

The use of Phonetics in India in the study of Sanskrit and the Vedas was described, and the methods of indicating pitch accent in Sanskrit (Vedic) MSS. were shown. In India at the present moment there is a method of expressing tone while chanting the Vedas by means of physical gestures, and these are worth studying, as a sort of visualized or pantomimic expression of tones. Three tones are recognized in Vedic—the *udātta* or high, the *anudātta* or low, and the *svarita* or combined rise and fall. In one system of tone-gestures, the head is moved up and down in front—it being raised for the high tone, kept in a normal position for the *svarita* tone, and dropped down in front for the low tone. In the second system, the right forearm is raised for the *udātta*, it is dropped down a little above the thigh for the *anudātta* (the Brahman chanting the Veda squatting on the ground), and it is kept in an intermediate position for the *svarita* tone. In the third system, the thumb and the index of the right hand are used for tone-gestures. The fingers are also used in taking count of the notes in singing the Sāma Veda. Slides were projected to illustrate this remarkable system of tone-gestures, which is extremely old.

The second topic discussed was illustrated by photographs of pages of two Chinese-Sanskrit dictionaries of the eighth century A.D., in which the Sanskrit words written in Chinese fashion, with characters from top to bottom, have their pronunciation expressed by means of Chinese characters (with Japanese *kana* transcriptions of the pronunciation also added by a later Japanese editor), and by reproductions of the facsimiles of the seventh-century Sanskrit MSS. preserved in Japan and studied there with transcriptions in Chinese and Japanese *kana* characters as in the edition of F. MAX MÜLLER and B. NANJIO.

The third topic illustrated and explained a number of drawings of the vocal organs depicting articulation of sounds, executed in the traditional style in books on Arabic phonetics which are in use among professional Qur'an chanters in Persia and India.

The fourth topic discussed the use of the Persian script in writing down very carefully words of Hindi in the Braj-bhakha dialect by an Indian Muhammadan writer of the end of the seventeenth century who composed a grammar and poetics and a general literary encyclopaedia of Hindi in the Persian language.

41. Mr J. R. FIRTH (London): *Phonological features of some Indian languages.*

The study of the speech behaviour of man is no simple task. It must be shared by many sciences. Experimental phonetics for example deals with certain aspects of a man's actual utterance. Actual speech events in time can be recorded fairly completely by means of the talking film, less completely by means of the phonographic disc or steel ribbon. The apparatus of experimental phonetics records only certain specific components of the speech act.

Linguistic phonetics and phonology deal with types and classes of events. A transcriptionist makes abstraction of certain features only of typical speech events and records them by means of his letters, the values of which depend on four sets of relations:

(i) The relations of the symbols to the general phonetic categories of sound types and their attributes, categories of similarity and identity, and categories of difference.

(ii) The actual contextual relations in any given transcription.

(iii) The systematic relations between the terms or letters of an alternance.

(iv) The relations between the letters considered as an intra-linguistic schematic notation for the symbolization of any given language material.

Thus the transcriptionist does not record actual speech events in any sense. He picks out certain features of a bit of speech, decides what general pigeon-holes they belong to and writes down the pigeon-hole labels in a certain order, according to certain rules. In such acts of symbolism the particular and general meet, but the record is nevertheless in general terms, all individuality of voice, pronunciation and tone necessarily ignored.

A transcription aims at symbolizing the essentials from the typological point of view. In order to make or use a transcription considerable technical skill is required. To begin with, the whole system of relations above suggested must be fully understood, and the notation correlated with bodily performances. It would be interesting to have a psychologist's analysis of all the skills required for such work.

From a study of speech events then, you build up a generalized transcription, and in the process two sets of relations have especially to be studied:

(1) The relation of the symbolized element, or letter if you like, to the type of context in which it appears, and

(2) The relations of the symbolized element to all other different symbolized elements that may also occur in the given type of context.

Under (1) the types of context in which such letters or symbols will appear can be listed and described. They may be described generally, such as initial, final, intervocalic, or more specifically for example by saying between initial *k* and final *p*, or say in initial position followed by *i*: in a stressed syllable.

It may be practically convenient to think of a language as having a sound system, or phonetic structure as a whole, but this is little more than a sum of all the possible alternances of sounds in all contexts. This is an "all-over" list, and not to be confused for example with a specific context of maximum alternance for a certain class of sound, e.g. the context in which the maximum number of plosives may alternate in English.¹

Let us now apply these principles to Indian languages. From the linguistic behaviour of many typical speakers of Hindi we may

¹ See my article in *English Studies*, February 1935, and also TRUBETZKOY'S *Anleitung*, para. 23, "Stellung der maximalen Phonemunterscheidung".

abstract the five typical articulations of plosives which may be suggested by the symbols: p, t, ʈ, c, k.

