On the Origin of Middle Korean Tone*

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To the best of my knowledge, the question of the origin of Middle Korean (MK) tone has not been asked. Although the present situation of studies on MK tones does not constitute a sufficient ground for the investigation of the mechanism of "tonogenesis", I will attempt to make inquiries about the origin of MK tone in the light of available theories of tonogenesis.

The fact that (Standard) Korean was a tone language during the period of Late MK (15-16c.) is well attested by many old texts such as Hunmin ch'ongum, Hunmin ch'ongum ounhae, Hunmong chahoe, etc. which have explicit tone markings and annotations about their phonetic realization. It is however a little difficult to confirm whether or not Korean had tones before the fifteenth century, since Chinese characters, without any device for marking Korean tones, were adopted to transcribe Korean sounds. As tones began to be clearly recorded only after the new Korean writing system, Han'gul, was invented in 1443, it is not easy to determine how far this tonal system can be traced back beyond this period. It is not impossible to assume that Korean was a tone language from the beginning, but it is unlikely that only Korean was a tone language among the Altaic languages, if we regard Korean as a member of this language family (cf. sec. 2). It seems safe to say that Korean was a tone language from an uncertain date to the sixteenth century. More specifically, Korean seems to have acquired a tonal system posteriorly at a certain point in its recent history (cf. sec. 3). It is likely that Korean was a tone language at the latest from the period of Old Korean (OK), because the latter is a direct ancestor of the present Southeastern (Kyongsang) dialect which is still apparently tonal.1 A discreet examination of the Koreanized pronunciation of Sino-Korean (SK) words also gives us a natural inference that the tonal system already existed before the appearance of the new script (K.-M. Lee 1972b: 151). In other words, the fact that the SK sound system already had tones in Late MK leads one to deduce that the Chinese characters used for writing pure Korean words before the invention of the Korean alphabet might bear the tonal designa-

* This paper is a slightly revised version of chapter 7 in S. -O. Lee (1978).

1 The present Northeastern (Hamkyøng) dialect, which is believed to have separated from the Southeastern dialect around the 14th century, maintains a tonal system more similar to that of MK than the Southeastern is (cf. Ramsey 1975). In other words, the Southeastern dialect has innovated, while the Northeastern has remained conservatively.
tion also in OK (1 c.B.C.—10c. A.D.) and Early MK (10~14c.), even though they were not overtly marked with certain devices such as ‘dots’ to indicate the tone values. Thus, one can hypothesize of an earlier acquisition of the tonal system in Korean. Yet, further studies on the nature of Chinese tones and their Korean counterparts are needed.\(^2\)

1. The Chinese Connection

Where did MK tones come from? An initially appealing assumption might be that they came into existence as a result of influence from the neighboring tonal language, Chinese, that had also been a written language among Korean literati for a long time since the seventh century at the latest. Over and above this, one may claim that the system of appellation for classifying tones in MK was just an imitation of the Chinese system (Ogura 1940: 473). Although the appellation of tones in MK was indeed quite similar to that in Chinese phonology, it is not however clear whether or not tone itself was transmitted from Chinese to Korean, since the intrinsic nature of tones between these two languages is quite different as will be shown below.

To speak in a simplified way à la Wang (1967: 93-4), the Sino-Tibetan languages are different from African and Amerindian languages in that, while the latter have mostly two or three non-contour tones, the former have many contour tones. For a somewhat detailed overview, see Welmers (1959). In the way tone sandhi operates, the latter is by syntagmatic displacement, but the former is by paradigmatic replacement. It is quite interesting to note that MK is similar to the latter, i.e. it has two register tones and syntagmatic sandhi although Korea is geographically closer to the former.

As for geographical consideration, we have to pay attention to the fact that the northern dialects of modern Chinese have fewer tones than the southern dialects (Cheng 1973), e.g. Northern Mandarin (the majority having 4 tones) vs. Cantonese (8 or 9 tones). Although this situation in Modern Chinese dialects was not entirely the same in Pre-Modern Chinese,\(^3\) it should be a northern Chinese dialect from which Korean, i.e. OK, borrowed tone if in fact it was borrowed at all. It is because northern China is contiguous to the Korean peninsula, and most of the early contacts between China and Korea must have occurred via this land route, although the sea route between the

\(^2\) During the period preceding the invention of the Korean alphabet, Chinese characters were borrowed to represent pure Korean words. Given that a certain syllabic unit of a Korean word at this time could have corresponded to several (3 or 4) Chinese character, we have to check whether there exists some evidence in the choice of a particular Chinese character (which, after all, have inherent tone) that might indicate tone for Korean based on a tonal similarity.

\(^3\) The term ‘pre-modern’ is used in order to denote all the periods preceding Modern Chinese, i.e. Archaic Chinese (—601 A.D.) as well as Middle Chinese (601 A.D.— ca. 12th century). C.C. Cheng suggests that Chinese tonal evolution is generally as follows:

<table>
<thead>
<tr>
<th>Period</th>
<th>Tonal Evolution</th>
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<td>7c.</td>
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</table>
| 4 tones in Early Mandarin | \(\rightarrow\) split to more than 4 tones | \(\rightarrow\) merger back to 4 tones in the north
southern parts of two countries became much easier after around the ninth century.

Therefore, 'fewer tones of the northern dialects' would encourage us to entertain a hypothesis of a 'tone-loan' from Pre-Modern Chinese to OK, or an 'areal diffusion' hypothesis: the acquisition of true tone system by originally atonal Korean was activated or catalyzed by intimate cultural contact with languages which already had true tone systems.4

In the data of modern Chinese (Cheng, 1973), however, we do not encounter a system with less than three tones, and there is no sign of even Pre-Modern Northern Chinese having only two register tones like MK. As another piece of counterevidence to this hypothesis, it seems that the Northwestern (P'yongan) dialect in Korea has not known any tonal phenomena, although this area has been the gateway of the cultural contact with China.5

Yet there is one point of similarity between the Sino-Tibetan languages and MK. Even though there are some cases in which MK tones are used in correlation with certain morphological aspects (for instance, Morphophonemic Tone Rules in S.-O. Lee 1978), it seems that in some cases MK tones are used "lexically" as in (1).

