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OF ENGLISH**

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KÁLMÁN BOLLA

A PHONETIC CONSPECTUS OF ENGLISH

**The articulatory and acoustic features
of British English speech sounds**

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Kálmán Bolla
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Preface

This phonetic conspectus of English, supplemented with an articulatory data base compiled by computer from the results of some related phonetic experiments, and presented here as Volume 20 of Hungarian Papers in Phonetics, summarizes the outcome of a recent stage in our general project for interlingual phonetic comparisons. As was reported earlier (MFF 9. 1981, p. 7), we are currently engaged in a major project for the complex phonetic investigation of several structurally related and unrelated languages (Hungarian, Finnish, Russian, Polish, British English, American English, German, and French) conducted in a unified framework and with constant methodology, in order to obtain a reliable basis for phonetic research both within and across languages. Our primary objective is a better understanding of the phonetic character and phonological system of Hungarian, and we intend to get closer to that ultimate aim by confronting it with articulatory mechanisms and acoustic characteristics of a number of other languages. The data base obtained from such experimental phonetic analyses of seven or eight languages may also contribute, at a later stage, to typological studies of a more comprehensive sort. The information and materials gathered from interlingual phonetic research can also serve educational purposes: they can be put to good use in university courses in phonetics (in Hungarian and general phonetics courses as well as in those in the other languages involved), in speech cultivation and other areas of applied phonetics.

This conspectus describes English speech sounds, rather than the phonemes of English. We have investigated sound types occurring in various phonetic positions, taking the effects of phonetic environment on the quality of speech sounds into consideration. The phonetic features of sounds are best characterized in terms of the dispersion of certain parameters, rather than in terms of absolute values. Such dispersion is based on two factors: a) normative pronunciation itself allows for lesser or greater differences or

'pronunciation varieties', b) its individual realizations exhibit accidental, non-systematic properties as well. The acoustic and articulatory diagrams reflect this variability to a certain extent. To take but one characteristic case, the diphthong [ɔɚ] is realised as/replaced by monophthongal [ɔ] (see Plate 21). Consonants are presented in two sets of plates, loosely corresponding to their occurrence in initial and final positions, respectively. For completeness' sake, both sets include medial occurrences where initial/final occurrence was not (readily) available. In addition to revealing the characteristics of individual speech sounds, these plates are also intended to provide some information as to the articulatory base of English speech.

In assembling the language corpus and selecting the informants Miklós Törkenczy was of great help to me. I would like to thank for his kind assistance.

The cineradiographic recordings underlying the material presented here have been made in the Radiological Clinic of the Semmelweis Medical University, Budapest, with the helpful consent of its director and Dr. Ernő Makó's generous cooperation. I wish to express my thanks to both of them.

The experiments and instrumental analyses involved in the investigation of the phonetic properties of English speech sounds have been conducted in the phonetic laboratories of the Linguistics Institute of the Hungarian Academy of Sciences and of the Phonetics Department at the Faculty of Arts of Loránd Eötvös University, Budapest. I am grateful to all colleagues at both laboratories for their cooperation.

Acknowledgements are also due to the native informants participating in the phonetic experiments, Susan E. Doughty, Geoffrey Richard Thompson, Peter Francis Doherty, and Judit Czigany for kindly undertaking this tiring and often uncomfortable task.

Finally, a word of thanks should go to the Director of the Linguistics Institute of HAS for making the publication of this book possible, and to the staff of HAS Mimeographic Services for their technical assistance in producing it.

I sincerely wish that linguists, phoneticians, students and teachers of English, and all other readers interested in the phonetic structure of English speech should find this book worth consulting.

The author

INTRODUCTORY REMARKS

1. On the use and purpose of the conspectus

The articulatory and acoustic properties of English speech sounds have been described in a number of excellent studies in the phonetic literature. The readers of the atlas would probably be pleased if they saw the results of our experiments compared with the statements to be found in the literature. However, there was no opportunity for that within the scope of this publication.

The present conspectus highlights the dynamic aspects of phonetic research.

It is exactly by means of its structural complexity that the extremely highly articulated sound shape of human language is capable of expressing an infinitely large number of communicative intentions, even the most complicated and intricate, in an economical manner. Although the individual configurations of sounds as materialized in spoken utterances are unique and non-recurrent, their structural constituents are taken from a finite set of types and obey explorable and definable regularities based on the given linguistic code as they are organized into sound sequences of varying length, expressing linguistic signs and structures. The sound shape of the speech continuum involves basically two types of structure, segmental and supra-segmental. The elementary units of segmental structure are linguistically-interpreted sections of the continuum known as speech sounds, i.e. the material realizations of the phonemes of the language in question. Within suprasegmental structure, factors of timing, melody, relative intensity (or dynamics), and phonation/timbre are organized into larger sequential units.

Based on linguistic patterns, the sound shapes embodied in the speech flow are produced by typical movements of various organs, or kinetic stereotypes. Such typical movements of the speech organs generate types of oscillations continually changing their frequency spectra and intensity values as a function of time (of articulation), i.e. oscillational stereotypes in which structures of constitutive and differentiative features of sound shapes can be found but which are also characterized by a considerable amount of redundancy.

This conspectus presents the major articulatory and acoustic properties of English speech sounds (segmented from

word-size chunks of phonetic material), arranged in tableaux, diagrams, photograms, and tables of numerical data.

Another important question we have to discuss briefly is whether the pronunciation of one -- or a few -- selected native speaker(s) can be taken to represent what is phonetically typical, functionally important and linguistically relevant, whether the speech of the person(s) taking part in these experiments reflects -- and if it does, to what extent -- the conventional and general aspects of what there is, mostly intuitively, in the collective consciousness of the speech community.

The history of experimental phonetic research, its results and their subsequent reception have shown that this is possible if the investigations are carried out with care and expertise, using methods and instruments that meet the technical requirements of the day. On the other hand, it has to be pointed out that the language under scrutiny is always richer and more complex in its actual reality than what can be captured of it by experimental techniques and various forms of visual display.

The subject-matter and purpose of research into the sound shape of English speech involve more than what is now presented in the plates and tables of this conspectus as a result of so-called objective (instrumental) investigations. An account of sequential and suprasegmental characteristics is beyond the scope of the present work: a phonological interpretation of the sound pattern of English, on the other hand, would require an entirely different approach. Still, the diagrams included here give a faithful and objective representation of articulatory and acoustic properties of English speech sounds. The information given in Plate 1, and the calibrations of subsequent spectrograms, provide further help for the user of this phonetic conspectus.

2. Experimentees, native speakers in the phonetic experiments

We have conducted a complex phonetic investigation of English speech sounds with the participation of four native speakers, two female and two male. This conspectus contains the data and articulatory and acoustic diagrams obtained from a female informant identified as 'Ds'. Since pronunciation cannot be considered completely homogeneous, we have made detailed observations of particular phonetic

phenomena by producing sound recordings and diagrams of the speech of other persons -- obviously, all of them native speakers of English -- but the results of these subsidiary investigations are not included in this conspectus. The results of articulatory and acoustic investigations of ninety-two English speech sounds (vowels and two series of consonants) based on the pronunciation of a male informant identified as 'Th' will be published later.

The informant of the present conspectus, Susan E. Doughty, was born in 1952 in Leeds. She worked as a teacher of English language at the Department of English Language and Literature of Loránd Eötvös University, Budapest. She was very cooperative during the phonetic experiments. Her vocal organs function normally: she is an experienced speaker whose pronunciation corresponds to the norms of Standard British English. In her well-cultivated speech, no dialectal or (non-standard) idiolectal features can be detected.

The other informant with whom I made all the experiments is Geoffrey Richard Thompson, born in 1947 in Gosport. Just like Susan Doughty, he worked at the Department of English Language and Literature of Loránd Eötvös University as a native guest-teacher. Besides his good diction and fine pronunciation he also contributed to the success of our experiments with his excellent competence of language education.

With the other two informants I only made partial experiments (cineradiography, sound recordings, spectrography). Judit Czigany was born in 1958 in London. She stayed at Budapest as a student on a scholarship. Peter Francis Doherty was born in 1943 in Ystard Muncech. He took part in the phonetic experiments as a teacher of the English Department.

3. The linguistic corpus of the phonetic experiments

The experimental phonetic research reported on here constitutes part of a larger project for interlingual comparisons. Therefore, it was reasonable and expedient to compile the linguistic corpus in accordance with pre-established criteria.

For the purposes of the investigation of articulatory and acoustic properties, we first compiled a bulky corpus of words, representative of the various phonetic environments. This corpus was recorded on tape,

pronounced by the informants as one-word sentences. Then, largely by auditory analysis, we selected a set of samples significantly representing the basic realizational types of English speech sounds. This 'minimized' set of samples then served as the linguistic corpus of instrumental investigations. To explore the ways adjacent speech sounds affect one another in connected speech, we also compiled a set of model sentences, including idiomatic phrases and proverbs, that contained the combinations we wanted to analyse. The total corpus also contains material suitable for investigating suprasegmental structure.

Finally, I asked every informant to read out sample texts of fiction and to produce spontaneous speech to be recorded and used for phonetic observation and analysis. Occasionally we used various further samples and/or repeated recording sessions to obtain as reliable material as possible.

The minimized corpus for instrumental investigation consisted of the following items:

For vowels: father, gone, sun, door, book, do, key, it, men, hat, earth, common, die, boy, doing, pay, now, so, sewer, more, hear, hair, fire, destroyer, player, tower, slower

For consonants:

bit, pit, many, deal, till, not, duration, tune, new, gear, keep, sing, right, wait, village, father, information, their, thin, zoo sit, measure, sugar, you, pure, head, little

Variations of consonants conditioned by the difference of the phonetic position:

robe, lip, socialism, aged, let, man, dig, comic, singer, far off, firewood, have, life, triumph, breathe, truth, these, us, prestige, fish, yet, huge, ahead, tell, lily, foundry, country, rods, hats, age, church.

THE DIAGRAMS OF THE SOUND PLATES, ON THE USE OF THE CONSPECTUS

(A description of the symbols, indications, measurement points and calibrations used in the phonetic analysis of the diagrams)

1. The heading of the sound plate

This contains the number of the plate (1--93) which facilitates reference to the plate within the text and makes the book easier to use. Below the number the phonetic symbol of the sound is presented in IPA transcription. The word containing the analyzed sound can be seen in IPA transcription between square brackets in the lower line, and the orthographic form of the word is given in the upper line.

2. Photolabiogram

This diagram shows the shape of the lips in articulation. The measurement points used indicate:

- 1 -- the opening between the upper and lower lips
- 2 -- the opening between the corners of the lips
- 3 -- the opening of the lower jaw
- 4 -- the horizontal movement of the lower jaw
- 5 -- the extent of lower lip protrusion
- 6 -- the horizontal movement of the upper lip.

3. Dynamic labiogram series

This consists of five photolabiograms taken from our videotaped material and shows how the position of the lips changes during the articulation of the sound presented. Each section photograph shows a 20 ms period of the articulation.

1. The first picture shows the position of the lips (frontally) in the initial phase,
2. the second at the one quarter time point,
3. the third at the half-time point,
4. the fourth at the three quarter time point, and
5. the fifth in the final phase of articulation.

4. Cineradiogram contours of the pure phase of the sound

The radiograms give information on the articulatory positions of the supraglottal cavities. The large schematic drawing of the radiogram on each plate represents the

so-called "pure phase" of the articulation of the sound in question which was segmented from the dynamic radiograms of words recorded by a videotape recorder. The contours of the supraglottal articulatory organs are provided in schematic drawings because the copying and typographic reproduction of the X-ray film blur the fine differences in shade and consequently observation is difficult. The cineradiogram sections show the position of the articulatory organs in 20 ms periods.

The articulatory organs seen in the schematic drawing on the right hand side of Plate 1 and the articulatory phonetic terms based on them are:

- A -- mouth cavity, oral
- B -- pharyngeal cavity, pharyngeal
- C -- nasal cavity, nasal
- 1 -- upper lip, labial }
- 2 -- lower lip, labial } bilabial
- 3 -- upper front teeth, dental }
- 4 -- lower front teeth, dental } interdental
- 5 -- alveolar ridge, alveolar
- 6 -- hard palate, palatal
 - a) prepalatum, prepalatal
 - b) mediopalatum, mediopalatal
 - c) postpalatum, postpalatal
- 7 -- soft palate, velar
- 8 -- uvula, uvular
- 9 -- pharyngeal wall, pharyngeal
- 10 -- epiglottis, --
- 11 -- larynx, laryngeal
- 12 -- tongue bone, --
- 13 -- root of the tongue, radical
- 14 -- dorsum, dorsal
 - a) predorsum, predorsal
 - b) mediodorsum, mediodorsal
 - c) postdorsum, postdorsal
- 15 -- tip of the tongue, apical
- 16 -- genial process, --
- 17 -- lower jaw.

In order to make the exact analysis of articulation easier measurement and referential points have been placed on the contours of the articulatory organs. Most of the points serve as measurement points for computer analysis, but some of them (10, 21, 23, 24, 25, 26, 32) are only referential points which make it easier to draw the exact

contours of the articulatory organs.

The figures in the schematic drawing on the left hand side of Plate 1 represent the following articulatory positions:

- 1--11: the opening between the upper and lower lips
- 2--12: the distance between the edge of the upper front teeth and that of the lower front teeth
- 2--10: the closedness/openedness of the jaws
- 2--22: the distance between the apex and the edge of the upper front teeth
- 2--13, 14, 15, 16, 17, 18: the distance between the edge of the upper front teeth and a point of the dorsum which faces the measurement point of the corresponding passive articulatory organ
- 3--22, 13, 14, 15, 16, 17, 18: the distance between the apex, the dorsum, the root of the tongue and the prepalatum
- 4--22, 13, 14, 15, 16, 17, 18: the distance between the apex, the dorsum, the root of the tongue and the mediopalatum
- 5--12, 13, 14, 15, 16, 17, 18: the distance between the apex, the dorsum, the root of the tongue and the palatovelar boundary line
- 6--22, 13, 14, 15, 16, 17, 18: the distance between the measurement points of the tongue and the boundary line between the soft palate and the uvula
- 5--12: the distance between the edge of the lower front teeth and the palatovelar boundary line
- 5--10: the distance between the genial process and the palatovelar boundary line
- 8--30 and 9--29: express nasality
- 12--22, 13, 14, 15, 16, 17, 18: the distance between the edge of the lower front teeth and the measurement points of the tongue
- 10--28: the distance between the genial process and the lower part of the pharyngeal wall
- 28--22, 13, 14, 15, 16, 17, 18: the position of the measurement points of the tongue as compared to the lower part of the pharyngeal wall
- 12--27: the distance between the edge of the lower

- front teeth and the measurement points at the upper part of the pharyngeal wall
- 10--27: the position of the genial process as compared to the upper part of the pharyngeal wall
- 27--22, 13, 14, 15, 16, 17, 18: the distance between the measurement points of the tongue and the measurement point of the upper part of the pharyngeal wall.

5. Schematic cineradiogram series

This consists of five schematic drawings of our videotaped X-ray films and shows articulation in process. The section diagrams represent a 20 ms period of the articulation. The central phase is repeated when the total length of the analyzed sound was shorter than 100 ms.

The first represents the articulatory organs in the initial phase,
the second at the one quarter time point,
the third at the half-time point,
the fourth at the three quarter time point, and
the fifth in the final phase of articulation

6. Photopalatogram

This is provided for identifying the configuration of the articulatory organs, the place and, partly, the manner of articulation. The significant zones are:

- C -- central zone
- L -- lateral zone
 - a -- upper front teeth, dental zone
 - b -- the alveolar ridge, alveolar zone
 - c -- the hard palate, palatal zone
 - d -- the soft palate, velar zone.

7. Photolinguogram

This shows the role of the tongue as an "active" articulatory organ. It is divided by letters into parts which are significant for a description of the phonetic quality of the sound:

- a -- the tip of the tongue (apex), apical
- b -- the front of the upper part of the tongue (predorsum), predorsal
- c -- the centre of the upper part of the tongue (mediodorsum), mediodorsal

- d -- the back of the upper part of the tongue (postdorsum), postdorsal
- e -- the right and left rims of the tongue (corona), coronal.

8. Composite oscillographic diagram

Oscillograms provide the graphic image of sound vibration. The oscillographic diagram on each sound plate consists of three curves: these show the specific vibration form of the sound presented.

The middle curve includes all the acoustic components of the sound and shows their changes through the entire length of articulation. The sample (sometimes two samples) above it is an enlargement of a segment delimited on the upper curve, and is provided to make finer analysis possible.

The lower curve is the glottographic representation of the sound: it shows the vibrations of the vocal cord, i.e., the vibration form of the voice produced in the larynx. The ascending part of the curve corresponds to the opening phase of the vocal cord, the descending part to the closing phase.

Amplitude size in the three oscillograms is not an absolutely precise indicator of real physical intensity, because intensification has been occasionally made to increase the demonstrative power of the presentation.

In the case of longer sounds the whole oscillogram could not be accommodated in the picture-size available and segments have been cut out for presentation, primarily from periods during which the curve was relatively steady. The cuts are indicated by broken lines.

9. Dynamic spectrograms and amplitude sections

The dynamic spectrogram shows the acoustic changes which determine sound quality, primarily the changes in all component frequencies of the complex vibration and, approximately, the intensities of the complex frequencies, during the entire length of articulation. Two spectrograms are given for each sound. The first one, the so-called broad-band analysis, is used to determine the formant structure and the fundamental frequency while the narrow-band analysis produces a more detailed spectrogram which lends itself to a minute analysis of the harmonics and the noise structure.

The frequency and temporal data of the spectrogram

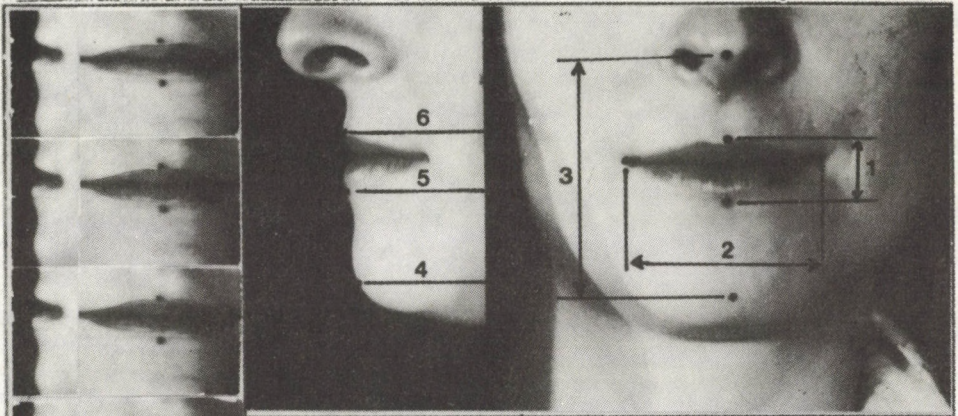
can be determined by the help of the calibration on the diagram. The measure of intensity can be seen from the degree of blackening and from the force with which the components appear. (The sensation of loudness can be determined only through the co-operation of other factors -- e.g. frequency and duration.)

The amplitude section furnishes the frequency and relative intensity data of the spectrum over a period of 8 ms in the so-called pure phase of articulation. A broad-band and narrow-band amplitude section is given for each sound, showing the frequency and intensity properties of the so-called pure phase.

Vowels are analyzed in a frequency range below 5 kHz, and consonants below 8 kHz, in terms of the calibration on the diagram.

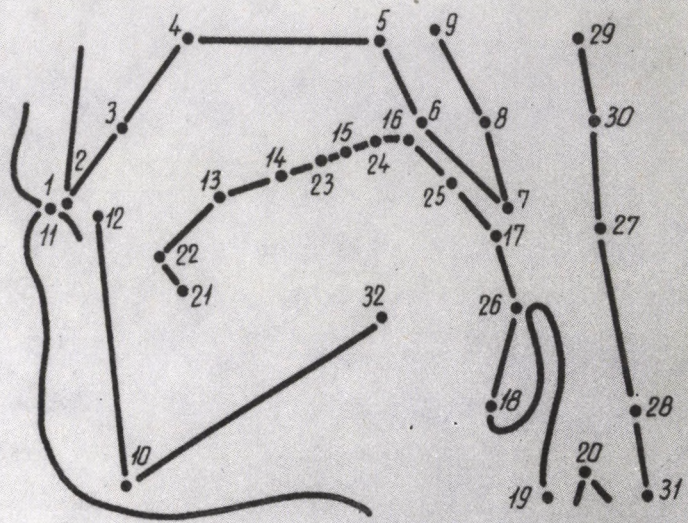
**ARTICULATORY AND ACOUSTIC DIAGRAMS
OF ENGLISH SPEECH SOUNDS**

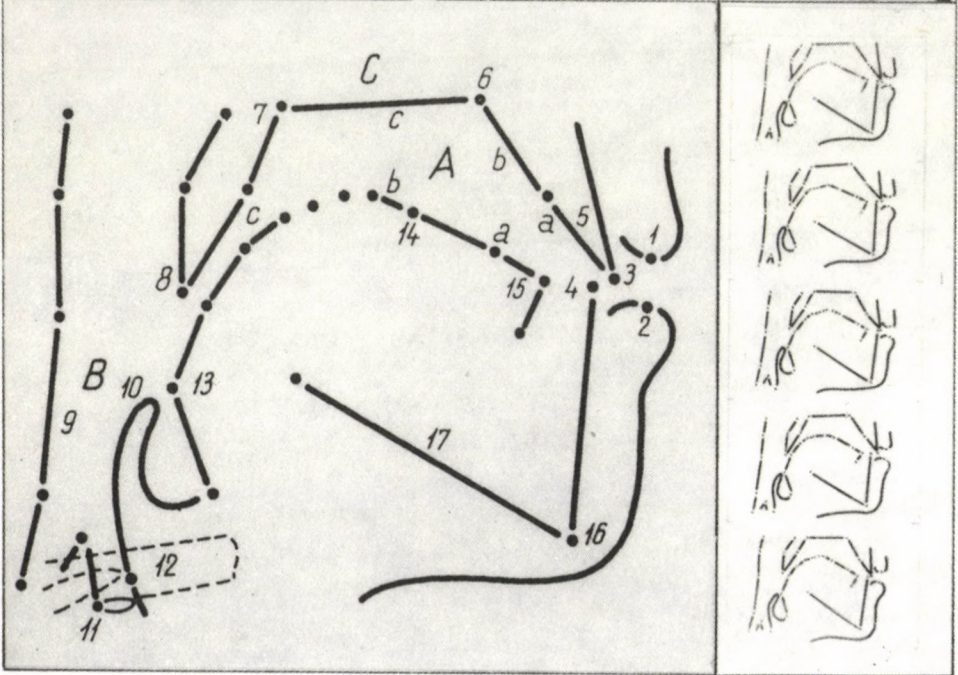
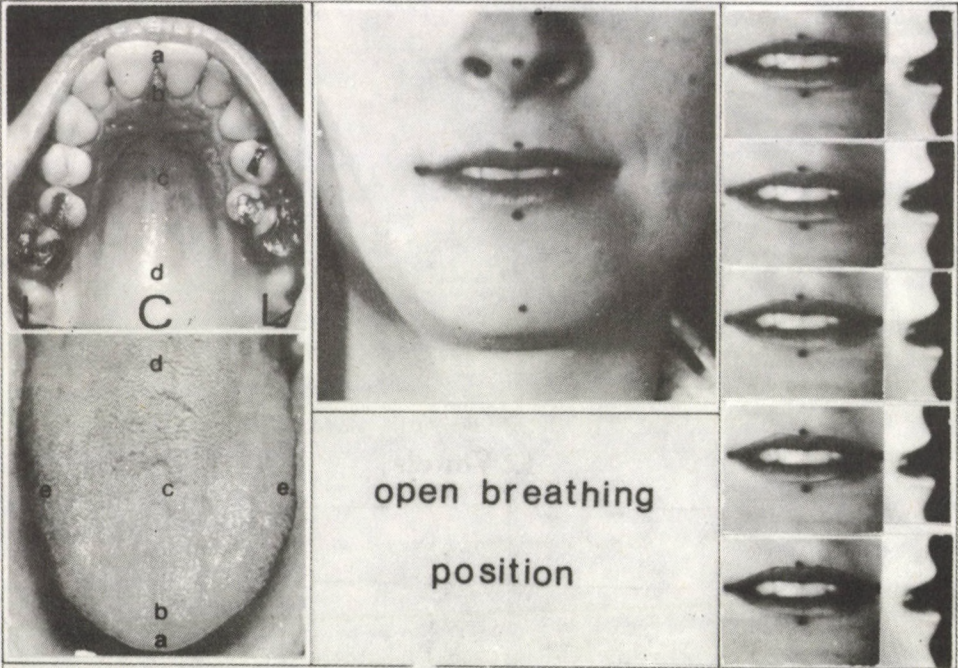
The rest position of the articulatory organs



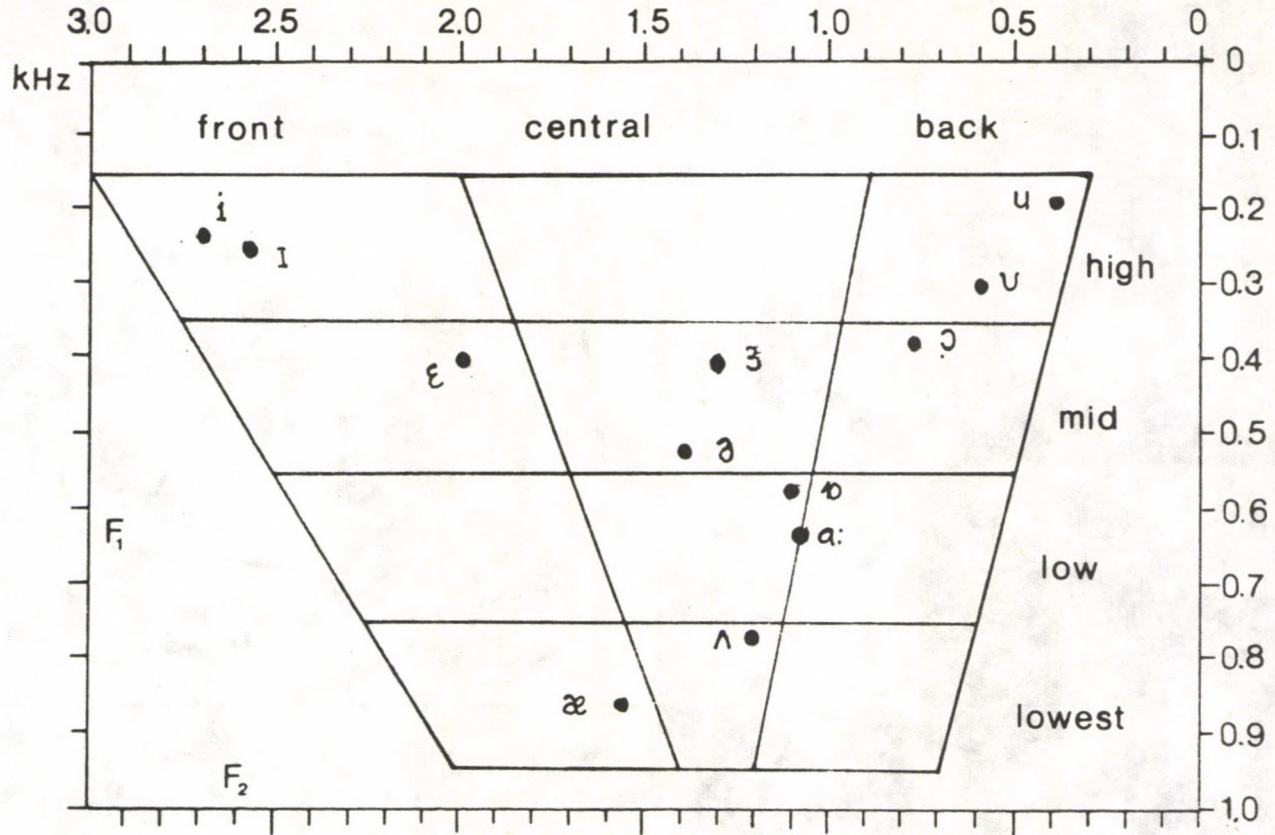
close breathing
position

1

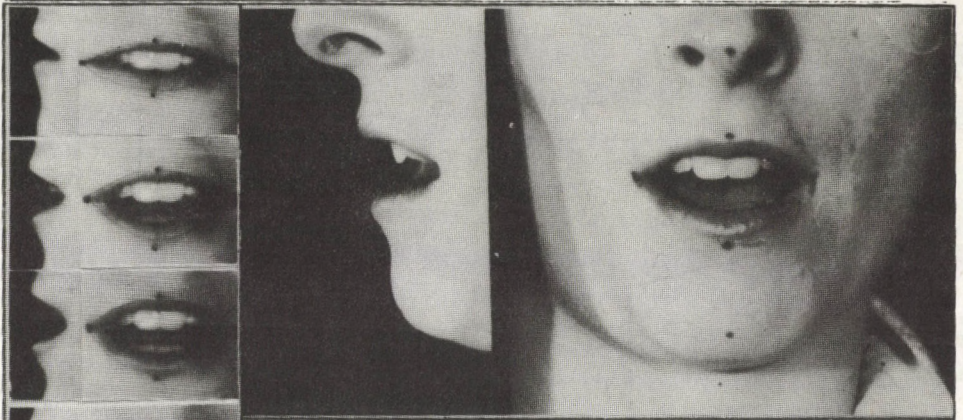




1. Vowels

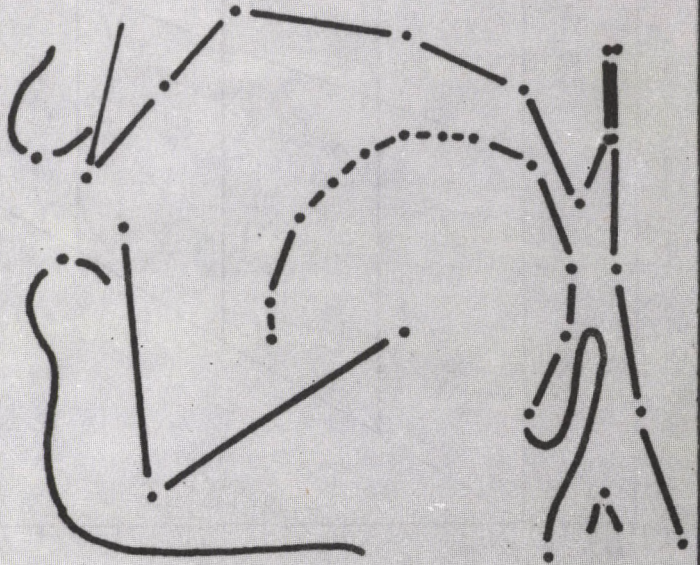
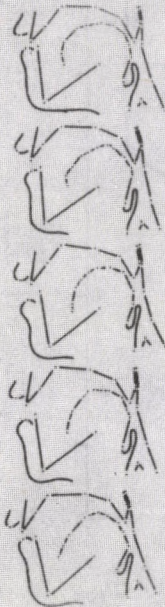


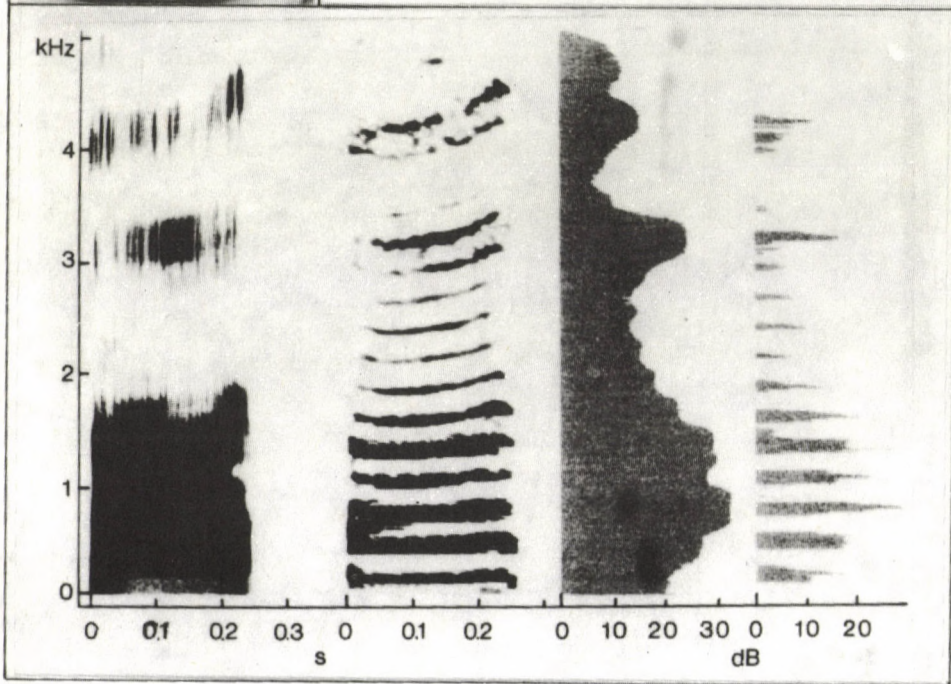
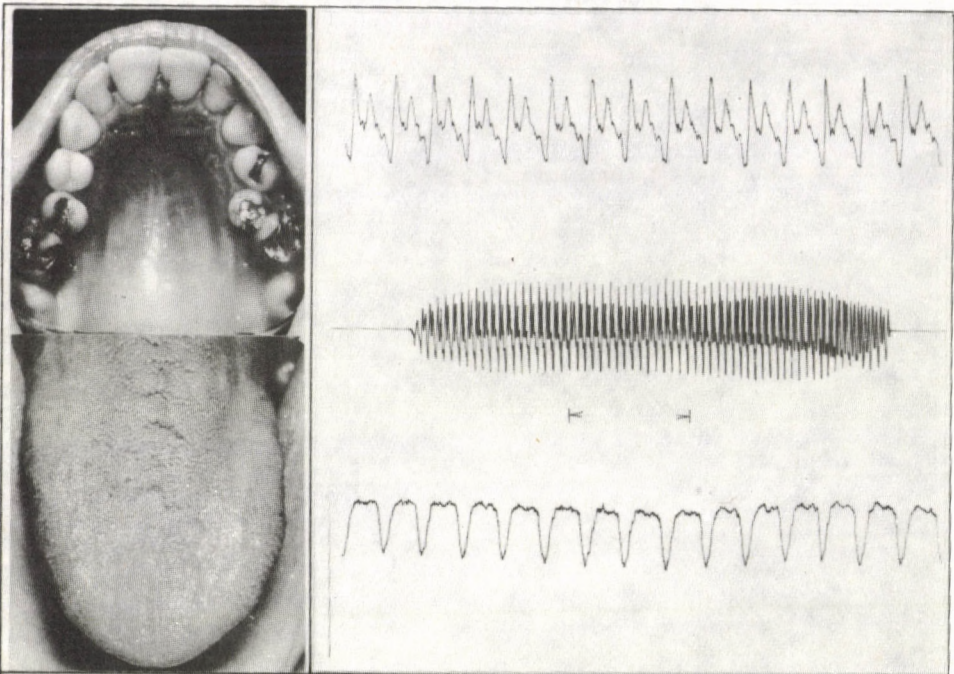
The classification of English vowels according to their articulatory features and F₁, F₂



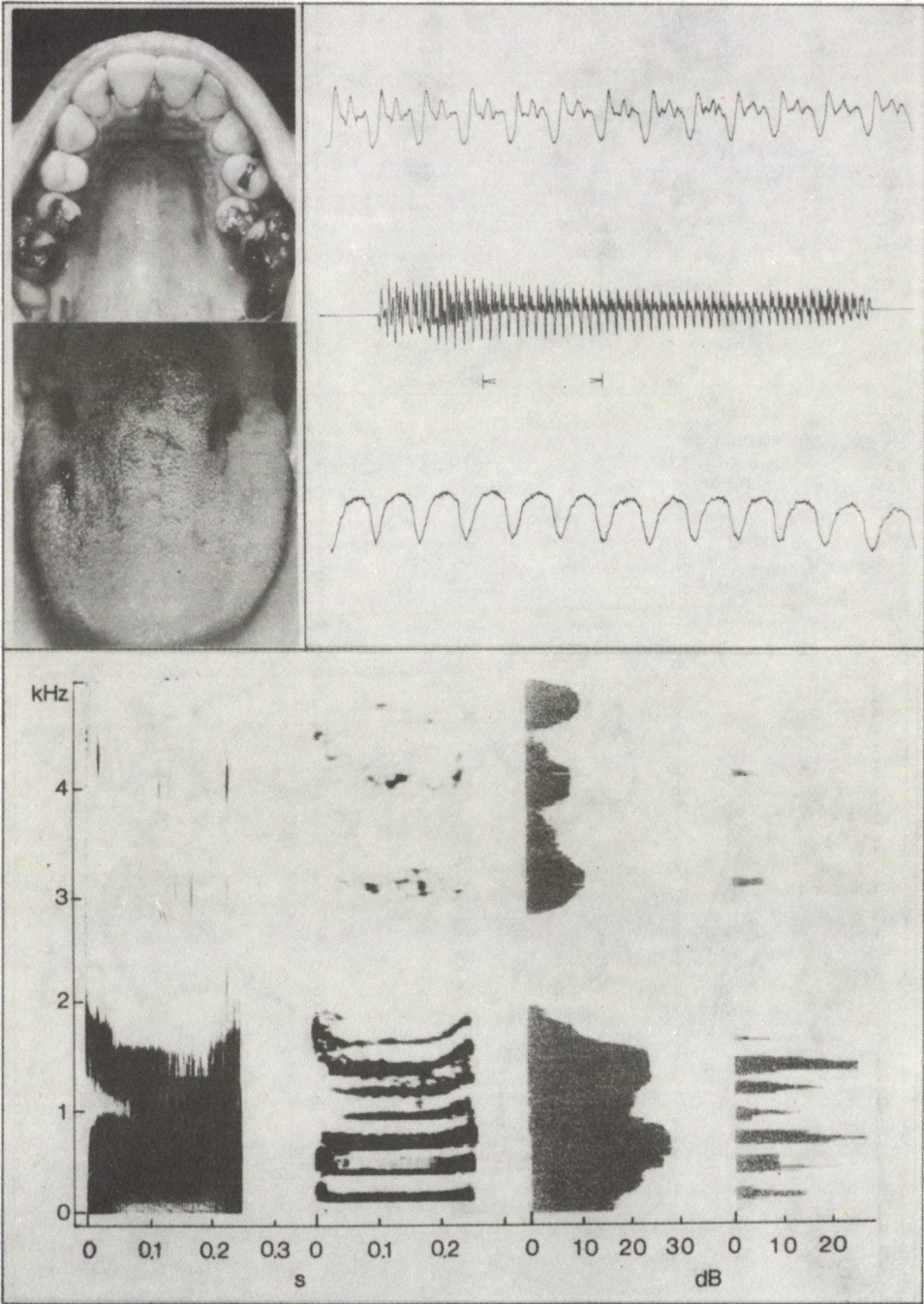
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Dr J. A. Jones

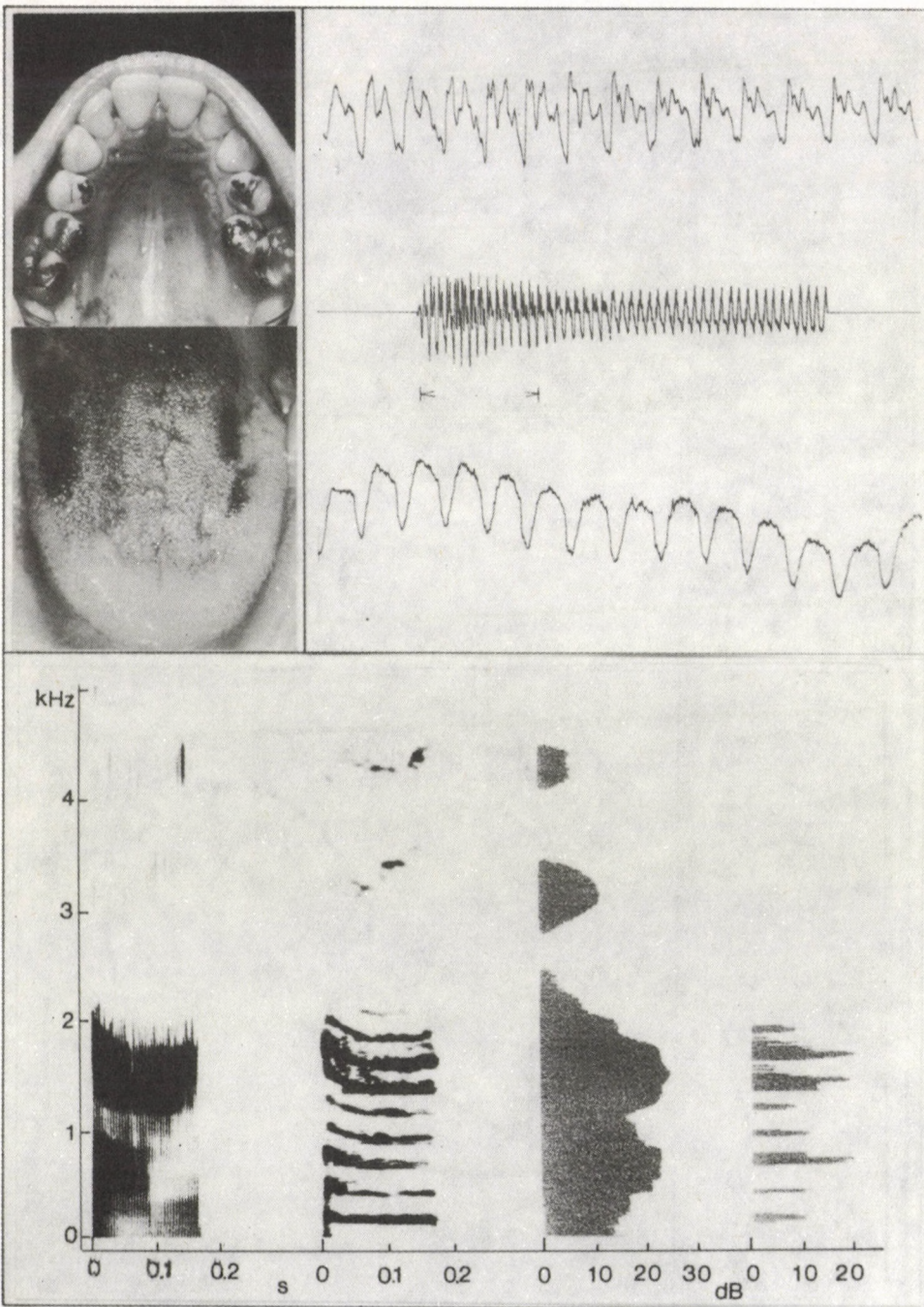




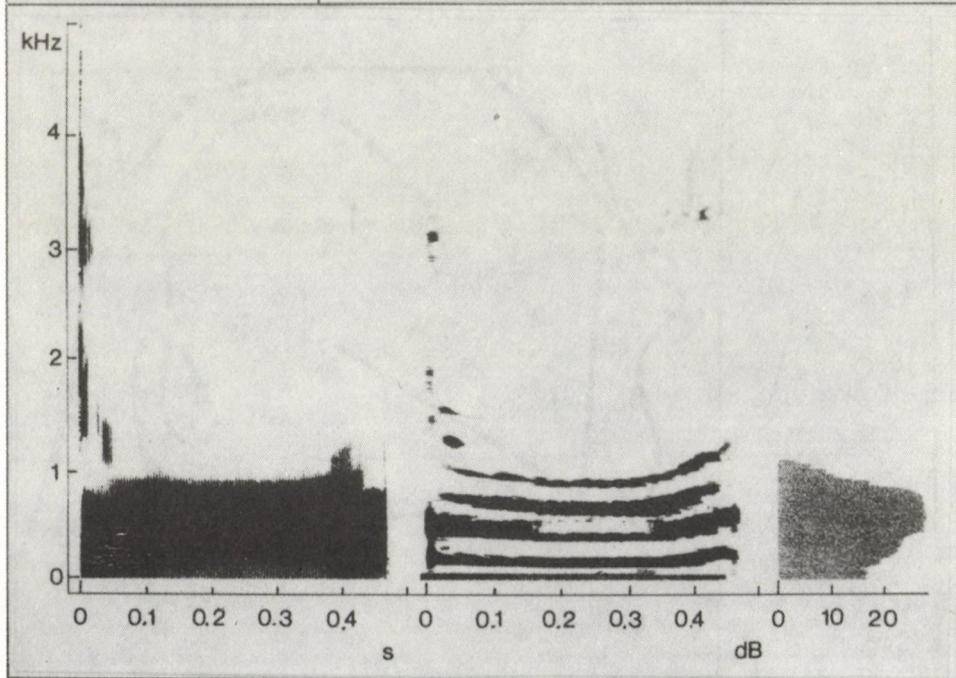
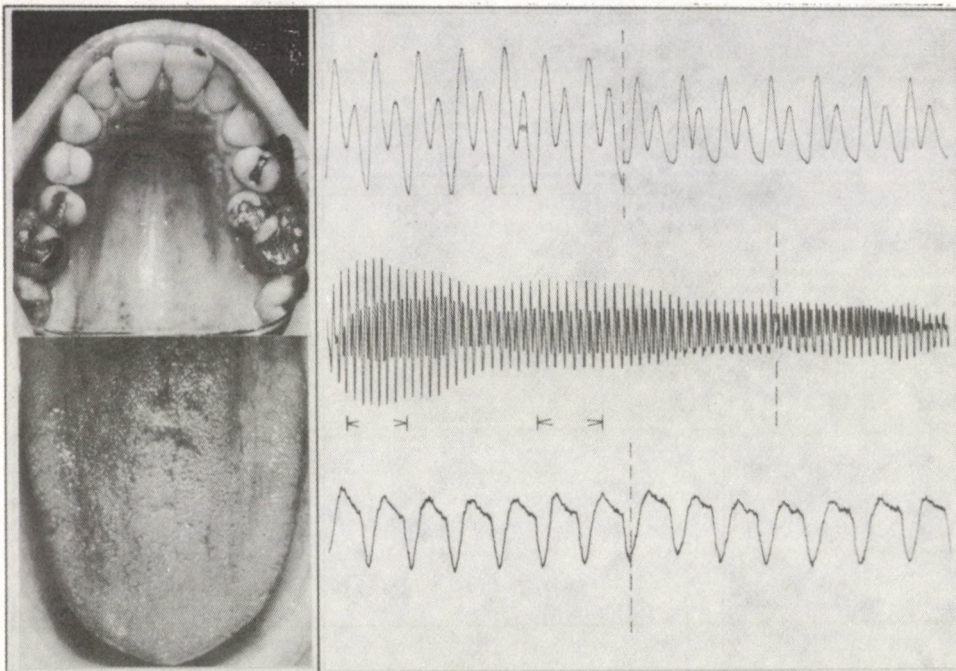
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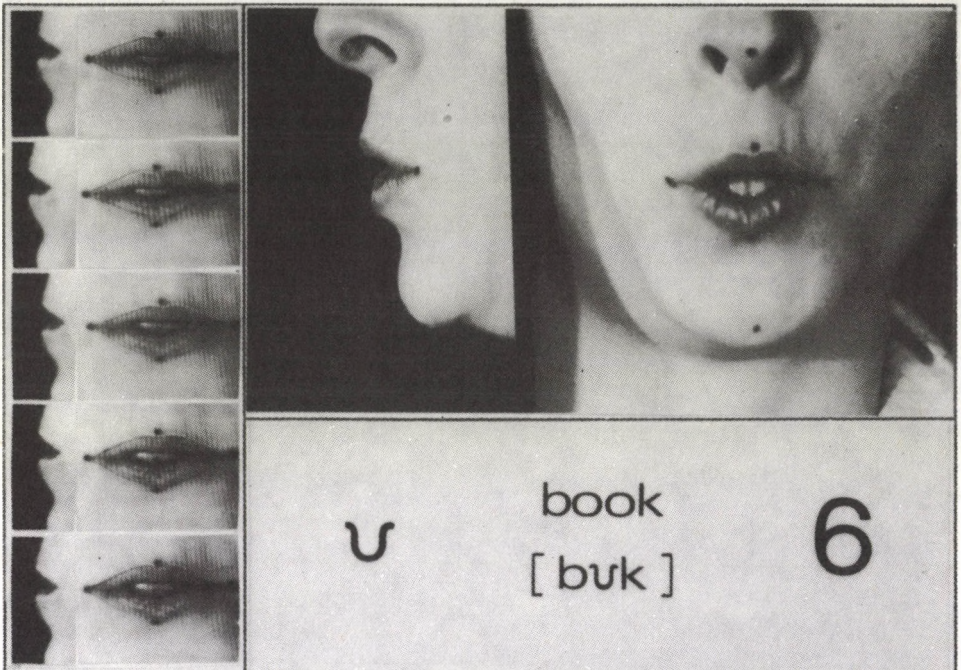


	<p> \wedge sun 4 [sʌn] </p>



	<p> d' door 5 [dɔː] </p>

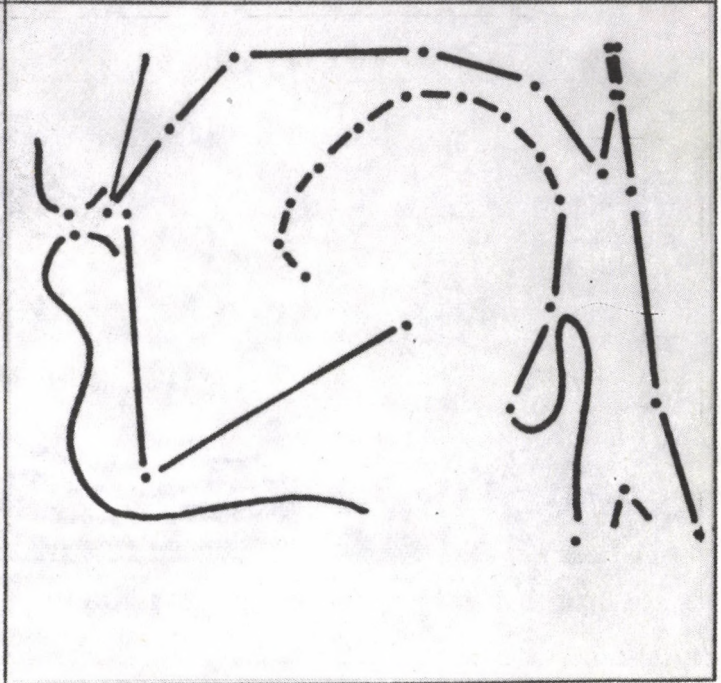
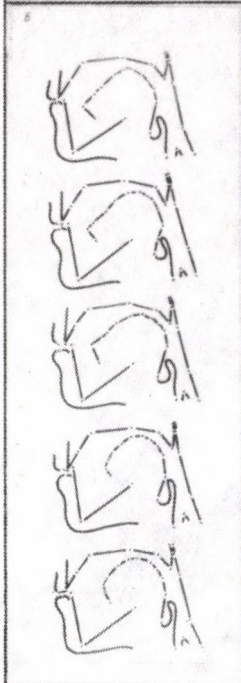


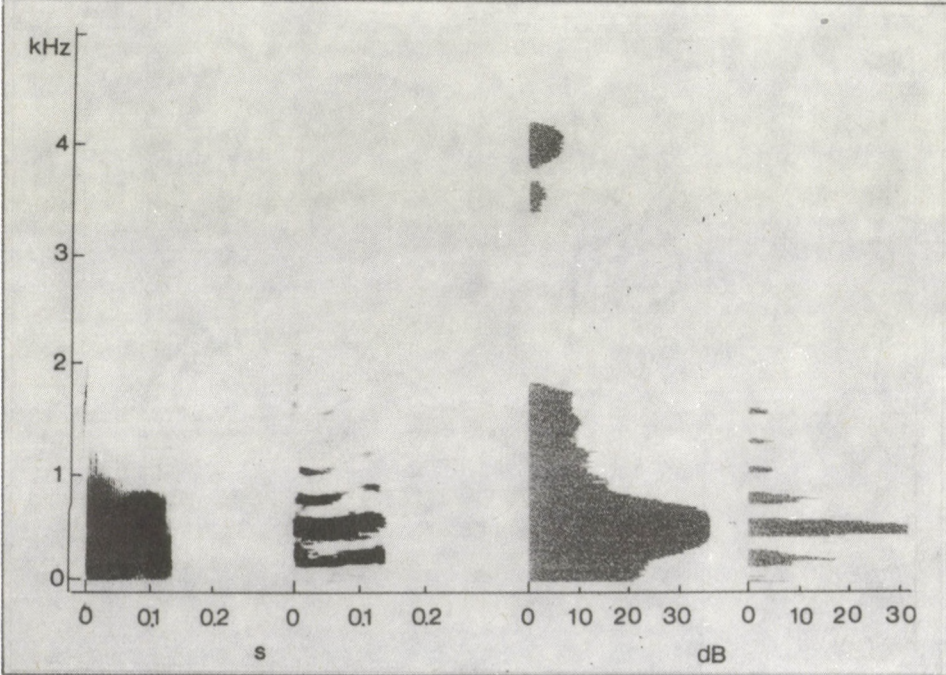
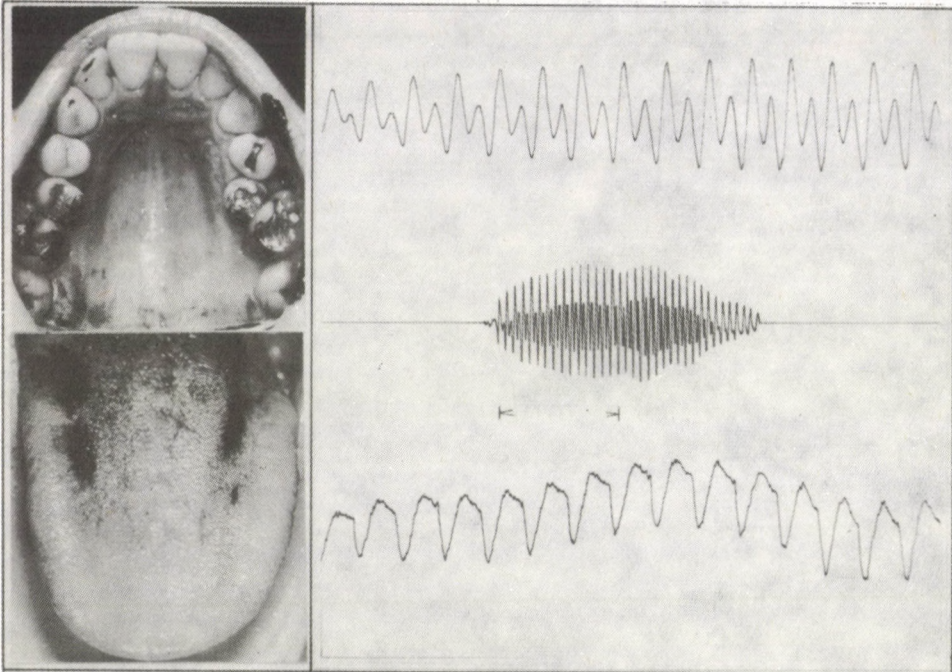


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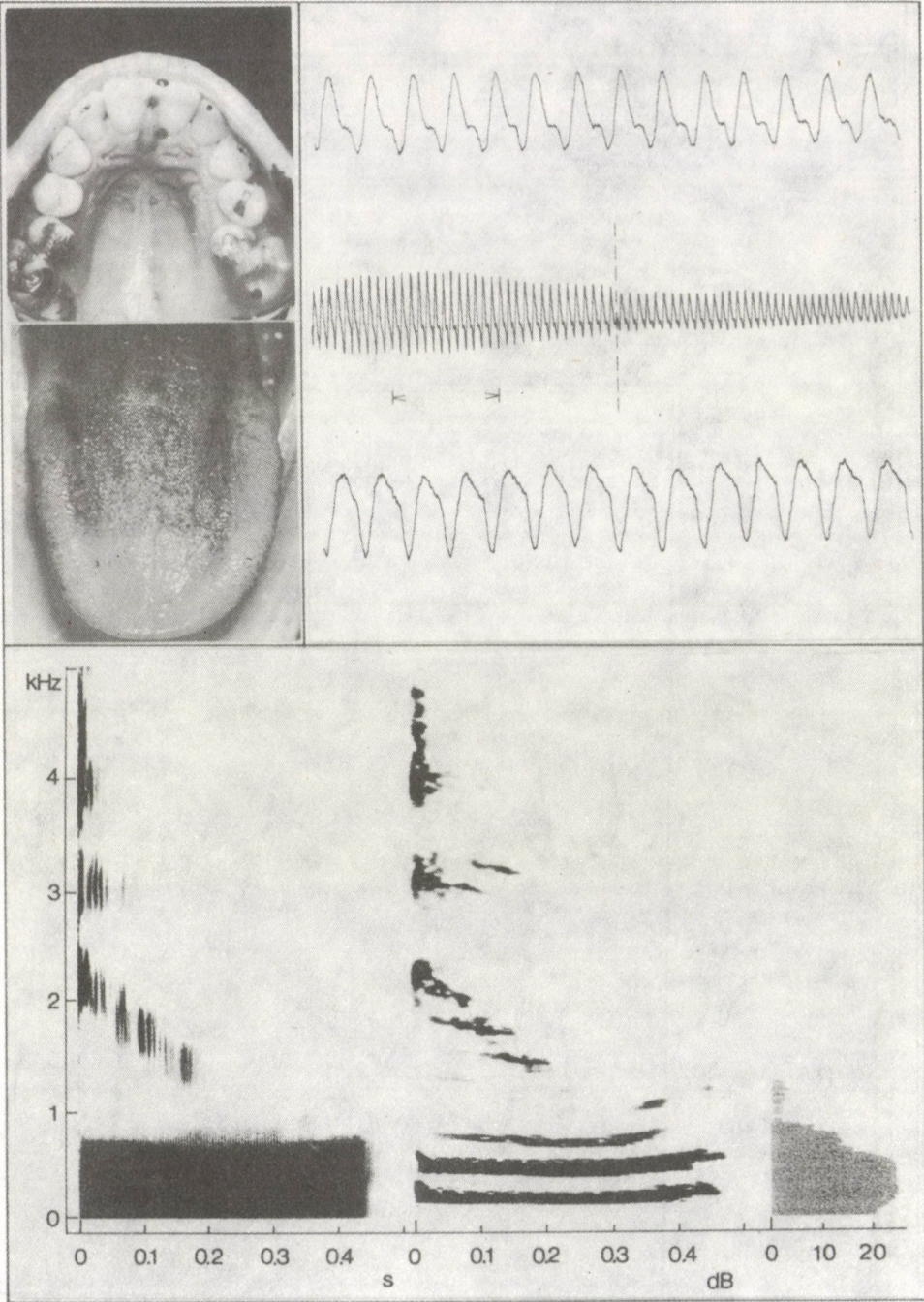
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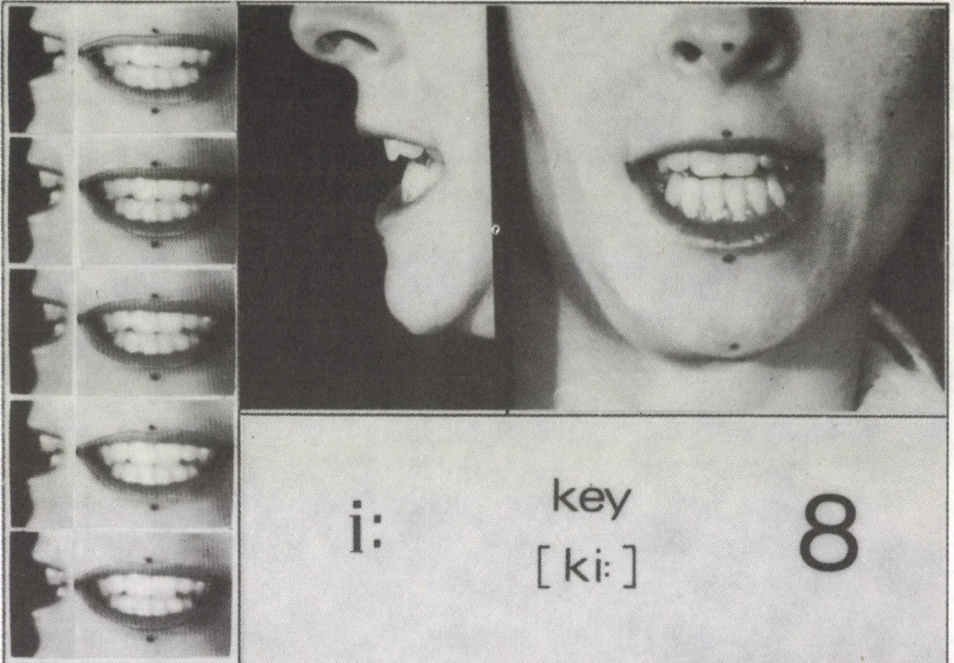
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		<p>u: do 7 [du:]</p>

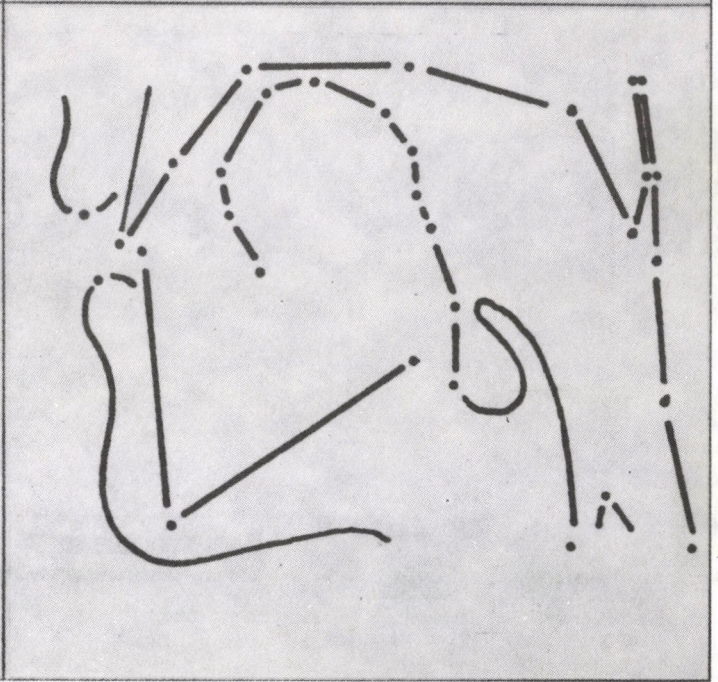
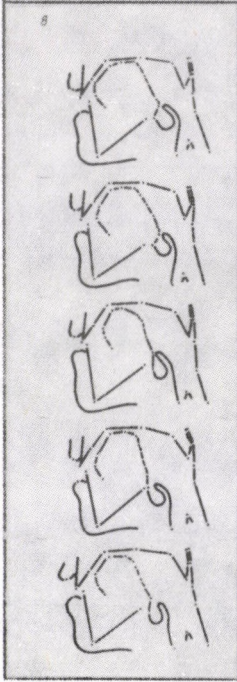


