its constituent elements to cultural borrowing.[24]

The problem is not quantitative but structural: are there changes in the grammar of the goal language, in terms of syntax and morphology?

As for syntax (the generalization of the vernacular in every written practice being beyond our topic here), we need only look at the possible impact of the introduction of new words. The overwhelming majority of these words are nouns. If we take as a sample the lists of 500 items given by Federico Masini in an appendix to his book[25], there are only 24 verbs or *dongci* 動詞 and 6 adjectives or *xingrongci* 形容詞 amongst a majority of nouns. There is not one grammatical word. As verbs command the framing of the sentence, and as the verbs listed do not include any particular constraint, we may conclude that the influx of new words has had no impact on the syntax of the Chinese language.

As for the morphology, Wang Li has suggested that until the nineteenth century the most common structure of disyllabic words was the associative one, and that the determining-determined structure is more characteristic of neologisms of foreign origin.[26] Masini relies on this hypothesis to stress the transformations in the Chinese language that resulted from the importation of Western concepts.[27] The point is that the determining structure is most useful in scientific and technical languages, where items are systematically sub-categorized. This observation is valid at all times, irrespective of the language considered. As for Chinese, one may remark that the sequence of two nominal forms, one specific plus one generic, is found in the vocabulary of titles and

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[24] Wang Gungwu. 1991. *The Chineseness of China. Selected Essays*. Hong Kong: Oxford University Press, p. 144.

[25] Masini 1993, pp. 157–223.

[26] Cf. Wang Li 王力. 1980 [1957–58]. *Hanyu shigao* 漢語史稿 (A draft history of the Chinese language). 3 vols. Beijing: Zhonghua shuju, vol. 2, pp. 342–6; vol. 3, pp. 514–5.

[27] Cf. Masini 1993, pp. 121–7 ("From monosyllabic to polysyllabic language").

administrative positions in inscriptions on bronze (11th–6th century BC).[28] Throughout the history of China this type of combination is quite common. In the Ming and Qing periods, but also in the texts about administrative management in the Song dynasty, we find many small terminological systems where disyllables and trisyllables refer to precise technical notions whose meaning cannot be deduced from the components' meanings. The majority of these terms are determinative. Some examples: *yongye* 永業 'inalienable estate', *xiantian* 閒田 'unattended lands (whose property cannot be claimed)', *fayunsi* 發運司 'commissioner office for the transports', *zhuanyunsi* 轉運司 'commissioner office for the taxes', *yezhu* 業主 'the master of an estate', *tianzhu* 田主 'the one who pays the taxes for an estate'. As the determination was not systematically marked in ancient Chinese[29], we can identify a word when the meaning of two syllables in sequence is specific.

3. Social and historical factors

The discourses about Chinese terminologies tend to obliterate social and historical factors. For example, when Joseph Needham says that the 'intrinsic preference' of the Chinese for translations at the expense of phonetic transpositions is due to the difficulties of the Chinese language, he jumps over centuries:

> Of course, this is very well known to those who are familiar with the Chinese world, but it is worth emphasising that the same problem had to be solved by the early translators from Buddhist texts as by those in our time translating modern scientific terms. Should we transliterate phonetically, with impossible ugly gibberish resulting? Or should we employ already existing Chinese words and distort the meaning?[30]

This quotation exemplifies the kind of canonic discourse that establishes the Buddhist enterprise as a prototype of translation in China. Although the Chinese language had always been in contact with a

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[28] For example, *dachen* 大臣 'grand servant', *xiaochen* 小臣 'servant', *dashi* 大史 'grand scribe', *neishi* 內史 'royal secretary', *yushi* 御史 'royal scribe', *yuzheng* 御正 'minister of state'.

[29] The most usual form was, indeed, 'determining – *zhi* 之 – determined', but the omission of *zhi* is also well documented.

