

Chinese Traditional Phonology

The acquisition of language by humans during their early years of life is not without effort but it is a natural, largely unselfconscious, process, and, once accomplished, our native languages define our mental worlds in such an enveloping way that it is very difficult to step back and treat them as objects of study. Linguistics is very young as a modern science, and its precursors in traditional civilizations had very uneven development. Literate civilizations have always had to devise ways of coping with language change, which is constant in all languages and tends to make older, revered texts hard to understand and to preserve. Such practical needs led, for example, to the creation of grammatical texts in Babylonia from about 1600 BC, listing inflections of the dead but still canonical Sumerian language with their equivalents in the current Akkadian language. The development of grammatical studies in Greece, which flourished especially in the Hellenistic age at Alexandria, was also, in the first place, the study of "letters" (*grammata*) and was directed towards education and the exegesis of earlier texts such as the Homeric epics. The rise of philosophy in Greece had also led to speculation about language.

India, where oral transmission of sacred texts was the norm and where, apart from the undeciphered Indus Valley script, there is no clear evidence of writing before the fourth century BC, was exceptional in the attention that was paid to linguistic structure. The Pāṇinian system of Sanskrit grammar was much the most sophisticated analysis of any language before modern times and associated with it was an analysis of the production of the sounds of Sanskrit designed to ensure the preservation of correct pronunciation of the Vedic hymns.¹ The ancient Indian science of phonetics had an important influence on the beginnings of modern linguistic science in the

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¹ W. S. Allen, *Phonetics in Ancient India* (London: Oxford U.P., 1953).

nineteenth century in the West but before that had also played a major role in stimulating phonological studies in East Asia, as we shall see.

THE NATURE AND EARLY HISTORY OF CHINESE WRITING

China achieved literacy already in the second millennium BC in a form that has survived in its essential features down to the present day. The earliest written documents are the Shang oracle-bone inscriptions from the last two centuries of the second millennium BC, but it is reasonable to assume that the origins of the script go back several centuries earlier. Because of surviving pictographic elements, it is often called “ideographic,” implying that it represents ideas directly rather than spoken words. This is a grievous error. As in the early stages of Sumerian and Egyptian writing, the Chinese script had its iconic roots – simplified drawings to stand for the names of objects such as “eye” or “hand” or to represent words for simple concepts such as “up” or “down” – but, as elsewhere, it was only the introduction of a phonetic principle, namely that of the rebus, whereby an icon is used to stand for a homophone of the word it directly represents, that could turn such “picture writing” into true “writing” capable of conveying any message that could be spoken. Examples of this in English would be a drawing of an “eye” to represent the pronoun “I,” or wavy lines representing the “sea” to stand also for the verb “see.” The rebus principle in Chinese writing is known as *jiàjiè* 假借, or “borrowing.” The addition of semantic indicators to distinguish homophones or near homophones resulted in the class of characters called *xíngshēng* 形聲 (“form and sound”), or *xiéshēng* 諧聲 (“agreeing in sound”), which constitute the great majority of those in a modern dictionary. The fact that Old Chinese was basically monosyllabic in structure, so that word = syllable = character, made this form of writing especially suitable and no doubt helped to inhibit any moves towards a more analytical phonetic representation.

In the Chinese case “matching sound” did not require exact homophony. Words related in sound and meaning could be written with the same graph. An example that has survived to the present day is the graph 長, still used for both *cháng* (“long”) and *zhǎng* (“to grow, elder”). Other related words like *zhāng* 張 (“stretch”) and *zhàng* 帳 (“curtain”; that is, something stretched), have had semantic determinatives added, namely *gōng* 弓 (“bow”) and *jīn* 巾 (“piece of cloth”), respectively. For the linguist this is important evidence that all these words must have been derivatives of a common root by processes of affixation that have been obscured by later

phonetic change and that in those days Chinese was not strictly an “isolating” language, in which changes in meaning and grammatical relationships were conveyed by means of word order and independent particles. We may compare this with the fact that the Phoenician alphabet, which is the mother of our own, included only consonants and left out the vowels. This was possible because of the structure of Semitic languages, in which words are composed of consonantal roots, with vowels inserted to mark derivational and inflectional changes. Omission of vowel signs was possible because these could commonly be supplied by the reader from the context. The addition of vowel signs by the Greeks when they borrowed the alphabet from the Phoenicians was not so much a mark of special cleverness as a necessary consequence of the different structure of the Greek language.

By extension, Chinese words that had the same phonetic kernel might be written with the same graph even when they were not etymologically related. Thus, the originally pictographic sign for *nǚ* 女 (“woman”) was borrowed for the second person pronoun *nǚ* (“you”), later distinguished as 汝, with the sign for “water” added because it was also a homophone of the name of a river. The phonetic connection between the two words becomes more apparent when we discover that *nǚ* had palatal [ɲ] as its initial in Middle Chinese while “woman” had a retroflex nasal transcribed as *nr*, phonetically [ŋ]. Comparison with related languages shows that the pronoun must originally have had the simpler structure. The pronoun “you” can be reconstructed as *nâ?, with a dental *n that palatalized according to a regular rule, while the word for “woman” must have had a prefixed or infix consonant that prevented this from taking place and caused retroflexion instead.² Thus, in spite of its nonphonetic structure the Chinese script contains clues to the early history of the sound system.

The process by which the writing system was created is not recorded and can only be guessed at. One may assume, however, that applying the rebus method to find the means to represent any spoken word would have focused some attention on phonemic structure, namely that there was only a limited number of possible distinct sounds, as is true of any language. In Egyptian hieroglyphic writing, which was similarly made up of originally pictographic signs used phonetically, a set of signs representing single consonants was singled out as a quasi-alphabet.³ A case has also been made for

² For a recent discussion, see Edwin G. Pulleyblank, “*Jiàjiè* and *xiéshēng*,” in Alain Peyraube and Sun Chaofen, eds., *Studies on Chinese Historical Syntax and Morphology: Linguistic Essays in Honor of Mei Tsu-lin* (Paris: École des Hautes Études en Sciences Sociales, 1998), pp. 145–64.

³ Alan Gardiner, *Egyptian Grammar*, 3d rev. edn. (London: Oxford U.P., 1957).

the hypothesis that in China the twenty-two calendrical signs known as the Ten Heavenly Stems (*tiangan* 天干) and Twelve Earthly Branches (*dizhi* 地支), which from the earliest times have been run side by side to form a continuous cycle of sixty, used as a day count independent of lunar months and solar years were similarly created as names for the possible initial consonants of the language as it existed at the time the script was invented.⁴ This unconventional hypothesis has not yet been widely accepted but no better explanation has been offered for the origin of this set of calendrical signs.⁵ In any case, even if this much insight into the phonetic structure of the language had been achieved when the script was invented, it had long since been obscured by phonetic change before the composition of the earliest surviving literary texts in the first millennium BC. There is no generally acknowledged account of how Cang Jie 倉頡, the reputed inventor of the script, did his work. In classical times graphs were treated as unanalyzable logograms standing for monosyllabic words. There was no way to refer to the sound of a word except by saying that it was the same as, or nearly the same as, some other monosyllable. No better system had yet been devised when the *Shuowen jiezi* 說文解字, the first dictionary analyzing graphic structure, was compiled early in the second century AD.

⁴ Edwin G. Pulleyblank, "The *gan*zhi as Phonograms and Their Application to the Calendar," *Early China* 16 (1991), pp. 39-80, and idem, "The *gan*zhi as Phonograms: An Emendation," *Early China News* 8 (1995), pp. 29-30.

⁵ Among other proposals is that of Paul Benedict, "Austro-Thai Studies, 3, Thai and Chinese," *Behavioral Science Notes* 2.4 (1967), pp. 288-91, deriving the duodenary cycle, also now known as the animal cycle, from Austro-Tai animal names. A similar proposal to derive these names from Austroasiatic is found in Jerry Norman, "A Note on the Origin of the Chinese Duodenary Cycle," in Graham Thurgood, James A. Matisoff, and David Bradley, eds., *Linguistics of the Sino-Tibetan Area: The State of the Art* (Canberra: Australian National University, 1985), pp. 85-89. In both cases the claimed resemblances peter out after a few plausible hits. Moreover, while the cyclical signs are already an integral part of Chinese writing in its earliest attestation on the Shang oracle bones, at a time when there is no evidence of writing of any kind in southeast Asia, the animal names associated with the duodenary cycle are not attested before the Han period and must have been a much later addition. The names of the duodenary cycle as now used in southeast Asia are clearly borrowed from Chinese and are not connected with any of the alleged native etyma. No parallel explanation has been offered for the denary cycle with which the duodenary cycle has been inextricably associated from the beginning. I shall not attempt to review other conjectures that have been made connecting these twenty-two signs with celestial phenomena. The proof of the hypothesis of the phonetic significance of the signs will be in how well it succeeds in accounting for the phonology of Old Chinese at the time of the origin of the script as reconstructed from other evidence.

FANQIE AND RHYME DICTIONARIES: THE FIRST STEP IN ANALYZING PRONUNCIATION

By then, however, the problem of referring to pronunciation had become acute with the growth of scholarship devoted to explicating classical texts that had become obscure through the passage of time. The so-called *fanqie* 反切 method was devised whereby the pronunciation of one monosyllable was explained in terms of two other monosyllables, one of which had the same initial and the other of which had the same final. Thus, in modern terms, *dōng* 東 ("east") could be spelled as *dé* 得 ("get") + *gōng* 公 ("public"). *Fǎn* 反 (turning from the sound of the initial to the sound of the final) and *qiè* (cutting the sound into complementary parts) were alternative names for the process later combined into the compound term *fanqie*.⁶ According to Yan Zhitui 顏之推, who wrote at the end of the sixth century, the *fanqie* method was known at the end of Han. The first work that he cites using it was the sound glosses on the *Erya* 爾雅 (an early lexical work included among the Confucian classics) by Sun Yan 孫炎, who lived in the third century AD, but, as Yan Zhitui implies, there is sporadic evidence for it in some earlier commentaries from the previous century.⁷

Along with the introduction of the *fanqie* method came a new awareness of rhyme and initial assonance as linguistic features and the compilation of rhyme dictionaries. It is surprising that in spite of the fact that end-rhyme had been a feature of Chinese poetry from the earliest times, the word *yùn* 韻 ("rhyme") does not occur in texts until post-Han times. The earliest recorded examples of rhyme dictionaries are the *Shenglei* 聲類 (*Classification of Sounds*) by Li Deng 李登 (fl. Sanguo-Wei era) and the *Yunji* 韻集 (*Assembly of Rhymes*) by Lü Jing 呂靜 (of the subsequent Jin period). Neither of these works has survived and their method of classification is not known, but judging by later examples of the genre the role of *fanqie* in stimulating this development is clear. An account datable to the fifth or sixth century states that the *Yunji* classified rhymes according to the five notes of the traditional pentatonic scale (*gong* 宮, *shang* 商, *jiao* 角, *zhi* 徵, *yu* 羽), and applied the terms *qing* 輕 ("clear") and *zhuo* 濁 ("muddy"), also

⁶ Gordon B. Downer, "Traditional Chinese Phonology," *Transactions of the Philological Society* (1963), pp. 127-42.

⁷ Wang Liqi 王利器, *Yanshi jiaxun jijie* 顏氏家訓集解 (Taipei: Mingwen shuju, 1982), pp. 436, 473. See also Yen Chih-t'ui, *Family Instructions of the Yen Clan*, annot. and trans. Teng Ssu-yü (Leiden: E. J. Brill, 1968), pp. 175, 188.

borrowed from musical theory, where they referred to relatively high and low pitch.⁸ Unfortunately, we do not know what phonetic features Lü Jing associated with these terms, which had a variety of applications in later phonological writings.

Because the *fanqie* method appeared just about the time when Buddhism made its first appearance in China, it is often assumed that it was inspired by Indian alphabetic writing.⁹ This is doubtful. There is nothing comparable in Indian phonetic theory. Classifying phenomena in terms of complementary opposites such as *yin* and *yang* is very much in keeping with traditional Chinese modes of analysis. Moreover, although some monastic communities were established and the first translations of Buddhist scriptures into Chinese were made in the second century, there is little evidence that Buddhism had yet drawn the attention of the literati. Erik Zürcher dates the beginnings of gentry interest in Buddhism to around the year 300, by which time the *fanqie* method was already established.¹⁰ The problem for translators of Buddhist texts, after all, was how to render Indian polysyllabic words by means of Chinese monosyllables, not how to explain the pronunciation of Chinese words.