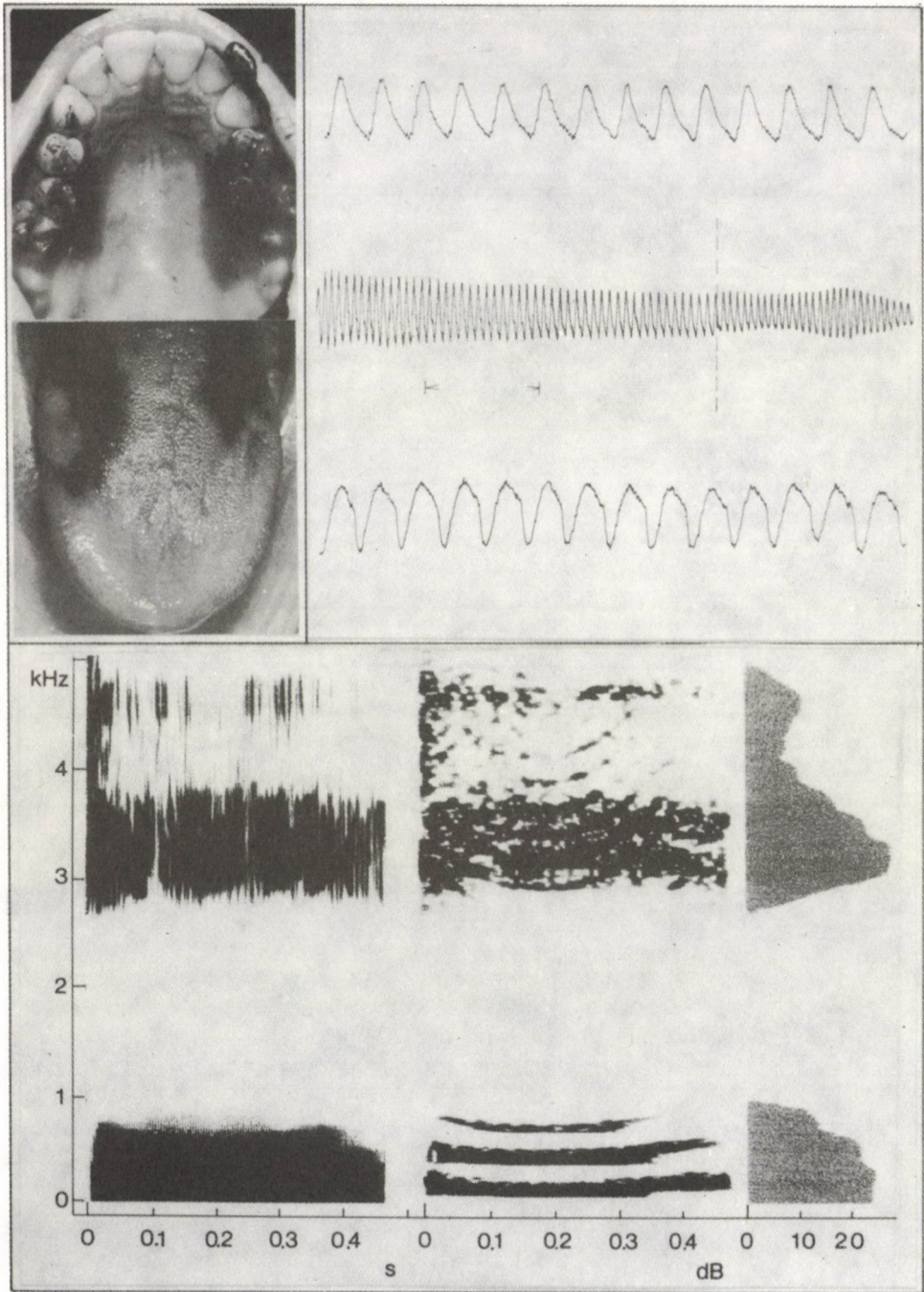


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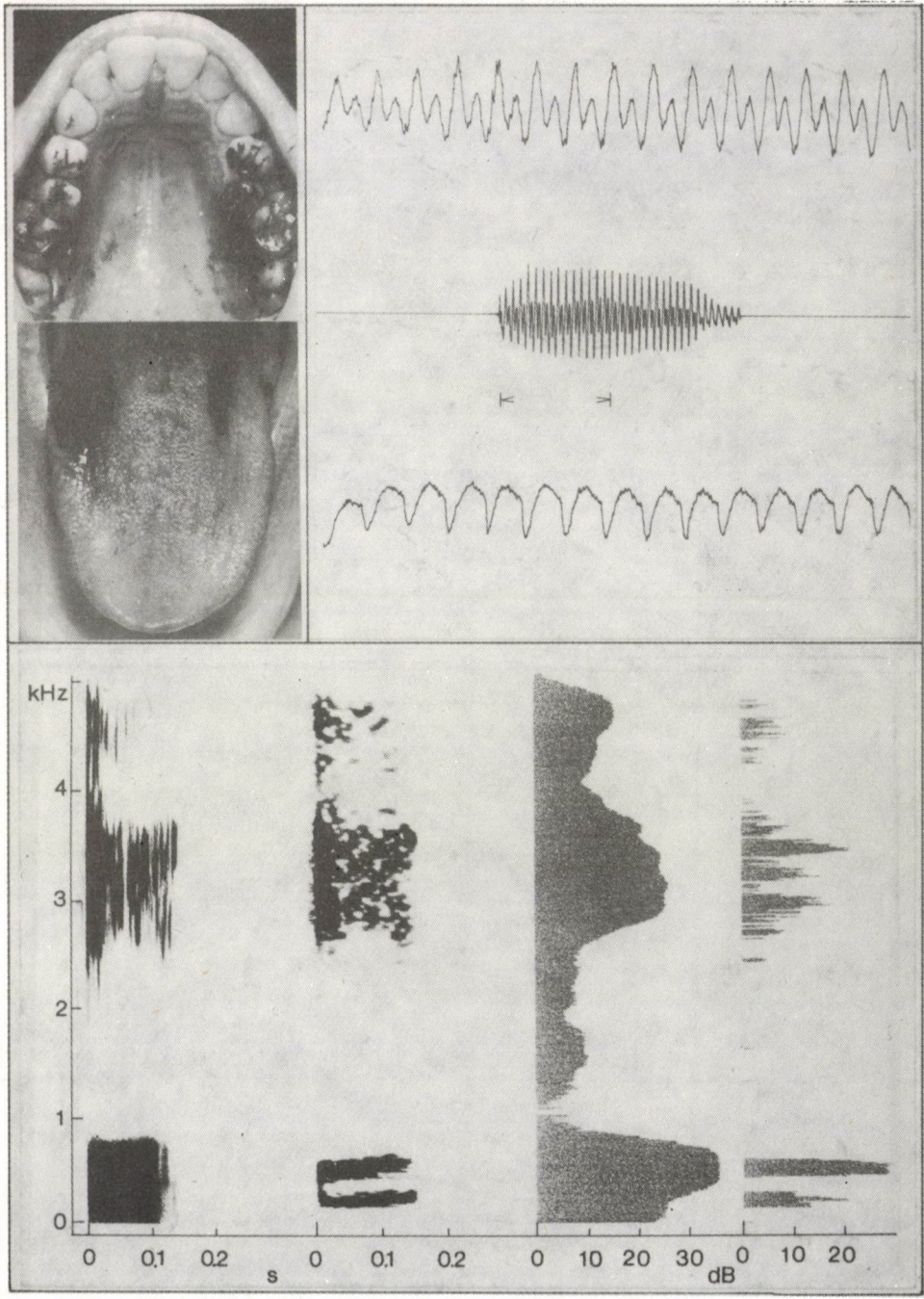
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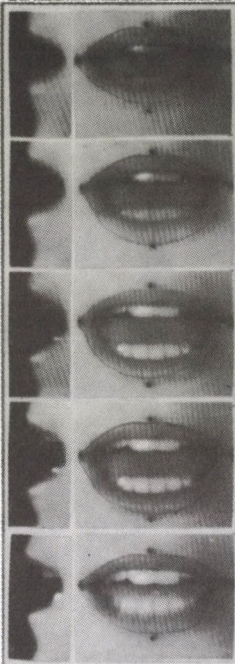
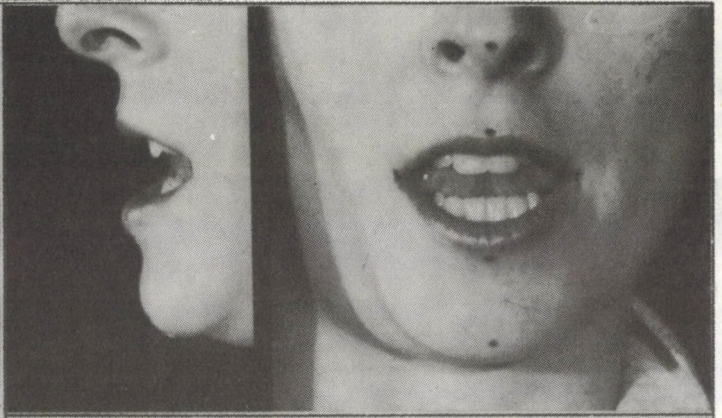

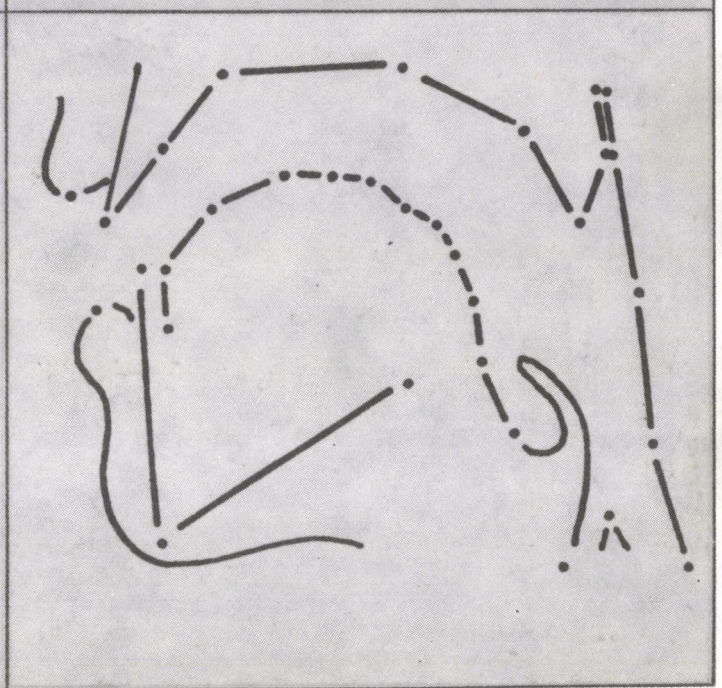
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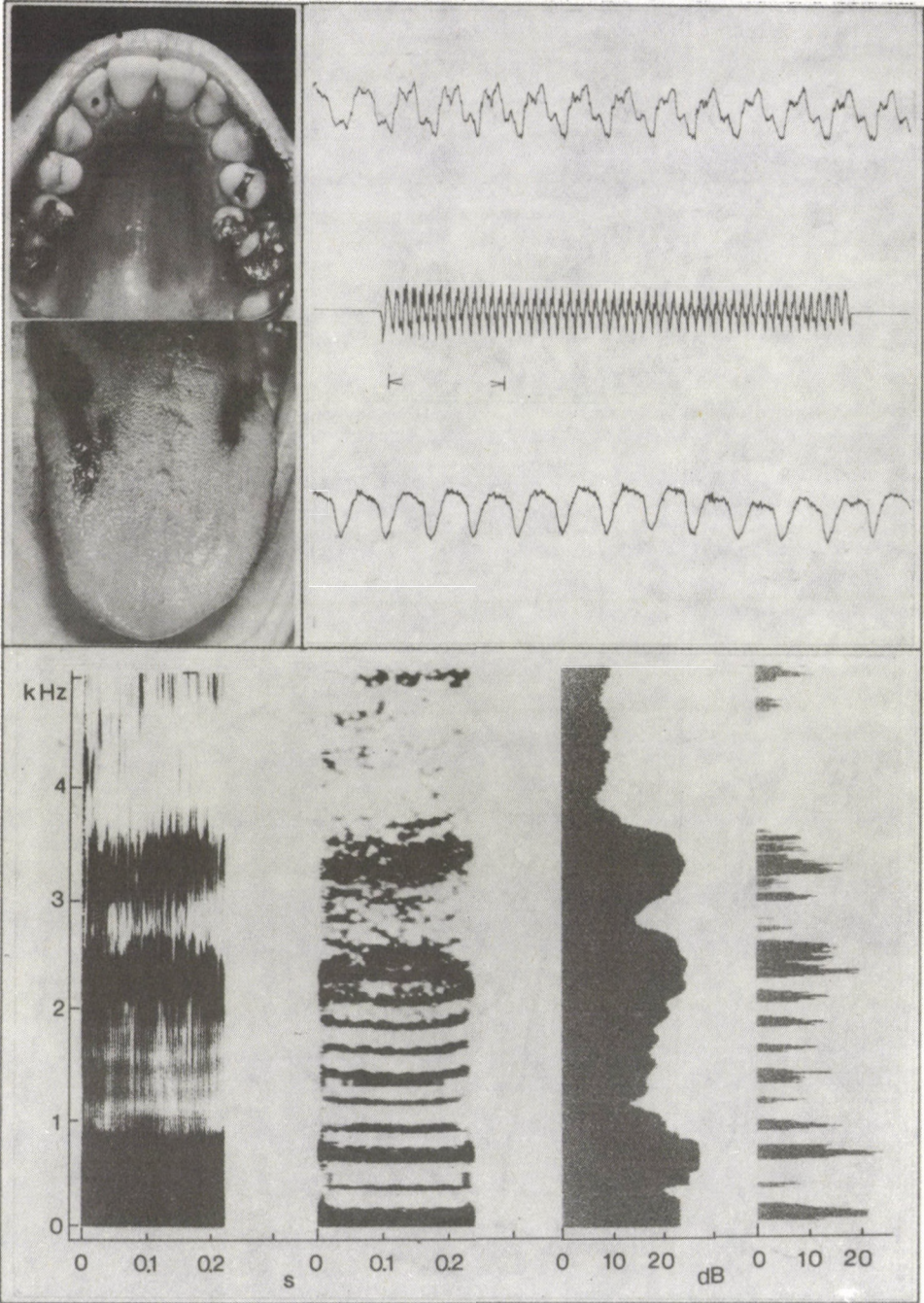




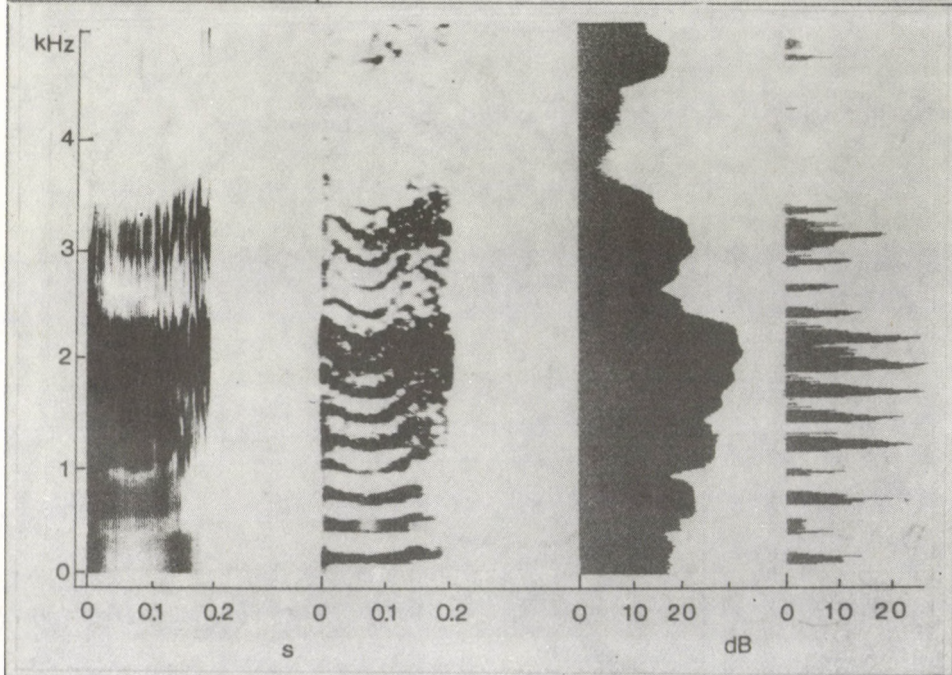
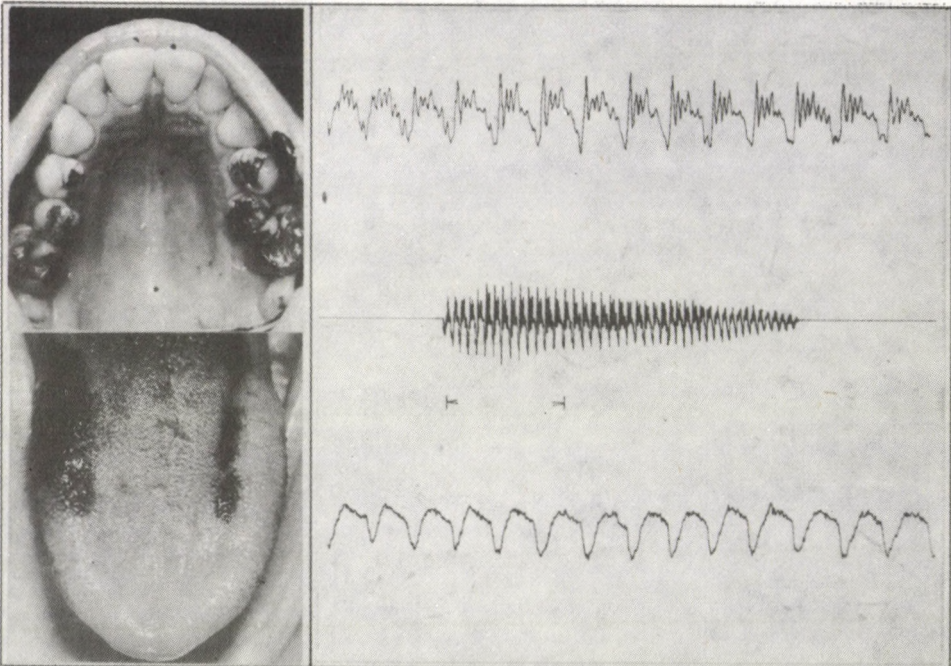
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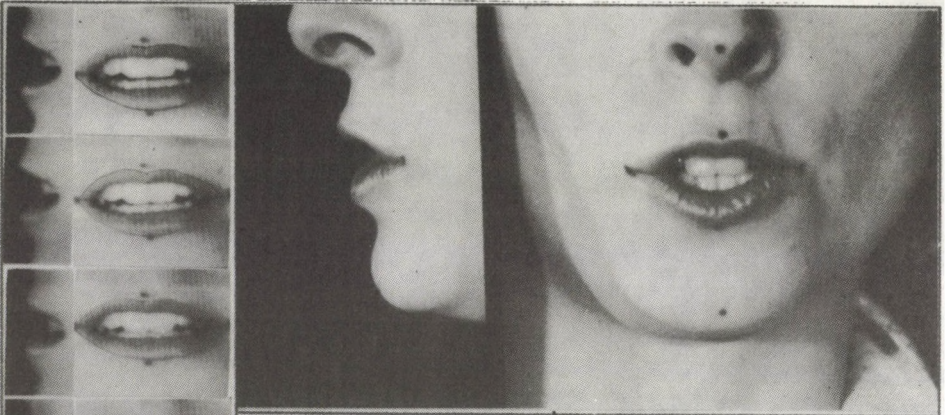


	
<p> ε man 10 [mɛn] </p>	
	



	<p>æ hat 11 [hæt]</p>	

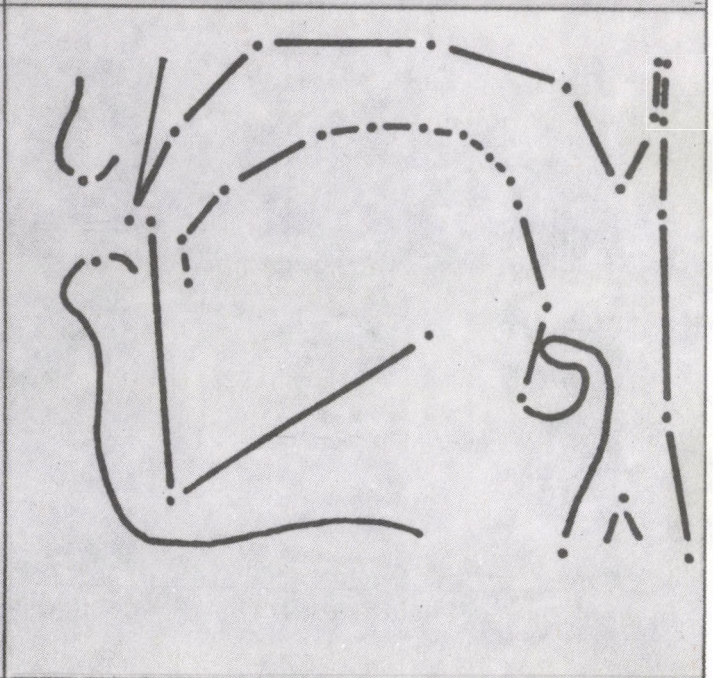


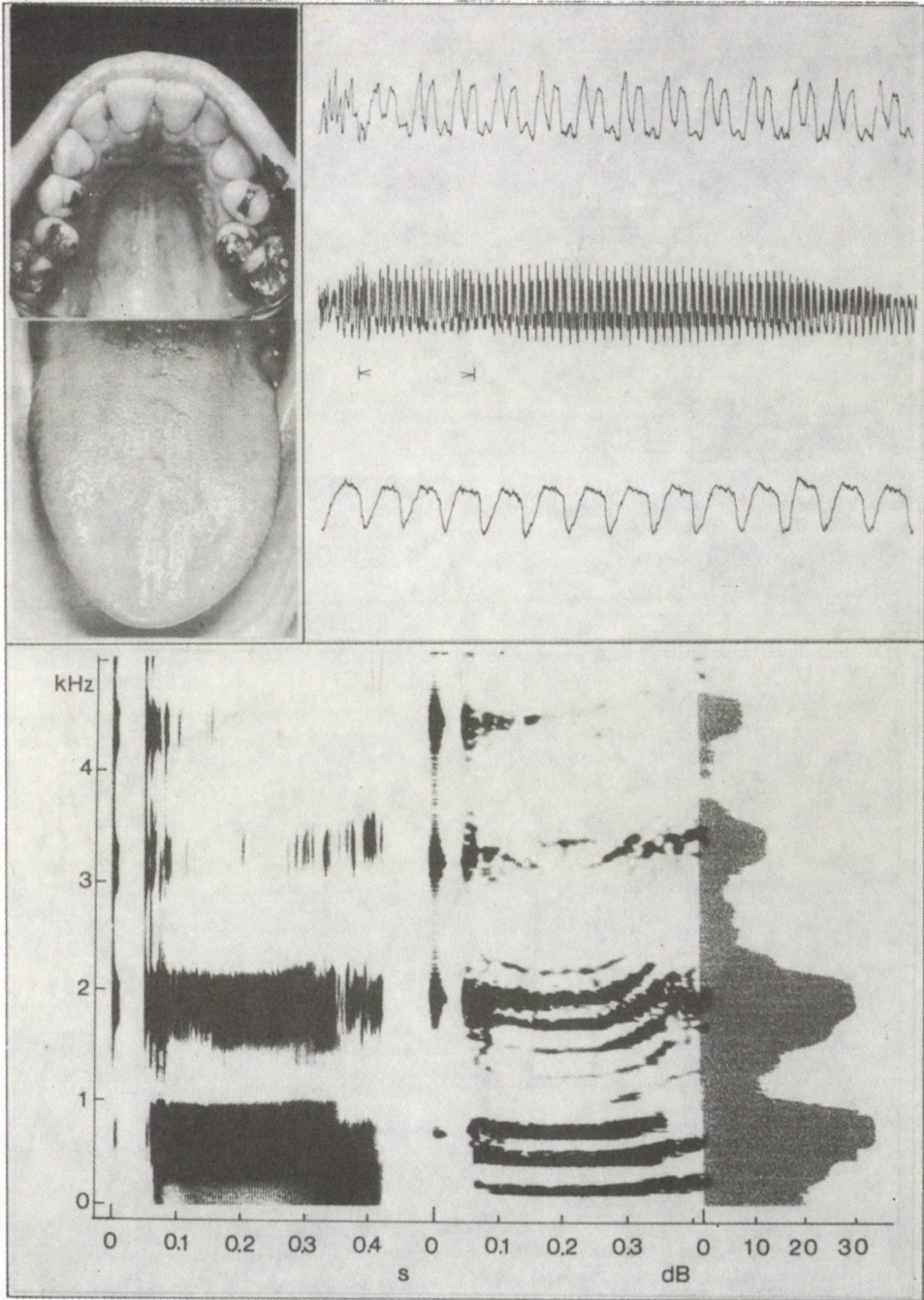


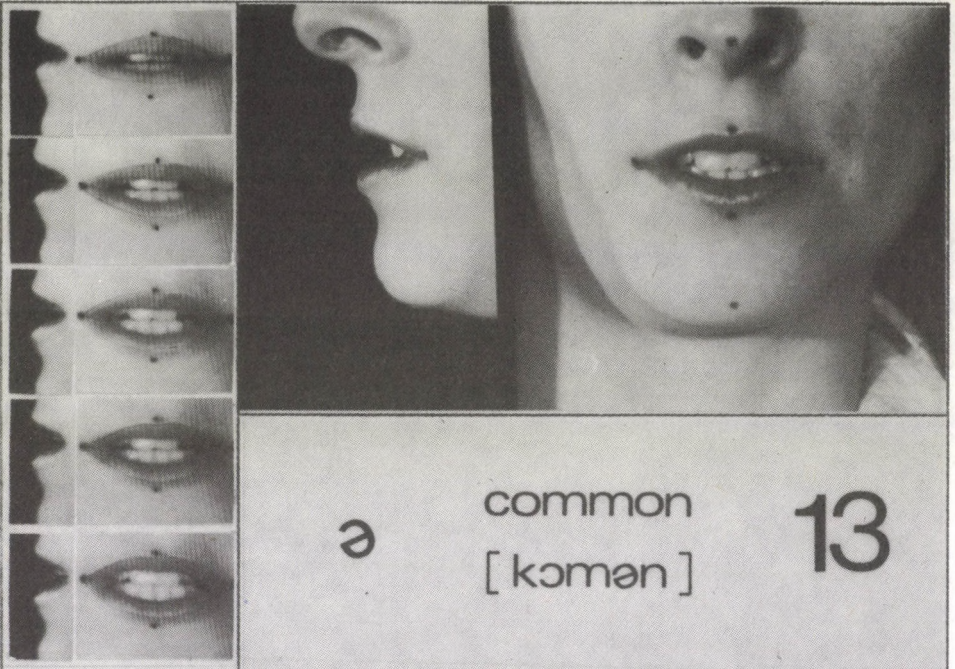
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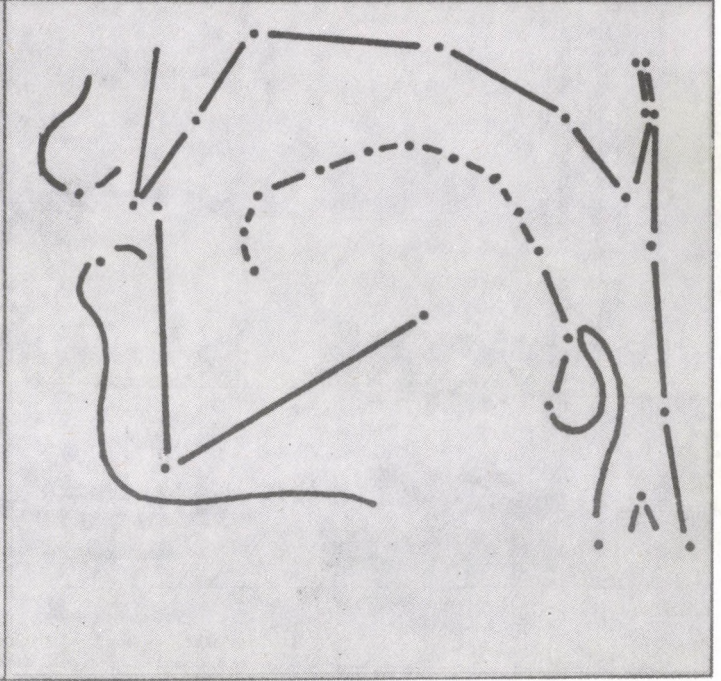


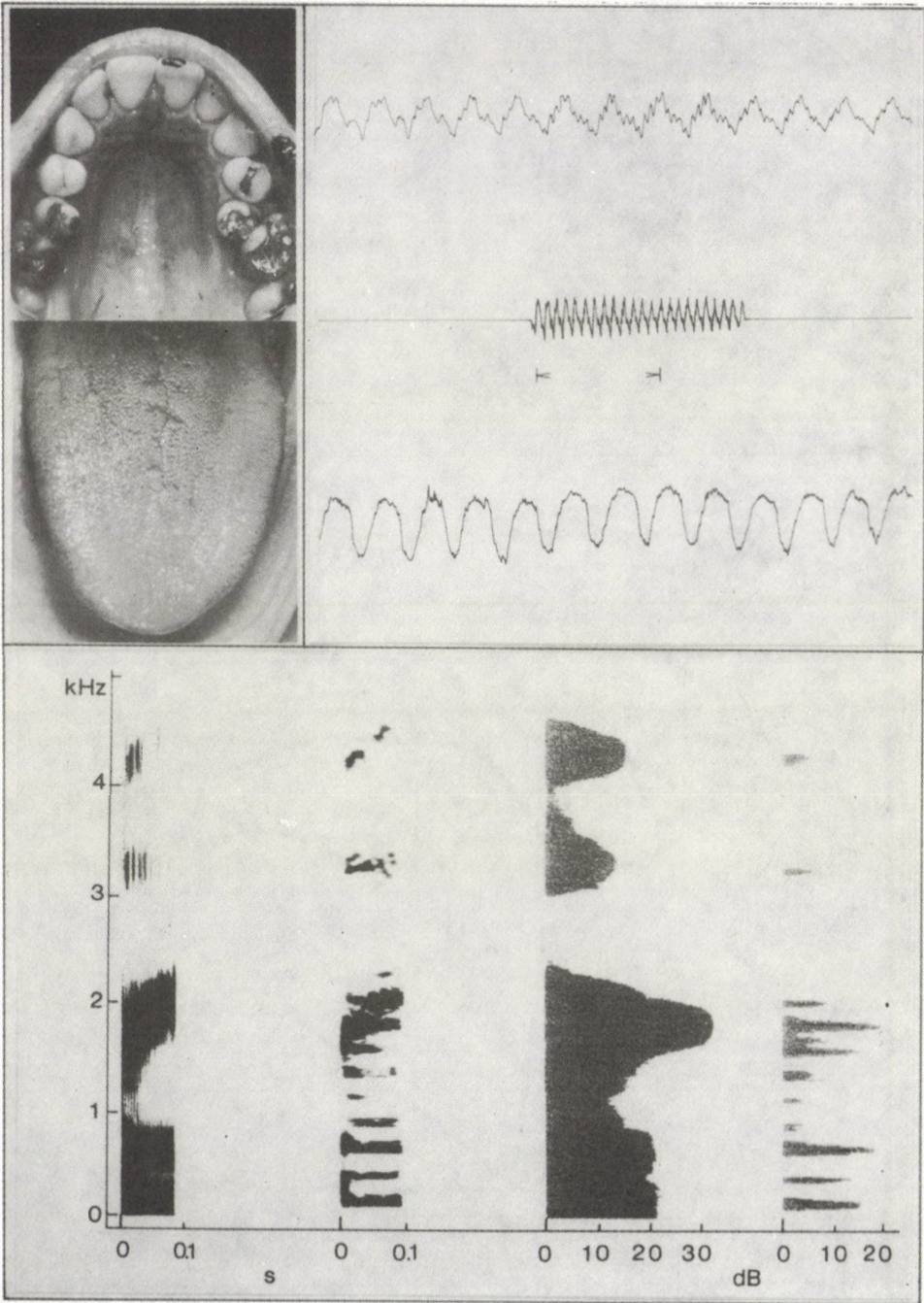


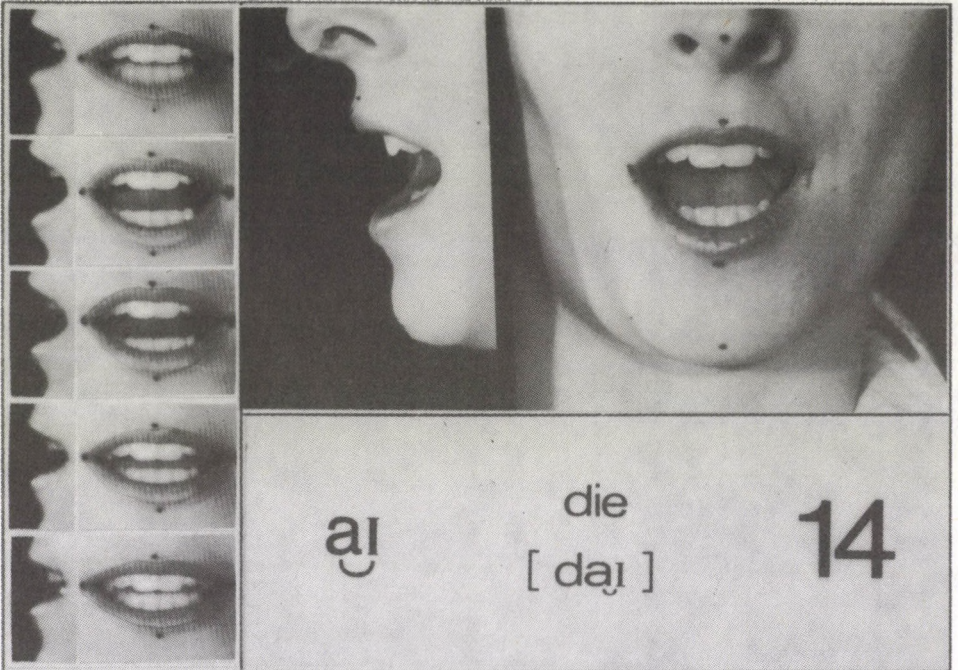
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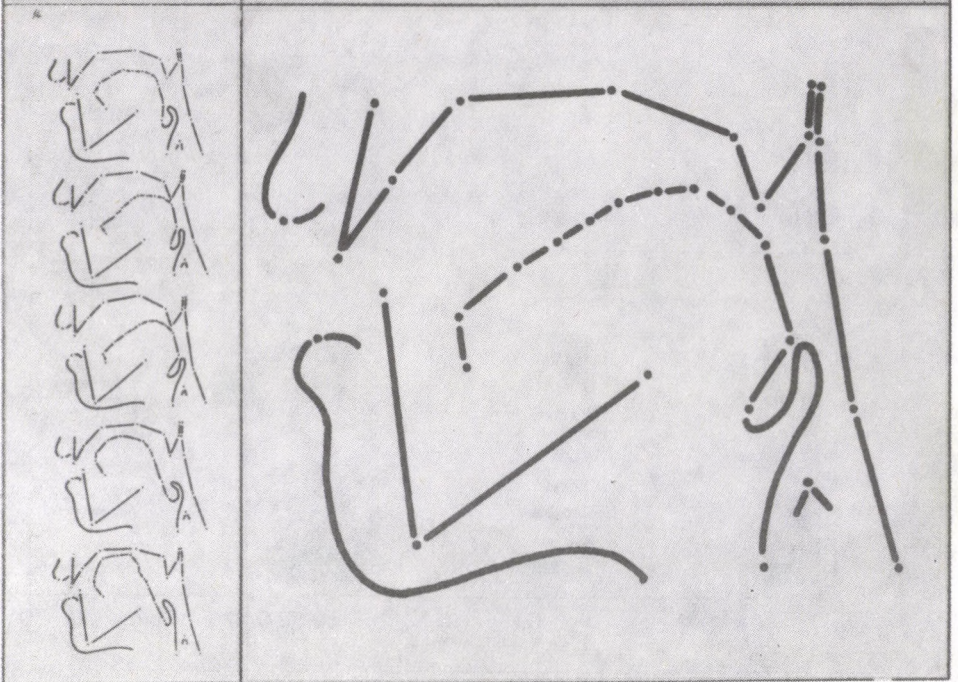


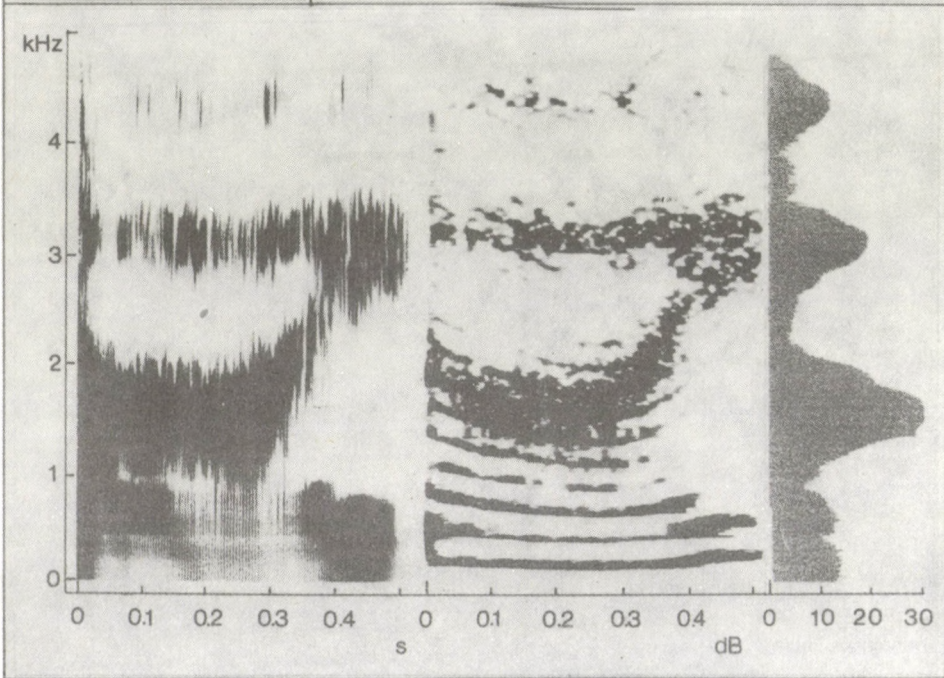
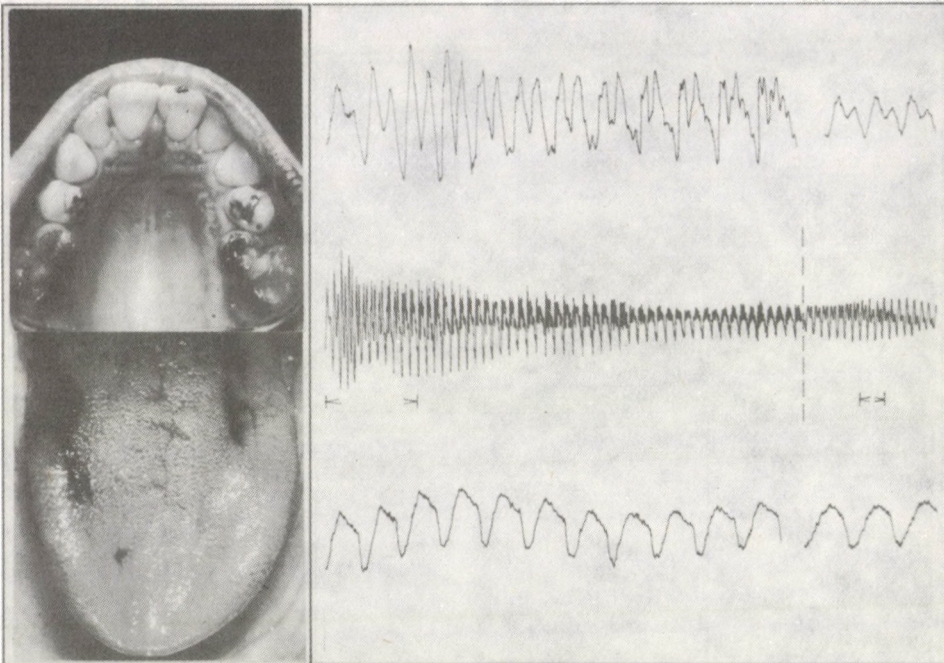



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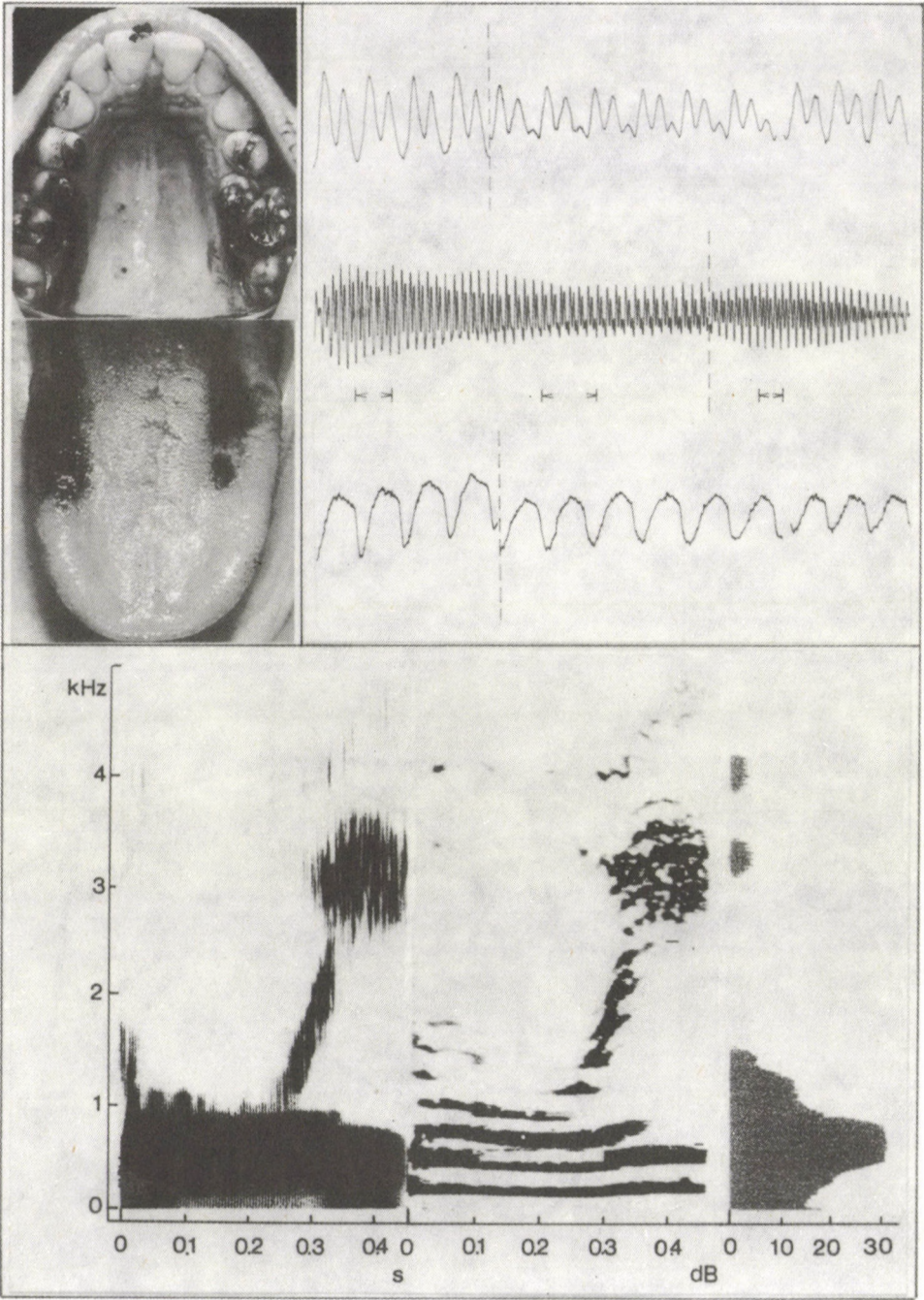
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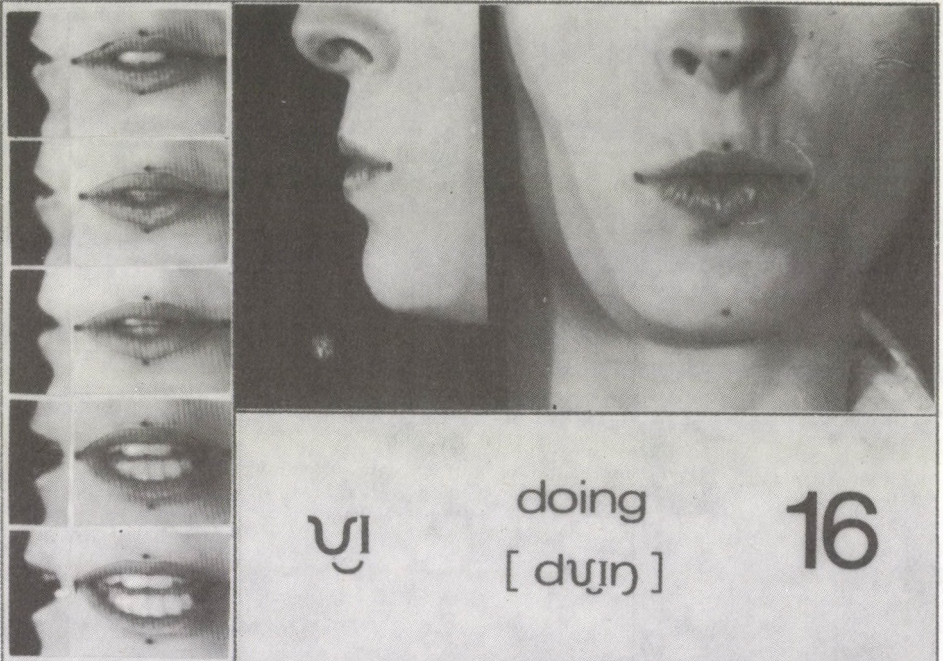
14





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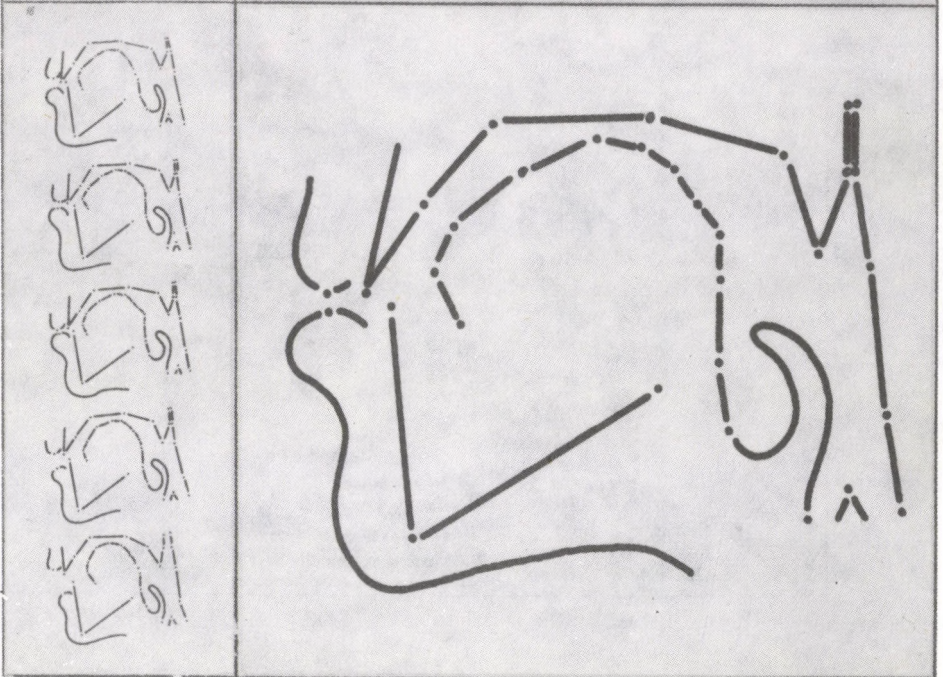


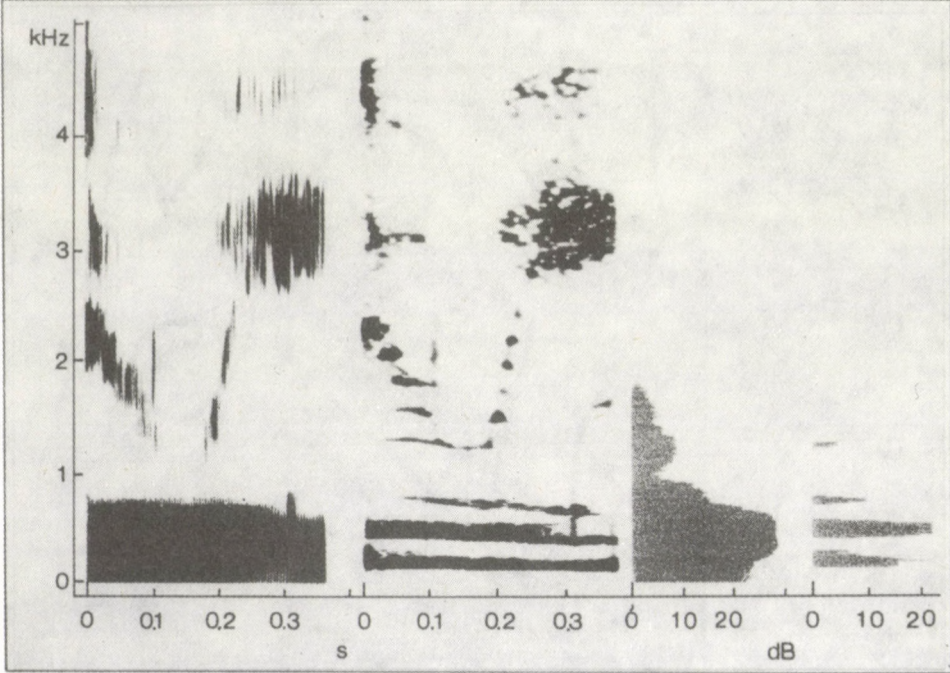
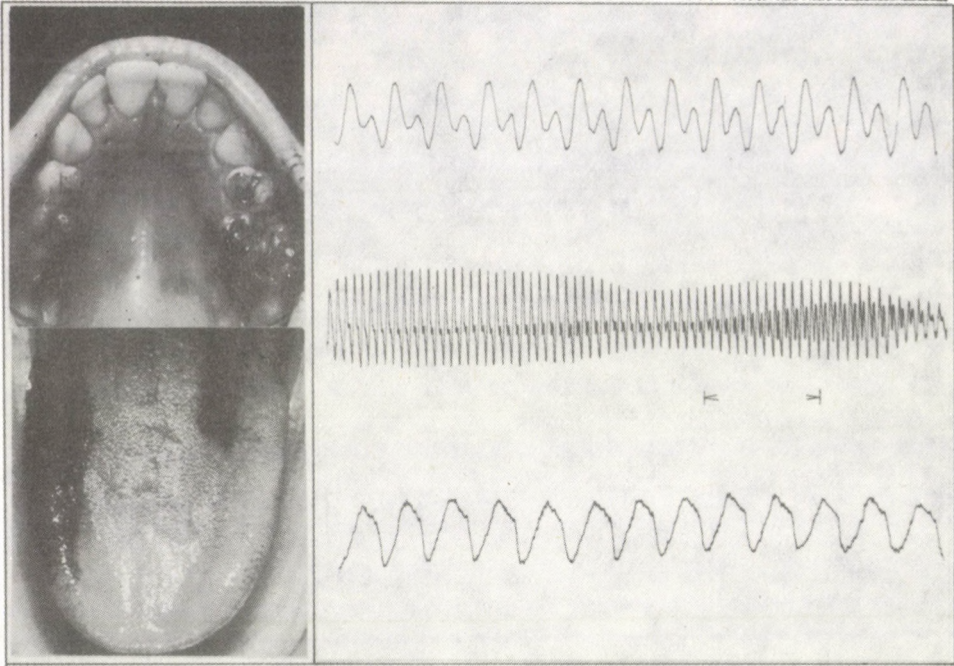


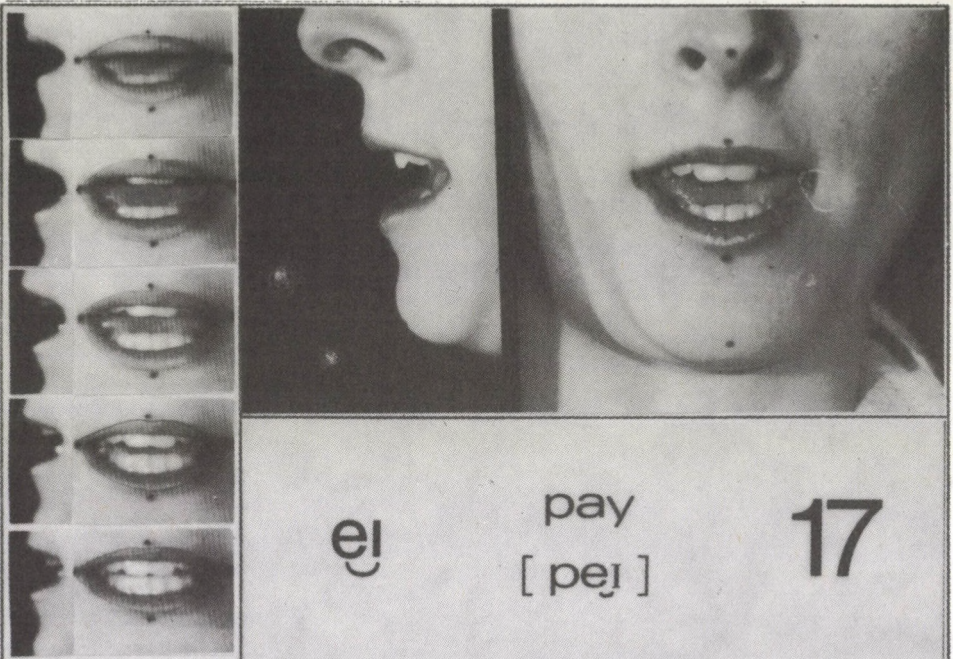
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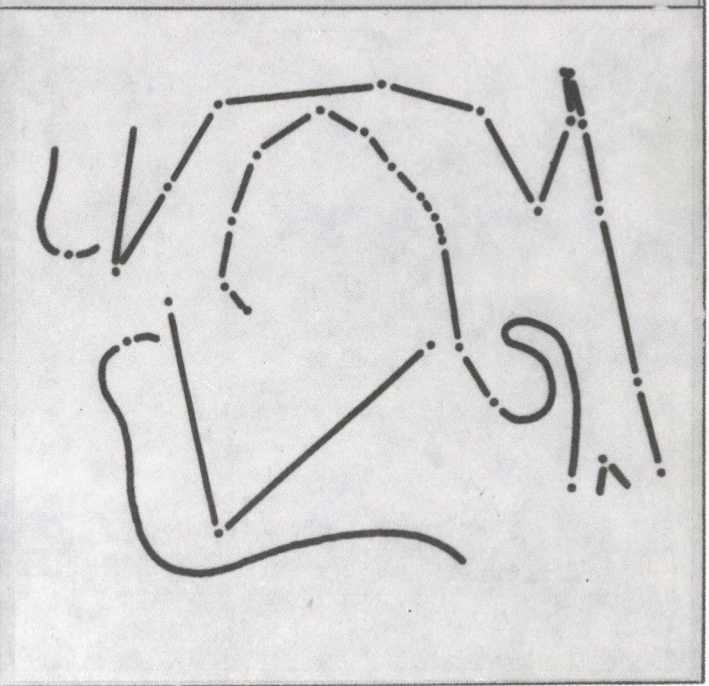
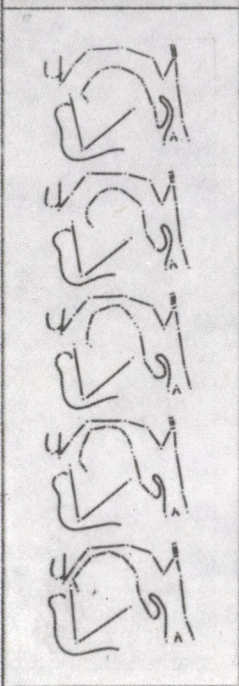


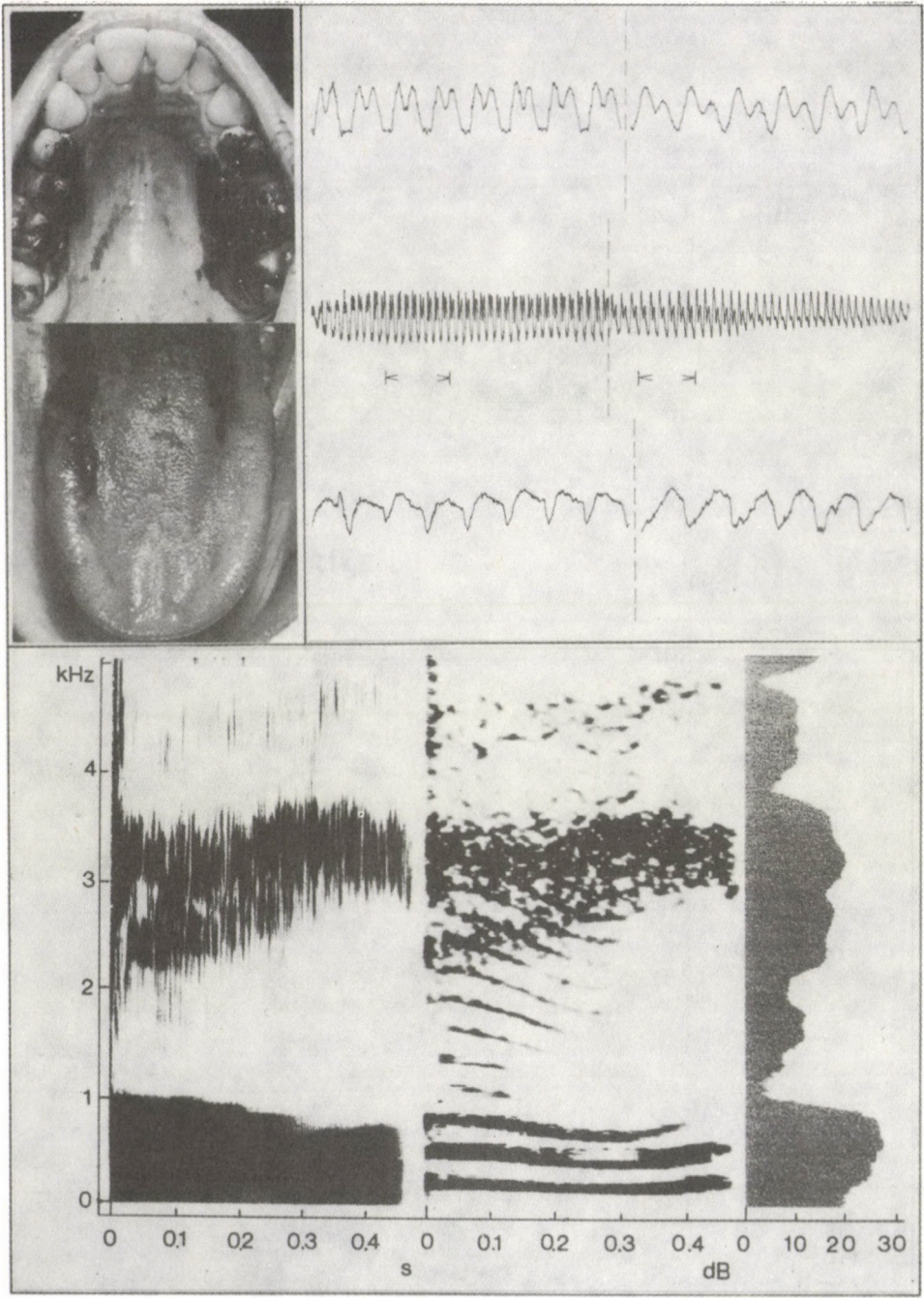


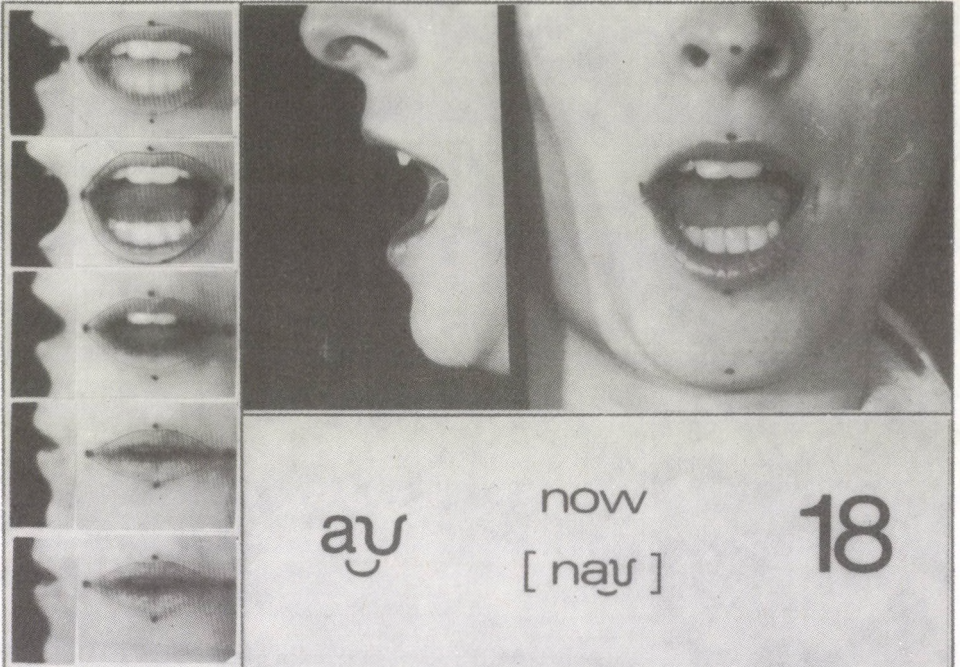
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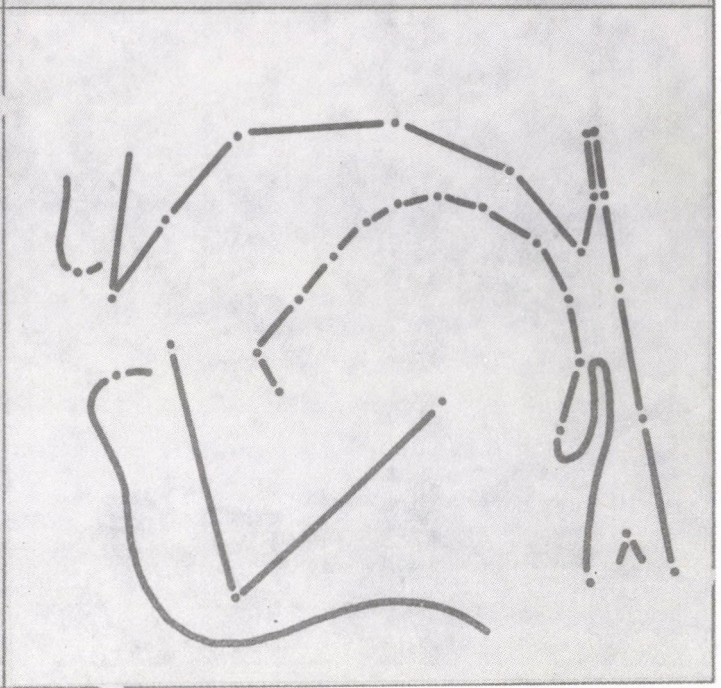
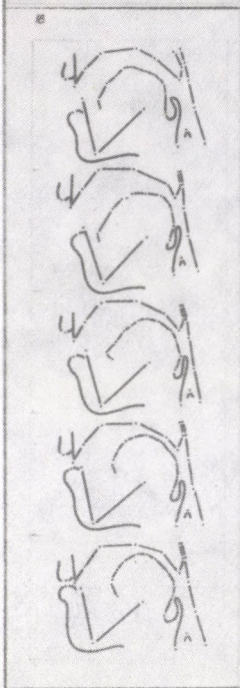


