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# Correspondence Between Initial Consonants in Modern Sino-Japanese and Modern Standard Chinese Character Readings, and Their Historical Origins

Enju Norris*

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Although the writing system and the readings of characters in the Japanese language was originally borrowed from Chinese, current readings of many characters in both languages are surprisingly different even with due regard to the difference in phonological systems of the two languages. This causes confusion to students of Japanese and Chinese. Such differences are partly due to the fact that the Sino-Japanese readings are a mixture of *Go-on* and *Kan-on* (*Go* and *Kan* readings). The existence of two readings as the major strata in Sino-Japanese is due to the fact that most Japanese borrowing from Chinese took place from two different dialect areas at two different historical periods. Also there is confusion arising from the arbitrary choice among *Go* and *Kan* readings in modern Sino-Japanese. And even if one sorts out this confusion, there still remains a marked lack of simple correspondences between Modern Sino-Japanese (MSJ) readings and their Modern Standard Chinese (MSC) counterparts, which demands linguistic explanation. Such an explanation was found by examining the ancestors of the two modern languages as they were at the time when the loans from Chinese into Japanese took place. The lack of simple correspondences is due in part to phonological adjustments made at the time of the borrowing, and in part of subsequent phonological changes in the lines of development leading to MSJ and MSC.

This paper addresses a problem of a synchronic-comparative nature that is bound to suggest itself to any student of modern Chinese and Japanese: how to make sense of the seemingly unsystematic phonetic correspondences, especially in initial consonants, between the two languages. Though it seeks to solve this problem by examining the associated diachronic facts, it has a pragmatic concern and a present relevance that are generally lacking in existing historical linguistic studies.

* 延寿ノリス: Lecturer, Faculty of Education, Griffith University, Australia.

## INTRODUCTION

Approximately half of the present-day Japanese vocabulary is made up of "Sino-Japanese," that is a corpus of loan-words acquired from Chinese mainly between the sixth and eighth centuries. When these Sino-Japanese loans, as currently pronounced in Modern Sino-Japanese (MSJ), are compared with their counterparts in Modern Standard Chinese (MSC),[1] it is found that the phonetic correspondences are very irregular. At one extreme there is identity in pronunciation; for example, the character 麻 is read identically as *ma*[2] in both MSJ and MSC. (The MSC tones are disregarded at this early stage in the discussion.) At the other extreme there is total dissimilarity; for example, the character 北 is read *hoku* in MSJ and *pei* in MSC, and 逆 is read *gyaku* in MSJ and *ni* in MSC. Between these two extremes are many cases of partial and/or inconsistent correspondence. Consider, for example, following examples based on the MSC initial consonant pairs p/p', t/t', and k/k'.

| | MSC | *Go* | *Kan* | | MSC | *Go* | *Kan* | | MSC | *Go* | *Kan* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 波 | puo | ha | ha | 旦 | tan | tan | tan | 亀 | kuei | ki | ki |
| 頗 | p'uo | ha | ha | 炭 | t'an | tan | tan | 虧 | k'uei | ki | ki |
| 婆 | p'uo | ba | ha | 壇 | t'an | dan | tan | 逵 | k'uei | gi | ki |
| 抜 | pa | bati | hatu | 憚 | tan | dan | tan | 跪 | kuei | gi | ki |

With the *Kan* readings the situation is simple; knowing the initial consonant of the MSC reading, one can always predict what the initial of the *Kan* reading will be:

| MSC | *Kan* | MSC | *Kan* | MSC | *Kan* |
|---|---|---|---|---|---|
| p, p' | h | t, t' | t | k, k' | k |

However, with the *Go* readings the situation remains confusing. The correspondences for the above twelve characters are:

| MSC | *Go* | MSC | *Go* | MSC | *Go* |
|---|---|---|---|---|---|
| p ..... | h | t ..... | t | k ..... | k |
| p' ..... | h | t' ..... | t | k' ..... | k |
| p' ..... | b | t' ..... | d | k' ..... | g |
| p ..... | b | t ..... | d | k ..... | g |

1 The term "Modern Standard Chinese," abbreviated henceforth to "MSC," is used here in the sense proposed by Paul Kratochivil, 1968. It can be equated with the Chinese terms *guoyu* (national language) and *putonghua* (common language—and less precisely with the English term "Mandarin Chinese").

2 Throughout this study, linguistic examples are given in the International Phonetic Alphabet unless otherwise stated.

Within each of the three places of articulation all of the possible combinations occur, and in no case is it possible to predict from the synchronic phonetic data, which *Go* consonant will correspond to a given MSC consonant, or vice versa.

These phenomena, along with others like them involving the remaining initial consonants, are the subject matter of the present study. The aim of the study is to sort out all such cases of similarity and difference, of regular and irregular correspondence, and to arrive at a systematic and explanatory account of them by examining the historical phonology of the two languages.

## Methodology

The various aspects of the study will be dealt with as follows:

1. The phonology of MSC and MSJ will be described and compared.
2. The examination of the correspondences between initial consonants, begun in the introduction with the six MSC consonants p/p', t/t', k/k' and their *Go-on* counterparts, will be extended to cover all MSC initial consonants and all MSJ initial consonants, both *Go-on* and *Kan-on*.
3. A description will be given of the initial consonants and the tones of Ancient Chinese (AncC).
4. An account will be given of the phonological changes that these underwent in the transition from AncC to MSC.
5. The phonology of Old Japanese (OJ) will be described, and its development into MSJ will be briefly traced.
6. A detailed comparison will be made between character readings in AncC and OJ. The fate of every AncC initial in the early *Go-on* and *Kan-on* will thus be traced.
7. Finally, the facts thus assembled will be brought together to produce an explanation for the problems identified in the Introduction.