The traditional Chinese method of dividing a syllable into complementary parts may seem primitive and crude compared to the segmental analysis used in alphabets in the Graeco-Roman tradition that string consonants and vowels one after the other in linear fashion as if they are atomic units of essentially the same kind. It has received more favorable recognition from followers of J. R. Firth, who have seen in it a precedent

⁸ Jiang Shi 江式, "Shanggu jinwen zibiao" 上古今文字表, quoted in the biography of the author in the *Wei shu* 魏書 (Beijing: Zhonghua, 1974) 91, p. 1963. For this and other references to early rhyme dictionaries, see Zhou Zumo 周祖謨, "Qieyun de xingzhi he tade yinxi jichu" 切韻的性質和它的音系基礎, in idem, *Wenxueji* 問學集 (Beijing: Zhonghua, 1966) 1, pp. 434-73; trans. Göran Malmqvist, "Chou Tsu-mo on the Ch'ieh-yün," *BMFEA* 40 (1968), pp. 38-78.

⁹ Perhaps the earliest explicit statement to this effect was by the Song polymath Shen Gua 沈括. See Hu Daojing 胡道靜, *Mengqi bitan jiaozheng* 夢溪筆談校證 (Shanghai: Shanghai chuban gongsi, 1956) 15, p. 505. Although Shen began with the blanket statement that "Qieyun studies originated in the Western Regions," he drew an analogy between the dividing of a syllable represented by a single character into two parts, one standing for the onset and the other for the rhyme, and the fusion of two function words into a single syllable represented by a single graph, e.g., *zhi hu* 之乎 → 語 *zhu*, which he is also credited with having been the first to recognize as a feature of Chinese grammar. For an argument that the *fanqie* method was an independent invention by Eastern Han scholars that owed nothing to the advent of Buddhism, see also Liu Jing 劉靜, "Fanqie yuan yu Fojiao shuo bianxi" 反切源于佛教說辨析, *Shaanxi shi daxue bao* 陝西師大學報 22.3 (1993), pp. 122-27. (I owe this reference to John Kieschnick.)

¹⁰ Erik Zürcher, *The Buddhist Conquest of China: The Spread and Adaptation of Buddhism in Early Medieval China* (1 siden: E. J. Brill, 1959) 1, p. 73.

for treating syllables as basic units, to be analyzed in terms of "prosodies."¹¹ Recent theories of nonlinear phonology in the generative school that analyze syllables as trees branching into onset and rhyme also show a correspondence to the Chinese tradition. An obvious difficulty from the point of view of a modern historical linguist is that, while the meaning of a *fanqie* spelling would have been transparent to a contemporary native speaker, it becomes more opaque with the passage of time. This was not, however, a concern of those who invented the method.¹²

An important point to remember when one tries to estimate early Indian influence on Chinese phonological theory is that the Indian alphabetic writing first made its appearance in the Kharoṣṭhī alphabet associated with northwest India. Unlike modern Indian alphabets, this is set out in the so-called *arapacana* order, which omits vowel signs other than *a* and lists the consonants in an apparently random fashion. It was not until much later that the Brāhmī alphabet made its appearance. The Brāhmī alphabet, better known in its later form, Devanāgarī, is an important product of Indian phonological sophistication. Unlike the first Semitic alphabets, it spells out vowel distinctions as fully as alphabets of the Graeco-Roman tradition, while still treating "consonant+vowel" as the basic syllabic unit. Moreover, the letters of the alphabet are not jumbled in random fashion one after the other but are arranged scientifically. It is important to understand this in order to appreciate both the influence it had on the Chinese rhyme tables and how the Chinese adaptation was actually based on different principles (see appendix 1).

The earliest versions of the phonetically arranged alphabet, based on the Brāhmī script and the classical Sanskrit language, arrived in China in the fifth century. It attracted a great deal of interest in Buddhist circles and it also attracted the attention of a layman, Xie Lingyun 謝靈運 (385-433), the most eminent poet of his day at the southern court, who was much interested in Buddhism and who collaborated with a monk in improving a translation of the text in which this alphabet first became known to the

¹¹ See M. A. K. Halliday, "The Origin and Early Development of Chinese Phonological Theory," in R. E. Asher and Eugénie J. A. Henderson, eds., *Towards a History of Phonetics* (Edinburgh: Edinburgh U.P., 1981), pp. 123-40.

¹² Others have been less favorable: e.g., Roy Andrew Miller, "The Far East," in T. Sebeok, ed., *Current Trends in Linguistics*, vol. 13 of *Historiography of Linguistics* (The Hague: Mouton, 1975), pp. 1214-64, who denies that anything can be found in Chinese dialects to correspond to the grades of the rhyme tables "as with so many of the other categories and distinctions that, on the face of it at least, may be deduced the rhyme books and rhyme tables." See also the article by Jerry L. Norman and W. South Coblin (cited below, n. 20), who take up Miller's theme.

Chinese. Together with another Chinese monk he compiled a glossary of Sanskrit terms in Chinese transcription "arranged according to the fourteen (vowel) sounds (of Sanskrit)" 十四音訓絃.¹³ This is unfortunately no longer extant, but one may assume that he adopted the pattern of a Chinese rhyme dictionary, treating the vowel sounds, which in Sanskrit are written as diacritics on the consonant signs, as corresponding to the final, rhyme, part of a Chinese monosyllable. There does not appear to be any precedent in early Indian tradition for lexical works arranged in this way. Lexicography was one branch of linguistics in which China, with its complicated script, was for practical reasons ahead of the rest of the world.

An interesting text does exist in which Xie Lingyun describes the Sanskrit alphabet.¹⁴ He refers to the way one "turns (*fan*)" from the consonant to the following vowel sound, so making up the full syllable out of two parts, but he is clearly borrowing the Chinese *fanqie* method to explain the Sanskrit phonetic script rather than the other way around (appendix 1). The extent to which the Brāhmī alphabet provided a model for the Chinese rhyme tables will be discussed below. An important point to be aware of is that the consonantal signs were assumed to have the inherent vowel *-a* unless this was cut off by a mark called the *virāma* ("stop"). Other vowels after consonants were written as diacritics on the consonant sign. The separate vowel signs, including that for *a*, were only used when there was no initial consonant. Hence the assumption on the part of Chinese scholars that each *akṣara* (letter, or combination of letters in the case of consonantal clusters, plus vowel sign if necessary), was equivalent to a Chinese *zi* 字 ("character-word").

THE DISCOVERY AND NAMING OF THE FOUR TONES

It was in the next generation after Xie Lingyun that the Chinese made the first independent discovery about the phonology of their language, the recognition and naming of the four Middle Chinese tones: *ping* 平 (Level), *shāng* 上 (Rising), *qù* 去 (Departing), and *rù* 入 (Entering). Though the example of a very different language may have stimulated interest in phonological features of their own language, it is hard to see any direct influence of Sanskrit here. Sanskrit has a pitch accent system like that of Classical Greek, but its role is to distinguish successive syllables from each other in

terms of relative prominence in a string. It is not, like a Chinese tone, part of the distinctive specification of each separate syllable. Note also the way in which the tones were defined. If there had been direct influence of Indian phonetic theory, one would have expected attention to be paid to the production of each tone individually. Instead the four tones as a set were divided into two complementary pairs: Level *vs.* Rising, and Entering *vs.* Departing. It is quite likely that Level and Rising refer to pitch differences, although there is good evidence that the Rising-tone, which was sometimes used to transcribe Sanskrit short vowels, also had a feature of glottalization. The terms Entering and Departing, however, seem to be chosen just as a pair of opposites. Entering was applied to words ending in the stop consonants *-p*, *-t*, *-k*. There is reason to believe that the Departing-tone at that period ended in a fricative: *-s* or *-h*; and *-s* could sometimes even be used as a rhyme with *-t*, which would have provided a link between the two categories.¹⁵

There is a well-known anecdote in which a Chinese emperor asks for an explanation of the four tones, the reply being a four-word sentence in which they were exemplified: *tiān zǐ shèng zhé* 天子聖哲 ("The Son of Heaven is sage and wise"). As it happens, these words illustrate the four tones of Mandarin (although in the order 1-3-4-2), but in Middle Chinese the tones were in the order: Level, Rising, Departing, Entering. Whether or not this incident actually occurred, it shows very well how this discovery about the language would have been popularized. To contemporary native speakers an example of this kind would have been perfectly clear and could have been easily generalized to other examples. In the same way, the *fanqie* method of explaining the pronunciation of a word would work very well among contemporary native speakers of the same dialect without the need for an explicit theory about the structure of syllables or about consonants and vowels. The problem, of course, is for us, who have no direct access to this native speaker intuition.

More of a case can be made for the claim that the development of a new system of tonal prosody, which followed soon after the recognition of the tones, may have been influenced by Sanskrit poetic meters as represented in Buddhist chanting.¹⁶ This influence could, however, only have

¹⁵ See Edwin G. Pulleyblank, "Some Further Evidence regarding Old Chinese *-s* and Its Time of Disappearance," *BSOAS* 36 (1973), pp. 368-73, and *idem*, "The Nature of the Middle Chinese Tones and Their Development to Early Mandarin," *Journal of Chinese Linguistics* 6 (1978), pp. 173-203.

¹⁶ As claimed in a recent article by Victor H. Mair and Tsu-lin Mei, "The Sanskrit Origins of Recent Style Prosody," *HJAS* 51 (1991), pp. 375-470.

¹³ Zürcher, *Buddhist Conquest* 2, p. 412.

¹⁴ Annen 安然, *Shittanzō* 悉曇藏 (9th c.; *Tedn.*, no. 2702), vol. 84, pp. 365-461, citing a lost work titled *Xuanyiji* 玄義記, by the monk Huijun 惠均.

been a matter of inspiration, not direct imitation. Sanskrit meters, like those of Classical Greek, were quantitative and independent of pitch accent, while Chinese tonal prosody was based on a contrast between Level-tone and any of the other three tones (collectively referred to as 仄 仄; "deflected"). The phonetic contrast between "level" and "deflected" seems to have been based on the fact that the latter all ended in a voiceless feature, either a stop (Entering-tone), a fricative (Departing), or a glottal stop (Rising), while the Level-tone ended in a voiceless consonant or glide. The Chinese poets who developed the conventions of "regulated verse" (*lüshi* 律詩) over the following two centuries can have had little, if any, real knowledge of Sanskrit metrical theory and must have been responding to their aesthetic feeling about the resources of their own language. What Sanskrit and Chinese meters had in common was a binary contrast in syllable types, something that is more or less universal for poetic meters.

EARLY MIDDLE CHINESE: THE QIEYUN

The naming of the four tones provided the first major classification for rhyme dictionaries. The *Qieyun* 切韻 (601 AD) conflated earlier dictionaries and became the established authority for rhyming of verse in the civil service examinations.¹⁷ It went through many revisions and enlargements during the succeeding Tang period, culminating in the *Guangyun* 廣韻, a work produced in 1085 under Northern Song court sponsorship. It retained its official status in spite of the great changes in the language that had already occurred. Bernhard Karlgren, the western scholar who first made a complete reconstruction of its language in phonetic notation, erroneously assumed that the *Guangyun* represented the current dialect of the Sui-Tang capital, Chang'an, at the time of its composition.¹⁸ It has since been shown that during the previous period of division into Northern and Southern Dynasties educated speakers in both parts of the country used a kind of "Mandarin" based ultimately on Luoyang of the third century. This "Mandarin" was taken to the south by refugees after the fall of Western Jin in 315 AD in the same way that present-day Mandarin was taken from the mainland to Taiwan in 1949.¹⁹ By the sixth century, educated speech of the south and that of the north had diverged but were still mutually intelli-

gible and sufficiently unified to constitute a common language distinct from the many local vernaculars. The aim of the *Qieyun* was to codify this common standard, preserving a maximum number of distinctions between syllables. I call this Early Middle Chinese (abbreviated as EMC).

