



i- Idiolect C- /buk/ [u] has lip rounding

ii- Idiolect A- /buk/ [u] has much lip rounding.

iii- Idiolect B- /buk/ [u] has too much lip rounding

The gradual tendency for the increase of lip rounding will be as follows:

Idiolect C→A→ B more lip rounding.

It is this tendency for gradual increase in the lip rounding of these different idiolects that determines a correct decision for a precise contrast between these vowels, which is very significant for any work done in contrastive analysis.

#### References:

- 1— Abercrombie, D., (1967) *Element of General Phonetics*'.
- 2— Brosnahan & Malmberg, (1970), *'Introduction to Phonetics*'.
- 3— Daniel Jones, (1909), *Element of General Phonetics*'.
- 4— Daniel Jones, (1950) *'An Autline of English Phonetics*'.
- 5— Gimson, A.C. (1962) *'An Introduction to the Pronunciation of English*'.
- 6— Lado, R. (1957), *'Linguistic, Across Culture*'.
- 7— Pike, K.L. (1943), *'Phonetics*'.
- 8— IPA, (1949), *'The Principles of the International Phonetic Association*.

e.g., idiolectal difference in pronouncing the word /buk/

- i- Idiolect -A- /buk/=[buk]=rounded [u] .
- ii- Idiolect -B- /buk/=[buk]=rounded [u] .
- iii- Idiolect -C- /buk/=[buck]=less rounded [u]

In fact, Jone's CVs. technique will varify two vowel qualities regarding place and manner only. There will be no indication for the amount of lip rounding accompanying the production of these different idiolects, except by the use of the adjectives 'rounded,' 'unrounded' or the use of additional diacritic to indicate rounded/unrounded quality.

On the other hand, the suggested technique will identify a degree of variation of lip rounding marked on the third dimension. The measurement of the vowel position on this axis is read as an accurate amount of lip rounding quality of that vowel.

Secondly, diacritics are used in general to indicate variation of vowel quality. But , in the field of contrastive analysis, diacritics may blur the degree of difference, because a diacritic is an indication of the existance and non-existance of certain vowel quality.

For instance, the lip rounding of the same /u/ vowels mentioned before can be read as follows:

- i- Idiolect A- /buk/ [U] no lip rounding.
- ii- Idiolect B- /buk/ [Uɔ] with lip rounding.
- iii- Idiolect C- /buk/ [Uc] (8) with less lip rounding.

The above mentioned information of vowel quality reveals the distinction between idiolect -A- without lip rounding as against idiolect -B- and -C- with lip rounding without any indication of the degree of lip rounding so as to varify their contrast. It is obvious now that the use of th diacritics has blurred the degree of contrast between these vowels. This sort of inadequacy might cause a lot of confusion in any work done in the field of contrastive analysis, whereas the use of three dimensional technique is far better by achieving a greater degree of accuracy in the identification of these vowels. i.e.,

---

(8) *The diacritic [c] is used for less lip rounding and [ɔ] for more lip rounding- see the IPA. ( 1949 ) . P. 16.*

i- CVs. [i,y] are not identical. Vowel [i] has no lip rounding, while vowel [y] has.

ii- The amount of lip rounding accompanying any vowel is proportionally relevant to the measuring of its position on the third axis. e.g. CV. [y] has more lip rounding than that of [ø] or [œ].

iii- The difference between the quality of CV. [a] and [æ] is very slight that it will be very difficult, if not impossible, to perceive it, because their position on the diagram is very close to each other.

iv- Although diagram -B- marks gradual increase in the amount of lip rounding quality as one moves in his reading of the diagram from the bottom to the top. Yet, this, in fact, is not always applicable. Only the reading of these vowels accompanied with lip rounding modification is applicable to this generalization, while others are not. e.g.,

Reading a. [OE→œ→ø→y] Generally gradual increase is present.

Reading b. [a→æ→e→i] Generally no gradual increase is present and better said no lip rounding at all.

## Conclusion

Finally, we can conclude to confirm the validity of this work by stating its applicability to the work of phonetics, phonemics and contrastive phonetics. Firstly, the degree of accuracy achieved in describing any vowel quality will determine a decision for a tendency of gradual increase or decrease in any quality marked on every axis. And by relating these variations of quality to the CVs. vowel quality as a reference, a decision for the degree of variations within any of the axes is established, to identifying an area on the diagram for both phonetic and phonemic relevances, which, is essentially significant for contrastive phonetics.

For example, gradual variations of this sort will provide a better degree of differences between different pronunciations of one vowel varied by idiolectal and dialectal variations. These variations are basically important when they are used in contrastive analysis. (7)

---

(7) See Lado, *Linguistics Across Culture*, 1957; pp. 9-50.

