LEVELS OF PHONOLOGICAL REGULARITY IN THE CHINESE WRITING SYSTEM

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The phonetic aspect of the Chinese written language is an area of Sinology that has been investigated by a number of scholars, both Chinese and Western. Most early researches have been concerned with (1) the historical development of phonetic compound characters and (2) the organization of these characters into series according to their common phonetic elements. Chinese scholars such as Xu Shen and later Chinese philologists , as well as Western scholars such as Chalmers (1911), Soothill (1911), and Wieger (1927) have contributed substantially to our knowledge of phonetic compounds and the role they play in the Chinese writing system. Bernhard Karlgren (1923) has made use of phonetic series in his reconstructions of Ancient and Archaic Chinese, and has made a number of statements regarding the phonological changes which phonetic compounds have undergone in various stages of the language.

More recent research has focused on three areas: (1) the phonetic aspects of character simplification in the People's Republic of China (Ng 1976); (2) the degree to which Chinese can be considered a phonetic writing system (DeFrancis 1984, Alber 1986); and (3) the analysis of phonetic series with regard to their usefulness in teaching Chinese (Astor 1970, Kraemer 1980).

Astor (1970) has identified several phonetic series which may be useful for students learning Chinese, since the characters in each series are all pronounced the same, including tone. Kraemer (1980) has gone beyond this and has characterized several types of phonetic series according to which part of the syllable (initial, final, or tone) is shared by all members in a series. According to Kraemer's typology, there are seven categories of phonetic series in Mandarin:

(1) <u>Totally Perfect</u> series, where all characters are pronounced with the same initial, final, and tone;

(2) <u>Segment Perfect</u> series, where all characters are pronounced with the same initial and final (tone varies);

(3) <u>Initial (I) Perfect</u> series, where all characters are pronounced with the same initial (final and tone vary);

(4) <u>Final (F) Perfect</u> series, where all characters are pronounced with the same final (initial and tone vary);

(5) <u>Tone (T) Perfect</u> series, where all characters are pronounced with the same tone (initial and final vary);

(6) <u>Initial-Tone (I-T) Perfect</u> series, where all characters are pronounced with the same initial and tone (final varies); and

(7) <u>Final-Tone (F-T) Perfect</u> series, where all characters are pronounced with the same final and tone (initial varies).

(Examples of phonetic series of characters which illustrate each of these seven categories are given on pages 12-13 below.)

If in addition to the breakdown of the syllable in Modern Standard Mandarin (based on the dialect of Peking) as Initial, Final, and Tone, one considers the traditional analysis of the Final as being composed of a Medial, Nucleus, and Ending (Cheng 1973), one can extend the typology outlined above to include phonetic series in which pronunciations of all characters in a series share one or more constituent parts of the Final as follows:

(8) <u>Medial (M) Perfect</u> series, where all characters are pronounced with the same medial (nucleus and ending vary) (initial and tone also vary);

(9) <u>Nucleus (N) Perfect</u> series, where all characters are pronounced with the same nucleus (medial and ending vary) (initial and tone also vary);

(10) <u>Ending (E) Perfect</u> series, where all characters are pronounced with the same ending (medial and nucleus vary) (initial and tone also vary);

(11) <u>Medial-Nucleus (MN) Perfect</u> series, where all characters are pronounced with the same medial and nucleus (ending varies) (initial and tone also vary);

(12) <u>Medial-Ending (ME) Perfect</u> series, where all characters are pronounced with the same medial and ending (nucleus varies) (initial and tone also vary);

(13) <u>Nucleus-Ending (NE) Perfect</u> series, where all characters are pronounced with the same nucleus and ending (medial varies) (initial and tone also vary). Since the combination of nucleus and ending is also known as the <u>rime</u>, this category will also be known as <u>Rime Perfect</u>. Examples of phonetic series which illustrate each of these six categories can be found on pages 14-17 below.

If, in addition to categories #8-13 outlined above, one combines the constituent parts of the final (i.e., the medial, nucleus, or ending) with either the <u>initial</u> part of the Mandarin syllable or the <u>tone</u>, or both, a number of theoretical categories of phonetic series are obtained, where pronunciations of all characters in a series share one or more constituent parts of the Mandarin syllable as follows:

(14) <u>Initial-Medial (IM) Perfect</u> series, where all characters are pronounced with the same initial and medial (nucleus, ending, and tone vary);

(15) <u>Initial-Nucleus (IN) Perfect</u> series, where all characters are pronounced with the same initial and nucleus (medial, ending, and tone vary);

(16) <u>Initial-Ending (IE) Perfect</u> series, where all characters are pronounced with the same initial and ending (medial, nucleus, and tone vary);

(17) <u>Initial-Medial-Nucleus (IMN) Perfect</u> series, where all characters are pronounced with the same initial, medial, and nucleus (ending and tone vary);

(18) <u>Initial-Medial-Ending (IME) Perfect</u> series, where all characters are pronounced with the same initial, medial, and ending (nucleus and tone vary);

(19) <u>Initial-Nucleus-Ending (INE) Perfect</u>, where all characters are pronounced with the same initial, nucleus, and ending (medial and tone vary) -- also known as <u>Initial-Rime Perfect</u>;

(20) <u>Medial-Tone (MT) Perfect</u>, where all characters are pronounced with the same medial and tone (initial, nucleus, and ending vary);

(21) <u>Nucleus-Tone (NT) Perfect</u>, where all characters are pronounced with the same nucleus and tone (initial, medial, and ending vary);

(22) <u>Ending-Tone (ET) Perfect</u>, where all characters are pronounced with the same ending and tone (initial, medial, and nucleus vary);

(23) <u>Medial-Nucleus-Tone (MNT) Perfect</u>, where all characters are pronounced with the same medial, nucleus, and tone (initial and ending vary);

(24) <u>Medial-Ending-Tone (MET) Perfect</u>, where all characters are pronounced with the same medial, ending, and tone (initial and nucleus vary);

(25) <u>Nucleus-Ending-Tone (NET) Perfect</u>, where all characters are pronounced with the same nucleus, ending, and tone (initial and medial vary)--also known as <u>Rime-Tone Perfect</u>;

(26) <u>Initial-Medial-Tone (IMT) Perfect</u>, where all characters are pronounced with the same initial, medial, and tone (nucleus and ending vary);

(27) <u>Initial-Nucleus-Tone (INT) Perfect</u>, where all characters are pronounced with the same initial, nucleus, and tone (medial and ending vary);

(28) <u>Initial-Ending-Tone (IET) Perfect</u>, where all characters are pronounced with the same initial, ending, and tone (medial and nucleus vary);

(29) <u>Initial-Medial-Nucleus-Tone (IMNT) Perfect</u>, where all characters are pronounced with the same initial, medial, nucleus, and tone (ending varies);

(30) <u>Initial-Medial-Ending-Tone (IMET) Perfect</u>, where all characters are pronounced with the same initial, medial, ending, and tone (nucleus varies); and

(31) <u>Initial-Nucleus-Ending-Tone (INET) Perfect</u>, where all characters are pronounced with the same initial, nucleus, ending, and tone (medial varies) -- also known as <u>Initial-Rime-Tone Perfect</u>.