In the *Qieyun*, words are classified first into the four tones, then into rhymes arranged in corresponding order within each tonal category. Within each rhyme individual words are placed in homophone groups, with a *fanqie* spelling applicable to the whole group placed under the first word. The homophone groups within each rhyme are in random order except for the fact that the first word in corresponding rhymes within each tonal category commonly have the same initial. The latter feature is extended to rhymes that were still treated as distinct in one or another earlier dictionary from north or south China, but that had probably merged for the majority of speakers by the time the *Qieyun* was compiled and were treated as interchangeable 同用 for examination purposes.

A discordant note has recently been struck by Jerry L. Norman and W. South Coblin in their paper "A New Approach to Chinese Historical Linguistics."²⁰ At one point they say, "It seems clear that the *Chiehyunn* does not represent a record of any spoken dialect of a certain place or time: it is rather an inventory of a tradition of phonological glossing. As such, the *Chiehyunn* system is not really a language in any common sense of the term." The evidence we have about the way in which the author of the *Qieyun* and his advisors went about their work in Lu Fayan's preface, supplemented by the comments on contemporary pronunciation by one of his main advisors, Yan Zhitui, show clearly that this criticism makes no sense.²¹ In the absence of a phonetic notation there was no way that a Chinese lexicographer could have accurately recorded an obsolete pronunciation. An old *fanqie* spelling copied from an earlier text could only have been interpreted in accordance with some contemporary spoken norm. The fact that a nineteenth-century scholar like Chen Li 陳澧 (1810-1882) could establish inductively a list of the initials and finals in the *Qieyun* by analyzing its *fanqie*,²²

pp. 1-18; Edwin G. Pulleyblank, "Some Examples of Colloquial Pronunciation from the Southern Liang Dynasty," in Wolfgang Bauer, ed., *Studia Sino-Mongolica: Festschrift für Herbert Franke* (Wiesbaden: Franz Steiner Verlag, 1979), pp. 315-28, and idem, *Middle Chinese: A Study in Historical Phonology* (Vancouver: U. British Columbia P., 1984), pp. 133-34.

²⁰ Jerry L. Norman and W. South Coblin, "A New Approach to Chinese Historical Linguistics," *JAOS* 115 (1995), pp. 576-84.

²¹ See Edwin G. Pulleyblank, "*Qieyun* and *Yunjing*: The Essential Foundation for Chinese Historical Linguists," *JAOS* 118 (1998), pp. 200-16.

²² *Qieyun kao* 切韻考 (*waipian fu* 外篇附) (Taipei: Guangwen shuju, 1966).

¹⁷ Malmqvist, "Chou Tsu-mo," pp. 33-78.

¹⁸ Bernhard Karlgren, *Études sur la phonologie chinoise* (Leiden: E. J. Brill, 1915-26); trans. Luo Changpei, Chao Yuen-ren, and Li Fang-kuei, *Zhongguo yinyunxue yanjiu* 中國音韻學研究 (Shanghai: Commercial Press, 1940).

¹⁹ Chen Yinke 陳寅恪, "Cong shishi lun Qieyun" 從史實論切韻, *Lingnan xuebao* 9 (1949),

a procedure that was later performed independently (but less thoroughly) by Karlgren and in more recent times by Li Rong,²³ is ample proof that it represents a coherent phonological system. The point of this is that since a word is not permitted to spell itself, one can set up mutually exclusive chains of equivalent spellers for both initials and finals. In fact a dictionary of this kind represents the synchronic linguist's ideal of a complete inventory of the distinct syllables of the target language, something that a historical linguist of a language in an alphabetic script can only hope to achieve, if at all, by long and painstaking study of texts without any way of ensuring that he or she has reached the goal.

Some distinctions recorded in the dictionary were not observed in one part of the country or the other. This has been discussed in some detail in my book *Middle Chinese*. Such evidence that the *Qieyun* does not, strictly speaking, represent one unified dialect but a "diasystem" is, however, no more remarkable than what we find in the case of a language like modern English in which, for instance, words like *which* and *witch* are homophones for some speakers in both England and North America but are distinguished by others without seriously interfering with mutual intelligibility. Similarly, many speakers of Canadian as well as American English use the same vowel in *too* and *tune*, while others distinguish them, using the vowel of *cue* in the latter. Dictionaries use different strategies for registering such variations. Of the dictionaries on my shelves, *Chambers Twentieth Century Dictionary* (revised and reprinted in 1977) gives the pronunciation of *where* as (*h*)wār; it writes *tōō* versus *tūn*, but in the prefatory material has: "ū. In British English this is a diphthong; in American English it often loses its diphthongal character, becoming *ōō*." In cases of this kind the *Qieyun* gives separate *fanqie*, for instance, spelling *chuán* 船 (EMC: zwián) as 繩川 (EMC: z[iŋ tɕ^h]wian), but *chuán* 端 (EMC: dzwian) as 市緣 (EMC: dz(i' j)wian), where, according to Yan Zhitui, the initials dz- and z- were distinguished in the north but not in the south. That Lu and his colleagues were well aware of what they were doing is shown by the fact that they set up the three separate rhymes *zhī* 支 (EMC: tciā), *zhī* 脂 (EMC: tci), and *zhī* 之 (EMC: tci), in spite of the fact that there is good reason to believe that the second and third had already merged in the south at the end of the fifth century, while the first and second had merged for at least some authors in the north. All three were treated as interchangeable for examination purposes from the middle of the seventh century. In the *Qieyun* they are treat-

ed as separate, with different final spellers throughout, but the fact they had merged for many speakers was no doubt responsible for the choice of characters with the same initial (EMC: tɕ-) for the name characters of each rhyme, not only in Level-tone but also in the corresponding rhymes in Rising and Departing.²⁴

LATE MIDDLE CHINESE: RHYME TABLES OF THE *YUNJING* TRADITION

During the seventh century the lingua franca of the elite, although enshrined in the authoritative *Qieyun*, was supplanted by a new standard based on the Tang capital Chang'an (namely Late Middle Chinese, abbreviated LMC). By the end of the seventh century and the first half of the eighth this shows itself in a markedly different system for transcribing Sanskrit and the introduction of a new standard in Sino-Japanese called Kan'on (Hanyin 漢音), based on LMC in contrast to the earlier Go'on (Wuyin 吳音) based on EMC.²⁵

Buddhist interest in the Sanskrit alphabet increased during Tang because of the introduction of the Tantric school, which emphasized recitation of magic spells (*dhāraṇī*) that depended for their effectiveness on correct pronunciation. Eventually Chinese monks turned their attention to the analysis of the sounds of their own language. This bore fruit in the creation of rhyme tables 等韻圖, an elaboration of the *fanqie* method in which the syllables of the language are displayed on a two-dimensional grid. Words with the same initial, and therefore capable of using the same initial speller, are placed in columns from right to left and words with the same final are set out horizontally in rows beneath. As we see, below, the categories by which words were classified in this system analyzed the two parts of a *fanqie* spelling, the initial and the rhyme, in terms of phonologically significant contrasts that would have been ostensible by example to native speak-

²⁴ Of course, it was possible for mistakes to be made in individual cases. I think this happened, for example, in the case of the word *shī* 實, for which the *fanqie* implies EMC: zit but which, I believe, ought to be read as EMC: dzit; Edwin G. Pulleyblank, "The Morphology of Demonstrative Pronouns in Classical Chinese," in H. Samuel Wang, Feng-fu Tsao, and Chin-fa Lien, eds., *Selected Papers from The Fifth International Conference on Chinese Linguistics* (Taipei: Crane Publishing Co., 2000), pp. 1-23. There was no contrast between these two initials in the rhyme in question and the authors may have been misled by the fact that, overall, dz- is much more common than z-.

²⁵ Edwin G. Pulleyblank, "Late Middle Chinese," *AMNS* 15 (1970), pp. 197-239, and 16 (1971), pp. 121-68; and idem, *Middle Chinese*, pp. 60-63.

²³ Li Rong 李容, *Qieyun yinxi* 切韻音系 (Beijing: Zhongguo kexueyuan, 1952).

ers, even though there was no explicit description of the articulatory mechanisms involved and no separate phonetic notation.

While, as with *fanqie* spellings, the phonetic interpretation of the categories would have been transparent to native speakers of the language at the time, it has been obscured by subsequent phonetic change and can only be properly understood by reconstructing the underlying spoken language. This is a complicated and difficult process based on collating a wide variety of evidence – forms in modern dialects as well as in Sino-Japanese, Sino-Korean and Sino-Vietnamese, which were originally borrowed during Tang, the rhyming of certain poets in the ninth century who used current vernacular rather than the prescribed rules, Tang-dynasty transcriptions of Sanskrit and other foreign languages, phonetic transcriptions of Chinese in Tibetan, Khotanese Brahmi and Uighur, and others.²⁶

The earliest extant complete rhyme table is the *Yunjing* 韻鏡 (*Mirror of Rhymes*), now known only in an edition of the Southern Song period (the prefaces are dated 1161 and 1203), but datable by internal evidence originally to the ninth or tenth century. A slightly different version of the same text, the *Qiyinlüe* 七音略 (*Summary of the Seven Sounds*), is included in Zheng Qiao's 鄭樵 (1102–1160) encyclopedic history *Tongzhi* 通志 (ca. 1162). Other tables in the same tradition, arranged somewhat differently, are:

Sisheng dengzi 四聲等子 (*Four Tones and Grades*, thought to be Northern Song in date);

Qieyun zhizhang tu 切韻指掌圖 (*Tabular Guide to the Qieyun*; wrongly attributed to the famous Northern Song historian Sima Guang 司馬光 [1019–1086] but probably composed between 1176 and 1203); and

Jingshi zheng yin Qieyun zhinan 經史正音切韻指南 (*Compass to the Correct Sounds of the Classics and Histories in the Qieyun*; 1336).²⁷

In spite of Song or Yuan dates, all these tables imply a basic prototype that goes back to late Tang. Direct evidence for this is provided by two Dunhuang manuscripts that do not contain fully worked out tables but illustrate the main classificatory principles and represent a preliminary stage in the evolution of the *Yunjing* system:

“Gui san shi mu li” 歸三十母例 (“Examples of Assigning the Thirty Initials”; S512); and

²⁶ See references in n. 24, above, with the emendations in Pulleyblank, *Lexicon of Reconstructed Pronunciation*.

²⁷ See Pulleyblank, *Middle Chinese*, pp. 255–57. A convenient reprint of these five works is *Dengyun mingzhu wu zhong* 等韻名著五種 (Taipei: Taishun shuju, 1972).

“Nan Liang biqiu Shouwen shu” 南梁比丘守溫述 (“Exposition by the Monk of Nan Liang, Shouwen”; P2012).²⁸

The first achievement of the rhyme-table phonologists was the isolation and classification of initial consonants, each named by a word that exemplified it, for example, *jian* 見 (LMC: *kjian* = *k*). The following standard list of thirty-six initials is found in the *Yunjing* and other tables of the same tradition, with minor variations in terminology:

The Thirty-six Initials of the Yunjing

	CLEAR 清	SECOND CLEAR 次清	MUDDY 濁	CLEAR- MUDDY 清濁	CLEAR- FINE 清細	MUDDY- FINE 濁細
Lip Sounds 唇音: heavy 重 light 輕	p 幫 f 非	p ^h 滂 f ^h 敷	pf 並 ff 奉	m 明 u 微		
Tongue Sounds 舌音: tongue-head 舌頭 tongue-up 舌上	t 端 tr 知	t ^h 透 tr ^h 徹	tf 定 trf 澄	n 泥 nr 娘		
Back-tooth Sounds 牙音	k 見	k ^h 溪	kf 群	ŋ 疑		
Front-tooth Sounds 齒音: front-tooth-head 齒頭 true front-tooth 正齒	ts 精 tʂ 照	ts ^h 清 tʂ ^h 穿	tsf 從 tʂf 床		s 心 ʂ 審	sf 邪 ʂf 禪
Throat Sounds 喉音	ʔ 影	x 曉	fi 匣	o 喻		
Half Tongue Sound 半舌音				l 來		
Half Front-tooth Sound 半齒音				r 日		

The inspiration of the Sanskrit alphabet is obvious, because it classifies stop consonants and corresponding nasals by place of articulation into five *vargas* of five letters each (appendix 1) in the following order: plain voiceless, voiceless aspirate, plain voiced, voiced aspirate and nasal – that is, *ka*, *kha*, *ga*, *gha*, *nā*, and so on. But it is also clear that the Chinese system was worked out independently for the Chinese language and that there was no attempt to imitate the Sanskrit model in detail. While the Sanskrit arrangement proceeds in regular fashion from the back to the front of the mouth, the order of the first three *vargas* in the *Yunjing* system is reversed. Then come the sibilants, the velar fricatives and laryngeals, and finally the two liquids. It is possible to see some precedent for the placing of the sibilants and the laryngeals in the fact that the Sanskrit alphabet

²⁸ These two manuscripts are reproduced in Pan Zhonggui 潘重規, *Yingya Dunhuang yunji xinbian* 瀛海敦煌韻輯新編 (Hongkong: Xinya yanjiusuo, 1972).