These five plosive articulation differences are shared by forty substitution elements in intervocalic position. Using five common plosive articulations the speaker of Hindi multiplies his substitution counters by differences of voice, aspiration and length. The voice difference adds five more terms:

b, d, ɖ, j, g.

The aspiration difference doubles these:

ph, th, etc.

bh, dh, etc.

And the length difference doubles these again, making forty in all.

But it is only in certain general contexts that all forty alternances or substitutions are possible, e.g. medially or intervocalically, so that I should hesitate to make any general statement about the function or value of any one term in the language as a whole apart from a more or less determined context. Whereas ʈ in intervocalic position is one of forty plosive terms in that context, in initial position it is one of twenty.

This use of a substitution element in contradistinction from others of a series I call minor function. The minor function of ʈ in initial position is quite different from its function in intervocalic position. If you like, initial ʈ is a different "phoneme" from intervocalic ʈ, the conventions of position differentiating them in the notation.

Marathi has a maximum number of twenty plosive alternants in initial position followed by *i* or *y*, but of twenty-four if followed by *a*. Certain dialects of Panjabi present a curious variation of this system. In the Gujranwala dialect, before vowels beginning with a low rising tone the plosive alternance is one of five terms only. The five articulation differences are used, but no voice or aspiration differences. Before other tones the five articulation differences are further differentiated by voice and aspiration, and the plosive alternance is constituted by five sets of three of the type p, ph, b—fifteen in all.

The contextual distribution of retroflex sounds in Indian languages is interesting. In Sanskrit languages ʈ, ɖ, ʈh, ɖh may occur in initial, intervocalic and final position, the ʈ as we have seen being one of a twenty-term series of substitution elements in initial position and one of a forty-term series in intervocalic position. Contrast this with Tamil, a Dravidian language. So far as I have been able to ascertain, retroflex sounds do not occur in initial position in pure Tamil words. Initial and final retroflex ʈ occur in a few borrowed words only, so that in Tamil sequences ʈ is not commonly found as a term in inter-word sound junctions. In the common spoken Tamil of Tinnevely you would hear in intervocalic position the following retroflex consonants: ʈ (flapped sort of ɖ), ʈʈ, ɖ (flapped), ɖɖ, ɭ (flapped), ɭɭ, and the mid-palatal frictionless continuant ɻ. The point here is the reason why ʈʈ and ɖɖ sounds like a flapped ɖ are grouped together by the notation ʈʈ and ɖ. There are several reasons for this notation.

First of all because of similarity of articulation, the laterals and nasals being obviously differentiated in pairs by the length difference.

Secondly, because the tense voiceless stop ʈʈ is always longer than the ʈ in similar context.

Thirdly, because the differentiation of tense fairly long voiceless stops and shorter lax homorganic flaps or fricatives only occurs in intervocalic position throughout the language.

Lastly, because such alternances have what I have called major function¹ in cases such as the following:

paʈu = I endure

paʈʈu = enduring

paʈʈeen = I endured

paʈteen = I did not endure

Another kind of major function, lexical function, is illustrated by:

paʈam = a picture

paʈʈam = a kite

Quite similarly with ʈʈ, and ʈ:

maatu = a woman

maattu = change

and c, and cc:

peecu = speak

peeccu = talk

The vowels group themselves in pairs differentiated by length correlation. There is no strain about that in Tamil. Compare

paʈu = to endure

paʈʈu = sing

paʈʈu = enduring

paʈʈʈu = a song

In Tamil, Malayalam and in Telugu the length difference divides the simple vowels in pairs quite clearly.

It is far otherwise with most of the Sanskritic dialects, including Urdu. Gujerati may possibly turn out to be an exception, but I doubt even that. But for Urdu, Hindi, Bengali, Marathi, I doubt very much whether the simple vowel qualities are further divided by the length difference. This is one of the difficulties, not only of phonology but of typography, *i* and *u* being such wretched letters. In Urdu for example between *m* and *l* you have *mil*, *myl*,² *mel*, *mayl*, *mal*, *məl*, *mol*, *mwł*,² *mul*. In this context at any rate I cannot pair them off by the length difference. The alternance is one of quality differences. Now let us take them in major function.

In normal speech *a* in final position is the sign of the masculine, *i*, the feminine, and *e*, the plural. These vowels are not long either actually or relatively: *ata*, *ati*, *ate*, *mera*, *meri*, *mere*.

Again by yet another major function, I see no system of pairing, i.e. in the "passives":

¹ See my article, "Use and Distribution of Certain English Sounds," *English Studies*, February 1935.