Examples of phonetic series of characters which illustrate categories #14-31 are given on pages 18-23 below.

Since categories #1-31 outlined above describe phonetic series in which all characters in a series share one or more phonemes of pronunciation, such phonetic series will be said to illustrate the principle of <u>phonemic congruence</u>. In this paper, the notion of phonemic congruence represents the first 'level' of phonological regularity in the Chinese writing system. Thus at this first level, one is looking at which phonemes are carried through in all pronunciations of Chinese characters which share the same phonetic element in the written language.

In subsequent levels of phonological regularity, we will be looking at phonetic series in which certain phonemes of character pronunciation vary, and we will be characterizing this phoneme variation according to certain linguistic criteria. Although there are many patterns of phoneme occurrence and variation in Mandarin character phonetic series, this paper will deal with only five major "levels" or overall kinds of phonemic patterning in the Mandarin writing system. The five kinds of patterning to be discussed in this paper can be outlined in their most general form as follows:

I: Phonemic Congruence.

II: Initial Patterns in Final-Constant (i.e., Final or Final-Tone Perfect) Phonetic Series.

III: Initial Patterns in Medial-Constant (i.e., Medial (M), MN, ME, MT, MNT, or MET Perfect) Phonetic Series.

IV: Initial-Medial Patterns in Rime-Constant (i.e., NE or NET Perfect) Phonetic Series.

V: Initial-Medial Patterns in Rime-Variant Phonetic Series.

II. Initial Patterns in Final-Constant (i.e., Final or Final-Tone Perfect) Phonetic Series.

At this level of patterning in Mandarin character phonetic series, initials of a series are varying in certain regular ways, while finals of a series are remaining constant. There are many types of initial variation in phonetic series where finals remain constant. In this paper, only a few of the most important types of such patterns will be described.

<u>Type II A. Homoorganic Initials + Final.</u>

In this type of pattern, initials of a phonetic series form homoorganic groups, i.e., are ordered according to their place of articulation (see Kratochvil 1968) as follows:

II. A. 1. Labials[1] + Final   i.e.,   { p p' m f }[2] + Final

    2. Dentals + Final   i.e.,   { c c' s } + Final

    3. Alveolars + Final   i.e.,   { t t' n l } + Final

    4. Alveopalatals + Final, i.e., { ç ç' ṣ r } + Final

    5. Palatals + Final   i.e.,   { tɕ tɕ ' ɕ } + Final

    6. Velars + Final   i.e.,   { k k' x } + Final

Examples of phonetic series which illustrate these Type II A. patterns can be found on pages 24 - 26 below. (Although no example for Type II A. 3., Alveolars + Final, i.e., {t t' n l } + Final is given on page 25, an example of the more restricted pattern Type II B. 3., Aspirated/Unaspirated Alveolars + Final, i.e., { t t' } + Final is given on page 28.)[3]

It should be mentioned at this time that the general pattern 'Homoorganic Initials + Final' does not necessarily stipulate which particular initials will be found in any given phonetic series as such, but rather stipulates the possible set of initials to be found in any particular phonetic series. Thus while the 方 phonetic series shows the *(See page 24, below)* pattern [f p'] +aŋ , (i.e., only the two labials f and p' are found, not all four possible labials), it nonetheless still conforms to the somewhat more general pattern of Labials + Final or { p p' m f } + Final. This latter, more general pattern is useful, for it helps to show us which phonetic series in Mandarin have two or more of the four possible labials, and <u>only these types of initials</u>, for pronunciations of all characters in a series.[†]

Type II B. Aspirated/Unaspirated Homoorganic Initial Pairs + Final.

Although strictly speaking this type of pattern is simply a subset of all 'Homoorganic Initials + Final' (or pattern II.A. above), it is important as a separate pattern type, since a number of phonetic series in Mandarin show initials which differ only in aspiration (plus a constant final). Like pattern type II.A., pattern type II.B. can also be ordered according to place of articulation as follows:

II. B. 1. Aspirated/Unaspirated Labials i.e., { p p' } [5] + Final

    2. Aspirated /Unaspirated Dentals i.e., { c c' } + Final

    3. Aspirated/Unaspirated Alveolars i.e., { t t' } + Final

    4. Aspirated/Unaspirated Alveopalatals i.e., { ç ç' } + Final

    5. Aspirated/Unaspirated Palatals i.e., { tɕ tɕ' } + Final

    6. Aspirated/Unaspirated Velars i.e., { k k' } + Final

Examples of Type II B. phonetic series can be found on pages 27-29 below.

Other important patterns of initial occurrence with constant finals in Mandarin phonetic series are as follows, with example given on pages 30-33:

Type II. C. {Homoorganic, ∅ Initials } + Final

    1. { Palatal, ∅ } + Final

    2. { Velar, ∅ } + Final

Type II. D. {Alveopalatal, t t'} + Final, i.e., { ç ç' ş r t t' } + Final

Type II. E. {Alveopalatal, Dental} + Final, i.e., { ç ç' ş r c c' s } + Final

These pattern types by no means represent all of the possible initial patterns in final-constant phonetic series, but only some of the most important ones. As was discussed for pattern II. A. 1. above, pattern Types II. C., D., and E. are general patterns and do not denote exactly which specific initials will necessarily occur in any given phonetic series, but rather denote the possible set of initials which may occur in any given series.

III. Initial Patterns in Medial-Constant (M, MN, ME, MT, MNT, or MET Perfect) Phonetic Series

Like Type II patterns above, these patterns illustrate phonetic series in which initials form regular patterns of occurrence. Unlike Type II however, Type III patterns have only the medial portion of the final remaining constant in all characters in a series, not the entire final, as in Type II. However, both Type II and Type III show similarities in their overall patterning, and in a number of cases the same basic overall type of initial variation found in Type II patterns can also be found in Type III patterns. This may very well be due to the fact that both Type II and III patterns show initial variations in phonetic series that have at least a medial phoneme in common.