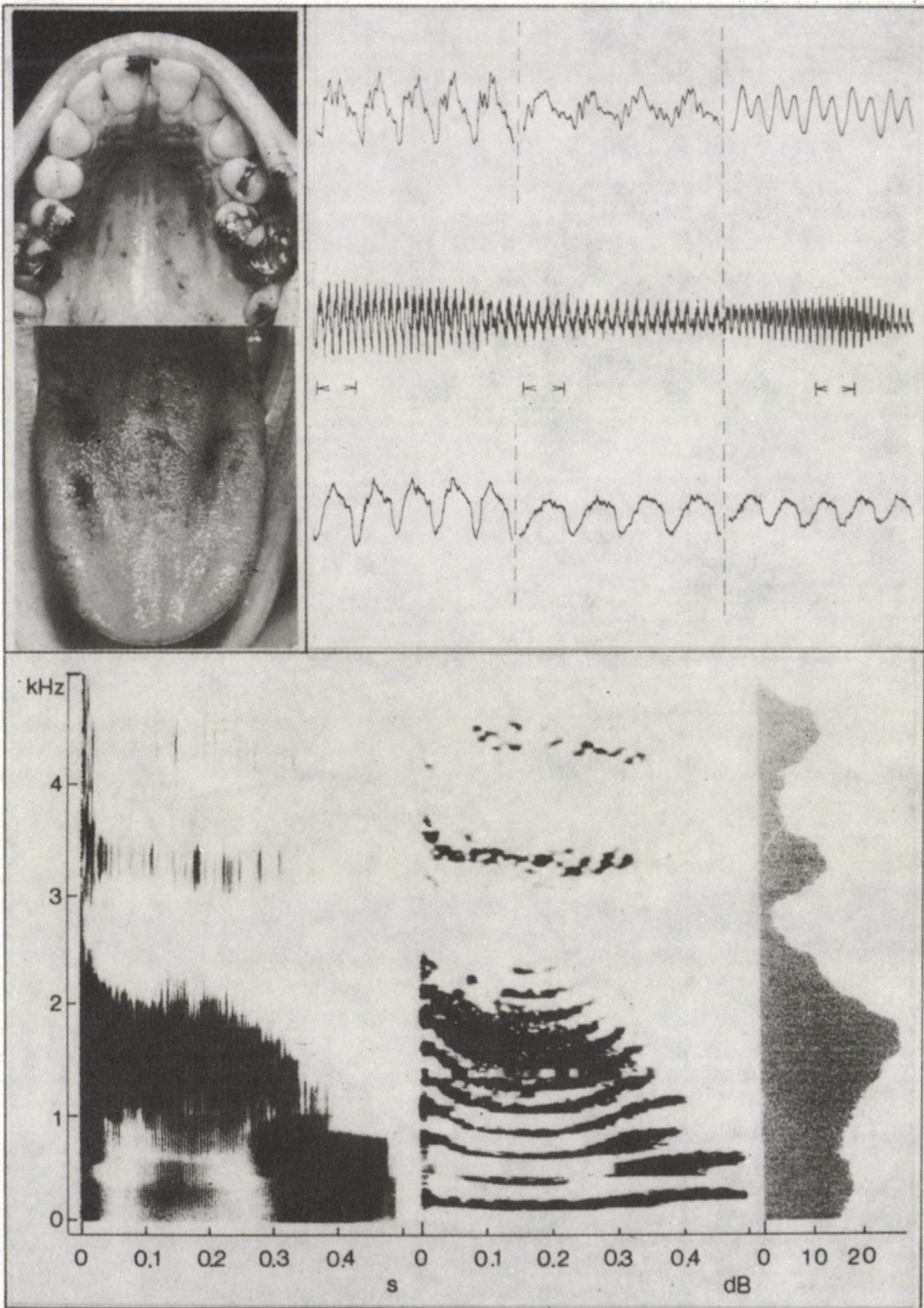


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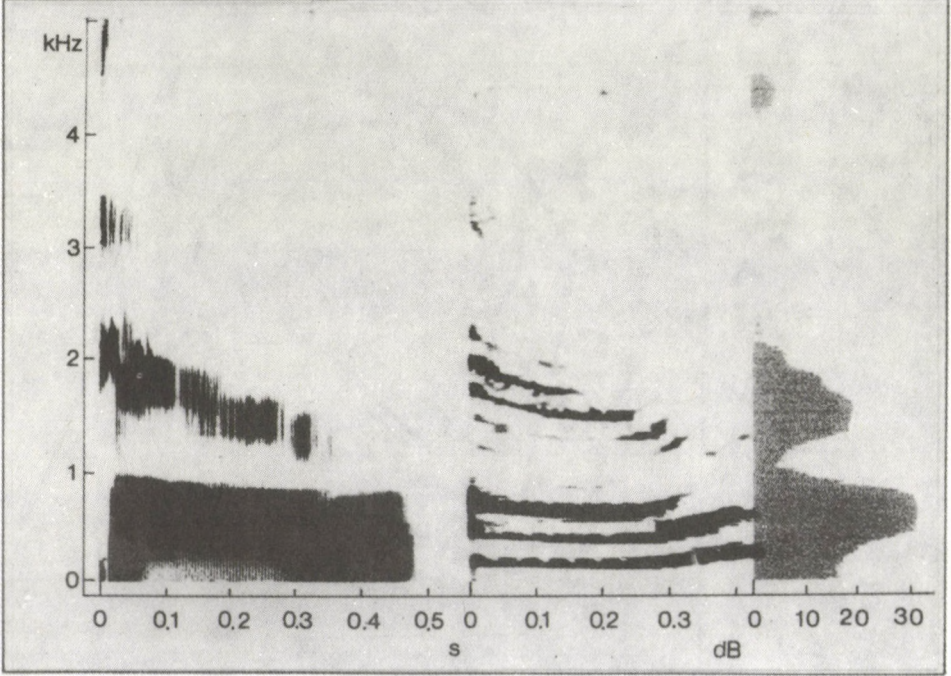
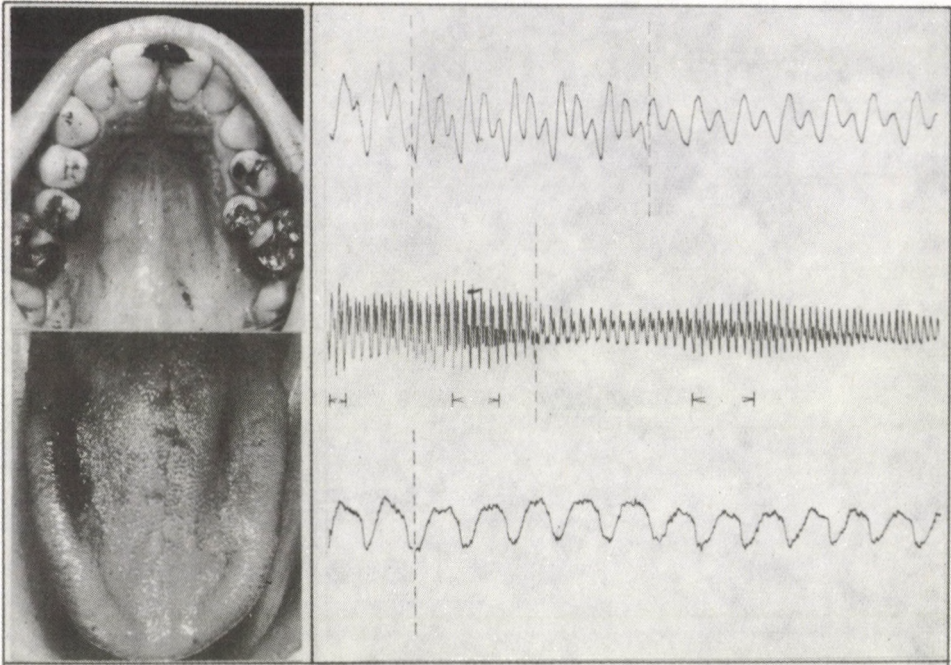
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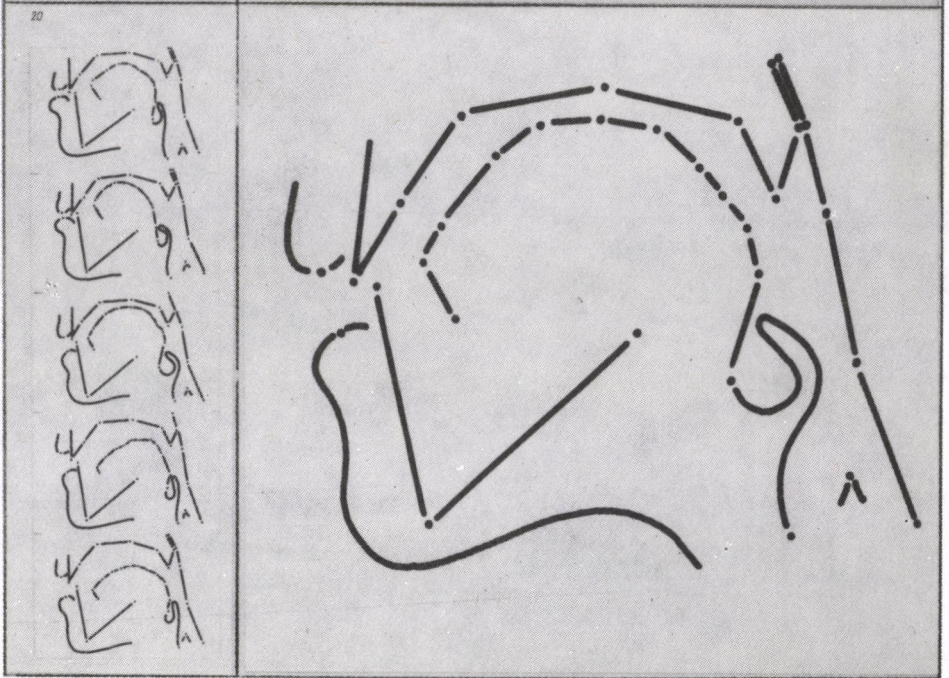
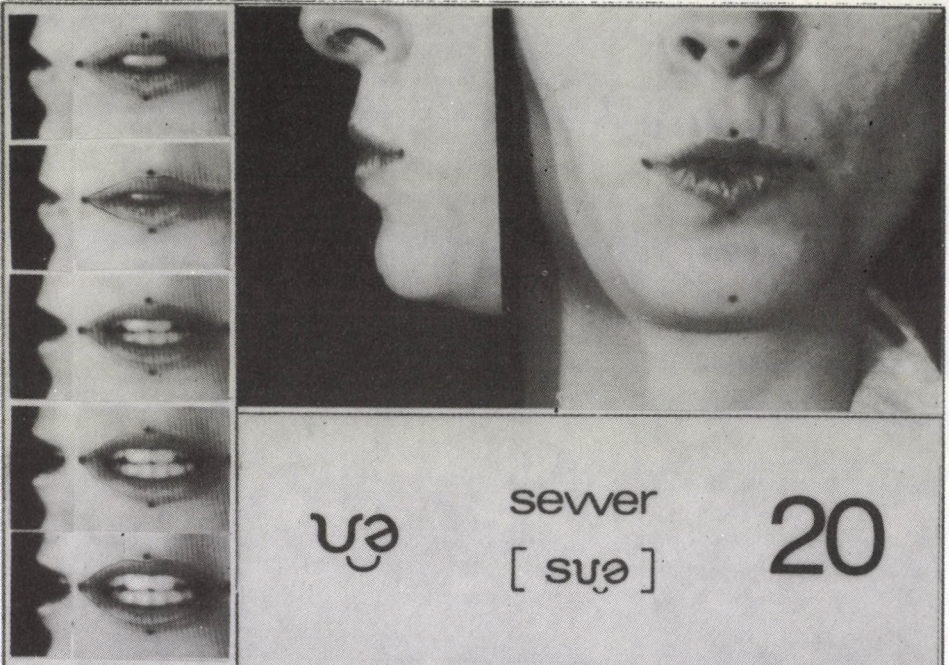
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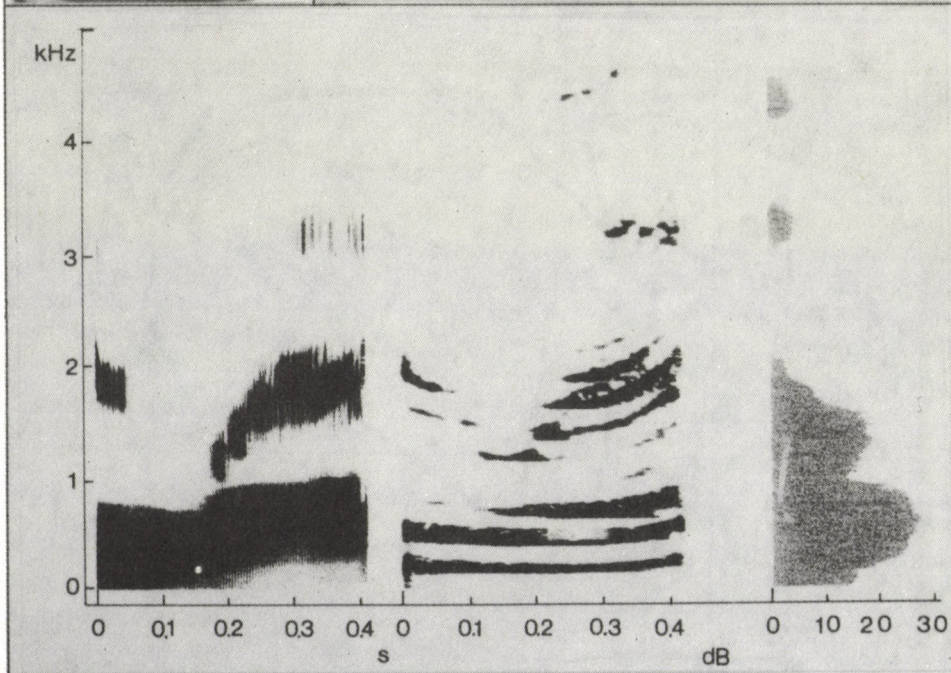
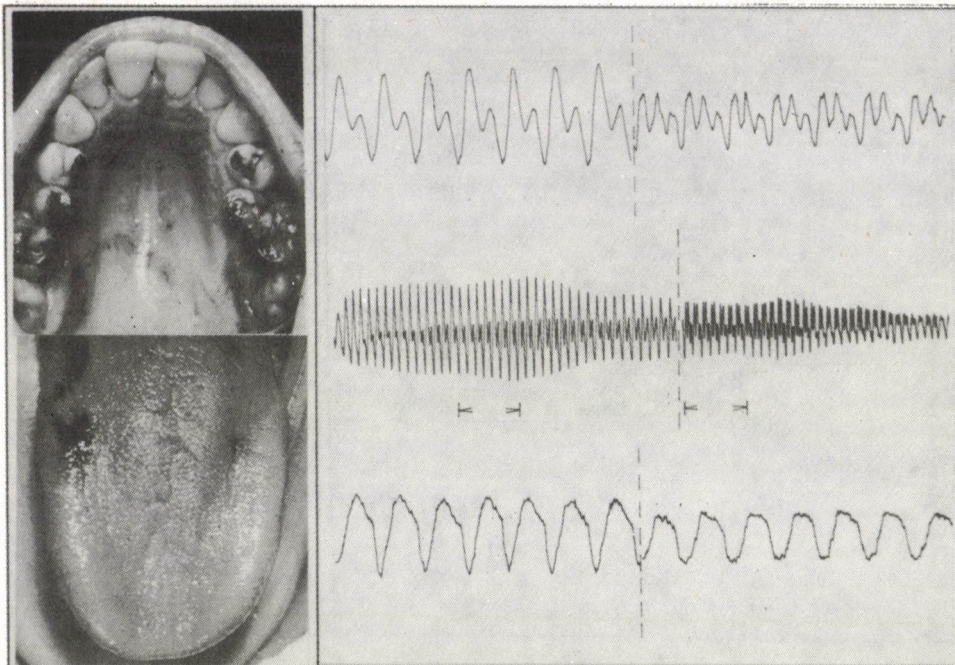


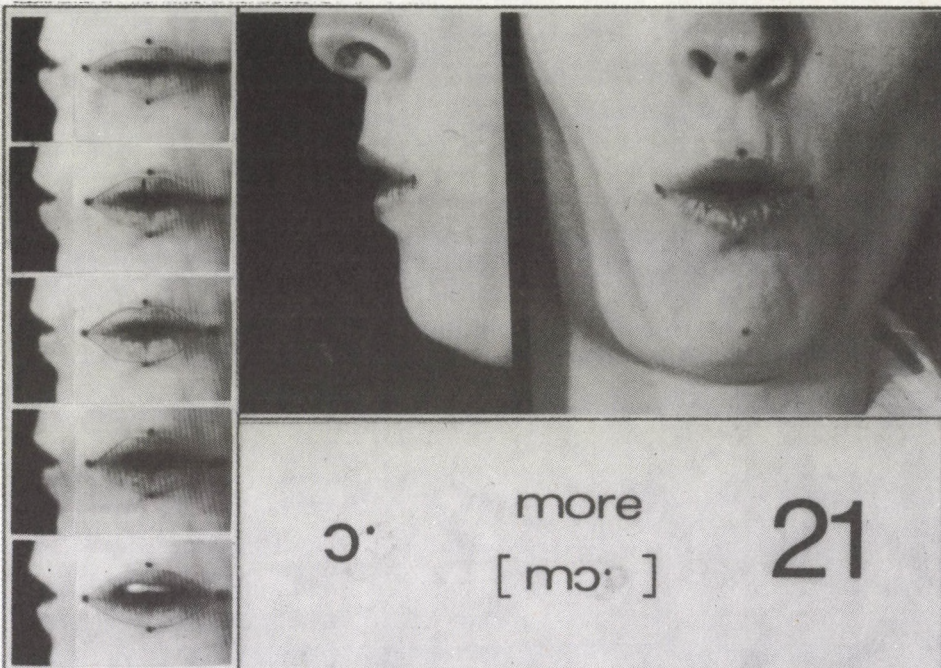


	<p> су so [soy] 19 </p>





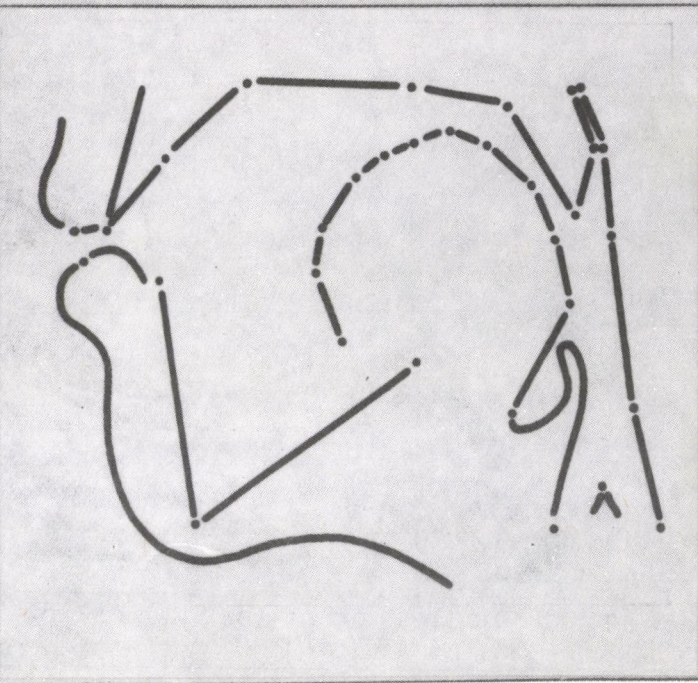
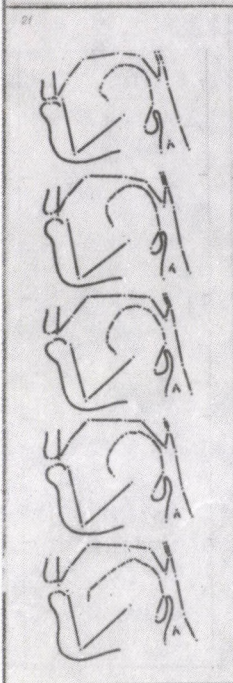


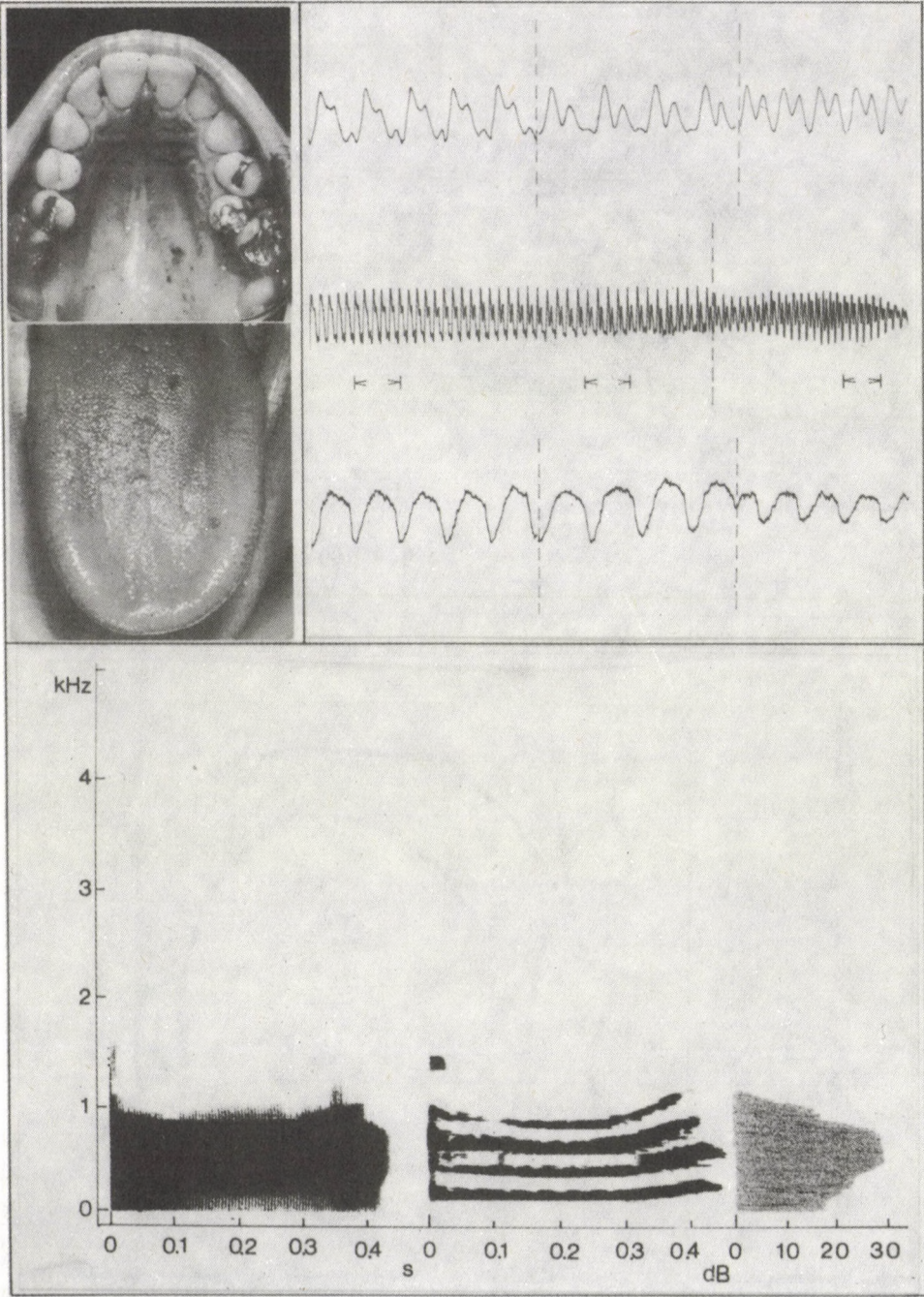


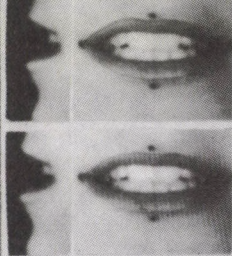
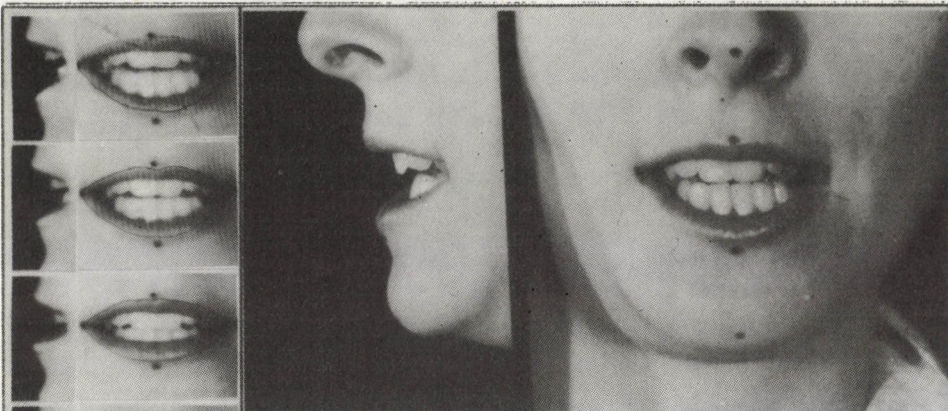
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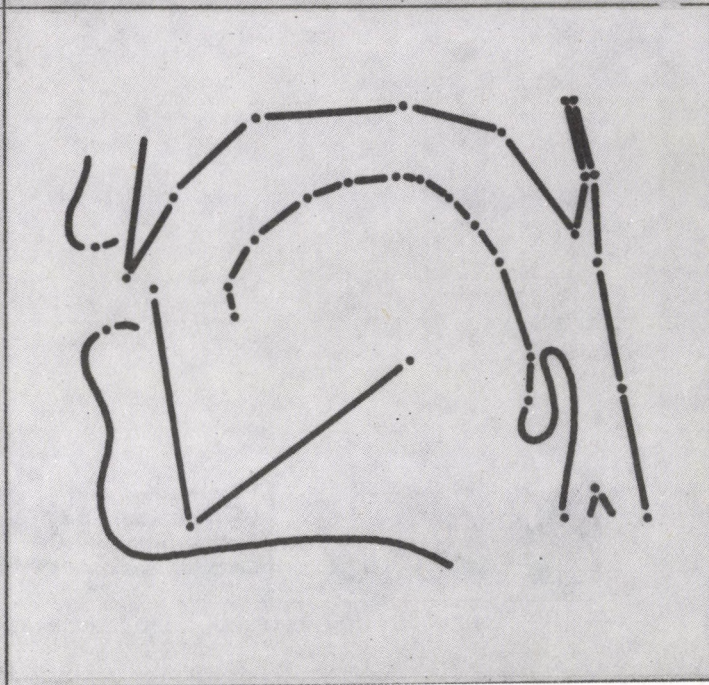
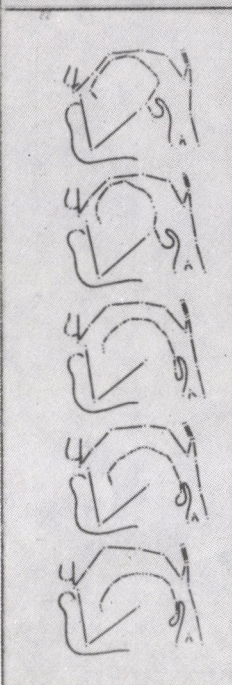
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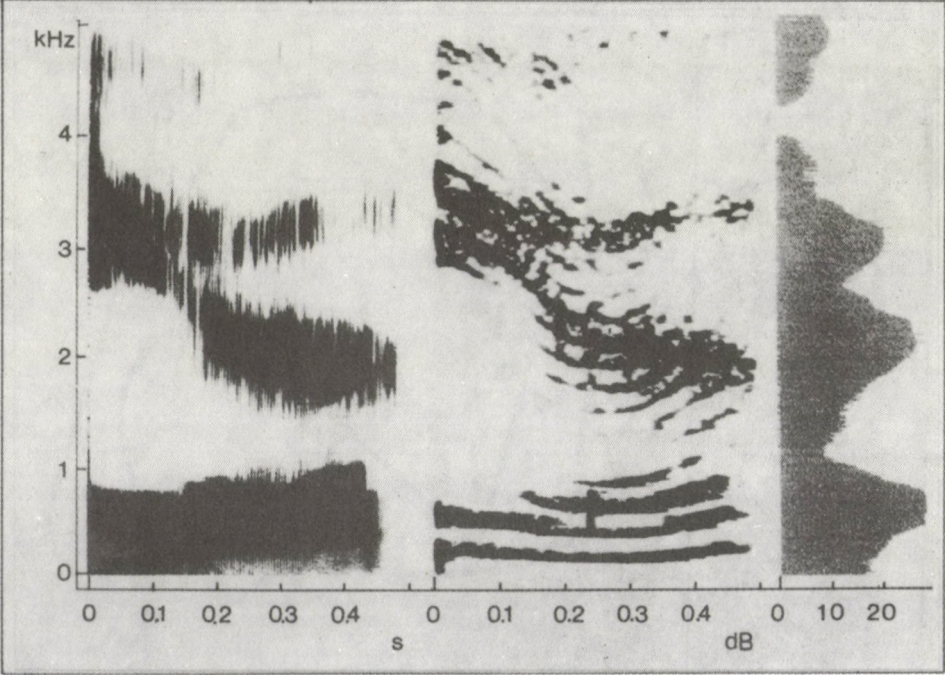
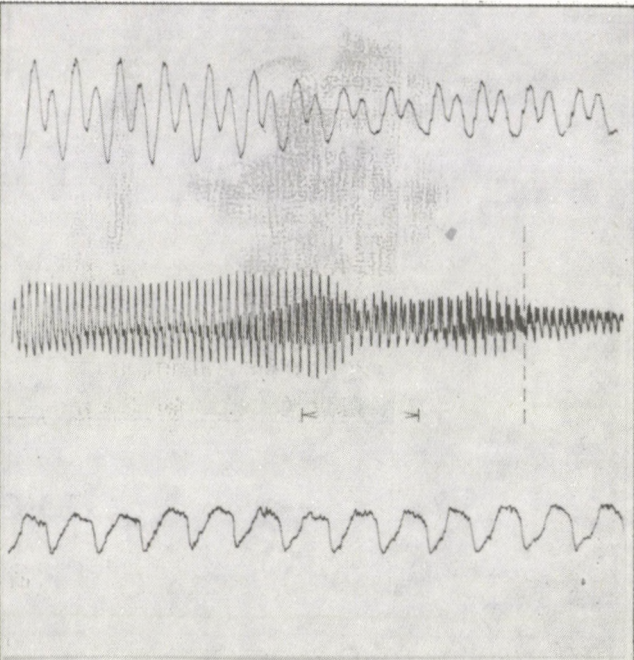
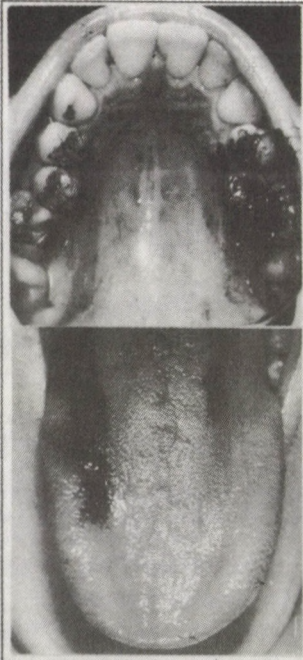




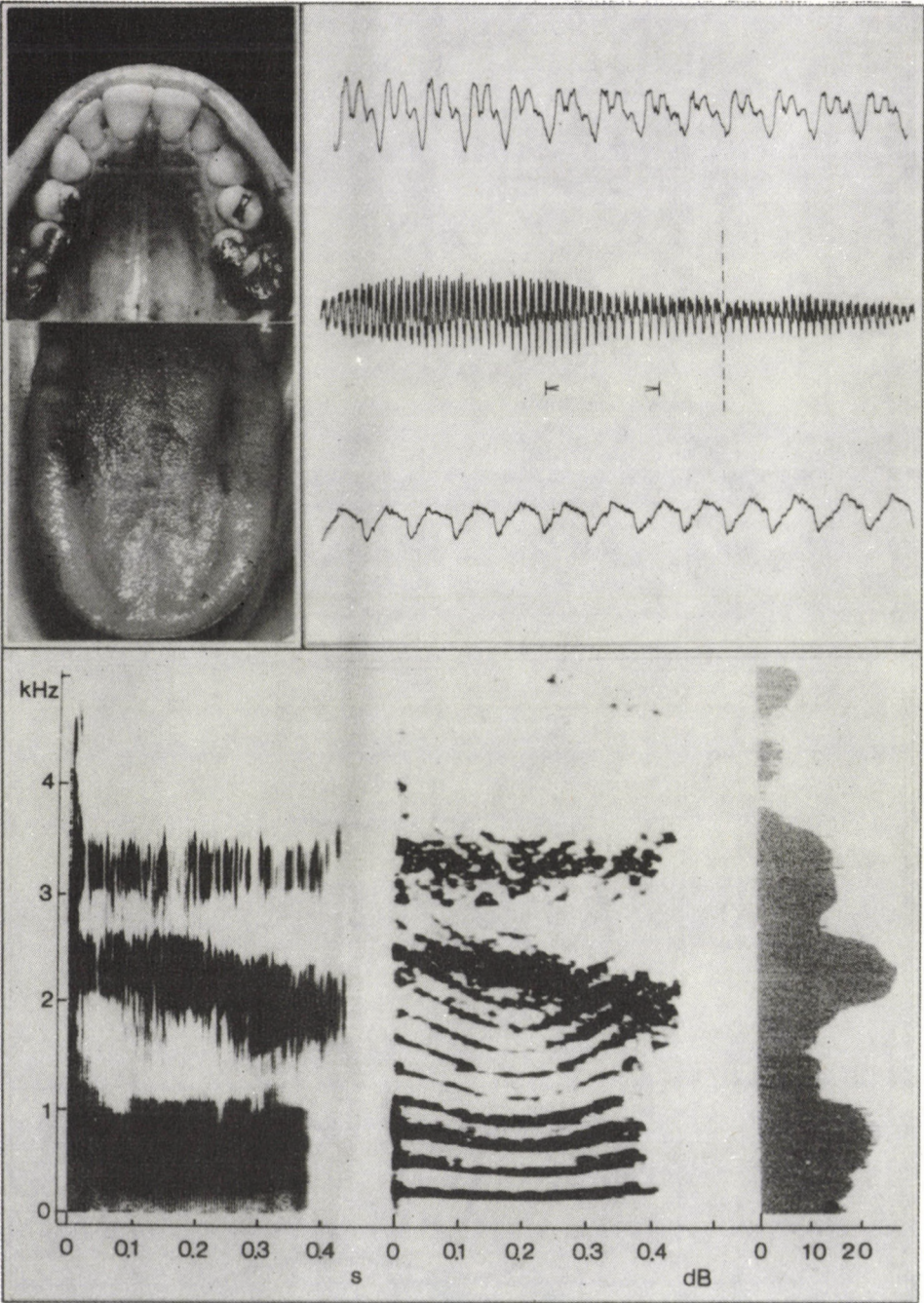


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[hɪə]

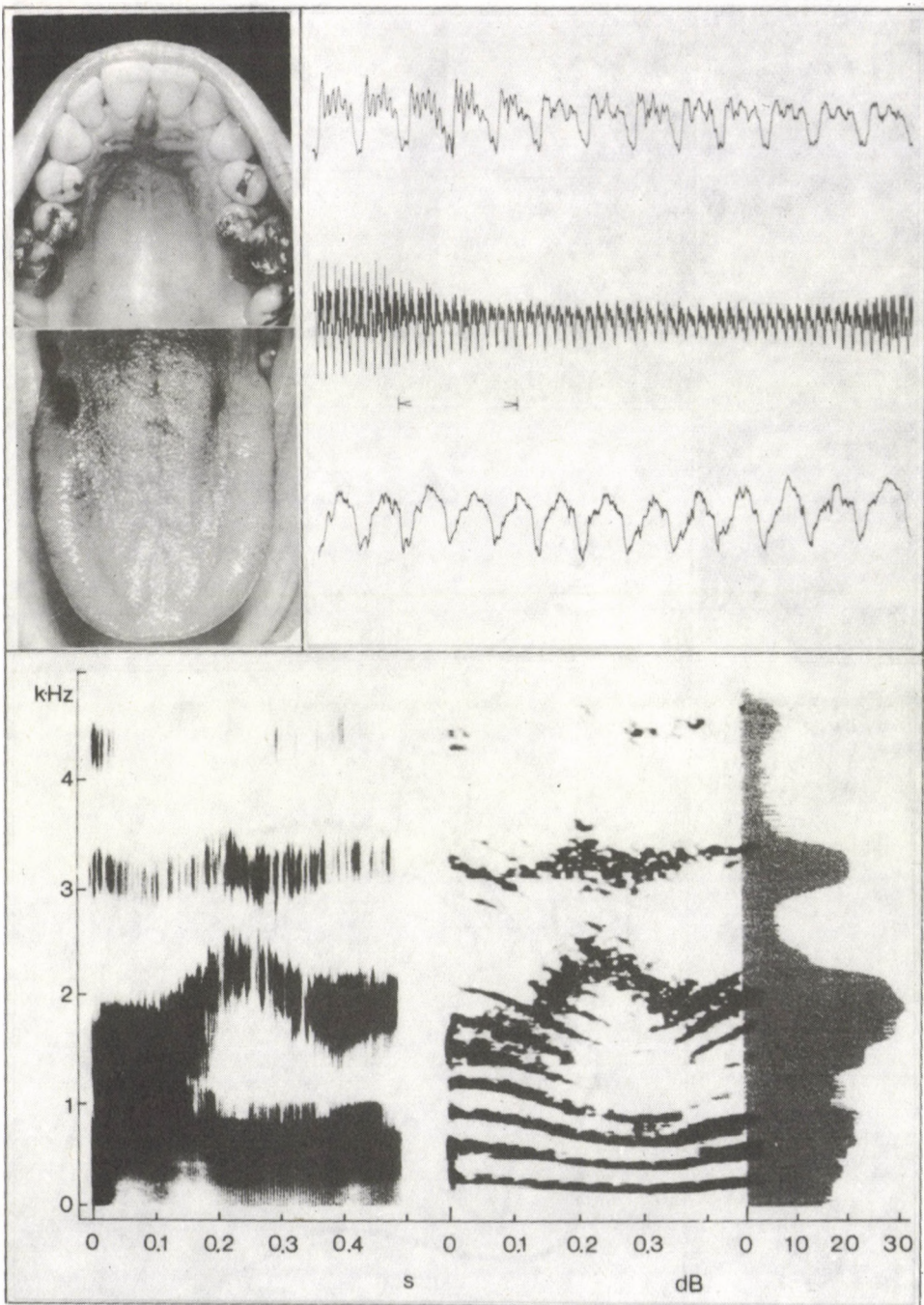


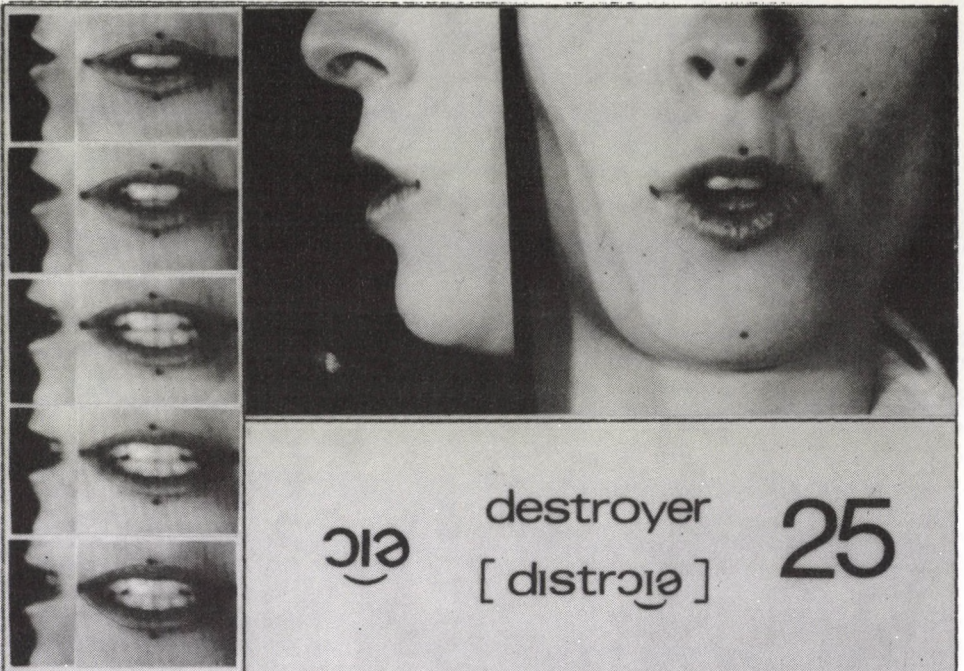


<p> ɛə hair [hɛə] 23 </p>	



<p style="text-align: center;"> aiə fire [faɪə] 24 </p>		

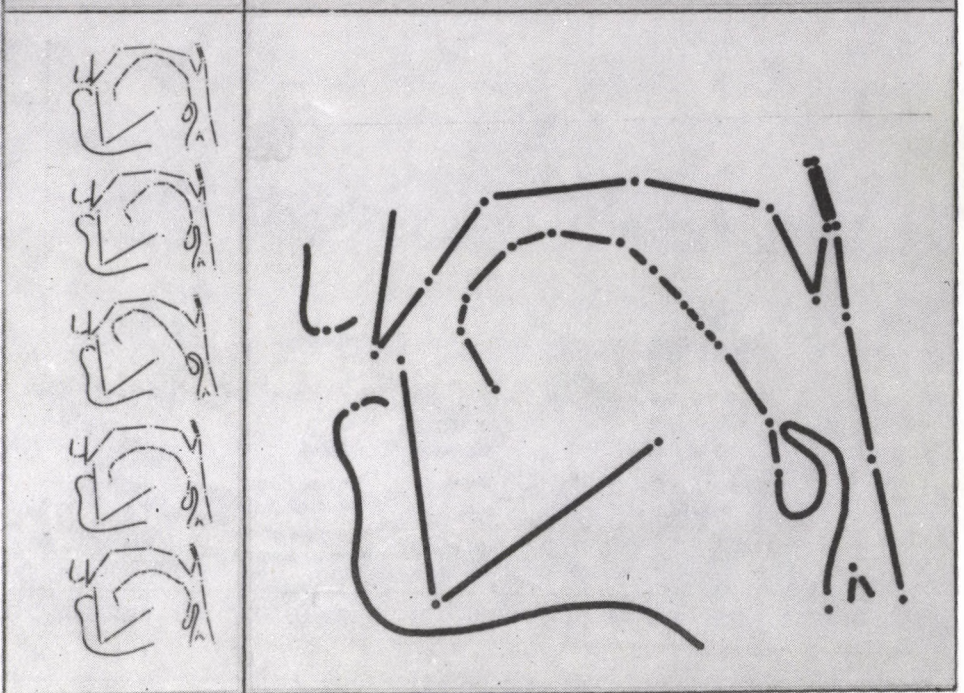


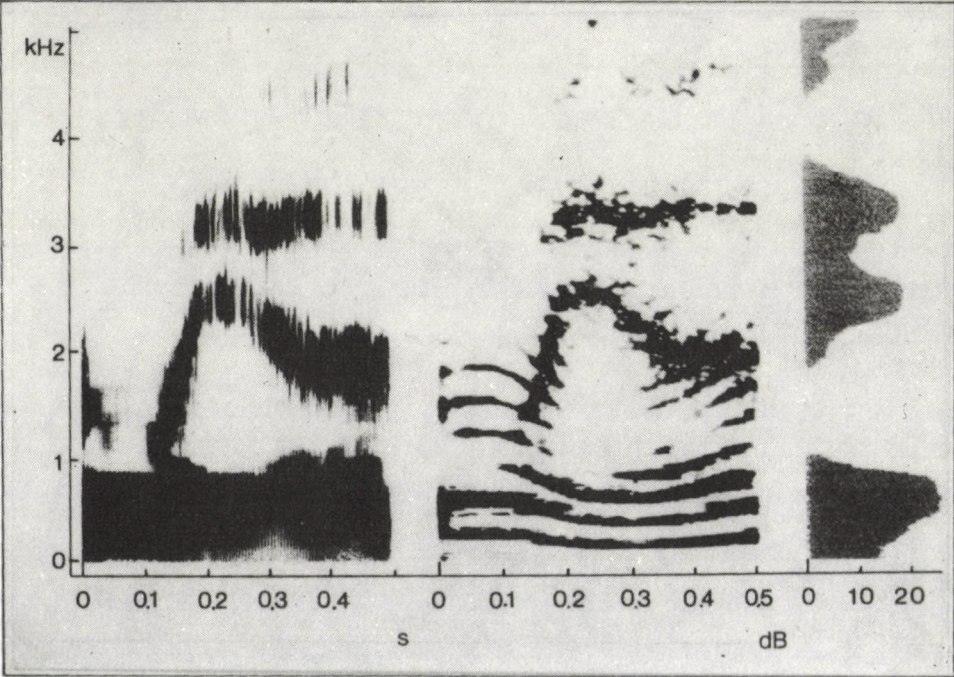
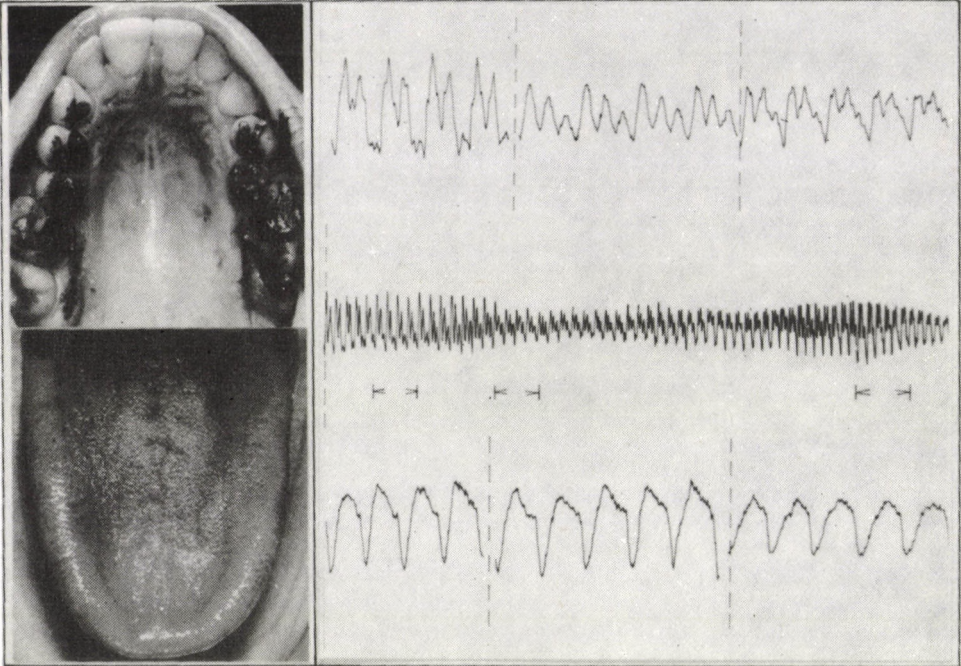


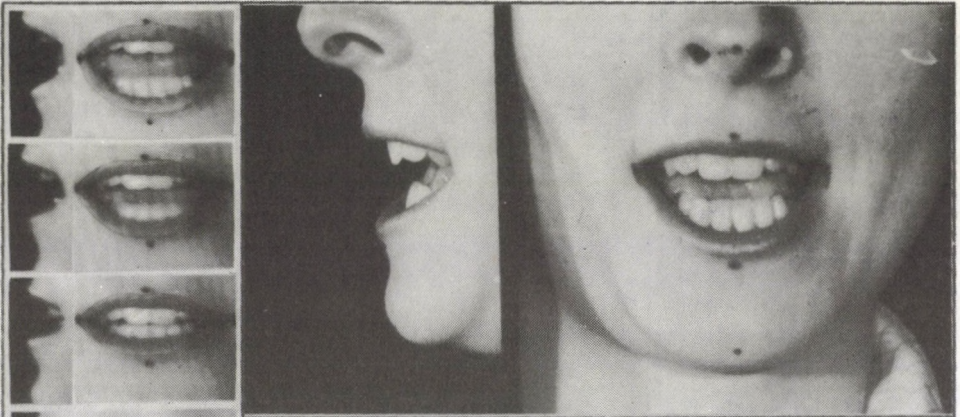
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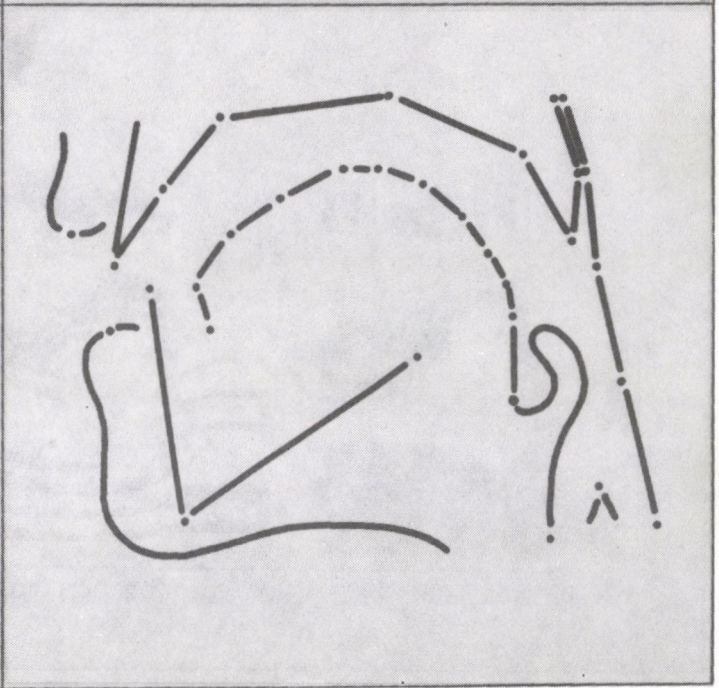
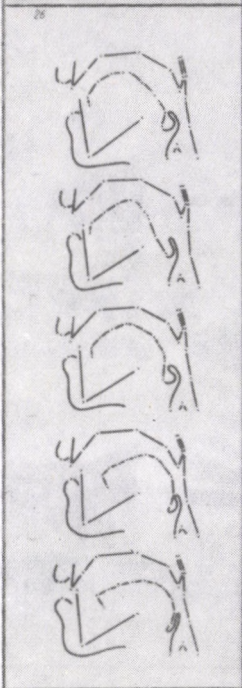


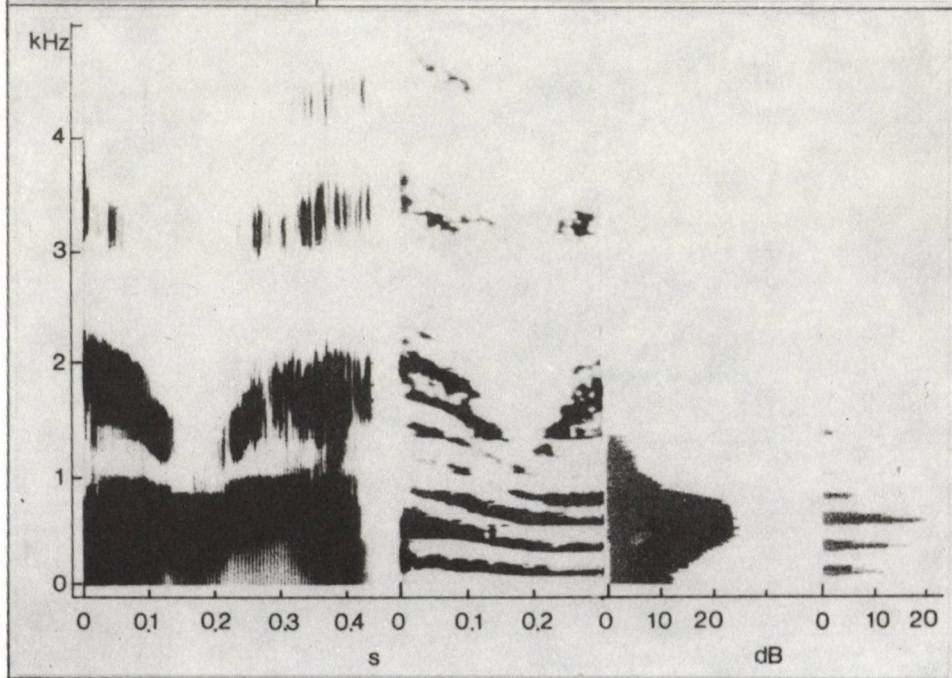
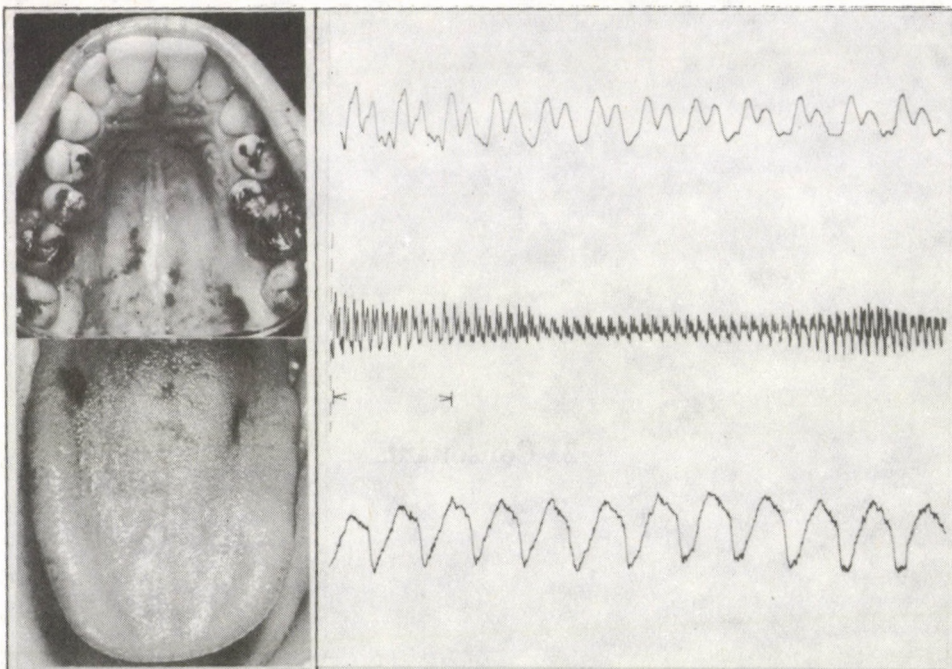


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26





2. Consonants

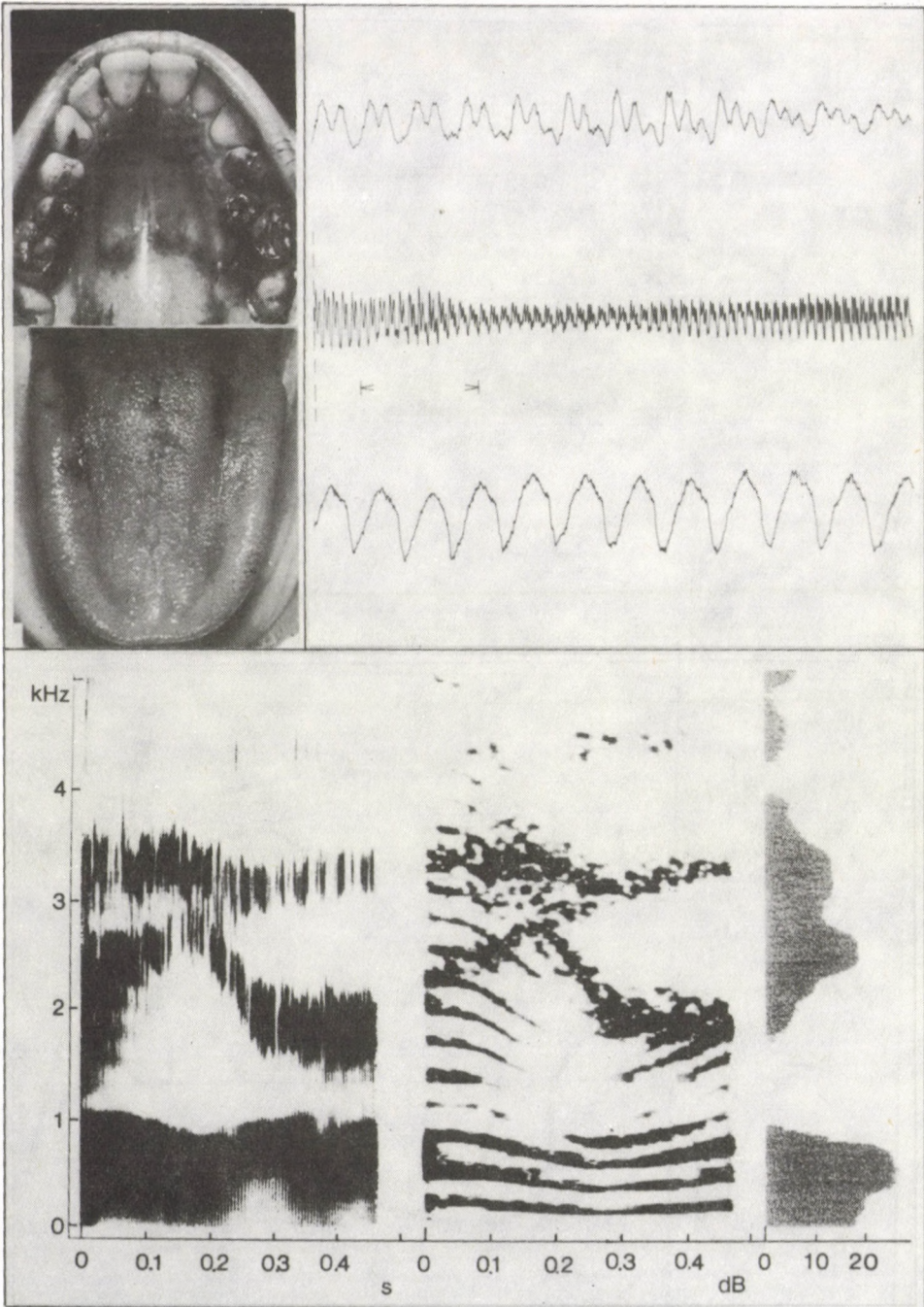
The classification of British English consonants according to their articulatory features

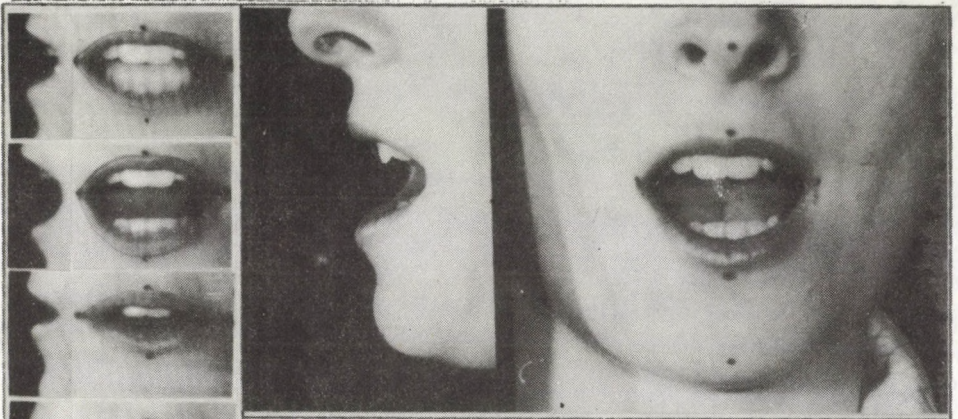
67
79

Manner of articulation		Place of articulation		bilabial	labio-dental	inter-dental	denti-alveolar	alveolar	pre-palatal	palatal	velar	glottal
oral	complet closure sounds	plosives	vd	b				d	d'		g	
			vl	p				t	t'		k	
rolled		vd					r					
nasal		occlusives	vd	m	ɱ			n, n'			ŋ	
			vl		ɱ̥							
oral		fricatives	centrals	vd	w	v	ʍ		z	ʒ	j	
	vl				f	ʍ̥		s	ʃ	ç		h
	laterals		vd					ɬ, l				
	affricates	vd					ɖr	ɖz	ɖʒ			
		vl					ɖr̥	ɖs	ɖʃ			

'vd = voiced, vl = voiceless

		<p>b bit 29 [bit]</p>

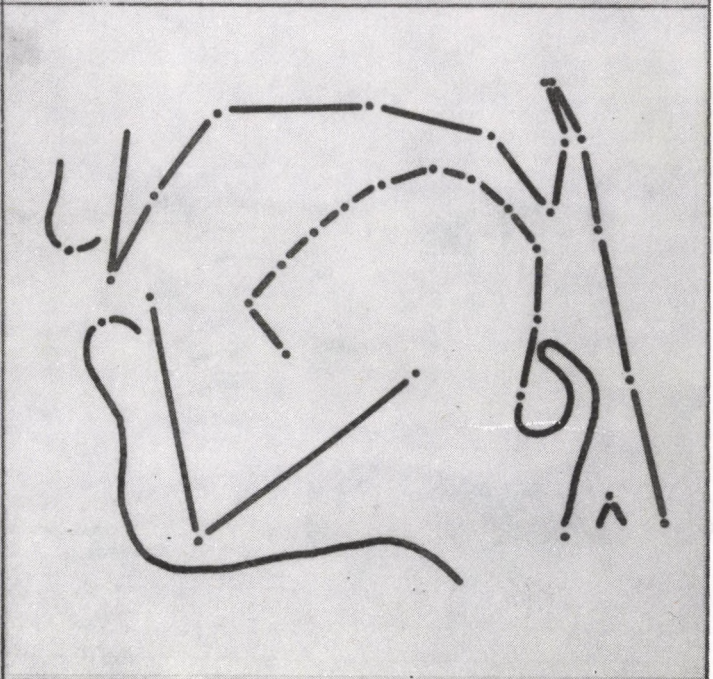
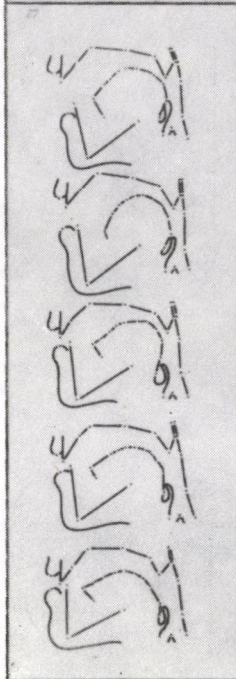


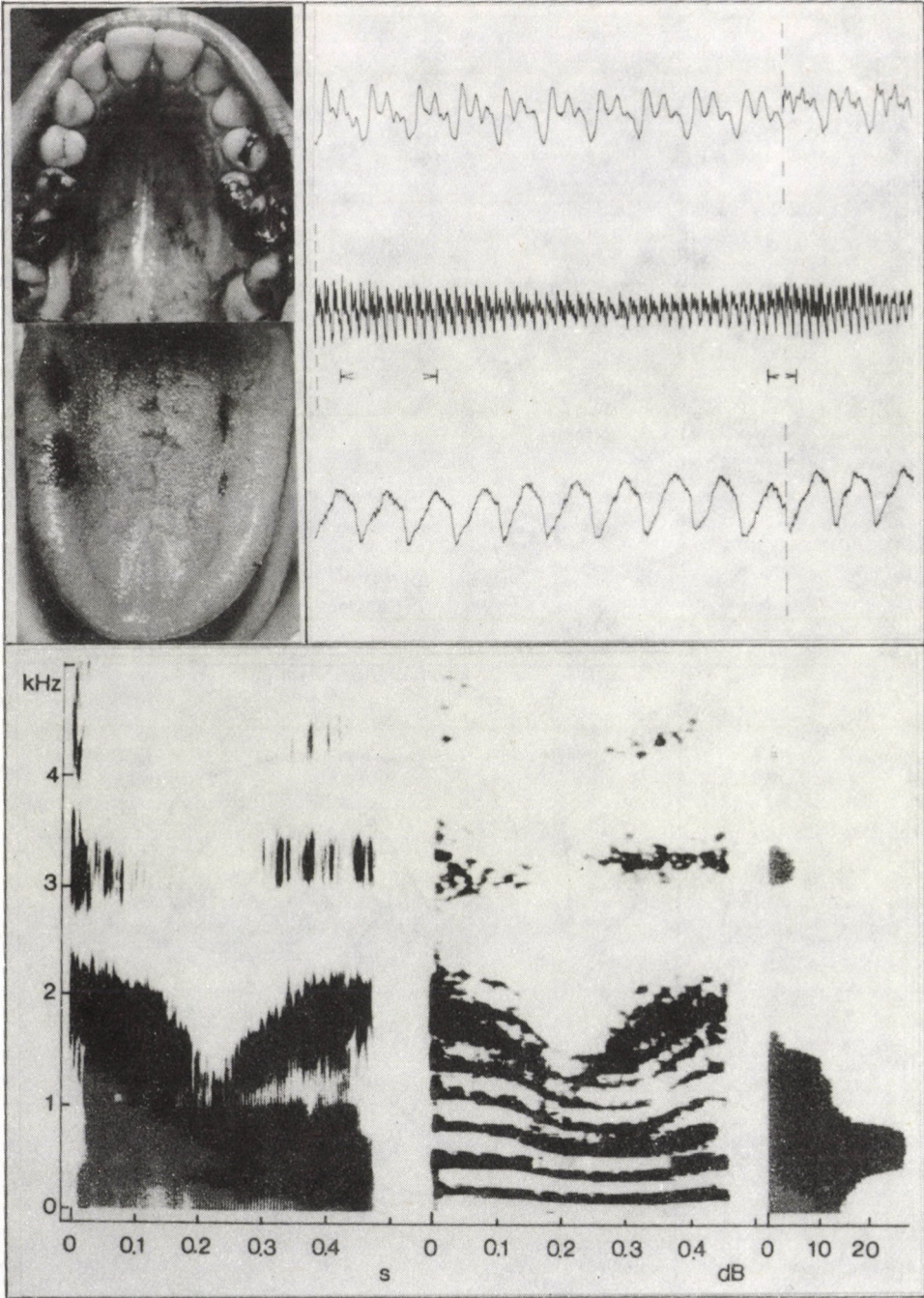


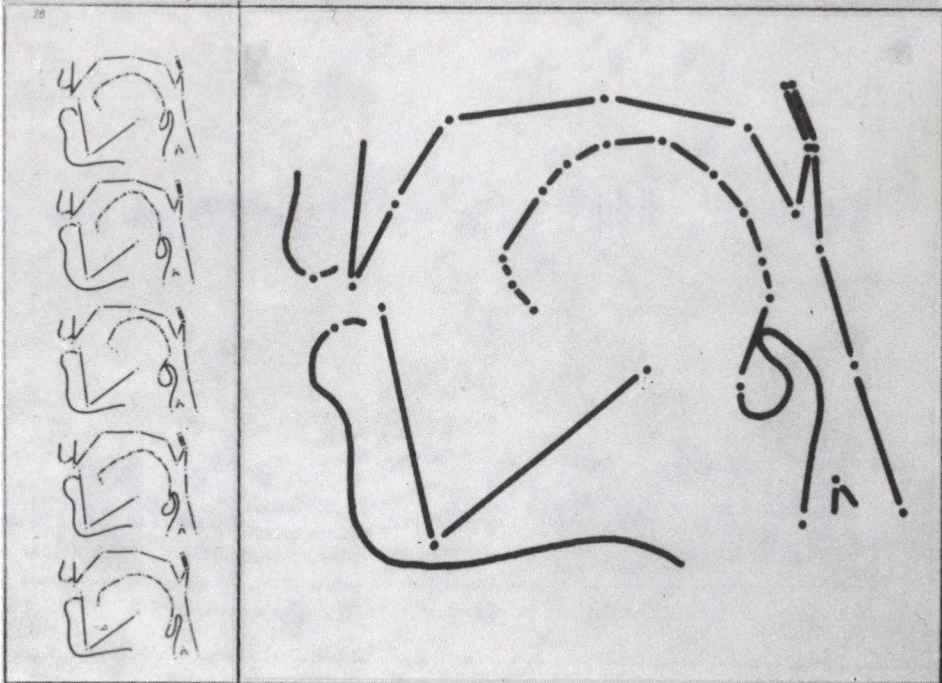
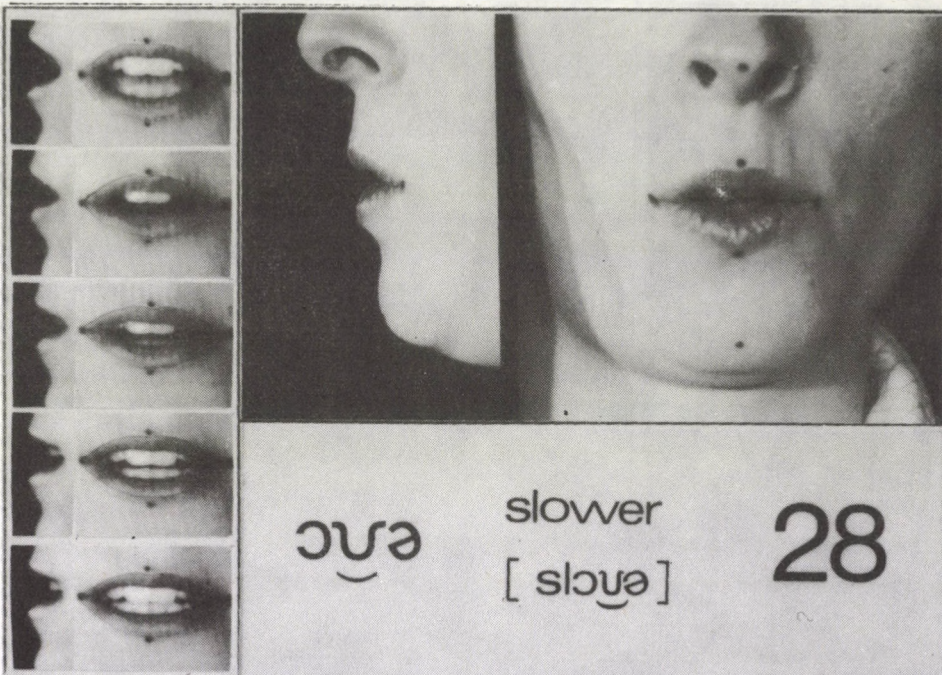
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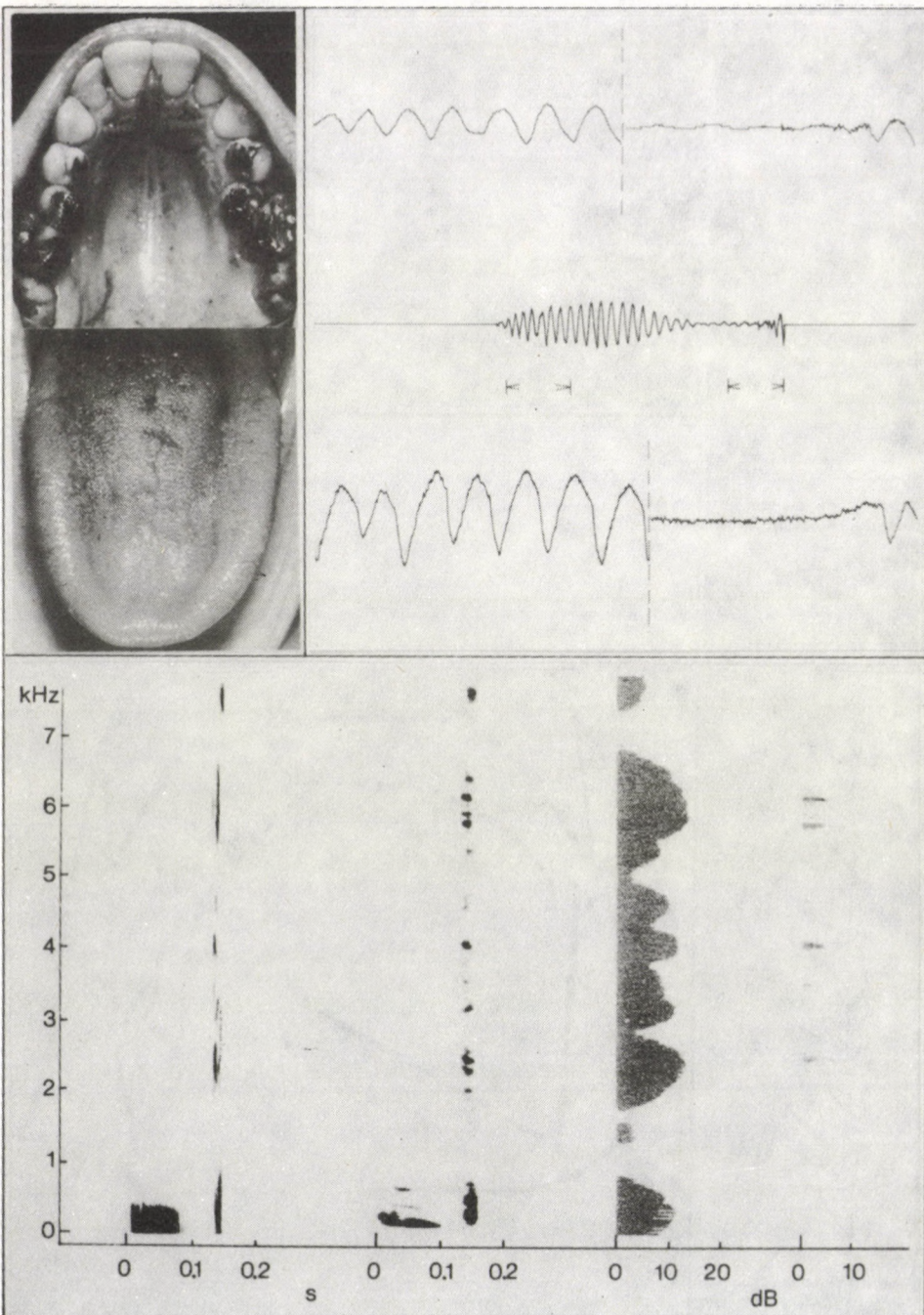
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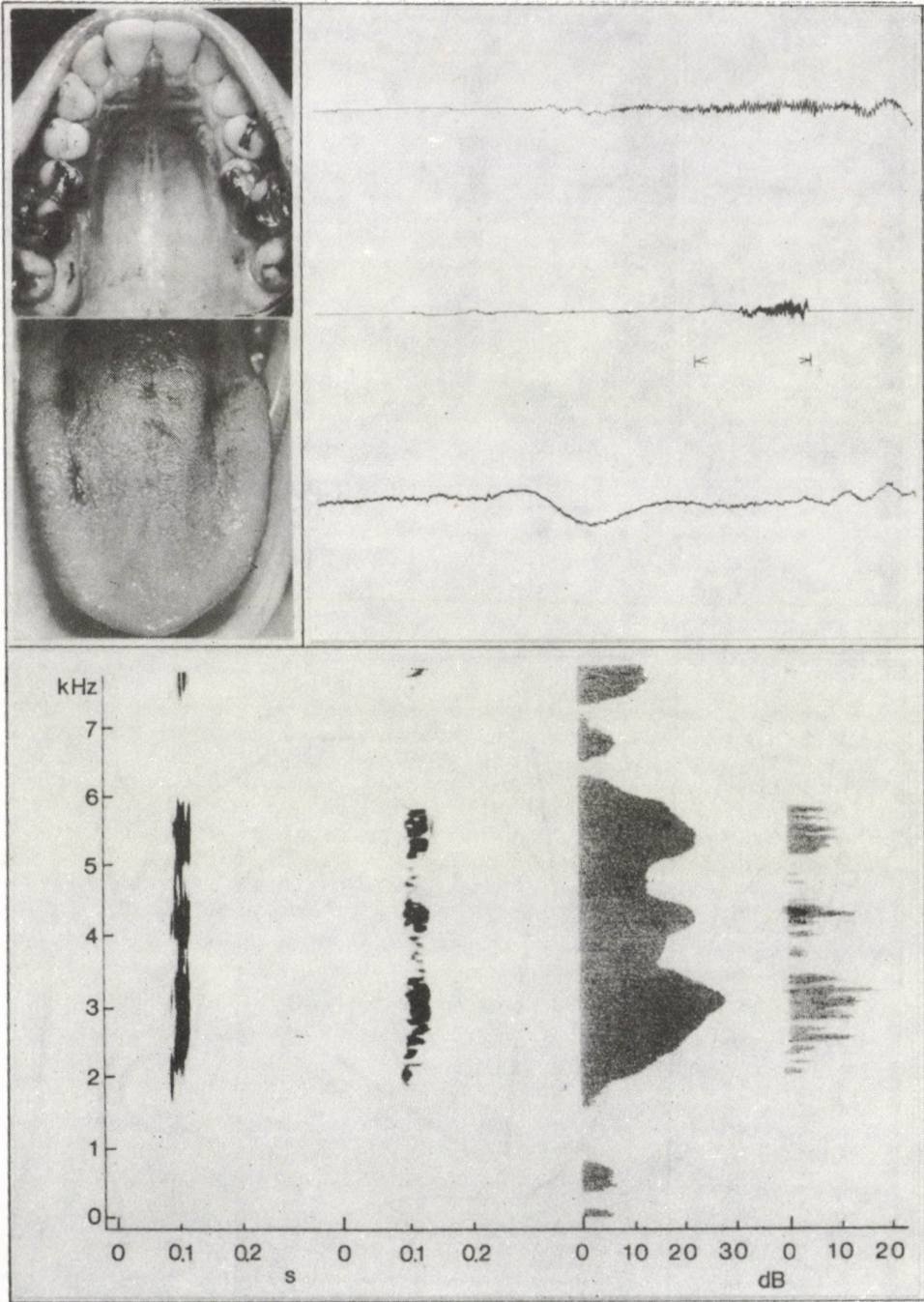


