do not embody the sounds which occur in human speech, and that the stops p b, t d, k g are generally among the earliest acquired by the child.

§ 22. It would perhaps be not regarded as too wild a speculation to suggest that since the beginning of human speech, the following line of evolution has characterised the history of its sounds, particularly during the last 5,000 years :

(i) A general fronting of pronunciation, from the back to the front palate, leading to the restriction of the gutturals and evolution of the palatals — of affricates and sibilants of this class particularly.

(ii) Evolution of spirants or open consonants of all sorts, including sibilants (excluding laryngal ones, which appear to be primitive sounds).

(iii) Simplification of double-gest sounds like kp, gb, which either were modified into kw, gw, or were split up into k, p, g, b.

(iv) Loss of clicks as speech sounds (clicks survive only as interjectional expressions in most speeches).

(v) Extension of vocalism from the guttural or back vowels (open and rounded) to frontal and central ones, and the development of „abnormal" vowels.

(vi) Devoicing of voiced stops.

(vii) Phonetic decay leading to the rise of word-tones.

(viii) Development of sentence intonation, with restriction of gesture and pantomime as accompaniment of speech.

51. Dr. P. DE V. PIENAAR (Johannesburg) : *Click formation and distribution.*

*Formation*

In dealing with the click sounds of the click speaking races of Southern Africa one has to bear in mind that the so called clicks really are compound phonemes, which consist of one or more acoustically different speech-sounds which have to be evaluated monophonematically. The first part of the phoneme is the suction release proper, whereas the second part may be of various acoustic qualities other than suction release noises.

This suction-release noise is generally known as the click sound and because of its independence of the breath stream these clicks-proper are grouped with the implosives of some African languages as rarefícatives, since the acoustic result of these two classes of speech-sounds is brought about by a rarefaction of air in an enclosed space and a subsequent release when air rushes into the partial vacuum causing :



(*a*) a surging of elastic air and the setting up of pressure waves (as, for example, with pre-palatal clicks) and/or,

(*b*) a friction noise as the release takes place slowly and air is drawn in to fill the partial vacuum (as e. g. with the dental click).

(i) In the case of the clicks the partial vacuum is created in the oral cavity, by shutting off the oral from the pharyngal cavity with a back of tongue plus velar closure, and, as regards the tip or blade lingual clicks, by closing the edge of the tongue against the upper molars, the tip or the blade being against some part of the alveolus or the palatum durum. Rarefaction is produced by drawing down the centre of the tongue by the action of the genioglossus, the vertical and the superior longitudinal muscles of the tongue. The release in front of the velar closure may take place medial-orally or lateral-orally. In the case of the bi-labial or labio-dental clicks the rarefaction of the cavity which has bi-labial or labio-dental, cheek, and back of tongue plus velum boundaries, is also brought about by a downward movement of the body of the tongue.

(ii) As for the implosives, the rarefaction occurs between a glottal closure, a velum plus pharynx closure and a closure somewhere in the oral cavity. The vacuum is created by a movement of tongue, pharyngal musculature and velum : with individual speakers the larynx as a whole may move downwards. Since with the implosives the supra-glottal cavity has a greater volume than is found where click rarefaction occurs, it follows that the acoustic result on the forward release will differ markedly from that obtained from a click.

*Acoustic Result of the Forward Release*

The click is usually named after the place where the forward release, resulting in the suction noise, occurs. The following types have been found and accurately described :

(i) Bi-Labial, or as variant } Both with a medial-oral release,
(ii) Labio-Dental } which has a fricative character.

Last-named is really infra-labio - supra-dental, and the lower lip may close against the gums of the upper teeth on the inside.

(iii) Interdental, with medial-oral release : the tongue-tip comes between the teeth and the blade closes against the upper gums. This is a variant of (iv).

(iv) Dental, with medial oral release. The tongue tip-blade touches against the upper gums and both (iii) and (iv) have a release of a fricative character.