## Initial Consonants of MSC

Excluding zero, the phonetically distinct consonants of MSC number 22: p, p', f, m, t, t', ts, ts', s, n, l, tʂ, tʂ', ʂ, ʐ, tɕ, tɕ', ɕ, k, k', x, ŋ (Dong, 1973: 15).

Phonological interpretations of the MSC initial consonants are numerous. The simplest of the existing interpretations is adopted here, namely that implicitly favoured by Dong. This interpretation regards each phonetic initial as realizing an independent and unitary phoneme. Thus [k]=/k/, [tɕ']=/tɕ'/, and so on. Of the 22 consonants of MSC, ŋ occurs only in terminal position; n occurs in both initial and terminal position; and the remainder occur only initially. Consequently, when the zero initial is included there are 22 phonemically distinct initials: p, p', f, m, t, t', ts, ts', s, n, l, tʂ, tʂ', ʂ, ʐ, tɕ, tɕ', ɕ, k, k', x, 0.

## Initial Consonants of MSJ

Modern standard Japanese can be seen as having 25 phonetically distinct consonants, excluding the zero initial: p, b, m, (w), ɸ, t, d, s, z, ts, dz, n, ɾ, ʃ, ʒ, tʃ, dʒ, (j), ç, ŋ, n, k, g, (ʔ), h (Isshiki, 1957).

[ʒ] and [ŋ] are less frequent free variants of [dʒ] and [g] respectively. [dʒ] and [g] occur word initially and [ʒ] and [ŋ], medially. The most widely accepted phonemic interpretation of the initials is such that each row of the *gojū-on* table (50-sound syllabary chart) is considered to share the same initial, and consonant clusters such as [tʃa] are segmented; for example,

[sa ʃi sɯ so]=/sa si su se so/
[ta tʃi tsɯ te to]=/ta ti tu te to/
[ha çi ɸɯ he ho]=/ha hi hu he ho/
[tʃa]=/tya/

Furthermore, [dʒi] is segmented as /zi/ or as /di/ according to whether its conservative kana representation is じ or ぢ; and [dzɯ] is segmented as /zu/ or as /du/ according to whether its conservative kana representation is ず or づ. For convenience, this interpretation is adopted here. Thus, when zero is included, modern standard Japanese has thirteen initial consonant phonemes, namely: p, b, m, t, d, s, z, n, r, k, g, h, 0.

In the *Go-on* component of the language all of these occur; however, /p/ is never found as an initial in isolated syllables in MSJ. In the *Kan-on* component the same applies, and as well the nasals n and m are missing, leaving just ten initial consonant phonemes:

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Go:* | b | m | t | d | s | z | n | r | k | g | h | 0 |
| *Kan:* | b | | t | d | s | z | | r | k | g | h | 0 |
| cf. MSC: | p | p' | f | m | t | t' | ts | ts' | s | n | l | |
| | | | tʂ | tʂ' | ʂ | ʐ | tɕ | tɕ' | ɕ | k | k' | x | 0 |

The inventories of initial consonant phonemes in MSJ and MSC differ greatly. Japanese lacks counterparts for the MSC affricates, ts, ts', tʂ, tʂ', tɕ, tɕ', and for the MSC contrast of dental versus retroflex versus palatal, e.g., s-ʂ-ɕ. In the plosives, Japanese contrasts voiceless with voiced, e.g., t-d, while MSC contrasts aspirated with unaspirated, e.g., t'-t.

## Comparison of Initial Consonants between MSC and MSJ

The preliminary comparison given in the introduction will now be extended to cover all the initials of MSC, *Go-on* and *Kan-on*. All the existing correspondences between each of the 22 MSC initials and its *Go* and *Kan* counterparts were identified.

It was found that a given MSC initial only rarely corresponds to a single MSJ initial. An exceptional example of simple and regular correspondence was found in MSC initial

m and l: MSC m=*Go* m, *Kan* b, MSC l=*Go* r, *Kan* r. The situation with MSC zero initial was found to be complicated. For example:

| Character | MSC | *Go-on* |
|---|---|---|
| 未 | 0uei | mi |
| 二 | 0ɣ[1] | ni |
| 餓 | 0ɣ | ga |
| 牙 | 0ia | ge |
| 阿 | 0a | 0a |

Here the correspondence is MSC 0=*Go* m, n, g, 0. The correspondences between MSC and *Kan-on* differ more or less substantially from those for *Go-on*. During the procedure for establishing the correspondences between MSC and *Go-on* and *Kan-on*, when a character has more than one reading in *Go-on* or *Kan-on*, the reading which

Table 1 Summary of Correspondences between Initials of (a) MSC and *Go-on*, and (b) MSC and *Kan-on*

| (a) *Go-on* | MSC | (b) *Kan-on* |
|---|---|---|
| h, b | p, p', f | h |
| m | m | b |
| t, d | t, t' | t |
| s, z | ts, ts', s, ʂ | s |
| n, g | n | d, g |
| r | l | r |
| s, z, t, d | tʂ, tʂ' | s, t |
| n, 0 | ʐ | z, 0 |
| s, z, k, g | tɕ, tɕ', ɕ | s, k |
| k, g | x, k', x | k |
| m, n, g, 0 | 0 | b, z, g, 0 |

[1] As with the consonants, phonemic interpretations of the MSC vowels are numerous. Here, for convenience, I follow Dong (1973).