(which does not provide for affricates) places the letters ś, ṣ, s, and h at the end, after the five *vargas* for stops and nasals and the semivowels. The manuscript evidence, however, shows that the arrangement, including the assignment of certain sounds such as l- and r-, was rather fluid at first. The setting up of five major categories was also to some extent influenced by the assumption that they should somehow correspond to the five notes of the ancient Chinese musical scale, a kind of analogy that was of interest to the Chinese monks but has no phonological significance.

Apart from the rather obvious term "lip sounds" for labials, the Chinese names for the classification of initials show little correspondence to the phonetically descriptive terms of the Sanskrit tradition. The aim of the Chinese phonologists was not phonetic exactitude but convenient labeling of relevant contrasts. The term "back-tooth" sounds for velars may have arisen from the observation that the sides of the tongue touch the back teeth when pronouncing such consonants. The "tongue" sounds and the "front-tooth" sounds were each divided into two subcategories – dental/alveolar and retroflex, respectively – in terms of place of articulation and should have constituted separate *vargas* from the Indian point of view. They were combined in the Chinese system because they were in complementary distribution with respect of the finals with which they could combine.

Within the *vargas* the Chinese consonants were classified into three contrasting phonation types: "clear" (*qing* 清) for voiceless, "muddy" (*zhuo* 濁) for voiced aspirate, and "clear-muddy" (*qingzhuo*) for sonorants (nasals, liquids and semivowels).²⁹ Voiceless aspirates were called "second clear" (*ciqing* 次清), probably a calque on Sanskrit *dvitīya* ("second") for such consonants because they came second in each *varga*. The three-way distinction between voiceless obstruents, voiced aspirate obstruents, and inherently voiced sonorants was an important feature of LMC, reflected in the development of the tones. There is other evidence that the split of the four *Qieyun* tones into upper and lower registers had already taken place by the ninth century.³⁰ The terms applied to the initials responsible for the register split

²⁹ This is the term used in the *Yunjing*. Shen Gua, *Mengqi bitan jiaozheng* 15, p. 505, called these initials "not-clear-not-muddy" and this expression is also used in the *Sisheng dengzi*. In the *Jingshi zhengyin Qieyun zhinan* the voiced obstruents are called "fully muddy" and the sonorants "half-clear-half-muddy." In current usage the sonorants are called "second muddy" in imitation of "second clear," but this terminology, which reduces the contrast to *qing* "voiceless" versus *zhuo* "voiced," fails to take account of the more complicated relation that the terms originally had to the register split in LMC. The term "second muddy" does not seem to have arisen before Yuan times. See Wang Li 王力, *Hanyu yinyun xue* 漢語音韻學 (Beijing: Zhonghua shuju, 1956).

³⁰ Pulleyblank, "Nature of Middle Chinese Tones," pp. 173–203.

in the rhyme table system made no reference to Indian phonetic terminology for voice or aspiration and show that the authors had insight into what was phonologically significant in their own language. The terms "clear" and "muddy" were borrowed from ancient musical theory, where they seem to have referred to relatively high and low pitch and so were appropriate to describe the tonal split in into upper and lower registers.

The two Dunhuang manuscripts list only thirty initials instead of the later thirty-six and also differ in their classification of some initials. This does not, however, mean that the language being analyzed was different. The six missing initials are the four labiodentals, the voiced retroflex aspirate tʂʰ, and the retroflex nasal ɳ. These omissions can be explained by the difficulty in reconciling the phonemic distinctions of the spoken language of the rhyme-table phonologists with the *fanqie* of the *Qieyun* system, to which they were providing a key.

There is ample evidence that labiodentals were already present in the Tang vernacular from the seventh century onward, but they were not distinguished from the bilabials in the *fanqie* of the *Qieyun*. The two types were, however, in complementary distribution in respect to the rhymes in which they occurred, so that by knowing the final *fanqie* speller one could correctly predict when a given initial speller should be read as bilabial or labiodental. A difficulty arose, however, because there were only three labiodentals, f-, fʰ-, v-, corresponding to the four bilabials, p-, pʰ-, pʰ-, and m-. That is, the plain voiceless and voiceless aspirate had merged. When the list of thirty initials was enlarged to thirty-six, initial *fū* 敷 (LMC: fʰ-) was artificially distinguished from *fēi* 非 (f-) to correspond to the earlier contrast between p- and pʰ-. A pronunciation [fʰ] distinct from [f] is theoretically possible but if it ever existed transitionally in LMC, it must have long since disappeared by the time the rhyme-table system was worked out. This is shown by the fact that the Shouwen manuscript (P2012) has a section devoted to "distinguishing cases in which the [initial] sound and the rhyme are alike but the places to which they should be assigned are not the same" 辯聲韻相似歸處不同. It lists first words with *fanqie* implying initial p- in rhymes where it would have been pronounced [f] and then words with *fanqie* implying initial pʰ- in the same rhymes where it too would have been pronounced [f]. Thus:

不 (initial f < p-) 風楓佩方戎反 . 封葑掣對府容反 . . .

芳 (initial f < pʰ-) 豐鄆澧縣融反 . 峰鋒蜂烽敷容反 . . .

In each list, the first set (the six characters before the stop) would have

been pronounced LMC: fuwŋ (EMC: puwŋ) and the second set pronounced LMC: fəwŋ (EMC: puawŋ). In the second list 豐 and its homophones would also have been pronounced LMC: fuwŋ but went back to EMC: p^huwŋ, while 峰 and its homophones were LMC: fəwŋ but went back to EMC: p^huawŋ. The fact that in other rhymes the *fanqie* spellers for f- were used for p-, or p^h-, at first led the rhyme-table phonologists to ignore the contemporary difference between labiodentals and bilabials. Later, four additional “light labial” initials were set up, preserving the correspondence to the *fanqie* spellers but artificially implying a continuing distinction between f- and f^h-.

In the case of the retroflex sibilants, such as tʂ and tʂh, there was a problem of the opposite kind. The *Qieyun* language had a separate category of palatals – tɕ, tɕh, dz, ɕ, z – which had merged phonemically with the corresponding retroflexes – tʂ, tʂh, dz, ʂ, z. – in LMC.³¹ It was natural, therefore, that only one set of initials should be set up to cover them both. This did not cause a serious problem in assigning syllables to a place in the tables because at the same time high front vowels had been systematically eliminated after the earlier retroflexes while all of the original palatals were still followed by either -i- or -y-, so that the two categories were in complementary distribution. Moreover, the original retroflexes were mostly found in rhymes that were assigned to Grade II on the basis of words with velar initials (see below), while those with original palatals fitted naturally into Grade III.

However, for both types of initials the distinction between voiced affricate and voiced fricative, which was already unstable at the time of the composition of the *Qieyun*, had disappeared in the Tang vernacular. While there may have been some free variation between fricative and affricate pronunciation, the bulk of the evidence shows that the fricative pronunciation predominated.³² A new distinction eventually emerged in Mandarin between voiceless affricate in level tone and voiceless fricative in oblique tones, but it applied equally to original fricatives and affricates, for example: *chéng* 盛 (“to fill”; EMC: dziajŋ; LMC: ʂfiajŋ), *shèng* 盛 (“full”; EMC:

dziajŋ^h; LMC: ʂfiajŋ^h), *chéng* 乘 (“to ride [in a vehicle]”; EMC: zɪŋ; LMC: ʂfiaŋ), and *shèng* 乘 (“vehicle”; EMC: zɪŋ^h; LMC: ʂfiaŋ^h). Lacking any distinction in pronunciation in their own language to guide them, the rhyme-table phonologists at first set up only one initial, *chán* 禪 (EMC: dzian; LMC: ʂfian), which for them was a fricative. When they aligned the retroflex sibilants in their tables in Grades II and III in complementary distribution to the dental sibilants in Grades I and IV, however, they found that there was an empty space for an affricate, tʂfi, corresponding to tʂfi. They found further that they could distinguish two sets of *fanqie* spellers so they set up a new initial *chuáng* 床 in addition to *chán* 禪. In the case of the original retroflexes the original distinction between voiced fricative and affricate was successfully restored. In the case of the palatals, however, it was reversed, which misled Karlgren into reconstructing *chán* 禪 with initial ʒ-, and words like *chéng* 乘 being placed in Grade III under initial *chuáng* 床, with initial dz-.³³

That the rhyme-table phonologists were troubled from the beginning by how to handle problems that had arisen from the merger of the palatal and retroflex sibilants is shown by the fact that the Shouwen manuscript has an item entitled “Examples in which two words are in one and the same rhyme, and one must rely on the *qie* to determine the source” 兩字同一韻憑切定端的例. Six pairs of words with LMC retroflex sibilant initials, both from the same rhyme, are given, each provided with a *fanqie* spelling. In two cases – *chén* 辰 (EMC: dzin; LMC: ʂfin) versus *shén* 神 (EMC: zin; LMC: ʂfin), and *chéng* 承 (EMC: dzɪŋ; LMC: ʂfiaŋ) versus *shéng* 繩 (EMC: zɪŋ; LMC: ʂfiaŋ [the Mandarin readings *shén* and *shéng* are irregular, preserving the original fricative initial!]) – the contrast is between words that would later be assigned to initials *chán* and *chuáng* respectively. In the remaining cases, it is a question of EMC palatals and retroflexes in the same rhyme that would later appear in Grade III and Grade II, respectively, in the *Yunjing* – for example, *chán* 禪 (EMC: dzian; LMC: ʂfian; Grade III) versus *chán* 潺 (EMC: dzian; LMC: ʂfia:n; Grade II), and *shāng* 賞 (EMC: ɕiaŋ^h; LMC: ɕiaŋ^h, Grade III) versus *shuǎng* 爽 (EMC: ɕiaŋ^h; LMC: ɕa:n^h, Grade II).

The treatment of the finals in the *Yunjing* owes nothing to Indian example. If it had done so, we should expect there to have been a separate classification of vowels and final consonants. Instead, finals, were not analyzed into segments but classified into contrastive types.

³¹ Differences that appear to correspond to the EMC distinction between palatal and retroflex sibilants survive in some dialects but this can be easily explained by the fact that, in spite of the phonemic merger, no contrasts were lost. That is, former palatals were always followed by a high front vowel while former retroflexes never occurred in this context. There was very likely an allophonic difference in these different contexts, just as there is in English between *sh-* in *shin* and *sh-* in *sham* or *shrink*. This could have induced subsequent differentiation at later stages.

³² See Pulleyblank, *Middle Chinese*, p. 70.

³³ Ibid.

First they were divided into sixteen *she* 攝 ("rhyme groups"). This term first appears in the *Sisheng dengzi*. It is, however, already implicit in the way in which *Qieyun* rhymes are grouped together in the forty-three numbered tables in the *Yunjing* even though the term *she* is not used. Since these tables were designed to be a key to the still authoritative rhyme dictionary, separate but equivalent tables were sometimes necessary in cases where *Qieyun* rhymes had merged in the later language. Thus the *shān* rhyme group, containing words ending in -an and -at, occupies tables 21 to 24 in the *Yunjing*. Tables 21 and 22, respectively *kaikou* and *hekou*, leave Grade I vacant, have rhyme *shān* 刪 in Grade II, rhyme *yuán* 元 in Grade III, and rhyme *xiān* 仙 in Grade IV. Tables 23 and 24 have rhymes *hán* 寒 (*kaikou*) and *huán* 桓 (*hekou*) in Grade I, rhyme *shān* 山 in Grade II, rhyme *xiān* 仙 in Grade III and rhyme *xiān* 先 in Grade IV. We know from other evidence that, grade by grade, this corresponds to mergers that had taken place in LMC. By spreading them out in this way, the *Yunjing* was able to achieve its aim of providing a key to the *Qieyun*. This was of less importance to later rhyme tables that overlapped equivalent rhymes within a rhyme group in a single table.