(v) Alveolar, with medial-oral release. The blade of the tongue touches against the alveolus : the tongue is flattened and the

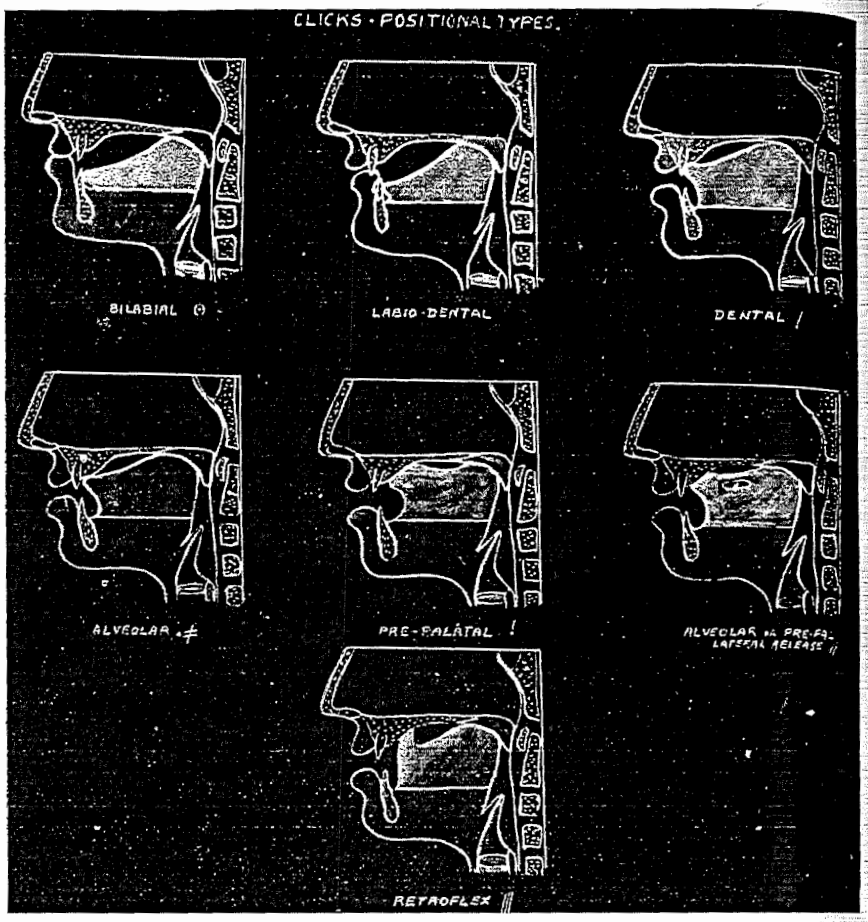


Fig. 1.

closure not too firm, but the area of the palate covered by the tongue is larger than with any of the other positional types. The release is of a plosive nature.

(vi) Prepalatal, with a medial-oral release. The blade-front touches against the prepalatal division of the hard palate, the tip pointing downwards. On the release, which has a plosive character, the blade-front may move back and downwards so energetically that it flaps down on the floor of the mouth.

(vii) Alveolar or prepalatal closure as described in (v) and (vi) but the release is lateral-oral on one or both sides of the tongue where closed against the gums of the upper molars.



The acoustic result of the release may vary between plosive and fricative character.

(viii) Retroflex, with a medial-oral release. The tongue-tip is curled back against the hard palate so that its underside touches the palate. On the release the tip moves back along the palate and a fricative-scrape acoustic noise results.

*The other members of the click compound*

Each of the six types of clicks, giving six distinct acoustic resultants, (*a*) may be followed by the following ways in which velar closure can be released, or (*b*) may be accompanied by acoustic phenomena produced behind the velum. (Note that the speakers of the language regard both the forward and the velar releases or the post-velar accompaniments as forming one phonemic unit.)

(*a*) Passage to nose closed. For a vowel to follow the click, the back of tongue-velar closure must be released. Result :

(i) a velar voiceless tenuis plosive (cf. Kymograph tracing No. I) ;

(ii) a velar voiceless media-plosive (cf. Kymograph tracing No. VI) ;

(iii) a velar voiced (media) plosive. Here the phonoposotia may show values varying between 5 and 10 (cf. Kymograph tracings No. IV and V) ;

(iv) a velar voiceless aspirated plosive (cf. Kymograph tracing No. II) ;

(v) a velar voiceless affricate : plosive (cf. Kymograph tracing No. III) followed by homorganic fricative.