Table 2 Summary of Correspondences between Initials of (a) *Go-on* and MSC, and (b) *Kan-on* and MSC

| (a) *Go* | MSC | (b) *Kan* | MSC |
|---|---|---|---|
| h | p, p', f | h | p, p', f |
| b | p, p', f | b | m, 0 |
| m | m, 0 | — | |
| s | ts, ts', s, tʂ, tʂ', ʂ, tɕ, tɕ', ɕ | s | ts, ts', s, tʂ, tʂ', ʂ, tɕ, tɕ', ɕ |
| z | ts, ts', s, tʂ, tʂ', ʂ, tɕ, tɕ', ɕ | z | z, 0 |
| t | t, t', tʂ, tʂ' | t | t, t', tʂ, tʂ' |
| d | t, t', tʂ, tʂ' | d | n |
| n | n, ʐ, 0 | — | |
| r | l | r | l |
| k | tɕ, tɕ', ɕ, k, k', x | k | tɕ, tɕ', ɕ, k, k', x |
| g | n, tɕ, tɕ', ɕ, k, k', x, 0 | g | n, 0 |
| 0 | ʐ, 0 | 0 | ʐ, 0 |

evidently corresponds to MSC was chosen. Exceptional readings are excluded from the tables. The correspondences thus obtained are brought together and summarized in Table 1. Next, the comparison was done in the reverse direction, i.e., from *Go-on* to MSC and from *Kan-on* to MSC. Here again a single *Go-on* or *Kan-on* consonant usually does not correspond to a single MSC consonant. The results are shown in Table 2.

In the correspondences between MSC on the one hand and *Go-on* or *Kan-on* on the other, simple one-to-one correspondence is found in only one case, that of MSC l and its *Go* and *Kan* counterpart r. At the other extreme are the cases of *Go* z and *Kan* s, each of which corresponds to no fewer than nine different MSC initials. This situation is hardly surprising, in view of the very different phonological inventories of the two languages. More striking, perhaps, is the already noted irregular pattern of correspondences among the labial, dental, and velar plosives.

## Phonology of Ancient Chinese (AncC)

### Historical Background of *Go-on, Kan-on* and AncC

The existence of *Go-on* and *Kan-on* as the two major strata in Sino-Japanese is due to the fact that most Japanese borrowing from Chinese took place from two different Chinese dialect areas at two different historical periods. Although the process of borrowing probably began as early as the third century A.D., large-scale borrowing did not get under way until the sixth century. It appears to have been the Chinese pronunciation then current in the region of the lower Yangzi River which, after reaching Japan during the sixth and seventh centuries, yielded the variety of Sino-Japanese pronunciation called *Go-on*.

The second large-scale borrowing appears to have taken place at or near Chang' an

at the peak of the Tang Dynasty, reaching Japan during the late seventh and the eighth centuries (Tōdō, 1966). It was this variety of Sino-Japanese that yielded the *Kan-on*.

The differences between the *Go-on* and *Kan-on* are thus due to differences both in source dialect area and in historical period.

An attempt to clarify the complex patterns of correspondence revealed in Tables 1 and 2 clearly has to be based on an examination of the varieties of Chinese spoken in the two areas and periods in question.

The term "Ancient Chinese" was coined by Karlgren to refer to the language codified in the pronouncing dictionary *Qieyun* compiled in 601 by Lu Fayan and others. AncC demonstrably was the source language for the first major borrowing, that which yielded *Go-on*. That AncC is the language represented in the *Qieyun* is accepted by other scholars. However, on the question what the *Qieyun* language represents (an actual spoken dialect, a hypothetical standard language, etc.) there is little agreement.

The language from which *Kan-on* derived evidently differed in certain important respects from AncC. E. G. Pulleyblank argues that the *Yunjing*, which is the earliest extant complete rhyme table, published in 1161, represents the Tang standard language from which *Kan-on* was derived. He further argues that Karlgren's hypothesis that during the Tang a standard language based on the speech of the capital spread as a koine over the whole country, though in need of reformulation, retains much of its validity. According to Pulleyblank, Karlgren's principal error was in identifying the Tang standard with the *Qieyun* language rather than with the more evolved language represented by the rhyme tables.

Karlgren's original reconstructions have been improved on by various scholars, in particular, Chou Fa-Kao. In his *Pronouncing Dictionary* Chou sets out the pronunciations of a large number of characters according to his own most recent revision. Because it is the most up-to-date one readily available, Chou's reconstruction is adopted as the basis for the present description of the AncC phonology.

**Tones**

AncC is traditionally described as having had four tones or *sheng* (聲), termed *ping*, *shang*, *qu*, and *ru* (平, 上, 去, 入) "even," "rising," "going," and "entering." The *ping*, *shang*, and *qu* tones occurred only in syllables that lacked a terminal stop, *ru* tone occurred only in syllables that did have a terminal stop (p̲, t̲, or k̲). Consequently only the *ping*, *shang* and *qu* tones were phonemically significant. They will be denoted here by superscript A, B, and C, respectively.