Again, as for Type II patterns, the kinds of Type III patterns dealt with in this paper represent only a small number of all the possible Type III patterns in the written language. Nonetheless, they illustrate important aspects of the kinds of phonological regularity inherent in the written language. The four kinds of Type III patterns mentioned in this paper, with examples given on pages 33-36, are as follows:

Type III. A. Homoorganic Initials + Medial + Rime(x,y...)   (Rime (x,y...) denotes two or more separate rimes, such as Rime(x), Rime(y), Rime(z), etc.)

Type III. B. Aspirated/Unaspirated Homoorganic Initial Pairs + Medial + Rime(x,y...)

Type III. C. {Alveopalatal, t t'} + Medial + Rime(x,y...)

Type III. D. {Alveopalatal, Dental} + Medial + Rime(x,y...)

IV. Initial-Medial Patterns in Rime-Constant (NE or NET Perfect) Phonetic Series

By definition, Rime-Constant, or NE or NET Perfect Phonetic Series are series in which the rime portion of the Mandarin syllable is shared by all characters in a series. This necessitates that the medials of all characters in a series are not the same (see NE Perfect, category #13, page 3 above; NET Perfect, category #25, page 4 above.

Since more than one medial is evident in such Rime-Constant phonetic series, the patterns of initials which such phonetic series show are often different from the patterns of initials illustrated by Type II and III series, where, as we have seen, the medial phoneme remains constant (see page 9, above.) Again, only a limited number of Type IV patterns can be dealt with in this paper. Those Type IV patterns which are mentioned here, with examples on pages 37-42, are as follows:

Type IV. A. {Initials (a)} $\emptyset$ Rime // {Initials (b)} i Rime

      1. {Alveopalatal} $\emptyset$ Rime // {Palatal} i Rime

      2. {Alveopalatal, t t'} $\emptyset$ Rime // {t t' $\emptyset$} i Rime

      3. {Velar} $\emptyset$ Rime // {Palatal} i Rime

Type IV. B. {Initials (a)} u Rime // {Initials (b)} ü Rime

      1. {Alveopalatal} u Rime // {Palatal} ü Rime

      2. {Velar} u Rime // {Palatal} ü Rime

V. Initial-Medial Patterns in Rime-Variant Phonetic Series

In Type V patterns, the overall pattern of a phonetic series may appear similar to a Type IV pattern series. Both the sets of possible initials which a phonetic series illustrates, as well as the medials which these initials combine with in a series may be quite similar to, or even the same as the initial-medial combinations shown in Type IV patterns. In Type V patterns, however, the rime portions of the syllable in character pronunciations in a series are not the same. It is for this reason that I have termed such series 'Rime-Variant' series. There are many ways in which the rime portion of the syllable can vary in Mandarin character phonetic series, but two of the more important kinds of rime variation are illustrated here. The two Type V patterns shown in this paper are as follows:

<u>Type V.A. { Initials (a) }</u> $\emptyset$ <u>Rime(x,y)</u> // <u>{ Initials (b) } i Rime(x,y)</u>   (Rime(x,y)

denotes two separate rimes, Rime(x) and Rime(y).)

      1. {Velar} $\emptyset$ Rime(x,y) // {Palatal} i Rime(x,y)

<u>Type V.B. { Initials (a) }</u> $\emptyset$ <u>Rime(x)</u> // <u>{ Initials (b) } i Rime(y)</u>

      1. {Velar} $\emptyset$ Rime(x) // {Palatal} i Rime(y)

It should be noted that in both examples which are given for Type V   phonetic

series (i.e., the 刀� series for V. A. 1. and the 曑 series for V. B. 1. -- see pages 43-44

below), although both series exhibit two separate rimes Rime(x) and Rime(y), in

both cases Rime(x) and Rime(y) form the same overall $_\wedge$ vowel-consonant (VC)

vowel (V) or

structure. Thus in the 刀ᶹ series, Rime(x) and Rime(y) are both single vowels V:

Rime(x) = **a** while Rime(y) = **ɤ** . In the 曑 series, Rime(x) and Rime(y) both form

the structure 'vowel + consonant' (VC) : Rime(x) = **ɤŋ** , while Rime(y) = **a**n.

I. Phonemic Congruence

A. Categories #1-7 from breakdown of Mandarin syllable into Initial(I), Final(F), and Tone(T).

1. Totally Perfect

丈 Series (çàη Perfect)

丈 zhàng (çàη)[6]

伏 zhàng (çàη)

杖 zhàng (çàη)

2. Segment Perfect

壬 Series (rɤn Perfect)

壬 rén (rɤ́n)

任 rèn (rɤ̀n),

    rén (rɤ́n)

妊 rèn (rɤ̀n)

飪 rèn (rɤ̀n)

紝 rèn (rɤ̀n)

衽 rèn (rɤ̀n)

3. Initial (I) Perfect

弗 Series (f Perfect) (I = f)

弗 fú (fú)   佛 fó (fuɤ́),

怫 fú (fú), fèi (fɤ̀i)   fú (fú)

拂 fú (fú)   沸 fèi (fɤ̀i)

绋 fú (fú)   狒 fèi (fɤ̀i)

艴 fú (fú)   费 fèi (fɤ̀i)

茀 fú (fú)

氟 fú (fú)

4. Final (F) Perfect

州 Series (ɤu Perfect) (F = ɤu)

州 zhōu (çɤ̄u)

氵州 zhōu (çɤ̄u)

酉州 chóu (ç'ɤ́u)

5. Tone (T) Perfect

許 Series (˅ Perfect) T = ˅)

許 xǔ (ɕǔ)

𦣻許 hǔ (xǔ),
xǔ (ɕǔ)

6. Initial-Tone (IT) Perfect

戾 Series (lˋ Perfect) (I = l, T = ˋ)

戾 lì (lì)

唳 lì (lì)

捩 liè (liɤ̀)

淚 lèi (lɤ̀i)

7. Final-Tone (FT) Perfect

戒 Series (iɤˋ Perfect) (F = iɤ, T = ˋ)

戒 jiè (tɕ iɤ̀)

誡 jiè (tɕ iɤ̀)

械 xiè (ɕ iɤ̀)

B. <u>Categories # 8-13, from breakdown of Final (F) into Medial (M), Nucleus (N),</u>
<u>and Ending (E).</u>

8. <u>Medial (M) Perfect</u>

   岩 <u>Series (u Perfect) (M = u)</u>

  端 duān (tuā n),

      zhuān (çuā n)

  端 duān (tuā n)

  端 tuān (t'uā n)

  顓 zhuān (çuā n)

  遄 chuán (ç'uá n)

  篅 chuán (ç'uá n)

  喘 chuǎn (ç'uǎ n)

  揣 chuǎi (ç'uǎ i),

      chuāi (ç'uā i),

      chuài (ç'uà i)

  踹 chuài (ç'uà i)

  惴 zhui (çuˋɤ i)