(1) (a) sŏn 'guest' (b) sŏn 'hand'
   (c) sŏrī 'frost' (d) sŏrī 'interval'
   (e) p'ay 'pear' (f) p'ay 'boat, belly'
   (g) năy 'my' (h) năy 'I'
   (i) ph'ar 'arm' (j) ph'ar 'fly'
   (k) sŏh 'mold' (l) sŏh 'pond'
   (m) p'ari 'throw away' (n) p'ari 'cut'
   (o) kăći 'sort' (p) kăći 'branch'
   (q) kăći 'wooden shoes'

Pairs of words in (1) are different just by pitch and meaning. This pitch contrast are not conditioned by any other grammatical reason. Let us compare this situation with

4 Here, we are talking about borrowing in such a sense that an atonal language has an overall loan of a tonal system from a tonal language. However, another type of 'borrowing' might also be possible. Certain bilingual speakers due to their contact with Chinese might have been more aware of pitch differences. They might possibly have become cognizant of previously non-distinctive pitch differences in Korean and started to establish their tonal system. Under this interpretation the tonal system would not have been borrowed from Chinese, but still the contact might have provided an impetus for the introduction of tones into Korean. This possibility was pointed out to me by Lee Becker.

5 Of course, if officials and exchange personnel came from the capital or other regions in China and stayed mostly in the middle or the southern part of the Korean peninsula, then the northern area despite being contiguous to China may not have received much Chinese influence. However, there is evidence that Kokuryō dynasty (37 B.C.—668 A.D.) in the north came to be familiar with the Chinese letters earlier than the other area in Korea. In 372 A.D., for instance, Kokuryō started to teach Confucianism and received Buddhism from China for the first time in Korea.
what Wang describes as follows.

“In languages of (the Sino-Tibetan family and many neighboring Southeast Asian—S.O. Lee), tones are almost exclusively used lexically, with no correlation with the syntactic or morphological aspects of the language. There are exceptions, of course, such as (...) the modified tones in several Chinese dialects which serve a variety of connotative as well as minor syntactic functions. Indeed, in the Peking dialect there are two dozen or so morphemes which change grammatical category according to tone. But these uses are marginal when they are compared to the extensive load that tones carry in the declensional and conjugational morphology of many languages in America and Africa.” (Wang, 1967: 93)

In this aspect of tone as mentioned just above Chinese looks quite similar to MK. Possibly, this similarity might serve as an argument for the “areal diffusion” hypothesis. However, it is at this point not likely to subscribe to this hypothesis, since the contrast in (1) is only a limited phenomenon which includes less than a dozen of pairs among many non-contrastive words. S.-O. Lee (1978) also proved that there is the great discrepancy in the tonal correspondences between Korean and Chinese, and argued that MK is not simply a true tone language but something between a true tone language and a pitch-accented language.

2. The Altaic Connection

It is generally supposed that the Altaic languages are not tone languages. As for the prosodic aspects of these languages, the following is all that one can outline at the present stage of knowledge.

“The expiratory, dynamic stress is in all Altaic languages bound to the same syllable. It is fixed (usually on the first syllable) and, therefore, non-phonemic. (...) The musical tone (i.e., high pitch) is independent of the stress and falls on the last syllable [or on the second syllable in Tungus]”. (Poppe 1965:180–1, 1960:143–7. Parts in brackets are added by S.O. Lee.)

It is likely that the Altaic languages showed a very simple, non-phonemic system of stress and pitch accent. Therefore, one may say that tone in MK which is more complicated than this is not inherited from the Altaic stock. However, it is possible to hazard a conjecture as follows:

“It is not improbable that these (Altaic) languages had an accent (perhaps pitch-accent) in the past and it is not entirely impossible that one should find in the future some dialects which have a pitch-accent”. (Hattori 1949:121)

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6 George N. Clements suggested, in a personal communication, that this situation is also the same in some African languages such as Yoruba and Ewe.
"The whole matter of the Proto-Altaic pitch system needs further investigation. Poppe seems to assume that every word had one and only one vowel with pitch accent. But one might instead hypothesize a Japanese-style system, with a contrast between tonic and atonic words: or imagine a system wherein any number of syllables within a word could be high- or low-pitched. It is particularly suspicious that pitch à la Poppe is contrastive only on short vowels of noninitial syllables". (Street 1974:4)

In my opinion, it is best now to avoid any wild guesses about the reconstructed period of the languages without convincing data and to reserve any conclusion until the time when I will discuss the subject in more detail in sec. 3.2. Recently, Anderson (1978) has tried to reconstruct a proto-stress accent system based on Modern Korean dialects and has made some interesting claims. However, I do not intend to appraise his work here, since it is a little premature to make any conclusive claim in this area of study.

If, then, the tone of MK has no connection with the Altaic stock, could we still assume that Korean belongs to this language family? It is not absolutely impossible to assume that MK alone internally developed a tonal system among non-tonal members of its linguistic phylum. Note that Swedish and Norwegian acquired a pitch-accent (or pitch-melody) system later while the other Germanic languages did not. Also Punjabi (and some other neighboring dialects) has tone within the atonal language area of Indo-Aryan. Cf. Bhatia 1975.