(*b*) Passage to the nose is closed. The glottis is open for glottal fricative *h*, the velum is released silently and glottal fricative then follows. The reason why the tongue-velar release is silent, is that for glottal fricative the vocal folds approach one another so closely that the outflow of breath is markedly retarded (cf. Kymograph tracing No. VII).

(*c*) Passage to nose closed. Glottis closed. Contraction of constrictores pharyngis, and a possible upward movement of larynx, resulting in air compression in pharynx. Velar release results in

(i) ejected velar plosive **k**ʔ (cf. Kymograph tracing No. IX) ;

(ii) ejected velar affricate **kx**ʔ, when the plosive is released in such a way that its homorganic fricative is heard too. Usually the fricative, being ejected, has a very sharp scrape (cf. Kymograph tracing No. X).

(*d*) Passage to nose closed. Glottis closep. Velar release silent,

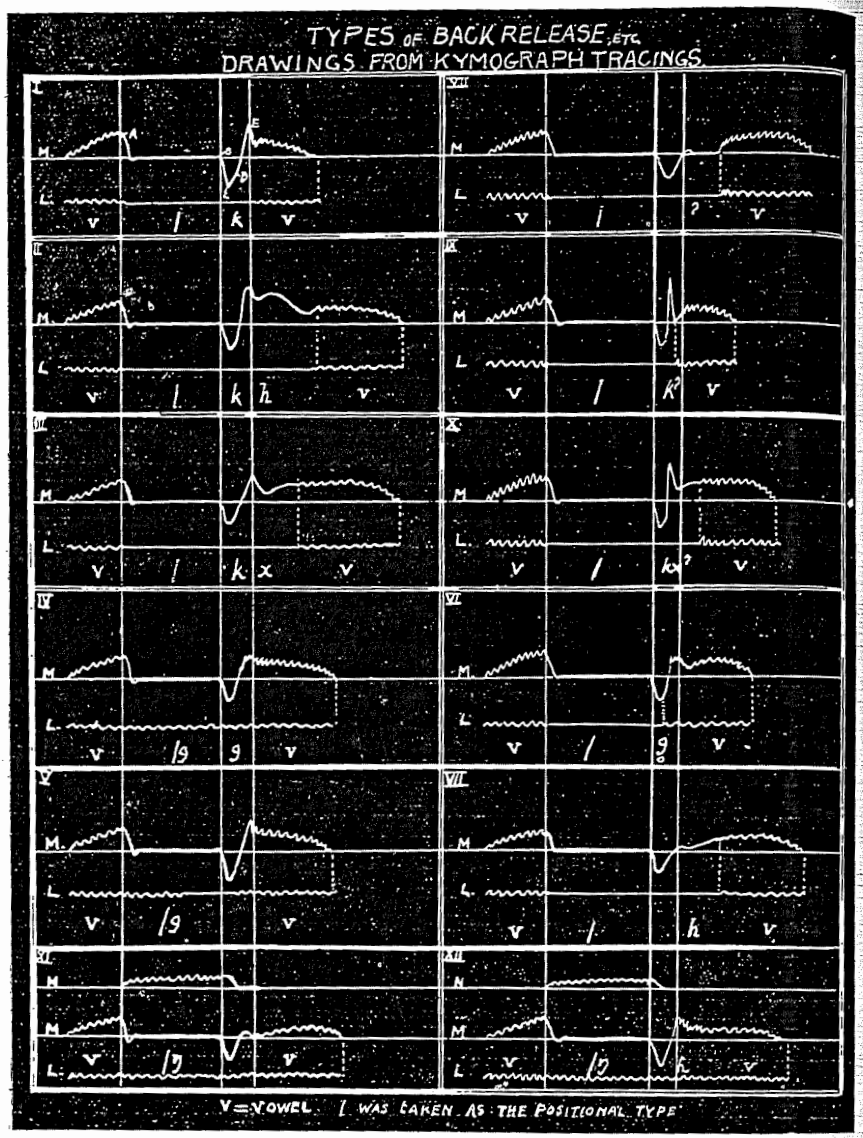


Fig. 2

followed shortly after the front release by glottal release with hard beginning to vowel or glottal plosive before vowel (cf. Kymograph tracing No. VIII).