A further classificatory feature, already found in the *Yunjing*, although not in the Dunhuang manuscripts, is the labeling of the various rhyme groups as "inner turning" (*nei zhuan* 內轉) or "outer turning" (*wai zhuan* 外轉). As shown by Luo Changpei,³⁴ although the meaning was obscured in Song times by later adjustments after the original meaning had been misunderstood, it seems clear that it originally referred to a contrast in vowel height which I interpret as between a non-low "inner turning" nuclear vowel, -ə- or one of the high vowels -i-, -u-, -y-, and the low "outer turning" nuclear vowel -a-, alone or preceded by a high vowel. This is essentially the same contrast that we find in vernacular rhyming in modern Mandarin where, for instance, the finals -ən, -in, -wən, and -yn form one "inner" rhyming set, and the finals -an, -jen (phonemically /jan/), -wan, and -ʋan or -ʋen (phonemically /ʋan/) form another.

In the case of rhyme groups ending in -n/t, -m/p, -j, and -w there were two each, one "inner" and one "outer." In contrast to this, there were five ending in -ŋ/k as shown by correspondences in modern dialects. This supports the hypothesis that the *gēng* 梗 rhyme group had palatal codas,³⁵ and

³⁴ Luo Changpei 羅常培, "Shi nei wai zhuan" 釋內外轉, *ZYY* 4 (1933), pp. 209-26; rpt. *Luo Changpei yuyanxue lunwenji* 羅常培語言學論文集 (Beijing: Zhonghua shuju, 1963), pp. 87-103.

³⁵ Mantaro Hashimoto, "Internal Evidence for Ancient Chinese Palatal Endings," *Language* 46 (1970), pp. 336-65; Pulleyblank, *Middle Chinese* pp. 118-20. See also Edwin G.

the *tōng* 通 and *jiāng* 江 groups had labiovelar codas.³⁶ Indirect but decisive evidence that such groups (the *shè*) were rhyme groups and that they date to Tang times comes from the way in which they correspond to the actual rhyming of vernacular poetry in the ninth century.³⁷

An interesting feature of the Shouwen manuscript is at variance with the *Yunjing*. The manuscript gives Entering-tone examples of the four grades in which the *gēng* 梗 rhyme-group in LMC: -ajk and the *zēng* 曾 rhyme-group in LMC: -əʔk are treated as a single category:

Grade I. *tè* 特 (LMC: tʃəʔk)

Grade II. *zhái* 宅 (LMC: tʃiaajk)

Grade III. *zhí* 直 (LMC: tʃiajək)

Grade IV. *dí* 狄 (LMC: tʃiajək).³⁸

This corresponds to a merger for which there is already evidence in Li He's ninth-century rhyming, which has many rhyme sequences that combine the two categories, for example:

碧 LMC: piajk (> pijk)

力 LMC: liək (> lijək)

席 LMC: sfiajk (> sfijək)

Pulleyblank, "Longitudinal Reconstruction in Chinese Historical Phonology: Palatal Endings in Middle and Old Chinese," in Anne O. Yue and Mitsuaki Endo, eds., *In Memory of Mantaro J. Hashimoto* (Tokyo: Uchiyama Shoten, 1997), pp. 5-20.

³⁶ Pulleyblank, *Middle Chinese*. William Baxter also writes -wŋ and -wʔ as the codas of the *tōng* and *jiāng shè* in his "convenient transcription" of Middle Chinese, without commitment as to whether "[t]he combinations [are tʃ] be taken literally, or interpreted as labiovelars /tʃw/ and /kʷ/, or simply regarded as a notational trick to get by with fewer vowel symbols"; William H. Baxter III, *A Handbook of Old Chinese Phonology* (Berlin and New York: Mouton, de Gruyter, 1992), p. 62. He has also found it necessary to reconstruct finals in *-awk and *-ewk and *-iwk in Old Chinese, although, in accordance with his "six-vowel" hypothesis, he derives his Middle Chinese -wŋ in all cases from *-ong or *-ung. I, on the contrary, reject the concept of a merely "convenient" transcription as a substitute for a committed phonological analysis of Middle Chinese as a suitable foundation for reconstructing a much earlier, far less well documented, language from which later forms are assumed to be derived (see n. 43, below).

³⁷ See Edwin G. Pulleyblank, "The Rhyming Categories of Li Ho (791-817)," *QHXB* 7 (1968), pp. 1-25, and idem, "Linguistic Evidence for the Date of Han-shan," in Ronald C. Miao, ed., *Studies in Chinese Poetry and Poetics* (San Francisco: Chinese Materials Research Center, 1978) 1, pp. 163-95.

³⁸ The changes involved were: the raising of the nuclear vowel /a/ (including long /aa/ which shortened) to /ə/ before the palatalized velar coda; and the fronting of the pharyngeal glide /ʒ/ to /j/ after /ə/. For details see Pulleyblank, *Middle Chinese*, pp. 117, 120. The merger between the *gēng* and *zēng* rhyme groups that occurred in northern Chinese between LMC and Early Mandarin and is also reflected in the literary layers of southern dialects is an important part of the evidence for the reconstruction of final palatals in the *gēng* group and by extension to the OC *gēng* rhyme group as well.

隔 LMC: kajjk (> kajjk)

食 LMC: sjak (> sjjk).³⁹

By Northern Song the merger had extended itself to nasal endings as well (see the discussion of Shao Yong, below). The fact that the *Yunjing* separates the two rhyme groups and correctly assigns the Entering-tone categories to them presumably reflects the arrangement of the rhymes in the *Qieyun*, but may also indicate that there were still northern dialects in which no such merger had taken place.

Within the rhyme groups separate tables are labeled “open mouth” (*kaihou*) and “closed mouth” (*hehou*) depending on the absence or presence of a rounded glide or vowel immediately after the initial consonant. Each table has sixteen rows, divided first into the four tones and within each tone into the four “grades” (*deng*).

The meaning of the grades is the most puzzling aspect of the classificatory system. Judging by the later history of the language they obviously have something to do with palatalization in the same way that the *kaihou/hehou* opposition refers to labialization, but how this worked has been obscured by later phonetic change. Again it emerges that the four grades represent successive binary cuts – first a contrast between Grades I and II taken together and Grades III and IV taken together, and then separate but related distinctions between Grades I and II and between Grades III and IV.

By various arguments based both on contemporaneous evidence and reflexes in modern dialects, two things can be shown: first, LMC had a contrast in syllable types between monomoraic and bimoraic nuclei (-V- and -VV-), the latter including not only the long vowel -a-, but also the vowel sequences -ia-, -ua-, and -ya-; and second, that after velar initials, bilabials and glottal stop ʔ, it was possible to have a palatal glide -j- in front of both long -a-, assigned to Grade II, and the sequences -ia- and -ya-, assigned to Grade III (with no preceding glide) and Grade IV (with preceding glide). It was this that created the possibility of four “grades” of palatalization after such initials, as in the following example:

Grade I. *gāo* 高 (LMC: kaw)

Grade II. *jiāo* 交 (LMC: kja:w)

Grade III. *jiāo* 嬌, (LMC: kiaw)

Grade IV. *jiāo* 澆 (LMC: kjia:w)

This is the first example given in the section entitled “Examples, Heavy

and Light, of the Four Grades” in the Shouwen manuscript. The fact that words with velar initials were also chosen for the first illustration in Rising- and Departing-tone supports the view that velars provided the basic paradigm, which would have been understandable by such examples to native speakers in the same way that the four tones had been explained to the emperor at the time of their first recognition and naming. Words with other initials were assigned to the grades by analogy based on the *Qieyun* rhymes in which they occurred.

MODERN CONTEMPORARY EVIDENCE FOR SYLLABLES WITH BIMORAIC NUCLEI

In his review of my book, *Middle Chinese*, William Baxter questioned the theoretical possibility of having diphthongs such as -ia- in which both segments are [+syllabic] (in contrast to -aj- or -ja-) in any natural language.⁴⁰ I understand that he has withdrawn from this untenable position, but his doubts show that this kind of structure is unfamiliar to many of those working in the field of Chinese historical linguistics. Consequently, it is desirable to discuss the matter here at some length. Since it is well established that long vowels can be regarded as two successive identical segments, there seems to be no theoretical objection to the assumption that there could be two nonidentical syllabic segments. When I proposed this for Late Middle Chinese, the best parallels I had were in Vietnamese, which contrasts *quan* [kwa:n] and *quân* [kwan], with long and short /a/, respectively, with *cuôn* [kuən], where [ə] can be regarded as an allophone of /a/ conditioned by the preceding high vowel. Even then I suspected that Min dialects also had syllables of the same kind. In 1931 Luo Changpei 羅常培 stated explicitly that in the Amoy (Xiamen) dialect /i/ and /u/ as the first elements in a diphthong were “prolonged,” and not so short as in Beijing, without a tendency to become consonantal [j] and [w]” 音長不像北平音那樣短，並沒有變成輔音 [j] [w] 的傾向。⁴¹ Søren Egerod also distinguished between high glides and vowel in the descriptions of Min dialects included in his doctoral dissertation on the Lungtu dialect.⁴² It has been difficult, however, to get confirmation of this in more recent

⁴⁰ William H. Baxter III, review of *Middle Chinese: A Study in Historical Phonology*, in *HJAS* 47 (1987), pp. 635–56.

⁴¹ Luo Changpei 羅常培, *Xiamen yinxi* 廈門音系, 2d edn. (1931; Beijing: Kexue chubanshe, 1963), p. 16.

⁴² Søren Egerod, *The Lungtu Dialect* (Copenhagen: Munksgaard, 1956).

³⁹ For the reference, see n. 32, above.

phonetic descriptions.

I suspect that one of the problems has been that since Yuen Ren Chao's critique of Karlgren's distinction between "vocalic" -i- and -u- and "consonantal" -j- and -w- as "medials" in *Qieyun* reconstruction,⁴³ it has been the regular practice in descriptive studies of Chinese dialects not to distinguish high vowels from the corresponding glides. Matthew Chen goes so far as to say that "There is no reason to introduce a contrast between vowels and glides in Chinese."⁴⁴ Fortunately there has recently been a break in that tradition, though it appears to have gone largely unnoticed. The second edition of the valuable compendium of dialect pronunciation published by Peking University continues the tradition of writing -i-, -u-, and -y- indiscriminately for high vowels and glides in the body of the text but in the introductory descriptions of some southern dialects it makes a clear distinction. In the case of Shuangfeng it says: "The head vowels in a rhyme (medials), i, u, y, are pronounced short and consonantal" 韻頭(介音) i, u, y, 發音短促, 帶輔音性. In the description of the Fuzhou dialect, on the other hand, it says, "The head vowels in a rhyme, i, u, y, are not short and not consonantal" 韻頭(介音) i, u, y, 發音不短促, 無輔音性, and there are equivalent remarks in the descriptions of Xiamen, Chaozhou and Jian'ou.⁴⁵

The existence of diphthongs in -ua- after labial initials in Min dialects, for example, *bàn* 半 (Xiamen literary: puán'; Xiamen colloquial: pūā'; Chaozhou: pūā'; Fuzhou: puán') in contrast to *bàn* 扮 (Xiamen literary: pan'; Xiamen colloquial: pūā'; Chaozhou: pan'; Fuzhou: pain'), supports the contention that in such cases -ua- must be interpreted as two successive vowels rather than glide + vowel. To interpret it as [wa] would violate the rule that, while rounded vowels can follow labial consonants, labialized labials are never allowed in Chinese.⁴⁶

⁴³ Yuen Ren Chao, "Distinctions within Ancient Chinese," *HJAS* 5 (1941), pp. 203-33. Chao, who worked in the framework of American structural phonemics, is well known for his theory of the "The non-uniqueness of phonemic solutions of phonemic systems" (*ZYY* 4 [1934]). That is, the linguist's "phoneme" was not thought of as having a strict definition in terms of its phonetic content but as a convenient index of minimal contrasts as observed by external observers, who might come to different conclusions depending on what they focused on. The advent of generative phonology based on the assumption that phonological contrasts depend on a universal set of distinctive features and rules of combination, including syllabic structure, should (in my opinion) have made such theories obsolete but their influence dies hard, especially in the rather rarefied field of Chinese historical linguistics.