Proto-Austro-Thai, as reconstructed by Benedict (1973), can be cited as a further example. In this Austro-Thai language family which was devoid of tone and had polysyllabic root-morphemes, while the Austronesian (i.e. Malayo-Polynesian) branch has retained polysyllabic structure and has not acquired true tones to the present day, the Tai and Miao-Yao branches have become monosyllabic and have developed complex tonal systems of the Sino-Tibetan type (Matisoff 1973a:85-6). If Benedict's classification is correct, there are more such examples: the acquisition of true tonal systems by Vietnamese which derives from the semi-tonal Austro-Asiatic stock and the acquisition of register system by many western Austronesian languages like Javanese which belongs to the atonal Austro-Thai stock. (The above cases assume an "areal diffusion" hypothesis for the Southeast Asian languages.)

On the other hand, the reverse case is also possible (i.e., an atonal member among tonal languages). Some modern dialects of Tibetan, like Balti, do not have tone while Sino-Tibetan in general is thought to have been "intrinsically tonal". (Matisoff, 1973a:81-5)

Last but not least, it is also important to note that, if both Korean and the other Altaic language had tones, this does not constitute a necessary and sufficient condition to prove that both are genetically related.

"Indeed, tonal criteria are not even sufficient to establish genetic subgroupings for
languages which are already known to be genetically related. A striking proof of this is the fact that some modern dialects of Tibetan are truly tonal while others are not". (Matisoff 1973a: 89)

Note also here that I do not admit any 'Japanese connection' for the development of MK tone, since Korean and Japanese (after they parted each other) had not experienced a close contact like that between Korean and Chinese in early times; and if there were any borrowing, it should be from Korean to Japanese, not vice versa, as is indicated by the general direction of cultural transmission in the times concerned.

3. Tonogenesis

3.1 Jingpho Type

One possible way to explore possibilities in tonogenesis of Korean is by applying to the Korean data the methodology adopted by linguists in establishing a relationship between tonal and linguistic classification in the languages of Southeast Asia. Haudricourt (1954) first suggested that the combinations of a glottal stop/fricative/zero final with a voiced/voiceless initial contrast gave rise to the six contrasting tones of modern Vietnamese. Thus, he was able to claim that Vietnamese originally belonged to the Mon-Khmer group in the Austro-Asiatic language family, which is merely semi-tonal with registral pitch-difference, rather than to the Tai group which has become tonal but which derives from the atonal Austro-Thai parent stock (Matisoff, 1973a).

Several further works on developmental aspects of tone in Tibeto-Burman (in the Sino-Tibetan language family) such as Lehman (1970), Matisoff (1970, 71, 73a), Maran (1971a,b, 73), etc., followed the same line of thought, i.e., segmental origin of tone.

As overviewed in Matisoff (1973a), earlier consonantal contrasts in a number of Oriental languages have given rise to modern-day tonal contrasts, with laryngeal consonants affecting the pitch of preceding vowels, and voicing of consonants affecting the pitch of the following vowels. In particular, in the latter case of tone-splitting or tonogenesis, a higher pitch on vowel is induced by voicelessness of an adjacent consonant and lower tone reflexes on vowels follow voiced consonants. (Cheng1973, Maddieson 1974) Note that this generalization applies usually to obstruents in 'syllable-initial' position.

However, Maran (1971a, 1973) has noted that the tonogenesis of Jingpho (Jingpaw), a Kachinic group of Tibeto Burman language, needs to be described with reference to 'syllable-final' consonants. That is, voiceless final stops ($p$, $t$, $k$, $g$) induced the high-tone, e.g. nāt 'spirits', but voiced ($b$, $d$, $g$, $g$) induced low tone, e.g. gād 'swing'. The tone rule will have the following form:

$+\text{tone}$→$[a \text{ high tone}] / \quad +\text{obstr, } -\text{voice} \#$

Maran prefers to regard Jingpho as a language without underlying tonal contrast, and to infer that it is the voicing contrast which is distinctive here, with the tonal
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Note that Maran’s position entails a question on the possible relation between finals and the development of tones. (Since he does not assume underlying tones, there should be a rise of tones.) Maran (1971b) claims that two processes are structurally related such that for each occurrence of a tone, there is a specific phonetic feature of the following segment (i.e., final consonant) which is associated with it. Hence, one of these might be regarded as phonologically redundant; and since the post-vocalic segments are involved in the linguistic process of morphology while tonal categories or features do not, one is forced to argue that the tonal features are the tonal features are the redundant ones. If tones of the final segments have become redundant, this would render rather implausible the loan hypothesis, that the Tibeto-Burman development of tonal system is a case of borrowing. For it is rather improbable to borrow the redundant system into the self-contained structure of a language.

This point is also significant for the loan hypothesis of Korean tone from Chinese. Since MK tones are mostly redundant except in some monosyllabic word pairs (for details, see (1)), this hypothesis should be rejected on the same ground.

In Maran (1973), he again shows the relation between finals and the development of tones. That is, in Jingpho where tonal characteristics have not yet become “phonemic”, there exists an arrangement where the redundant phonetic features of tone are directly recoverable from the array of existing finals. In other words, a higher pitch and a lower pitch redundantly mark voiceless and voiced consonants, respectively. If we grant this system of complementation between the finals and (phonetic) tones, there might be a way to clarify the tonogenesis of this language.

Note also here that there exists a possible mechanism of transfer segmental to tonal

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1 Matisoff (1973b) prefers to interpret the Jingpho situation in the opposite way for several reasons. In syllable-final position the voicing or voicelessness of a consonant is rather the automatic, redundant consequence of a pre-existent tonal opposition, not its cause. In line with Matisoff, Maddieson (1974: 18-19) also prefers to grant that Jingpho has underlying tonal contrasts. For instance, ‘syllable-final’ voiceless stops after low tone vowels (in the underlying representation) become voiced in a process of gemination when certain particles follow: e.g. yâk ‘difficult’—yàggai ‘it is difficult’.

