179. *Physico-phonetical Studies of the Mongolian Language.*¹⁾

By Jūichi OBATA and Takehiko TESIMA.

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Notwithstanding the geographical contiguity of Mongolia to China, the language of the former country is known to resemble Japanese more than Chinese. The present authors, after having studied the physico-phonetical properties of the Korean and Chinese languages, extended their investigations to the Mongolian language.

Like most Orientals, Mongolians write vertically, but, contrary to the Japanese and Chinese, from left to right. In modern Mongolian, the spoken language is totally different from the written, and the present investigation concerns only the Mongolian that is spoken in the district near Hulun-Buir, or Kulun-Buir (呼蘭貝爾), in Outer Mongolia.

In these investigations we had the kind participation of three Mongolian students, who spoke twenty-one words, containing all the vowels and consonants in the language, the sound of which were recorded by means of a condenser microphone and an oscillograph, and the analyses were made on the records, the necessary correction for the microphone-characteristic being applied.

The Mongolian language consists of twenty consonants and seven vowels as follows:—Masculine vowels *a*, *o*, *u*; Neuter vowel *i*; Feminine vowels *e*, *ö*, *ü*. Of these vowels, *e*, in beginning or ending a word, often changes to *ö* or *ü*, and *ö* likewise to *ü*, and since, for this reason, the pronunciation of *ö* is somewhat uncertain, this vowel was excluded from our present investigations.

General Nature of the Language. A mere inspection of the sound-records shows the following characteristics with respect to the language:

(a) Generally, if the first vowel of a word is strongly pronounced, very little stress is laid on the next vowel, it often being pronounced so lightly as to almost disappear. For example, the words “modo” (tree) and “üsü” (hair) are often pronounced or recorded as *modo* and *üsü*, respectively, while “lama” (lama priest) and “batu” (hard) often

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become *lam* and *bat*. Strong accents like these in the intensity also accompany the pitch-accent, the pitch difference often exceeding the fourth; thus forming an interesting contrast with the very weak accent (in pitch only) in Standard Japanese.

(b) In contrast to the foregoing—the final vowel of a word is very weakly pronounced, or even disappears—words like “*üher*” (ox) and “*nühüs*” (friends) are often pronounced *üherü* (or *üheru*) and *nühüsü* (or *nühüsü*), respectively. This seems to be the result of the general rule that in Mongolian a consonant accompanies a vowel.

(c) As regards the consonants the most remarkable feature is that such voiced-consonants as *d* and *g* in the words “*gotol*” (shoe) and “*daisun*” (enemy), which in other languages are pronounced hard, are in Mongolian pronounced very lightly. These characteristics of the Mongolian consonants seem to have already been noticed by Ramstedt and Rudnieff.

Vowels. About one hundred records of vowels were analysed and estimates made of the characteristic-frequency-regions (Formanten in German)

Fig. 1. Characteristic frequency regions of the Mongolian vowels (male voice).

of the vowels. The results are shown in Fig. 1 and their characteristics will be briefly given.

(1) *a*. In Mongolian, the vowel *a* is generally pronounced very distinctly compared with the other vowels. The tone-colour of the Mongolian *a*, like those of Japanese and Korean, differs somewhat compared with that of the English *a* in "father," resembling rather the German *a*.

(2) *o*. The Mongolian *o* is a sound closely resembling the Japanese *o*, and is not an intermediate sound between *a* and *o*, like the Korean *ö* or Chinese *ê*, the tone-colours of which have been described in previous papers.

g (γ) in "gotol" (a shoe)

g' in "g'arak" (a week)

j in "jang-datgal" (custom)

y in "yasu" (bone)

Fig. 2. Mongolian consonants.

(3) *ü*. An intermediate sound between *u* and *i* exists both in Korean and in Chinese. The Korean *eu*, which is a sound resembling the German *u*-umlaut, having a tone-colour near that of *i*, while the Chinese *ü* is quite distinct from *i*. On the other hand, the Mongolian *ü* is an entirely different sound from these intermediate sounds between *u* and *i*. The very high-pitched Formant near 3000 hertz, which is a characteristic of the vowels of the family of *i*, is missing in this vowel, with the result that it is nothing but a sound that is hardly distinguishable from *u*. It may therefore be said that the use of the letter *ü* in expressing this Mongolian vowel is liable to cause misunderstandings.

Generally speaking, with the exception of *ü*, all the Mongolian vowels are quite similar to those of the five Japanese vowels.

Consonants. The subjoined table contains the characteristics of the Mongolian consonants, and in Fig. 2 are reproduced some of their wave-forms.

Consonant	Duration	Approx. pitch
<i>g</i> (γ) as in "gowa" (beautiful), "gotol" (a shoe), etc.	sec 0.025	800
<i>g'</i> as in "garak" (a week)	0.03	1300
<i>t</i> as in "tib" (shoal)	0.028	2700
<i>ch</i> as in "chingga" (solemn)	0.055	3650
<i>h</i> as in "üher" (ox)	0.073	1000
<i>j</i> as in "jang-datgal" (custom)	0.03	3400

It will be seen from the table that in general the duration of the Mongolian consonants is very short, lasting only from 0.03 to 0.08 second.

The Chinese aspirate is usually represented by an inverted comma, as *p'é*, *k'u*, etc. The Mongolian consonant indicated here by *g'* is, however, not an aspirate of *g*, it is a sound used to represent *k* in other languages as well as the Chinese aspirate *k'*. Either *g'* or *g* (γ) in Mongolian is a very short, low-pitched consonant, resembling *k* in English. Further, Fig. 2 reveals the property of the consonant *j* as in "jang-datgal" (custom), which is not a voiced form of *s*, but a high-pitched, voiceless consonant resembling *s*.