  瑞 rui (ruˋɤ i)

9. Nucleus (N) Perfect

黑 Series (ɤ Perfect) (N = ɤ)

黑 hēi (xɤ̃i)

嘿 hēi (xɤ̃i),

mò (muɤ̀)

墨 mò (muɤ̀)

默 mò (muɤ̀)

10. Ending (E) Perfect

参 Series (n Perfect) (E = n)

参 zhěn (çɤ̌n)[7]

珍 zhēn (çɤ̄n)

朕 zhēn (çɤ̄n)

診 zhěn (çɤ̌n)

軫 zhěn (çɤ̌n)

畛 zhěn (çɤ̌n)

疹 zhěn (çɤ̌n)

趁 chèn (ç'ɤ̀n)

殄 tiǎn (t'iǎn)

11. Medial-Nucleus (MN) Perfect

敦 Series (uɤ Perfect) (M = u, N = ɤ)

敦 dūn (tuɤ̄n),
　　duì (tuɤ̀i)

墩 dūn (tuɤ̄n)

礅 dūn (tuɤ̄n)

撴 dūn (tuɤ̄n)

蹾 dūn (tuɤ̄n)

暾 tūn (t'uɤ̄n)

12. Medial-Ending (ME) Perfect

參 Series (∅--n Perfect) (M = ∅, E = n)

參 cān (c'∅ā n),

shēn (ş∅ɤ̄n),

cēn (c'∅ɤ̄n)

騎參 cān (c'∅ā n)

憯 cǎn (c'∅ǎn)

穆 cǎn (c'∅ǎn)

篸 cǎn (c'∅ǎn)

滲 shèn (ş∅ɤ̀n)

瘮 shèn (ş∅ɤ̀n)

糝 shēn (ş∅ɤ̄n),

sǎn (s∅ǎn)

摻 chān (ç'∅ā n)

磣 chěn (ç'∅ɤ̌n)

13. Nucleus-Ending (NE) Perfect or Rime Perfect (Rime = NE)

山 Series (a n Perfect) (N = a, E = n)

山 shān (şā n)

舢 shān (şā n)

汕 shàn (şà n)

訕 shàn (şà n)

疝 shàn (şà n)

仙 xiān (ɕiā n)

籼 xiān (ɕiā n)

秈 xiān (ɕiā n)

氙 xiān (ɕiā n)

C. <u>Categories #14-31, from combining constituent parts of Final (i.e., M,N,E) with Initial (I) &/or Tone (T).</u>

14. <u>Initial-Medial (IM) Perfect</u>

國 Series (ku Perfect) (I=k, M=u)

國 guó (kuɤ́)

虫國 guō (kuɤ̄)

中國 guó (kuɤ́)

月國 guó (kuɤ́)

才國 guāi (kuāi),
guó (kuɤ́)

15. <u>Initial-Nucleus (IN) Perfect</u>

爪 Series (ç--a Perfect) (I = ç, N = a)

爪 zhǎo (çǎu),
zhuǎ (çuǎ)

爫 zhào (çàu)

抓 zhuā (çuā)

16. <u>Initial-Ending (IE) Perfect</u>

別 Series (p--∅ Perfect) (I = p, E = ∅)

別 bié (piɤ́ ∅),
biè (piɤ̀ ∅)

捌 bā (pā ∅)

17. Initial-Medial-Nucleus (IMN) Perfect

勒 Series (l$\emptyset\gamma$ Perfect) (I = l, M = $\emptyset$, N = γ)

勒   lè (l$\emptyset\gamma$),

      lēi (l$\emptyset$ɤi)

勒   lè (l$\emptyset\gamma$)

鰳   lè (l$\emptyset\gamma$)

嘞   lei (l$\emptyset$ɤi)

18. Initial-Medial-Ending (IME) Perfect

晉 Series ($t\textctc$i--n Perfect) (I = $t\textctc$, M = i, E = n)

晉   jìn ($t\textctc$iɤn)

縉   jìn ($t\textctc$iɤn)

戩   jiǎn ($t\textctc$iɑn)

19. Initial-Nucleus-Ending (INE) Perfect or Initial-Rime Perfect

苗 Series (m--ɑ u Perfect) (I = m, N = ɑ, E = u)

苗   miáo (miɑu)

喵   miāo (miɑu)

揺   miáo (miɑu)

瞄   miáo (miɑu)

鶓   miáo (miɑu)

猫   māo (mɑu),

      máo (mɑu)

貓   māo (mɑu),

      máo (mɑu),

錨   máo (mɑu)

20. <u>Medial-Tone (MT) Perfect</u>

衰 <u>Series (u⁻ Perfect) (M = u, T = ⁻)</u>

衰 shuāi (ʂuāi),
cuī (c'uɤ̄i)

竹衰 suō (suɤ̄)

桟 cuī (c'uɤ̄i)

縗 cuī (c'uɤ̄i)

蓑 suō (suɤ̄)

21. <u>Nucleus-Tone (NT) Perfect</u>

贛 <u>Series (a ˋ Perfect) (N = a , T = ˋ)</u>

贛
贛
章心 (vertical)

gàn (kàn)

gàn (kà n)

zhuàng (çuàŋ),

gàng (kàŋ)

22. <u>Ending-Tone (ET) Perfect</u> [8]

23. <u>Medial-Nucleus-Tone (MNT) Perfect</u> [9]

24. Medial-Ending-Tone (MET) Perfect

會 Series (u-i ˋ Perfect)(M = u, E = i, T = ˋ)

會 huì (xuɤ i),

kuài (k'uɑ i)

燴 huì (xuɤ i)

薈 huì (xuɤ i)

繪 huì (xuɤ i)

檜 guì (kuɤ i),

huì (xuɤ i)

澮 kuài (k'uɑ i)

噲 kuài (k'uɑ i)

鄶 kuài (k'uɑ i)

儈 kuài (k'uɑ i)

膾 kuài (k'uɑ i)

鱠 kuài (k'uɑ i)

獪 kuài (k'uɑ i)

劊 guì (kuɤ i)

25. Nucleus-Ending-Tone (NET) Perfect or Rime-Tone Perfect

未 Series (ɤi` Perfect) (N = ɤ, E = i, T = `)

未　wèi (uɤ̀i)　　　　　寐　mèi (mɤ̀i)

味　wèi (uɤ̀i)

妺　mèi (mɤ̀i)

昧　mèi (mɤ̀i)

魅　mèi (mɤ̀i)

26. Initial-Medial-Tone (IMT) Perfect

宰 Series (cØˇ Perfect) (I = c, M = Ø, T = ˇ)

宰　zǎi (cØǎi)

滓　zǐ (cØɨ̌)