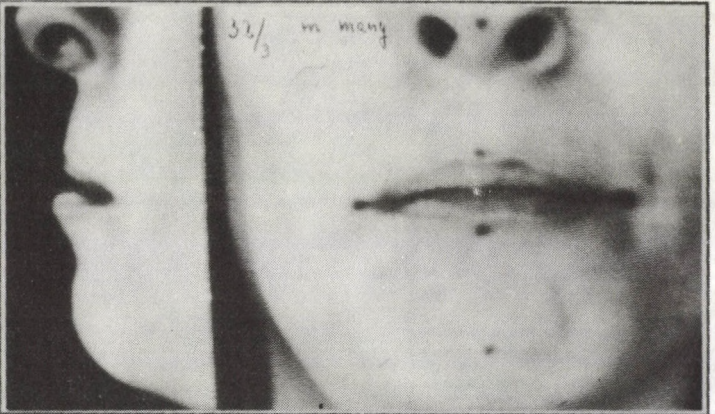
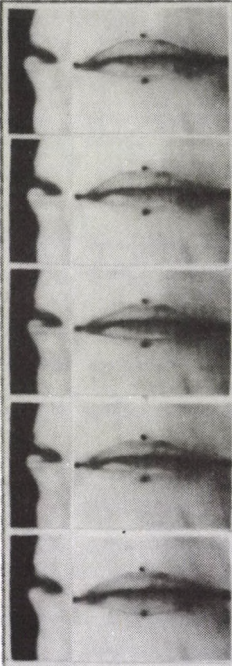






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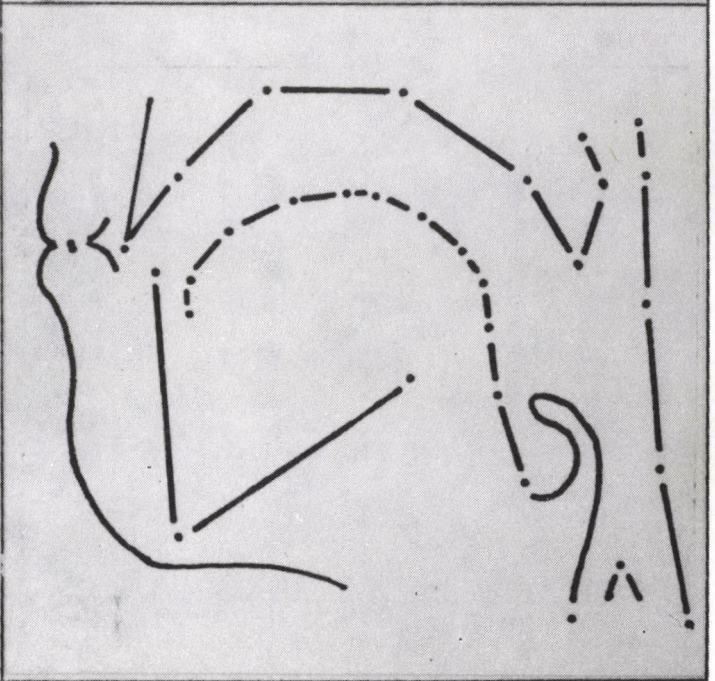
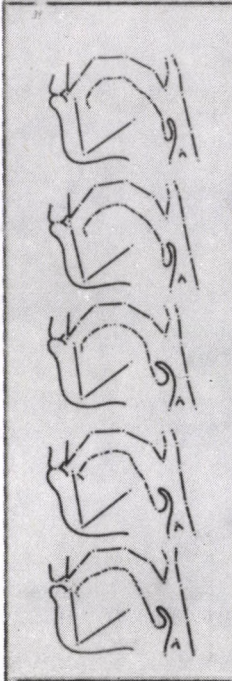


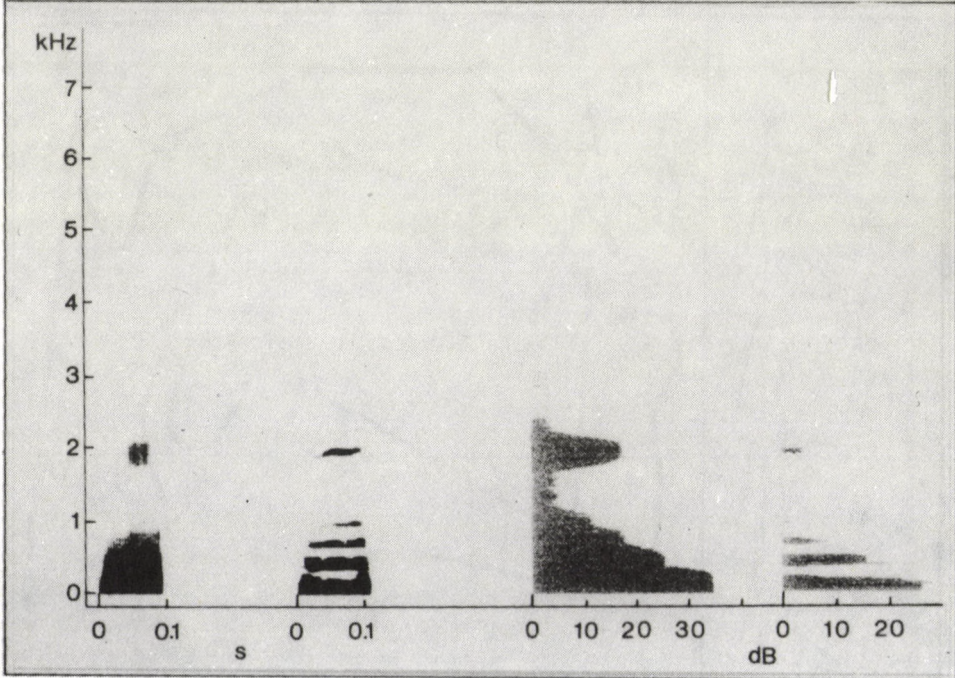
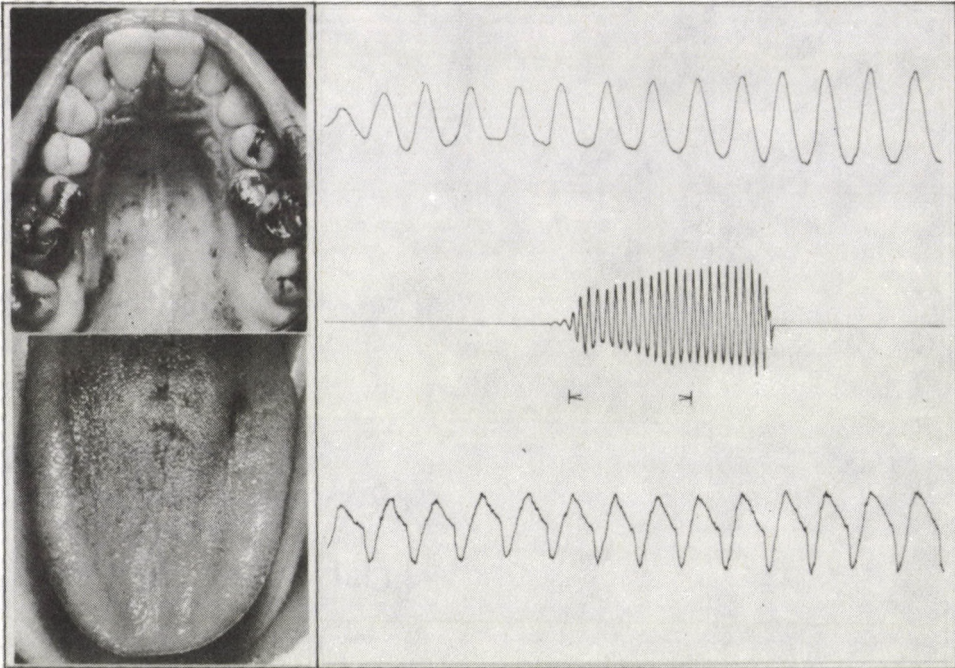


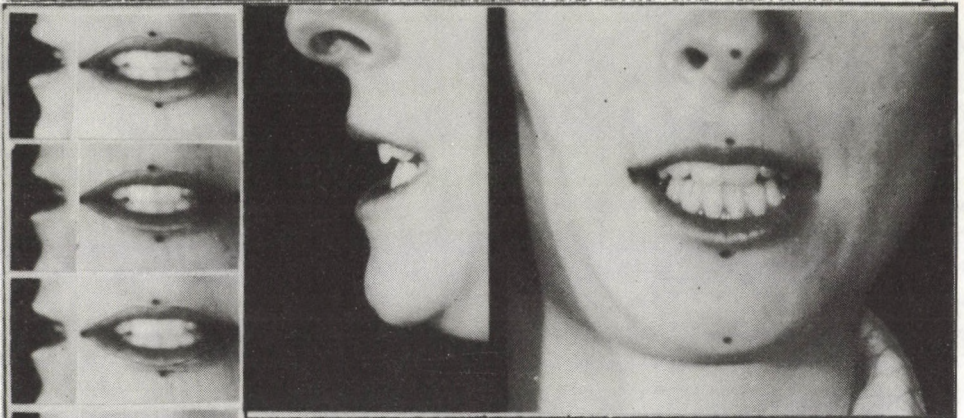
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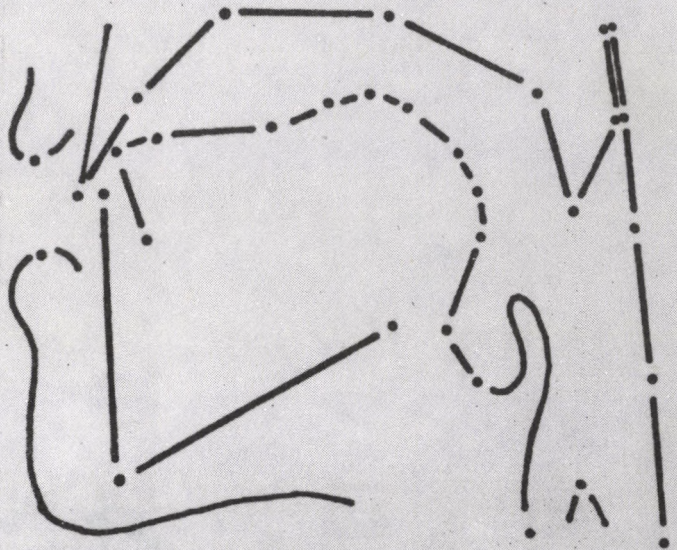
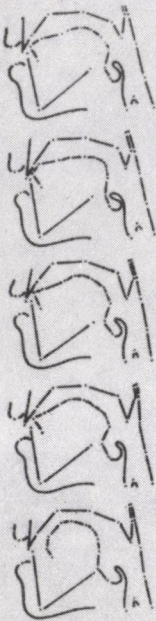
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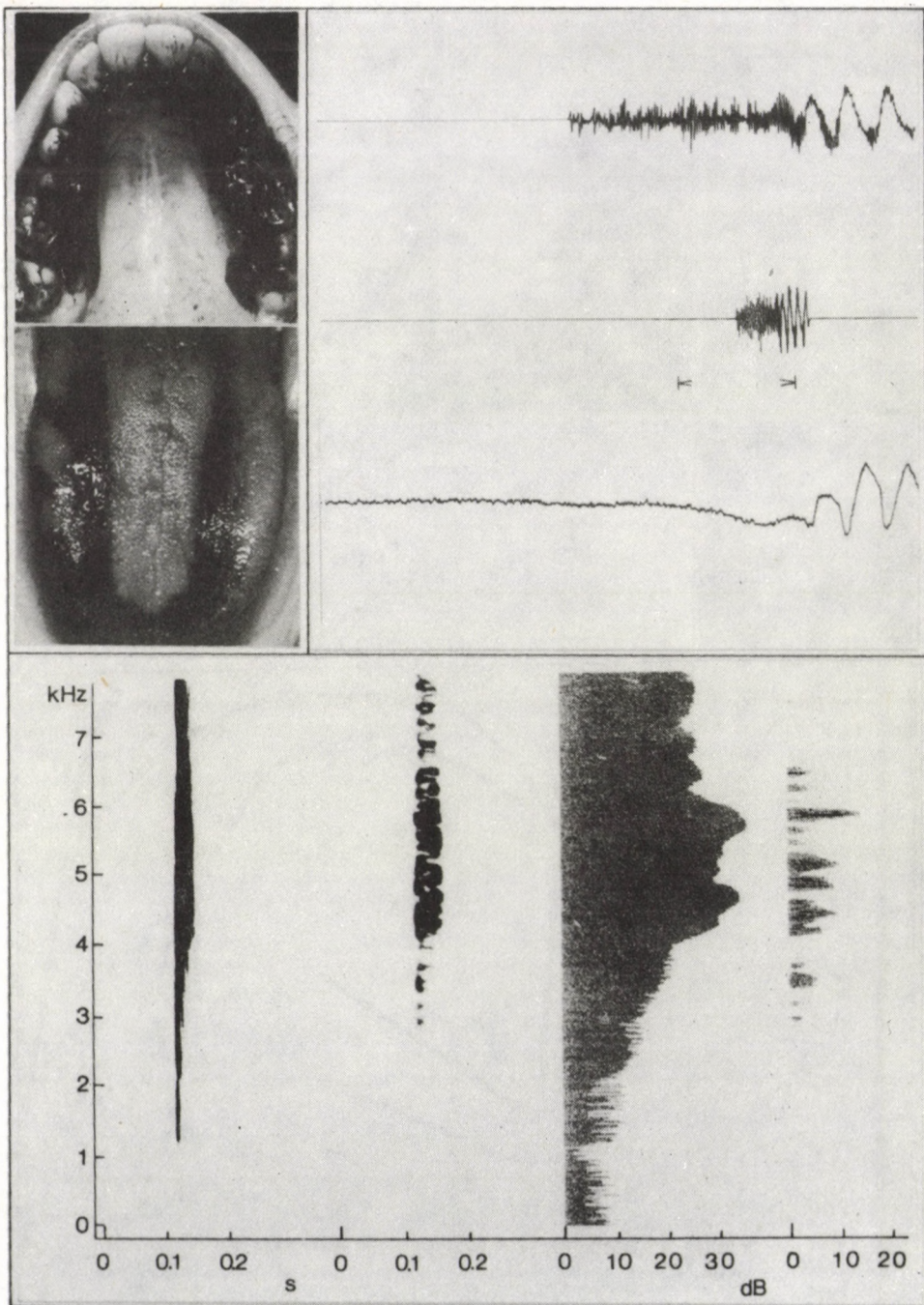
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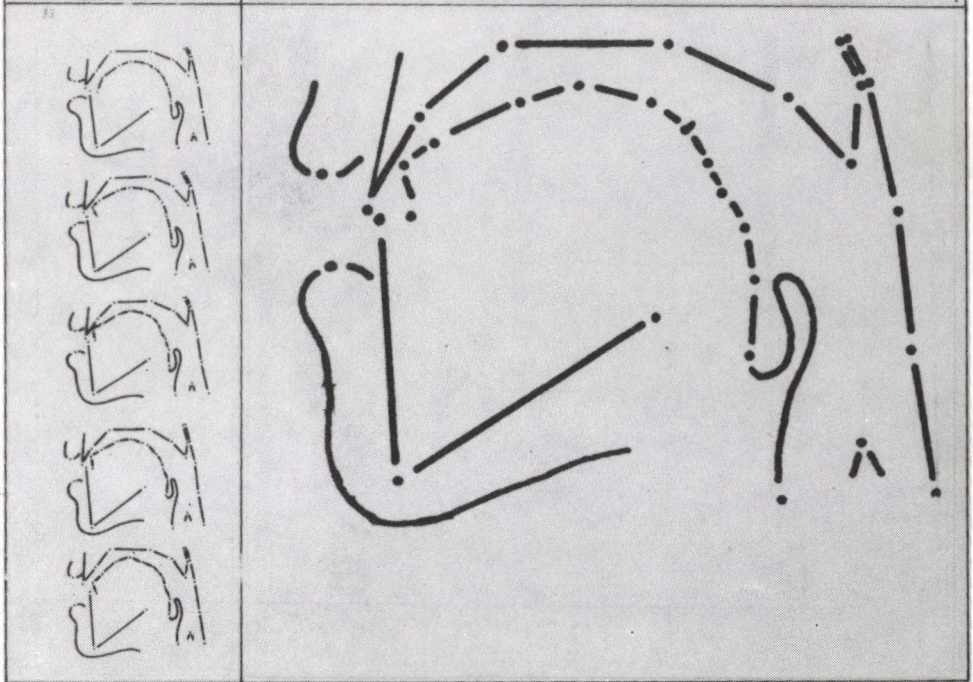
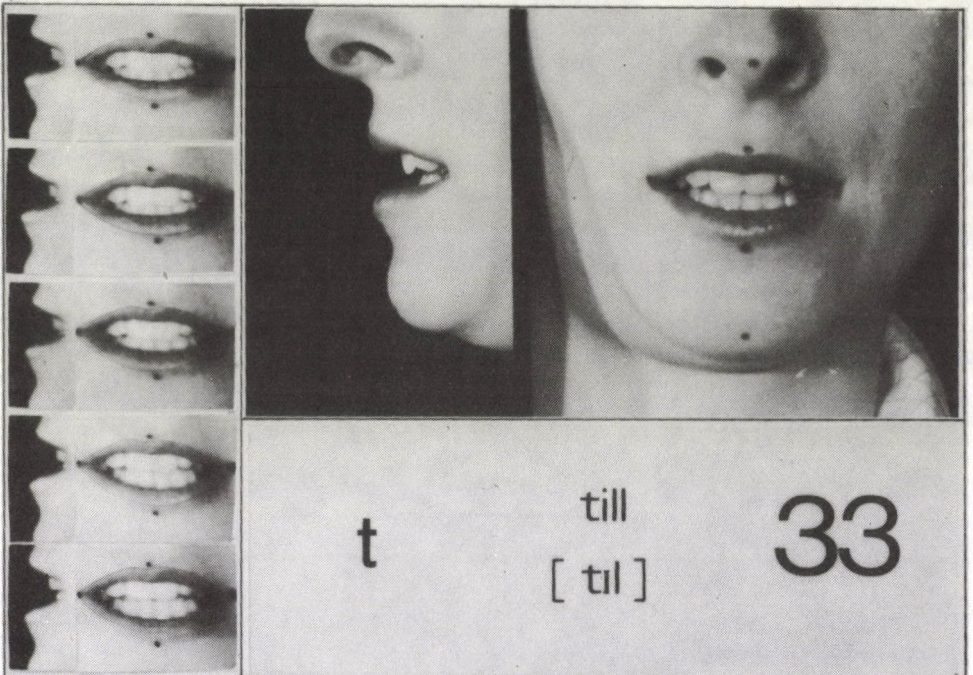
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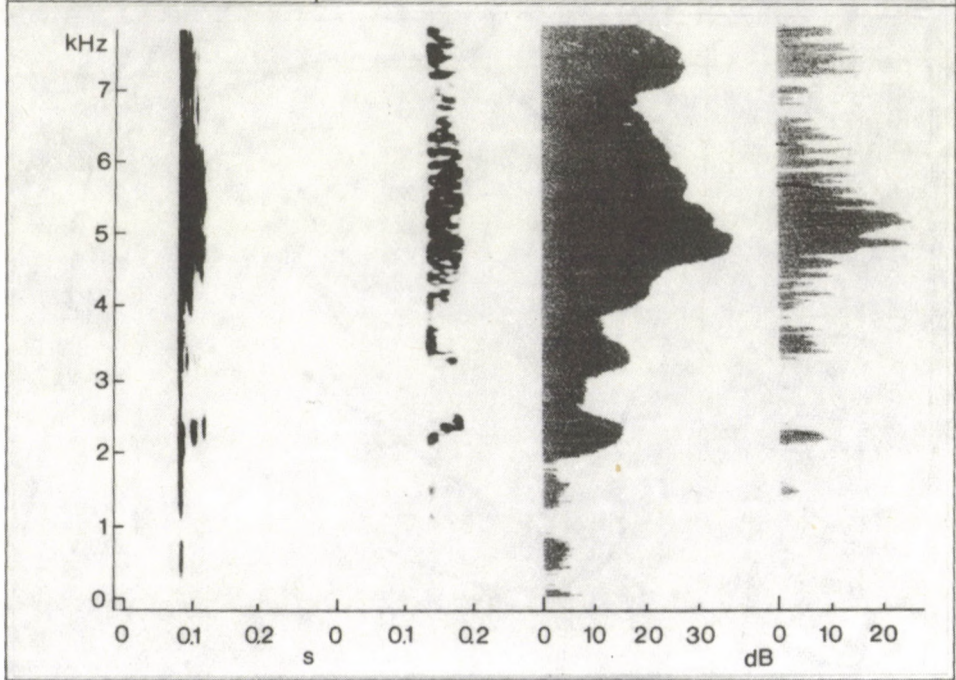
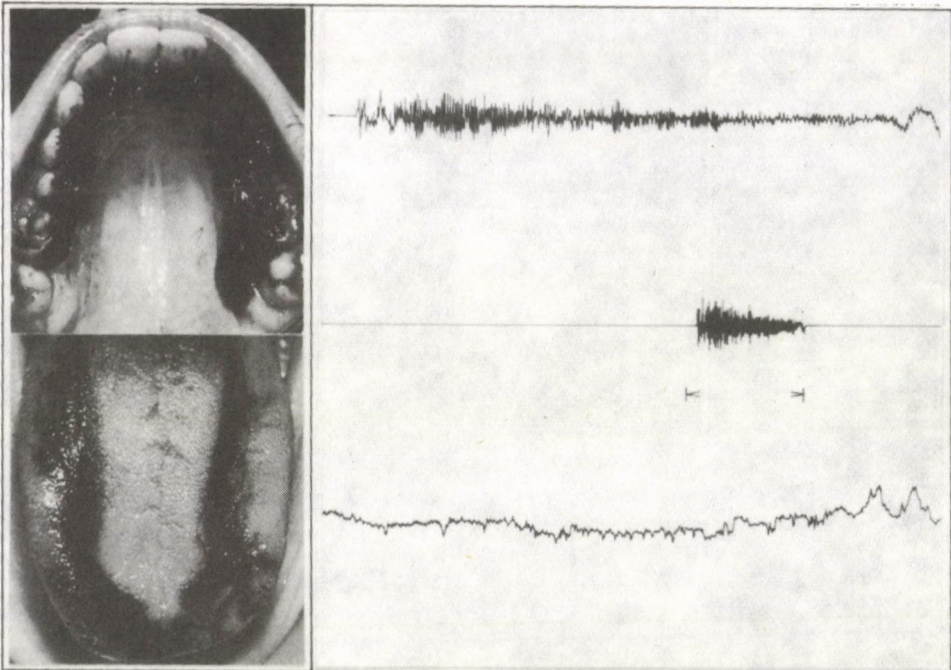
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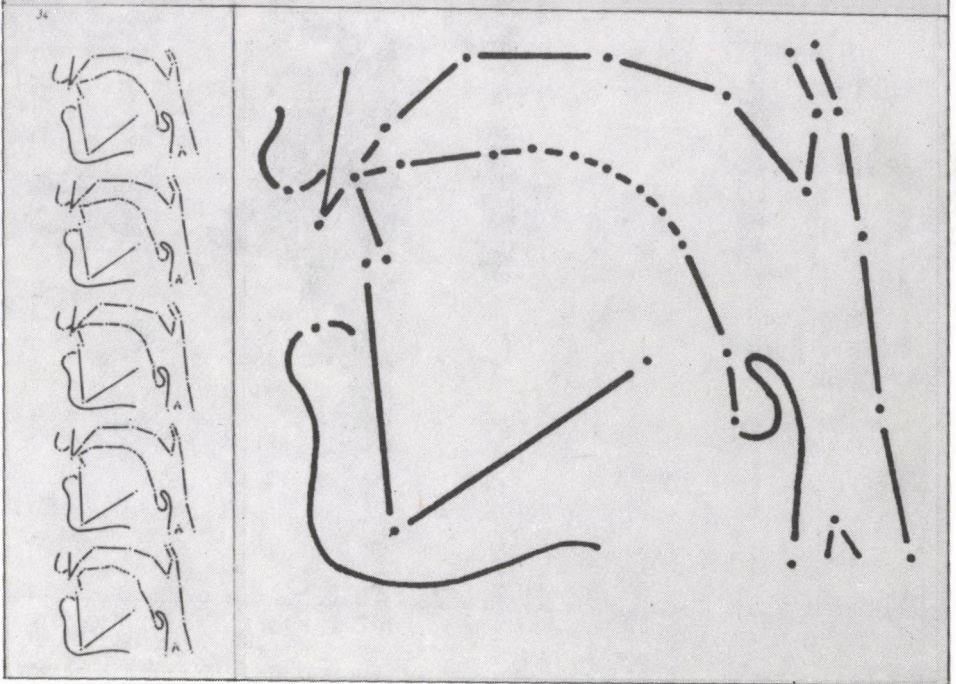
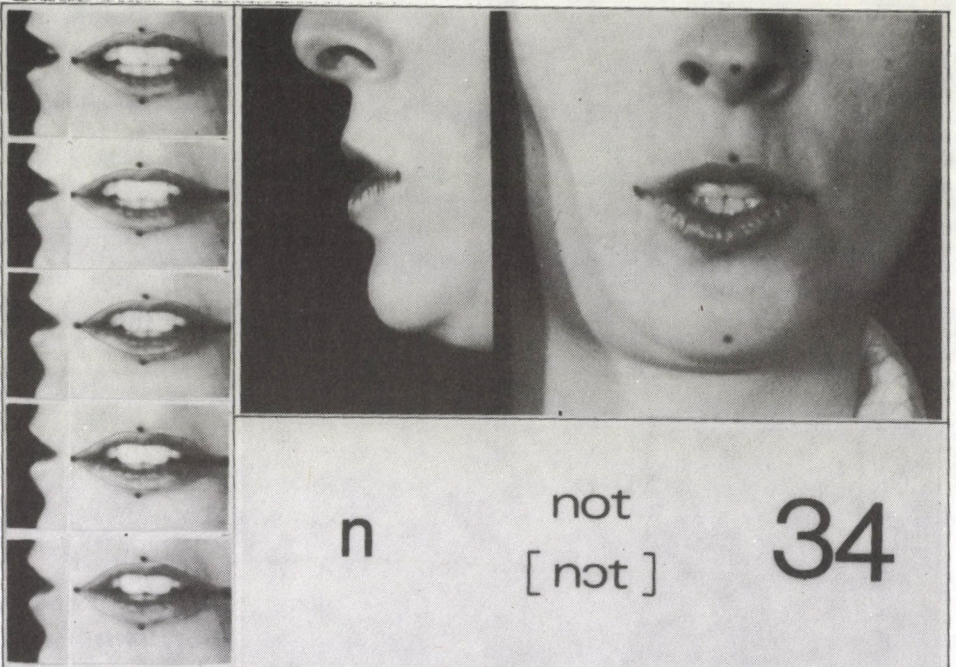
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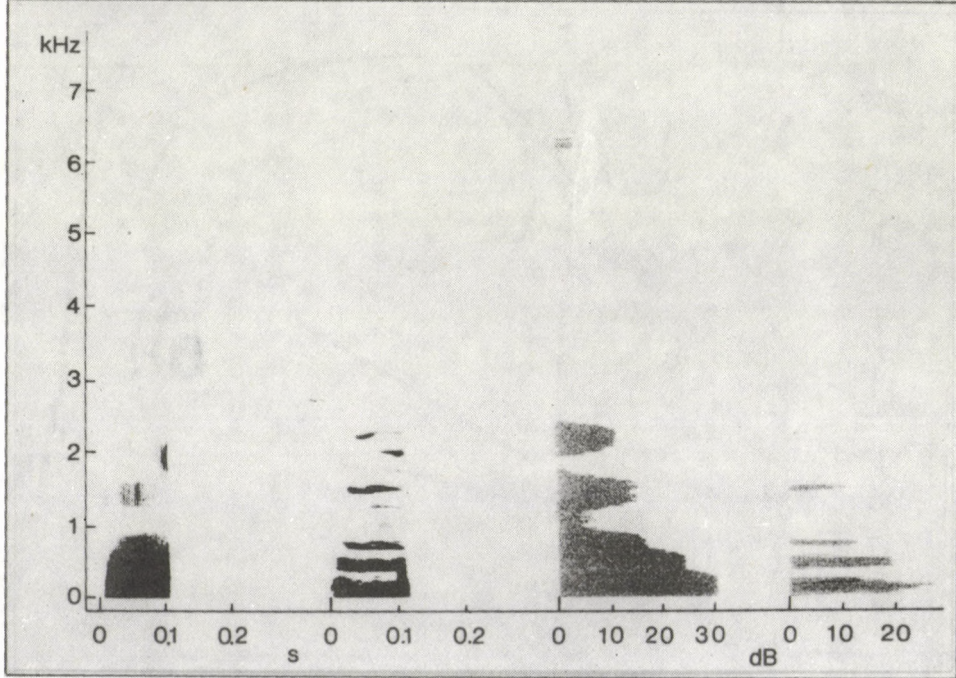
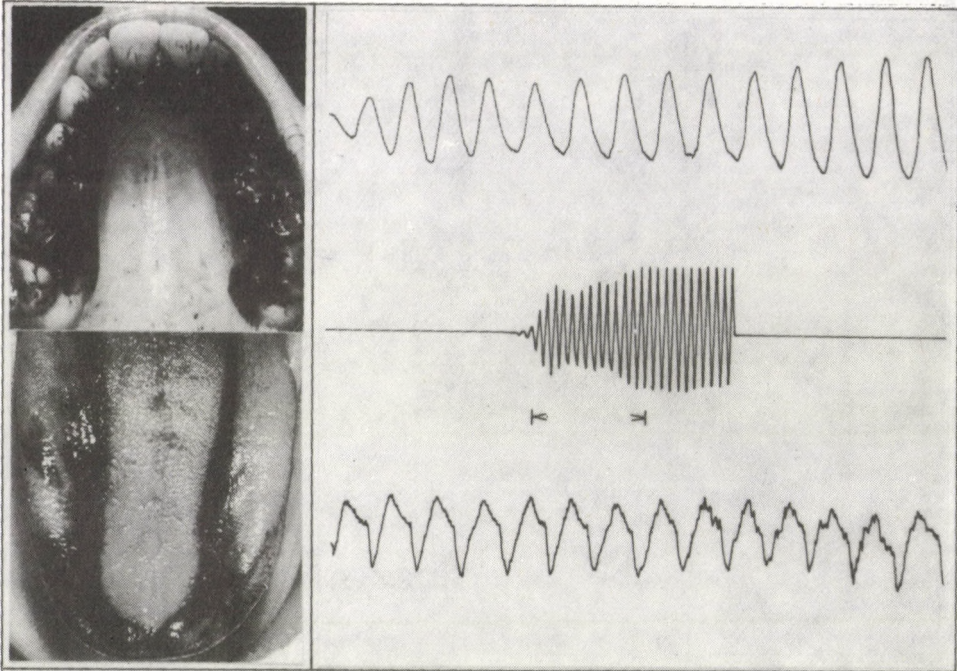


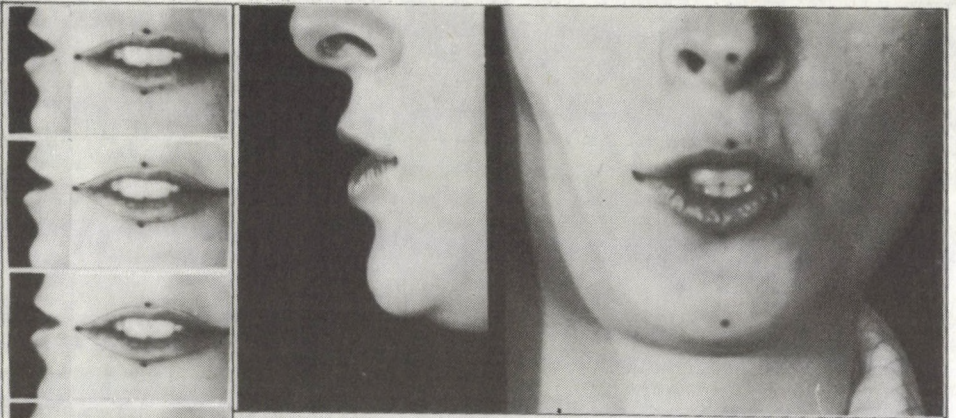




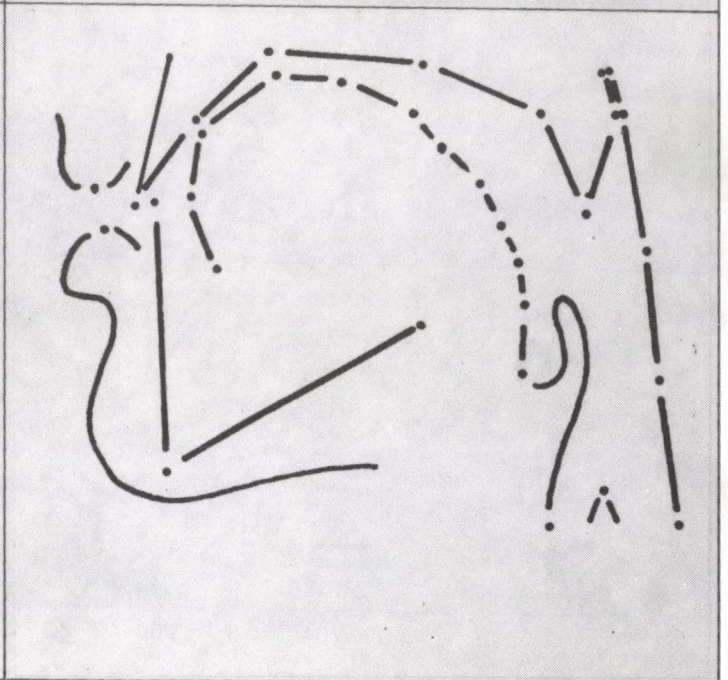
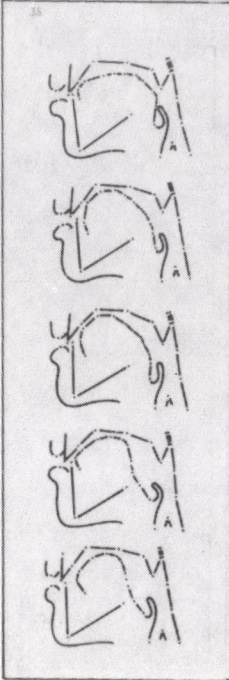


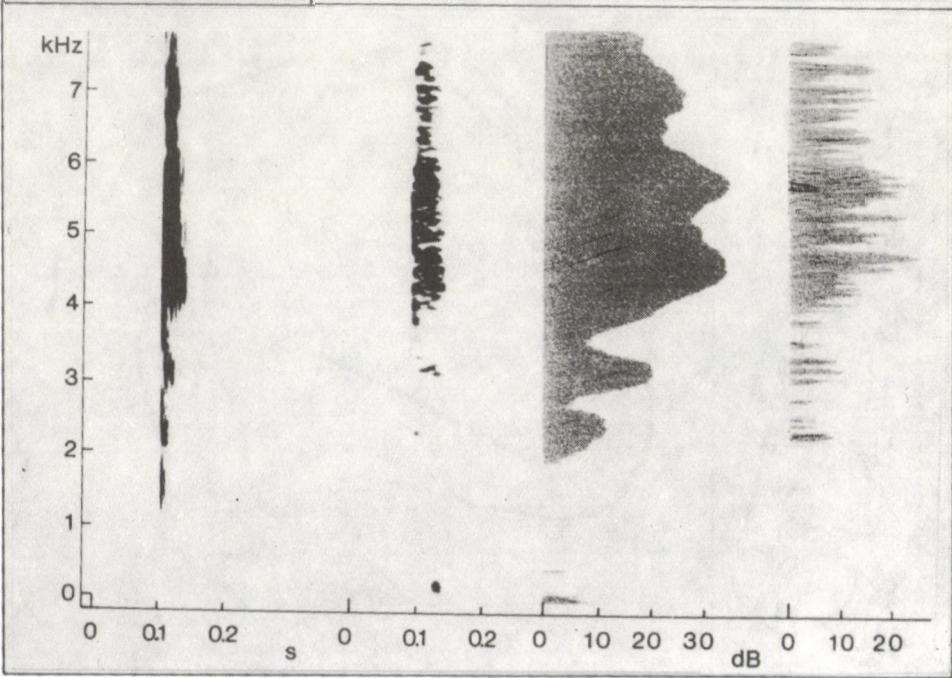
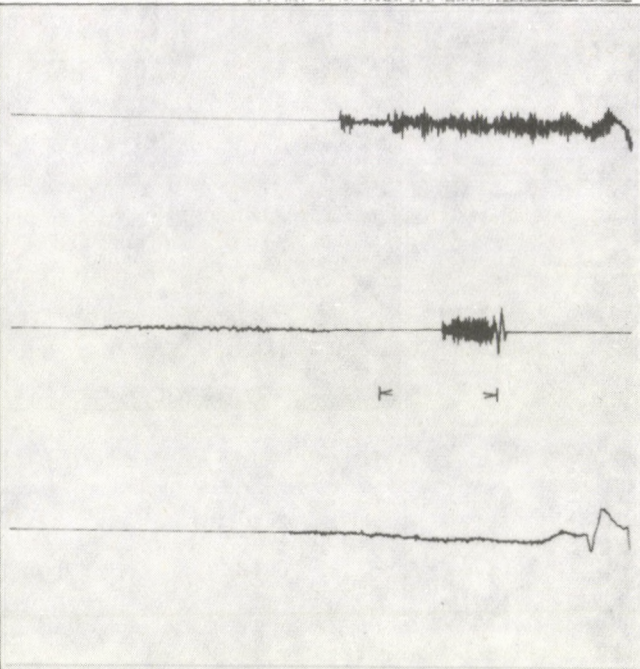
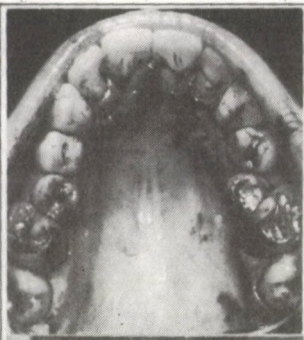


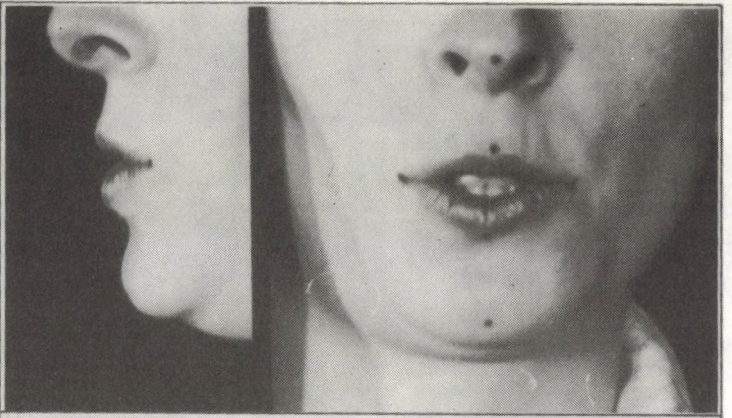
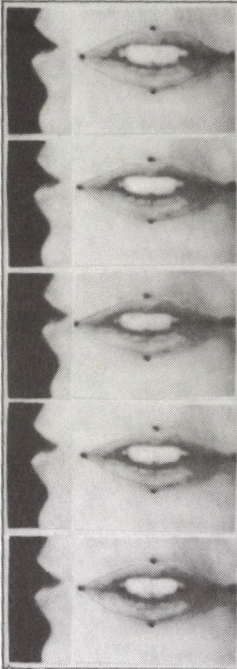




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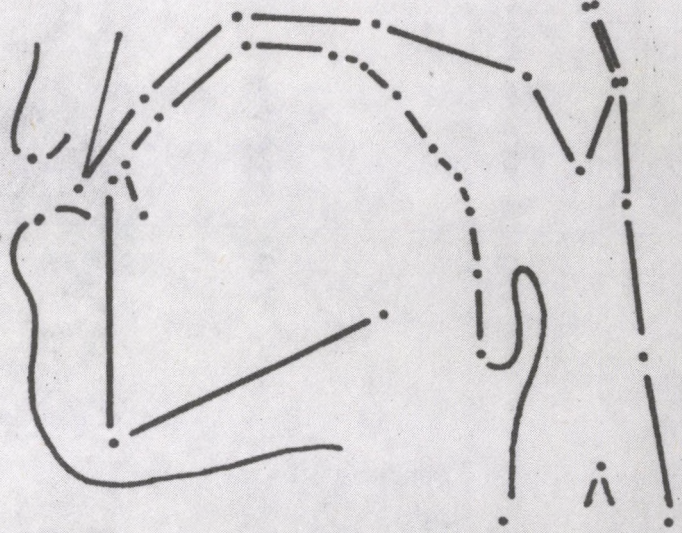
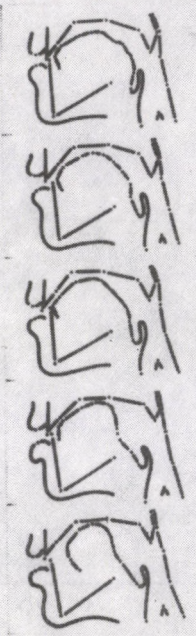


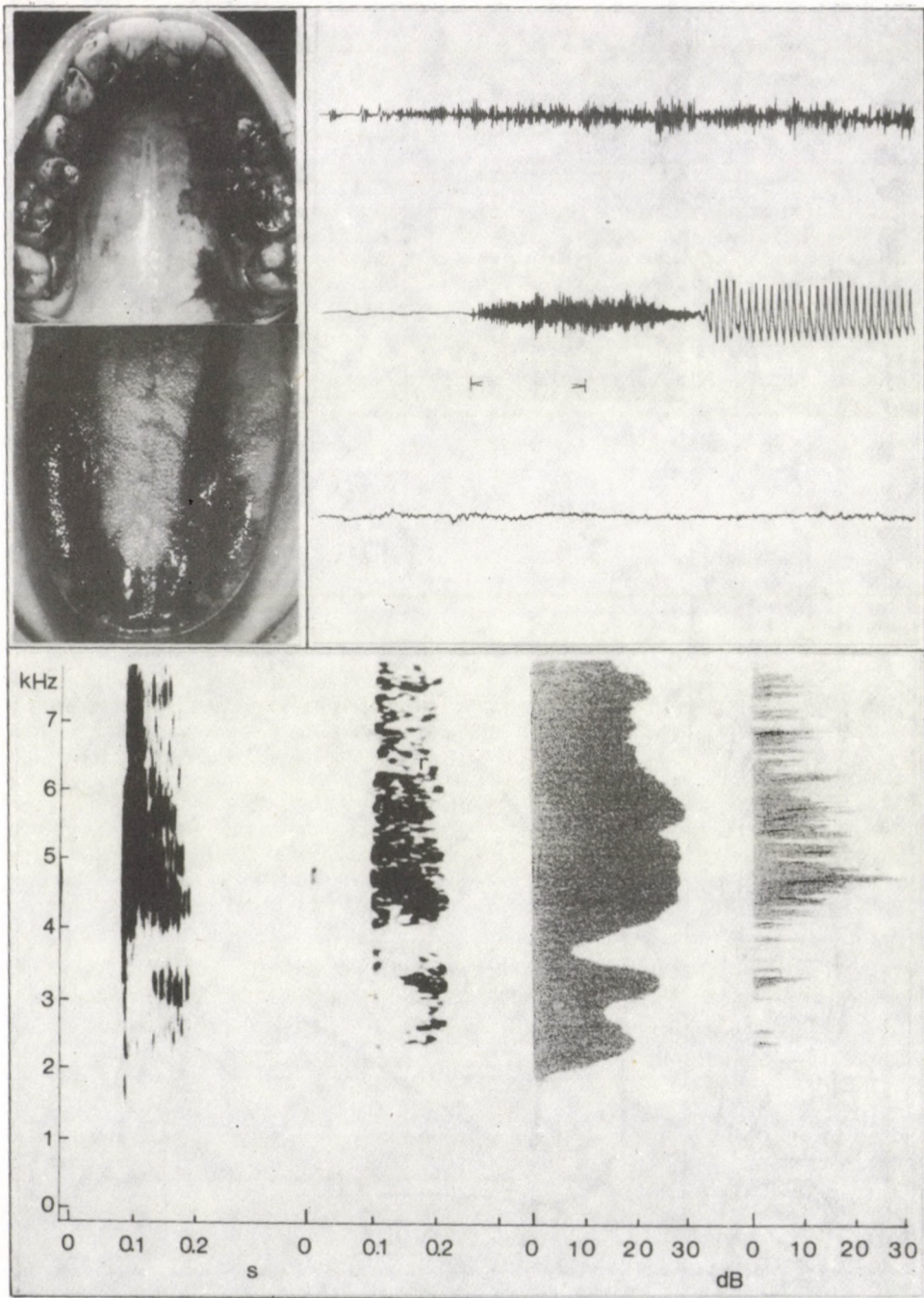


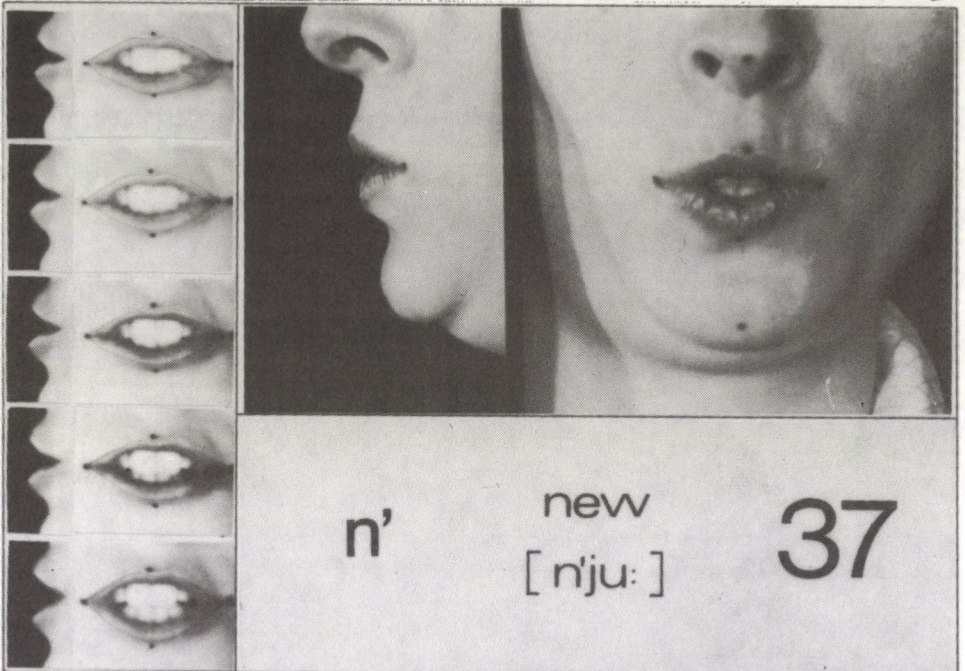
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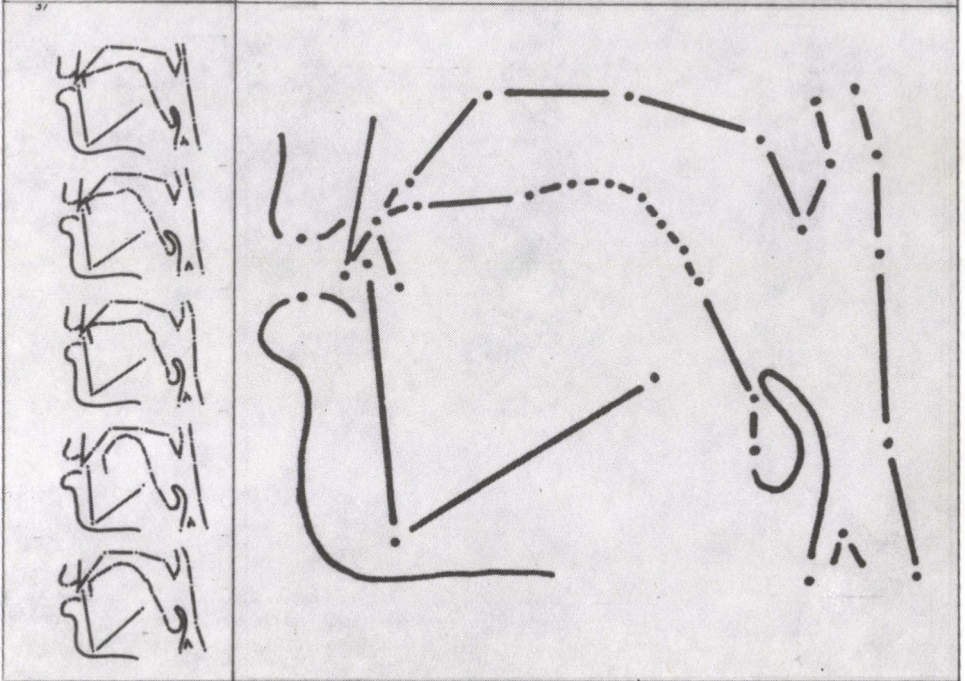


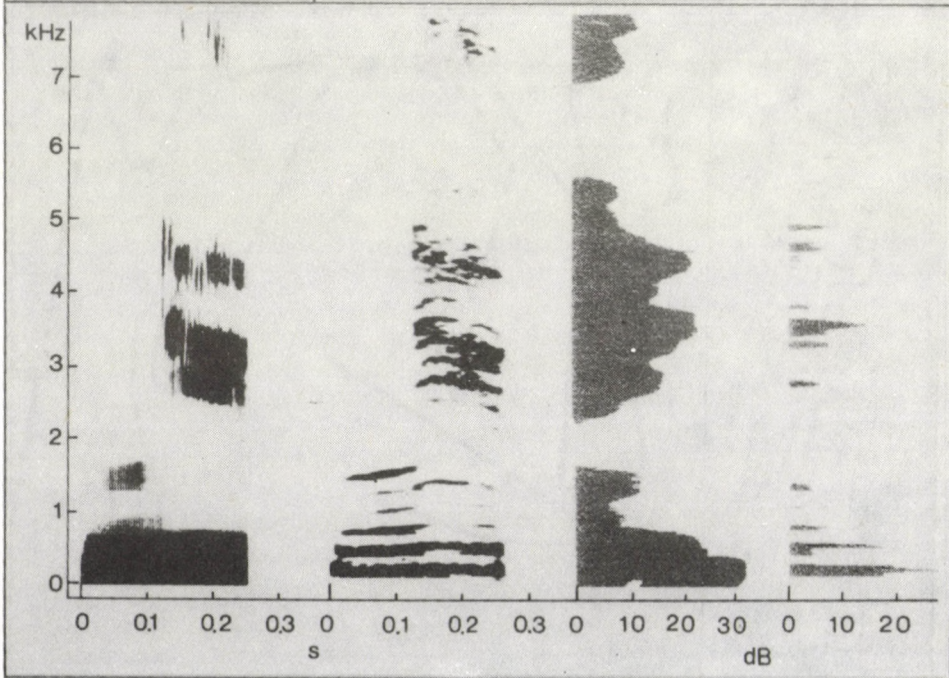
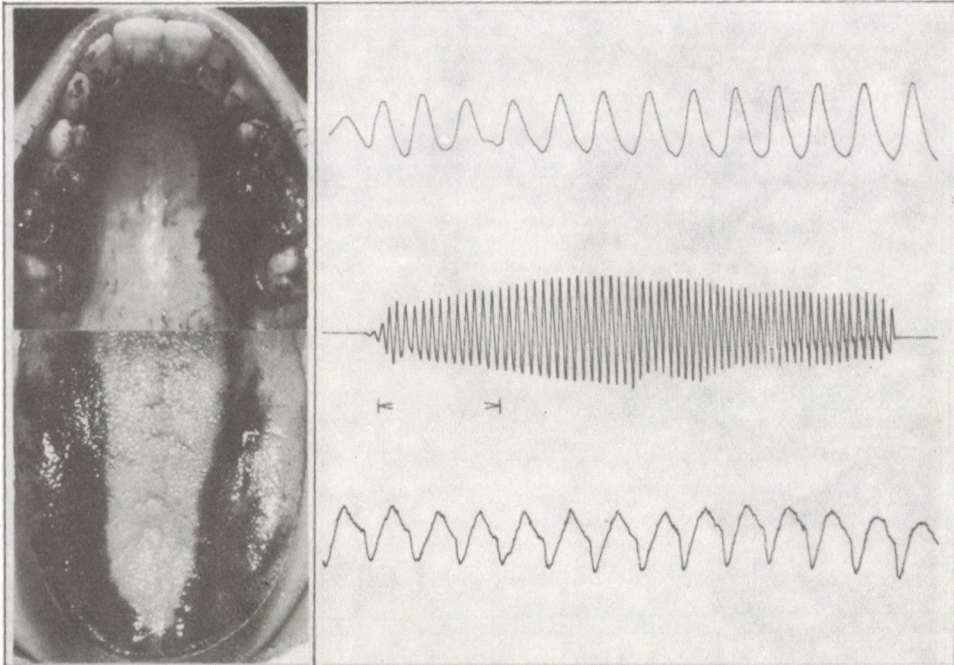


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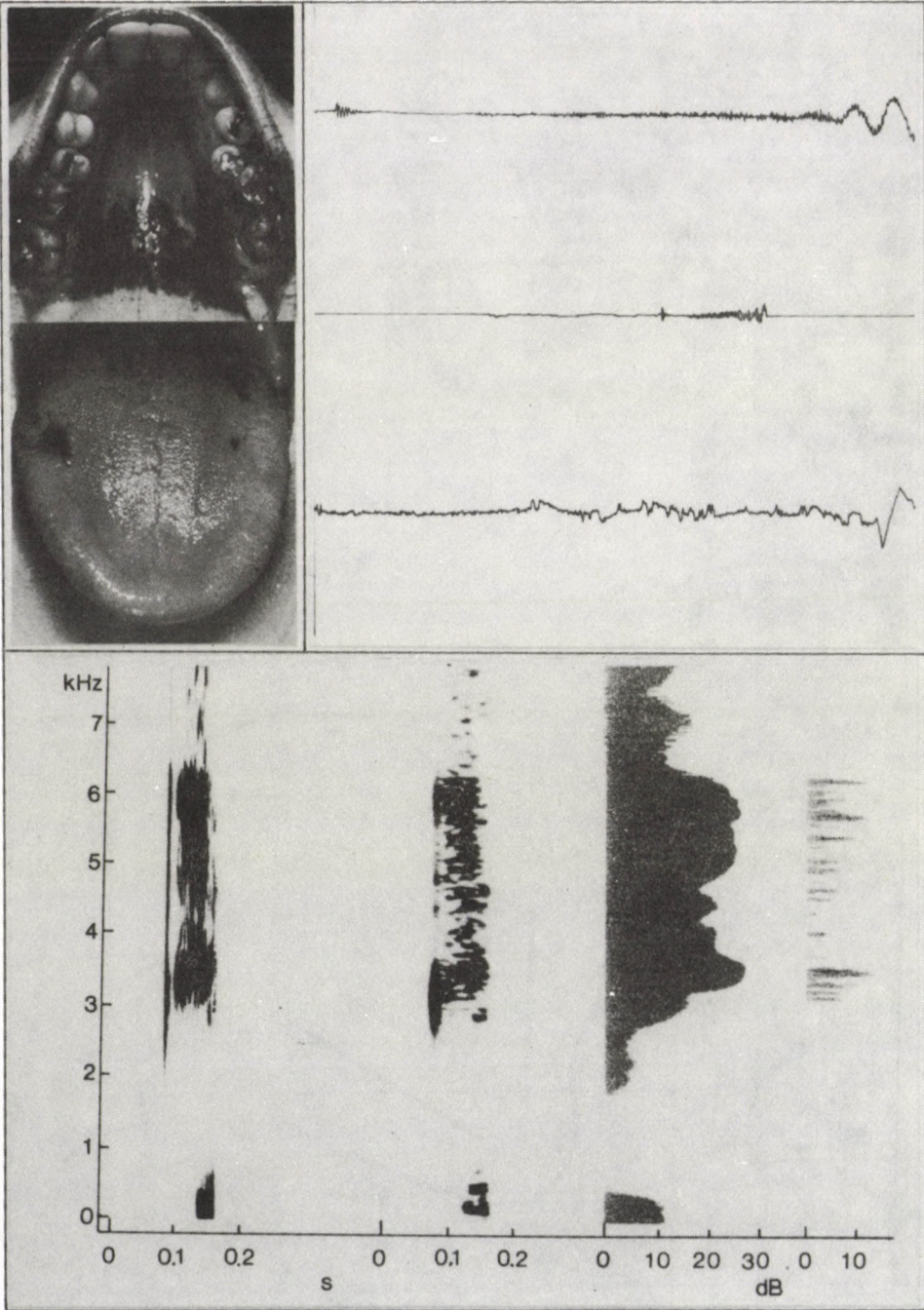
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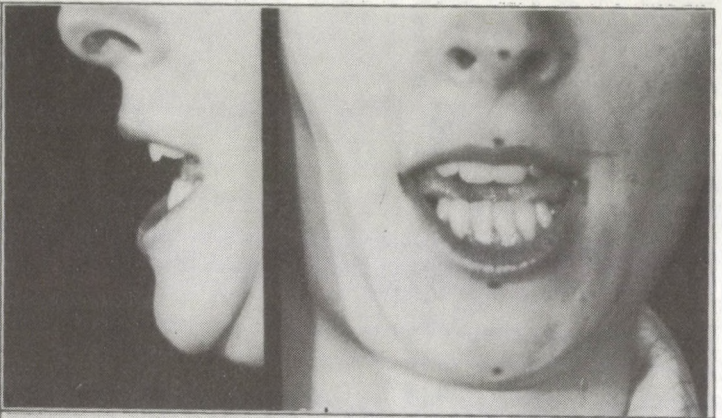
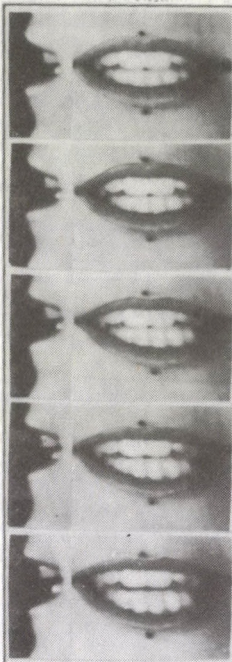
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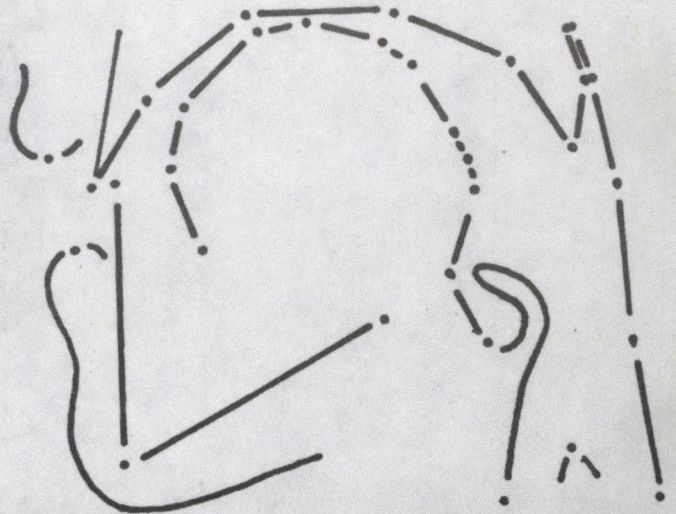