Maddieson believes that this is a counter example to the claim by Hyman & Schuh (1974) that “Consonants affect tone, but tone does not affect consonants.”

Matisoff-Maddieson’s claim is quite dubious, since there is no trustworthy known precedent. In addition, ‘distinctive’ tonogenesis is the result of a process which destroys the transparency of the conditioning environment such as final devoicing, after low tone has come about before [+voice]. I owe H.H. Hock for this comment on Matisoff-Maddieson’s claim.

On the other hand, if one takes Maran’s position, he would choose a toneless form with a voiced final consonant (yag) as underlying in these alternating forms and predicts the preceding low tone from the voiced consonant and then devoices the consonant in final position. However, the comparative evidence does not support a reconstruction of original final voiced consonants (cf. Maddieson 1974:19). It is not the place to pursue this problem and I leave it for further studies. In the main text, I will tentatively adopt Maran’s position.
stages. That is, once phonetic tones take over the cognitive function of contrast by finals, then finals can be lost toward the direction of gradual simplification. The data from MK as well as Jingpho indicates this stage has not been reached yet.

With this much of background information on the relation between final consonants and tones in Jingpho I will now turn to an examination of MK.

There is an interesting report "On the tones of the stems in conjugation of the 15th century Korean" by Chong (1963). Although he limits the scope of his data to monosyllabic verbal stems, he finds some remarkable tendencies as follows:

(2) All the regularly conjugating stems which end with the voiceless final consonants (-p, -t, -s, -c, -k, -h, -ph, -th, -ch) exhibit the low tone.

(3) The basic tone of the stems which end with the voiced consonants (-m, -n, -r, and possibly -β, -z, -y)\(^8\) is low-high.

In MK there were no voiced stops or affricates. The low-high tone or so-called rising tone is generally understood to be a juxtaposition of a low and a high tone.

Examples supporting the (2) above is as follows (cf. Chong 1963):


\(^8\) Chong did not explicitly mean that -β, -z, and -y are included in this category, but his data show this fact. In addition, β and z alternate with p and s, respectively, and r in (3) includes the items which show the alternation between r and t.
However, the generalization as in (2) is not an iron-clad rule, but has exceptions of the following kind.

First, there are the so-called ‘irregularly’ conjugating stems which end with either voiceless final consonants before consonant-initial suffixes or voiced final consonants before vowel-initial suffixes but still end with low tone as follows:

(5) (a) nüp/B- ‘lie down’, mïy/p- ‘be hateful’, mâm/p- ‘be hot’;
(b) tât/r- ‘run’, tït/r- ‘hear’.
(c) pis/z- ‘pour, swell’

These verbs show alternations of (a) p~B (B before vowels, p elsewhere), (b) t~r (r before vowels, t elsewhere), and (c) s~z (z before vowels, s elsewhere) in the stem-final position, while others ending in p, t, and s show no such alternation as in (4a) and (4b).

Secondly, among the regularly conjugating stems which end with the voiceless final consonants, there are a couple of high-toned stems as in (6) and also some low-high (rising) toned stems as in (7).

(6) châc- ‘look for’, órh- ‘be right’
(7) kû(r;k-)rk- ‘be thick’, tyô:h- ‘be good’, ɔ:t- ‘get’, ɔ:ps- ‘lack’, cyā:k- ‘be few’

Thirdly, some low-toned stems end with the ‘voiced’ finals as in (8), although the voiceless consonants are expected according to (2), or the stem tone should be low-high according to (3).


The verbs ending in -r are usually low-high toned but those in (8b) are exceptionally low-toned. (8c) is included here, since glide -y is also a ‘voiced’ final (i.e., so-called semi-consonant).

Although the three exceptional cases mentioned above weaken (2) to some extent, the overwhelming tendency of (2) is still significant and worth noticing.

Examples supporting (3) are as follows (cf. Chông 1963):


Here again, however, there are some exceptions to the generalization of (3). First, some stems which end with voiced finals are not low-high-toned but high-toned as shown in (10) below.


This group of stems shows two interesting tendencies. One is that none of these examples has voiced initials. The other is that about half of these examples show vowel length, but these stems with long vowels are randomly distributed in (10b-c).

Second, the underlying tone of some stems which end with voiced finals is neither low-high nor high but ‘low’ as already shown in (8).

Third, several low-high-toned stems end with ‘voiceless’ consonants. Examples were already introduced in (7).

Again, the above three exceptional cases weaken the validity of (3), but I do not think that (3) is totally invalidated by these exceptions. (3) is still too remarkable a tendency to be ignored. I feel that further studies should be able to explain the exceptions.

The Jingpho situation outlined earlier shows some similarities to MK, but not quite a striking coincidence. First, voiceless final stops (-p, -t, -k, -q) in Jingpho induce high tone instead of the low as in MK. Secondly, Jingpho has voiced final stops such as -b, -d, -g, -ʔ, which MK did not. In addition, those -b, -d, -g, -ʔ, induced low tone while the MK voiced consonants -m, -n are associated with low-high tone. Therefore, at best we can see only a reverse correspondence.

Moreover, obstruents interchange with continuants in some morphological processes in Jingpho where finals are distributed as follows:
However, in MK where there are no voiced obstruents such as \( b, d, \) and \( g \), (also no \( h \) and \( \tilde{g} \) as well as \( ? \)) the situation is so different that \( m \) and \( n \) would have to be considered as voiced obstruents in order to make a pairwise contrast between voiced and voiceless, if that were desired. It seems that the tonal-segmental complementation neatly displayed by Jingpho is not possible in MK. In other words, the MK data is not likely to be consistent with the claim that all tonal systems are historically derived from related finals.

