

Pharyngeal articulation in Hebrew

Asher Laufer, The Hebrew University (Israel), Laufer@mscc.huji.ac.il

Hebrew is a very old language. It has been spoken and written since the 15th century BC. In this lecture we will concentrate on the realizations of the pharyngeal and pharyngealized sounds in two periods: In ancient Hebrew - *Biblical* or *Classical Hebrew* - and in *Modern Hebrew* spoken today. The last part of our paper will be devoted to the description of the phonetic realization of the pharyngeal and pharyngealized sounds.

A. *Biblical* or *Classical Hebrew*

We have a wealth of different sources on Biblical Hebrew, and scholars can base their conclusions on how the pharyngeal and pharyngealized sounds were pronounced quite confidently. Biblical Hebrew had 2 pharyngeal consonants and 3 emphatic sounds. All scholars agree that the 2 pharyngeal consonant phonemes were /h ʕ/. However there is a debate about the way the emphatics were realized. Most of the scholars believe that they were realized as pharyngealized consonants [t^f s^f k^f], a minority of scholars believe they were realized as ejective consonants [t' s' k'], and some scholars believe they were aspirated [t^h s^h k^h].

B. *Modern Hebrew*

Modern Hebrew pronunciation can be classified into two types: (1) The liturgical traditional pronunciation by Jewish communities, and (2) The non-liturgical pronunciation of colloquial Hebrew.

- (1) By "liturgical traditional pronunciation by Jewish communities" we denote the Hebrew pronunciations that have been used by the various Jewish communities mainly in reading the Bible and the post biblical literature and in prayers. These traditional pronunciations still exist in Israel and in various Jewish communities of the Diaspora, and we can classify them as descendants of the 3 main Hebrew dialects that existed in the early middle ages (Morag, 1963, 1972; Garbel, 1958, 1965, 1968; Laufer, 2003).
- (2) The current pronunciations of colloquial Hebrew (the non-liturgical ones) can be divided into two: the Oriental one and the Non-Oriental one.

We will concentrate on the pronunciation of the pharyngeal and pharyngealized sounds, and show how most of them are affected by contact with other languages. We shall also make a note on the tendency we find in the Oriental pronunciations of Modern Hebrew, especially by younger generations: the weakening of pharyngeals and the almost disappearance of the pharyngealized sounds.

C. *Description of the phonetic realization of the pharyngeal and pharyngealized sounds*

In our studies of the articulation of these consonants we included video films of the pharynx, obtained with a fiberscope positioned in the upper pharynx, and we also recorded simultaneous audio recordings through an external microphone. (Approximately 300 minutes of video and audio recordings were obtained from 9 Hebrew and 6 Arabic speakers, containing nonsense utterances, real words, sentences, and connected speech passages.) For analysis, the videotapes with simultaneous audio were examined using normal speed, variable speed (slow motion), and stopped modes (Laufer & Condax, 1981; Laufer, 1986; Laufer & Baer, 1988).

Our studies clearly showed that in producing the pharyngeal and pharyngealized sounds the epiglottis is involved: The narrowest constriction seems to be between the epiglottis, which tilts backwards, and the pharyngeal wall. Qualitatively we see the same pharyngeal constriction for both the pharyngeal and the pharyngealized sounds. However, the pharyngeal constriction is more extreme and less variable for the pharyngeals, where it is the primary articulation, than for the pharyngealized sounds, where it is a secondary articulation.

Our physiological observations from the videotapes are supported by our analyses of the simultaneous acoustic signals. Observed constriction of the pharynx was always accompanied by lowering of F2 and raising of F1, which were clearly evident in the spectrograms. Variability in the degree of constriction for the pharyngealized consonants was also evident in the extent of acoustic effects for these sounds. This correspondence between acoustic and articulatory data is expected on the basis of acoustical theory (Klatt and Stevens, 1969, pp. 212-213; Fant, 1970, p. 215).