⁴⁴ Matthew Y. Chen, "From Middle Chinese to Modern Peking," *Journal of Chinese Linguistics* 4 (1976), p. 251, n. 2.

⁴⁵ Beijing Daxue Zhongguo yuyan wenxue xi, *Yuyanxue jiaoyanshi* 北京大學中國語言文學系語言學教研室, comps., *Hanyu fangyin zihui* 漢語方音字彙, 2d edn. (Beijing: Wenzigai, 1985).

⁴⁶ Chao, who discussed the absence of a contrast between *kaikou* and *hekou* after labials in

SHAO YONG'S NEW STYLE OF SKELETAL RHYME TABLE

By the eleventh century, knowledge of rhyme-table phonology had begun to spread outside Buddhist circles. For example, writing in the *Mengqi bitan*, Shen Gua 沈括 (1029-1093) gave a somewhat confused account of a rhyme-table like the *Yunjing*.⁴⁷ His imperfect understanding shows itself in his account of the "grades," which he confuses with the four classes of consonants within a *varga*.

Of greater interest is the contribution of Shao Yong 邵雍 (1011-1077), who included a kind of skeletal rhyme table in his numerological work *Huangji jingshi* 皇極經世 (*Cosmological Chronology*).⁴⁸ Shao was not interested in providing a practical key to pronunciation. In keeping with his numerological interest, he supposed that the structure of human speech sounds, which he rather naively took to be more or less exhaustively represented by the sounds of Chinese as it was spoken in his own day, corresponded to the complementary oppositions - *yin* and *yang*, heaven and earth - that made up the universe. This theory, though fascinating from the point of view of the history of thought, has no relevance from the point of view of linguistic science and could well have led to forced interpretations. In fact, when we examine Shao's tables of initials and finals in detail, it is remarkable how well he succeeded in not only avoiding any such distortion but in using categories borrowed from the *Yunjing* to present a valid analysis of the phonology of northern Chinese in the eleventh century, unconstrained by the necessity to refer to the obsolete authority of the *Qieyun*, which inhibited the creators of the *Yunjing* system.

In this he was aided by the fact that his numerological scheme involved two sets of four-way oppositions which could be associated with the four tones and the four grades: one set was that of heaven - divided into *yin* and *yang*, which were each further divided into major and minor; the

the *Qieyun* in the same article in which he objected to Karlgren's contrast between consonantal and vocalic medials (see n. 23, above), did not discuss its bearing on the analysis of Min dialects.

⁴⁷ For Shen's text, see n. 9, above.

⁴⁸ I wish to acknowledge the kind assistance of M. Alain Arrault, who at a preliminary stage in the preparation of my article for the *Enciclopedia Italiana* kindly sent me an extract from his forthcoming doctoral thesis, "Shao Yong (1012-1077), cosmologue et poète" (Institut des Hautes Études Chinoises, Collège de France), as well as a draft version of his article, "Pensée correlative et arithmologie en Chine: Le cas de Shao Yong (1012-1077)," to appear in Alain Arrault and Catherine Jami, eds., *Science and Technology in East Asia*, 20th International Congress of History of Science, Liège (Turnhout: Brepols), in press. He is not, of course, responsible for any errors that I may have committed.

other was earth – divided into firmness and softness, each further divided into major and minor. The four divisions of heaven were labeled “sun,” “moon,” “stars,” and “planets”; the four divisions of earth were “water,” “fire,” “earth,” and “stone.” Heaven and earth were further associated with the two calendrical series Ten Heavenly Stems and Twelve Earthly Branches. For Shao Yong, the finals of Chinese syllables corresponded to heaven and the initials corresponded to earth. Initials were set out in twelve tables, each containing two initials divided into “clear” and “muddy,” giving a total of four columns. The terms “clear” and “muddy” were treated as sub-categories applicable to all initials, including voiceless aspirates and sonorants, no longer as descriptive terms for individual initials. We can infer from this that the devoicing of Middle Chinese voiced obstruents was now complete but that low tone register was still accompanied by breathy voice throughout the syllable. As in modern Mandarin, voiced stops had become voiceless aspirates in level tone and plain voiceless in other tones. Sonorants were “clear” (upper register) in rising tone and “muddy” (lower register) elsewhere. The tables for initials each had four rows corresponding to the four grades. Initials were assigned to the twelve “earthly” tables as follows:

1. k and k^h
2. x and ŋ
3. 0 (including glottal stop ʔ, which was no longer distinctive) and m
4. f and v
5. p and p^h
6. t and t^h
7. n (including nr) and l
8. ts and ts^h
9. s and a second initial marked as nonoccurring (presumably a sonorant bearing the same relation to alveolar s as r to retroflex ʂ)
10. ʂ and r
11. tʂ and tʂ^h
12. tr and tr^h.

It is interesting that a distinction is made between possible but non-occurring sounds marked by an empty square or circle and slots for which no corresponding sound existed marked by a filled-in square or circle. The latter systematically included Grades I and IV for all retroflex initials, ʂ, r, tʂ, tʂ^h, tr, tr^h, thus corresponding to the *Yunjing*. However, Grade IV was also marked with filled-in squares for the dental initials, t, t^h, n, l, ts, ts^h,

and s. Words with these initials that would have been placed in Grade IV in the *Yunjing* were transferred to Grade III. This shows that, in contrast to the *Yunjing*, in which the assignment of these words to their grade relied on an analogy with velar and labial initials in the same *Qieyun* rhymes, Shao Yong had a clear phonetic criterion: [i] or [y] in Grade III contrasting with [ji] or [jy] in Grade IV regardless of the initial. Shao Yong also transferred some dental consonants to Grade II instead of Grade I. Again one can find a clear phonetic reason for this. It must have been because the vowel -a- of EMC had lengthened to -a:- after coronal initials in such cases, a change that is reflected not only in present-day Cantonese but also in the evolution of entering tone words in Mandarin. Thus, while the short vowel after a velar initial in *gé* 葛 (LMC: kat; Grade I) has become a mid-vowel in Mandarin, that in *dá* 達 (LMC: tʃiat; Grade I) has remained low, like the long vowel in *zhá* 札 (LMC: tʃa:it; Grade II) or *jiá* 戛 (LMC: kja:it; Grade II) (see appendix 2). This implies that short -a- must have lengthened to -a:- before the loss of the final -t. Also, because the vowel -i in open syllables had been lost after dental sibilants in words like *sī* 思 (“think”), pronounced [sɿ] in Mandarin, such words were transferred from Grade IV to Grade I. Another notable difference from the *Yunjing* is that instead of being confined to Grade III *hekou*, the labiodentals in Shao Yong’s table 4 are distributed over Grades I, II, and IV in ways that correspond to their development in Mandarin pronunciation.⁴⁹

The ten tables of finals contain two finals each, divided into *pī* 闕 (“open”) and *xī* 翕 (“close”) corresponding to “open mouth” and “closed mouth” in the *Yunjing*. The last three tables are empty, marked as having no corresponding sounds. The four rows in each table, labelled sun, moon, stars and planets, represent the four tones. Entering-tone words are no longer associated with the corresponding nasals, as in the *Qieyun* and the *Yunjing*, but are associated with finals in open vowels or diphthongs, the exception being those in -p which were still placed under finals in -m. There is rhyming evidence to support this, indicating that final -k and -t at least had been lost, probably replaced by a glottal stop, as in some modern Mandarin dialects. The *gěng* and *zēng* rhyme groups, which were distinct in the *Yunjing* system, although already tending to merge in Entering-tone in vernacular rhyming in the ninth century, had merged for Shao Yong, as had the *jiāng* and *dàng* groups. This also is in agreement with other Song-era evidence.

⁴⁹ Pulleyblank, *Middle Chinese*, pp. 81, 84, 125, 127; idem, “Dentilabialization in Middle Chinese,” in John McCoy and Timothy Light, eds., *Contributions to Sino-Tibetan Studies* (Leiden: Brill, 1985), pp. 345–64.

The incomplete nature of Shao Yong's tables, which only give examples of the various categories rather than a display of all possible combinations of initials and finals, leaves room for doubt at some points; but our general conclusion must be that, in spite of the apparent arbitrariness of the framework which he devised on the basis of his metaphysical theory, he succeeded very well in presenting the essential phonological contrasts of the language of his day.

LATER DEVELOPMENTS

The rhyme-table method of displaying the syllables of the language represents the high point of traditional Chinese phonology. The fact that there was no notation, like an alphabet, to make explicit the phonetic nature of the contrasts involved is an obvious disadvantage but when we consider the difficulties that historical linguists often have in interpreting traditional spellings in alphabetic scripts, the way in which a rhyme table sets out and classifies all the significant phonemic contrasts in the language at a given point in time also has its advantages. Chinese rhyme table theory played a role in the creation of the first alphabetic orthography for Chinese by the Tibetan monk 'Phags-pa (1235-1280), an influential adviser of Kublai Khan. 'Phags-pa's alphabet, based on Tibetan, was created in 1269 and was intended to be a universal alphabet for the languages of the Mongol empire. It was used principally for Mongolian but was also adapted for Chinese and was the earliest attempt to provide a systematic phonetic transcription of the language.⁵⁰ Rhyme-table phonology was also influential in the creation of the Korean *hangul* alphabet by king Sejong (r. 1419-1450).⁵¹

After the Mongol period, rhyme dictionaries and rhyme tables of the *Qieyun-Yunjing* tradition were no longer relevant to current spoken language, though they were still authoritative for certain types of poetry and regained interest in scholarly circles in late-Ming and Qing times as stepping stones to the analysis of ancient rhyming that flourished in the so-called School of Han Learning (*Hanxue pai*) led by Gu Yanwu 顧炎武 (1613-1682). The rhyme-table tradition did, however, continue to develop as means were devised for describing contemporary forms of speech. An important figure in this regard is Pan Lei 潘耒 (1646-1708), who devised a new style of

⁵⁰ Edwin G. Pulleyblank, "Notes on the hP'ags-pa Alphabet for Chinese," in Mary Boyce and Ilya Gershevitch, eds., *W. B. Henning Memorial Volume* (London: Lund Humphries, 1970), pp. 35⁸-75.

⁵¹ Edwin G. Pulleyblank, "Phonetics, East Asian: History of," in *Encyclopedia of Language and Linguistics* (Edinburgh: Pergamon Press, 1994), pp. 3095-99.

rhyme table for current Mandarin. By his time the four-fold distinction in degrees of palatalization had long become obsolete. Combining the *kai/he* distinction with the simple distinction between palatal and non-palatal, he distinguished four syllable types: *kaikouhu* 開口呼 ("open-mouth"; no high vowel/glide), *hekouhu* 合口呼 (back-rounded vowel/glide), *qichihu* ("even-teeth"; front-unrounded vowel/glide), *cuokouhu* 撮口呼 ("pursed mouth"; front-rounded vowel/glide). These terms are obviously based on observation of the shape of the lips as viewed from the front. "Even-teeth" refers to the mouth with spread lips for the vowel [i], while "pursed mouth" as opposed to "closed mouth" refers to the tensor rounding of the lips for the vowel [y] than for [u]. The nature of this four-way distinction is uncontroversial, since it is easily demonstrable in present-day Mandarin, for example, *gān* 干 ([kan]), *jiān* 間 ([tɕjɛn]), *guān* 官 ([kwan]), and *juān* ([tɕuan]), unlike the Four Grades in the *Yunjing*, which would have been equally obvious to native speakers at the time but now seem mysterious because they are no longer found in any current form of the Chinese language. Pan Lei's analysis of Mandarin is the basis for the *zhuyin zimu* 注音字母 system, the native system of phonetic symbols devised for Chinese in the present century.

