BOOK REVIEW

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Looking back on the 20th century, "language revolution" is not an overstatement. Professor Tsu presents a captivating account of the technology of reading and writing in China that over the years built upon the historical tasks of unification around a national language and the standardization of its writing system.

The story, however, begins in Chapter 1 with the Hundred Days Reform of 1898. Credit goes to fugitive scholar Wang Zhao whose early understanding of the language-literacy interface presaged the sweeping changes of the modern period. In addition, his phonetic notation system, the *Mandarin Combined Tone Alphabet*, foresaw the selection of one of the varieties (dialects) of the Mandarin vernacular as the "single standard" for the nation (p. 25). Missionary phonetic notation systems abounded, but as is often still the case today, they were more useful for local proselytization than for eradicating a national 90% illiteracy, tied to the massive isolation of speech communities deprived of a *lingua franca*.

Tracing the work of scholars of writing and specialists in language and information from the beginning years of the 1911 Revolution, the first chapters detail how the advances in their work served as the early foundation for modern online word processing. Problem solving centered on pre-digital mechanical technology pointed researchers in the right direction for future research that could never even have been contemplated.

The conceptual breakthrough, again, predating the advent of digital technology, consisted in taking seriously, and delving deeply into the relevant details of, the third dimension in the analysis of character components: in addition to the semantic radical and the phonetic, the order and patterns of character strokes and the strictly graphic configurations of these patterns. While always in "plain view," not requiring a linguistic scrutiny, they came forward for the purpose of designing workable typewriters and cataloging systems. Chapters 2–4 summarize the origin of these conceptions, born of practical engineering solutions.

The account of the advances in mechanical typewriting, in Chapter 2, is important to study for the reason just mentioned. But in the end, looking back on the scale of the challenge, it was apparent that the models of analog technology would in effect, each in turn, make progress mainly as approximations, "partial solutions" and "patches" (p. 215). For a morphosyllabic writing system, it would

require a true leap of technology to solve the problem of scale, which it then did without any serious qualification, perhaps putting to rest forever the idea that Hanyu Pinyin would eventually replace the characters. Crucially, important to understand fully, how can we appreciate the consistency of research and development spanning the overlapping years of the Republican era and the Peoples' Republic of China? Even as we take note of differences today (which in the broad outlines seem superficial, and even unnecessarily petty: a competing pinyin scheme in Taiwan, for example), the overall continuity in how systems evolved is hard to ignore.

Chapter 3 on telegraphy follows up on the same kinds of attempt to find ways to work around problems in communication technology prior to the advent of the Third Industrial Revolution. For the same reason why the previous discussions are important for appreciating the research continuities in each domain and to frame the bigger picture, readers should not omit this chapter. Prior to digital information processing, "China's case was unique" (p.115). In a number of interesting ways, from a purely scientific point of view, the morphosyllabic writing system still is unique. Only the Japanese language, today, also applies its principles, and in its case only to the Kanji subsystem. This is the reason for the interest by psycholinguistics and the cognitive psychology of writing (one could say that it consists of a pressing research problem) – not really fair to describe it as an "obsession."

A different but related practical question, that of indexing and classification, storage and retrieval, is the topic of Chapter 4. Also arising during the time of the May Fourth Movement, the challenges coincided with the broader questioning of fundamental aspects of language and literacy. Practical problem solving lead to discussion about foundations. In this case, for the above mentioned purposes, related to efficiency (not a trivial matter for information processing), the radical system could give way to the systematic analysis of stroke order and shape.

Chapter 5 returns to the theme of understanding the role of phonological transcription in the promotion of Mandarin, the reform of writing to achieve a closer alignment between spoken language and literacy learning. The two developments, Romanization (as in pinyin) and Zhuyin Fuhao (bopomofo) participated in the language and literacy revolution. Early studies in the experimental schools that implemented Hanyu Pinyin showed significant improvement over the traditional method; the difference was consistent and robust (Liu 2005). Following the transformation of literacy learning in elementary school, completely unexpected both by its pioneers dating back to the first years of the Republic and experts in recent years, each variant, independently (China and Taiwan) would also transform how native speakers and second language learners of Chinese write (today, mainly on a computer or mobile phone device). So sweeping

has the change turned out to be that researchers have called attention to a potentially major unintended consequence: not only a foreseeable decline in character handwriting skill, but a more surprising result, if confirmed by follow-up studies–in the elementary grades a significant decline in *reading* ability. The causal factor (proposed as hypothesis) might be traced to the pinyin input method that does not require active formation of characters by hand, by pen or other means (Tan et al. 2013). We can add this research problem to pending questions of the concluding chapters 6 and 7.