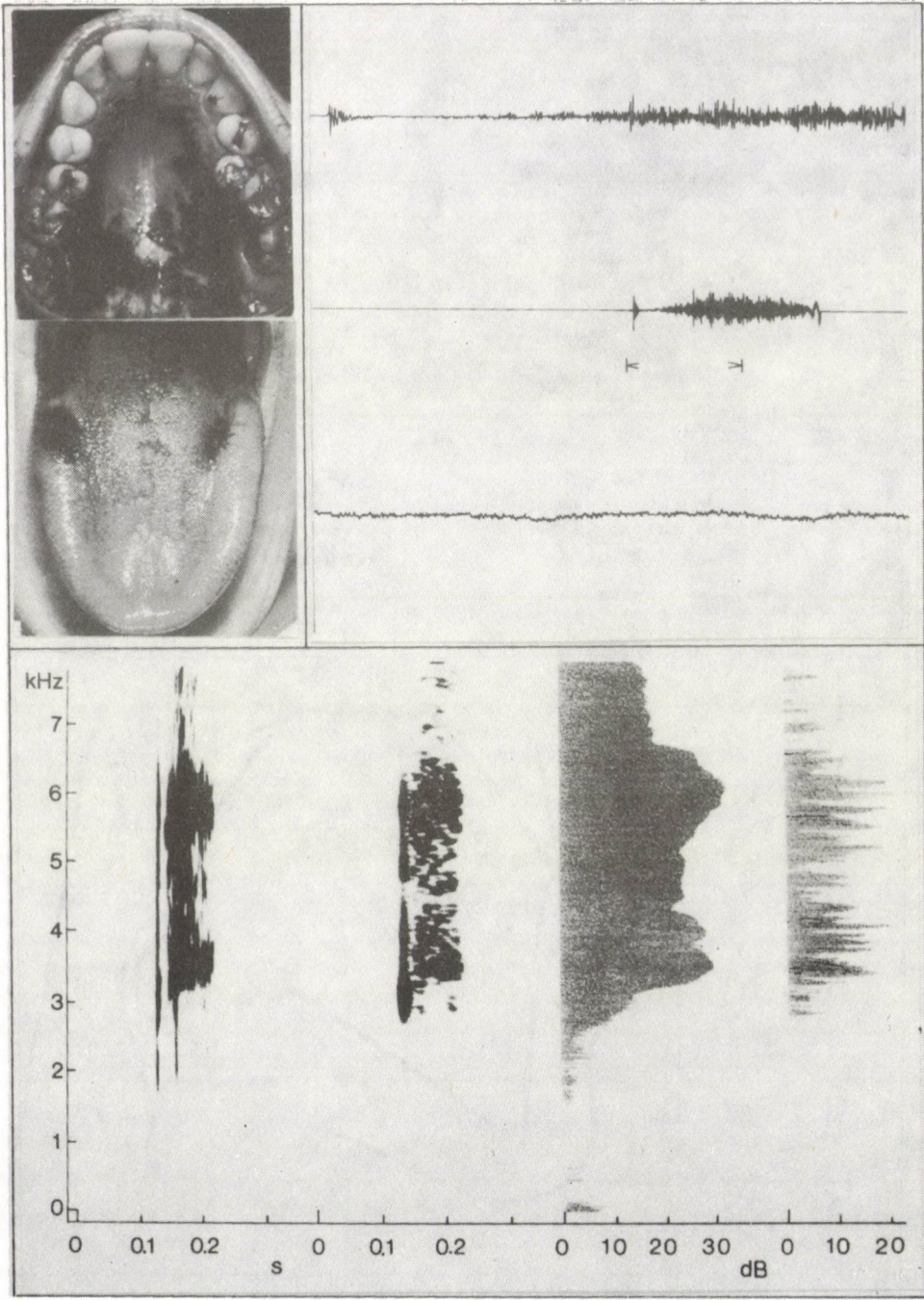


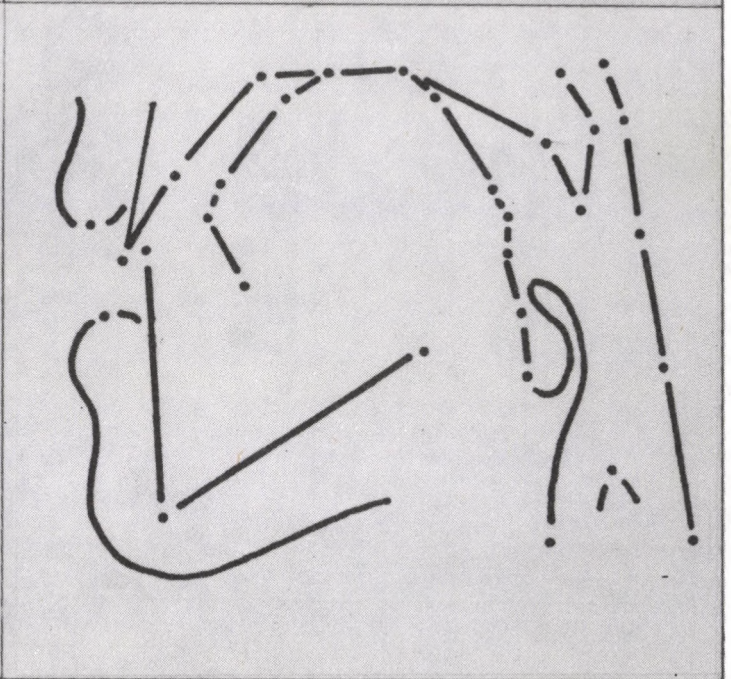
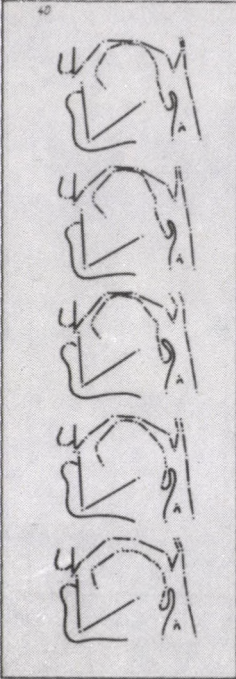
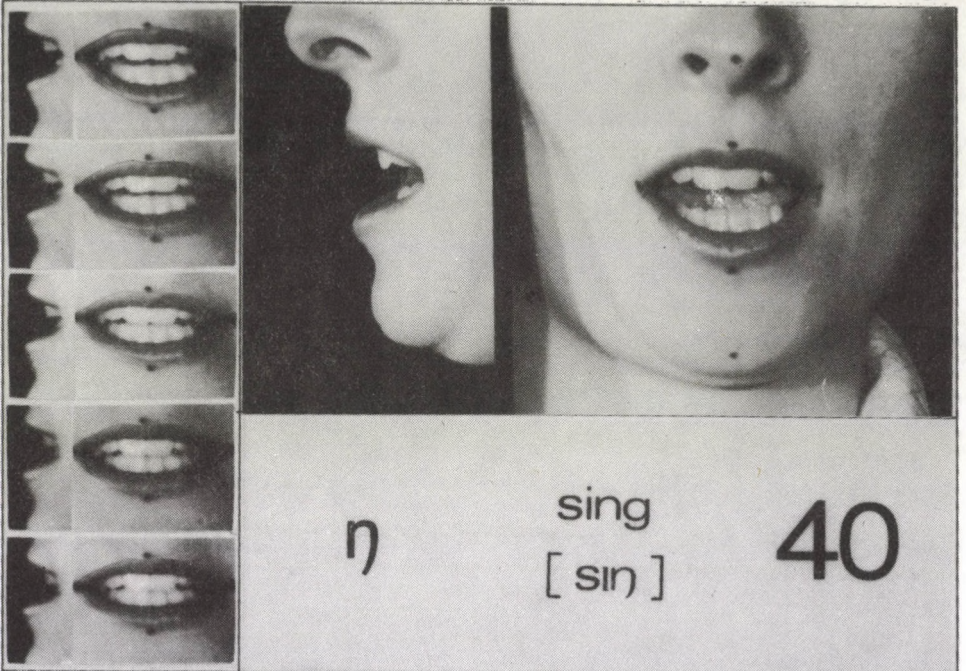
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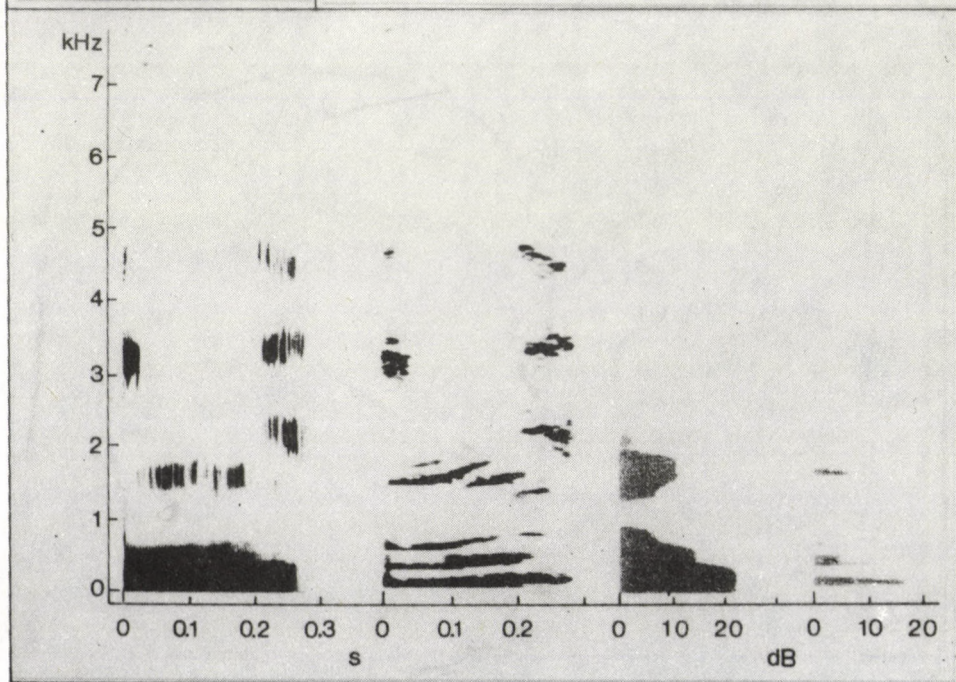
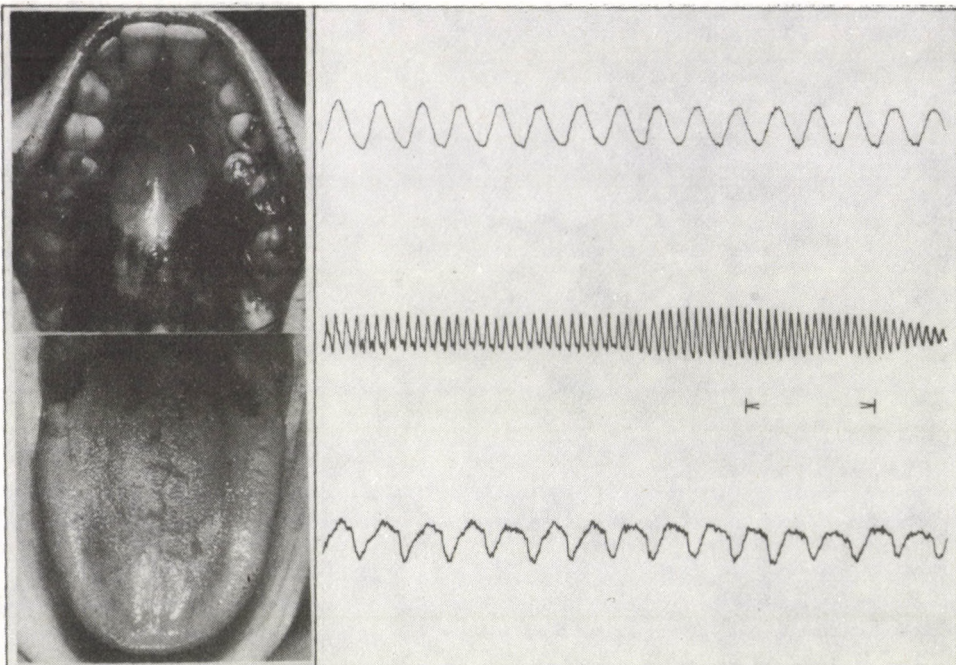
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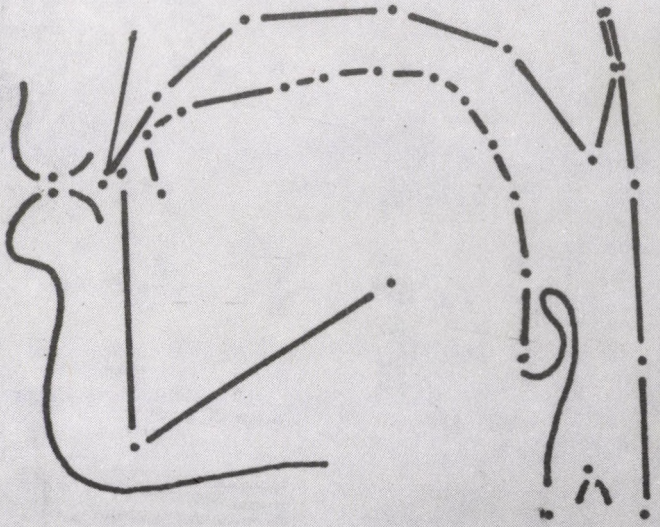
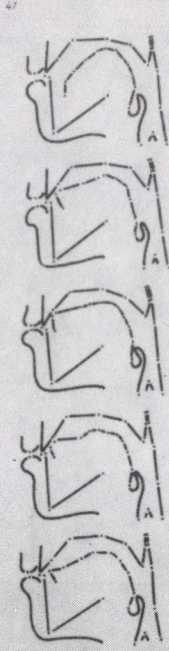


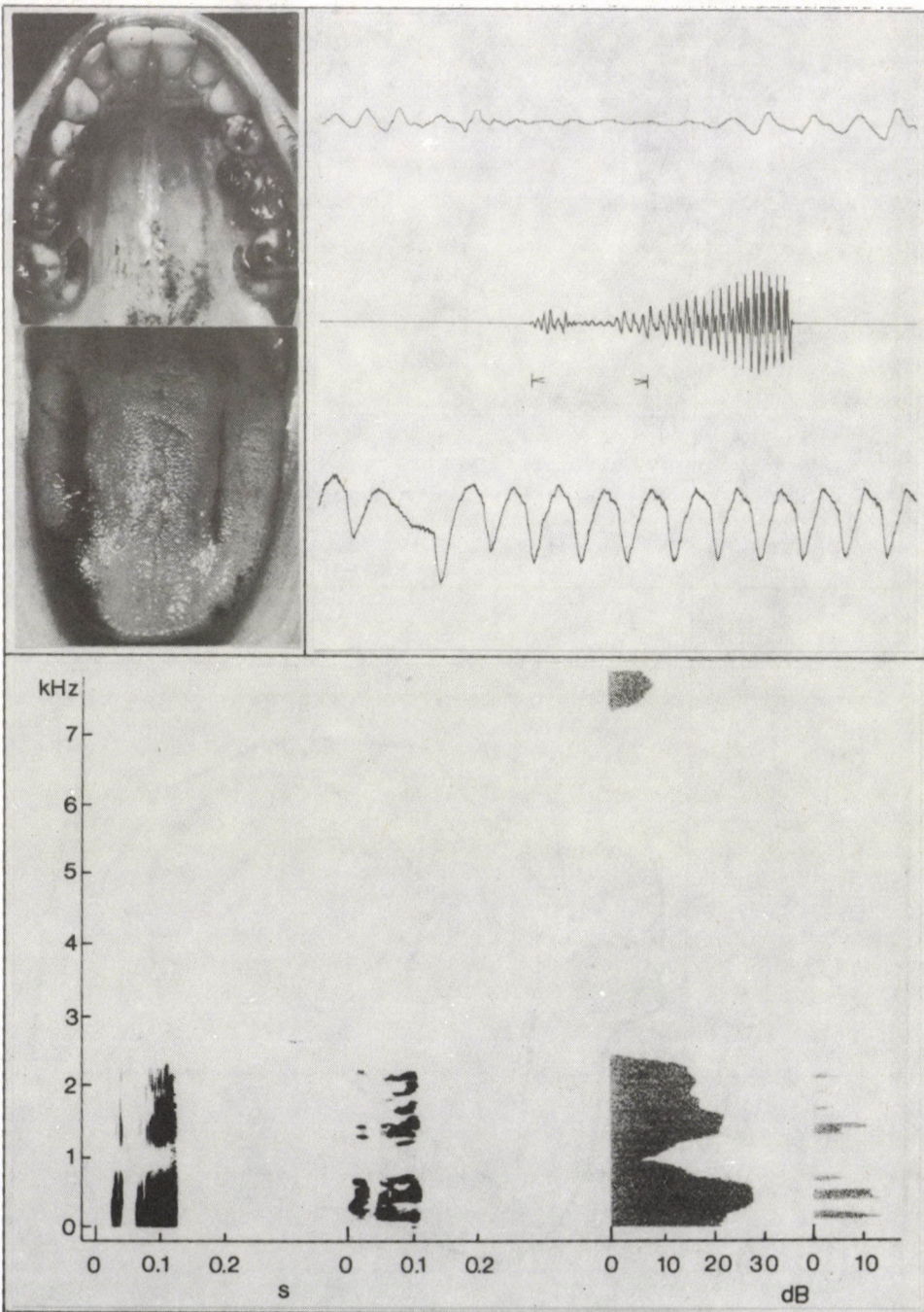


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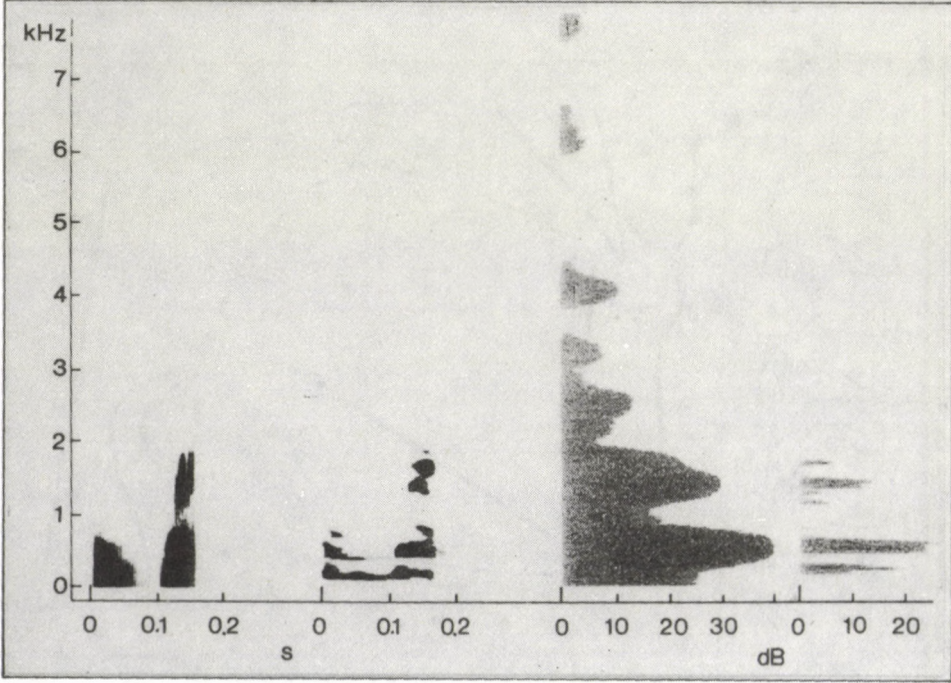
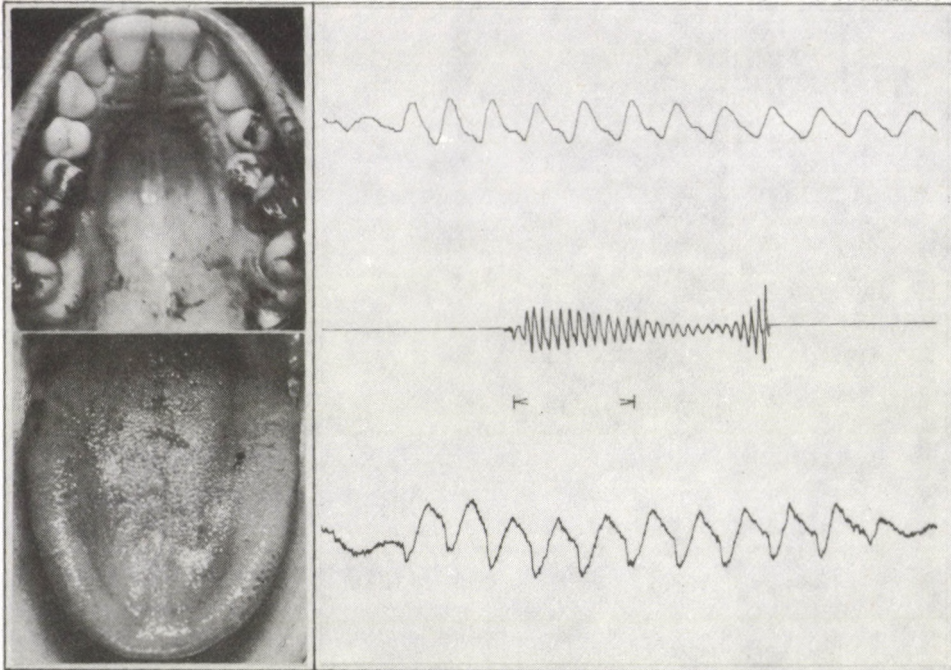
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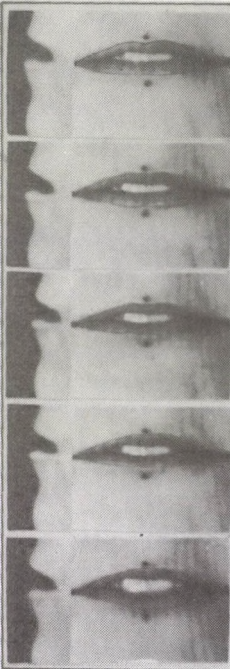
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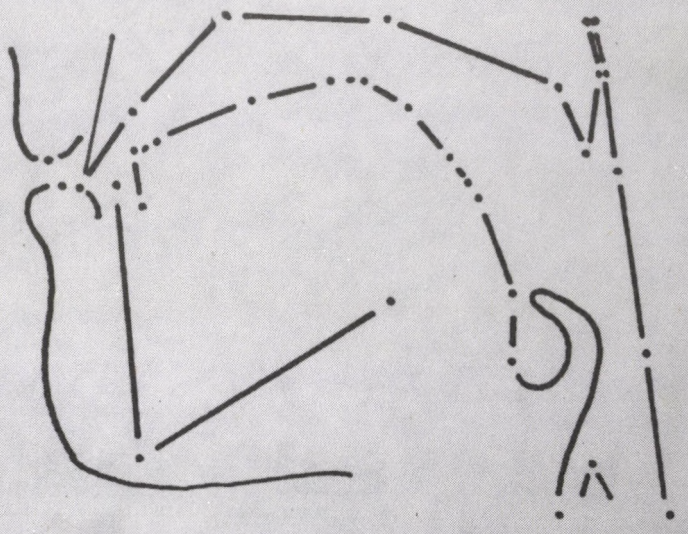
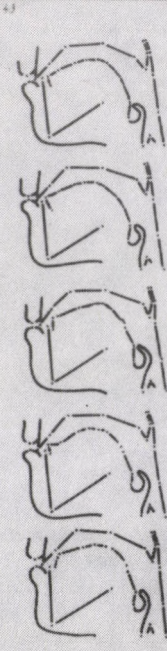


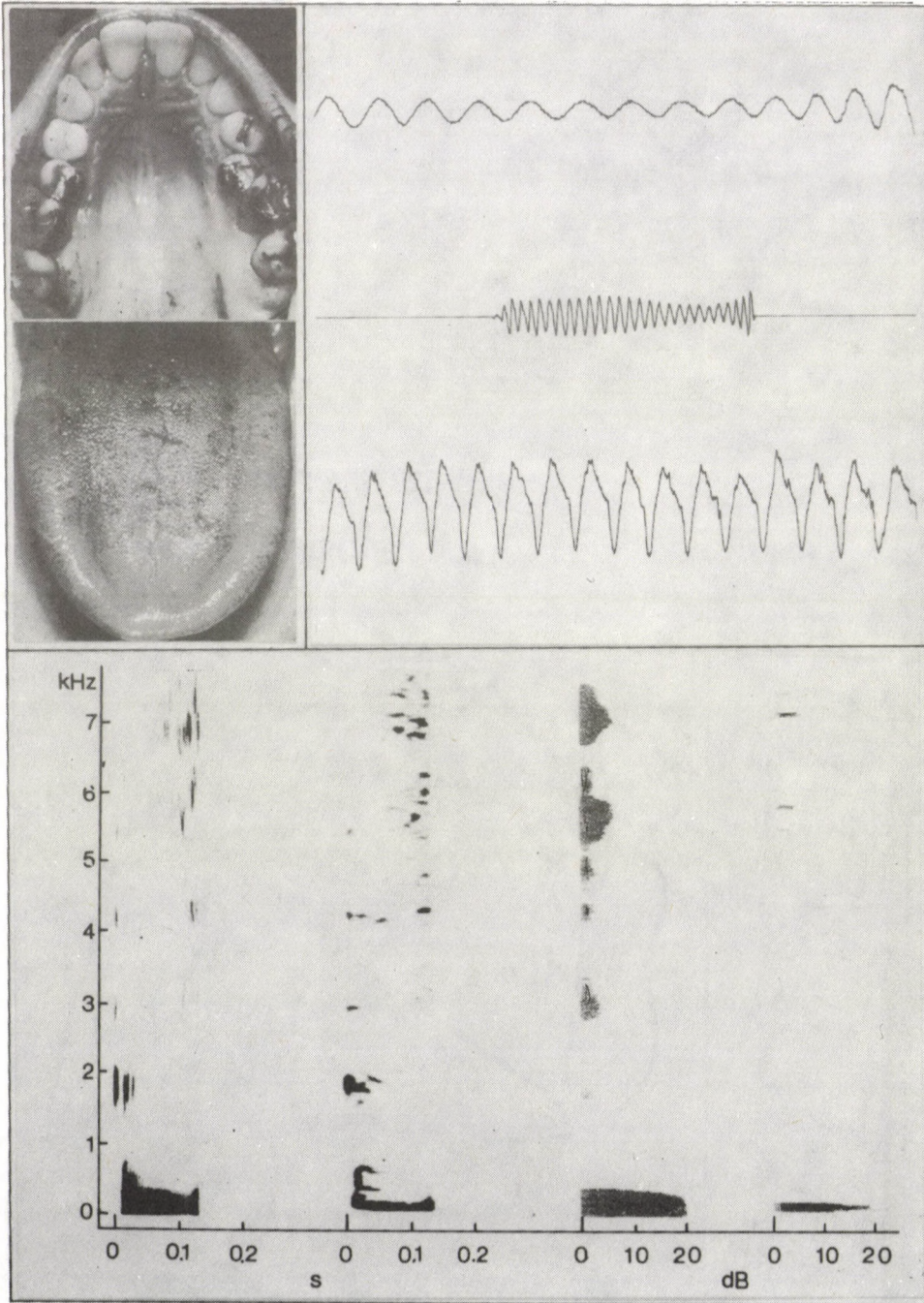


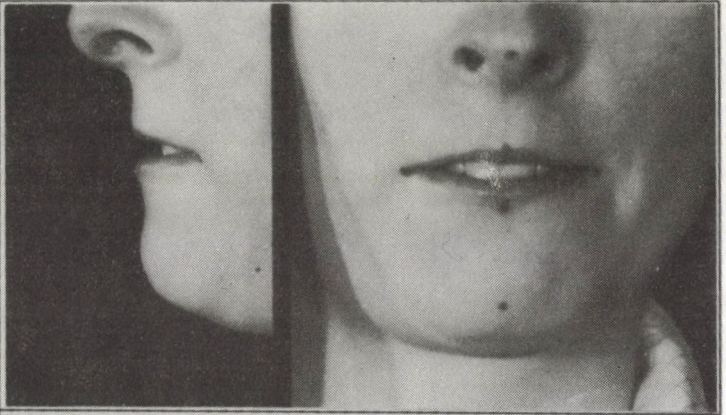
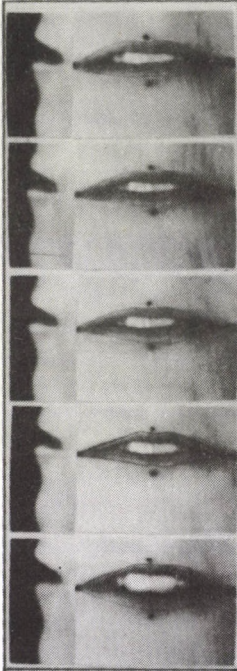
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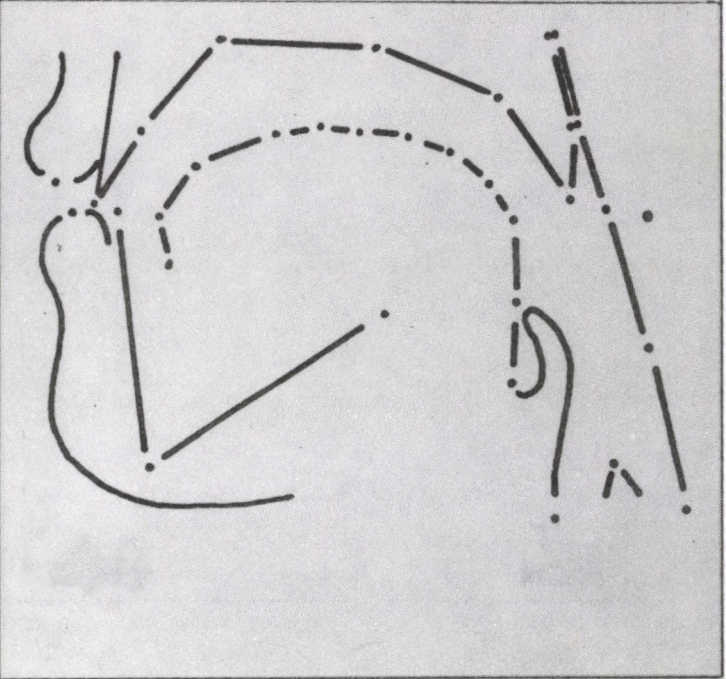
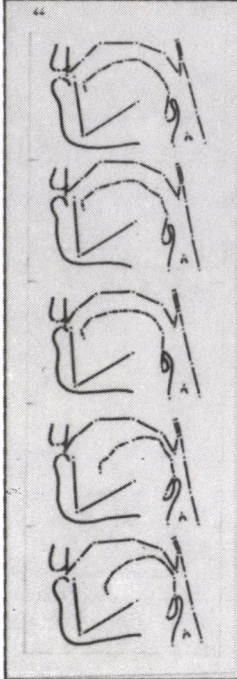


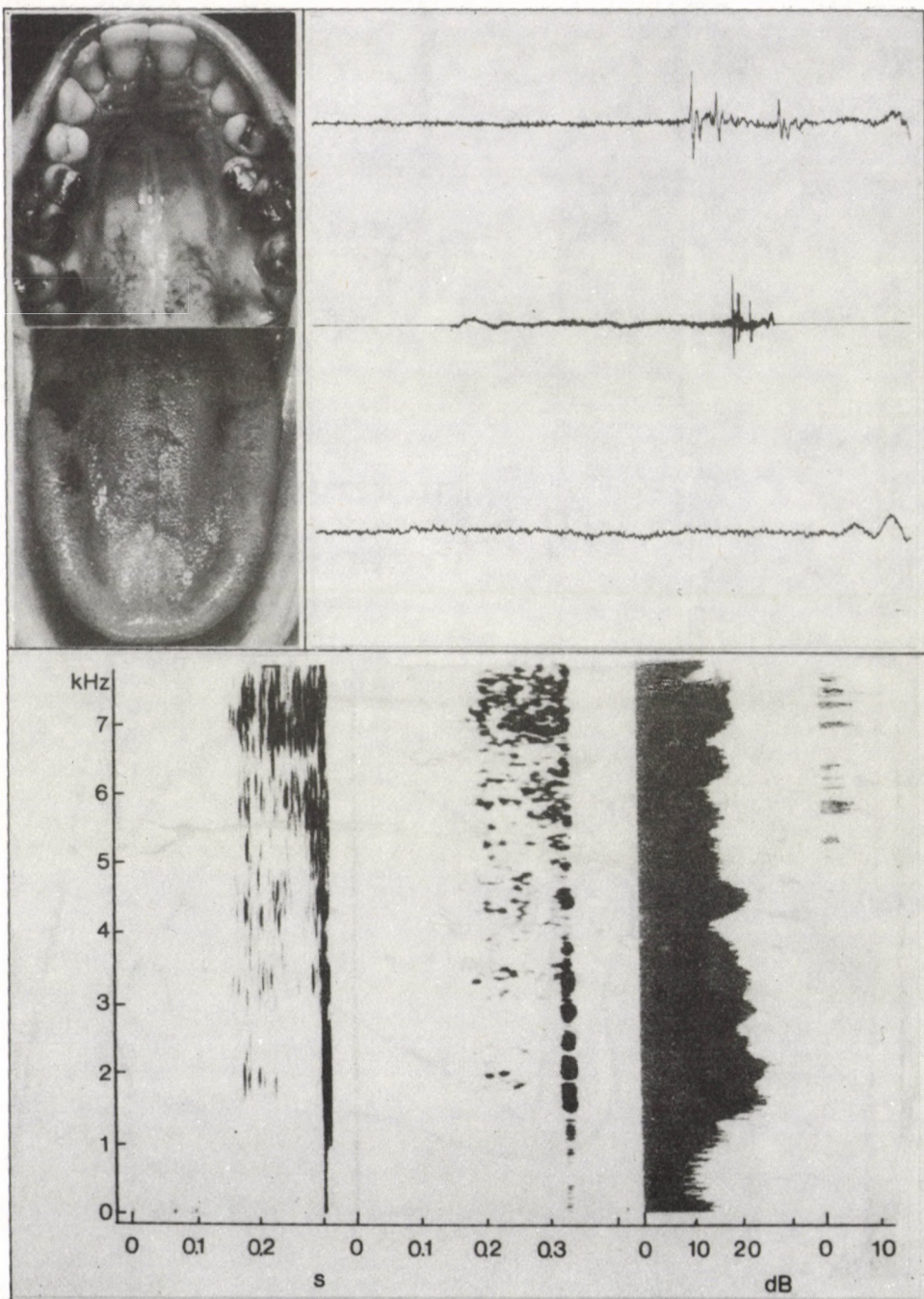


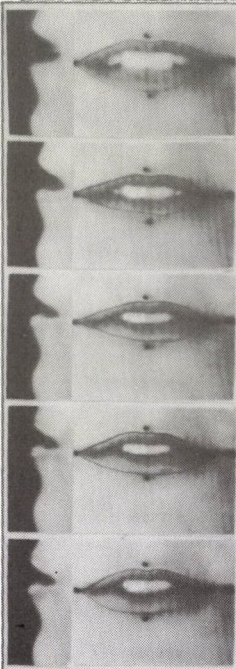
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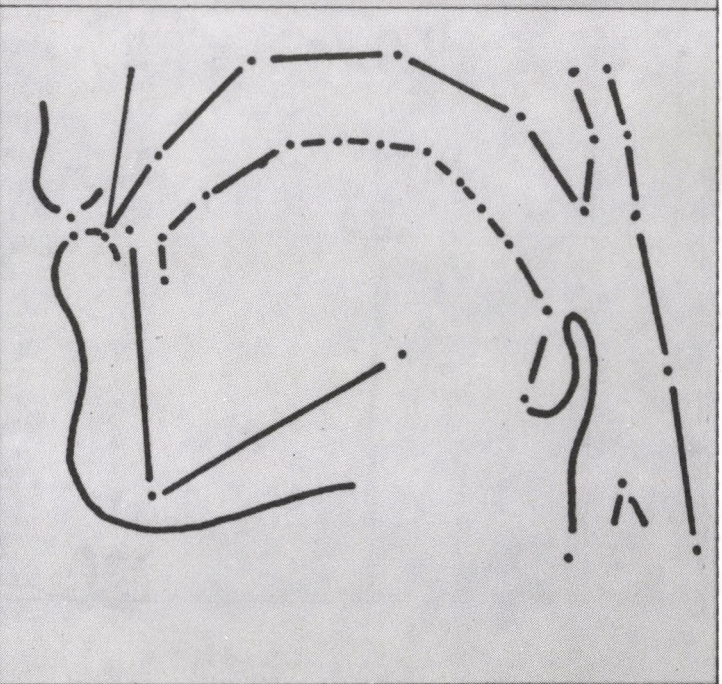
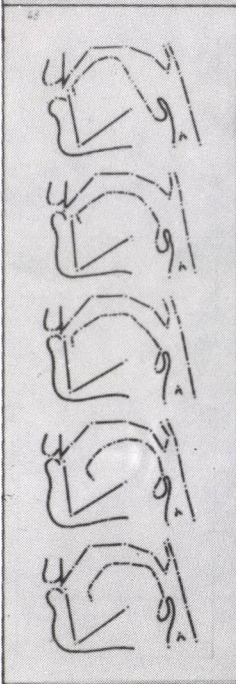
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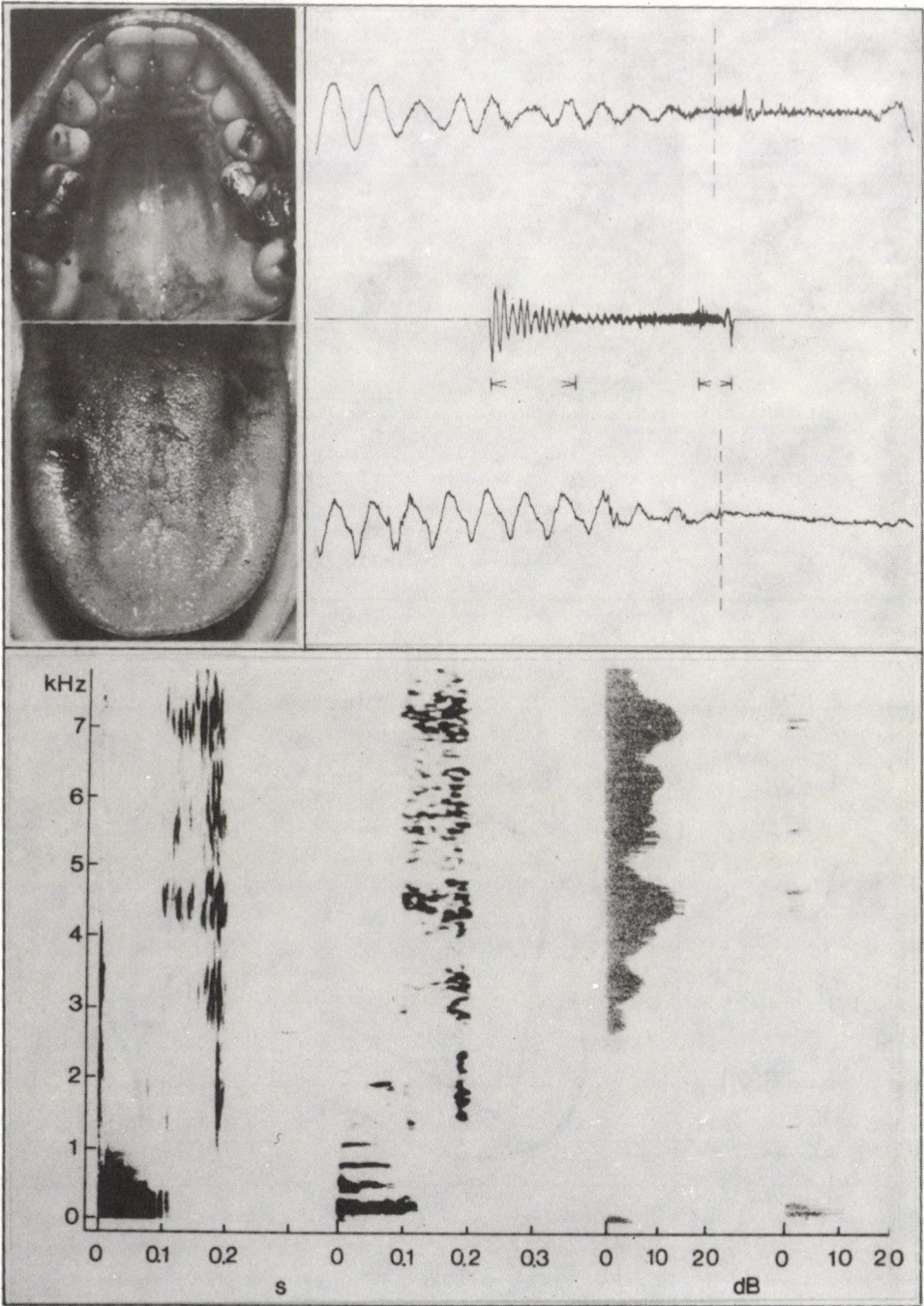


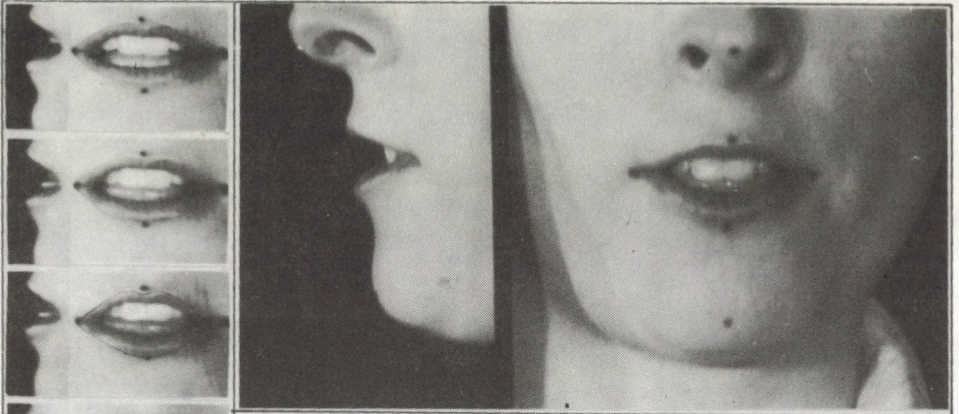




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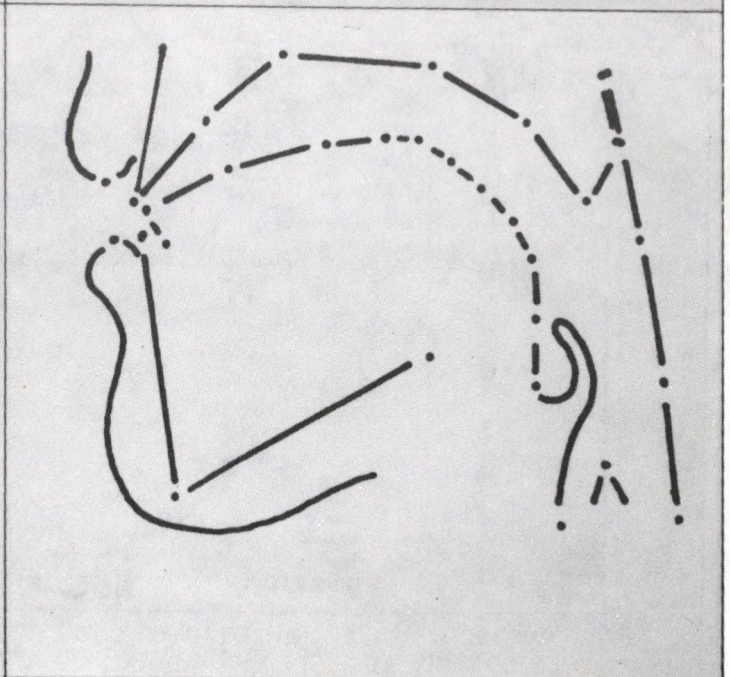
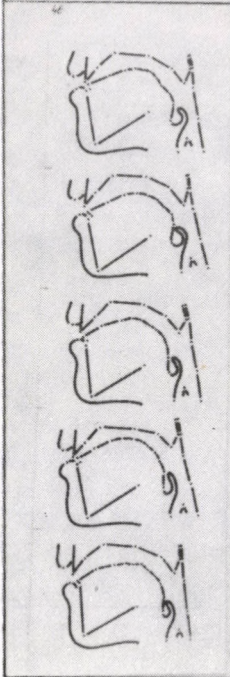
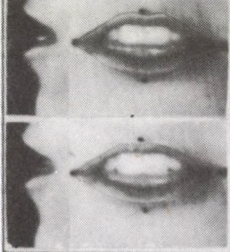


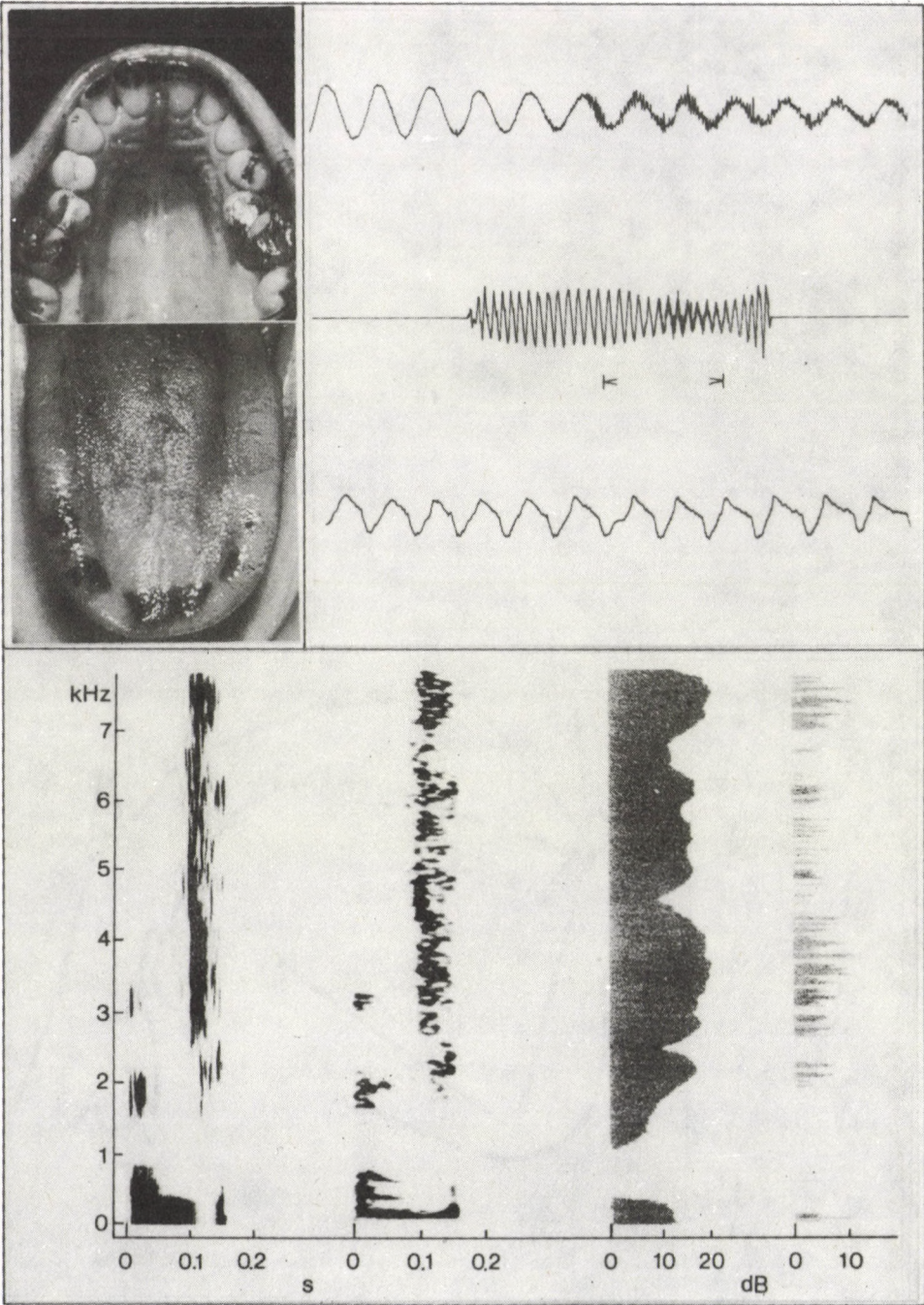
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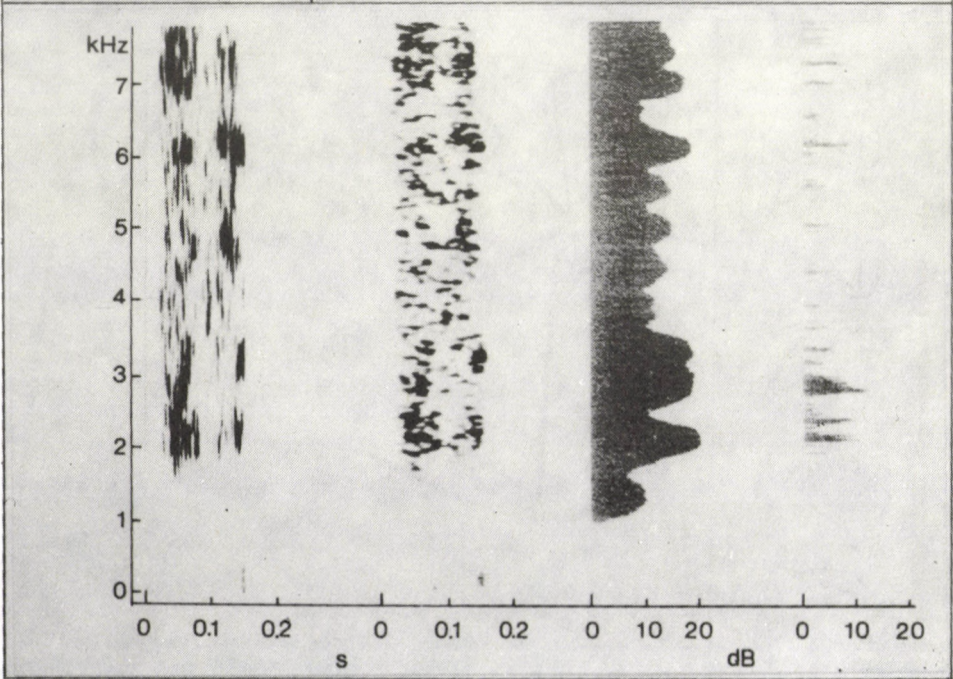
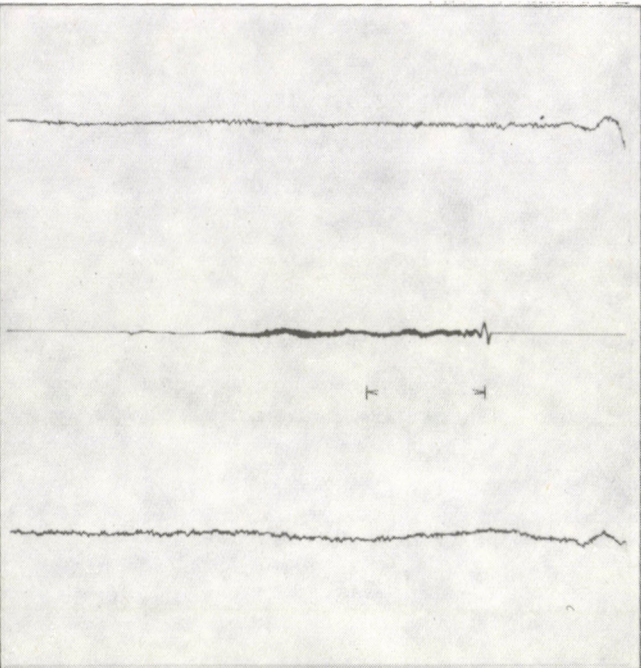
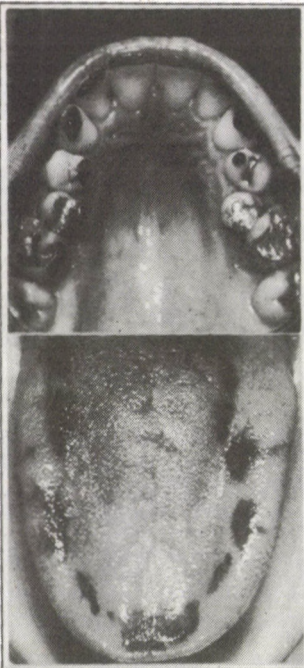
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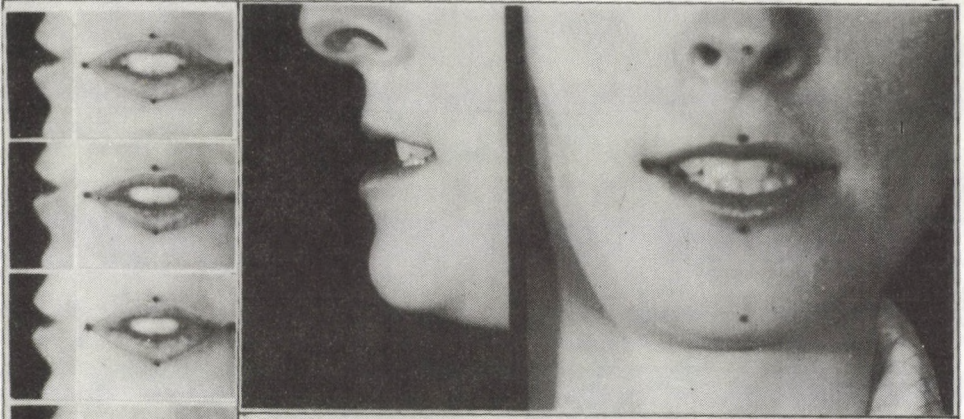
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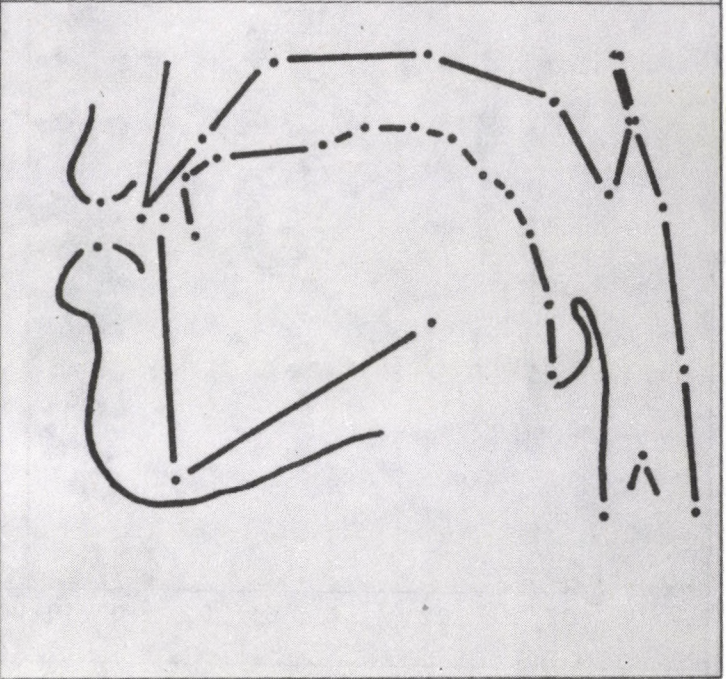
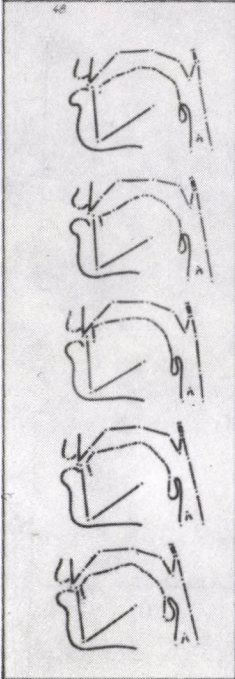


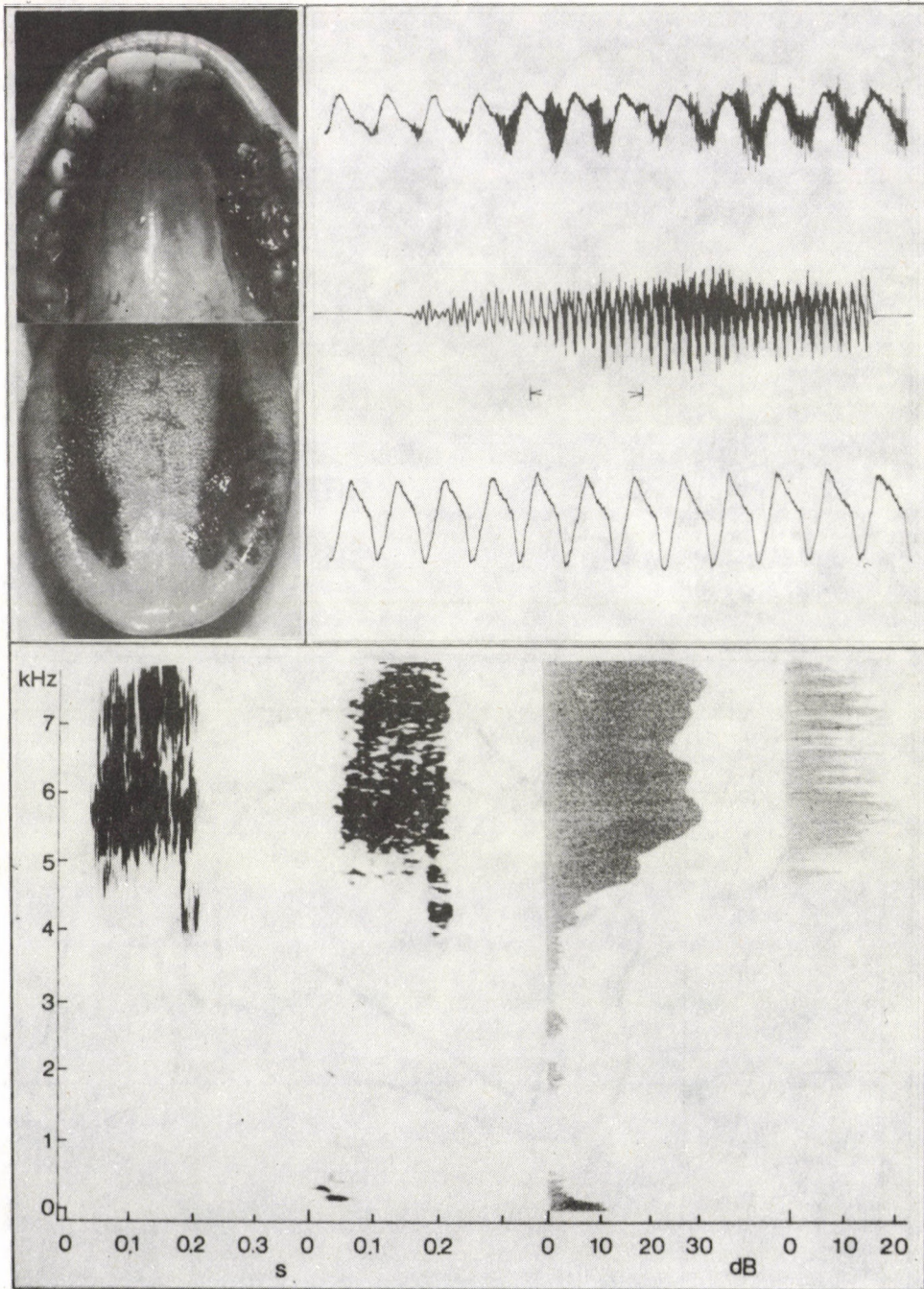


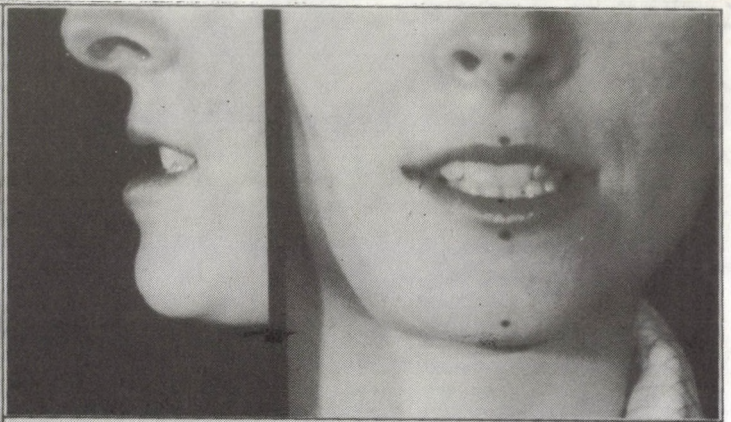
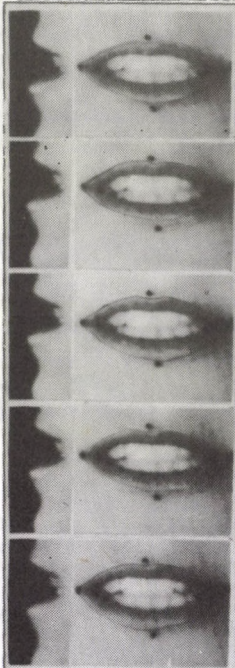
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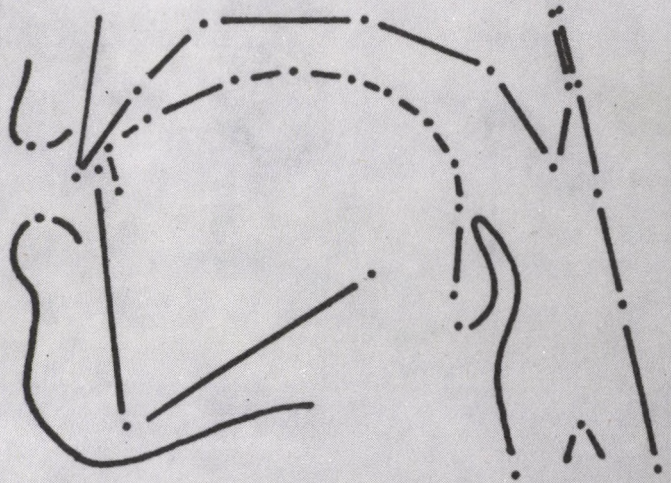
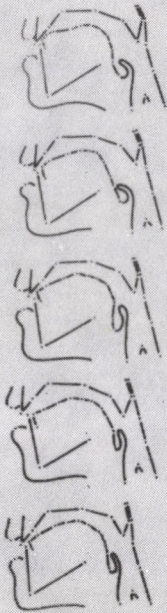


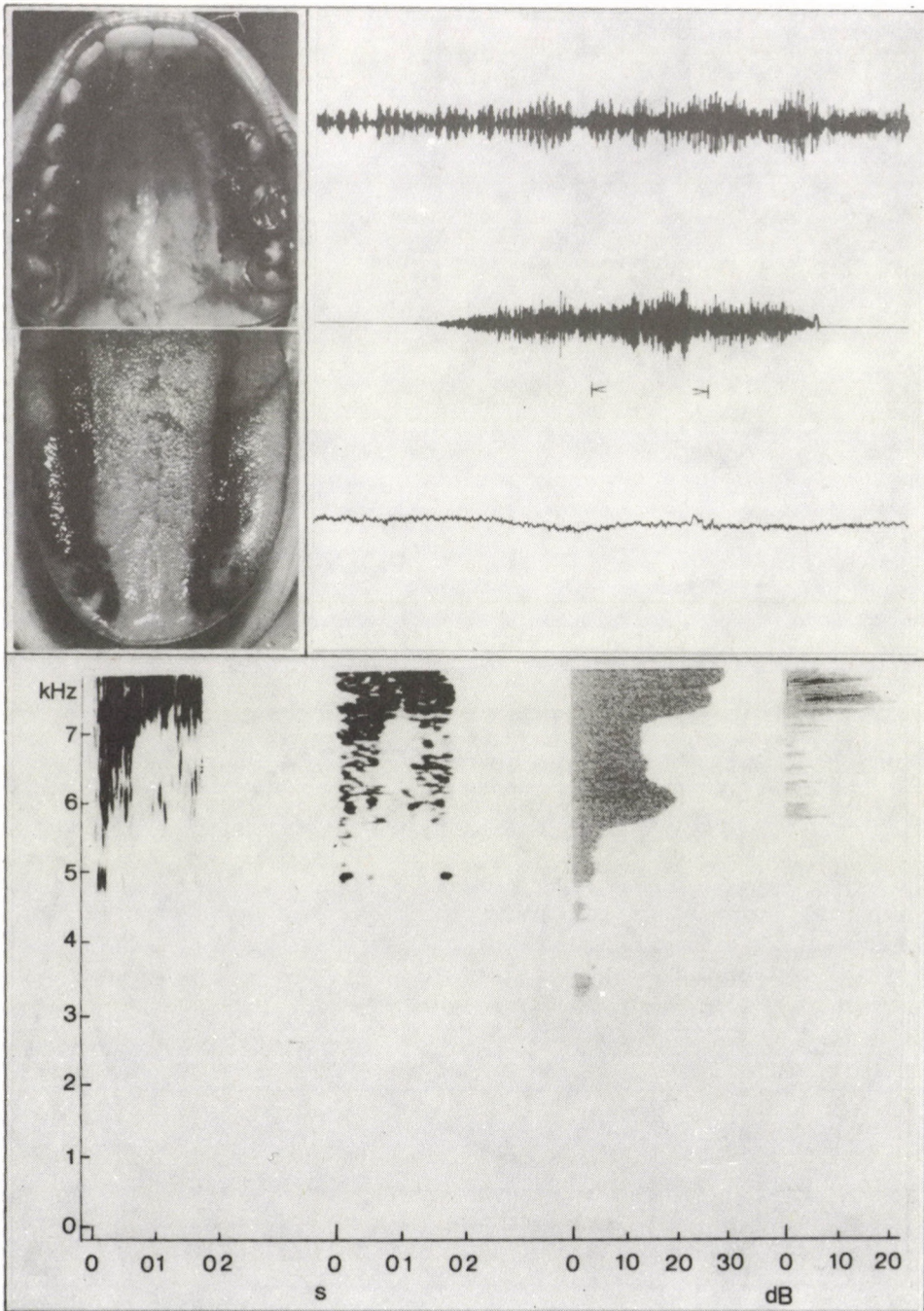


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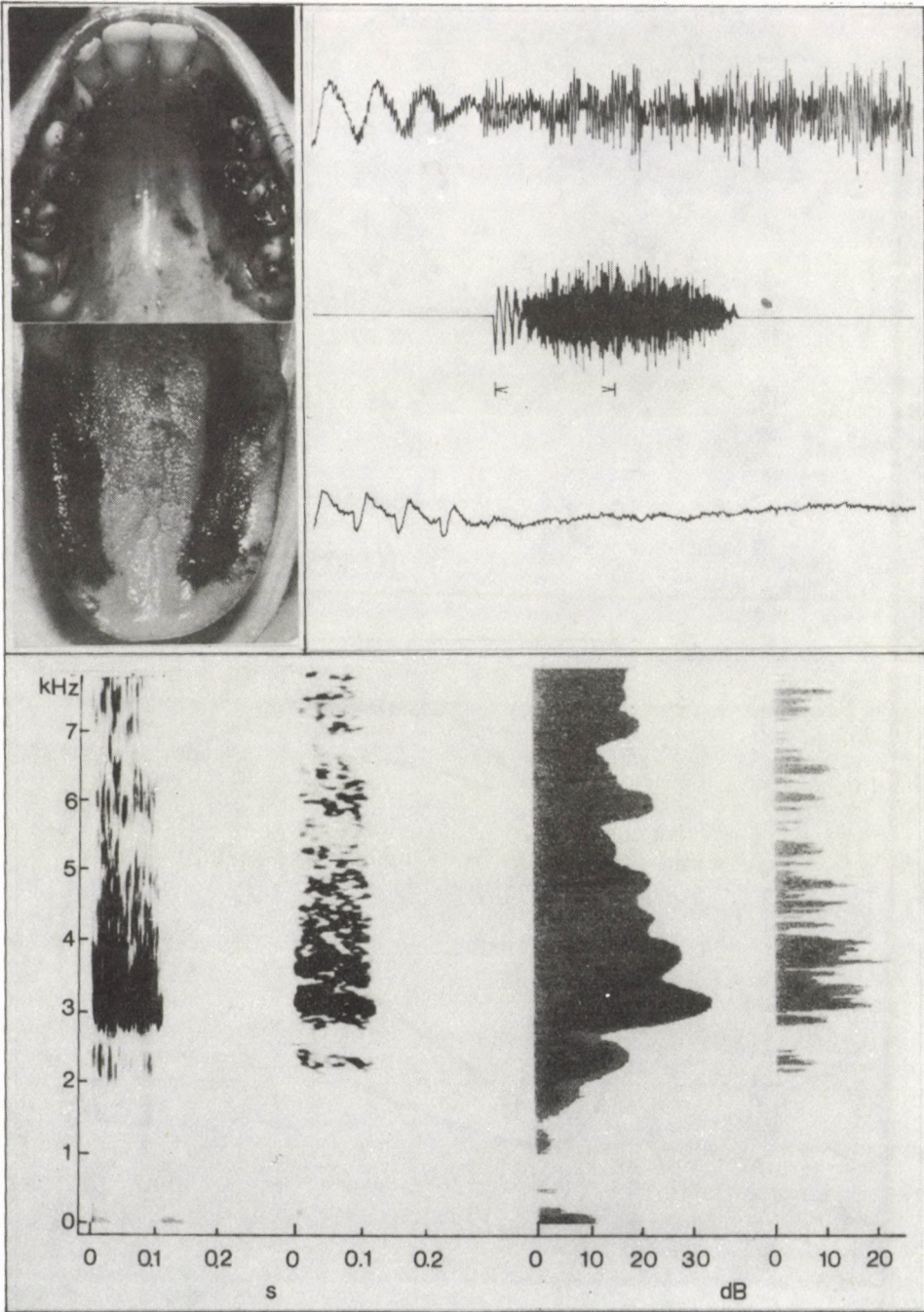
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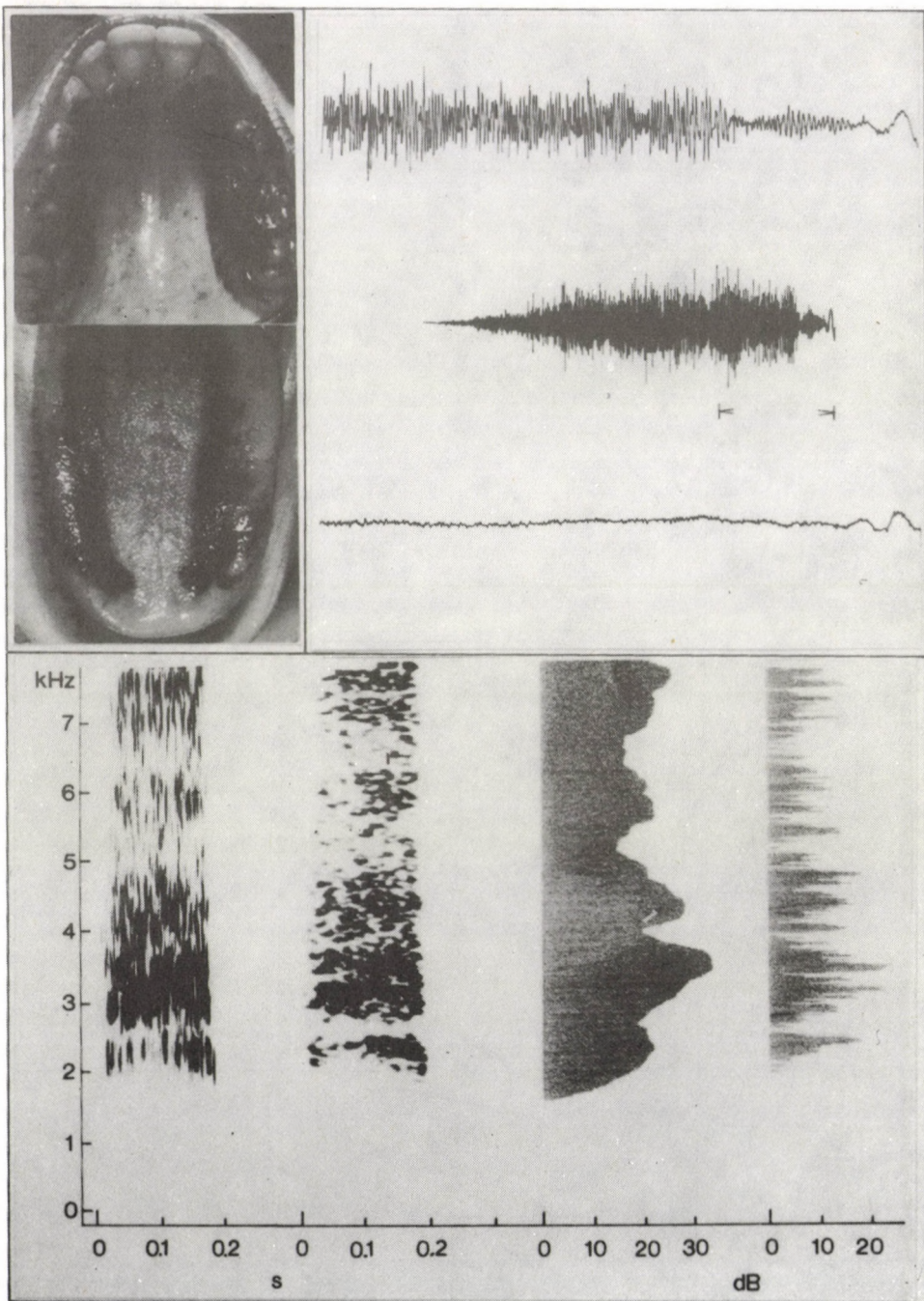