Let us turn to the problem of the reverse correspondence in MK in comparison with Jingpho. It appears that, if \( m, n, r, \beta, z, y \) in MK are regarded as equivalents of Jingpho voiced finals \(-b, -d, -g, -?\), a kind of tonal ‘flip-flop’ (although this process as a historical change is uncommon and mostly doubtful) or tone reversal must be assumed to have occurred in MK tones if they are to match the general pattern of tonogenesis in Jingpho. To sum up, the following table is more illustrative.

<table>
<thead>
<tr>
<th></th>
<th>voiceless finals</th>
<th>tone</th>
<th>voiced finals</th>
<th>tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>MK</td>
<td>(-p, -t, -s, -c, -k, -h)</td>
<td>low</td>
<td>(-m, -n, -r, (-\beta, -z, -y))</td>
<td>low-high</td>
</tr>
<tr>
<td>JP</td>
<td>(-p, -t, -k, -?)</td>
<td>high</td>
<td>(-b, -d, -g, -?)</td>
<td>low</td>
</tr>
</tbody>
</table>

What does this almost reverse correspondence in the column of ‘tone’ imply? I do not intend to prove any linguistic affiliation between these two remote languages. However, it would be nice if we could see any phenomenon concerning universal phonetics in MK data, for it can bear on the issue of the relationship between various consonant types and tones suggested in Halle and Stevens (1971), Hyman (1973), or Ladefoged (1973) and the issue of distinctive phonological features of tone.

Yet, it is still difficult to draw any implication from MK data given above on general typology of tone as being systematically associated with voicing, the prevalent association being high tone with voicelessness and low tone with voicedness. However, the following can be cited to support MK case:

"Voicing and lowering of pitch do not go together in all languages in synchronic or diachronic processes (see Li 1965:152, Maddieson 1974). In the Tai family there are rather more cases where the tone reflexes are higher when originally voiced stops preceded than when voiceless ones preceded (Brown 1965, Sarawit 1973)," (Maddieson 1974:20)
Maddieson (1977: 92) again says that where diachronic effects of consonants on tones have been detected, the correlation of voicing with higher tone and voicelessness with lower tone is not unusual. It is found, for example, in Sui (Haudricourt 1972), the Central branch of the Tai family of languages and many of the Northern Tai languages (Brown 1965, Sarawit 1973), Nasu and Lü-Ch'üan among the Loloish languages (Matisoff 1972), Chaochow and Shaowu among the Min Chinese dialects (Norman 1973), Ngombe among Bantu languages (Ellington 1970-1), etc.

In addition, in the development of tones from MK to the modern Southeastern (Kyongsang) dialect, Chong (1971a, 1974a) believes that there occurred a sort of ‘flip-flop’ (in his term, a ‘seesaw’ movement): low→high (MK cip ‘house’→Kyongsang cip), high→low (MK mir ‘water’→Kyongsang mir). The switching of the voiced/voiceless opposition which in effect results in ‘flip-flops’ of tones. Standard Thai is a typical example, with the old voiced series becoming voiceless aspirated, merging with the old voiceless aspirated series and the old voiceless sonorants becoming voiceless, merging with the old voiced sonorants. (Matisoff 1973a: 88). For other examples from Maddieson (1977: 93), in Puyi dialects of the Tai family, original voiced obstruents have modern voiceless aspirated or unaspirated reflexes depending on the tones (Sarawit 1973). In Mandarin and Yüeh dialects of Chinese, the old voiced obstruents became devoiced.

Leaving this problem of reverse correspondence aside, let us pay attention to the tendency of ‘low-high’ tone preceding the voiced finals (m, n, r) in MK. Recall that in a similar context in Jingpho, the tone is ‘high’ not ‘low-high’. In fact, a Korean text, Sohak onhae (小學詮解) (1587), which represents the period of tonal decay in the phonological history of Korean, also shows a confusion between ‘low-high’ and ‘high’ tone marking and the general tendency is to change ‘low-high’ into ‘high’ (Chong 1974b). I do not know whether the existence of this confusion is significant for our issue and whether it improves the situation for comparison with Jingpho.

In the above discussion of Korean tonogenesis, we have noted a poor match between Jingpho pattern and MK data. However, notice that the hypothesis considered so far concerns itself only with the final consonant of closed syllables and with the ‘preceding’ vowel. Yet if one were to consider the last consonant and its ‘following’ vowel, which is the final segment of a (following) open syllable, the MK data correspond to the Jingpho pattern to a great extent.

Ramsey (1975:256-63) analyzes that there are two classes among the verb stems starting with low tones: one consists of monosyllabic stems and the other of bisyllabic stems underlyingly. My immediate interest here is not to criticize or justify Ramsey’s...

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9 Interestingly enough, in Xi Tan Zang (Hsi-t'an tsang) 慈恩窪, the 9th century Japanese monk Annen 安然 indicates that the rising tone of Middle Chinese is level and high (上聲直高) in one tradition of reading. Mei (1970:97) suggests that here 'high' means either a level high pitch or a rising contour.
analysis, but to point out that the data for his analysis is very interesting in terms of
tonogenesis. The two classes, i.e. 1a and 1b à la Ramsey, are as follows.