[30] Joseph Needham. 1970. "The Translation of Chinese Old Scientific and Technological Texts", in: id. *Clerks and Craftsmen in China and the West. Lectures and Addresses on the History of Science and Technology*. Cambridge: Cambridge University Press, pp. 83–94; 93.

number of different linguistic families, the first discussions of our topic occur with the massive translations of Buddhist texts during the first centuries AD—from Sanskrit, an Indo-European language, written in alphabetic script. Here we find the first explicit formulation of an opposition between the foreign words that are 'transcribed' and those that are 'translated', that is, 'explained by analogy'. According to Xuanzang 玄奘 (600–664), translation is 'better', the phonetic transposition being a last resort solution; he therefore listed no more than five types of words that he considered 'improper to translate' (*wu bu fan* 五不翻).[31]

These views are often considered still relevant for modern times since (i) the Chinese vocabulary in the written form has roughly maintained the same characteristics; (ii) the translation procedures are in many ways similar, with foreigners in the dominant role, transmitting the gist of the meaning and Chinese assistants writing down a first draft to be subsequently polished. We must be aware that this parallel, interesting as it may be, does not provide an authoritative approach for modern times to the opinions of the ancient Buddhists translators. When we speak of terminologies now, we consider a large set of different fields. In the Middle Ages, complexity was minimal: for the source, one domain (religion), one civilization (Indian), one language (Sanskrit); for the reception at one given period, one dominant group of translators—and no Chinese exterior to these teams were involved in the process.

If we admit that throughout its history China was a changing world, we cannot deal with different periods as if conditions were always identical. An important point is the relationship between Chinese and foreign translators.

To enrol the Jesuits in the 'Westernization of the vocabulary' is probably a distortion of their intentions. Soon after their arrival in China at the end of the sixteenth century, when they began to expound their religion and world-view in Chinese and to translate texts written in European languages, they were more interested in finding adequate Chinese words than in creating new ones. It is true that they could not avoid to coin new Chinese words by the composition of existing mor-

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[31] Cf. Zhou Dingyi 周定一 . 1962. "Yinyici he yiyici de xiaozhang" 音譯詞和意譯 詞的消長 (Growth and decline of phonetic loans and semantic translations), *Zhongguo yuwen* 119, pp. 459–76; 465.

phemes. Documentation is widely available on words with religious implications, due to the long and intense controversies on these topics.[32] However, for other words such as *zhongxue* 重學 'mechanics', *diqiu* 地球 'terrestrial globe', and *yike* 藝科 'medicine', as these were not the focus of religious controversy, we have no information about the methods and opinions of their authors[33]. Even the excellent analysis by Peter Engelfriet of terminology and language in the translation of Euclid's *Elements*, whose interest goes far beyond mathematics and which gives extensive references to the sources of their translations, does not provide indications on the Jesuits' ideas about their terminological practice.[34]

In the later half of the nineteenth century linguistic work was done by English-speaking missionaries and other foreigners, primarily those in the Tongwenguan and the Shanghai Arsenal. These foreigners had two objective advantages: (i) they had some knowledge of the sciences, techniques or principles described in the texts to be translated; (ii) they initiated and managed the translation projects. Even in the Tongwenguan, the only institution under overall Chinese control and financing, the initiative of translation projects was in the hands of foreign professors. They also had the subjective advantage of believing themselves more intelligent than their Chinese collaborators.

As a result of these factors, translations were not international achievements but rather Western enterprises with Chinese assistance. This situation had important consequences for linguistic productions. Even in large institutions, where translation work was handled by small teams, confrontation of opinions did not occur, as far as we know—it arose only in the form of polemics between different teams. This contrasts sharply with the Japanese situation where groups of Japanese scholars organized, very early on, a number of specialized committees whose lexicographic decisions were made in a democratic

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[32] What was at stake was the translation of the name of God, for which the problem was not to coin a new word but to choose between existing words. Other discussions occurred on the translation in European languages of Chinese words as fundamental as *li* 理 'principle' or 'reason' and *qi* 氣 'pneuma'.

[33] For most of the words we do not know exactly who proposed translations: the part played by Chinese friends and informants of the Jesuits was probably decisive, but this must be confirmed.