**AncC Initials**

Chou identifies 36 phonetically distinct initial consonants plus zero in AncC: p, p', b, m, t, t', d, ts, ts', dz, s, z, n, l, ʈ, ʈ', ɖ, ʈs, ʈs', ɖz, ʂ, ɳ, tɕ, tɕ', dʑ, ɕ, ʑ, ɲ, y, k, k', g, x, ɣ, ŋ, ʔ.

These initials, like their MSC derivatives, pose various problems of phonemic interpretation. Since all transcriptions of AncC represent reconstructed forms, they cannot

have the force of a phonetic or phonemic transcription based upon present-day observation.

## Chinese Historical Phonology

The correspondences in initials between AncC and MSC will be examined, in order to specify the historical-phonological relationship between the two languages.

First the relationship between the 37 AncC initials (including zero) and their 22 MSC derivatives will be described. Each AncC initial is considered in turn, and its MSC reflex(es) are identified. In a few cases an AncC initial has a single MSC reflex. However, in the majority of cases an AncC initial has two or more MSC reflexes. All the attestable correspondences between the initials of AncC and those of MSC are summarized in Tables 3 and 4.

The correspondences shown in Tables 3 and 4 are naturally to be interpreted as representing historical-phonological changes that took place during the one thousand years separating MSC from its AncC ancestor. It is known, however, that the changes did not all come about simultaneously. The most recent change was that which yielded the MSC palatals tɕ, tɕ', and ɕ, which is believed to have occurred later than sixteenth century (Forrest, 1948). Whenever, in the pre-modern precursor of MSC, ts, ts', s, k, k', or x was immediately followed by i or ü, palatalization occurred. All the other changes implied in Tables 3 and 4 are much more ancient.

Table 3 Summary of Correspondences between Initials of AncC and MSC

| AncC | | MSC | AncC | | MSC |
|---|---|---|---|---|---|
| p | ⟶ | p, f | dʐ | ⟶ | tʂ, tʂ', ʂ |
| p' | ⟶ | p', f | ʂ | ⟶ | s, ʂ |
| b | ⟶ | p, p', f | ɳ | ⟶ | n |
| m | ⟶ | m, 0 | tɕ | ⟶ | tʂ |
| t | ⟶ | t | tɕ' | ⟶ | tʂ' |
| t' | ⟶ | t' | dʐ | ⟶ | tʂ', ʂ |
| d | ⟶ | t, t' | ɕ | ⟶ | ʂ |
| ts | ⟶ | ts, tɕ | ʐ | ⟶ | tʂ', ʂ |
| ts' | ⟶ | ts', tɕ' | ɲ | ⟶ | ʐ, 0 |
| dz | ⟶ | ts, ts', tɕ, tɕ' | y | ⟶ | ʐ, 0 |
| s | ⟶ | s, ɕ | k | ⟶ | k, tɕ |
| z | ⟶ | ts', s, tɕ', ɕ | k' | ⟶ | k', tɕ' |
| n | ⟶ | n | g | ⟶ | k, k', tɕ, tɕ' |
| l | ⟶ | l | x | ⟶ | x, ɕ |
| ţ | ⟶ | tʂ | ɣ | ⟶ | x, ɕ |
| ţ' | ⟶ | tʂ' | ng | ⟶ | 0, n |
| ɖ | ⟶ | ts, tʂ, tʂ' | ʔ | ⟶ | 0 |
| tʂ | ⟶ | ts, tʂ | 0 | ⟶ | ʐ, 0 |
| tʂ' | ⟶ | ts', tʂ' | | | |

Table 4 Summary of Correspondences between Initials of MSC and AncC

| AncC | | MSC |
|---|---|---|
| p, b | ⟶ | p |
| p', b | ⟶ | p' |
| p, p', b | ⟶ | f |
| m | ⟶ | m |
| t, d | ⟶ | t |
| t', d | ⟶ | t' |
| ts, dz, ʤ, tʂ | ⟶ | ts |
| ts', dz, z, tʂ' | ⟶ | ts' |
| s, z, ʂ | ⟶ | s |
| n, ɳ, ŋ | ⟶ | n |
| l | ⟶ | l |
| ʈ, ɖ, tʂ, dʐ, tɕ | ⟶ | tʂ |
| ʈ', ɖ, tʂ', dʐ, tɕ', dʐ, ʐ | ⟶ | tʂ' |
| dʐ, ʂ, dʑ, ɕ, ʑ | ⟶ | ʂ |
| ɲ, y, 0 | ⟶ | ʐ |
| ts, dz, k, g | ⟶ | tɕ |
| ts', dz, z, k', g | ⟶ | tɕ' |
| s, z, x, ɣ | ⟶ | ɕ |
| k, g | ⟶ | k |
| k', g | ⟶ | k' |
| x, ɣ | ⟶ | x |
| m, ɲ, ŋ, y, ʔ, 0 | ⟶ | 0 |

For our present purpose the most important by far of these changes concerns the AncC voiced plosives, affricates, and fricatives. These all became devoiced and (except where they yielded MSC fricatives) they acquired aspiration as well if associated with AncC tone A.

| | | AncC | MSC |
|---|---|---|---|
| e.g. | 蒲 | buo$^{A}$ | p'ú |
| | 部 | buo$^{B}$ | pù |
| | 亭 | dieng$^{A}$ | t'íng |
| | 定 | dieng$^{B}$ | tìng |
| | 河 | ɣa$^{A}$ | xɣ |

Other changes that took place in the development from AncC to MSC were of relatively limited scope.