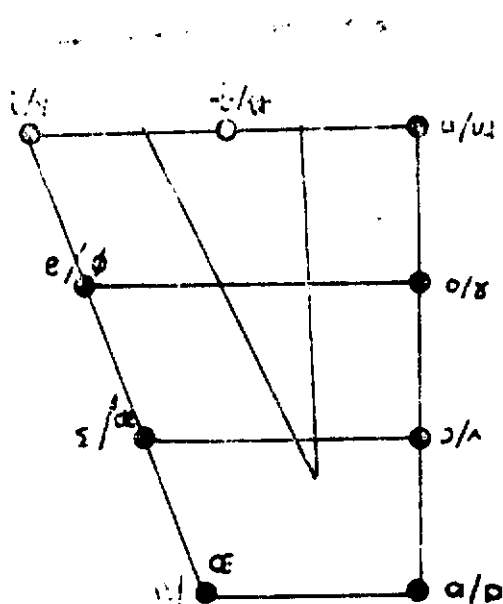


Diagram -A-

D. Jones's Cardinal vowels

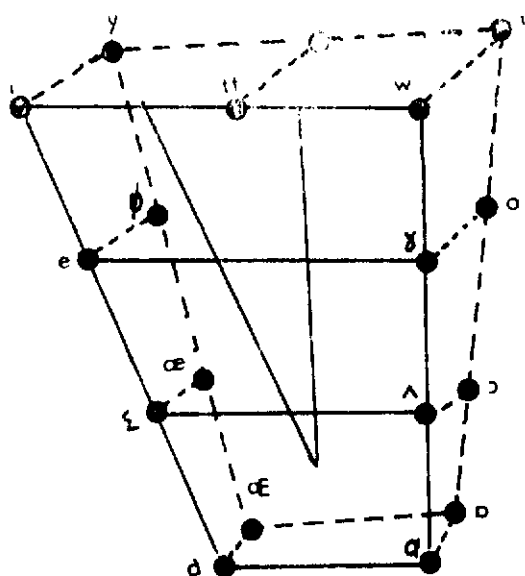


Diagram -B-

The suggested three

Dimensional Convention

Whereas Jones's CVs. diagram fails to illustrate the effect of lip rounding quality on the position of both primary and secondary CVs. the new . integrated three dimensional technique will easily varify between the posi- tions of these vowels not only to mark the presence and absence of this queity but to indicate its ammount on a third axis semi-detached to what is already known to us as Jones's CVs., two dimensional, diagram -A-.

The reading of the new diagram -B- will help to identify an additional vowel quality-Lip-rounding. The measuring of the distance separating the position of any vowel on the third axis from the other two axes is an accurate reading to the ammount of lip rounding accompanying the articulation of that vowel.

For example, a correct reading to the diagram -B- will reveal the following phonetic facts.

### **A Suggestion for a Three Dimensional Convention:**

Daniel Jones was successful in establishing this geometric scale to illustrate on paper the position of the highest point of the tongue only in vowel production corresponding to its position inside the mouth. Now, it is suggested here that a third dimension is to be added to this geometric scale so as to get full use of all its ranges. An integrated scale of three-dimensions can achieve even greater accuracy in describing vowel quality.

To arrange all the variables underlying the auditory features of a vowel on a scale at one time is extremely difficult if not impossible. Hence, all these auditory features have to be arranged according to their role in identifying vowels. Following Jones convention of marking a vowel quality on two dimensions, the following arrangement is made:

- i— front/ back
- ii— close / open
- iii— rounded / unrounded
- iv— Lax / tense
- v— ( long/short)
- vi- nasalization/non-nasalization
- vii- retroflexed / non retroflexed

Thus, the possibility is still existing to identify a further third variable of a vowel quality selected from the other remaining unmarked variables from the list above. An additional vowel quality can simultaneously be marked on a third dimension to add a greater degree of accuracy to the description of vowels by extending the two dimensional limit of the Cardinal Vowels technique.

Thereupon, the suggested integrated technique will mark a clear contrast between the positions of the primary and secondary CVs...to which D. Jones's two dimensional convention is rather unsuccessful.

Jones's convention allocates only one identical position for both the primary and secondary CVs. The following diagrams will reveal this contrast.

which is acoustically described by the formants. (5) A spectrographic display of a vowel sound may show three or more different formants. The first of these formants is referred to as the input of the voice quality or the fundamental frequency. The other formants are the output of this fundamental frequency modified by a final process of resonance taking place within the pharyngeal, oral and nasal cavities.