27. Initial-Nucleus-Tone (INT) Perfect

厓 Series (Ø--a′ Perfect) (I = Ø, N = a, T = ′)

厓　yá (Øiá)

崖　yá (Øiá)

㟁　yá (Øiá)

涯　yá (Øiá)

睚　yá (Øiá)

捱　ái (Øái)

28. <u>Initial-Ending-Tone (IET) Perfect</u> [10]

29. <u>Initial-Medial-Nucleus-Tone (IMNT) Perfect</u>

   拍   Series (p'$\emptyset$ɑ ⁻ Perfect) (I = p', M = $\emptyset$, N = ɑ , T = ⁻)

   拍   pāi (p'$\emptyset$ɑ̄i)

   啪   pā (p'$\emptyset$ɑ̄)

30. <u>Initial-Medial-Ending-Tone (IMET) Perfect</u>

   回   Series (xu--i ′ Perfect) (I = x, M = u, E = i, T = ′)

   回   huí (xuɤ́i)   迴   huí (xuɤ́i)

   迴   huí (xuɤ́i)   逥   huí (xuɤ́i)

   茴   huí (xuɤ́i)

   蚘   huí (xuɤ́i)

   徊   huái (xuɑ́i)

31. <u>Initial-Nucleus-Ending-Tone (INET) Perfect or Initial-Rime-Tone Perfect</u>

   明   Series (m--ɤŋ ′ Perfect) (I = m, N = ɤ , E = ŋ , T = ′)

   明   míng (miɤ́ŋ)

   盟   méng (mɤ́ŋ),

          míng (miɤ́ŋ)

   萌   méng (mɤ́ŋ)

II. Initial Patterns in Final-Constant (F or FT Perfect) Phonetic Series

II. A. Homoorganic Initials + Final

1. Labials { p p' m f } + Final

方 Series [f p'] + aŋ

方 fāng (fāŋ)

枋 fāng (fāŋ)

鈁 fāng (fāŋ)

邡 fāng (fãŋ)

芳 fāng (fāŋ)

坊 fāng (fãŋ),

    fáng (fáŋ)

纺 fáng (fáŋ),

    fāng (fãŋ)

防 fáng (fáŋ)

肪 fáng (fáŋ)

魴 fáng (fáŋ)

房 fáng (fáŋ)

仿 fǎng (fǎŋ)

訪 fǎng (fǎŋ)

紡 fǎng (fǎŋ)

昉 fǎng (fǎŋ)

舫 fǎng (fǎŋ)

放 fàng (fàŋ)

旁 páng (p'áŋ)

仿 páng (p'áŋ)

2. <u>Dentals {c c' s} + Final</u>

司 <u>Series [s c'] + ɨ</u>

司 sī (sɨ̄)

飼 sì (sɨ̀)

嗣 sì (sɨ̀)

笥 sì (sɨ̀)

伺 sì (sɨ̀),

    cì (c'ɨ̀)

詞 cí (c'ɨ́)

祠 cí (c'ɨ́)

3. <u>Alveolars {t t' n l} + Final</u>^ᴜ

4. <u>Alveopalatals {c̣ c̣' ṣ r} + Final</u>

成 <u>Series [c̣' ṣ] + ɤ ŋ</u>

成 chéng (c̣'ɤ́ŋ)

城 chéng (c̣'ɤ́ŋ)

誠 chéng (c̣'ɤ́ŋ)

鋮 chéng (c̣'ɤ́ŋ)

宬 chéng (c̣'ɤ́ŋ)

盛 shèng (ṣɤ̀ŋ),

    chéng (c̣'ɤ́ŋ)

晟 shèng (ṣɤ̀ŋ)

5. Palatals {tɕ tɕ' ɕ} + Final

奚 Series [tɕ tɕ' ɕ] + i

奚 xī(ɕī)

傒 xī(ɕī)

膝 xī(ɕī)

谿 xī(ɕī)

溪 xī(ɕī),
qī(tɕ'ī)

蹊 xī(ɕī),
qī(tɕ'ī)

雞 jī(tɕī)

鷄 jī(tɕī)

6. Velars {k k' x} + Final

昆 Series [k k' x] + uɤn

昆 kūn(k'uɤn)

琨 kūn(k'uɤn)

錕 kūn(k'uɤn)

鯤 kūn(k'uɤn)

醌 kūn(k'uɤn)

鵾 kūn(k'uɤn)

緄 gǔn(kuɤn)

輥 gǔn(kuɤn)

棍 gùn(kuɤn)

餛 hún(xuɤn)

混 hùn(xuɤn),
hún(xuɤn)

II. B.   <u>Aspirated/Unaspirated Homoorganic Initial Pairs + Final</u>

1. <u>Aspirated/Unaspirated Labials {p p'} + Final</u>

比 Series   [p p'] + i

比 bǐ (pǐ)

泚 bǐ (pǐ)

妣 bǐ (pǐ)

秕 bǐ (pǐ)

粃 bǐ (pǐ)

庇 bì (pì)

批 pī (p'ī)

砒 pī (p'ī)

紕 pī (p'ī)

枇 pí (p'í)

毗 pí (p'í)

毘 pí (p'í)

蚍 pí (p'í)

琵 pí (p'í)

仳 pǐ (p'ǐ)

屁 pì (p'ì)

2. Aspirated/Unaspirated Dentals {c c'} + Final

曹 Series [c c'] + α u

曹　cáo (c'ɑ́ u)

嘈　cáo (c'ɑ́ u)

漕　cáo (c'ɑ́ u)

槽　cáo (c'ɑ́ u)

螬　cáo (c'ɑ́ u)

艚　cáo (c'ɑ́ u)

糟　zāo (c ɑ̄ u)

遭　zāo (cɑ̄u)

3. Aspirated/Unaspirated Alveolars {t t'} + Final

典 Series [t t'] + iαn

典　diǎn (tiǎn)

碘　diǎn (tiǎn)

腆　tiǎn (t'iǎn)

覥　tiǎn (t'iǎn)

4. Aspirated/Unaspirated Alveopalatals {ç ç'} + Final

州 Series [ç ç'] + ɤu

州　zhōu (çɤ̄u)

洲　zhōu (çɤ̄u)

酬　chóu (ç'ɤ́u)

5. Aspirated/Unaspirated Palatals {tɕ tɕ'} + Final

求 Series [tɕ tɕ'] + iɤu

求 qiú (tɕ'iɤu)

俅 qiú (tɕ'iɤu)

球 qiú (tɕ'iɤu)

毬 qiú (tɕ'iɤu)

賕 qiú (tɕ'iɤu)

裘 qiú (tɕ'iɤu)

述 qiú (tɕ'iɤu)