[34] Cf. Peter M. Engelfriet. 1998. *Euclid in China. The Genesis of the First Translation of Euclid's Elements Book I–VI (*Jihe yuanben*. Beijing, 1607) and its Reception up to 1723.* Leiden, Boston: Brill, pp. 138–55, 283–6.

way. During the Tokugawa period, direct contacts with foreigners were forbidden or at least difficult, and thus, Japanese scholars took responsibility for organizing learned societies with regular meetings. When, at a later date, foreign specialists were hired as teachers in Japan, they were not involved in the process. This contrasts with China, where foreigners who were in charge of the job were convinced that the Chinese tradition was mainly artistic and literary and that the Chinese language could provide the materials (morphemes), but had no previous frame and presented many obstacles. Their aim was therefore to duplicate as best as they could the semantic structure of foreign words.

After 1900, the Chinese took full responsibility of their terminologies. At the beginning of this period, foreign scholars were still playing an important role. However, they were conscious that it was a transitional situation. One of their most interesting contributions is the book of Ada Haven Mateer,[35] which was based on the usage of the Chinese.

4. Morphology and systems: illustrations

If we call 'formant' any final element of a complex word in a Chinese nomenclature, irrespective of its possible label as a suffix or a generic, we find no less regular correspondences between Chinese and English sets as between French and English sets. However, each field, and each sub-system within these fields, must be considered separately, as shown in the following examples.

4.1 Example 1: Nouns on inflammation in medicine
The Chinese use the formant -*yan* 炎 as regularly as the French use -*ite* and the English -*itis*, as is shown in the following table—a selective sample[36]:

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[35] Her aims were "to help foreigners to read the Chinese newspapers", "to teach our students to write for the papers", and, ultimately, she thought, "we must ourselves write for them". Cf. Mateer 1922, "Preface", p. 4.

[36] Cf. Colin Yallop and Deng Ziqin. 1993. "Medical Terminology: A Case Study of Terms in -itis and their Equivalents in Chinese and Modern Greek", *The Linguist* 32.2, pp. 38–42; 38–9.

Table 1: Terms for types of inflammation

Chinese		English	French
dongmaiyan	動脈炎	arteritis	artérite
guanjieyan	關節炎	arthritis	artrite
piyan	皮炎	dermatitis	dermatite
changyan	腸炎	enteritis	entérite
weichangyan	胃腸炎	gastroenteritis	gastroentérite
weiyan	胃炎	gastritis	gastrite
saixianyan	腮腺炎	parotitis	parotidite

4.2 Example 2: Grammar

There is a case where a well-established notional system in the European tradition, due no doubt to its long history, is expressed by a set of words without formal relationships. The names of the parts of speech as well as the names of functions are elements of notional systematizations that are not manifested in the language forms. The Chinese borrowed the concepts and the system. After some adjustments during the first decades of the twentieth century[37], their terminology is now structured: the terms for the parts of speech end with *-ci* 詞 and the terms for the grammatical functions end with *-yu* 語 (see Table 2):

Table 2: Grammatical terms

Chinese		English
1. Parts of speech:		
mingci	名詞	nouns
fuci	副詞	adverbs
dongci	動詞	verbs
jieci	介詞	prepositions
xingrongci	形容詞	adjectives
lianci	連詞	conjunctions
shuci	數詞	numerals
zhuci	助詞	particles
liangci	量詞	measures
tanci	嘆詞	interjections

[37] Cf. Peter Peverelli. 1986. *The History of Modern Chinese Grammar Studies*. Ph.D. diss., Leiden University.

Table 2: Grammatical terms (cont.)

Chinese		English
daici	代詞	pronouns
xiangshengci	響聲詞	onomatopoeic word
– subclass:		
zhudongci	助動詞	auxiliary verb
– synthetic class:		
shuliangci	數量詞	numeral + measure
2. Functions:		
zhuyu	主語	subject
dingyu	定語	noun determinative
weiyu	謂語	predicate
zhuangyu	狀語	verb determinative
binyu	賓語	object
buyu	補語	complement

There are no conceptual innovations here. What we observe is a formal systematization facilitated by the fact that the sets of concepts were introduced in China as a whole and by the morphology of the Chinese language.