² *y* and *w* are more open than *i* and *u* and centralized.

pisna = to grind chedna = to pierce
 pysna = to be ground chydna = to be pierced

Here you will notice two alternances with *y*: *i* and *y*, and *e* and *y*, and just as *y* alternates in this function with both *i* and *e*, so *w* alternates with *u* and *o*:

guthna = to plait
 gwthna = to be plaited
 kholna = to open
 khwlna = to be open
 kaṭna = to cut
 kaṭna = to be cut

Cf. also

I have mentioned the major function of alternances. I suppose in Hindi and Urdu the commonest vowel alternances are those above mentioned, and to them I would add other substitution elements differentiated by nasalization:

ī fem. plural, ē common plural,
 ā in particles, õ dat. plural,
 ū 1st person singular.

There are also other pairs:

ay, aȳ; ə, ẽ.

Other common morphological alternances are the dental *t* and *n* in verbs, e.g. *kərna*, *kərta*, and in initial position in particles *y* and *v*, *j* and *k*.

In the matter of the nasalization difference in vowels, Marathi is a special case. It has nothing like the functional importance of nasalization in Urdu, Hindi or Gujerati.

Nasals and nasalization in the Sanskritic languages raise fundamental questions of phonetic and phonological theory, and also problems for Roman transcription. Let us take Marathi for instance. In initial position only two nasal consonants can be used, *n* and *m*. In final position there is a three-term nasal alternance, but immediately preceding another consonant, especially stops, only one is possible, the nasal homorganic with the following consonant. In these contexts there is no alternance, only a specific and unique nasal, homorganic with the following consonant. Of these I have noted at least eight, alveolar *n* before *ts*, dental *n* before dental *t*, *d*, and similarly retroflex *ṇ*, palato-alveolar nasal, velar nasal, bilabial, labio-dental, and a sort of nasal *ṃ*. In transcription I should use the letter *n* to symbolize the initial *n* used in contradistinction from *m* only, also for the final *n* which functions in a three-term alternance and again for the specific unique homorganic nasal on-glides before *ts*, *t*, *d*, and perhaps even all the rest. But I should not thereby identify all these *n* sounds as linguistically and functionally the same element or unit. Indeed, they cannot be so identified. The homorganic nasal on-glides to the stops could be represented by a separate nasal symbol such as *~*, but that is not really necessary. Surely we are free to use the same letter without being compelled to concoct a rationalized "derivation" from the letter in the shape

of a phoneme theory. Similarity of sound is no safe guide to functional identity, though it may serve as the basis of practical transcription symbols. There are not eight nasal "phonemes" in Marathi. We might possibly say there are three, though I should prefer to say that the sounds we symbolize by *n* and *m*, for example, constitute the total nasal alternance in initial position, but only two out of three terms in final position, whilst they both serve also as unique homorganic on-glides.

The actual mechanism and act of utterance of *n*, for example, in each of the three cases would be different. They would actually be slightly different sounds, and their minor function would also be different. Though writing them with the same symbol on practical phonetic grounds, I should not identify them in any other way. That they are the same "phoneme" is the very last thing I should say. In Tamil in initial position three nasals may alternate, in intervocalic position four, some say five, but there are seven contextually specific nasal on-glides. These are unique terms, and do not function in any alternance. That is to say in the context in which each one occurs the articulation difference does not function. What functions is merely the broad nasalization difference.

There are certain noteworthy phonological differences which function in alternances in certain parts of India only. First of all the characteristic "implosives" of Sindhi and Western Panjabi and certain dialects of Gujerati. There is also the very strongly marked differentiation of unaspirated and aspirated plosives by a parallel and correlated laryngeal difference in Marathi and also in certain Western Panjabi dialects. The voiceless plosives and even affricates are often ejective in Marathi. There is certainly some glottal and perhaps also pharyngeal difference parallel with the aspiration difference in such languages.

Even more interesting is what may be called the phonation difference which I first noticed in the Nowshera Tahsil of the Shahpur district in 1925. I have since noticed a similar phonation difference in Gujerati as spoken by Indians from Surat. This phonation difference separates pairs of words. That is to say it differentiates the terms of an alternance. The vowel qualities thus affected are pronounced (i) with breathy phonation, (ii) with what I have called "tight" phonation. Thus in Surati Gujerati:

Tight phonation	Breathy phonation
kā = why	kāh = where
mel = dirt	mehl = palace
koḍ = longing, desire, zest	koḥḍ = leprosy
kəro = do	kəroh = wall of a house
fer = two pounds weight	fəhr = city
kəyū = which	kəhyū = I said
avū? = shall I come?	ahvū? = like this?

And many others.

Perhaps the most important of all phonological investigations is the study of intonational alternances differentiating otherwise similar

sequences of sounds. For example, the following sequence of sounds and words in Gujerati without intonation means very little. It is neutral:

vandro beṭho che.