(13) Class 1a verbs: low-toned verb stems + suffix-initial (euphonic) vowel -/~/-.
   (1) kás~-́-́- ́-́- ‘cut’ (2) kàph~-́-́- ‘repay’ (3) kót~-́-́- ‘be straight’ (4) kóc~-́-́- ‘insert’ (5) kút~-́-́- ‘harden’ (6) kúp~-́-́- ‘be curved’ (7) nás~-́-́- ‘fish’ (8) nyáth~-́-́- ‘be shallow’ (9) nôk~-́-́- ‘grow old’ (10) nîrk~-́-́- ‘be late’ (12) nîk~-́-́- ‘ripen’ (13) nîrk~-́-́- ‘read’ (14) nîp~-́-́- ‘wear’ (15) tát~-́-́- ‘close’ (16) mâk~-́-́- ‘stop up’ (17) mák~-́-́- ‘eat’ (18) mût~-́-́- ‘bury’ (19) mit~-́-́- ‘believe’ (20) màrk~-́-́- ‘be clear’ (21) pàrk~-́-́- ‘be bright’ (22) sôk~-́-́- ‘rot’ (23) sôs~-́-́- ‘mix’ (24) sôs~-́-́- ‘spurt out’ (25) àrh~-́-́- ‘suffer’ (26) irh~-́-́- ‘lose’ (27) càp~-́-́- ‘grasp’ (28) càch~-́-́- ‘chase’ (29) cúk~-́-́- ‘die’

(14) Class 1b verbs: verb stems containing a low-toned prefinal vowel and a
stem-final /i/- (+ suffix) (1) náh~́-́- ‘bear’ (2) nôh~́-́- ‘put in’ (3) nòhl~́-́- ‘put’ (4) pih~́-́- ‘sprinkle’ (5) còh~́-́- ‘fear’ (6) tâh~́-́- ‘touch’ (7) ànc~́-ác~́-́- ‘sit’ (8) yànc~́-yàc~́-́- ‘place’ (9) cîhi- ‘give a name’ (10) nûb~́-́- ‘lie down’ (11) màyb~́-́- ‘be spicy’ (12) miyb~́-́- ‘be hateful’ (13) pizì- ‘swell, (14) pizì- ‘pour’ (15) càz~́- ‘spin’ (16) tit/tìrì-́- ‘hear’

The final vowel /a or i/ is chosen depending on the vowel harmony. Notice that
the relation between tones on /a or i/ and their preceding consonants can be described as
follows (I owe this observation to C.-W. Kim):

(15) High-toned suffix vowels are preceded by voiceless stem final consonants or
consonant clusters which end with voiceless consonants: -p- , -ph- , -t- ,
-th- , -s- , -c- , -ch- , -k- , -sk- , -rk- , -rh-.

(16) Low-toned stem final vowels are preceded by voiced stem consonants such as
-β- , -z- , -r- (although some of them are preceded by -h- or -nc/c-).

Note that the tone-affecting consonants ‘precede’ (rather than ‘follow’) the vowels,
and that (15) and (16) corroborate a general correspondence relationship between voicing
of consonants and tone of vowels, i.e. high~voiceless, low~voiced. Lea summarizes the
interesting trend of consonantal effects on intrinsic F₀ (voice fundamental frequency)
of an adjacent vowel as follows:

“Initial and peak F₀ values in vowels are higher when the preceding consonant is
unvoiced than if it is voiced, but are not affected significantly by following con-
sonants.” (Lea 1973:43)

At any rate, mutatis mutandis, the MK case corresponds to the Jingpho case not
reversely but directly as in (15) and (16). However, two problems remain. First, there
are two MK Class 1b stems whose last consonant is c: àc~á/ànc~-́- ‘sit’, yàcì/yàncì-́- ‘place
K.-M. Lee (1964) has shown that the forms \( \acute{\text{ac} \text{i}} \) and \( \dot{\text{y} \text{ac} \text{i}} \) are older than the forms with nasal insertion. Therefore, it is difficult to claim that these two stems originally have voiced consonants which might explain why their following vowels are low-toned. In addition, there are two Class 1a stems which also end in \( e \), such as \( k\text{c} \text{c} \) ‘insert’ and \( n\text{c} \text{c} \) ‘be late’, although these Class 1a stems do not alternate with \( -\text{nc} \).

To differentiate \( e \)-final stems in Class 1b from those in 1a, only the inserted \( -n\) (which is quite sporadic and unpredictable, cf. Ramsey 1975:69-70) can be pointed out as a distinction of two Class 1b stems. Thus, this distinction is still significant, although \( -n \) is an epenthesis element, and this later insertion of \( -n \) might cause a deviation of Class 1b stem from Class 1b stem among \( e \)-final stems. That is, one may still attribute the reason that \( \acute{\text{ac} \text{i}} \) and \( \dot{\text{y} \text{ac} \text{i}} \) have low tone on the last vowel to the preceding voiced consonant: \( -n\).

The second problem is that there are many Class 1b stems whose last consonant is \( -h \) and these contrast with Class 1a stems such as \( \text{arh} \) ‘suffer’, \( \text{irh} \) ‘lose’, \( \text{kaph} \) ‘repay’, \( \text{ny\text{gh}h} \) ‘be shallow’, and \( \text{c\text{gh}ch} \) ‘chase’. Notice here that \( h \)-final stems in Class 1b have single \( h \) whereas those in Class 1a contain clusters ending in \( h \). Probably this difference may serve as a clue to explain why stems with single \( -h \) are grouped together with stems ending in voiced consonants such as \( -\beta \), \( -z \), and \( -r \) as belonging to Class 1b.

In fact, when there is \( g \) in a given sound system, it is common that \( h \) is grouped together with voiced consonants and \( g \) with voiceless as in (11). In Old Vietnamese for example low pitch and voicedness are associated with \( -g \) while high pitch and voicelessness are associated with \( -\text{g} \) (Matisoff 1973a:74-77).

Besides the final-based case discussed so far, there is another remarkable case in MK pointing to a tonal correspondence based on initial consonants. It comes from a very interesting observation made by Chêng (1963) as follows:

(17) The basic tone of some vowel stems which begin with aspirated consonants (\( \text{ph} \), \( \text{th} \), \( \text{ch} \), \( \text{kh} \)) is high.