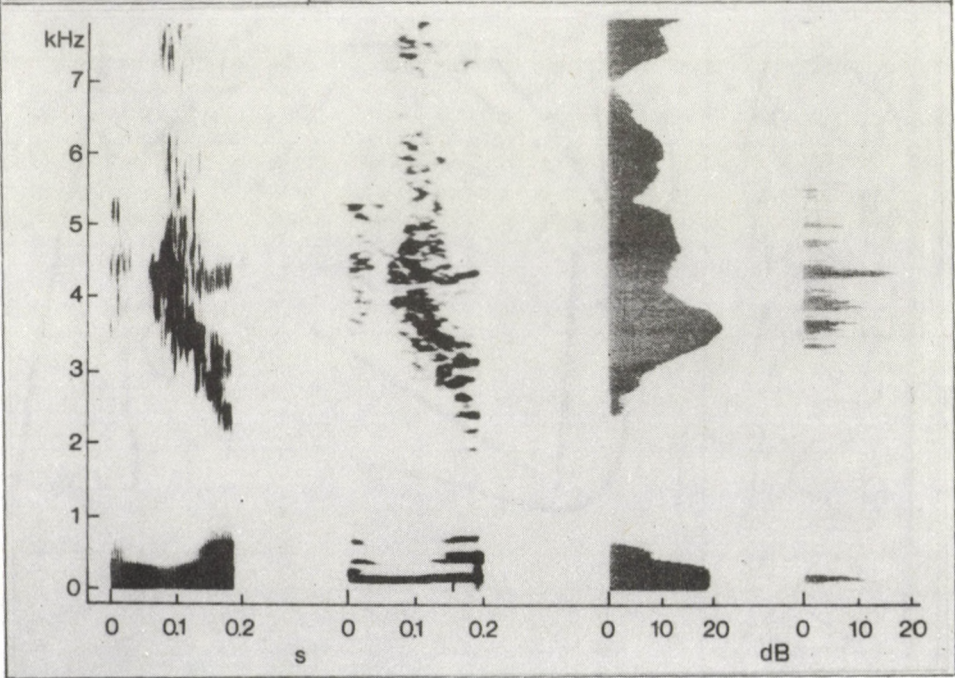
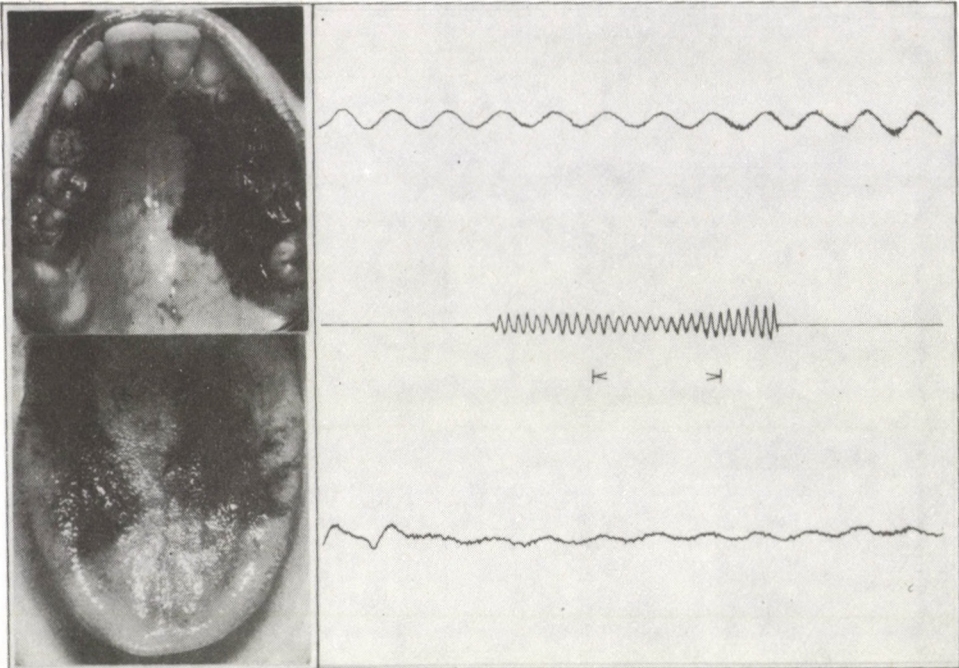
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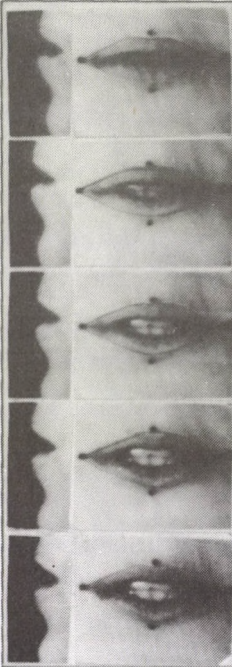


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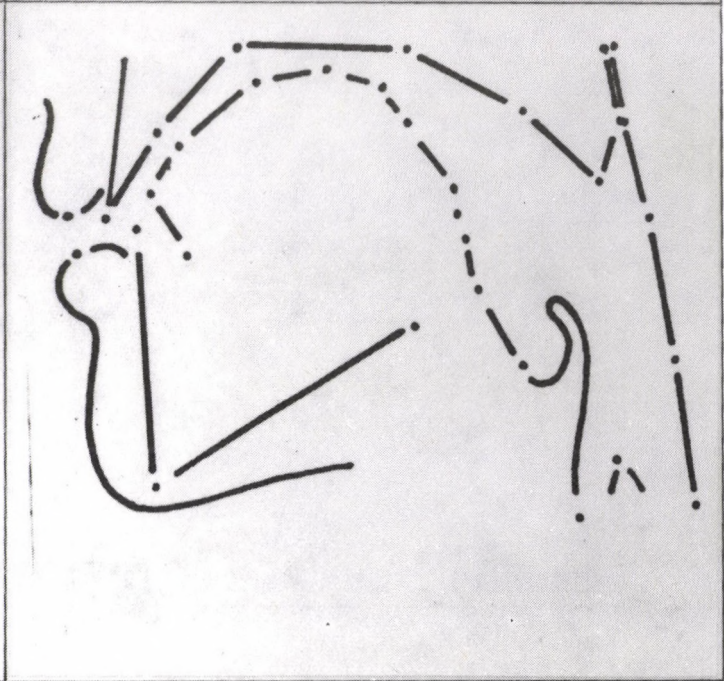
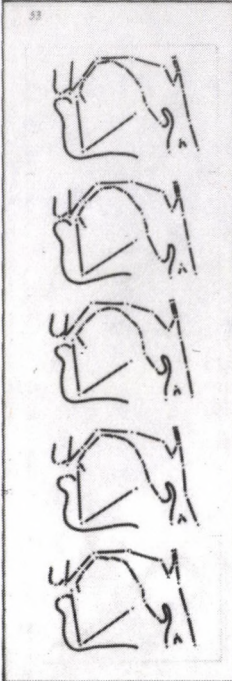


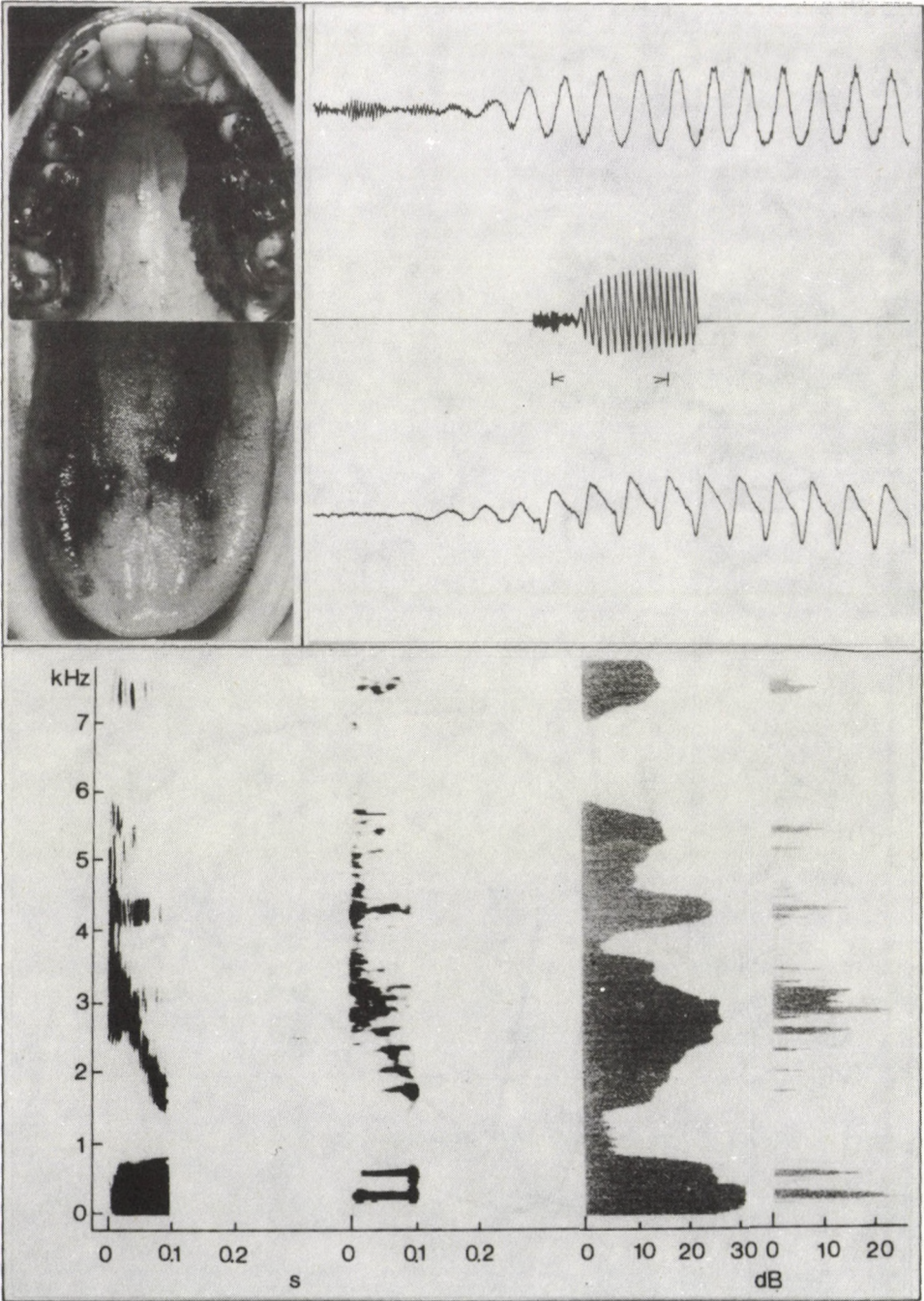


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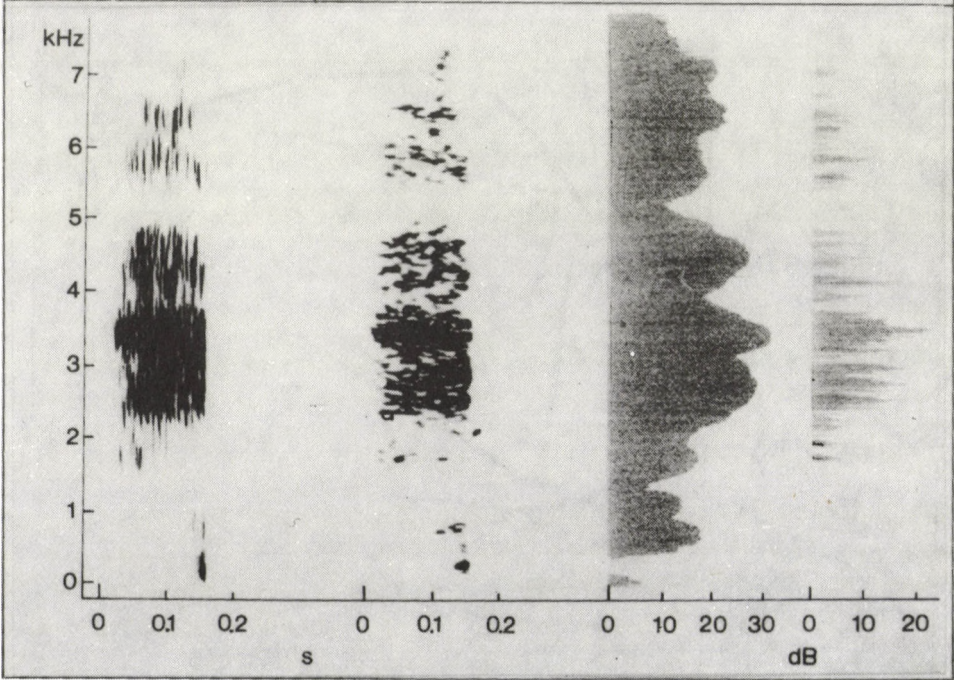
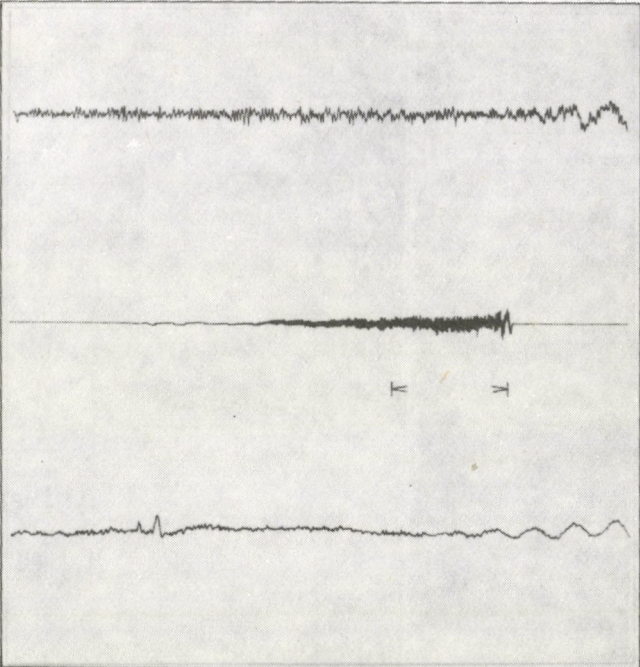
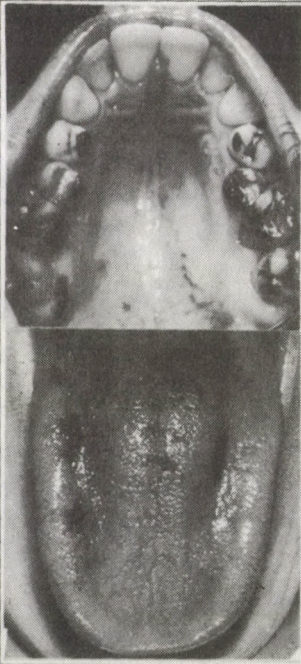
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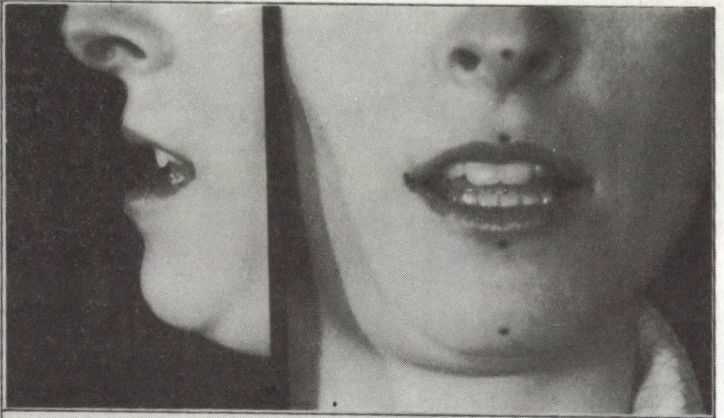
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	<p>h head 54 [hɛd]</p>



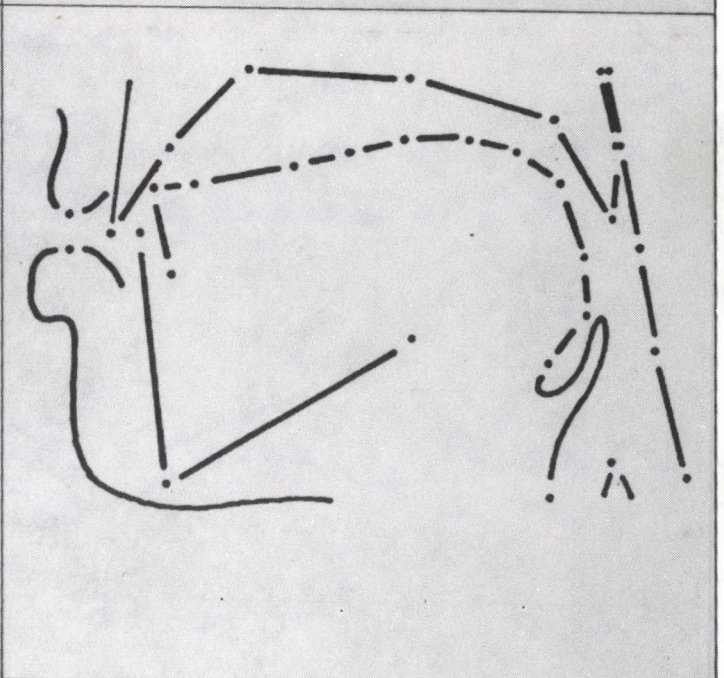
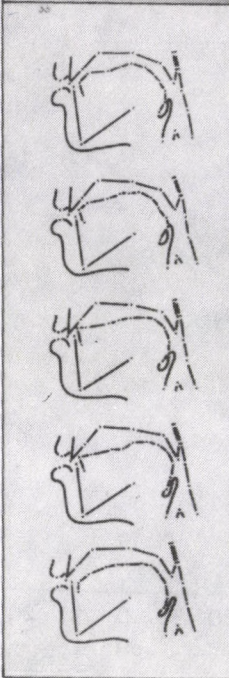


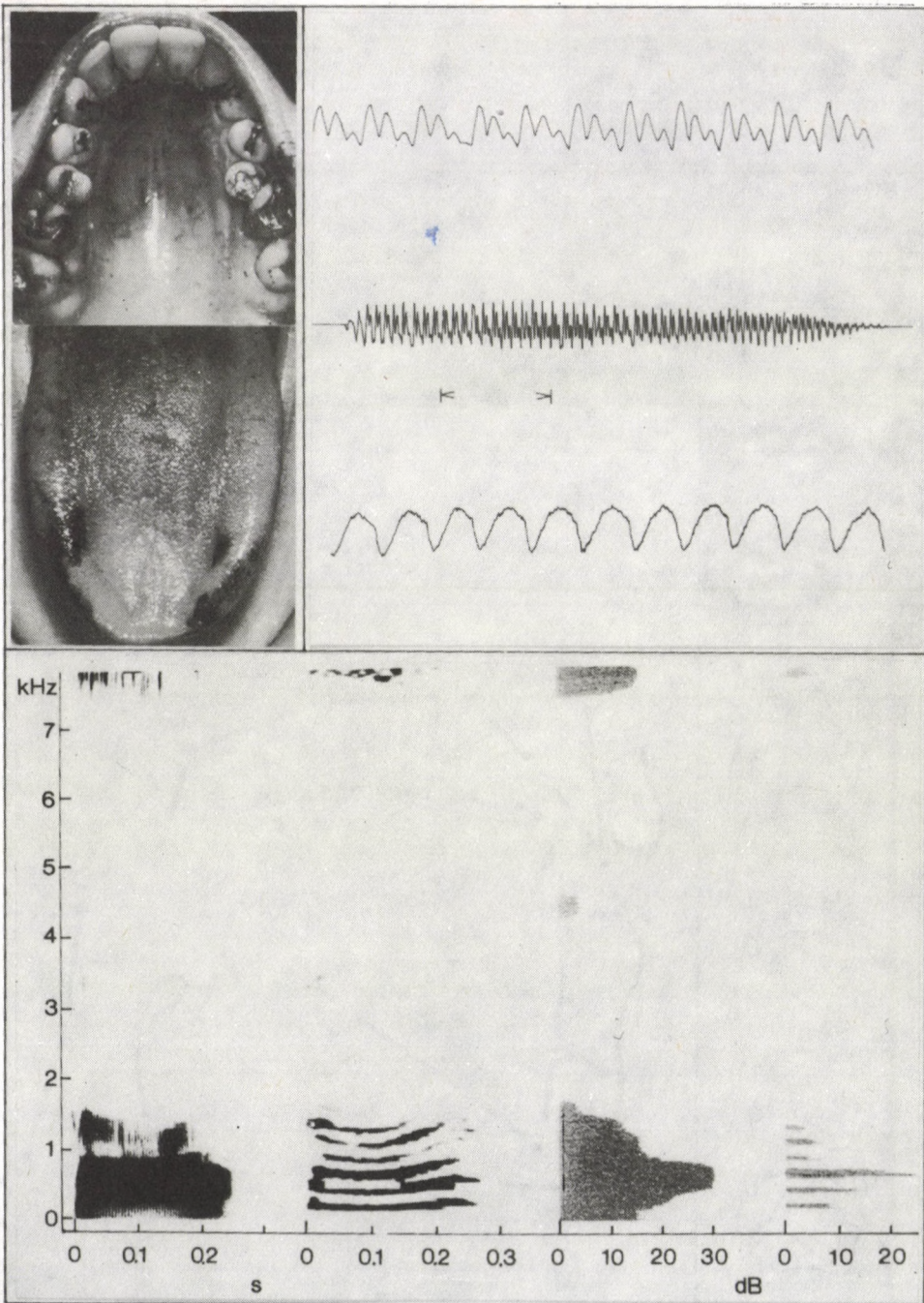
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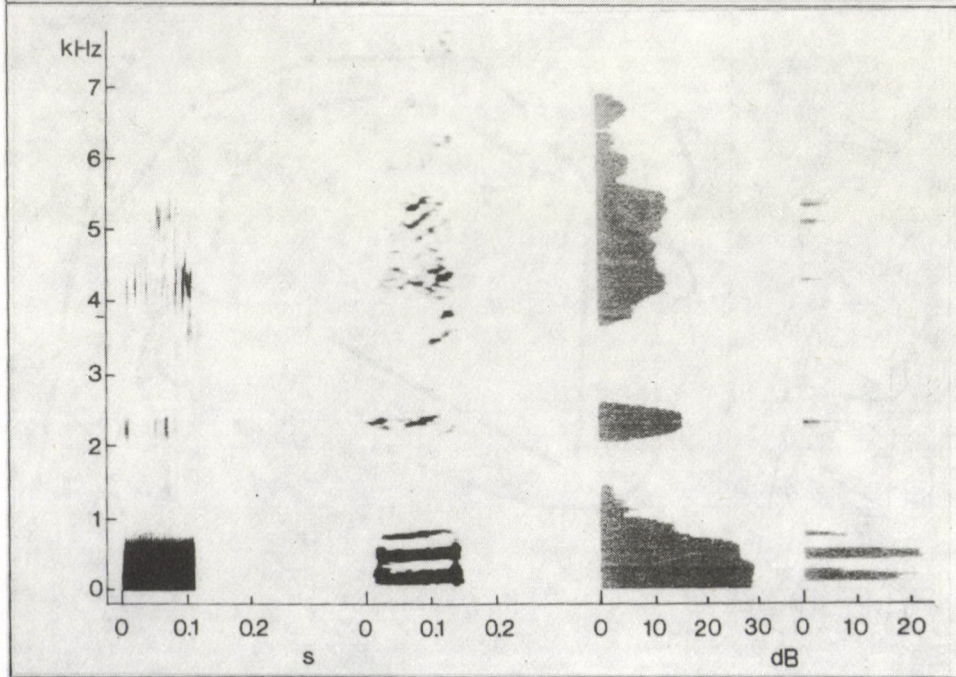
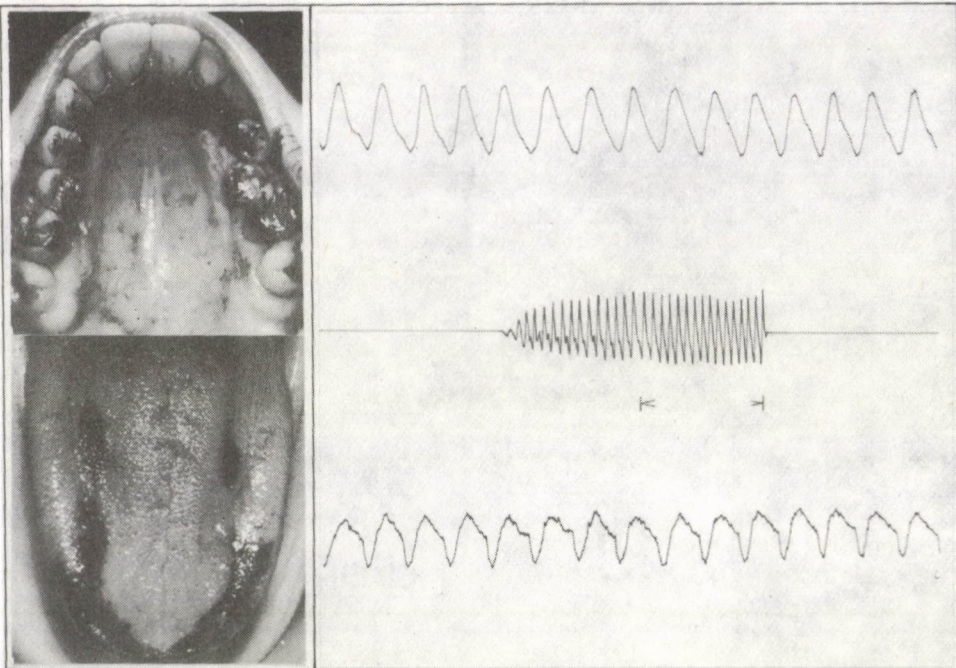
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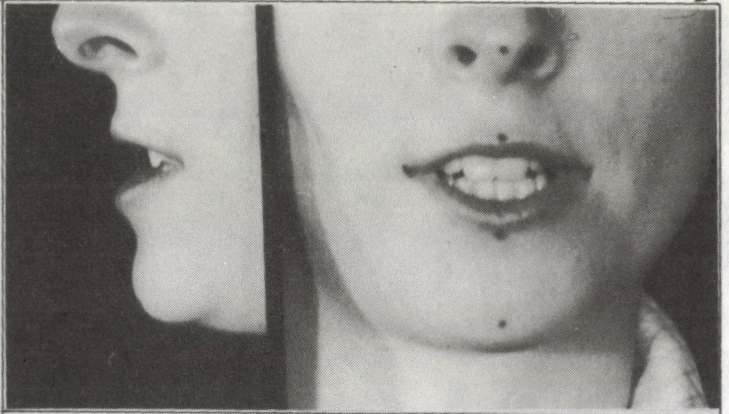
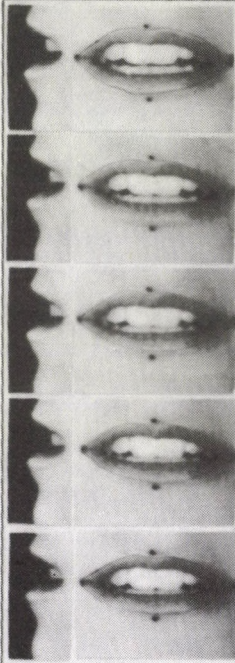
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	<p>late [leɪt]</p> <p>56</p>

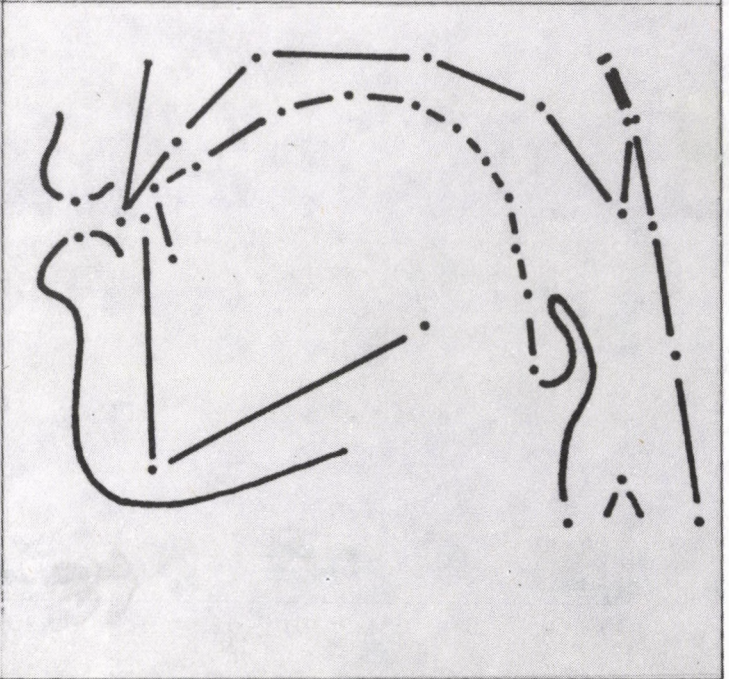
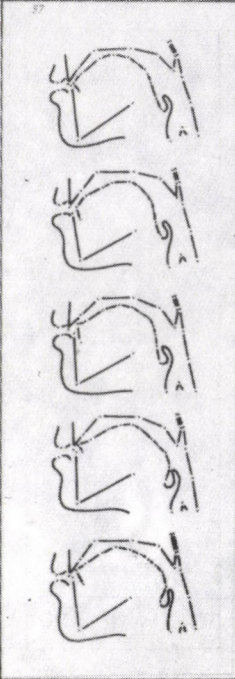


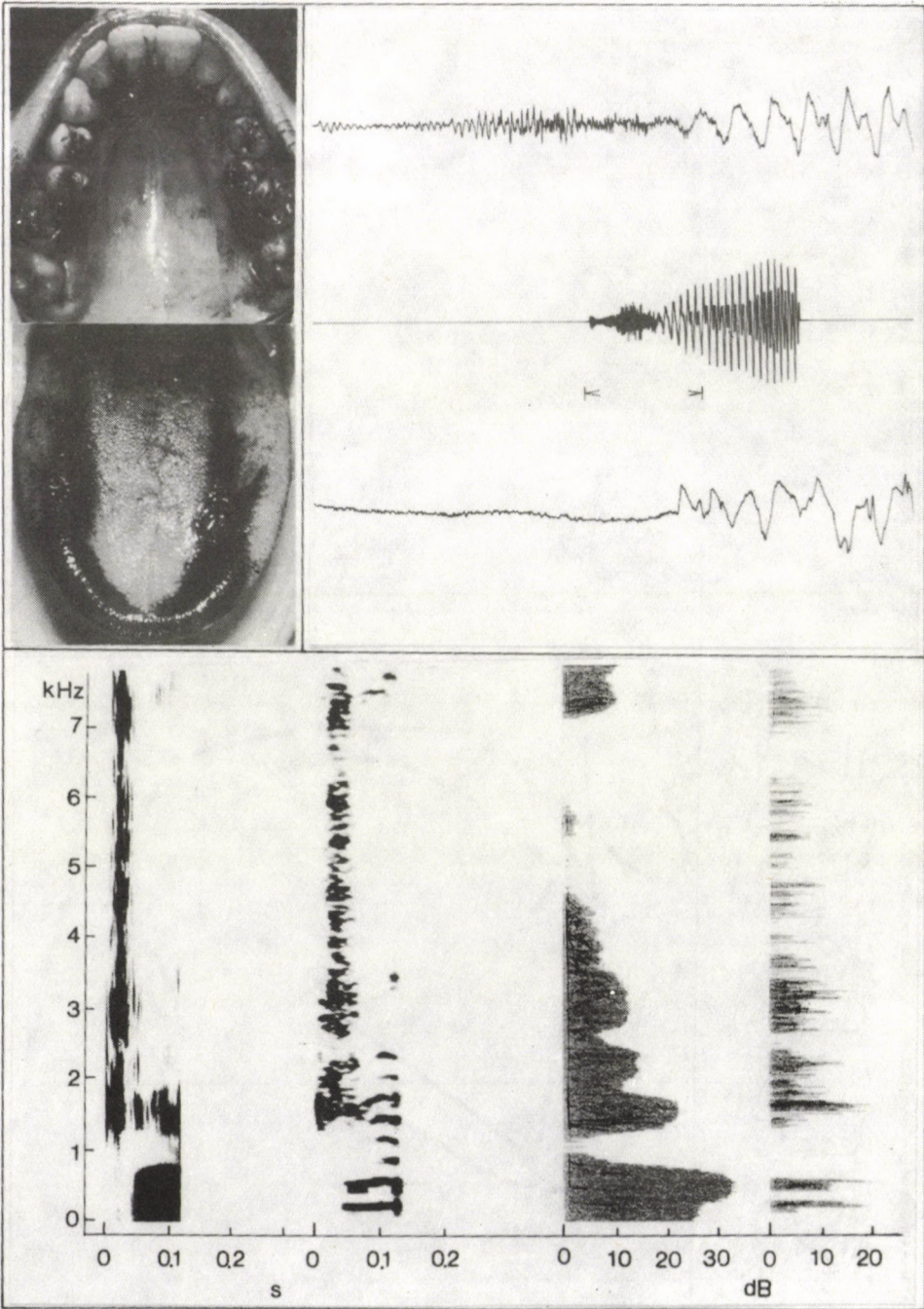


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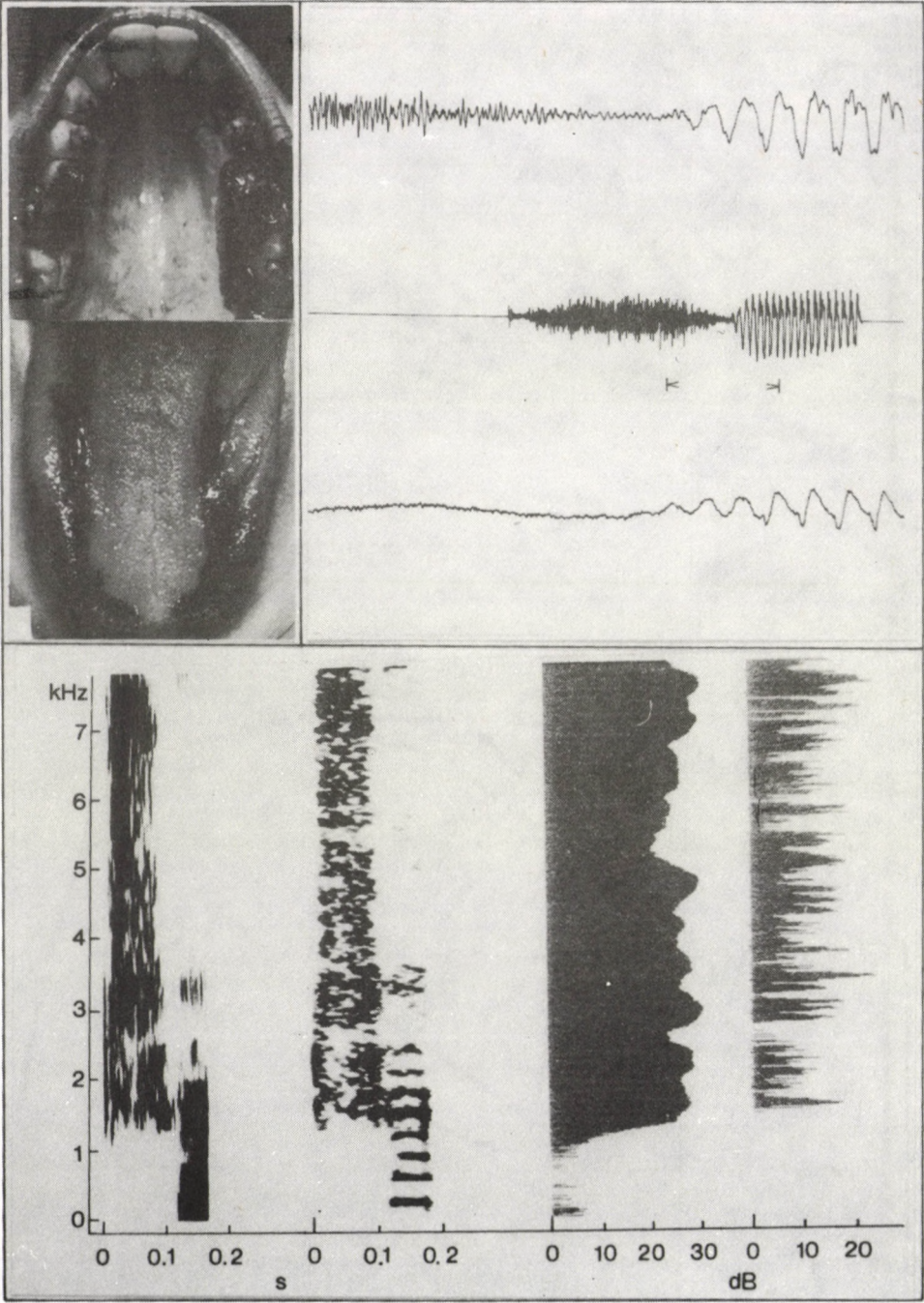
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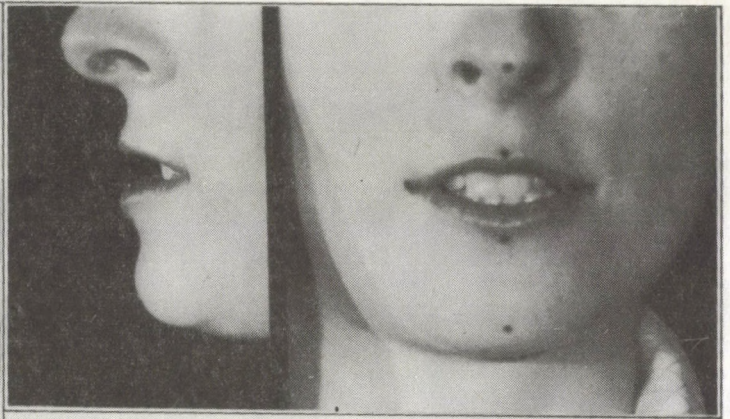
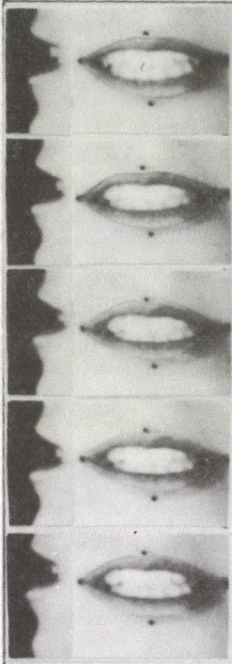
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	<p>tr try 58</p> <p>[traɪ]</p>

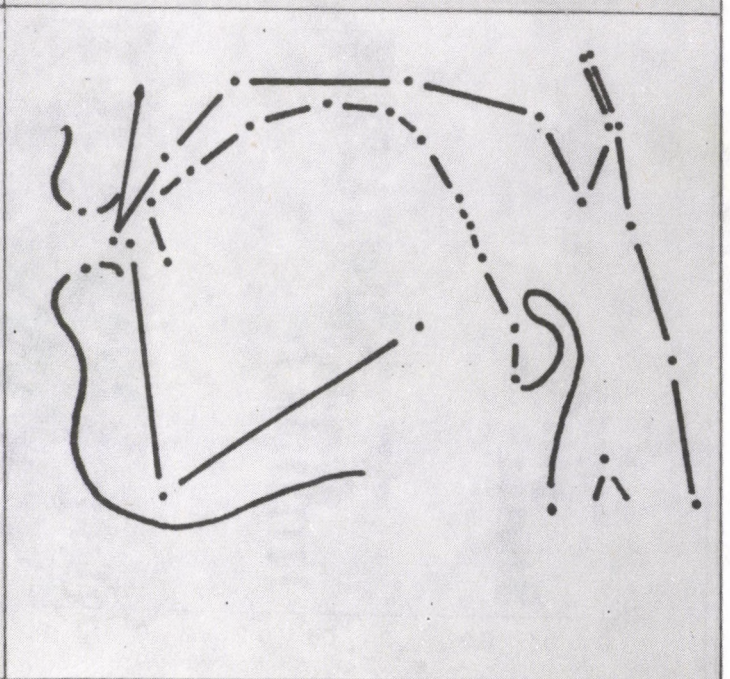
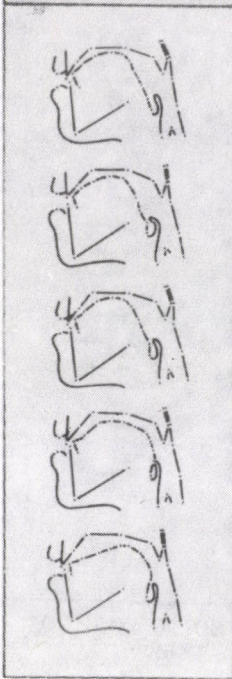


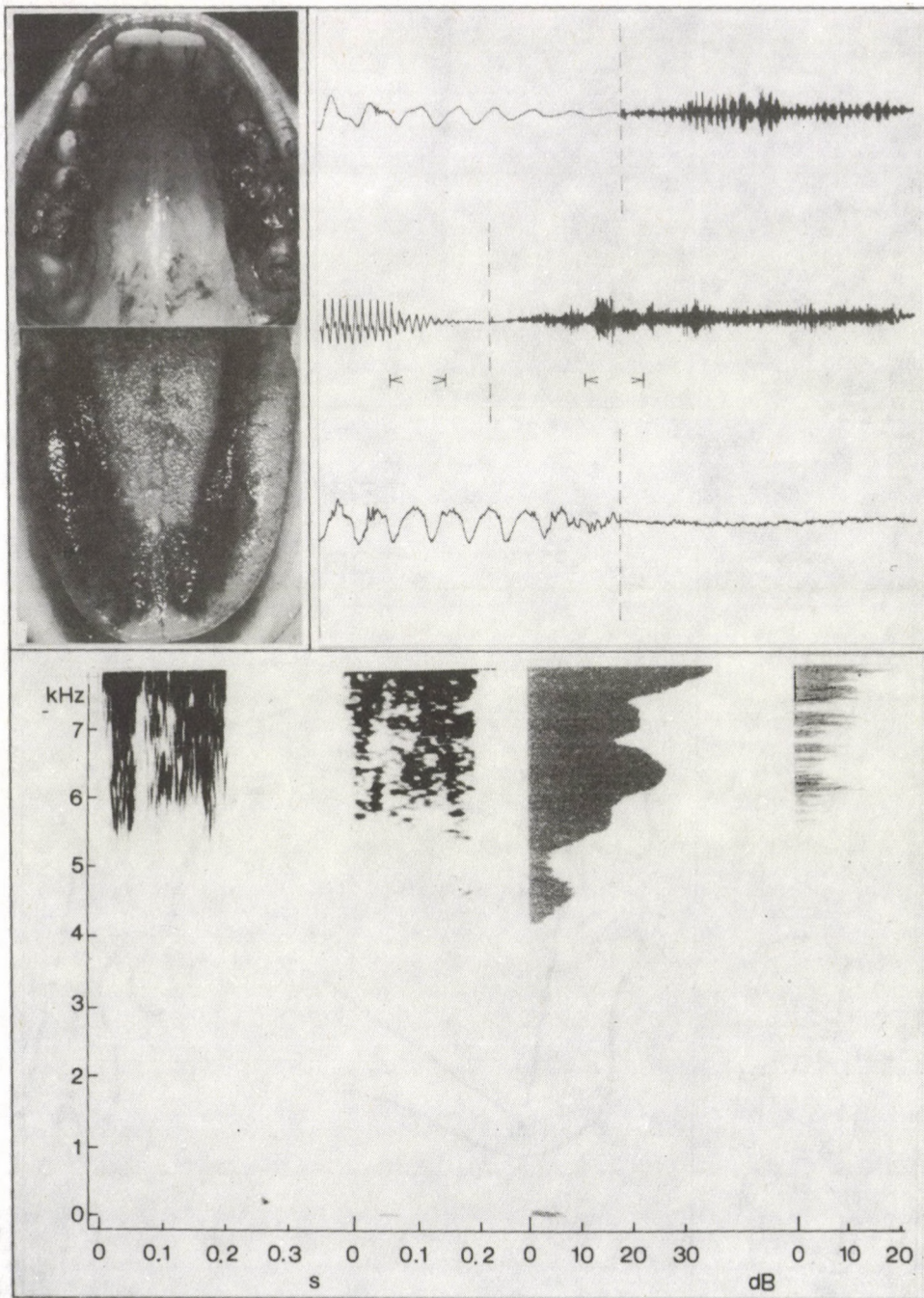


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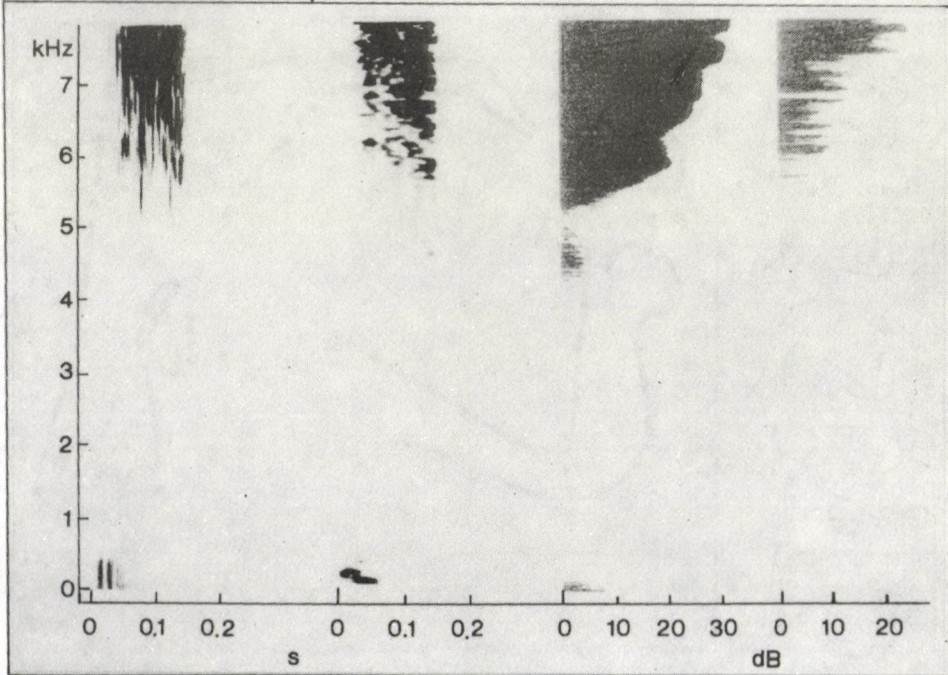
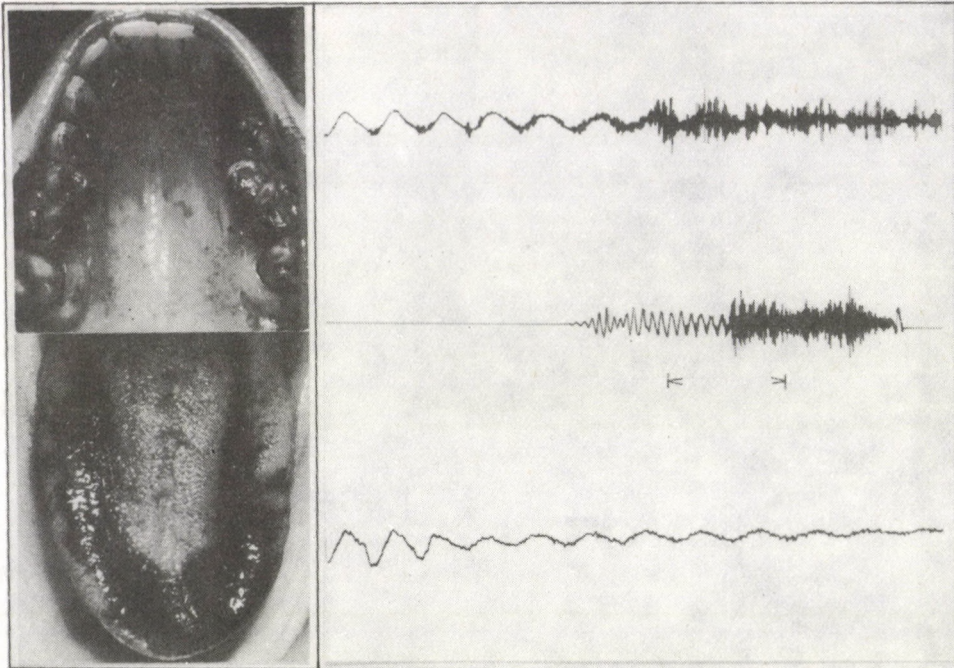
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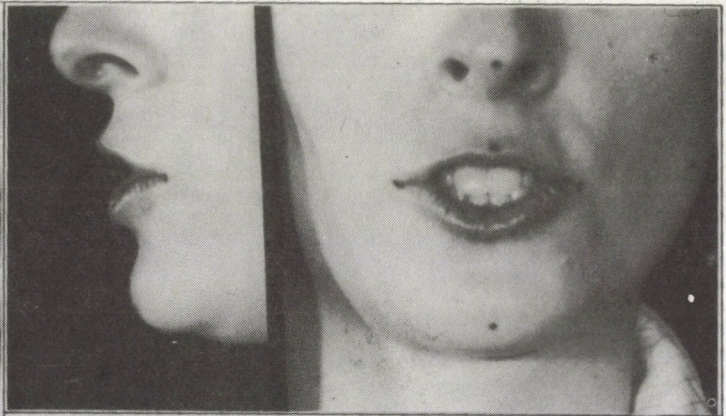
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	<p>ts tsar 60</p> <p> [tsa:]</p>

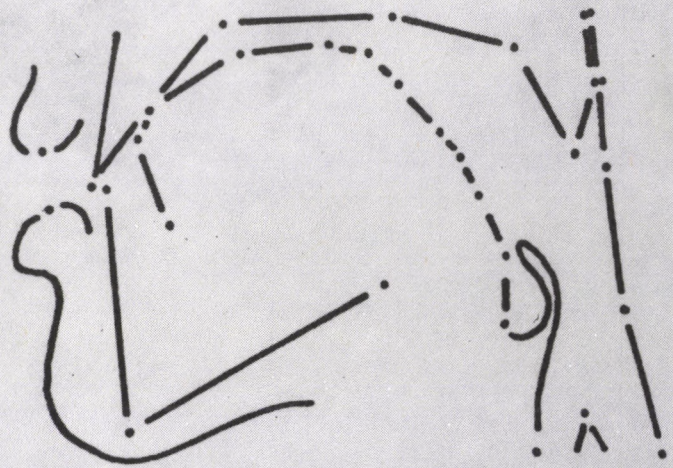
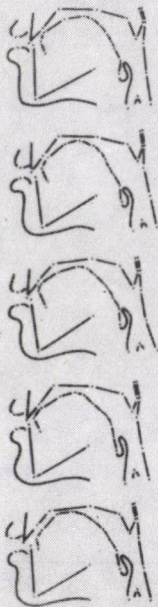


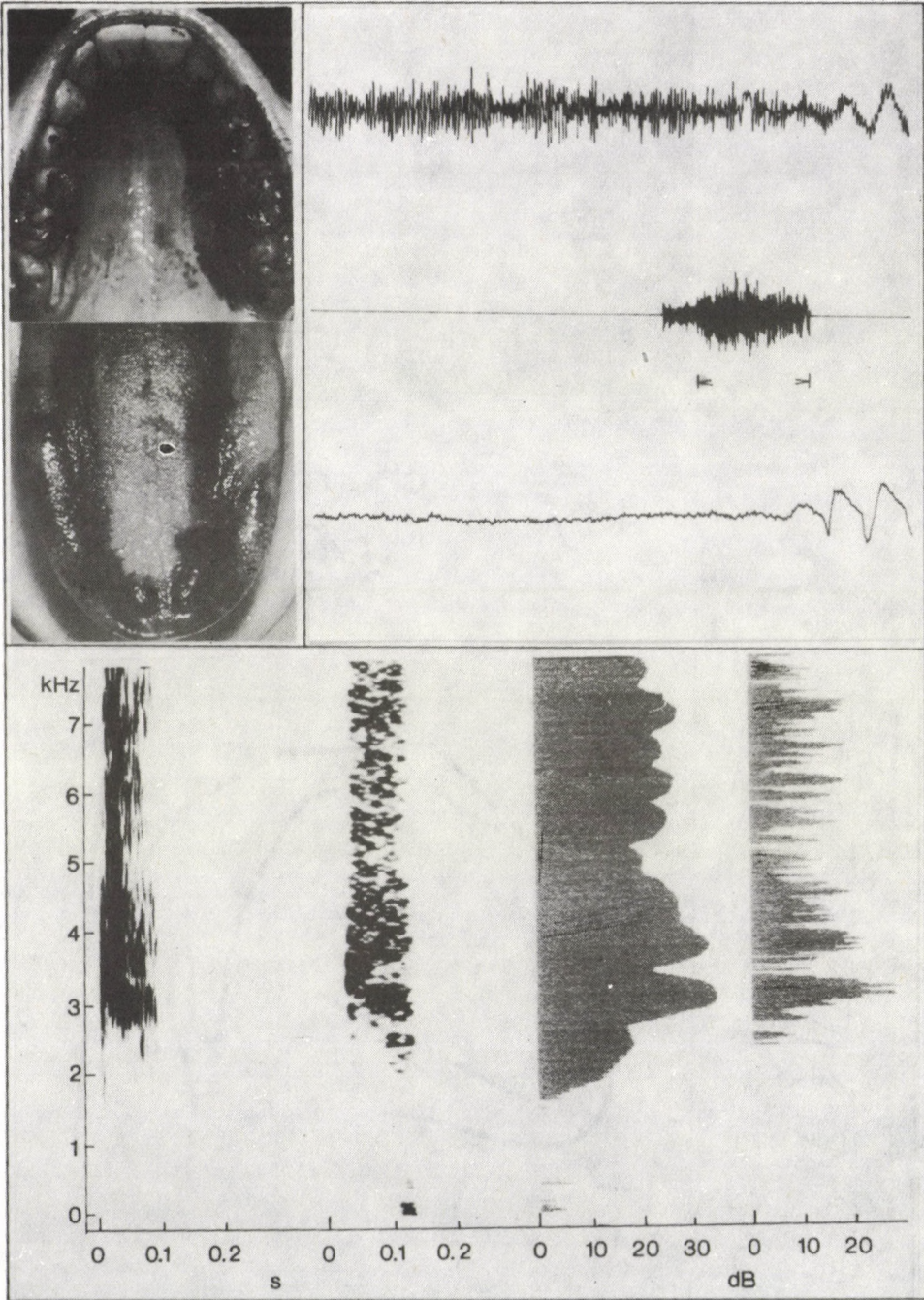


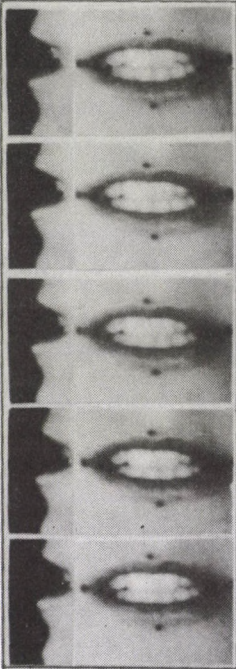
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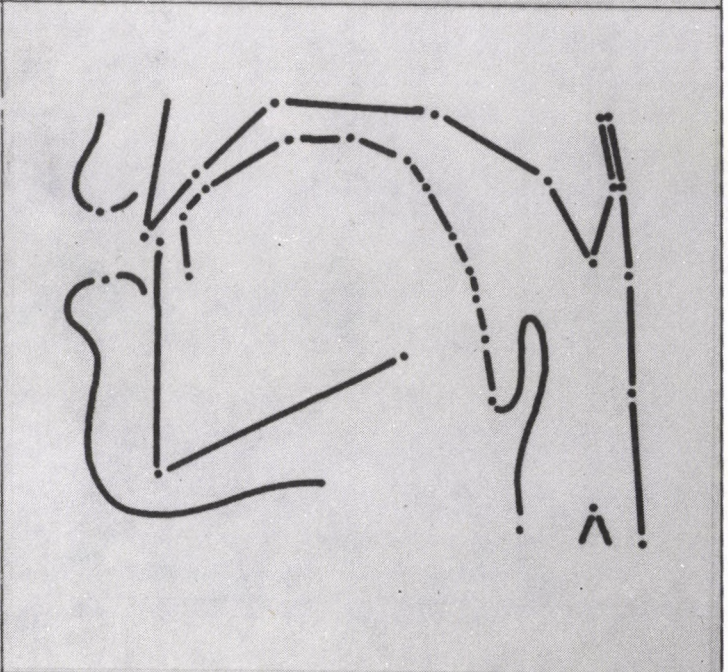
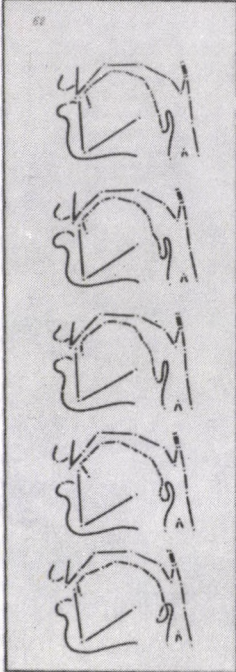


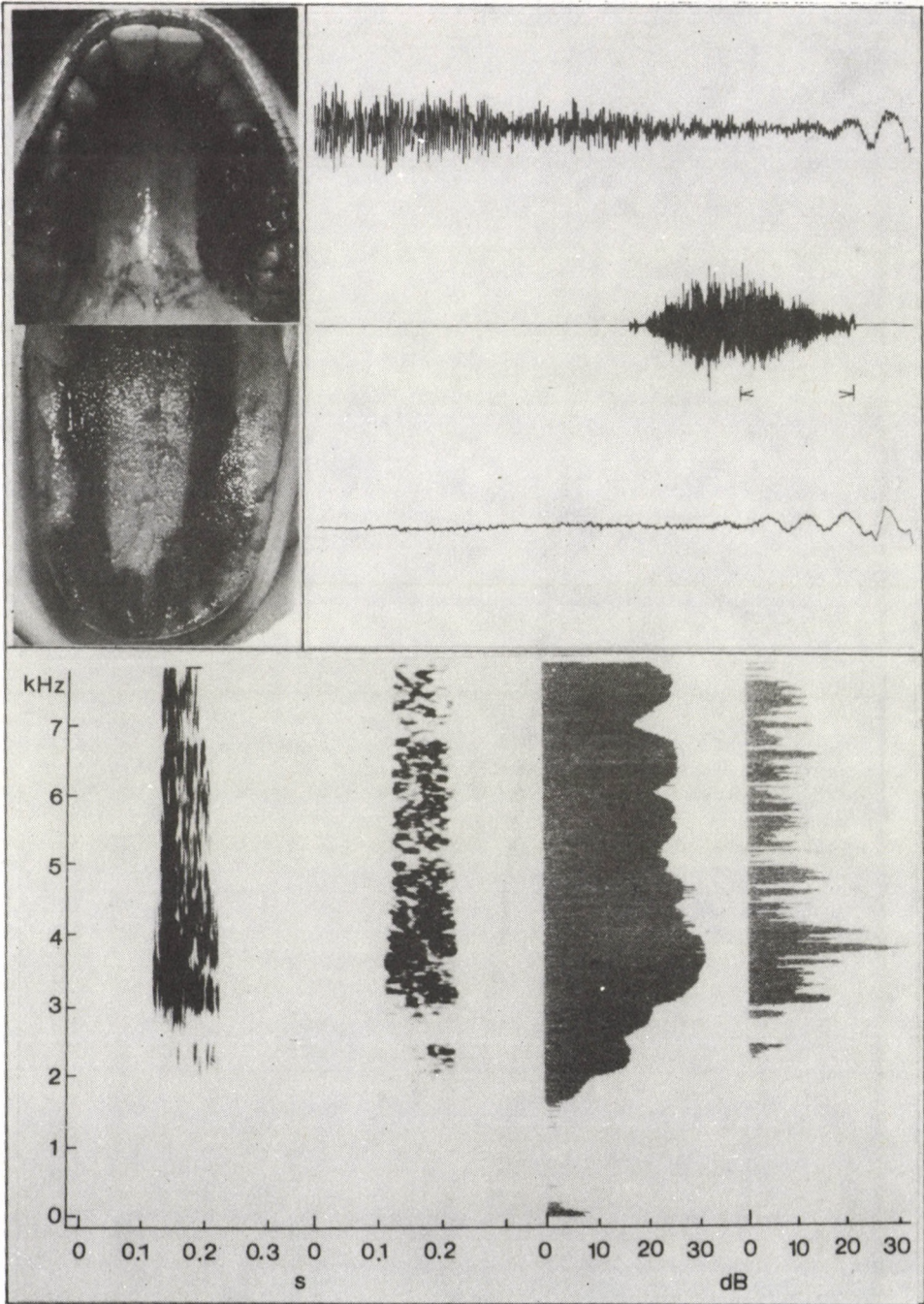
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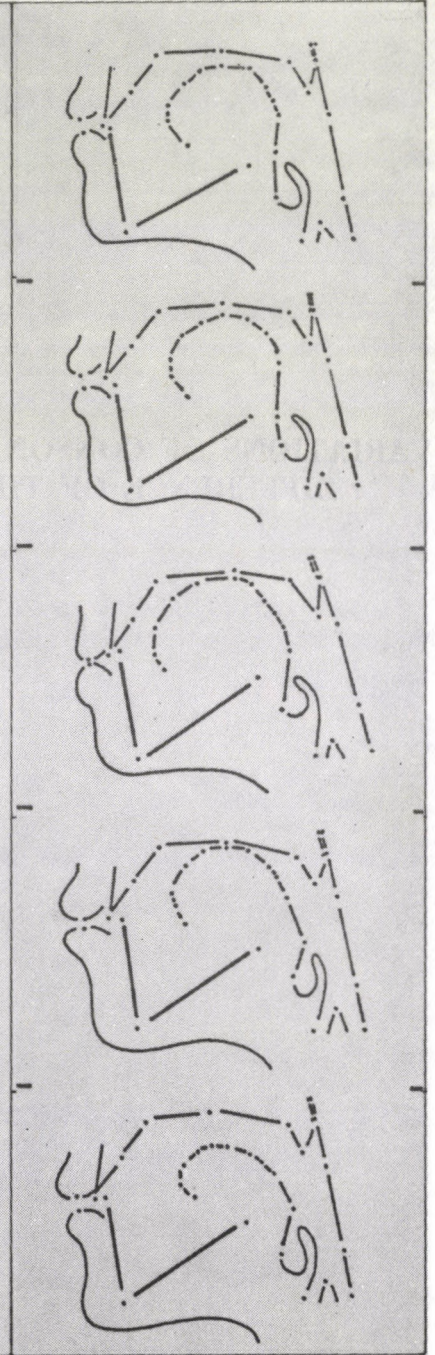
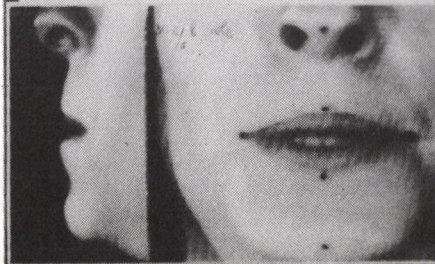
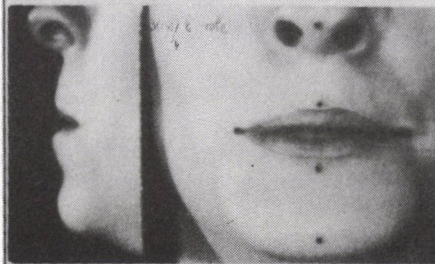
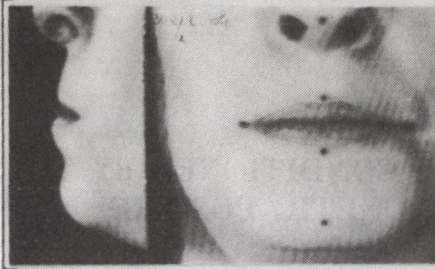
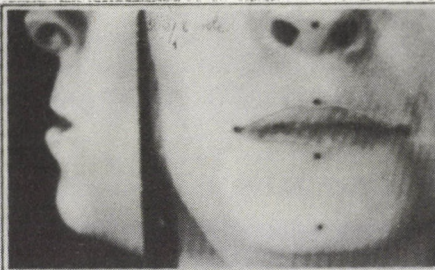
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**VARIATIONS OF CONSONANTS CONDITIONED BY THE
DIFFERENCE OF THE PHONETIC POSITION**