(*e*) Passage to nose open. Vocal folds in vibration. Velar nasal frictionless continuant accompanies click, during its whole stop (cf. Kymograph tracing No. XI).

(*f*) Passage to nose open. Vocal folds in vibration. Velar nasal frictionless continuant accompanies the click during its whole stop, and on the release of click and at the closing of nasopharynx by the velum a voiced glottal fricative follows the velar nasal consonant (cf. Kymograph tracing No. XII).

*Distribution*

In Southern Africa clicks are used as compound phonemes in (*a*) Bushman, (*b*) Hottentot, (*c*) Sandawe and Hadzapi,

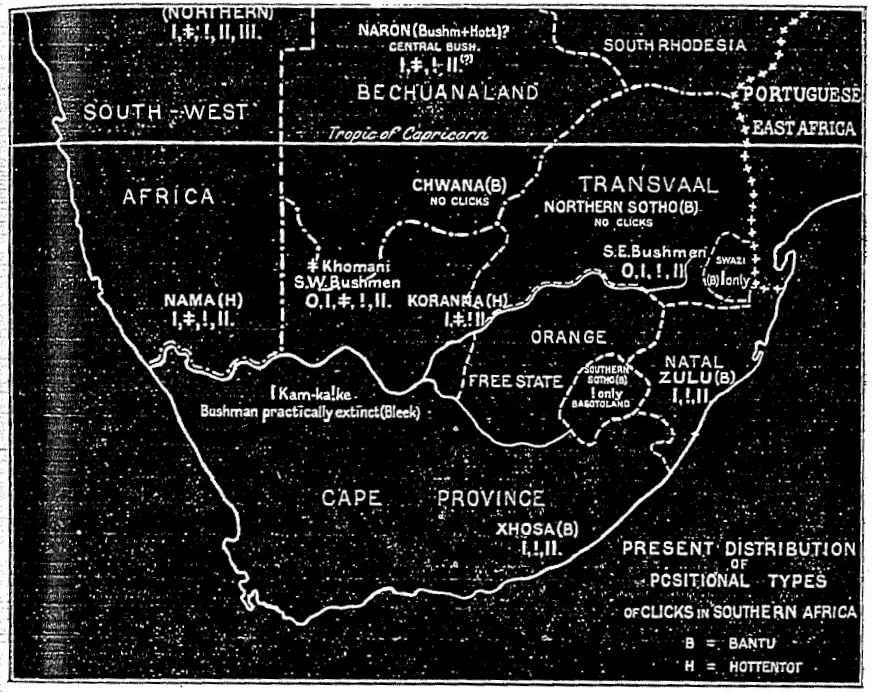


Fig 3

(*d*) Bantu-Ngoni (Zulu, Xhosa, Swazi) and sporadically in Bantu-Sotho (only one click).

(*a*) *Bushman* :

The term „Bushman" is a collective term for several dialects

once spoken over the whole of Southern Africa, but now scattered mostly in the Kalahari and in some places like the Free State, the Cape and Natal practically extinct.

We have fairly reliable records as to the occurrence of clicks in Western Bushman, South West Africa, !khũ: (Professor DOKE) ; Central Bushman, Southern Kalahari, ≠khomani and /'ainu (Professor DOKE and author) ; Eastern Bushman from Lake Chrissie, Transvaal, (author). For the North-Western group, the Naron, I rely on the information supplied by Miss BLEEK.

(i) For !khũ: Professor DOKE found five positional types, viz. Dental, Alveolar, Prepalatal, Retroflex, (all with medial oral release), and one prepalatal with lateral release. Note that the labial click is not represented and that the retroflex click occurs which is not found in Central and Eastern Bushman. As regards the back release DOKE has charted the following possibilities, but it is not clear whether all the distinctions are phonemically important : (*a*) velar voiceless plosive (tenuis?). (*b*) velar voiceless aspirated plosive, (*c*) velar voiceless affricate. (*d*) velar ejected affricate, (*e*) velar voiced plosive, (*f*) glottal closure, (*g*) glottal voiceless fricative, (*h*) velar nasal, accompanying entire stop.