AncC Labials: p, p', b, m

1. By the devoicing process just described, the voiced b of AncC was eliminated:

when associated with AncC tone A it yielded MSC p', and when with the other tones, it yielded MSC p.

2. AncC p, p', and b when followed by iu usually yielded MSC f.
3. AncC m when followed by iu usually yielded MSC 0.

AncC Dentals: t, t', d, ts, ts', dz, s, z, n, l

1. The devoicing process eliminated AncC d, dz, and z: AncC d and dz, when associated with tone A yielded MSC t' and ts', and with other tones yielded MSC t and ts respectively. AncC z, when associated with tone A yielded MSC s, or ts', and with other tones it yielded MSC s.
2. The pre-MSC affricates ts, ts' (both the originals and those derived from AncC dz and z) and fricative s (both the original and the one derived from AncC z) suffered palatalization before MSC i and ü.
3. AncC t, t', n, l survived without change.

AncC Retroflexes: ʈ, ʈ', ɖ, ʈʂ, ʈʂ', ɖʐ, ʂ, ɳ

1. AncC retroflex plosives changed to affricates: ʈ>ʈʂ, ʈ'>ʈʂ', and ɖ>ɖʐ. Then the devoicing process eliminated ɖʐ, which, when associated with tone A yielded MSC ʈʂ', and with the other tones yielded MSC ʈʂ or occasionally ʂ.
2. AncC ʈʂ, ʈʂ', and ʂ became MSC dentals ts, ts', and s in cases where the following MSC vowel is ɣ. Otherwise they remained unchanged.
3. AncC ɳ lost its retroflexion to yield MSC dental n.

AncC Palatals: tɕ, tɕ', ɖʐ, ɕ, ʑ, ɲ, y

1. Through devoicing, AncC ɖʐ and ʑ, when associated with tone A yielded MSC ʈʂ' or ʂ, and when with other tones yielded MSC ʂ.
2. AncC palatals tɕ, tɕ', ɖʐ, ɕ, ʑ yielded MSC retroflexes.
3. AncC ɲ, when followed by i yielded MSC ʐ or occasionally 0.

Thus twelve AncC initials ʈ, ʈ', ɖ, tɕ, tɕ', ɖʐ, ɕ, ʑ, ʈʂ, ʈʂ', ɖʐ, and ʂ converged to three MSC initials ʈʂ, ʈʂ', and ʂ.

AncC Velars: k, k', g, x, ɣ, ng

1. By devoicing, AncC g, when associated with tone A yielded MSC k', and when with other tones yielded MSC k. Similarly by devoicing AncC ɣ became MSC x. These later became palatalized to MSC tɕ, tɕ', ɕ when followed by i or ü.
2. AncC initial ŋ normally yielded MSC 0 and rarely MSC n.

AncC Glottal Stop: ʔ was simply lost, being represented in MSC by 0.

Many of the changes indicated here and in Tables 3 and 4, for example the change from AncC palatals to MSC retroflexes and from AncC retroflexes to MSC dentals,

have no relevance for the question of Chinese-Japanese correspondences. The reasons for this will become apparent after an examination of "Old Japanese" and Japanese historical phonology.

## Phonology of Old Japanese and Japanese Historical Phonology

"Old Japanese" (OJ) is Miller's translation of the term *Jōko Nihongo*, applied to the language of the Nara period (eighth century). Another term *Chūko Nihongo*, applied to the language of the Heian period (ninth to twelfth centuries), is translated by Miller as "late Old Japanese" (Miller, 1967). Because this distinction is irrelevant for the present study, the term "Old Japanese" will be used here in a loose sense to cover both, i.e., to refer to the language spoken at the time of both the *Go-on* and *Kan-on* loans.

The historical phonology of Japanese is far simpler than that of Chinese, so can be dealt with fairly briefly. Concerning the initial consonants, the only noteworthy phonological differences between OJ and the modern stnadard language have to do with the labials. The OJ ɸ changed to MSJ h around the seventeenth or eighteenth century. ɸ was in its turn probably derived from an earlier p. The exact time of that shift is not known, but it is believed to have been some time during or before the period of *Jōko Nihongo* (Hashimoto, 1966).

In another phonetic shift, which initially did not affect the phonological patterning of the language, t and d before i became palatal affricates [tʃ] and [dʒ], and before u became alveolar affricates [ts] and [dz] respectively. Later ひ [zi] and ぢ [dʒi] fell together as did also ず [zu] and づ [dzu]; however, the kana spellings remained unchanged.

## Comparison of Initial Consonants in AncC and Their Counterparts in OJ

Results of the comparison of the 37 AncC initials with their counterparts in OJ *Go-on* and *Kan-on* are set out in Table 5. The correspondences revealed here may best be described by identifying how they differ from each other.