捄 jiù (tɕiɤu)

救 jiù (tɕiɤu)

6. Aspirated/Unaspirated Velars {k k'} + Final

規 Series [k k'] + uɤi

規 guī (kuɤi)

窺 kuī (k'uɤi)

闚 kuī (k'uɤi)

II. C. {Homoorganic, Ø Initials} + Final

 1. {Palatal, Ø} + Final

交 Series [tɕ ɕ Ø] + i a u

交 jiāo (tɕiāu)

峧 jiāo (tɕiāu)

姣 jiāo (tɕiāu)

胶 jiāo (tɕiāu)

蛟 jiāo (tɕiāu)

跤 jiāo (tɕiāu)

鮫 jiāo (tɕiāu)

郊 jiāo (tɕiāu)

鵁 jiāo (tɕiāu)

茭 jiāo (tɕiāu)

佼 jiǎo (tɕiǎu)

狡 jiǎo (tɕiǎu)

餃 jiǎo (tɕiǎu)

絞 jiǎo (tɕiǎu)

鉸 jiǎo (tɕiǎu)

皎 jiǎo (tɕiǎu)

較 jiào (tɕiàu)

校 xiào (ɕiàu),
      jiào (tɕiàu)

洨 xiáo (ɕiáu)

効 xiào (ɕiàu)

効 xiào (ɕiàu)

咬 yǎo (Øiǎu)

齩 yǎo (Øiǎu)

2. {Velar, $\emptyset$} + Final

胃 Series [k' $\emptyset$] + uɤi

胃 wèi ($\emptyset$uɤi)

渭 wèi ($\emptyset$uɤi)

謂 wèi ($\emptyset$uɤi)

猬 wèi ($\emptyset$uɤi)

蝟 wèi ($\emptyset$uɤi)

喟 kuì (k'uɤi)

II. D. {Alveopalatal, t t'} + Final, i.e., {ç ç' ṣ r t t'} + Final

充 Series [ç' t'] + uɤŋ

充 chōng (ç'uɤŋ)

茺 chōng (ç'uɤŋ)

銃 chòng (ç'uɤŋ)

統 tǒng (t'uɤŋ)

II. D. {Alveopalatal, t t'} + Final, i.e., {ç ç' ṣ r t t'} + Final (continued)

重 Series [ç ç' t] + uɤŋ

重 zhòng (çuɤ̀ŋ),

    chóng (ç'uɤ́ŋ)

鍾 zhōng (çuɤ̄ŋ)

踵 zhǒng (çuɤ̌ŋ)

腫 zhǒng (çuɤ̌ŋ)

種 zhǒng (çuɤ̌ŋ),

    zhòng (çuɤ̀ŋ),

    chóng (ç'uɤ́ŋ)

衝 chōng (ç'uɤ̄ŋ),

    chòng (ç'uɤ̀ŋ)

董 dǒng (tuɤ̌ŋ)

動 dòng (tuɤ̀ŋ)

亶 Series [ç ç' ṣ t t'] +ɑn

亶 dǎn (tǎn)¹²

檀 tán (t'án)

鱣 zhān (çān)

鸇 zhān (çān)

邅 zhān (çān)

澶 chán (ç'án)

顫 chàn (ç'àn),

    zhàn (çàn)

膻 shān (ṣān)

羶 shān (ṣān)

擅 shàn (ṣàn)

嬗 shàn (ṣàn)

壇 tán (t'án)

氊 zhān (çān)

毡 zhān (çān)

II. E. { Alveopalatal, Dental } + Final, i.e.,

_____{ ç ç' ṣ r c c' s }_____ + Final

察 __Series [ç' c'] + a__

察 chá (ç'á)

鑔 chǎ (ç'ǎ)

嚓 cā (c'ā),

      chā (ç'ā̄)

擦 cā (c'ā)

礤 cā (c'ā)

III. Initial Patterns in Medial-Constant (M ,MN, ME, MT, MNT, or MET Perfect)

Phonetic Series

III. A. Homoorganic Initials + Medial + Rime(x,y...)

賴 __Series [l t'] + ∅ + [ai   an   a]__   Initials = [l t']

賴 lài (l ∅ ài)   Medial = ∅

瀨 lài (l ∅ ài)   Rime(x) = ai

癩 lài (l ∅ ài)   Rime(y) = an

籟 lài (l ∅ ài)   Rime(z) = a

懶 lǎn (l ∅ ǎn)

孏 lǎn (l ∅ ǎn)

獺 tǎ (t' ∅ ǎ)

III. B. Aspirated/Unaspirated Homoorgánic Initial Pairs + Medial + Rime(x,y...)

敦 Series [t t'] + u + [ɤ n   ɤ i]   Initials = [t t']

敦　dūn (tuɤ̄ n),   Medial = u

　　dui (tuɤ̀ i)   Rime(x) = ɤ n

墩　dūn (tuɤ̄ n)   Rime(y) = ɤ i

礅　dūn (tuɤ̄ n)

撉　dūn (tuɤ̄ n)

蹾　dūn (tuɤ̄ n)

暾　tūn (t'uɤ̄ n)

III.C. {Alveopalatal, t t' } + Medial + Rime(x,y...), i.e.,

_____{ç ç' ş r t t'} + Medial + Rime(x,y...)

耑 Series [ç ç' r t t'] + u + [ɑ n　ɑ i　ɤ i]　　Initials = [ç ç' r t t']

山而　duān (tuɑ̄ n),　　　　　　　　　　　Medial = u

zhuān (çuɑ̄ n)　　　　　　　　　　　Rime(x) = ɑ n

端　duān (tuɑ̄ n)　　　　　　　　　　Rime(y) = ɑ i

湍　tuān (t'uɑ̄ n)　　　　　　　　　Rime(z) = ɤ i

顓　zhuān (çuɑ̄ n)

遄　chuán (ç'uɑ́ n)

篅　chuán (ç'uɑ́ n)

喘　chuǎn (ç'uɑ̌ n)

揣　chuǎi (ç'uɑ̌ i),

chuāi (ç'uɑ̄ i),

chuài (ç'uɑ̀ i)

踹　chuài (ç'uɑ̀ i)

惴　zhuì (çuɤ̀ i)

瑞　ruì (ruɤ̀ i)

III.D. {Alveopalatal, Dental} + Medial + Rime (x,y...), i.e.,

_____{ç ç' ş r c c' s}_____ + Medial + Rime (x,y...)

參 Series [ç' ş c' s] + Ø + [an ɤn]   Initials = [ç' ş c' s]

參 cān (c'Ø ā n)   Medial = Ø

shēn (şØ ɤ̄ n)   Rime(x) = an

cēn (c'Ø ɤ̄ n)   Rime(y) = ɤn

駿 cān (c'Ø ā n)