For now, we can separate the question of the effect of the pinyin input method in computing from the effect of pinyin on literacy in general. Linked to the promotion of Mandarin/Putonghua, with which Hanyu Pinyin is aligned, the consensus, summarized in Chapter 5, is that it contributed to the massive reduction in illiteracy. Recall that the final nationwide standardization of a phonological transcription, aptly designed for elementary school literacy instruction, followed the vernacularization reform. It allowed readers and writers to grant Literary Sinitic is rightful place in historical study and the relevant scholarly fields of academia. How all these developments that the New Culture Movement of the early 20th Century gave birth to are related still needs a complete explanation. The larger connection that ties everything together might be related to the linkage between the characters and the patterns of language, the sound patterns in particular (pp. 181–184), despite the challenge of homophony, not so hard actually given the straightforward way in which Hanyu Pinyin marks tone. How was it that a recently invented alphabetic script played such an important role in the consolidation of a logographic/morphosyllabic writing system?

The chapter recounts the strong proposals for the former replacing the latter. Ironically perhaps, today with the phonological scripts, in both China and Taiwan, and everywhere else, dominating computer and mobile phone inputting, the character system is as secure as ever. For another example, the writing system has become more accessible to second language learners of Chinese than ever before. On the related discussion of how simplification was implemented (especially interesting in that its initial proposal can be traced to the Republican era), modern word-processing may render the mismatch between traditional-simplified pairs one of little consequence.

Readers might suggest that the book appears at times to lean to one side regarding certain aspects of its overall positive assessment of policy and planning since 1949. But this review asks whether the central claims drawn from the outlined history can be shown to be correct, and if its proposals and inferences can be considered plausible in the realm of language and literacy, that is, all politics aside. For example, the forging of a national common language needs to be considered in terms of the related outcome of near universal access, today, to print literacy

and computer word processing, in both reading and writing. In addition, the successful attainment of a shared national language does not cancel or contradict the problems of standardization, prior to attainment of digitization and computer encoding, for the other languages[1] of the Chinese family of languages. On a more basic level, consensus around a shared common language does not overrule the active use in speech or writing of any other language. The account in Chapter 1 of how one language came to be selected national-common and how over the years Mandarinization has accompanied the other achievements of the language revolution, in both China and Taiwan, does not sign away, in principle, a prevailing multilingualism. The language policy problem applies to both the sister languages and dialects of the same family to which Putonghua belongs and to the (minority) national languages of other families and branches. But this question needs to be deferred, over the reasonable objection of many readers of this journal, to another discussion. Skipping ahead, Chapter 7 briefly discusses the related and interesting problem of ancient variants and adaptations of Chinese characters by other East Asian cultures. It should be kept in mind that despite the seemingly impossible task of encoding many tens of thousands of new adapted and invented characters, their preservation/digitization stands as a priority cultural project. To mention only two cases, the final and irretrievable deterioration of the vast literary heritage written in Chữ Nôm, dating back to the 13th Century, or of the Zhuang language manuscripts, that remain in circulation today, would be an irreplaceable loss to science and to the humanities.

Chapter 6 is the account of how China made the first step over the threshold of the Third Technological Revolution. During the pre-dawn years that began to shed light on the end of "the intellectual wasteland of the Cultural Revolution's dark decade" (p. 222), Zhi Bingyi, together with other scientists, working from prison, helped to find a way for the characters to enter the computing age of full digitization. The dark age, in reality, was not only of one decade. The back story to the first six chapters is the remarkable achievement of individuals who advanced science and technology throughout the entire Maoist period including the Great Leap Forward and its prelude during the 1950s. The Four Modernizations (1977), free-market oriented reform and opening up, allowed for learning from abroad, from native-speakers of the language working in the United States and from how Japan had crossed the mechanical-electronic divide in typesetting Kanji.

Digitization was the first step to prepare the way for Han script unification, for a single unified encoding standard, bringing us up to date in the concluding chapter. Agreements needed to be thrashed out across borders on originals and

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1. Alternatively, languages belonging to the Chinese branch, or family, of Sino-Tibetan are termed *dialects* (even if mutually unintelligible), or *topolects*.

variants, which characters are shared and which are unique. This East Asia-wide joint effort carried through a collaboration that put non-linguistic and non-orthographic considerations aside. Readers will recall that this work remains to be completed. But the results so far should be looked back on as an example to follow.

References

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