APPENDIX ONE: Xie Lingyun's Exposition of the Brāhmī Alphabet

The following table gives in roman transcription the fifty letters of the Brāhmī alphabet as described by Xie Lingyun.⁵² The translation that follows is confined to his introductory paragraph, after which Xie presented the Siddham characters (in the order shown in the table) with a letter-by-letter transcription in Chinese. This is, of course, of much interest, along with other such early transcriptions of Indian alphabets in both *arapacana* order and Brāhmī order for reconstructing Chinese pronunciation, but the Siddham is omitted here, since the main point that we are concerned with is Xie's comparison between Indian and Chinese writing systems as he understood them.

⁵² See n. 14, above.

The Brāhmī Alphabet as Described by Xie Lingyun

The First Twelve Letters

a ā i ī u ū e āi o āu m ḥ

The Second Thirty-four Letters

ka	kha	ga	gha	ṅa
ca	cha	ja	jha	ṅa
ṭa	ṭha	ḍa	ḍha	ṅa
ta	tha	da	dha	na
pa	pha	ba	bha	ma
ya	ra	la	va	
śa	ṣa	sa		
ha	kṣa			

Translation of Xie Lingyun's Introduction

According to the *Xuanyiji* 玄義記 by Huijun 惠均, Xie Lingyun of Song stated, "In the *Mahāparinirvāna sūtra* there are fifty letters/characters 字 that are used as the foundation of all the letters/characters. One draws on one [letter] and goes on to another, turning the pronunciation 反語 to form a letter/character. The sounds of the [first] twelve letters taken two-by-two are similar to each other, but in spite of the similarity still have separate meanings. In the first six letters the first sound is short and the second sound is long. The following six letters do not have the contrast of short and long, but the last two of the six represent left-over sounds for the first two letters (i.e., *anusvara* [nasalization] and *visarga* [voiceless -h replacing another final consonant in *sandhi*]). In addition there are four letters that are not normally used in ordinary writing and therefore they are listed separately after the [rest of] the letters (vocalic r and l, short and long). Among the thirty-four letters [that follow the first twelve], twenty-five (consonants) proceed from inside [the mouth] to beyond the lips. The remaining nine return from outside inwards. In each set of five [of the twenty-five] (called *vargas* in Sanskrit) numbers four and three (gh, g; jh, j, etc., which the Chinese had difficulty in distinguishing) are the same with a small difference in weight 輕重. All the small letters (the vowel signs added to consonants to change the inherent -a) are called half-letters. The first twelve letters (independent vowel signs) may be compared to the enunciation (*yán* 音; perhaps Xie's term for the second half of a *fanqie*) of this country. The remaining thirty-four may be compared to [initial] sounds (*yīn* 音; perhaps his term for the first half of a *fanqie*) of this country whereby, proceeding to the enunciation, one forms words 字 (i.e., syllables). It is as if all words/syllables are made up of two words/syllables that, joined together, may be called full words/syllables 滿字. The structure of the sound 聲體 borrows the letters to transmit the foreign speech 胡音. Below are listed the

foreign letters. Now I add the Sanskrit letters and also give a translation of the sound." (Here follow the Siddham characters with Chinese transcription.)

APPENDIX TWO: *Shao Yong's Phonetic Tables*

Shao Yong's phonetic tables are contained in chapters 7 to 10 of his *Cosmological Chronology*. The presentation below is based on the rearrangement by Zhou Zumo.⁵³ The twelve tables of initials are called *yīn* 音 and the ten tables of finals are called *shēng* 聲, the reverse of present usage. Each table of initials contains two initials in two columns each (here rearranged as rows) the first labeled *qīng* 清 ("clear") and the second labeled *zhūo* 濁 ("muddy"). Each column has four rows (presented here as columns) corresponding to the four Grades found in the *Yunjing* system. Shao Yong names the four grades *kai* 開 ("to open"), *fa* 發 ("to send out"), *shou* 收 ("to receive"), *bi* 閉 ("to close"). What he meant by these terms is by no means clear but they suggest that he conceived of the grades as forming a kind of cycle. It should be noted that each name exemplifies the grade to which it is applied in his dialect, as I reconstruct it: Grades I: k^haj, II: faa?, III: siw, and IV: pji'. These four grades are also labeled "water," "fire," "earth," and "stone," but these terms have no phonological significance and are omitted in this presentation. The ten tables of finals similarly contain two finals each divided into *pi* 開 ("open") and *xi* 翕 ("close"), corresponding to the familiar terms *kaikou* and *hekou*. Again they receive cosmological labels, "sun 日," "moon 月," "stars 星," and "planets 辰," which are phonologically irrelevant and are omitted here. Within each table of initials and finals a single example is given to illustrate a given category, e.g., one example for "clear" initial k- in each of the four grades and one example of the *kaikou*-aa final in each of the four tones. On the whole this enables one to infer by analogy the way in which other words would have been classified but there are some uncertainties that will be noted below.

In each case I give a reconstruction of the illustrative characters presented in the tables in terms of LMC, that is, the late-Tang standard of the ninth century as presented in the *Yunjing*, followed, where necessary, by a later form intended to represent Shao Yong's own language. The main changes that Shao Yong's classification implies are as follows:

1. "Muddy" stops and affricates have merged with voiceless aspirates in level tone and plain voiceless in oblique tones but preserve breathy voice on the following vowel as a mark of lower tone register, as in modern Wu dialects: e.g., kfiā- > k^hā- (Level Tone), kḗ- (Oblique Tones). The merger of Rising-

⁵³ Zhou Zumo 周祖謨, "Songdai Bian Luo yuyin kao" 宋代汴洛語音考, *Furen xuezhì* 輔仁學誌 12 (1943), pp. 221-85; rpt. in idem, *Hanyu yinyun lunwenji* 漢語音韻論文集 (Shanghai: Commercial Press), pp. 189-239. See also Li Rong 李容, *Qiyunyinxi* 切韻音系 (Beijing: Zhongguo kexueyuan, 1952).

tone with Departing-tone after these breathy obstruents had already occurred in LMC.⁵⁴

2. Muddy fricatives merged with the corresponding voiceless fricatives with the same retention of breathy voice on the vowel.
3. Sonorants, which formed an intermediate class between voiceless obstruents and muddy obstruents in LMC, were treated as "clear" in Rising-tone but had assimilated with the muddy obstruents in having lower tone register with breathy voice in the other tone categories. This also corresponds to what has happened in modern Wu dialects.
4. The glottal stop, initial *yǐng* 影 of the *Yunjing*, was no longer distinctive but was treated as the "clear" counterpart of the "zero" initial *yù* 喻.
5. The retroflex nasal initial *niáng* 娘 (LMC: *nr*), was not distinguished from the dental nasal *ní* 泥 (LMC: *n*).
6. The "muddy" retroflex fricative *ʃi* in *chén* 辰 (LMC: *ʃin*) had become an aspirated affricate *tʃʰ* in Level-tone as in Mandarin. In the case of *chóng* 崇, a Grade II word that was already placed in the affricate column in the *Yunjing* and was reconstructed as LMC: *tʃfiəwŋ* in my *Lexicon*,⁵⁵ the affrication may have existed earlier but the evidence for this point is not very clear.
7. Shao Yong treated the assignment of syllables to the four grades as a feature of the initials rather than the finals. His treatment of velars and bilabials corresponds exactly to that found in the *Yunjing*. In the case of coronal initials, however, he was not constrained by the need to make his table a key to the *Qieyun*. He was able, therefore, to transfer the plain dental stops and sibilants occurring before -i- and -y- from Grade IV to Grade III where they properly belonged, since they had -i- and -y- rather than -ji- and -jy- (tables 6 to 9) and the sibilants which had replaced -i in open syllables by syllabic -z were transferred to Grade I (table 9). On the other hand retroflex sibilants in -ʔ and -əwŋ were not transferred from Grade II to Grade I as one might have expected if the nature of the vowel nucleus was taken as the sole criterion for the assignment of the Grade. This can be explained by the fact that, while in "outer" rhyme groups long -a:- was a distinctive marker for Grade II, there was no such purely vowel distinction in the "inner" rhyme groups. Shao Yong continued the practice of the *Yunjing* of placing plain dental stops, affricates and fricatives in Grade I and retroflex affricates and fricatives in Grade II.

More unexpected is the transfer of words with plain coronal initials in -an, -am, and sometimes -aj from Grade I to Grade II. Thus *dān* 丹 (LMC: *tan*), which belongs in Grade I in the *Yunjing*, is placed in Grade II, implying *ta:n*. See tables 6, 7, 8, 9 for other examples. The merger of -am/p, -an/t, and -aj (Grade I) with -a:m/p, -a:n/t, and -a:j (Grade II) shows up in Cantonese, e.g.,

⁵⁴ Edwin G. Pulleyblank, "The Nature of the Middle Chinese Tones and Their Development to Early Mandarin," *Journal of Chinese Linguistics* 6 (1978), pp. 181 ff.

⁵⁵ Pulleyblank, *Lexicon of Reconstructed Pronunciation*.

dān 丹 (Cantonese: [tɑm], which is like *shān* 山 (LMC: *ʃɑ:n*; Cantonese: *ʃɑ:n*; Grade II) in contrast to *gān* 干 (LMC: *kan*; Cantonese: *kɑ:n*; Grade I) (the lengthening and rounding of short -an to -ɑ:n in Cantonese being a later change).⁵⁶ In the north the length distinction was lost before -m, -n, and -j as part of the general reduction of bimoraic vowel nuclei to monomoraic in Early Mandarin but it shows up in Entering-tone words in LMC: -ap and -at. Compare *dá* 答 (LMC: *tap* > *ta:p*; EM: *ta*˥; Grade I), like *zhí* 筴 (LMC: *trɑ:p*; EM: *tʂɑ*˥; Grade II), in contrast to *gé* 蛤 (LMC: *kap*; EM: *kɑ*˥; Grade I). Since the placing of such words in Grade I in the *Yunjing* would have been determined by their *Qieyun* rhyme, it is possible that the lengthening had already taken place in the Tang period.⁵⁷

8. The grade assignments for labiodental initials in Shao Yong's tables were even more radically altered. In the *Yunjing* they are treated as Grade III *hekou* in the basis of their *Qieyun* rhyme assignments and *fanqie* but, as I have argued elsewhere, the finals with medial -jy-, which they would have had at the time of the shift from bilabial stops to labiodental fricatives, must have been rapidly subject to simplification. This is faithfully reflected in the assignments to Grades I, II or IV in table 4 by Shao Yong.⁵⁸

In the case of the rhyme groups there were also several changes from LMC, as follows:

1. As mentioned in the text, final -t and -k must have lost their oral closures and replaced them by glottal stop -ʔ. Final -p was still treated as the Entering-tone coda corresponding to -m. Such words were, however, treated as *hekou*. Hence I reconstruct *shí* 十 *ʃfi:p* > *ʃyp* and *qiè* 妾 *tʂi:ap* > *tʂi:yap*. A possible trace of this is the modern reading *rù* for 入 (LMC: *rip*; "enter"), but this may be an avoidance of the vulgar pronunciation *ri* for the same word in a sexual sense.
2. The *dàng* 宕 rhyme group in LMC: -a:ŋ/k (in which I make explicit the pharyngealization of the coda, written -a-, which was omitted as predictable in my *Lexicon*⁵⁹) and the *jiāng* 江 rhyme group in LMC: -awŋ/k had merged. In the case of the nasal finals, the labialization was changed to pharyngealization but in the case of the stop finals, the opposite change took place. That is, the pharyngealization was replaced by labialization, after which -k was replaced by glottal stop: -a:k > -awk > -awʔ. The only example which shows this is the *huò* 霍 (LMC: *xfiua:k* > *xfiawʔ*) place in the Entering-tone column of the -aw table.

⁵⁶ On the Cantonese development, see Edwin G. Pulleyblank, "The Cantonese Vowel System in Historical Perspective," in Wang Jialing and Norval Smith, eds., *Studies in Chinese Phonology* (Berlin: de Gruyter, 1997), pp. 185-217.

⁵⁷ On this lengthening and its reflexes in Early Mandarin, see Pulleyblank, *Middle Chinese*, pp. 83-84, 126-27, and idem, "Some Issues in CV Phonology with Reference to the History of Chinese," *Canadian Journal of Linguistics* 31 (1986), pp. 225-66.