(ii) For ≠khomani were found also five positional types, viz : Bilabial (or labiodental), Dental, Alveolar, Prepalatal, (all with medial oral release) and Prepalatal-lateral release. Words like „flesh", „branch", „sleep", „wild cat", „firewood" have the uncommon bilabial click. Back releases noted, include : velar voiceless plosive ; velar aspirated voiceless plosive ; velar voiceless affricate ; velar ejected plosive ; velar ejected affricate ; voiced velar plosive ; glottal fricative ; glottal closure ; velar nasal and velar nasal followed by voiced glottal fricative. It is not certain whether all the distinctions are phonemically important.

(iii) With Eastern Bushman (Batwa) from Lake Chrissie I found only four positional types of clicks : viz. Bilabial, Dental, Prepalatal, (all with medial oral release) and the Prepalatal-Lateral release. The Bilabial click was only encountered in a few words, like : „body", „tree", „son", „father-in-law", „toes", „sleep". It is noteworthy that the Alveolar click is not represented. The back releases show : the voiceless velar plosive ; the aspirated velar plosive ; the voiceless velar affricate ; the ejected velar affricate ; the voiced velar plosive ; the velar nasal ; the glottal closure.

(iv) Miss BLEEK records only four positional types for Naron : Dental, Alveolar, Prepalatal, Retroflex = Prepalatal-Lateral (?).



Labial clicks are not represented. Judging from her orthography the following back releases combine with the positional types : voiceless velar plosive (weak and strong) ; voiceless aspirated plosive, voiceless velar affricate, voiced velar plosive, velar nasal, glottal closure and glottal fricative.

The clicks are the most important sounds of these Bushman dialects, and it will be appreciated that in ≠khomani and !khũ, if every back release is representend, and every use is phonemically distinctive, there must be 40 different click combinations.

(*b*) For Hottentot I have made use of Professor Beach's very detailed study of Nama Phonetics, and my own investigations for Koranna.

(i) Nama has four positional types : Dental, Alveolar, Prepalatal, (all with medial oral release), Alveolar-Lateral oral release, and five different kinds of back release, or accompaniment, all phonemically distinctive : viz. velar weak voiceless plosive, velar voiceless affricate, glottal fricative, glottal closure, velar nasal.

(ii) Koranna has the same four positional types but has two additional back releases, both phonemically distinctive : viz. voiced velar plosive and ejected velar affricate.

(*c*) ZULU-XHOSA, as the main click-using Bantu languages of the Ngoni group, employ three positional types, namely : Dental, Prepalatal (both medial oral release) and Prepalatal (or Alveolar) lateral release, the same types as represented in Sandawe. ZULU and XHOSA show four types of back release, namely glottal closure, strongly aspirated velar plosive, voiceless velar media plosive (where voicing may occur in first part of stop, but latter part is voiceless up to the point when front release takes place), and velar nasal accompaniment, (XHOSA has an additional type : velar nasal accompaniment with voiced glottal fricative following the front release of click).

It was noticed that the back releases, especially in the case of the aspirated velar plosive and the voiceless velar plosive (media), show a close correspondence with the ordinary non-click consonants formed in these positions.

(*d*) DEMPWOLFF found three positional types of front release in Sandawe : viz. Dental, Prepalatal (medial-oral) and Alveolar (lateral release) clicks. Of the back releases only the voiceless velar plosive release and the velar nasal accompaniment DEMPWOLFF observed.

(*e*) SOTHO and SWAZI evidently borrowed their single clicks viz. Prepalatal and Dental respectively from the Zulus. In Sotho only the voiceless velar media back release of the Zulu is not represented.