懆 cǎn (c'Ø ǎ n)

穇 cǎn (c'Ø ǎ n)

篸 cǎn (c'Ø ǎ n)

滲 shèn (şØ ɤ̀ n)

瘆 shèn (şØ ɤ̀ n)

糁 shēn (şØ ɤ̄ n)

sǎn (sØ ǎ n)

掺 chān (ç'Ø ā n)

磣 chěn (ç'Ø ɤ̌ n)

衰 Series [ş c' s] + u + [ai ɤi ɤ]   Initials = [ş c' s]

衰 shuāi (şu ā i),   Medial = u

cuī (c'u ɤ̄ i)   Rime(x) = ai

榱 cuī (c'u ɤ̄ i)   Rime(y) = ɤi

縗 cuī (c'u ɤ̄ i)   Rime(z) = ɤ

蓑 suō (su ɤ̄)

簑 suō (su ɤ̄)

IV. Initial-Medial Patterns in Rime Constant (NE or NET Perfect) Phonetic Series

IV. A. {Initials (a)} Ø Rime // {Initials (b)} i Rime

IV. A. 1. {Alveopalatal} Ø Rime // {Palatal} i Rime, i.e.,

{ç ç' ş r} Ø Rime // {tɕ tɕ'ɕ } i Rime

山 Series ş Ø a n // ɕ i a n   Rime = a n

山   shān (ş Ø ā n)

仚   shān (ş Ø ā n)

訕   shàn (ş Ø à n)

訕   shàn (ş Ø à n)

疝   shàn (ş Ø à n)

仙   xiān (ɕ i ā n)

籼   xiān (ɕ i ā n)

杣   xiān (ɕ i ā n)

氙   xiān (ɕ i ā n)

向 Series ş Ø a ŋ // ɕ i a ŋ   Rime = a ŋ

垧   shǎng (ş Ø ǎ ŋ)

晌   shǎng (ş Ø ǎ ŋ)

向   xiàng (ɕ i à ŋ)

响   xiǎng (ɕ i ǎ ŋ)

餉   xiǎng (ɕ i ǎ ŋ)

IV. A. 1.{Alveopalatal} Ø Rime // {Palatal} i Rime (continued)

争 Series [ç ç'] Øɤŋ // tɕ iɤŋ   Rime = ɤŋ

爭 zhēng (ç Øɤ̄ŋ)   闃 zhèng (ç Øɤ̀ŋ)

崝 zhēng (ç Øɤ̄ŋ)

猙 zhēng (ç Øɤ̄ŋ)

睜 zhēng (ç Øɤ̄ŋ)

錚 zhēng (ç Øɤ̄ŋ)

箏 zhēng (ç Øɤ̄ŋ)

掙 zhèng (ç Øɤ̀ŋ)

        zhēng (ç Øɤ̄ŋ)

諍 zhèng (ç Øɤ̀ŋ)

琤 chēng (ç' Øɤ̄ŋ)

淨 jing (tɕ iɤ̀ŋ)

瀞 jing (tɕ iɤ̀ŋ)

靜 jing (tɕ iɤ̀ŋ)

秦 Series ç Øɤn // tɕ' iɤn   Rime = ɤn

獉 zhēn (ç Øɤ̄n)

榛 zhēn (ç Øɤ̄n)

臻 zhēn (ç Øɤ̄n)

蓁 zhēn (ç Øɤ̄n)

溱 zhēn (ç Øɤ̄n),

        qín (tɕ' iɤ́n)

秦 qín (tɕ' iɤ́n)

螓 qín (tɕ' iɤ́n)

IV. A. 2. {Alveopalatal, t t'} ∅ Rime // {t t' ∅} i Rime, i.e.,

{ç ç' ṣ r t t'} ∅ Rime // {t t' ∅} i Rime

兆 Series [ç ç' t'] ∅ ɑu // [t t' ∅] i ɑu   Rime = ɑu

兆 zhào (çʾɑ̀u)

晁 cháo (çʾʾɑ́u)

咷 táo (tʾɑ́u)

洮 táo (tʾɑ́u)

桃 táo (tʾɑ́u)

桃 táo (tʾɑ́u)

逃 táo (tʾɑ́u)

銚 diào (t i à u),

　　 yáo (∅ i ɑ́ u)

祧 tiāo (tʾ i ā u)

佻 tiāo (tʾ i ā u)

挑 tiāo (tʾ i ā u),

　　 tiǎo (tʾ i ǎ u)

朓 tiǎo (tʾ i ǎ u)

窕 tiǎo (tʾ i ǎ u)

眺 tiào (tʾ i à u)

跳 tiào (tʾ i à u)

姚 yáo (∅iɑ́ u)

珧 yáo (∅iɑ́u)

IV. A. 2. {Alveopalatal, t t'} ∅ Rime // {t t' ∅} i Rime (continued)

詹 Series [ç ç' ṣ t t'] ∅ a n // ∅ i a n   Rime = **a** n

詹 zhān (ç ∅ā n)

譫 zhān (ç ∅ā n)

瞻 zhān (ç ∅ā n)

黵 zhǎn (ç ∅ǎ n)

蟾 chán (ç' ∅á n)

幨 chàn (ç' ∅à n)

贍 shàn (ṣ ∅à n)

儋 dān (t ∅ā n)

擔 dān (t ∅ā n),

    dàn (t ∅à n)

膽 dǎn (t ∅ǎ n)

澹 dàn (t ∅à n),

    tán (t' ∅á n)

檐 yán (∅ i á n)

簷 yán (∅ i á n)

IV. A. 3. {Velar} ∅ Rime // {Palatal} i Rime, i.e.,

    {k k' x} ∅ Rime // {tɕ tɕ' ɕ} i Rime

巷 Series [k x] ∅ a ŋ // ɕ i a ŋ   Rime = **a** ŋ

港 gǎng (k ∅ǎ ŋ)

巷 xiàng (ɕ i à ŋ),

    hàng (x ∅à ŋ)

IV. A. 3. {Velar} Ø Rime // {Palatal} i Rime (continued)

戛 Series k Øɑ // tɕ iɑ   Rime = ɑ

嘎 gā(kØɑ̄),

　　 gá(kØɑ́),

　　 gǎ(kØɑ̌)

戛 jiá(tɕ iɑ́)

IV. B. {Initials (a)} u Rime // {Initials (b)} ü Rime

IV. B. 1. {Alveopalatal} u Rime // {Palatal} ü Rime, i.e.,

　　 {ɕ ɕ' ʂ r} u Rime // { tɕ tɕ ' ɕ } ü Rime

全 Series ʂ u ɑ n // tɕ' ü ɑ n   Rime = ɑ n

栓 shuān(ʂ u ɑ̄ n)