⁵⁸ For detailed discussion, see Pulleyblank, "Dentilabialization in Middle Chinese."

⁵⁹ See n. 50, above.

This treatment of LMC: -aak agrees with the *Zhongyuan yinyun* and colloquial Beijing Mandarin in words like *jiǎo* 腳 (“leg”; LMC: kiaak > kiaw? > EM: kjaw) and *jiǎo* 角 (LMC: kja:wk > kja:w? > EM: kjaw; “horn”).

3. The merger of the *gēng* and *zēng* rhyme groups, which had begun for Entering-tone words in the 9th century as shown by the Shouwen manuscript and Li He's rhyming, had spread to nasal finals. This involved modifications to both rhyme groups. In the *zēng* group, the secondary pharyngeal articulation was changed to palatal: -əŋ > -əŋj, -iaŋ > -ijŋ. This also happened in the case of Entering-tone words in Grade I: 德 tək > təkj, 北 puək > puəkj. In the case of nasal finals in the *gēng* group, which contained no Grade I words, /a/ was deleted in Grades III and IV: -iajŋ > -ijŋ, -jiajŋ > -jijŋ, -yajŋ > -yijŋ, -jyajŋ > -jyijŋ. Grade II of the *gēng* group seems to have been exempt from this raising. Thus we find *bǎi* 百 pa:jk > pa:j? (“hundred”) and *bái* 白 pfi:jk > pə:j? (“white”) given as examples of Grade II for initial p- (clear and muddy) which agrees with their treatment both in Early Mandarin of the *Zhongyuan yinyun* 中原音韻 and colloquial Beijing Mandarin. One would expect find such words as the Entering-tone category for the -aj rhyme group but this is left blank. We also find *lěng* 冷 (LMC: la:ŋj; EM: ləŋ; “cold”) as an example for Grade II with initial -l, which seems to imply that the vowel had not yet raised to its EM value. The skeletal character of Shao Yong's tables makes it difficult to solve these apparent contradictions.

4. Table 5 of the finals was divided into two sets, which are apparently to be interpreted as: a) open high vowels -i, -ɿ, -z and -u; b) coda -j preceded by -ə- in *kaikou* and -u- or -y- in *hekou*. There is no example of -ɿ in 5a; but 士 (LMC: sɿr' > sɿr') given as an example of Grade II for initial s muddy, would presumably have been placed here. The reconstruction of *shuāi* 衰 as sɿwi and *shuài* 帥 as sɿwi is only tentative. In my lexicon such words are reconstructed as EMC: sɿwi/LMC: sɿui because of the Glide Strengthening rule before short vowels but its application in this case is difficult to verify. The Mandarin lowering to -waj which is already attested in the *Zhongyuan yinyun* can be attributed to the influence of the retroflex initial but seems easier to understand if -i was preceded by the glide -w- than the vowel -u-.

LIST OF ABBREVIATIONS

EM	Early Mandarin
EMC	Early Middle Chinese
LMC	Late Middle Chinese

GRADE I 開 GRADE II 發 GRADE III 收 GRADE IV 閉

Table 1

k (C)	kuə' 古	kja:p 甲	kiw' 九	kjy' 癸
k (M)	□	□	kfin' > kin' 近	kfiy' > kjiy' 揆
k ^h (C)	k ^h un 坤	k ^h a:w' 巧	k ^h iw 丘	k ^h ji' 棄
k ^h (M)	□	□	kfiian > k ^h jan 乾	kfiijw > k ^h jw 蚪

Table 2

x (C)	xək > xək? 黑	xwa:t 花	xiaŋ 香	xjyat > xjya? 血
x (M)	xfiuaŋ > xuaŋ 黃	xfiwa:t > xwa:t 華	xfiwŋ > xjwŋ 雄	xfiian > xjian 賢
ŋ (C)	ŋuə' 五	ŋwa:t' 瓦	ŋian' 仰	□
ŋ (M)	ŋuə > ŋuə 吾	ŋja:t > ŋja:t 牙	ŋyat > ŋyət? 月	ŋjiaw > ŋjiəw 莧

Table 3

0 (C)	?an > an 安	?ja:t > ja:t 亞	?it > i? 乙	?jit > ji? 一
0 (M)	□	(x)fi:aw > ja:w 爻	yaŋ > yaŋ 王	jin > jin 寅
m (C)	məw' 母	ma:t' 馬	mi' 美	mji' 米
m (M)	məwk > məw? 目	ma:w' > mət:w' 兒	mi > mi 眉	mjin > mjin 民

Table 4

f (C)	fjya > fuə 夫	fjyap > fa:p 法	□	fjy > fji 飛
f (M)	ffiya' > fua' 父	ffiyam > fa:m 凡	□	ffiyaj' > fji' 吠
v (C)	vjya' > vuə' 武	vjyan' > va:n' 晚	□	vjy' > vji' 尾
v (M)	vjyn > vuŋ 文	vjyan' > va:n' 万	□	vjy' > vji' 未

Table 5

p (C)	pəwk > pəw? 卜	pa:jk > pa:j? 百	piajŋ' > piŋj' 丙	pjit > pji? 必
p (M)	pfiuə' > puə' 步	pfi:jk > pa:j? 白	pfi' > pi' 備	pfiit > pji? 鼻
p ^h (C)	p ^h uə' 普	p ^h a:wk > p ^h a:w? 朴	p ^h im' 品	p ^h jit > p ^h ji? 匹
p ^h (M)	pfiuaŋ > p ^h uaŋ 旁	pfi:aj > p ^h a:j 排	pfiajŋ > p ^h iŋ 平	pfiiajŋ > p ^h iŋ 瓶

Table 6

t (C)	təwŋ 東	tan > ta:m 丹	tiaj' > tij' 帝	■
t (M)	tfiuaj' > tuəj' 兌	tfi:aj' > ta:j' 大	tfi:aj' > ti' 弟	■
t ^h (C)	t ^h uə' 土	t ^h am > t ^h a:m 倉	t ^h ian 天	■
t ^h (M)	tfiəwŋ > t ^h əwŋ 同	tfiam > t ^h a:m 覃	t ^h ian > t ^h jan 田	■

Table 7

n (C)	naj' 乃	nra:j' > na:j' 妳	nrya' > nyə' 女	■
n (M)	nuaj' > nuəj' 內	nam > nɑ:m 南	nian > njan 年	■
l (C)	law' 老	la:ŋj' 冷	lyə' 呂	■
l (M)	ləwk > ləw? 鹿	lwa:wk > lwəw? 舉	li > li 離	■

	GRADE I 開	GRADE II 發	GRADE III 收	GRADE IV 閉
Table 8				
ts (C)	tsəw' 走	tsaj>tsa:ɿ 哉	tsywk>tsyw? 足	■
ts (M)	tsfɿz'>tsz 自	tsfɿaj'>tsa:ɿ 在	tsfɿaɑŋ'>tsjaɑŋ 匠	■
ts ^h (C)	ts ^h aw' 草	ts ^h aj'>ts ^h a:ɿ 采	ts ^h it>ts ^h i? 七	■
ts ^h (M)	ts ^h aw>ts ^h aw 曹	ts ^h aj>tsa:ɿ 才	ts ^h ɿyan>ts ^h yan 全	■

Table 9				
s (C)	sz 恩	sam>sa:m 三	siajŋ>sijŋ 星	■
s (M)	sfɿz'>sz' 寺	□	sfɿaɑŋ'>sjaɑŋ 象	■
(C)	□	□	□	■
(M)	□	□	□	■

Table 10				
ʂ (C)	■	ʂa:m 山	ʂiw' 手	■
ʂ (M)	■	ʂfɿr'>ʂr' 士	ʂfɿiajk>ʂi? 石	■
r (C)	■	□	rɿ' 耳	■
r (M)	■	□	rɿ 二	■

Table 11				
tʂ (C)	■	tʂa:ɑŋ 莊	tʂin' 震	■
tʂ (M)	■	tʂfɿa:a'>tʂa:a' 乍	□	■
tʂ ^h (C)	■	tʂ ^h a:a 叉	tʂ ^h iajk>tʂ ^h ij? 赤	■
tʂ ^h (M)	■	ʂhəwŋ'>tʂ ^h əwŋ 崇	ʂhɿn>tʂ ^h ɿn 辰	■

Table 12				
tr (C)	■	trwəwk>trwarw?卓	triwŋ 中	■
tr (M)	■	trfɿa:jk>traj?宅	trfɿiajk>trij?直	■
tr ^h (C)	■	tr ^h a:jk>tr ^h a:j?坵	tr ^h iw' 丑	■
tr ^h (M)	■	trfɿa:a>tr ^h a:a 茶	trfɿiajŋ>tr ^h ijŋ呈	■

Part B: Ten Tables of Finals 聲; (k) = kai, (h) = he

	平	上	去	入
Table 1				
-aɑ (k)	taɑ 多	k ^h aa' 可	kaa' 个	ʂfiat>ʂia? 舌
-aɑ (h)	xfiuaɑ>xuaɑ 禾	xuaɑ' 火	xwa:a' 化	pa:t>pa:? 八
-aj (k)	k ^h aj 開	tsaj' 宰	?aj'>aj' 愛	○
-aj (h)	xfiuaj>xuaj 回	muaj' 每	t ^h uaj' 退	○

Table 2				
-aɑŋ (k)	liaɑŋ>ljaɑŋ 良	liaɑŋ' 兩	xiaɑŋ' 向	○
-aɑŋ (h)	kuaɑŋ 光	kuaɑŋ' 廣	xyaɑŋ' 況	○
-əjŋ (k)	tiajŋ>tijŋ 丁	tsiajŋ'>tsijŋ' 井	kəɑŋ'>kəjŋ' 互	○
-əjŋ (h)	xyajŋ>xyjŋ 兄	yajŋ'>yjŋ' 永	?jyajŋ'>jyjŋ 塋	○

	平	上	去	入
Table 3				
-an (k)	ts ^h ian 千	tian' 典	tan'>taan' 且	○
-an (h)	ɲyan>ɲyan 元	k ^h jyan' 犬	puan' 半	○
-ən (k)	ʂfin>ʂin 臣	jin' 引	kən' 良	○
-ən (h)	kyn 君	jyn' 允	sun' 巽	○

Table 4				
-aw (k)	taw 刀	tsaw' 早	xja:w' 孝	ɲja:wk>ɲja:w? 岳
-aw (h)	muaw>muaw 毛	puaw' 寶	puaw' 報	xfiuaɑk>xuaw? 霍
-əw (k)	ɲiw>ɲiw 牛	təw' 斗	tsəw' 奏	liwk>ljw? 六
-əw (h)	○	○	○	ɲywk>ɲyw? 玉

Table 5				
-o (k)	ts ^h iaj>ts ^h i 妻	tsz' 子	sz' 四	rit>rj? 日
-o (h)	ʂwi (?) 衰	○	ʂwi' (?) 帥	kut>ku? 骨
-əj (k)	○	○	○	təɑk>təj? 德
-əj (h)	kyj 龜	ʂyj' 水	kyj' 貴	puɑk>puj? 北

Table 6				
-əwŋ (k)	kiwŋ 宮	k ^h əwŋ' 孔	tʂiwŋ' 眾	○
-əwŋ (h)	lywŋ>lywŋ 龍	jywŋ' 甬	jywŋ'>jywŋ' 用	○
-əɑ (k)	ɲia>ɲia 魚	ʂia' 鼠	k ^h ia' 去	○
-əɑ (h)	?ua 烏	xua' 虎	t ^h ua' 兔	○

Table 7				
-əm (k)	sim 心	ʂim' 審	kim' 禁	○
-əm (h)	○	○	○	ʂhip>ʂyp 十
-am (k)	nam>na:m 男	k ^h am' 坎	k ^h iam' 欠	○
-am (h)	○	○	○	ts ^h iap>ts ^h yap 妾

Table 8	●	●	●	●
	●	●	●	●
	●	●	●	●
	●	●	●	●

Table 9	●	●	●	●
	●	●	●	●
	●	●	●	●
	●	●	●	●

Table 10	●	●	●	●
	●	●	●	●
	●	●	●	●
	●	●	●	●