But if we consider the following intonation alternances, paying special attention to the intonation difference, we make some sort of translation possible.

vandro beṭho che.

- | | | |
|----|--|-------------|
| 1. | | [statement] |
| | <hr/> <p>The monkey is sitting down.</p> <hr/> | |
| 2. | | [question] |
| | <hr/> <p>Is the monkey sitting down?</p> <hr/> | |
| 3. | | [surprise] |
| | <hr/> <p>Is the monkey sitting down?</p> <hr/> | |
| 4. | | |
| | <hr/> <p>Is it the monkey that is sitting there?</p> <hr/> | |
| 5. | | |
| | <hr/> <p>Is the monkey sitting there?</p> <hr/> | |

The intonation examples just given serve to remind us what a highly abstract proceeding an alphabetic transcription of speech behaviour really is. And it is only by means of a thorough theoretical understanding of the principles and methods of the technique that we can make scientific use of such records.

In conclusion may I say that the features and examples selected for comment are intended to raise questions of general theoretical interest and to establish certain general principles for Indian phonology.

42. Dr T. GRAHAME BAILEY (London): *The four-fold consonant system in Kashmiri.*

[ə is a high unrounded neutral vowel; when used finally without adding a syllable, it is inherent in the previous consonant.

ɜ is a low vowel of the same type, not used finally. w means that the previous consonant is velarized, and y that it is palatalized.]

Anyone seeing Kashmiri (kʌʃmiri) written in Roman letters and noticing the numerous tiny vowels written above the line must wonder what they are and how they are pronounced, and must be bewildered to be told that many of them are inaudible to non-

Kashmiri ears. It reminds us of the high-pitched musical notes which scientists tell us human ears cannot hear, though cats' ears can.

It is about these tiny vowels that I wish to make a few remarks to-day. In some languages the great majority of words have a vocalic ending, in others the last sound is generally consonantal. Italian belongs to the former class, while the closely allied French belongs to the latter. Often the vocalic endings indicate gender and number. Thus, to take Indian languages, in Hindi, Urdu, Panjabi, Lahndi and others, -a is a common masc. sing. ending, changing to -e for the masc. pl., -i for the fem. sing., and -i or -iā for the fem. pl.

Kashmiri, however, prefers consonantal endings. The final vowels have been taken into the last consonant, but whereas in French they do not as a rule affect the final consonant, in Kashmiri the consonant so to speak, absorbs the vowel, and is velarized, palatalized, centralized or left neutral. This at least is the theory. In this way the -a ending just mentioned becomes -u, -e becomes -i, and -i becomes -ə (for the sing.), but the noteworthy point is that these vowels are part of the consonant; they are not separate vowels. Let us take *khur̥s*, *he feared*. In Urdu, if it existed, it would be *khutsa*, *he feared*; *khutse*, *they feared*; *khutsi*, *she feared*; *khutsī*, *they feared* (fem.). In Kashmiri we have *khur̥sw*, *he feared*; *khur̥sy*, *they feared*; *khur̥s*, *she feared*. Similarly *suzw*, *sent*; masc. pl. *suzy*; fem. sing. *suz*. (There are slight vowel changes accompanying the changes in the consonants.)

Let us compare this state of affairs with what we have in English. Our final plosives in English, including affricates, are generally followed by a slight vowel emission, voiced or unvoiced. Our fricatives are often treated in the same way; they may have a vowel inherent in them. Thus our words *world*, *look*, *whiff*, *rove*, to mention only four, end in a short neutral vowel, as most of our words do; the vowel is not always the same. We do not consider that this tiny vowel adds a syllable to the word. In the same way these Kashmiri vowels do not add a syllable, they are part of the consonant.

In English this vowel is generally neutral and has no semantic significance. In exceptional cases we get a velar or palatalized vowel. Thus we may encourage a sawyer by saying *puʃw puʃw*, *puʃw puʃw*, or call a cat by saying either *pusw pusw* or *pusy pusy*. This last is quite different from *pusi* *pusi* *pusi*. Kashmiri theoretically has four of these vowel endings, of which one is more correctly an absence of ending, almost the same as in English. But the Kashmiri endings are semantically significant.

The velar ending is always masc. sing., the palatalized ending is often, but not always, masc. pl. The centralized ending (a tiny ə) is generally fem. sing. The neutral ending, closely resembling the English one, has no significance.

Examples: *phokw*, *shoulder*; pl. *phyeky* (one syllable); *necuvw*, *son*; pl. *necvry* (two syllables), *sons*; abl. sing. *necvri* (three syllables); *gorw*, *horse*; pl. *gury* (one syllable), *horses*; *gori*, abl. sing.; *gorə* (one syllable), *mare*. There is a good deal of vowel and even consonant harmony connected with these endings.