拴 shuān(ʂ u ɑ̄ n)

全 quán(tɕ' üɑ́ n)

詮 quán(tɕ' üɑ́ n)

痊 quán(tɕ' ü ɑ́ n)

荃 quán(tɕ' ü ɑ́ n)

佺 quán(tɕ' ü ɑ́ n)

銓 quán(tɕ' ü ɑ́ n)

筌 quán(tɕ' ü ɑ́ n)

輇 quán(tɕ' ü ɑ́ n)

IV. B. 2. {Velar} u Rime // {Palatal} ü Rime, i.e.,

{k k' x} u Rime // {tɕ tɕ'ɕ} ü Rime

蒦 Series [k x] u a n // tɕ' ü a n   Rime = ɑn

蒦 guàn (k u ɑ̀ n)[13]

觀 guān (k u ɑ̄ n)

    guàn (k u ɑ̀ n)

瓘 guàn (k u ɑ̀ n)

罐 guàn (k u ɑ̀ n)

鸛 guàn (k u ɑ̀ n)

獾 huān (x u ɑ̄ n)

貛 huān (x u ɑ̄ n)

歡 huān (x u ɑ̄ n)

懽 huān (x u ɑ̄ n)

驩 huān (x u ɑ̄ n)

權 quán (tɕ' ü ɑ́ n)

顴 quán (tɕ' ü ɑ́ n)

勸 quàn (tɕ' ü ɑ̀ n)

巩 Series [k k'] u ɤn // tɕ' ü ɤŋ   Rime = ɤŋ

玒 gǒng (k u ɤ̌ŋ)

鞏 gǒng (k u ɤ̌ŋ)

恐 kǒng (k' u ɤ̌ŋ)

卭 qióng (tɕ' ü ɤ́ŋ)

邛 qióng (tɕ' ü ɤ́ŋ)

V. Initial-Medial Patterns in Rime-Variant Phonetic Series

V. A. {Initials (a)} Ø Rime(x,y) // {Initials (b)} i Rime(x,y)

V. A. 1. {Velar} Ø Rime (x,y) // {Palatal} i Rime (x,y), i.e.,

{k k'x} Ø Rime(x,y) // {tɕ tɕ' ɕ} i Rime(x,y)

加 Series [k k'] Øa // tɕia   Rime(x) = a

_____ x Øɤ // tɕ' iɤ   Rime (y) = ɤ

咖 kā (k'Øā),

    gā (kØā)

賀 hè (xØɤ)

加 jiā (tɕ iā)

痂 jiā (tɕ iā)

袈 jiā (tɕ iā)

迦 jiā (tɕ iā)

耞 jiā (tɕ iā)

珈 jiā (tɕ iā)

嘉 jiā (tɕ iā)

枷 jiā (tɕ iā)

跏 jiā (tɕ iā)

笳 jiā (tɕ iā)

駕 jià (tɕ ià)

架 jià (tɕ ià)

茄 qié (tɕ' iɤ́),

    jiā (tɕ iā)

伽 qié (tɕ' iɤ́),

    jiā (tɕ iā)

V.B. {Initials (a)} Ø Rime(x) // {Initials (b)} i Rime(y)

V. B. 1. {Velar} Ø Rime(x) // {Palatal} i Rime(y), i.e.,

{k k' x} Ø Rime(x) // {tɕ tɕ' ɕ} i Rime(y)

堅ˣ Series k' Ø ɤŋ // [tɕ tɕ'] i ɑ n   Rime(x) = ɤŋ

鏗ˣ kēng (k' Ø ɤ̄ŋ)   Rime(y) = ɑn

硜ˣ kēng (k' Ø ɤ̄ŋ)

堅ˣ jiān (tɕ i ɑ̄ n)

鰹ˣ jiān (tɕ i ɑ̄ n)

慳ˣ qiān (tɕ' i ɑ̄ n)

NOTES

1. Although Kratochvil (1968) divides the initials of Mandarin into bilabials (p p' m) and labiodental (f), this author will include all four in a more general category entitled, 'labial'.

2. Throughout this paper, notation for initial phonemes is taken from Cheng (1973).

3. No example of a phonetic series which illustrates pattern Type II. A. 3., Alveolars + Final, i.e., { t t' n l } + Final, has as of yet been found by this author.

4. In this paper, the symbols { } are used to indicate the possible set of initials which one or more phonetic series may illustrate. The symbols [ ] are used to indicate the actual initials to be found in any given phonetic series. The 方 phonetic series, for example, exhibits the two initials f and p', which is indicated by [f p']. These two initials are part of a more general pattern { p p' m f }, which represents all possible combinations of two or more labial initials which any given phonetic series might actually contain. In theory, then, the general pattern { p p' m f } could be realized by actual phonetic series which might contain any of the following specific sets of initials: [p p'], [p m], [p f], [p' m], [p' f], [m f], [p p' m], [p p' f], [p m f], [p' m f], [p p' m f].

5. In cases such as { p p' }, { t t'}, or other instances where the possible set of initials contains only two members, there is no difference between the possible set of initials { } and the actual set of initials [ ] which a specific phonetic series might illustrate. Thus { p p' }, for example, has only one realization, namely [p p'].

6. The pronunciation of characters in this paper is taken from the Xinhua Zidian (1971) and is given in pinyin, followed by phonemic notation (tones, initial phonemes, and underlying final phonemes) according to Cheng (1973). The ∅ (null) symbol for the ∅ initial, ∅ medial, and ∅ ending are added by this author.

7. The character 叅 is not listed in Xinhua Zidian (1971). The pronunciation for this character is taken from the Hanyu Da Zidian (1986 : 111) and the Ci Hai (1979 : 4677).

8. Examples of phonetic series which illustrate category # 22 (Ending-Tone Perfect) have as of yet not been found by this author.

9. Examples of phonetic series which illustrate category # 23 (Medial-Nucleus-Tone Perfect) have as of yet not been found by this author.

10. Examples of phonetic series which illustrate category # 28 (Initial-Ending-Tone Perfect) have as of yet not been found by this author.

11. See note 3.

12. The character 亶 is not listed in <u>Xinhua Zidian</u> (1971). The pronunciation for this character is taken from the <u>Hanyu Da Zidian</u> (1986 ; 291). The <u>Hanyu Da Zidian</u> (1986 ; 291) also lists the additional pronunciations of dàn, chán, and zhǎn for this character.

13. The character 韭 is not listed in <u>Xinhua Zidian</u> (1971). The pronunciation for this character is taken from the <u>Ci Hai</u> (1979 ; 1410).

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