4.3 Example 3: Chemical agents

In the margins of the chemical nomenclature[38], the 'ordinary discourse' of chemistry includes a lot of technical terms used for the description of the manipulations and experiments, that is, the characterization of the phenomena. These words may or may not constitute small lexical systems. Among the final elements with a structuring function, we have examined the formant *-ji* 劑 . Here are some of the terms built on this basis:

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[38] This nomenclature is a special case, as in Chinese a chemical expression is not a word but a sentence made of monosyllabic morphemes, and the whole set must be interpreted, according to the law of the chemical science, to give the chemical nature of the links. It works as a specific syntax. In each language, one formula written with symbols corresponds to one and only one 'chemical sentence'. In different languages these linguistic sub-systems differ greatly, but the basic rules laid by the creators of this science and extended by more recent international agreements are strictly followed. Cf. Jean-Claude and Viviane Alleton. 1966. *Terminologie de la chimie en chinois moderne*. Paris, La Haye: Mouton.

Table 3: Terms/names for inanimate agents

Chinese		English	French
cuihuaji	催化劑	catalytic agent	catalyseur
fangfuji	防腐劑	antiseptic	antiseptique
huanyuanji	還原劑	reducing agent	agent réducteur
mazuiji	麻醉劑	anaesthetic, narcotic	anesthésique
miehuoji	滅火劑	fire-extinguishing chemical (or agent)	(produit) extincteur
rongji	溶劑	solvent	solvant
shachongji	殺蟲劑	insecticide, pesticide	insecticide
shiji	試劑	reagent	réactif
tuoshuiji	脫水劑	[dehydrating agent]	agent déshydratant
yanghuaji	羊滑劑	oxidizer, oxidant	agent oxydant
zhilengji	製冷劑	refrigerant	réfrigérant

Here we do not observe a reproduction of a conceptual or formal pattern. These terms ended by *-ji* refer to inanimate agents. In the Western tradition, this notion has never been the main structuring principle of a theory—which is the case for the 'part of speech'. In spite of the fact that the notion of an inanimate agent appeared quite early in the history of European thinking and was a necessary prerequisite to the creation of modern science, it remained always in the background, far behind God and the human agent. Although the Chinese conception of the world was different, we will not suggest that an ideological bias influenced the construction of a formal system in Chinese that is not observed in European languages. Such a remark would present the advantage of showing that limitations on the development of terminologies are not always on the side of the goal language but may also be found in source languages. The example is too limited to allow for such a broad conclusion. In the case of the set of words ending in *-ji*, we may consider that the positive factor was, again, the systematic nature of Chinese word composition.

CONCLUSION

This overview of the attitudes and theories about Chinese neologisms as induced, directly or not, by the introduction of the West, suggests three remarks.

As people dealing with linguistic anthropology often realize, the potentialities of a language are more important than its so-called defects. The Chinese language is said to have a 'poor morphology' because of the absence of flexions and the dubious status of suffixes. We consider that the efficiency of the process of word composition is a decisive advantage in the creation of neologisms.

Secondly, what happened in China, and in contrast with Japan, seems to prove that the so-called 'permanent features' inherent in a civilization, such as its language and writing system, are not as relevant as the historical and social contexts.

Lastly, if we admit that the aim of a terminological study is to understand the relationship between notions and words, to try to map their discordances and to identify in each domain the most important words, it seems clear that research must focus on texts of some well circumscribed domains during limited periods of time. The conceptual framework for a given science is familiar to specialists of that field, and this guarantees that the studies will be built on solid foundations. This does not imply that one cannot be interested in the evolution of the use of words, their migrations from one discipline to another and their extensions to general usages, but it seems that these exciting studies must be delayed until a sufficient number of limited monographs have been completed.