Between the initial consonants of AncC and their counterparts in OJ *Go-on*, in only three cases is there simple one-to-one correspondence: AncC b, m, l to OJ *Go-on* b, m, r respectively. Elsewhere there is extensive convergence, a natural consequence of the more limited OJ inventory of phonemes. The AncC aspirated-unaspirated distinction was lost because Japanese had no counterpart for it. At the same time all the retroflexes and palatals converged with the dentals, and all the affricates converged with the fricatives:

| AncC | | | OJ *Go-on* |
|---|---|---|---|
| Dental | Retroflex | Palatal | Dental |
| d | ɖ | | d |
| t, t' | ʈ, ʈ' | | t |
| n | ɳ | ɲ | n |
| dz, z | dʐ | dʑ, ʑ | z |
| ts, ts', s | tʂ, tʂ', ʂ | tɕ, tɕ', ɕ | s |

Table 5 Summary of Correspondences between Initials of AncC and OJ *Go-on* and *Kan-on*

| *Go* | AncC | *Kan* |
|---|---|---|
| ɸ | p, p’ | ɸ |
| b | b | |
| m | m | b |
| t | t, t’, ʈ, ʈ’ | t |
| d | d, ɖ | |
| s | ts, ts’, s, tʂ, tʂ’, ʂ, tɕ, tɕ’, ɕ | s |
| z | dz, z, dʐ, dʑ, ʐ | |
| n | n, ɳ | d |
| | ɲ | z |
| r | l | r |
| k | k, k’, x | k |
| g | g, ɣ | |
| | ŋ | g |
| 0 | ʔ, y, 0 | 0 |

In the velars only the voiced-voiceless contrast was retained, as convergence took place into the two plosives:

| AncC | OJ *Go-on* |
|---|---|
| k, k’, x | k |
| g, ŋ, ɣ | g |

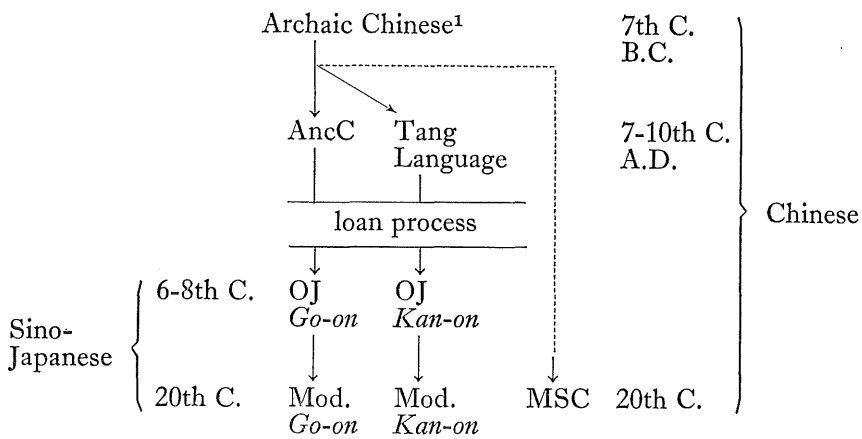
Two initials, ʔ and y, were simply dropped and thus converged with original 0.

Through these changes, the 37 AncC initials became just twelve in OJ *Go-on*. Consequently, many phonological distinctions were obliterated in the loans. In the extreme case nine different AncC initials were collapsed into the single OJ s. But in spite of the extensive convergence involved, the process of change was regular and very simple in nature: every AncC initial had just one reflex in OJ *Go-on*.

Table 5 shows that where *Go-on* has voiced plosives and fricatives (b, d, g, z), *Kan-on* has voiceless (ɸ, t, k, s)—except that *Go-on* and *Kan-on* agree in having g for AncC ŋ. Where *Go-on* has nasals (m, n), *Kan-on* has the corresponding voiced plosives (b, d)—except that whereas the *Go-on* counterpart of AncC ɲ is n, the *Kan-on* counterpart is z.

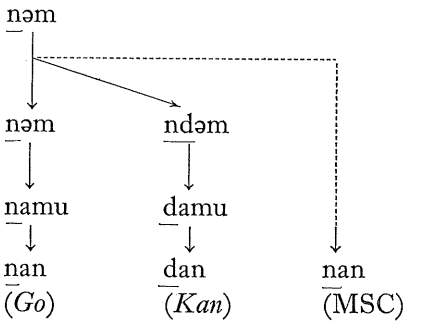
These differences are clearly to be attributed to differences in the form of Chinese from which the borrowing occurred. The differences between *Go-on* and *Kan-on* summarized above indicate how these two source languages must have differed. For example, the fact that *Kan-on* has voiceless sounds wherever AncC has voiced plosives, affricates, and fricatives may be taken as indicating that the plosives, affricates, and fricatives of the Tang language were all voiceless. Again, the fact, that the AncC nasals, m, n, ŋ, ɲ, have as their *Kan-on* counterparts, b, d, d, z, respectively rather than m, n, n, n as in *Go-on*, is seen, for example by Hayashi Chikafumi, as indicating that the Tang counterparts of these nasals had acquired non-nasal elements to become mb, nd, ŋd, ɲʒ: in *Kan-on* these non-nasal elements were preserved at the expense of the nasal.

The relationships among the different processes of historical change involved may be roughly portrayed as follows.




For example, the evolution of the readings of 男 illustrating the treatment of the voiced-voiceless distinction and of the nasals respectively, appears to have been as shown:

[1] "Archaic Chinese" is Karlgren's term for the language of approximately the seventh century B.C. which he reconstructed mainly using two sources: the rhymes in the *Shi Jing* (詩経), and the phonetic hints contained in the structure of characters of the *xing-sheng* 形声 type.