The passage leading from the larynx to the beginning of nasal and oral cavities is like a tube functioning as a link and causing cavity resonance. It is possible for this tube to produce frictional noise when the narrowing of the stricture, made by an extreme retraction of the root of the tongue, is close enough to produce friction perceived as higher than the voice quality of a vowel changing the vowel to a fricative. The nasal cavities are responsible for nasalization added to the vowel quality whenever the velum is lowered allowing some of the pulmonic air to diverge through the nasal

cavities, e.g., the following vowels are nasalized vowels.  $\overline{/a/}$ ,  $\overline{/e/}$ ,  $\overline{/u/}$ ..etc

The oral cavity may be further divided into two different cavities: the buccal cavity and the labial cavity. The former is responsible for several aspects of vowel quality i, e; back/front/close/open, lax / tense, (long/short) and retroflexed/non-retroflexed. The latter is only responsible for rounded/unrounded quality.

**Cardinal Vowels :** Where as it is rather easy to make a valid acoustic description of a vowel quality by using instruments, it is difficult, yet still possible, to describe a vowel quality (on the basis of articulatory data supported by x-ray tracings and impressionistic judgements) by relating the unknown vowel to the already known one. This solution to the difficulty was advanced by Daniel Jones, when he established the set of Cardinal Vowels. (6) The Cardinal Vowels system is an equi-measured scale of eight different points of reference to which other vowels can be related describing them in two dimensions:

- 1— A dimension of close/open quality.
- 2— A dimension of front/back quality.

---

(5)- *Brasnuhan and Malmberg*, 1970 p.37, and *Pike*, 1947. pp. 67-69.

(6) - See *Daniel Jones, Cardinal Vowels* 1914, pp. 18-22.

Voiced vowels have no local strictures producing local friction which can be heard as a noise above the glottal tone.

Cavity resonance affects the quality of these sounds without adding audible friction to them. In voiceless sounds the difference is still present, but it is not so marked and the borderline is not clear cut. Hence it is difficult to perceive a voiceless vowel without the addition of local friction. The following will illustrate the difference.

VOICE GLOTTAL TONE	LOCAL FRICTION AUDIBLE	CAVITY RESONANCE AFFECTS THE QUALITY	SOUND & SYMBOL
+	+	+	Voiced friction /k/
+	+	—	voiced fricative /z/
—	+	—	voiceless fricative /s/
+	—	+	voiced vowel /U/
—	—	+	voiceless vowel /ə/
—	+	+	whispered vowel /h/

#### Voiced Vowels and their Description :

In the case of voiced vowels, it is clear that part of the vowel quality is contributed by the larynx itself. Instrumental phonetics provides us with the techniques with which spectrographic displays of voiced vowels are obtained.

It is not so difficult to determine the rate of the vibration of the vocal cords, responsible for or accompanying different vowel sounds, by mathematical calculations. The fundamental frequency of any vowel is read in the value of cycles per second (cps.) or hertz (hz)—as the unit of frequency of periodic phenomena equal to one cycle per second.

It appears also that the same techniques can be used to determine the final, complex quality of a vowel, resulting from the line of filtering within the supra-glottal vocal tract. This sort of phonetic process is called resonance.



## VOWEL QUALITY AND A SUGGESTION FOR THREE DIMENSIONAL CONVENTION OF IDENTIFICATION

By

LASIM M. AWANESS

Dept. of European Languages

### Introduction :

Work on the area of vowels is generally related to the following concept; 'a glottal tone modified by the action of the upper resonators of the mouth, pharyngeal and nasal cavities.' (1) This concept usually underlies basic vowel quality. The glottal tone is that of phonation. Voice is produced as the vocal cords are set into vibration, that is into steady repetition of opening and closing movements. The rate of vibration determines the fundamental frequency of the glottal tone (2)

### Kinds of vowels

Yet not all vowels are voiced. Voiceless, whispered, breathy and creaky vowels may exist within the pronunciation of some languages. In English for examples, the first vowel of the word *potato* is sometimes pronounced as voiceless vowel (3) [ə] in [p ə 'teitəu].

A combination of whispered and voiceless vowels may also occur. In English too, [h] can be regarded as a voiceless vowel plus whisper and [ʌ] is regarded as voiced vowel plus whisper when the latter occurs in intervocalic position, e.g. [ʌ] in [bə 'ʌɪnd].

Other sorts of vowels are made equally with other air stream mechanisms when the tongue occupies a vowel position. But, some of these vowels are difficult to perceive and others are inaudible, because firstly, the air stream is short and weak. Secondly, there are two types of friction: local friction and cavity friction. (4)

---

1— Gimson, *The Vowel Type* 1970, second edition p. 35

1— Brosnahan and Malmberg, *The Larynx and the Glottis* 1970 pp. 31-39.

3— Abercrombie, *Voiceless Vowels* 1967 pp. 58-59.

4— See Pike, *chp. V. Classification Criteria* 1947 pp. 71-73. As he mentions local friction, referring to noise, cavity friction, referring to resonance.