*A Note on Physical-Anthropological Measurements*

BEACH in his work on Hottentot phonetics states that the reason why the European cannot make the alveolar click is that the Hottentots and the Bushmen with their rather canine tongues can get the exact fit required (into the alveolar end of the roof of the mouth) and they have the additional advantage that their six upper front teeth make a much wider arc than is the case with most Europeans. From unpublished investigations by Dr. LAING of the Witwatersrand University, (Anatomy and Physical-Anthropology Department), on ≠khomani-Bushman palates, it would appear that there are no appreciable differences in the shape of the palates from European palates, with the exception that the Bushman-palate is slightly shorter and may be shallower : also the point of greatest depth seems to be shifted more forward. In how far this is due to the clicking, I am not prepared to state. Dr. J. C. M. SHAW in his work on *The teeth, the bony palate and the mandible in Bantu races of South Africa* found that there was very little difference between the English and the Bantu palates as regards width and length.

| | English (KEITH) | Bantu (SHAW) | Dutch (Miss KAISER) |
|---|---|---|---|
| [Prosthion — Post Molar Line], — Length | 49.0 mm. | 50.1 mm. | ± 42 mm. |
| [2nd Molar — 2nd Mol-inside] — Width | 46.0 mm. | 38.6 mm. | ± 38 mm. |
| Height | 21.0 mm. | 17.5 mm. | ± 19 mm. |
| Palate across canines (Inside) | 25.30 mm. | 24.17 mm. | ± 30.5 mm. |

It will be seen from these findings that the Dutch average palate is broader across the canines than is the Bantu one or the English one. The Bantu Palate seems less deep and, if we can accept Miss KAISER's view expressed at the previous Phonetic Conference, viz. „It appears that low palates pronounced consonants more sharply and clearly, whereas their vowels often were very dull", it would in a way explain the relative wealth of consonants in the Bantu. Although the measurements of the Bushmen Palates are not ready for publication, there is an indication that the Bushman palate is on the average shorter and shallower than the European one.



However, I feel with Dr. KAISER that any generalisation at this stage would be premature.

It has been recorded that children who acquire Koranna or Zulu from nurses as their first language, learn to pronounce all the different positional types of clicks with the same proficiency as the native speakers of these languages.

From what has been said with regard to distribution of the clicks today, it will be noticed that in the Bushman of Eastern Transvaal and the click-using Bantu languages, the alveolar click does not occur. Is this not due to an acoustic resemblance between the dental and alveolar types?

With regard to the theory that clicks are the most primitive sounds of mankind, I have recorded this fact that the Bantu and Hottentot children, when they acquire the language from their parents, at first have great difficulty with the click sounds. In Zulu all clicks [/, ! and //] are replaced by the back release k, except the nasal accompaniment ones which substitute ŋ. The following substitutions were given me by a Koranna informant in an animal story in which the animals were supposed to speak as children.

taep = /kaep, nhũ:khwã:p = !kũ:khwã:p,
thwekwʔai = !kxwe-kxʔai, toã = //koã.

Finally I want to appeal to this Conference to recommend a standard orthography for the clicks. After discussing this question with my colleagues I want to suggest the use of a digraph, to represent both the front and the back releases. The symbols already in use should be standardized, viz. ʘ, /, ≠, !, //, /// for the Bilabial-, Dental-, Alveolar-, Prepalatal-medial release, the Alveolar or Prepalatal-lateral release, and the Retroflex-medial release sounds respectively. The back releases may be represented by adding their symbols to the positional type ones : thus, /k, /g̊, /kh, /g, /h, /ŋ, /ʔ, /kʔ, /kxʔ, /ŋḫ.

52. Prof. P. H. G. VAN GILSE (Leyden) : *Niederländisch als Schnalz-Sprache.*

Es soll hier auf die bisher wenig oder nicht beachtete Tatsache hingewiesen werden, dass Schnalze resp. schnalzartige Phoneme unter ganz bestimmten Umständen in einer Sprache, welche diese sonst nicht kennt, auftreten können.

Freilich sind diese Umstände pathologischer Art : wenn der Kehlkopf nicht zur Stimmgebung und nicht zur Atmung, also auch nicht zum „Flüstern", gebraucht werden kann. Man könnte gewiss der Meinung sein, dass der Sprachforscher, welcher sich mit der Sprache normaler Menschen befasst, hierfür kein Interesse zu haben braucht. Aber es kommt mir vor, dass in diesem