## SUMMARY, SYNTHESIS AND CONCLUSION

With the historical-linguistic information assembled, it is now possible to account for the observed complexity of the correspondences between the character readings of MSC and their counterparts in MSJ (*Go-on* and *Kan-on*).

### MSC and *Go-on*

A major source of the complexity in the present pattern of correspondences is the extensive modification of the consonantal system that has taken place, particularly on the Chinese side, during the intervening one thousand years. While changes on the Japanese side were minimal, those on the Chinese side were considerable. However, not all such changes are relevant in the present context. For example, as mentioned earlier, the shift of AncC palatals to yield the corresponding MSC retroflexes did not affect the pattern of Chinese-Japanese correspondences because palatals and retroflexes alike are represented in Japanese by dentals. Other changes did affect the pattern of correspondences and therefore *are* relevant.

By far the most important of these changes is that involving the AncC voiced initials. In the line of development to MSC, the AncC voiced plosives, affricates, and fricatives became devoiced, and (apart from the fricatives) they became aspirated as well if associated with AncC tone A. This is illustrated in the following table, based on the AncC syllables tɑn, t'ɑn, and dɑn in tones A, B, and C. For completeness, the MSC tones are included.

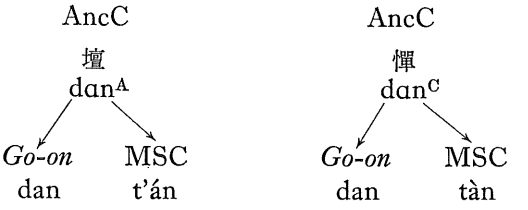
| | AncC | ·····→ | MSC | |
|---|---|---|---|---|
| 單 | 灘 | 壇 | | |
| tɑn$^{A}$ | t'ɑn$^{A}$ | dɑn$^{A}$ | tān | t'ān | t'án |
| 亶 | 坦 | 但 | | |
| tɑn$^{B}$ | t'ɑn$^{B}$ | dɑn$^{B}$ | tǎn | t'ǎn | tàn |
| 旦 | 炭 | 憚 | | |
| tɑn$^{C}$ | t'ɑn$^{C}$ | dɑn$^{C}$ | tàn | t'àn | tàn |

This group of changes disrupted the originally simple pattern of correspondence between Chinese and Japanese (*Go-on*), and indeed provides the solution to one of the

principal problems posed earlier. The lack of simple correspondence between the MSC and *Go-on* plosives was illustrated in the Introduction of this paper with sets of four character readings, of which the following, based on *Go-on* t and d, is a typical example.

| MSC | *Go-on* | MSC | *Go-on* |
|---|---|---|---|
| 旦 tan | tan | t ..... | t |
| 炭 t'an | tan | t' ..... | t |
| 壇 t'an | dan | t' ..... | d |
| 憚 tan | dan | t ..... | d |

All of the possible combinations are found, making the correspondences appear haphazard. The explanation for this appearance of haphazardness is now evident. *Go* d reflects AncC d (and d). In AncC, the characters 壇 and 憚 of the above set both had initial d, which gives them the AncC readings dɑn$^{A}$ and dɑn$^{C}$ respectively. By the process of historical change summarized above these yielded MSC t'an and tan respectively:




The explanation for the present pattern of correspondence between the MSC and *Go-on* dental plosives can now be summarized by adding the AncC readings to the above set of four character readings, thus:

| | AncC | | MSC | *Go-on* |
|---|---|---|---|---|
| 旦 | tɑn | ⟶ | tan | tan |
| 炭 | t'ɑn | ⟶ | t'an | tan |
| 壇 | dɑn$^{A}$ | ⟶ | t'an | dan |
| 憚 | dɑn$^{C}$ | ⟶ | tan | dan |

On the Japanese side, AncC t and t' both became *Go-on* t, while AncC d became *Go-on* d; and on the Chinese side AncC t and t' became MSC t and t' respectively, while AncC d became MSC t' or t depending on whether or not it was associated with AncC tone A.

Similar tables could be prepared for all the AncC plosives and affricates.

To facilitate further discussion of the changes that took place in the interval between AncC and its derivatives, MSC and modern *Go-on*, the above partial tables are now

Table 6 Summary of Correspondences between Initials of AncC, MSC, and MSJ *Go-on*

| | AncC | MSC | *Go-on* |
|---|---|---|---|
| 1. | p, p', p p' / b, b, b | p, p', f | h, b |
| 2. | m | m | m |
| 3. | t, t' / d, d | t, t' | t, d |
| 4. | ts, ts', s, ʂ, ʂ, ʨ / dz, dz, z, z, dʐ, dʐ, ʐ | ts, ts', s, ʂ | s, z |
| 5. | n, ɳ / ng | n | n, g |
| 6. | l | l | r |
| 7. | tʂ, tʂ', tɕ, tɕ' / dʐ, dʐ, dʐ, ʐ / ʈ, ʈ' / ɖ, ɖ | tʂ, tʂ' | s, z, t, d |
| 8. | ɲ / y, 0 | ʐ | n, 0 |
| 9. | ts, ts', s / dz, dz, z, z / k, k', x / g, g, ɣ | tɕ, tɕ', ɕ | s, z, k, g |
| 10. | k, k', x / g, g, ɣ | k, k', x | k, g |
| 11. | m / ɲ / ŋ / ʔ, y, 0 | 0 | m, n, g, 0 |