Reviewing the African languages, Hyman and Schuh (1972, 1974) propose a phonetic hierarchy among consonants in terms of their tone lowering or tone raising effect. Tentatively they suggest something like the following (cf. also Greenberg 1970).

(18) Tone raising

\[
\begin{array}{c}
\text{implosive} \\
\text{voiceless aspirated} \\
\text{voiceless unaspirated} \\
\text{sonorants} \\
\text{voiced obstruents} \\
\text{breathy voice}
\end{array}
\]

Gandour (1974:112) also reports on the basis of Siamese that the fall in pitch after voiceless unaspirated stops is greater than after the ‘plain’ (i.e. voiceless) aspirated
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stops. So he expects the latter to have a greater tone raising effect than the former.

Indeed, the vowels following ‘heavily aspirated’ initials (i.e., ph, th, kh, ch) in MK are quite systematically associated with high tones as in (19), cf. Ch'ong (1973).


This initial case in MK is consistent with the general phonetic hierarchy as in (18).

In addition, one has to check whether or not the vowels following (a) ‘unaspirated’ (i.e., pp, tt, kk, ss, hh) and (b) ‘slightly aspirated’ (i.e., p, t, k, c, s, h) initials may also have high tones. Unfortunately, there are innumerable such examples: (a) ssi- ‘write, wear’, ssá- ‘be cheap’, pca- ‘weave’; (b) kAr- ‘grind’, sám- ‘hide’, etc. Yet the fact stated in (17) is remarkable enough to attach significance to the initial consonants.

However, the case of the finals in MK is very problematic in terms of its reverse correspondence between voiced vs. voiceless and low vs. high tone as discussed earlier. Maran (1973) maintains that there is not a tonal system in Tibeto-Burman which depends entirely on the initial-based mechanism to acquire and develop its tones. On the contrary, Maran insists that the beginning step must be performed by the final based mechanism.

The aim of this section is not so much to offer a solution as to delineate the issues concerning the genesis of Korean tone and suggest some ways to approach them. I have simply speculated on some typological similarity between MK and other tonal languages without attempting to make any genealogical hypothesis to connect Proto-Korean to any of the Southeast Asian languages.

As discussed in S.-O. Lee (1978), I postulate that the prosodic phase in MK is intermediate between two different types: (1) Japanese (pitch-accent language) and (2) Chinese (true tone language). In my remarks on the ‘Chinese connection’ (sec. 1), although I did not fully accept the “areal diffusion” hypothesis which sometimes implies an overall borrowing of the tonal system, I did leave open the possibility that Korean still owe Chinese a sort of impetus for the development of its own tonal system(cf. note 4). To this extent, Chinese, which belongs to the Sino-Tibetan languages together with Jingpho, may have some relevance for Korean. As for Jingpho, I do not imply any impetus or contact with respect to Korean, but rather accidental similarity in a typological sense.

It is probably too early to say that Korean tones have developed from segmental features and have experienced a sort of ‘flip-flop’ in order to explain a reverse corre-

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10 Maddieson (1974, 1977) raises counterexamples from many languages against the claim that “consonants affect tone, but tone does not affect consonants.” In fact, according to him, tones can also affect consonants, i.e. segment.
spondence between tone and consonant types in general typology of tone. Further studies are needed.

3.2 Other types

Besides the case of tonogenesis from segments as in the southeast Asian languages, in fact there are other ways in which tone, especially contour tone, can arise as informed me by Hans Henrich Hock. (i) The tonal contrasts of Norwegian and Swedish result from different syllable configurations in terms of whether or not an unstressed syllable following the stressed syllable was lost: \( \text{VCV} \rightarrow \text{VCP} \). (ii) Also the contour tones of Greek and Sanskrit originate from the result of contractions or loss of syllabic: Gk. \( \text{EE} \rightarrow \text{E} \), \( \text{EE} \rightarrow \text{E} \); late and post Rig-Vedic Skr. \([\text{i}a] \rightarrow [\text{ya}]\). There are, thus, a number of other possible sources for contour tone. However, this statement presupposes that there were already simple (level) tones in the given languages.

Since the distribution in (2) and (3) is contrary to what one usually expects in terms of the voicing of the final consonants, there might be a possible, partial, explanation to this reverse correspondence in connection with (i) mentioned above. A potential source for the low-high sequences of (3) can be outlined as follows.

(a) Stems in voiceless obstruent final were originally not followed by a vowel, but stems in voiced final were followed by a vowel. The similar claim was already made by Chŏng (1963). Extending his claim, one can suggest that the stems ending in \(-m, -n, -r, -p/\beta, -z/z, -t/r,\) and \(-y\) as in (9) were originally bisyllabic (i.e. another vowel follows after these consonants) but this vowel in the second syllable was dropped some time before MK. Thus, (9) shows the forms in MK which do not retain the second vowels but only their high tones because tone on the last vowels tends to remain and constitutes rising tones on the first vowels. (cf. ‘tonal stability’ in S.-O. Lee 1978, especially sec. 5.1). Note that there might be a certain relevance between the fact that these stem final vowels (or post-stem vowels) were mostly high pitched and Poppe’s postulation of high pitch on the last syllable in the Proto-Altaic tone system in sec. 2.

(b) According to Chŏng (1963), the examples in (5) and (8) are stems which might also be originally bisyllabic but the second vowels are not high but low-toned, and after the second vowels drop their tones are probably collapsed to the single low-tone on the first vowel constituting a sequence of two low tones at first and then a single low tone at last. A similar statement can be made for (14) which is suggested by Ramsey (1975). Notice the fact that some stems end in the voiced fricatives \(-\beta,-\zeta\) as in (5), (14) as well as (9) is usually the result of an earlier process of medial weakening. (The alternations between \(-\beta\) and \(-\phi\) and between \(-\zeta\) and \(-\zeta\) are quite common and attested in Korean.)