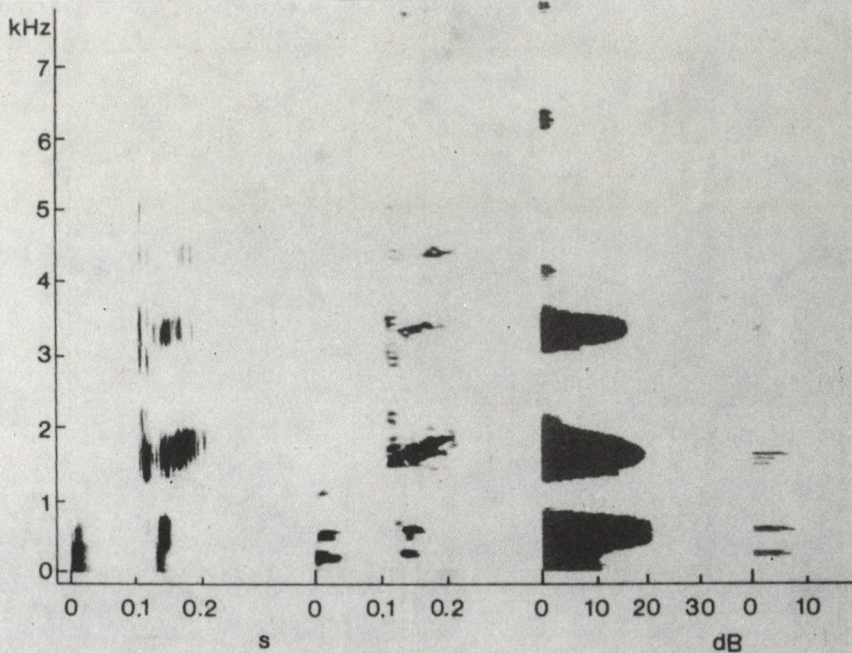
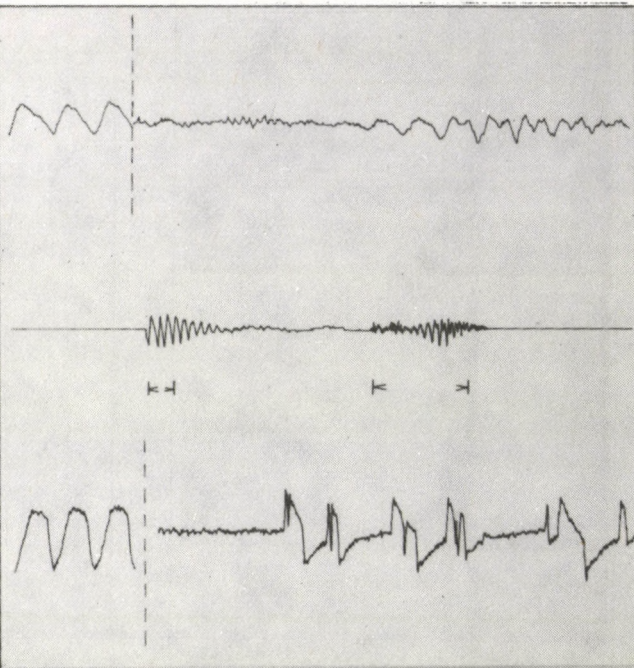


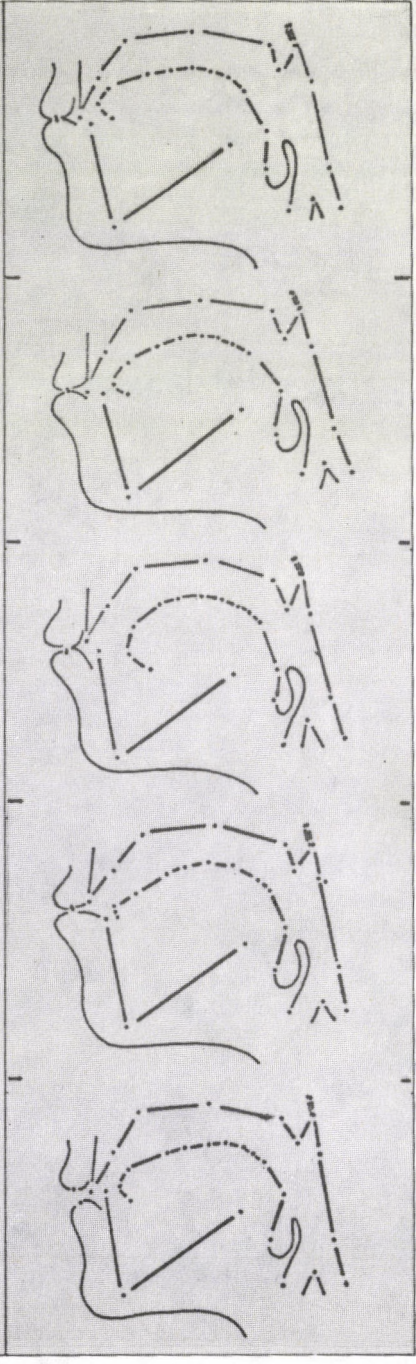
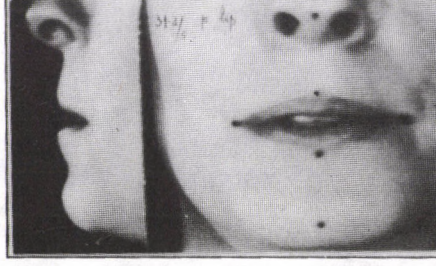
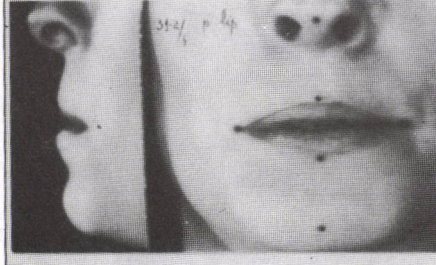
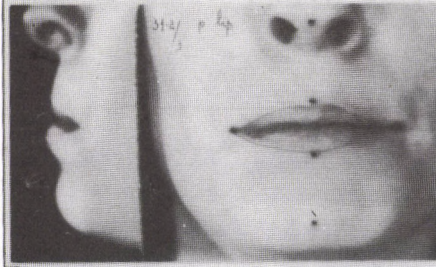
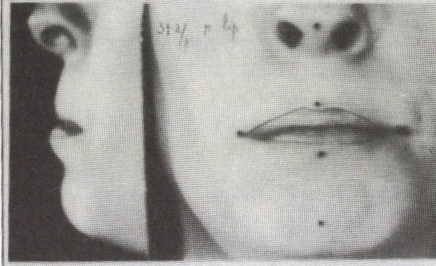
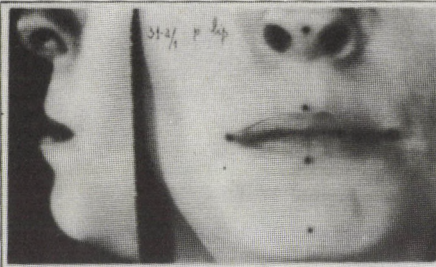
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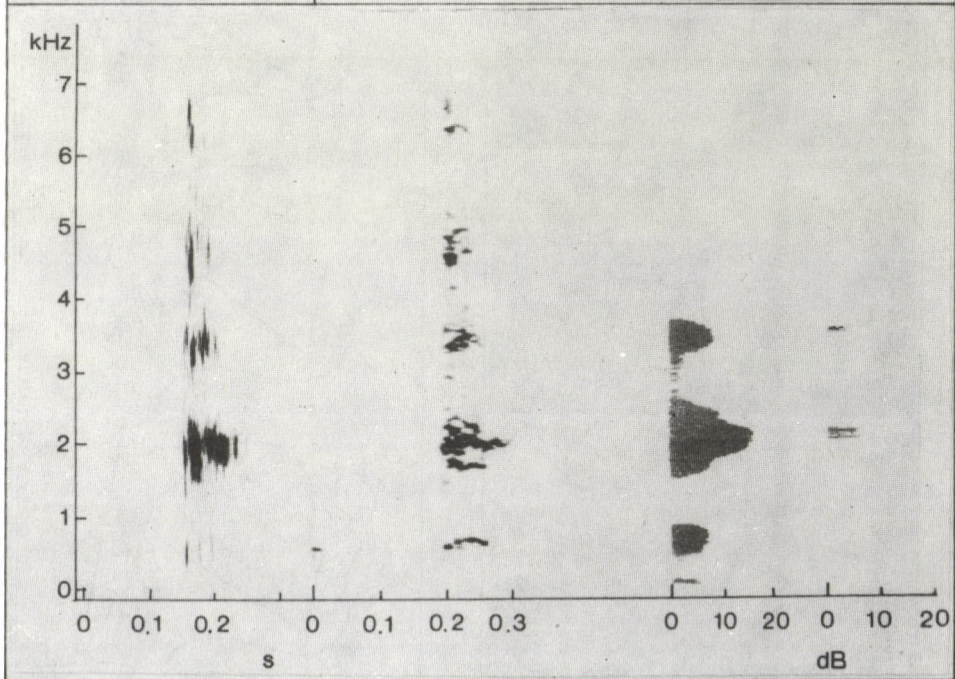
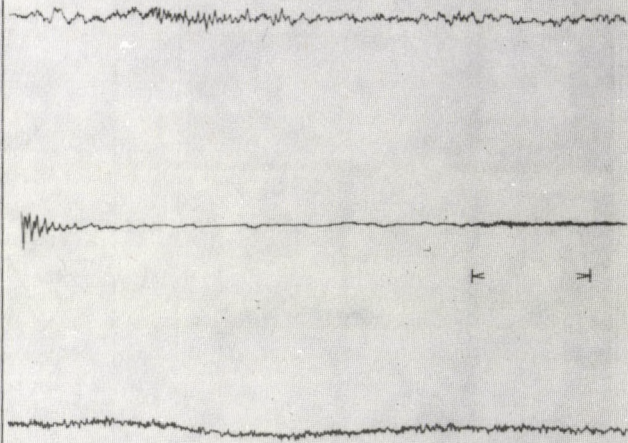


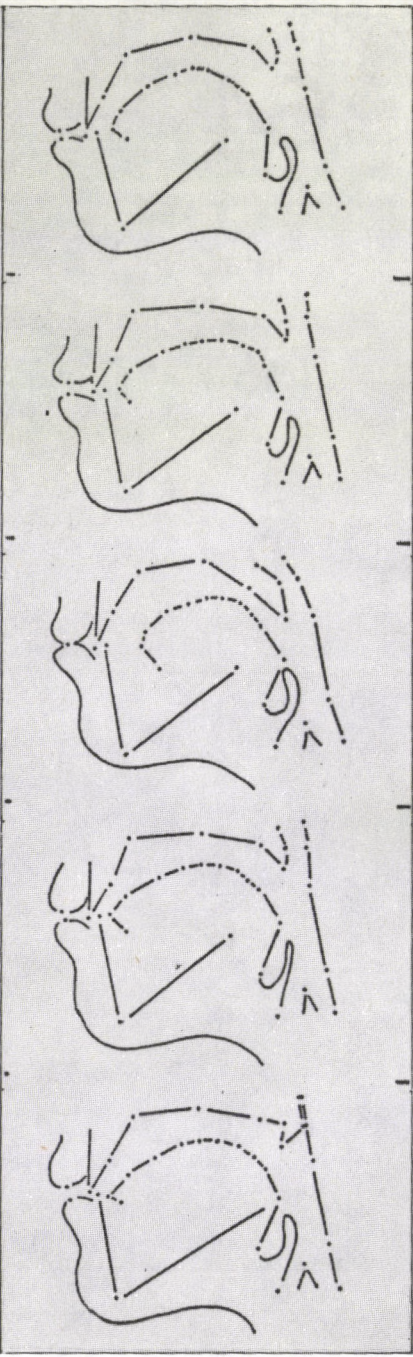
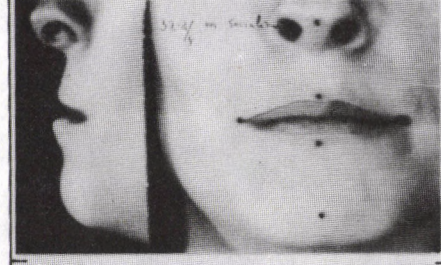
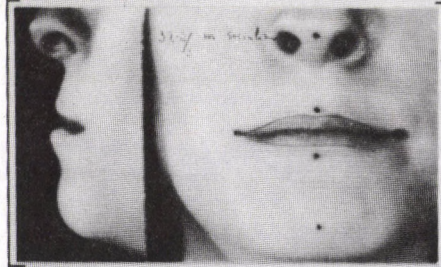
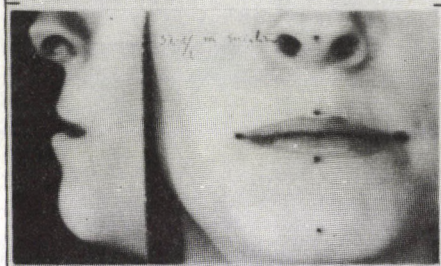
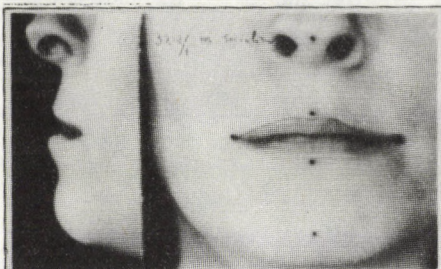
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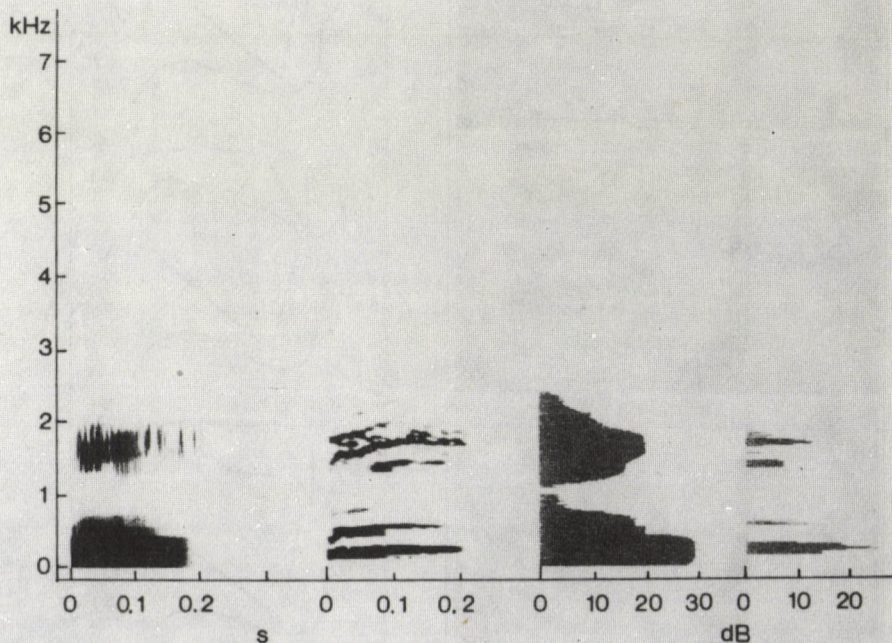
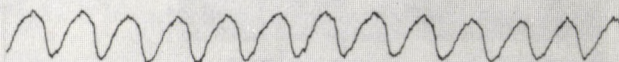
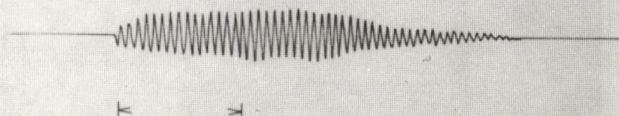
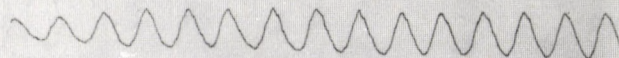


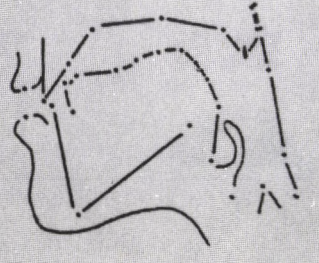
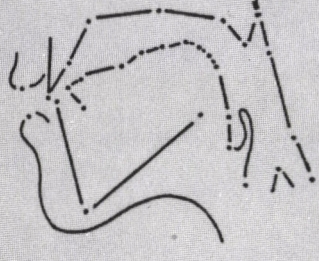
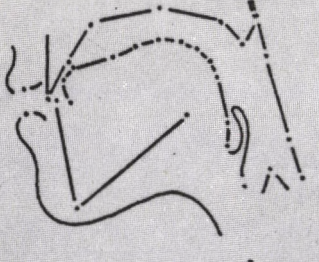
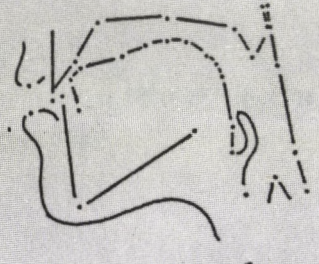
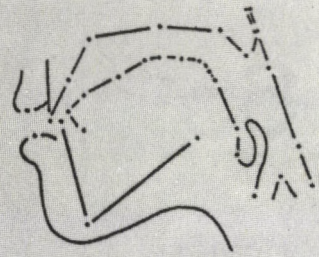
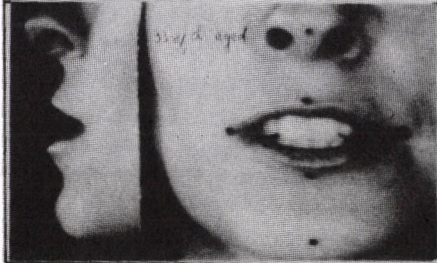
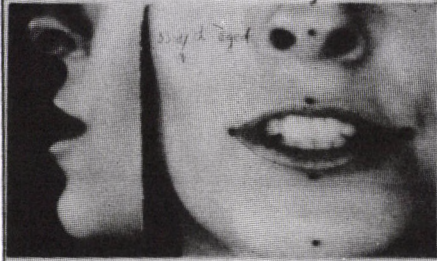
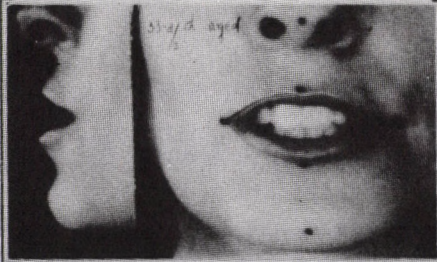
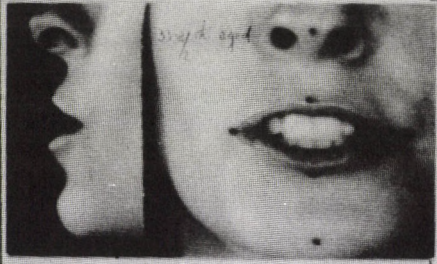
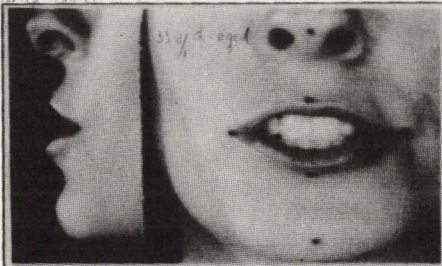
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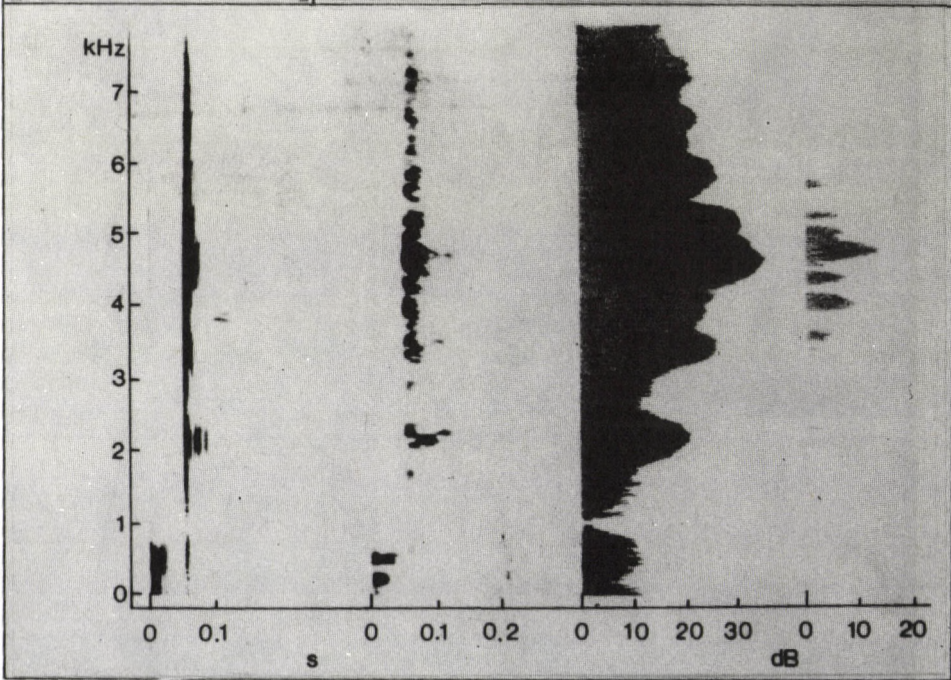
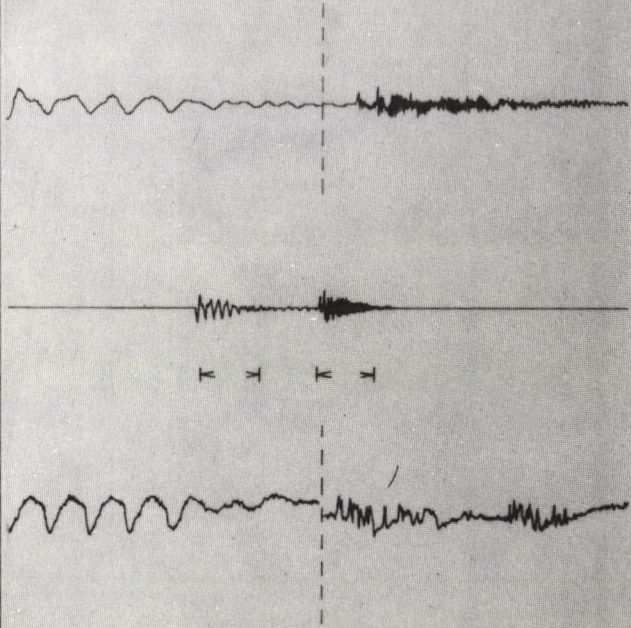


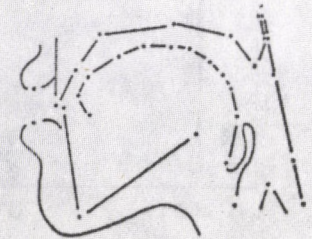
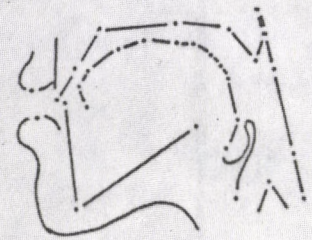
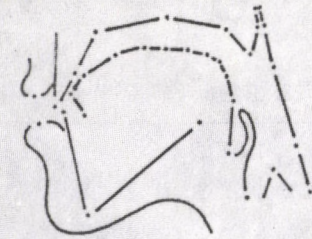
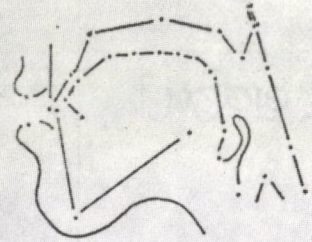
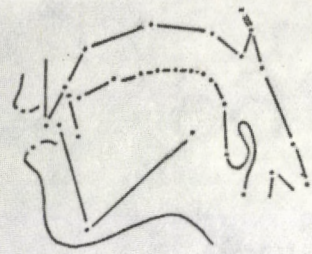
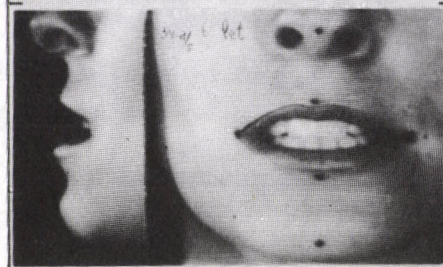
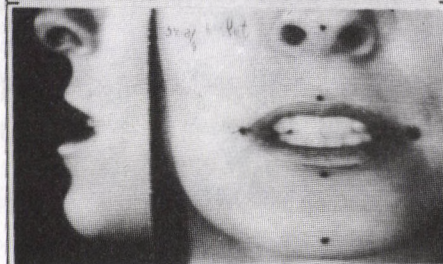
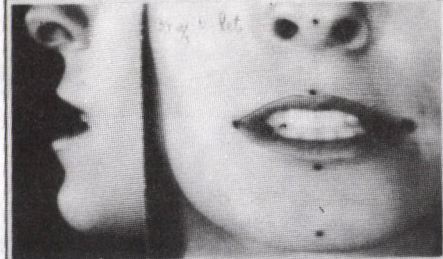
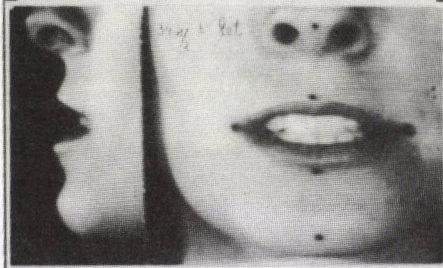
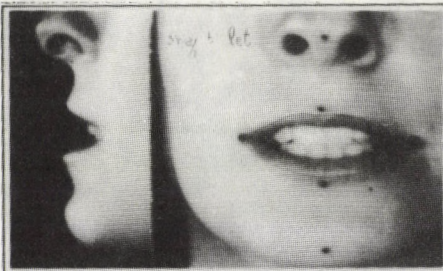
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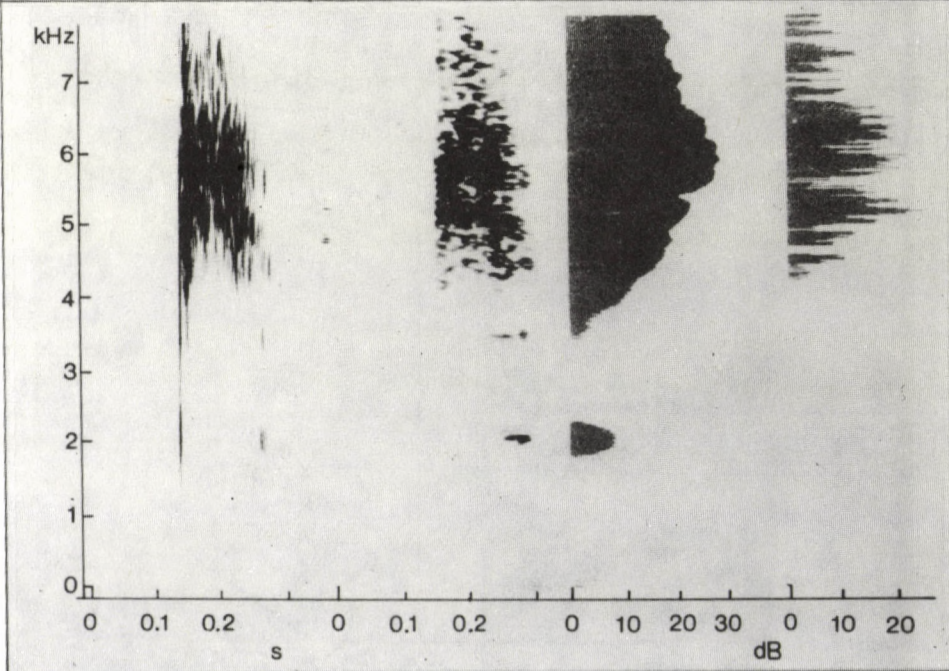
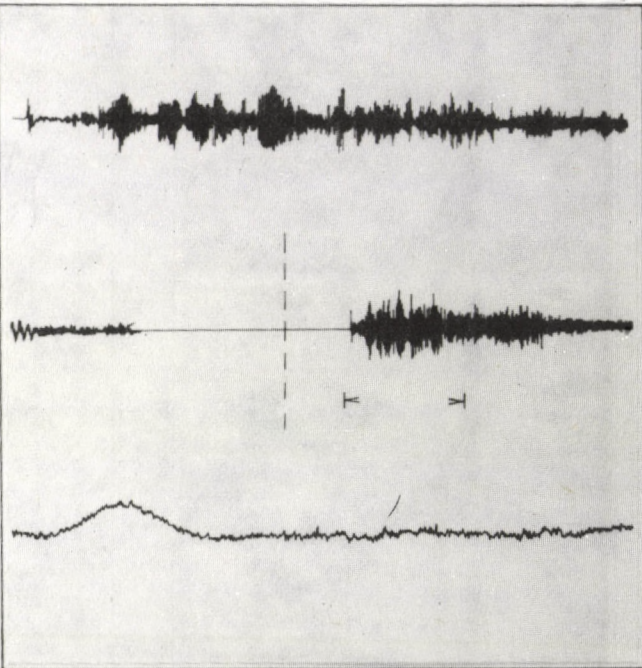


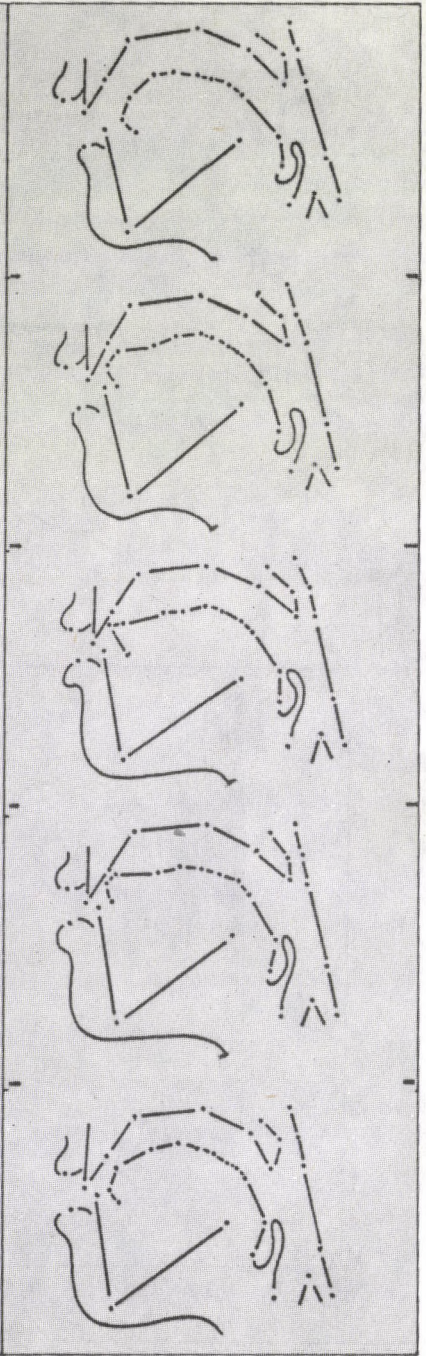
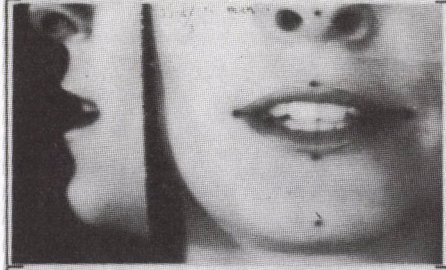
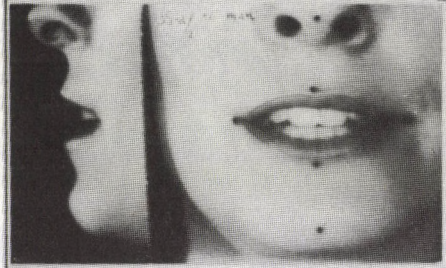
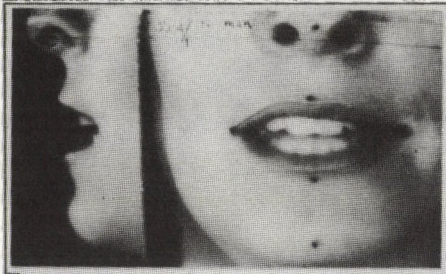
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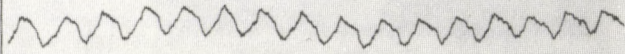
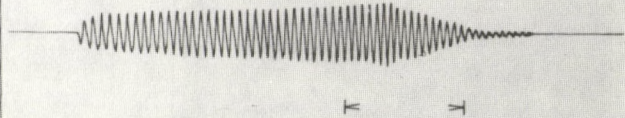
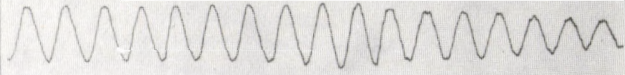


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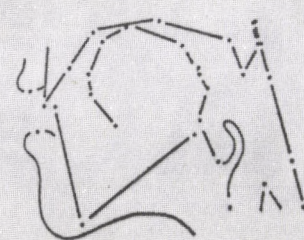
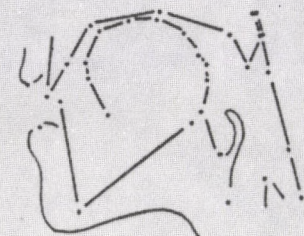
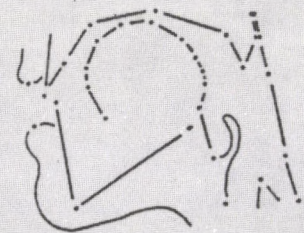
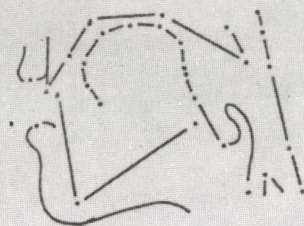
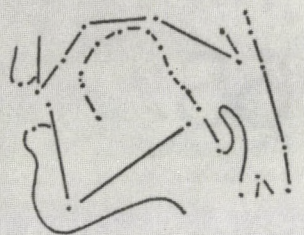
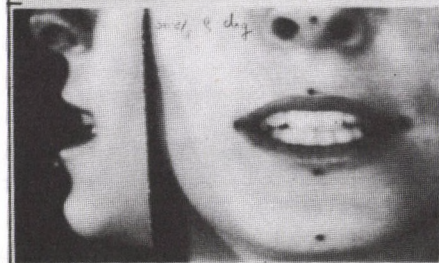
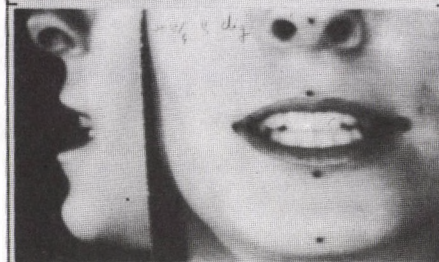
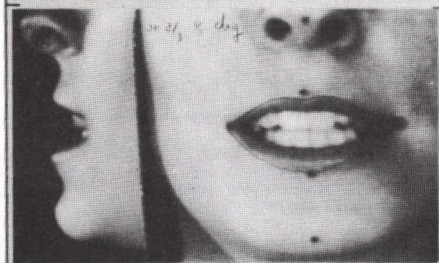
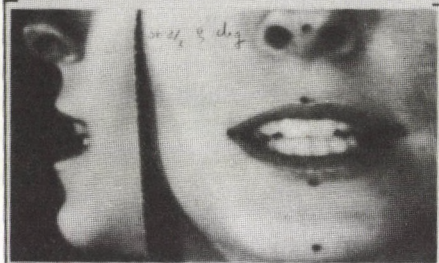
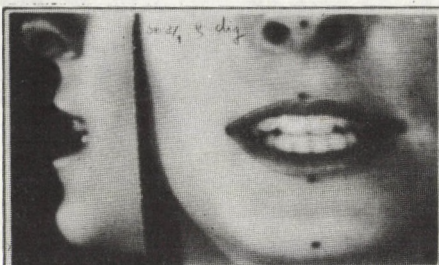
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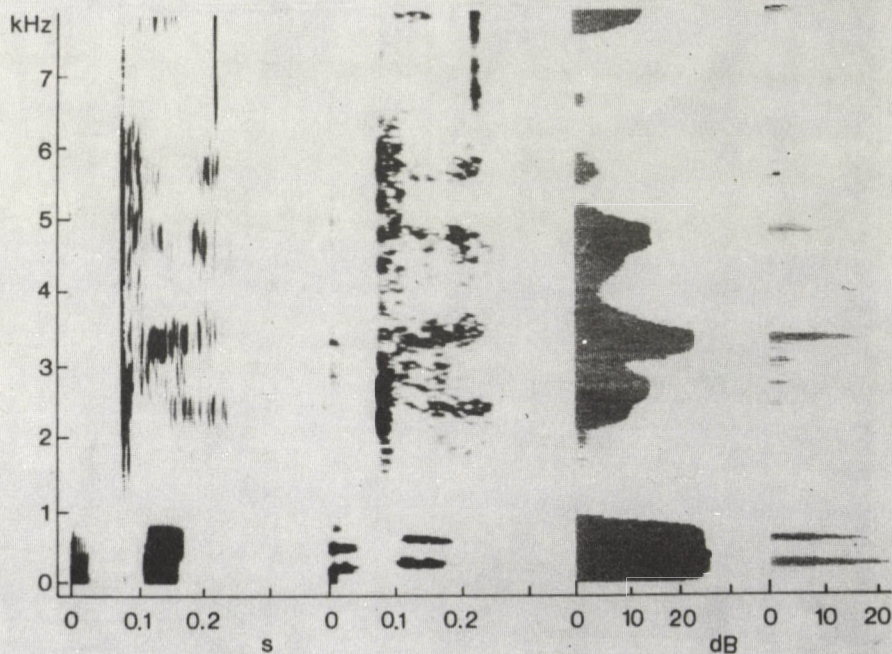
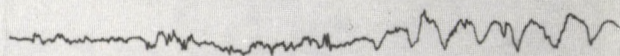
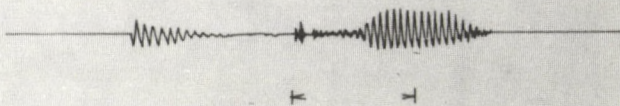
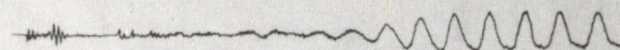


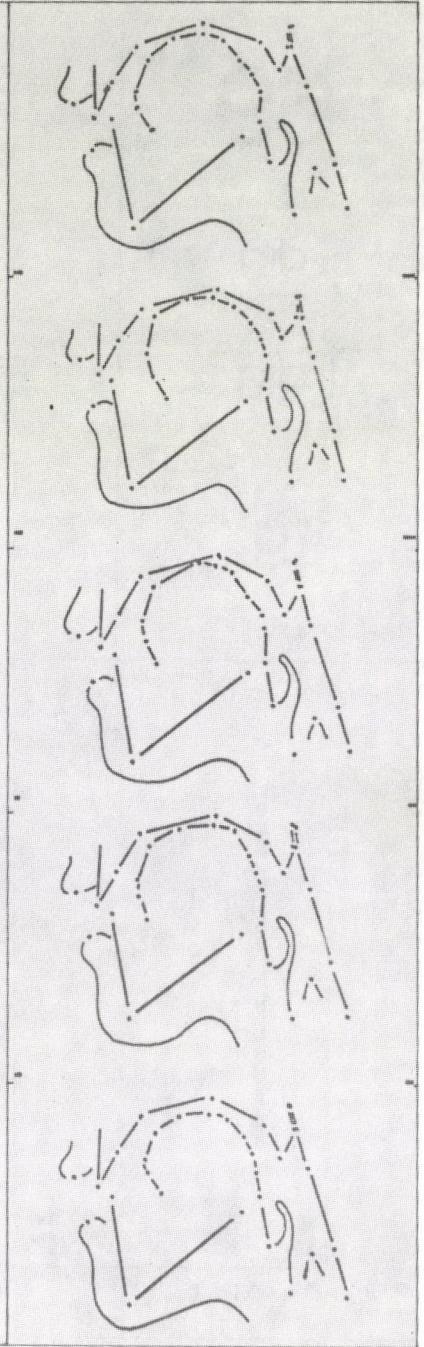
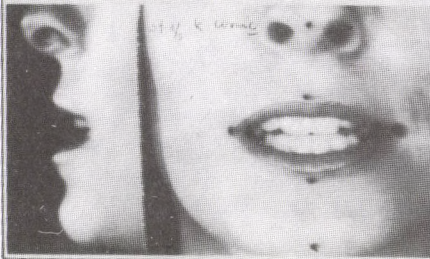
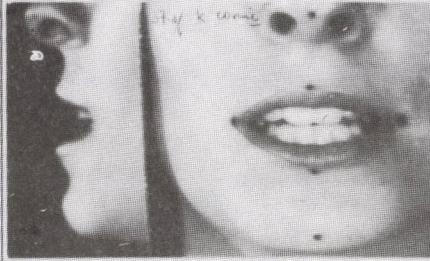
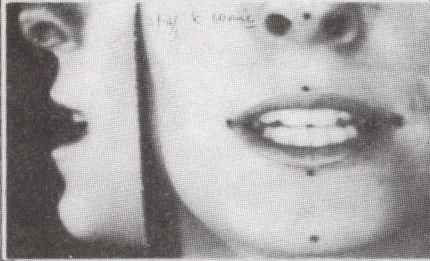
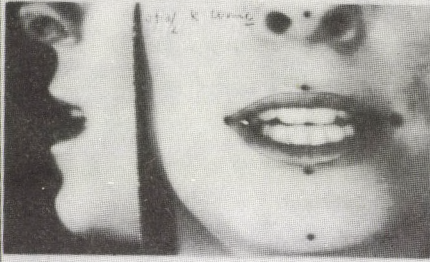
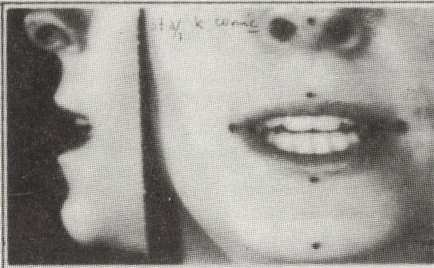
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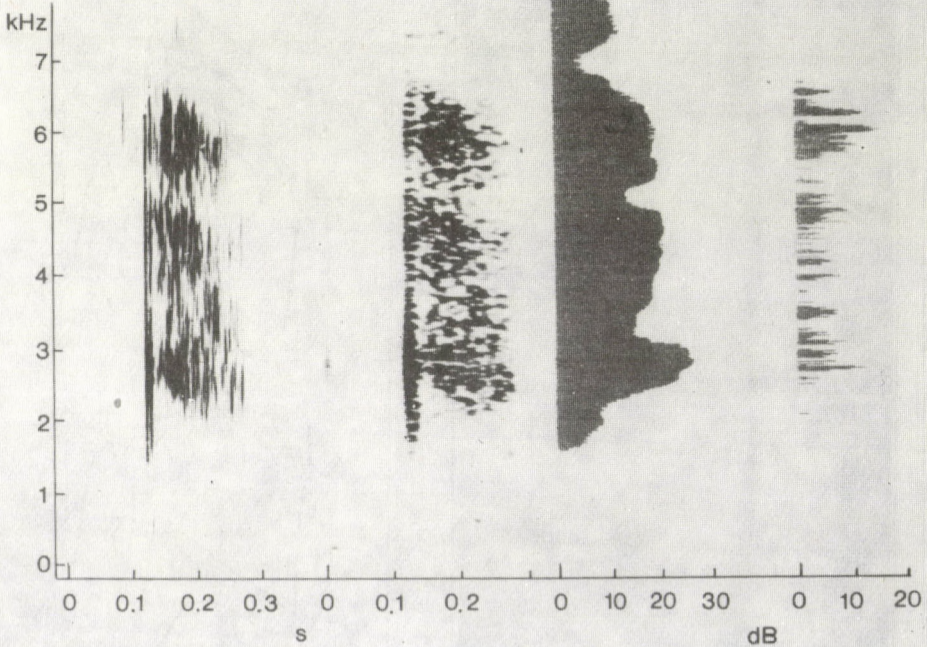
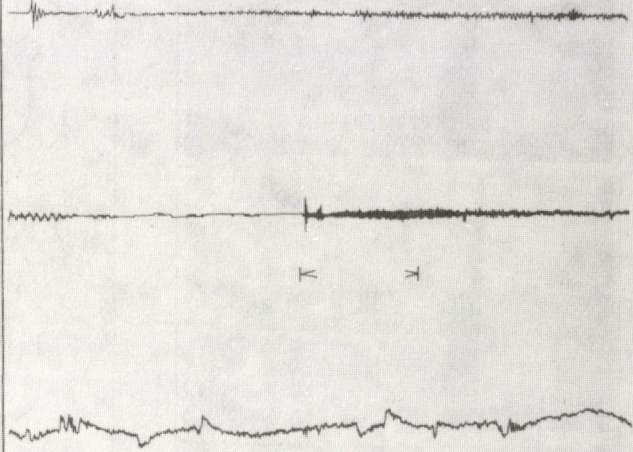


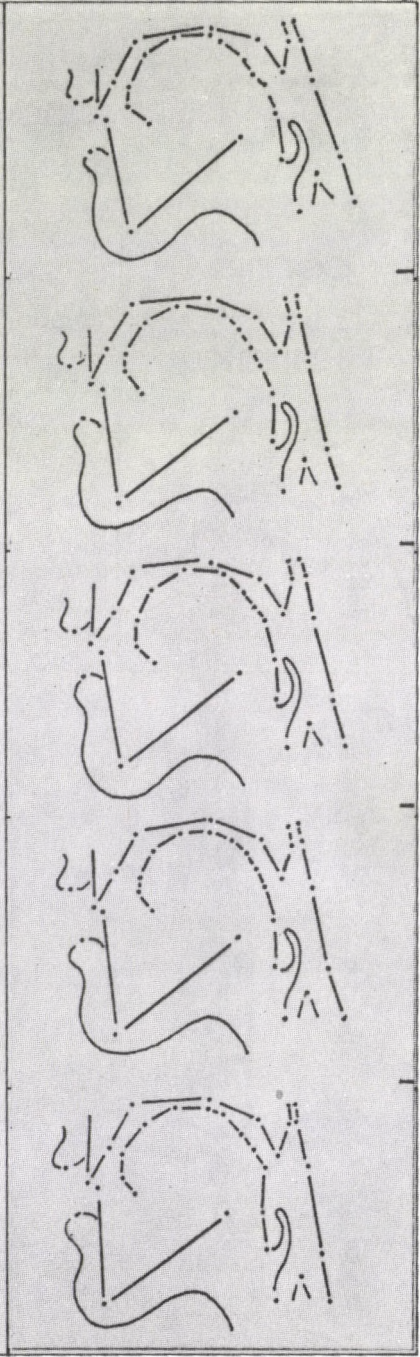
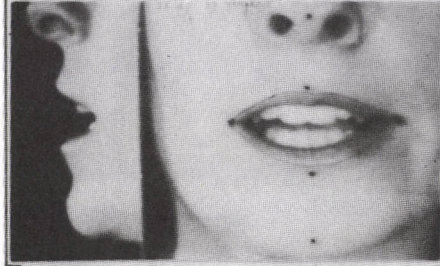
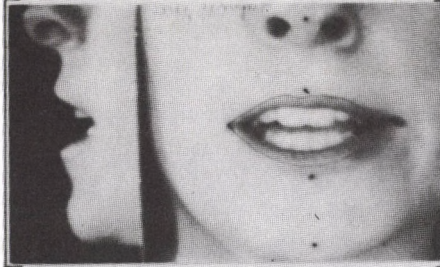
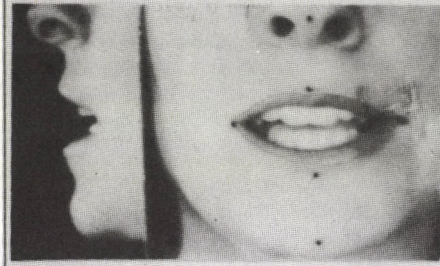
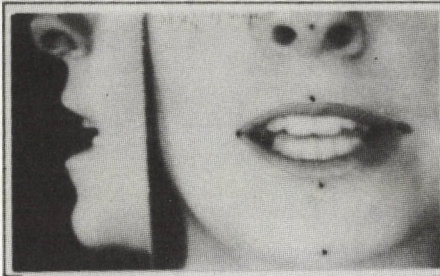
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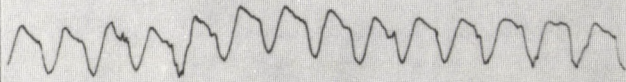
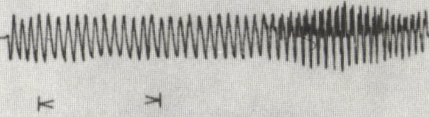
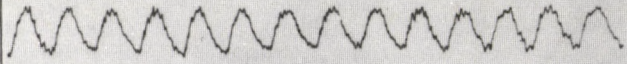


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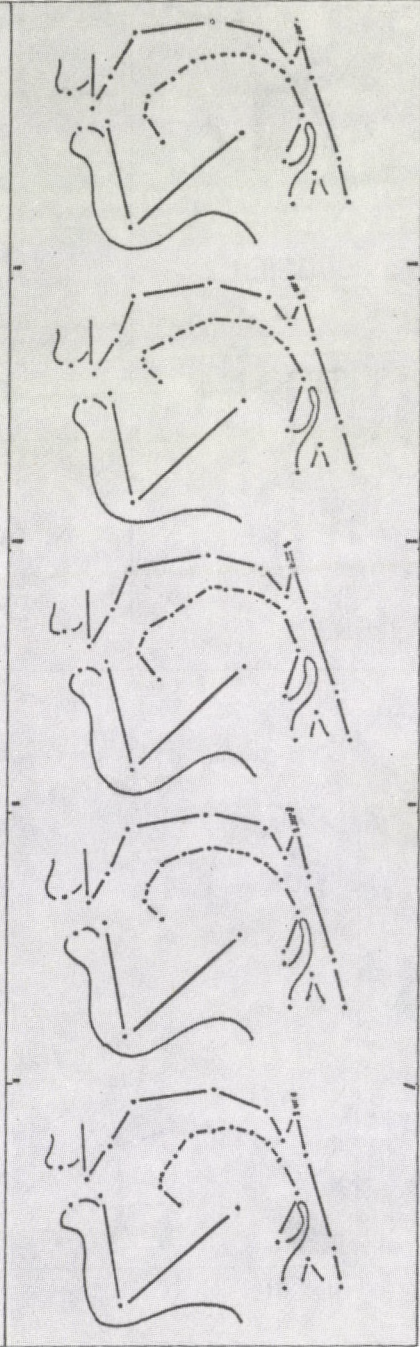
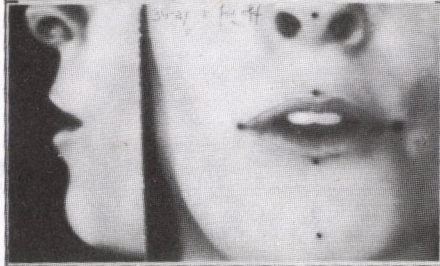
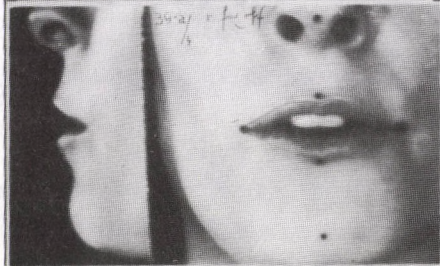
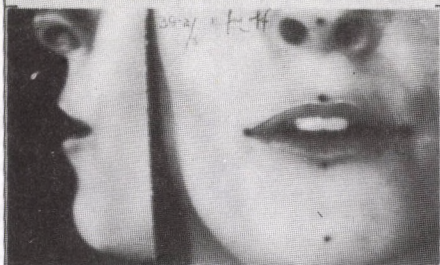
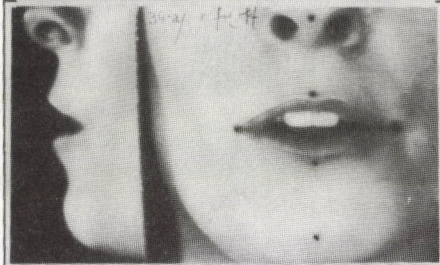
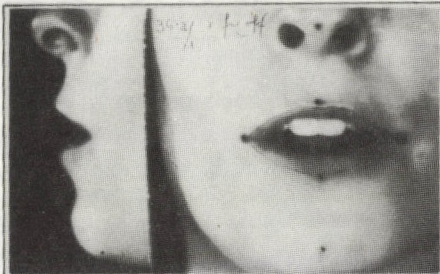
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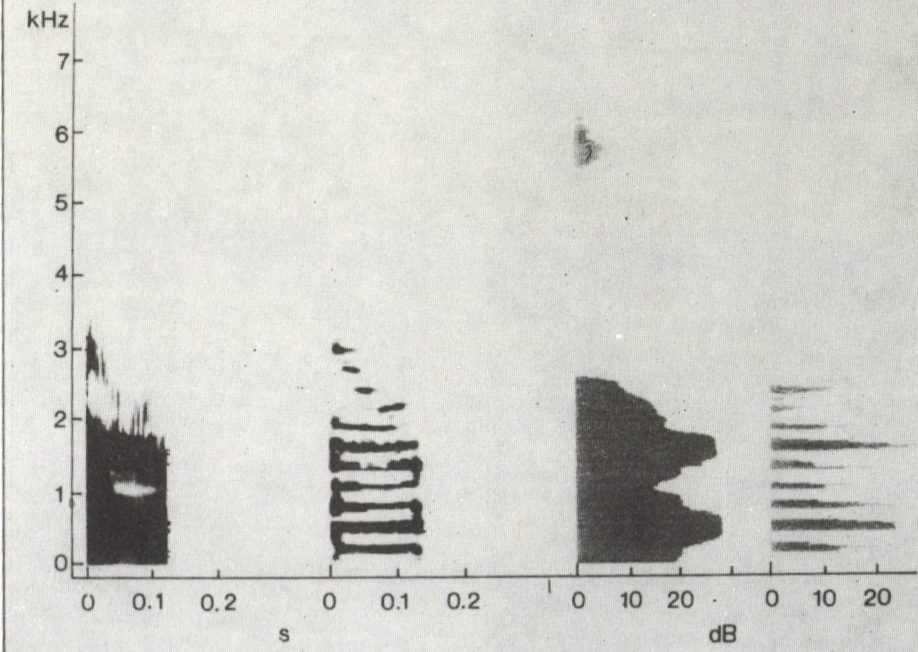
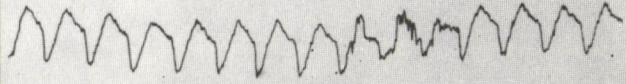
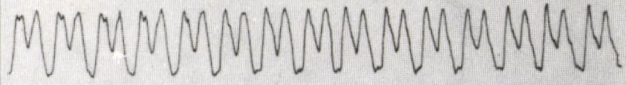


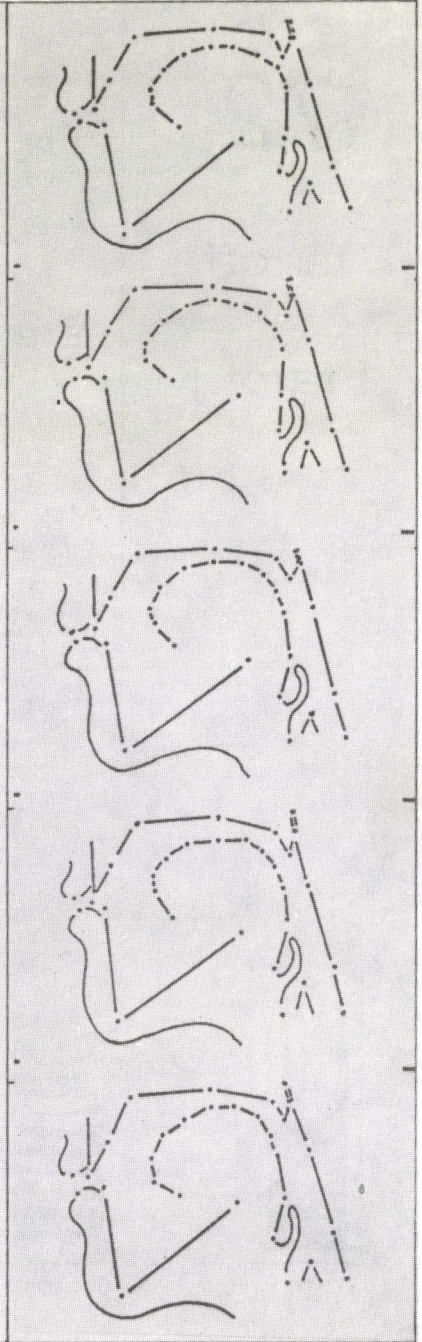
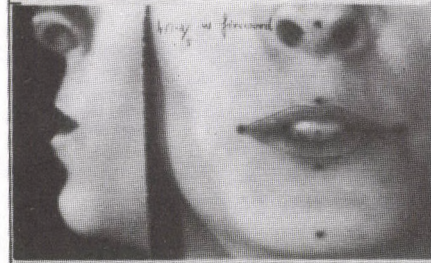
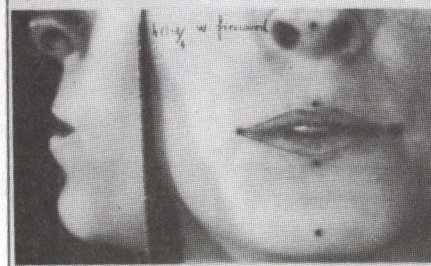
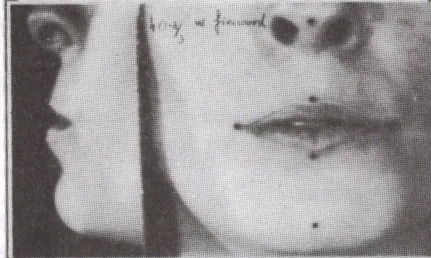
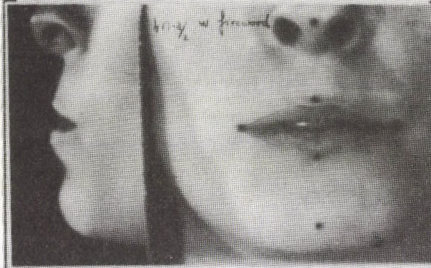
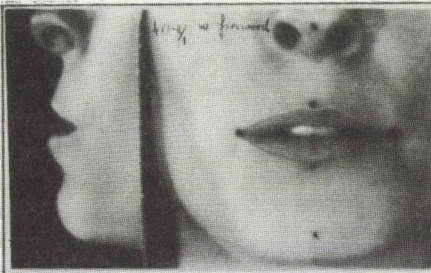
72

far off

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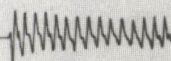
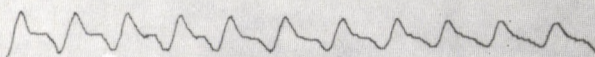


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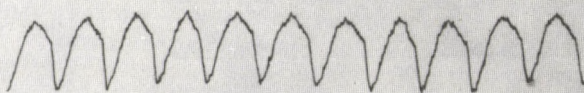
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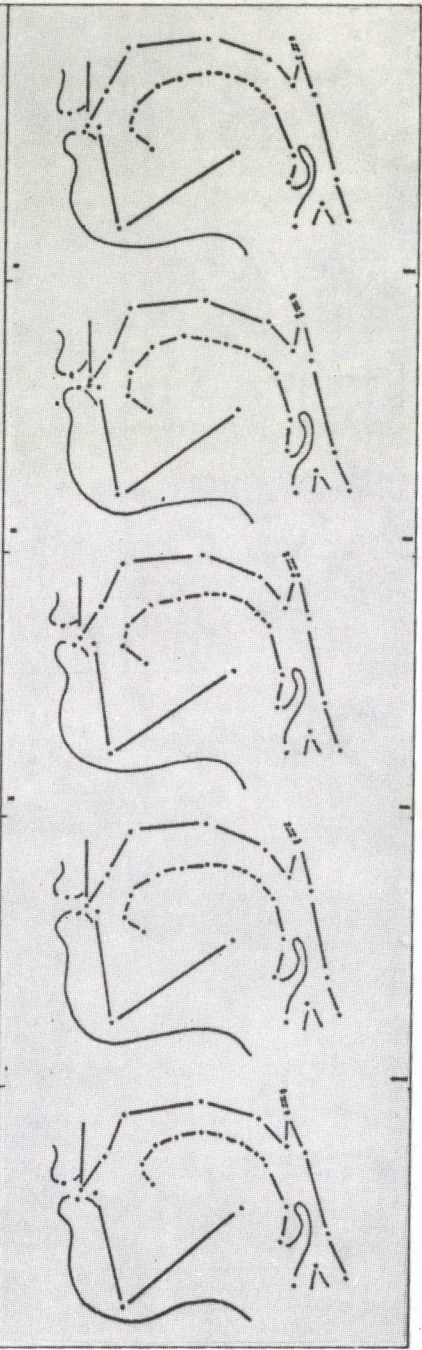
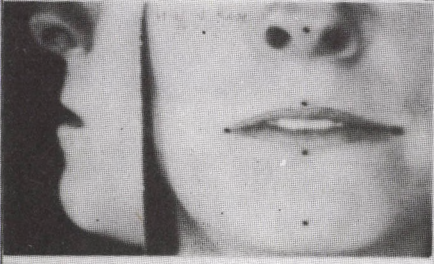
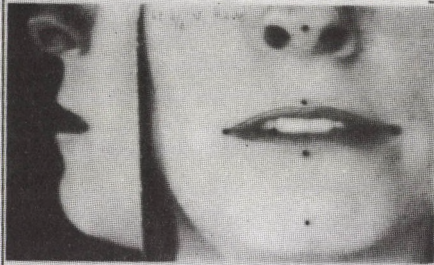
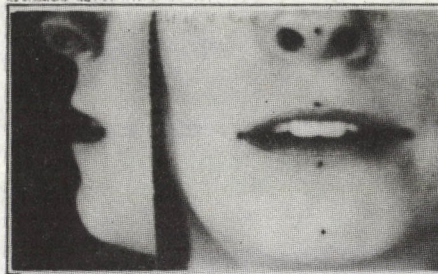
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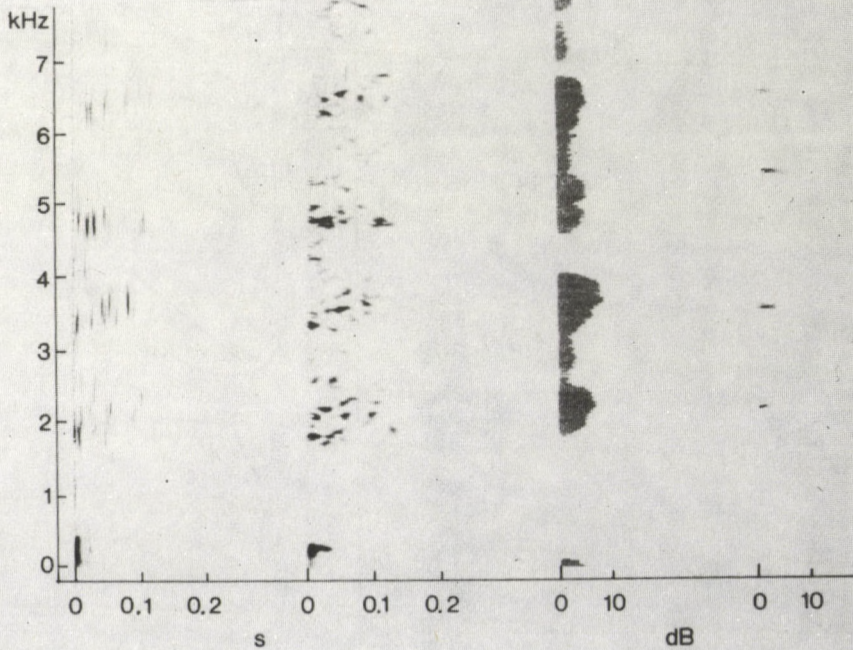
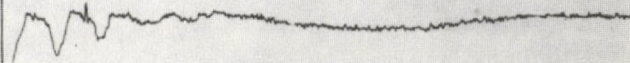
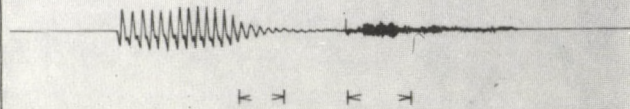
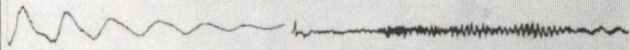