expanded to cover all the correspondences in initial consonants. The result is Table 6. The two columns occupying the right half of Table 6 (" MSC " & " *Go-on* ") show the present-day correspondences between MSC and *Go* readings: those two columns are, therefore, equivalent to section (a) of Table 1. The set of boxes occupying the left half ("AncC ") provides the explanation for those correspondences by indicating the AncC origins of both the MSC and *Go* readings; it and the " MSC " column together are equivalent to Table 4. Each MSC initial is derived from the AncC initial(s) shown to its left on the same horizontal line, regardless of how they are boxed; for example, MSC f is derived from AncC p, p' and b. Each *Go-on* initial is derived from the AncC initial(s) shown in the box to its left which occupies the corresponding horizontal position; for example, *Go-on* h (the left-most *Go* initial in row (1) is derived from AncC p and p' (actually shown as p, p', p p'), the AncC initials contained in the left-most box in row (1).

The two sets of boxes under "AncC" and "*Go-on*" are based on Table 5 except that MSJ *Go-on* h of Table 6 replaces OJ *Go-on* ɸ of Table 5.

Table 6 provides a convenient summary of the correspondences between the MSC and *Go-on* initials. Those correspondences are explained in terms of divergent derivation from the common source, AncC. For example, the fact that *Go-on* g corresponds not only to MSC k and k' as discussed above, but also to MSC x, n, 0, and tɕ, tɕ', ɕ, is summarily explained in the table as follows: *Go-on* g corresponds to MSC n or 0 when both derive from AncC ŋ (rows 5 and 11), and it corresponds to MSC tɕ, tɕ', or ɕ, when both derive from AncC g or ɣ (row 9). Again, the correspondences of MSC 0 not only with *Go-on* 0 but also with *Go-on* m, n, and g is explained as follows: MSC 0 derives not only from AncC ʔ, y, and 0, all of which yielded *Go-on* 0, but also from AncC m, ɲ, and ŋ, which yielded *Go-on* m, n, and g respectively (row 11).

### MSC and *Kan-on*

The correspondences between the MSC initials and their *Kan-on* counterparts will now be examined similarly. These are less irregular than the MSC—*Go-on* correspondences.

For MSC t and t', *Kan-on* has uniformly t. It is inferred that the explanation for this is that in the Tang language at the time of the main *Kan-on* loans the plosives, affricates, and fricatives were all voiceless, having retained only the contrast of aspirated versus unaspirated, which was ignored in Japanese. The same applies to the correspondences of the sets based on MSC p, p', and k, k'.

The remaining differences between the *Kan* and *Go* readings can be explained along similar lines. However, such "explanation" actually entails circularity of argument because our knowledge of the Tang language, from which the *Kan-on* derive, is based principally on those *Kan-on* themselves. Discussion of the origins of the MSC/*Kan-on* correspondences cannot, therefore, profitably be pursued further. It is nevertheless instructive to show how these correspondences relate to AncC, which, though it is not the immediate source of the *Kan-on*, is presumably fairly close to that source. This is done in Table 7.

It was pointed out that there is a marked lack of simple correspondence between the MSJ readings and their MSC counterparts, which demands linguistic explanation. It was proposed that such a explanation could be found by examining the ancestors of the two modern languages as they were at the time the loans from Chinese into Japanese took place. The confusing present-day situation has thus been explained. It has been shown to be due in part to phonological adjustments made at the time of the borrowing, and in part to subsequent phonological changes on the lines of development leading to MSJ and MSC.

This finding is, of course, neither unexpected nor novel, at least in its general outlines. What this investigation has done, however, is to specify both the problem and the explanation with precision and completeness. This investigation has specified exactly what the existing MSC-MSJ correspondences are; and it has identified just what

Table 7 Summary of Correspondences between Initials of AncC, MSC, and MSJ *Kan-on*

| AncC | MSC | *Kan-on* |
|---|---|---|
| p b<br>p' b<br>p p' b | p<br>p'<br>f | h |
| m | m | b |
| t d<br>t' d | t<br>t' | t |
| ts dz tʂ dʐ<br>ts' dz z tʂ'<br>s z ʂ<br>dʑ ʂ dʑ ɕ ʑ | ts<br>ts'<br>s<br>ʂ | s |
| n ɳ ŋ | n | d g |
| l | l | r |
| tʂ dz tɕ<br>tʂ' dʑ tɕ' dʑ ʑ t dʐ<br>t' dʐ | tʂ<br>tʂ' | s t |
| ɲ y 0 | ʑ | z 0 |
| ts dz<br>ts' dz z<br>s z k g<br>k' g<br>x ɣ | tɕ<br>tɕ'<br>ɕ | s k |
| k g<br>k' g<br>x ɣ | k<br>k'<br>x | k |
| m ɲ ŋ ʔ y 0 | 0 | b z g 0 |

were the adjustments and historical changes that produced them. These phases of the investigation have entailed the collation of data not previously undertaken in systematic and thorough fashion.

This study has, therefore, examined and explained, with a fair degree of precision and completeness, a phenomenon that had previously been taken largely for granted: the complex pattern of correspondences between Modern Standard Chinese and Modern Sino-Japanese.

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