(c) Upon the loss (syncope) of the stem-final vowel (with high pitch) before a
suffix, the preceding syllable of the stems with the voiced fricatives which was previously low-pitched becomes long with a low-high sequence:

\[ \text{CV} \rightarrow \text{CV} \rightarrow \text{CV} \rightarrow \text{CV} \rightarrow \text{CV} \rightarrow \text{CV} \]

MK examples are in (9). Note that there are similar developments in Serbo-Croatian (cf. Becker, 1977a), Lithuanian, and common Slavic, as well as no doubt in the Norwegian and Swedish case mentioned in (i) above.

(d) Besides the stems with the voiced fricatives, there occurs subsequent generalization of low-high to all stems in voiced final consonant. Notice that this historical development of a rising tone bears a close parallel to the synchronic rule which produces a rising tone in MK (S.-O. Lee 1978). Therefore, this similarity helps to establish the argument outlined above.

The hypothetical development proposed above is probably a minor source of producing a low-high sequence. Another possible source of a low-high sequence is the glide formation or contraction mentioned in (ii) as in Sanskrit and Greek.

As shown in S.-O. Lee (1978, sec. 5.1), there are many cases of desyllabication across morpheme boundaries in MK.

(20) a. /tʌri/ ‘bridge’ + /i/ (nom.) → /tʌri-i/ → [tʌri(:)y] → [tʌri(:)]
    b. /ki/ ‘he, it’ + /i/ (nom.) → /kɪ-i/ → [kɪ(:)y]
    c. /nة/ ‘you’ + /i/ (nom.) → /nة-i/ → [nة(:)y]
    d. /nةhiy/ ‘you’ (pl.) + /i/ (nom.) → /nةhi-i/ (y-drop) → [nةhi(:)y]
(21) a. /mовыа/ ‘first’ + /i.си.и/ (copula, etc.) →
    /mовыа-i.си.и/ → [mовыа(:)ysini]
    b. /нуи)/ ‘sister’ + /i.ра/ (copula, etc.) →
    /нуи-i.ра/ (y-drop) → [нуи(:)yra]
    c. /матая/ ‘joint’ + /i.my/ (copula, etc.) →
    /мата-i.my/ (y-drop) → [мата(:)ymy]
(22) a. /ti/ ‘fall’ + /fi/ (caus.) → /ti.i/ (fi-drop) → [ti:y] or [ti:] ‘let fall’
    b. /hа/ ‘do’ + /fi/ (caus.) → /hа.i/ (fi-drop) → [hа(:)y] ‘let do’
    c. /pо/ ‘see’ + /fi/ (caus.) → /pо.i/ (fi-drop) → [pо:y] ‘let see’
    d. /на/ ‘produce’ + /fi/ (caus.) → /на.i/ (fi-drop) → [на:y] ‘give birth to’
(23) a. /kahi/ ‘dog’ → /kаi/ (fi-drop) → [kа:y]
    b. /мактаи/ ‘stick’ → /мактаи/ (fi-drop) → [макта(:)y]
    c. /nүри/ ‘generation, world’ → /nүи/ (r-drop) → [nүи(:)y]

It is necessary to formulate a Glide Formation Rule by which [+syl] + [+syl] results in \( \text{V} \rightarrow \text{V} \). Note that pitch assignment historically and synchronically preceded the
syllabicity rule, i.e. glide formation. Then, after glide formation, the first vowel (originally \( \tilde{V} \)) receives a rising tone. Another possible source of a low-high sequence is as follows.

\[
\begin{align*}
(24) &\quad a. [\text{cũri. tā}] \sim [\text{cũ:ri. tā}] \quad \text{‘starve’} \\
&\quad b. [\text{tũrh}] \sim [\text{tũ:rh}] \quad \text{‘two’} \\
&\quad c. [\text{nũ}] \quad \text{‘who’} + [\text{i.r}] \quad (\text{acc.}) \rightarrow [\text{nũ(:)}r] \quad \text{‘whom’} \\
&\quad d. [\text{nã}] \quad \text{‘I’} + [\text{i.r}] \quad (\text{acc.}) \rightarrow [\text{nã:r}] \quad \text{‘me’}
\end{align*}
\]

Here again we need a vowel deletion rule (or contraction): \( \tilde{V} \tilde{V} \) results in \( \tilde{V} \). As a matter of fact, one could then state that some MK rising tones results from the contraction or “glide-reduction” of vowels in hiatus which were originally differently pitched. Here again, pitch assignment was historically and synchronically prior to contraction. As Ch'ŏng (1976:147) mentions, the origin of MK tone (or pitch) can be traced back to a quite earlier period because tones assigned to the lost second syllable should exist up until the occurrence of desyllabication, contraction, or syncope.

Based on the statements as above, Hans H. Hock has suggested to me to hypothesize further that Proto-Korean probably had a pitch-accent system. As I discussed in S.-O. Lee (1978) sec. 5.2, MK had the stage of a pitch-accent system like Japanese (but this system is not borrowed from Japanese), and, as mentioned in sec. 2, the quotations from Hattori and Street suggest that Proto-Altaic might have had a pitch-accent system. By all accounts, Korean belongs to the Altaic language family, and, if Japanese is also a member of this family, it is quite encouraging to surmise the above hypothesis. However, I would like to be cautious in establishing a sort of the ‘Altaic Connection’ for MK tonogenesis, since more convincing studies in the Altaic linguistics have to be done. I simply speculate on this possibility while looking forward to upcoming fruitful studies.

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