With respect to the articulatory results, all our subjects gave qualitatively similar results: Whenever subjects had a pharyngeal or pharyngealized sound in their dialects, all showed pharyngeal constriction with the epiglottis in comparison to their non-pharyngeal counterparts in minimal pairs (and by the way, in this regard, there was no distinction between Hebrew and Arabic speakers).

The ubiquity of this result provides strong support to the notion that whenever pharyngeal or pharyngealized sounds are produced, the narrowest constriction in the pharynx is between the epiglottis and the back wall of the pharynx. We argue this because our own data, as well as those from other studies (e.g. Ghazeli, 1977), show that the epiglottis can form the major constriction in the pharynx, and therefore it functions as an articulator. The definition of an articulator is that it is the organ that moves closest toward the place of articulation (Smalley, 1967; Laufer, 2008, p. 16). Thus, whether the epiglottis moves by itself during speech or is pushed around by the tongue is not relevant for deciding what the articulator is.

From our articulatory and acoustic studies we came to these conclusions:

1. [ħ] is a voiceless pharyngeal fricative.
2. [ʕ] is a voiced pharyngeal approximant.
3. [t^ħ] is a voiceless alveolar pharyngealized stop.
4. [s^ħ] is a voiceless alveolar pharyngealized fricative.
5. [k^ħ] is a voiceless velar pharyngealized stop.

In the presentation we would like to show some video clips of the articulation in the pharynx during speech, to support our phonetic conclusions.

References

- Klatt D.H. and Stevens K.N. (1969), "Pharyngeal consonants", *Quarterly Progress Report of the Research Laboratory of Electronics* (Massachusetts Institute of Technology), 93, 207-216.
- Fant G. (1970), "Analysis and synthesis of speech processes", In B. Malmberg (ed.), *Manual of Phonetics* (pp. 173-277). Amsterdam: North Holland.
- Garbell I. (1958), *Hebrew Pronunciation*, Jerusalem: The Hebrew University (in Hebrew).
- Garbell I. (1965), "*The Jewish Neo-Aramaic Dialect of Persian Azerbaijan*", The Hague.
- Garbell I. (1968), "Hebrew Pronunciation traditions of Asian and African Jewish communities", *Forth World Congress of Jewish Studies*, Jerusalem, 1968, Division 2, pp. 453-454 (In Hebrew, Abstract in English on p. 212).
- Ghazeli S. (1977), *Back Consonants and Backing Coarticulation in Arabic*, Doctoral dissertation, University of Texas at Austin.
- Laufer, A. (1986), *The pharyngeal sounds*, Proceedings of the Israeli National Academy of Sciences, Jerusalem, 7, pp. 39-66 (in Hebrew).
- Laufer, A. (2003), "Re-thinking of the early Ashkenazi pronunciation", *Kol Le-Yaakov, Yaakov Bentolila Jubilee Volume*, Research Papers, Editors: Sivan D. and Halevi-Kirtchuk P., Eshel Beer-Sheva, Ben-Gurion University, Beer-Sheva, pp. 259-275 (in Hebrew).
- Laufer, A. (2008), *Chapters in Phonetics and in Phonetic Transcription*, (The book is accompanied with a CD), Magnes, Jerusalem, (in Hebrew).
- Laufer A. and Condax I.D. (1981), "The role of the epiglottis in speech", *Language and Speech*, 24, pp. 39-62.
- Laufer A. and Baer T. (1988), "The emphatic and pharyngeal sounds in Hebrew and in Arabic", *Language and Speech*, 31, pp. 181-205.
- Morag S. (1963), *The Hebrew Language Tradition of the Yemenite Jews*, Jerusalem: The Hebrew Language Academy (in Hebrew).
- Morag S. (1972), "Pronunciation of Hebrew", *Encyclopedia Judaica* (Jerusalem: Keter), 13, pp. 1120-1145.
- Smally A.W. (1967), *Manual of Articulatory Phonetics*, Tarrytown, N.Y.: Practical Anthropology.