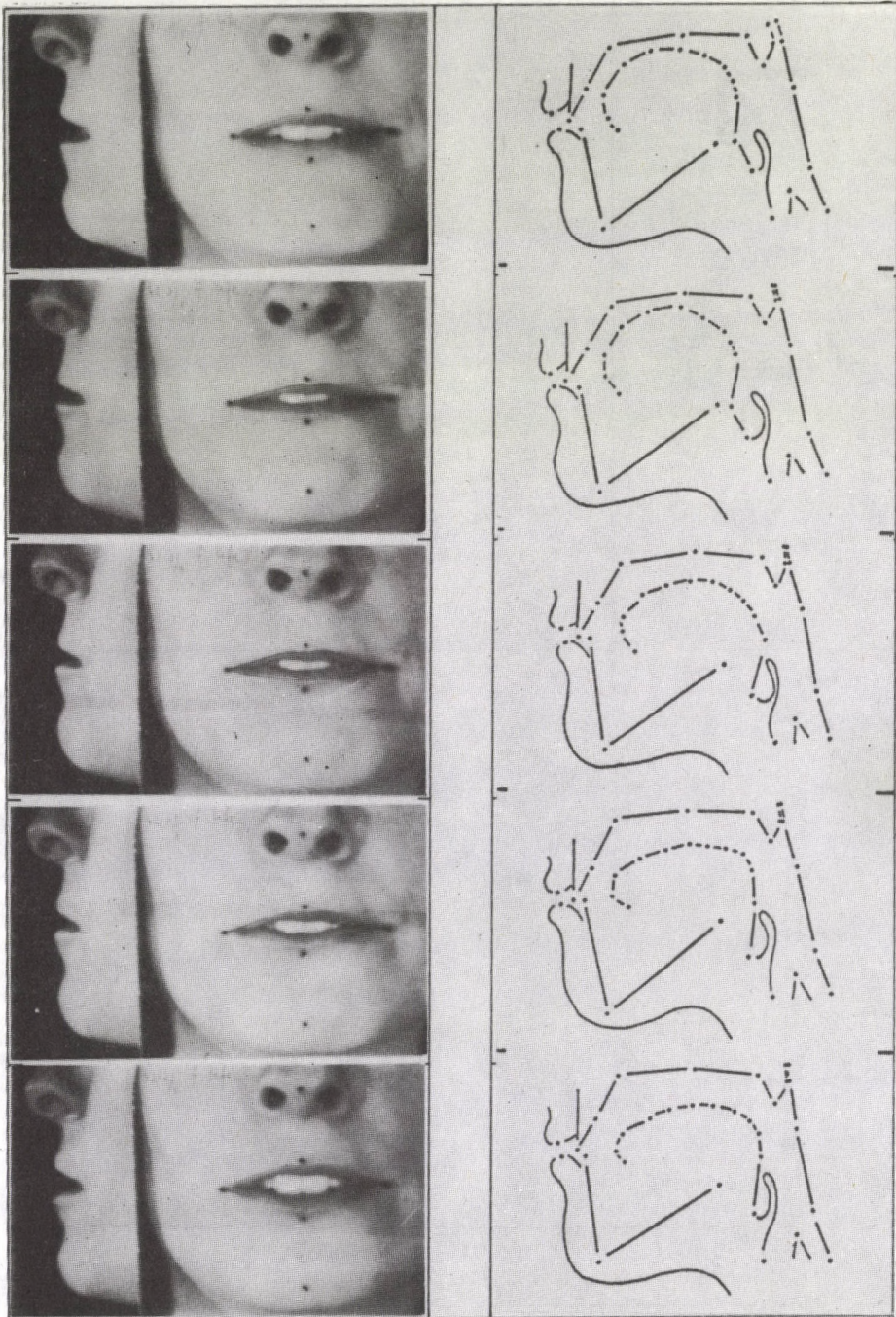
74

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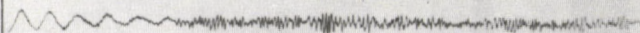


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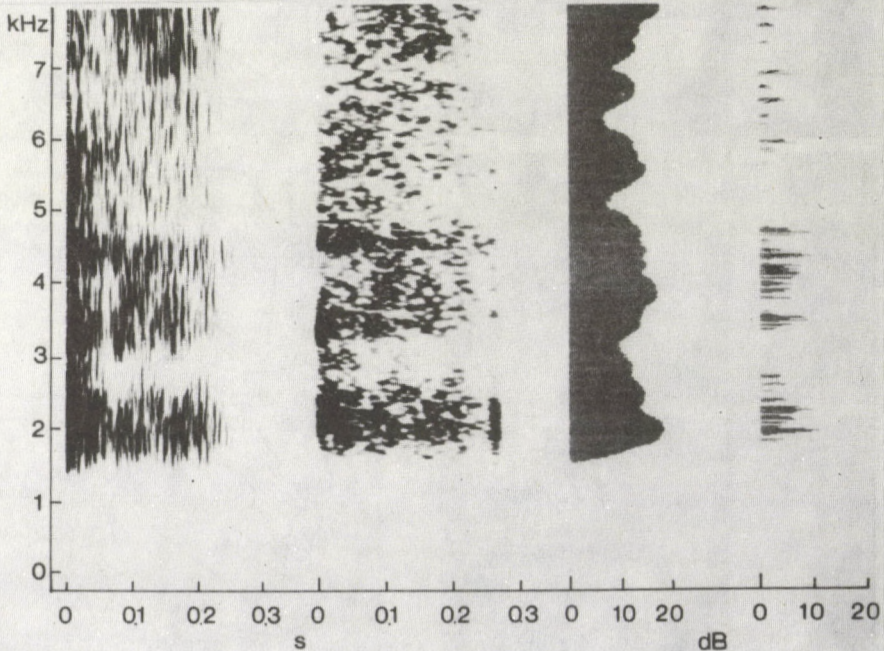
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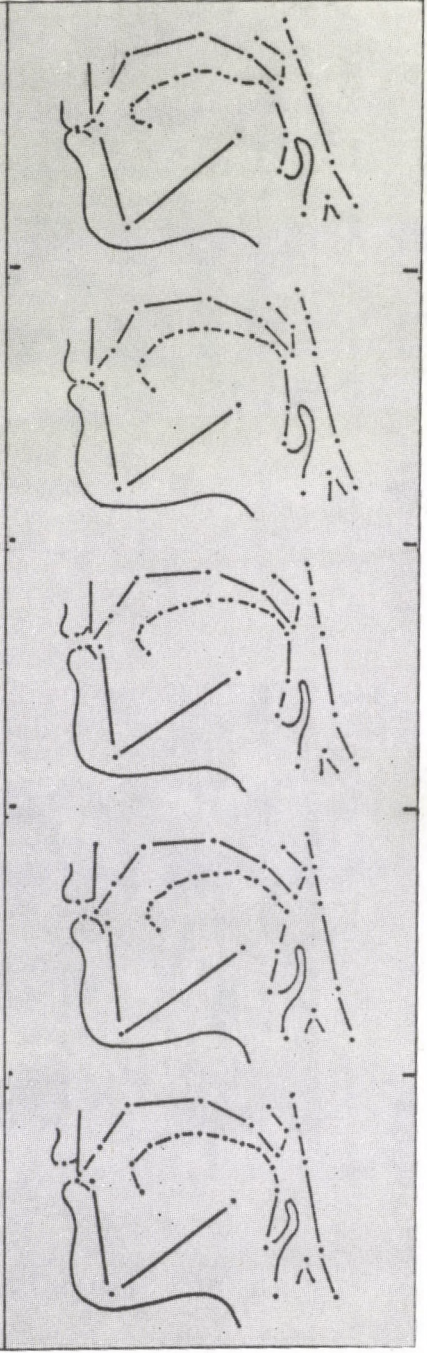
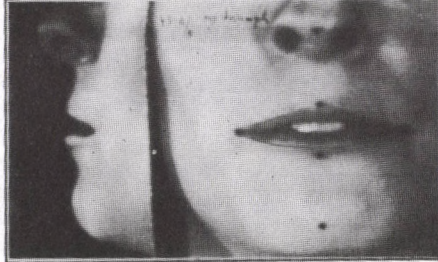
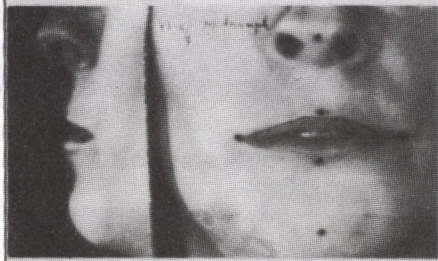
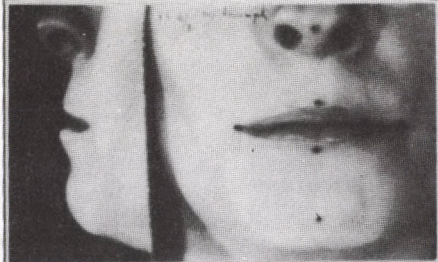
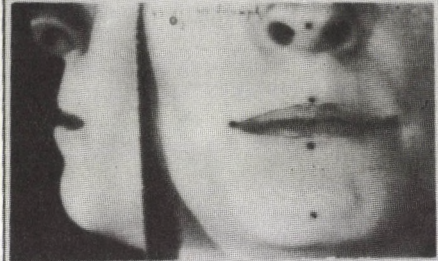
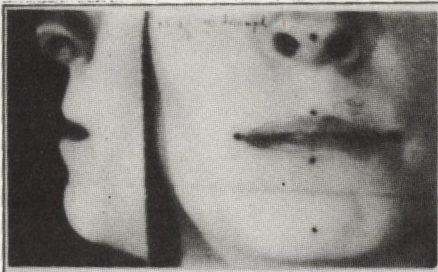
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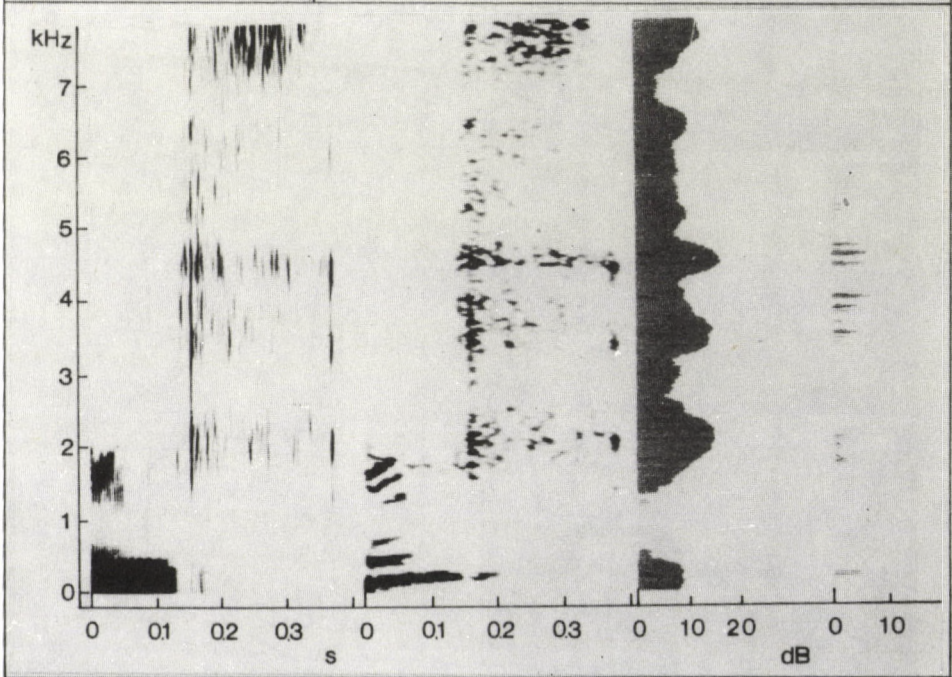
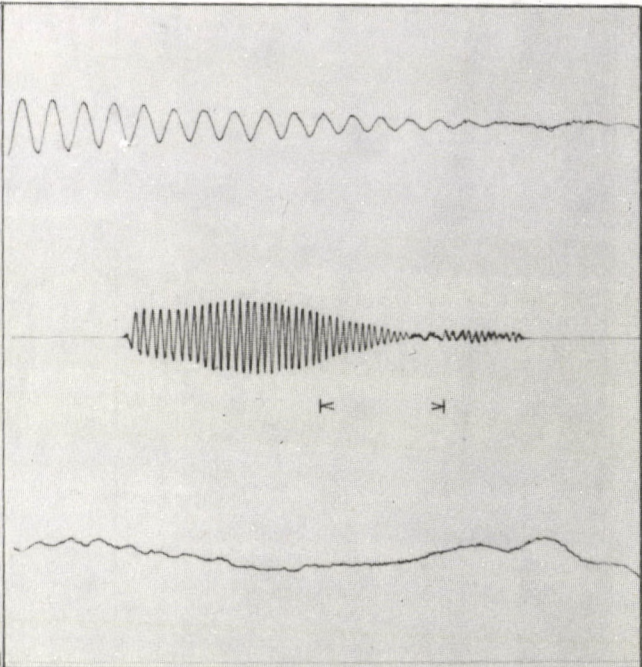


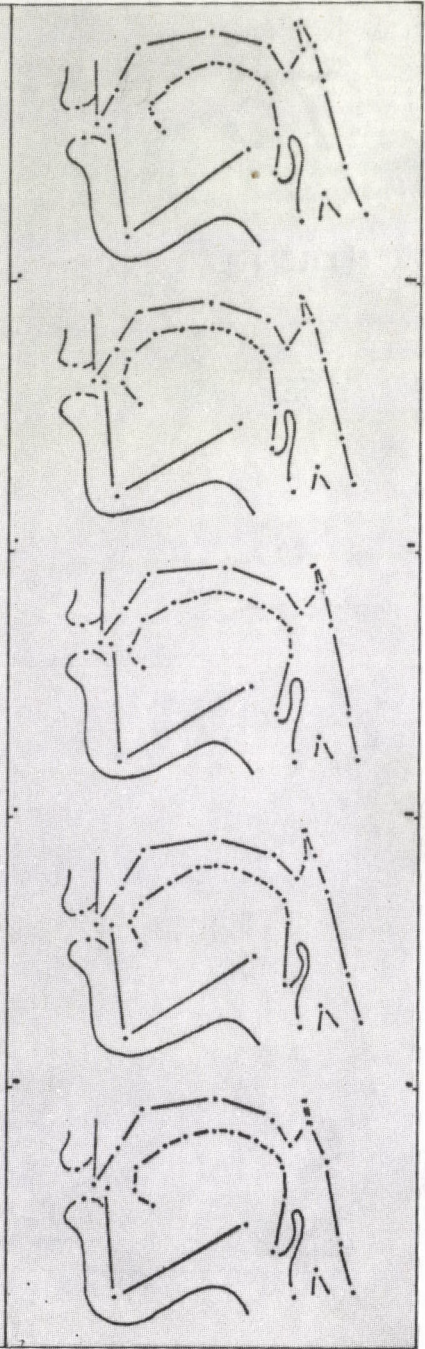
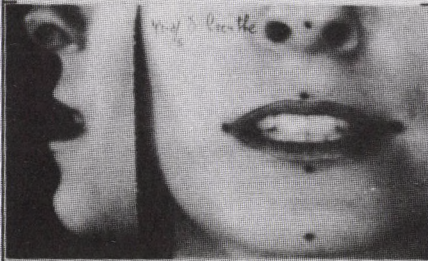
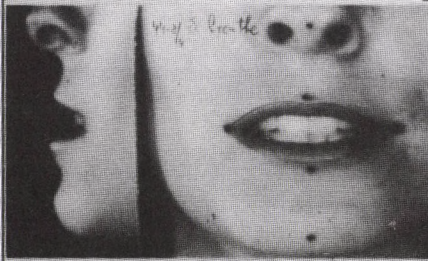
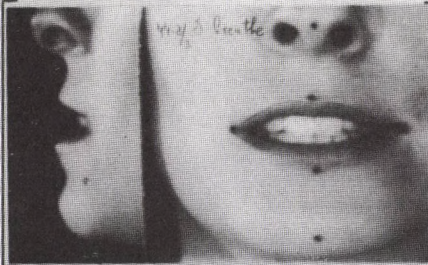
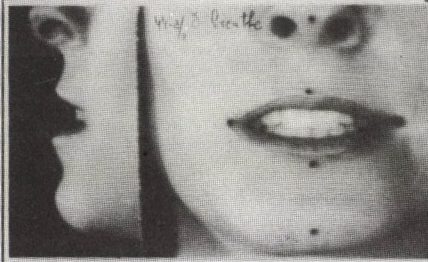
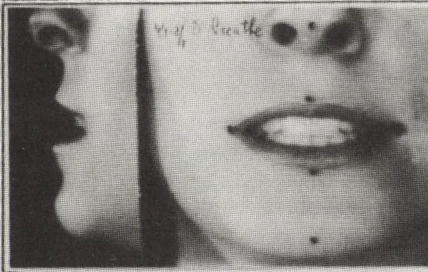
76

triumph

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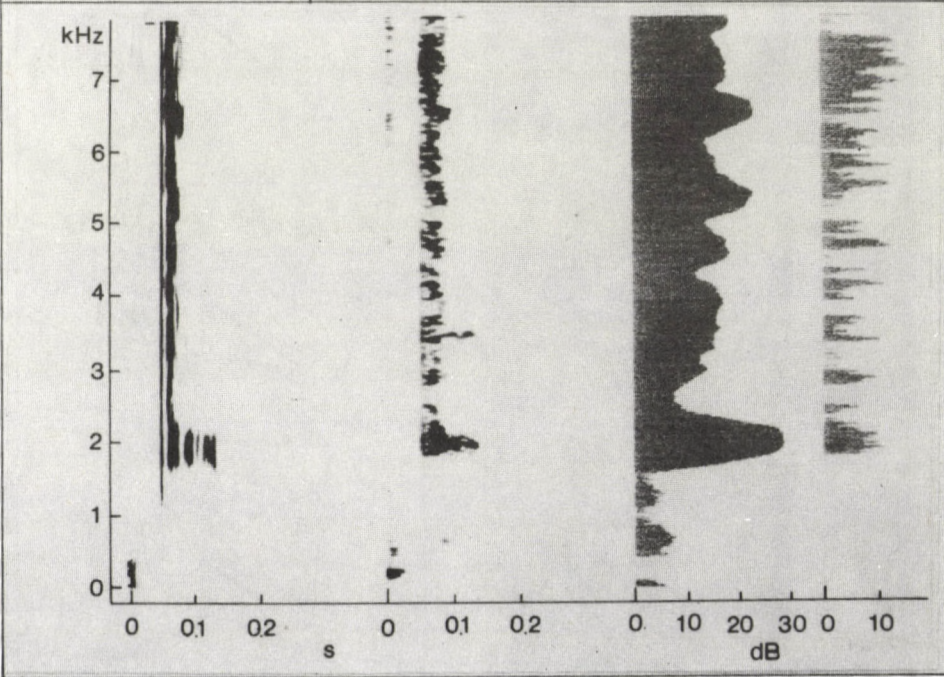
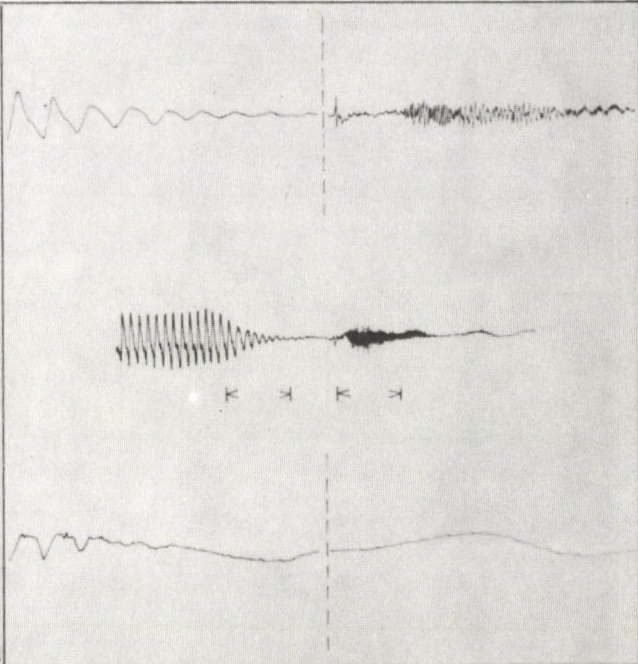


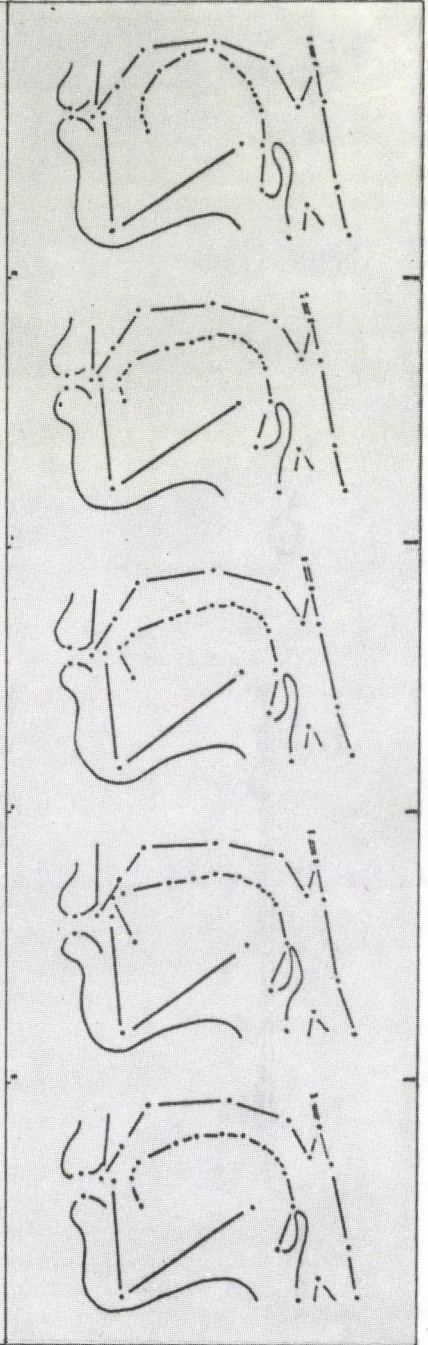
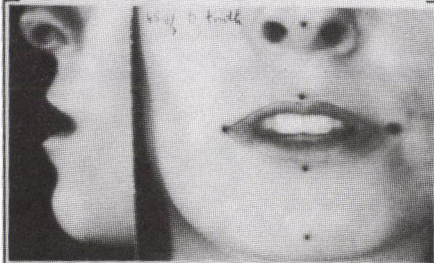
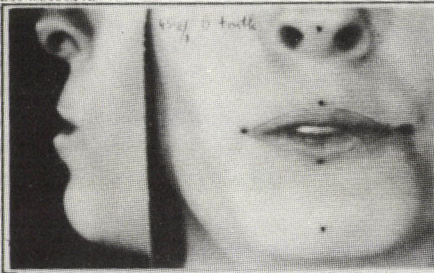
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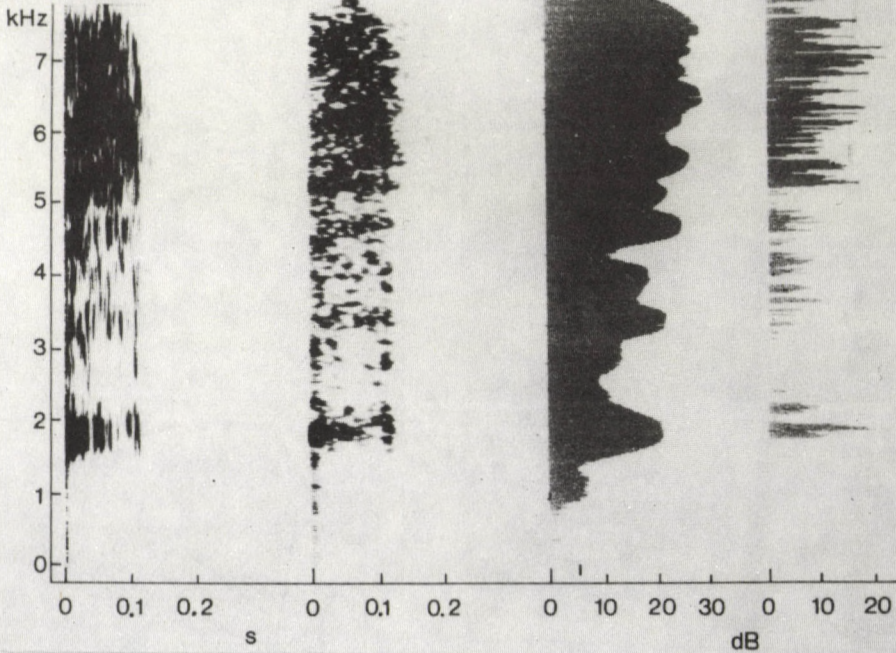
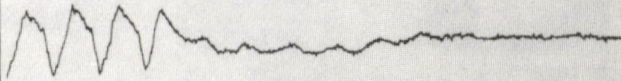
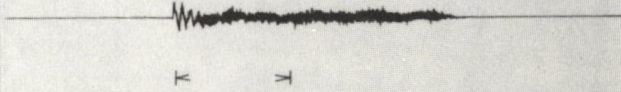
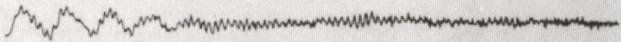


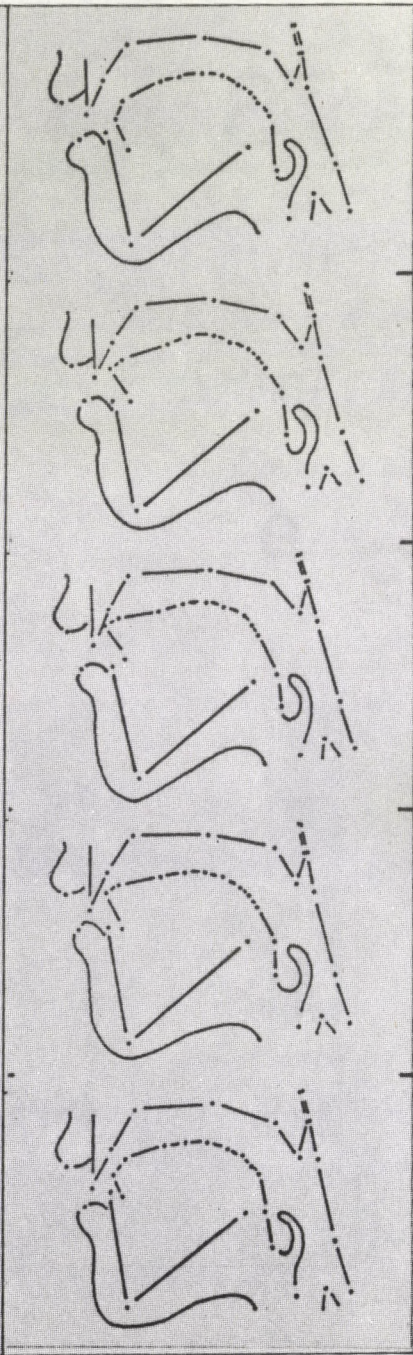
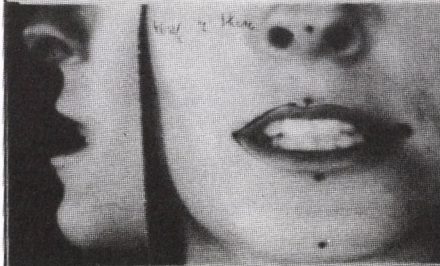
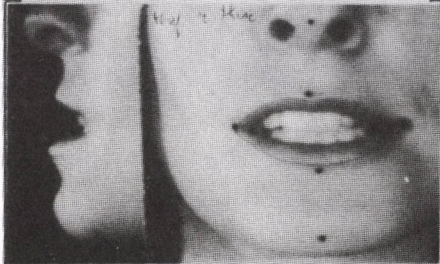
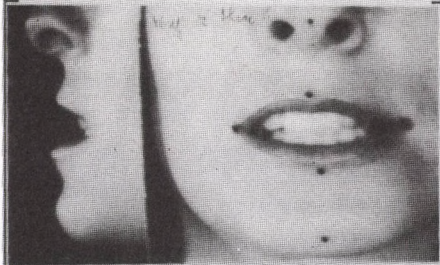
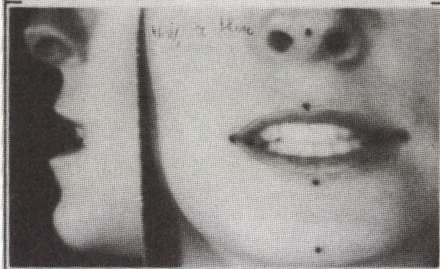
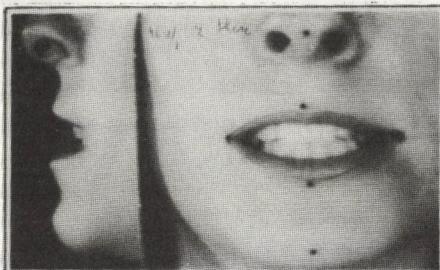
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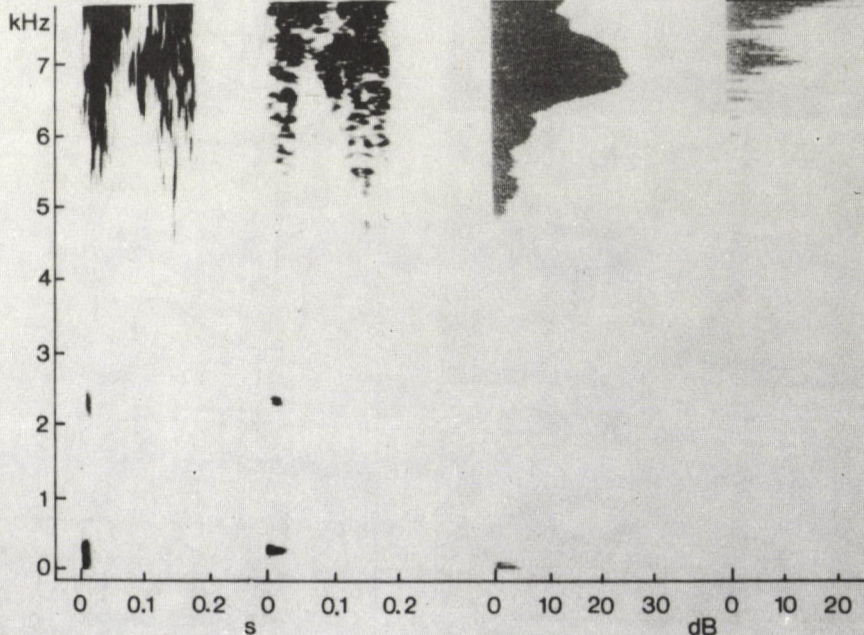
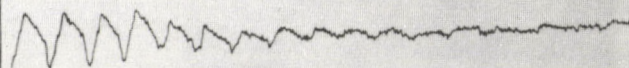
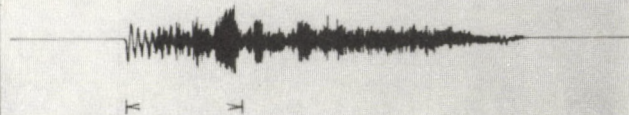
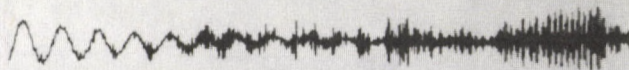


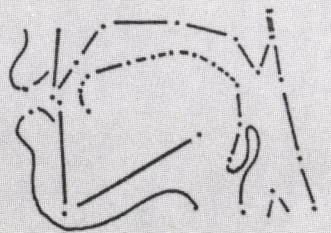
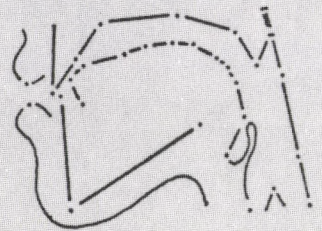
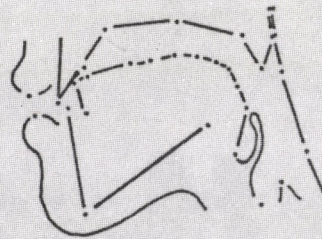
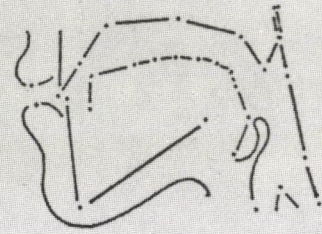
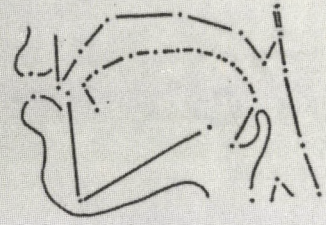
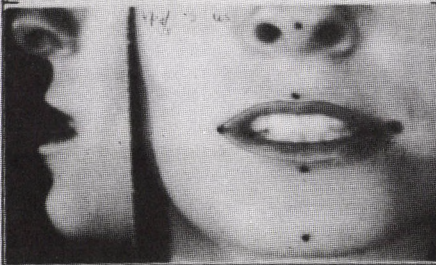
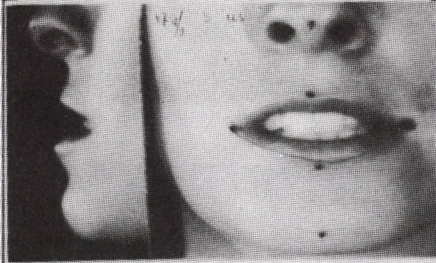
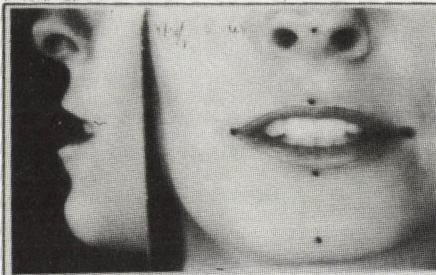
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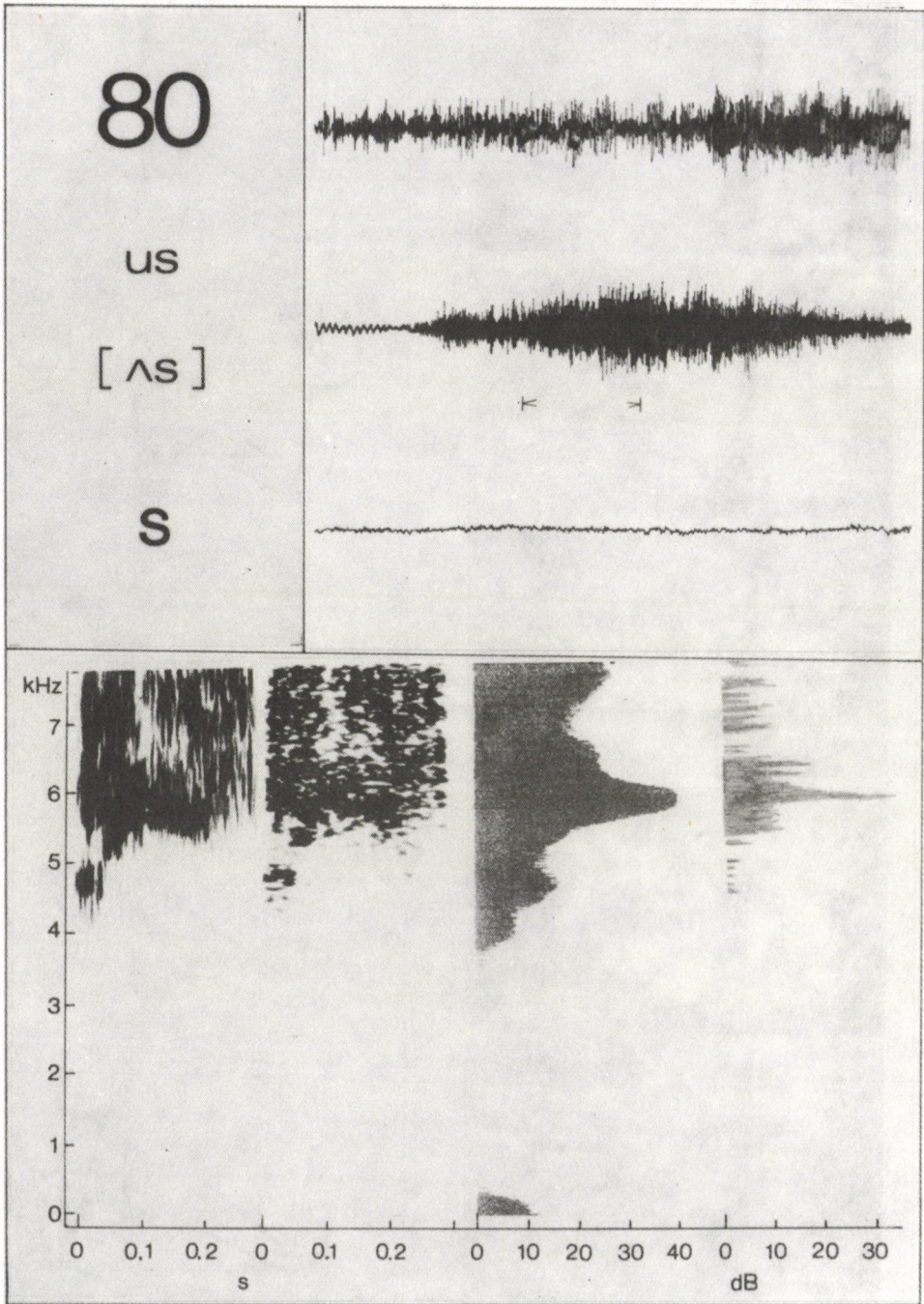
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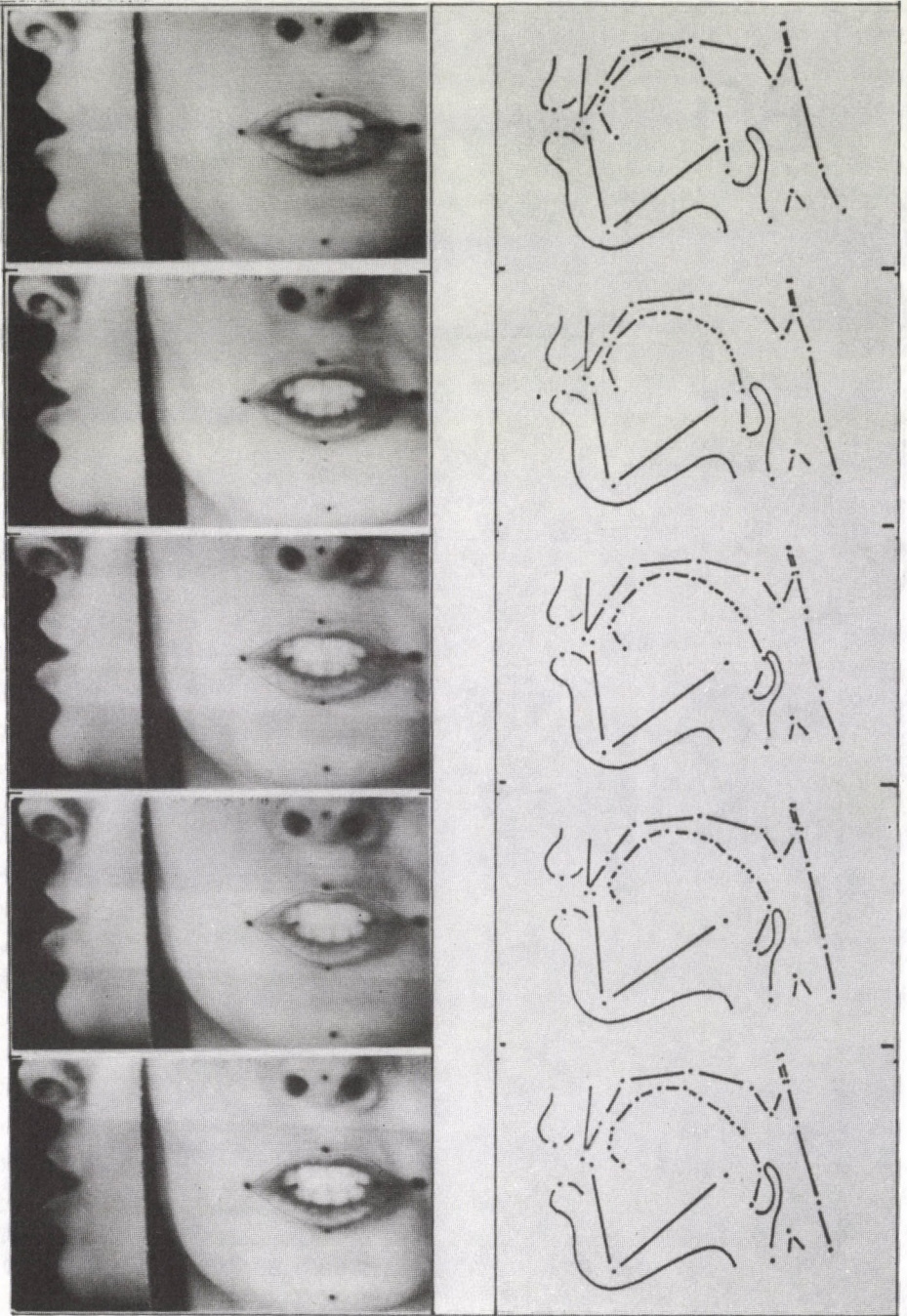
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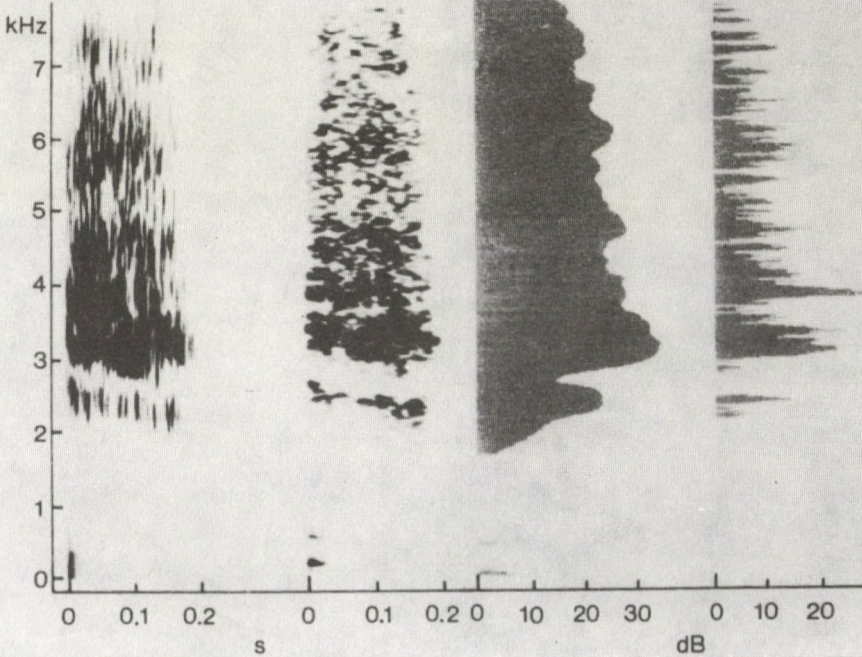
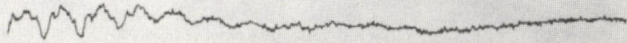


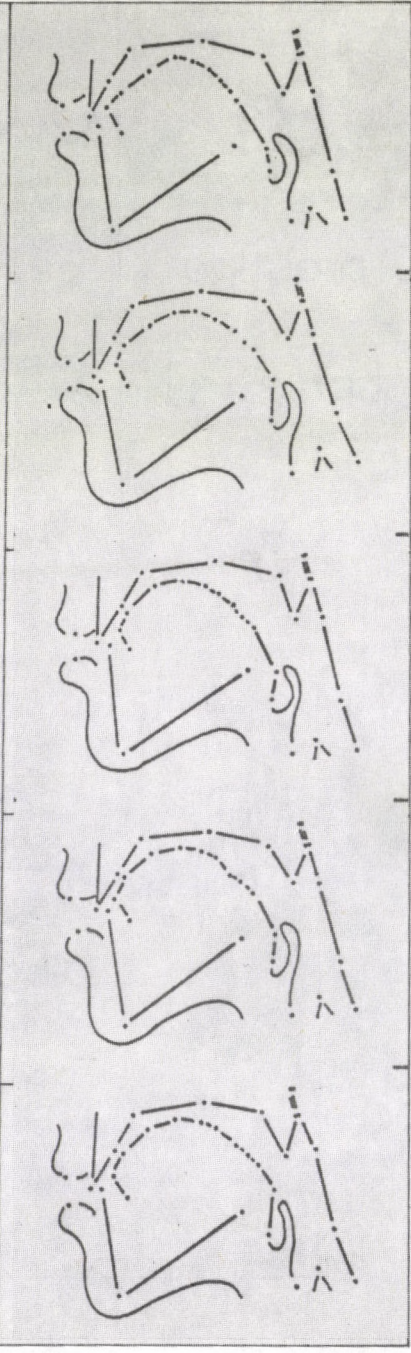
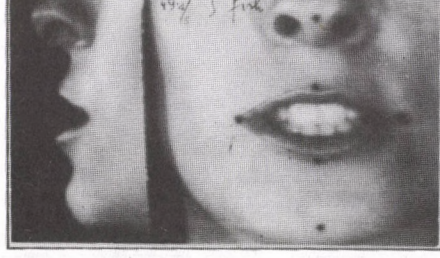
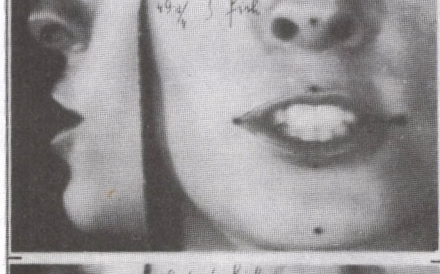
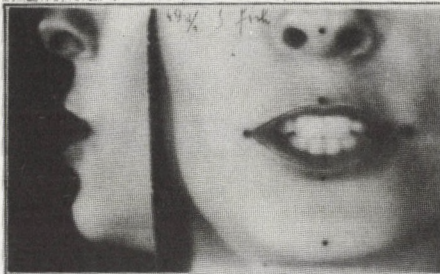
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prestige

[prɛstɪ:ʒ]

3



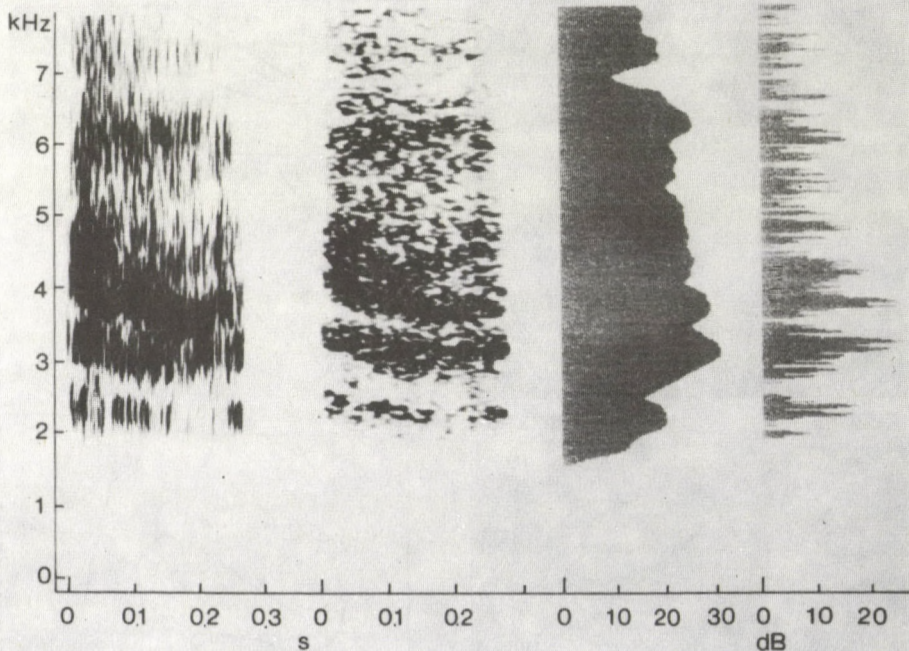
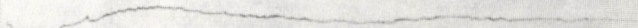
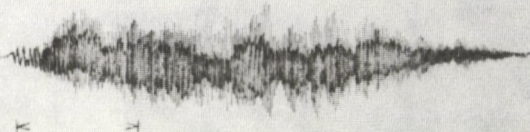


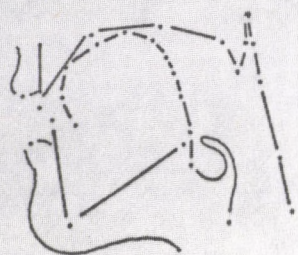
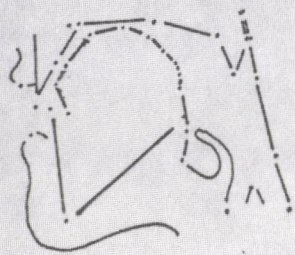
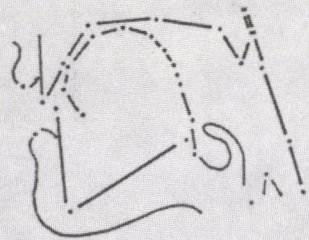
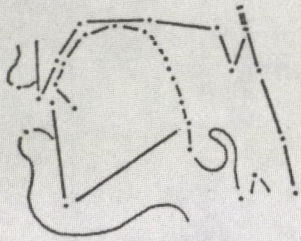
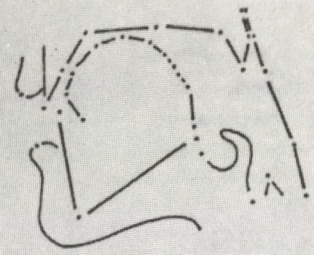
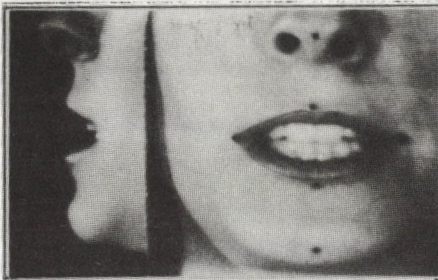
82

fish

[fɪʃ]

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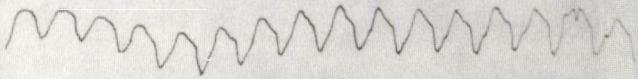
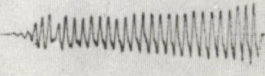
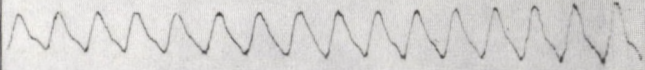


83

yet

[jɛt]

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kHz

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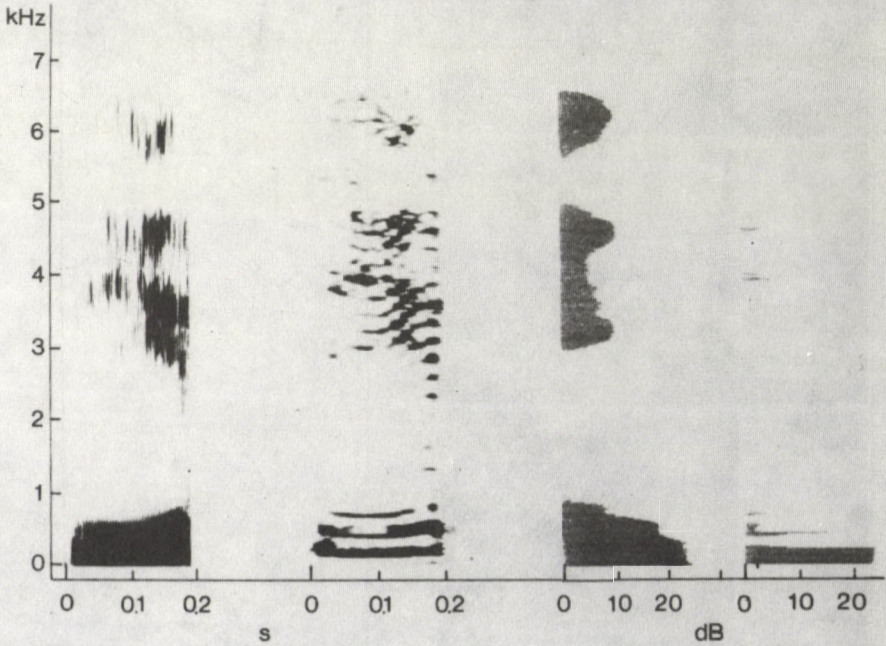
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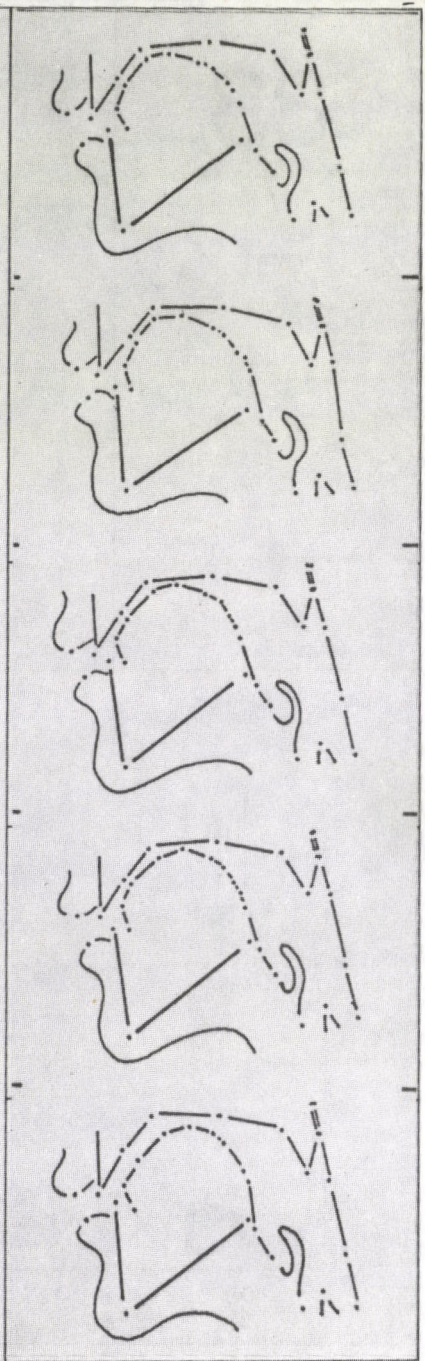
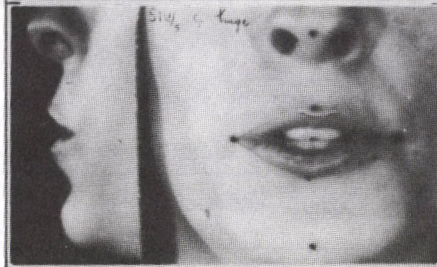
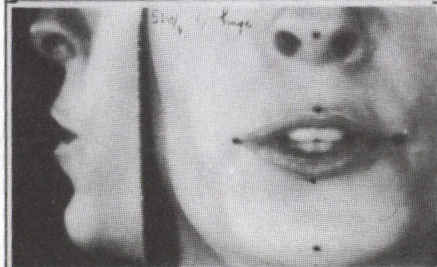
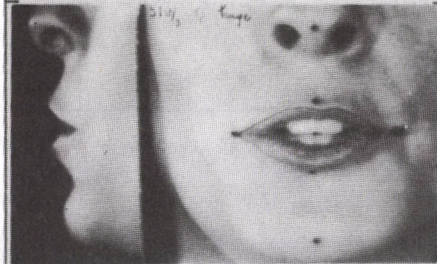
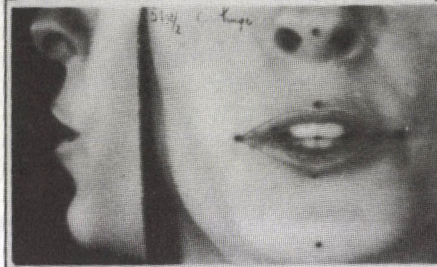
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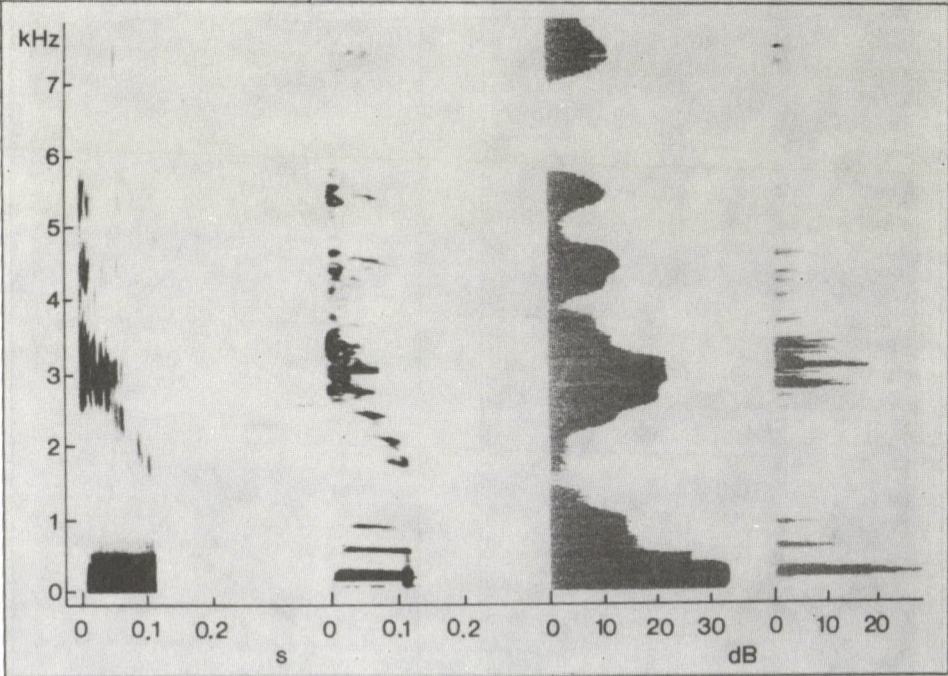
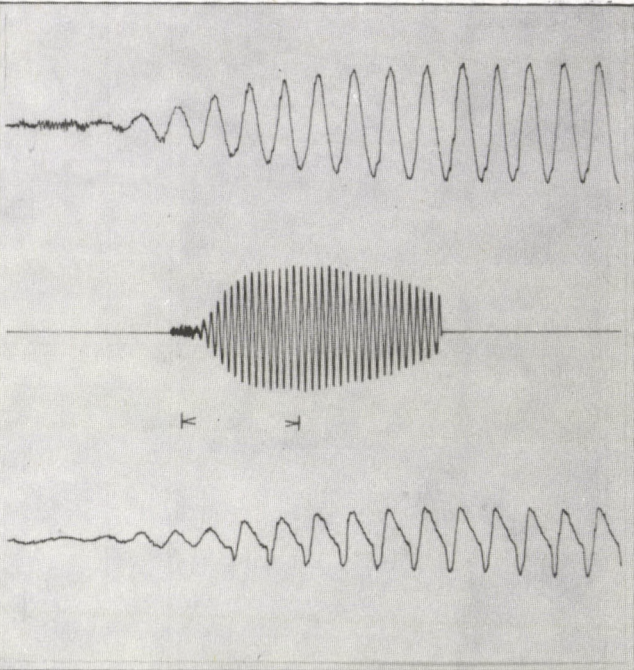


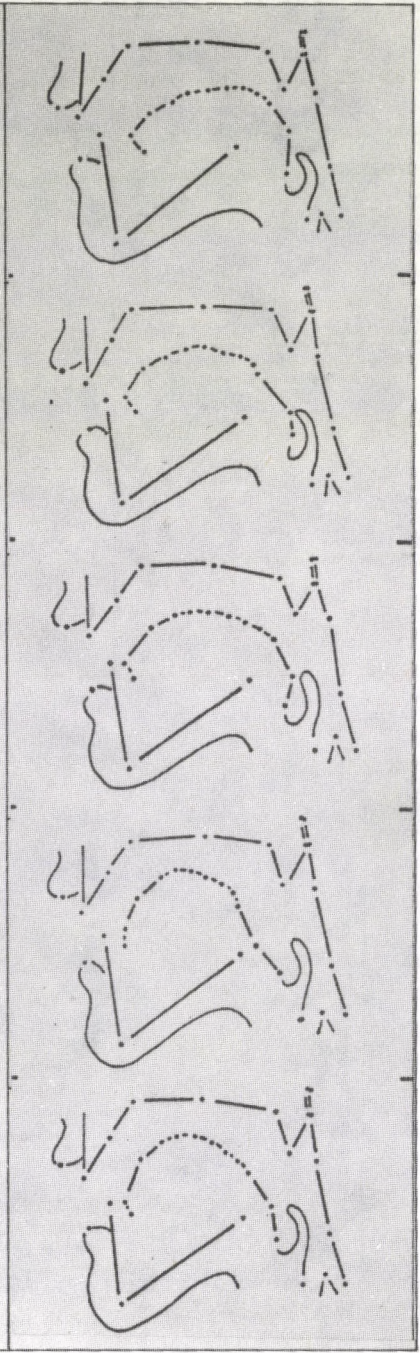
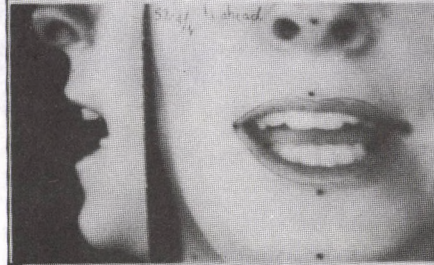
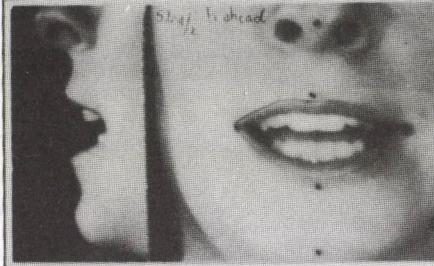
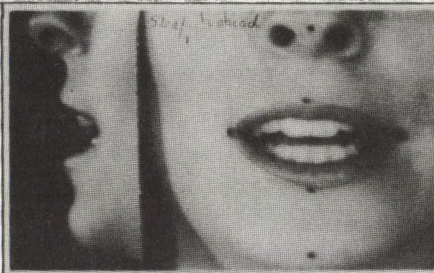
84

huge

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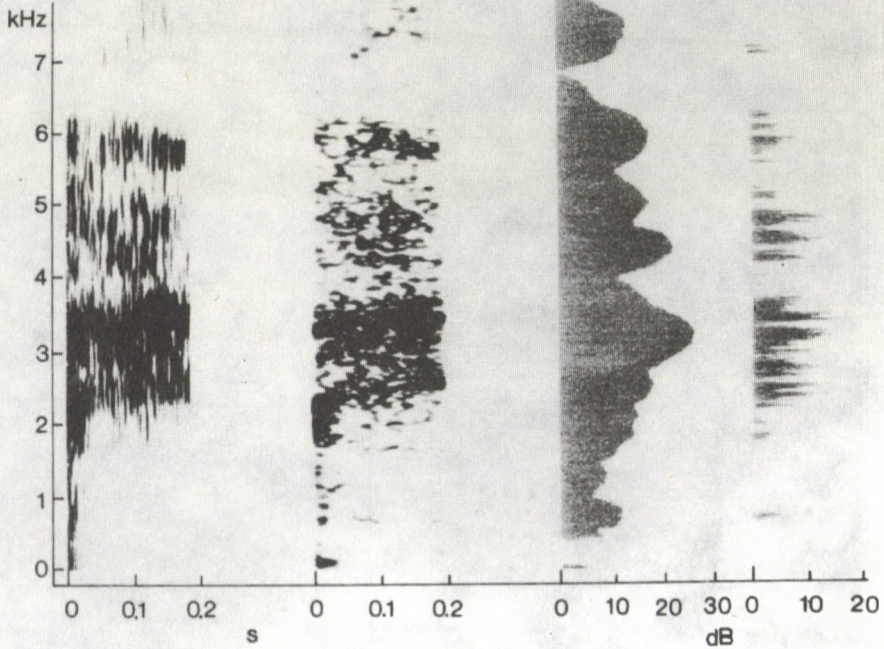
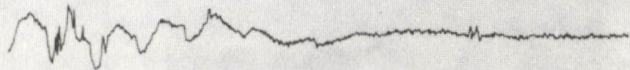
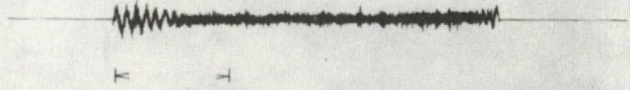
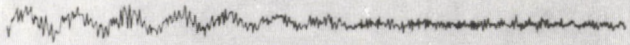


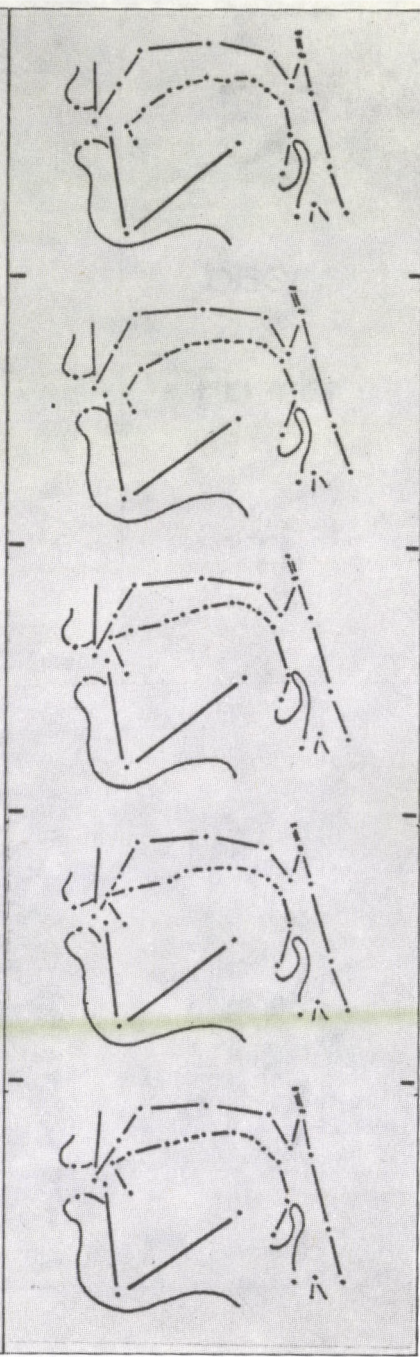
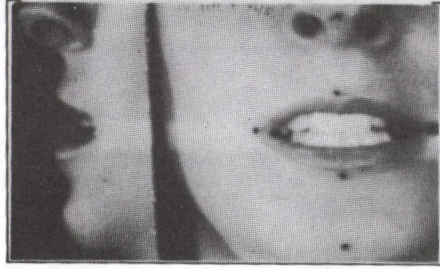
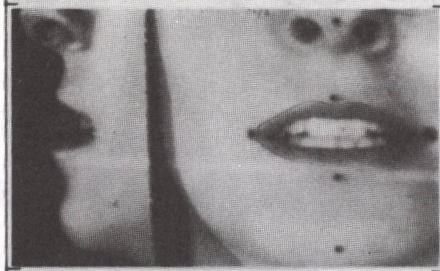
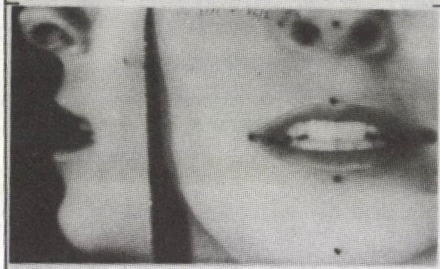
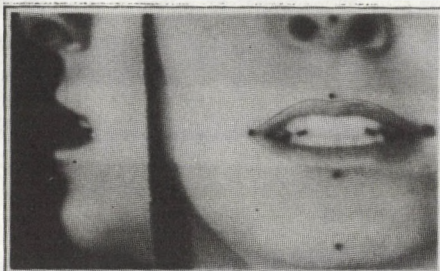
85

ahead

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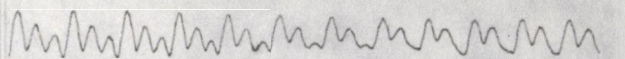


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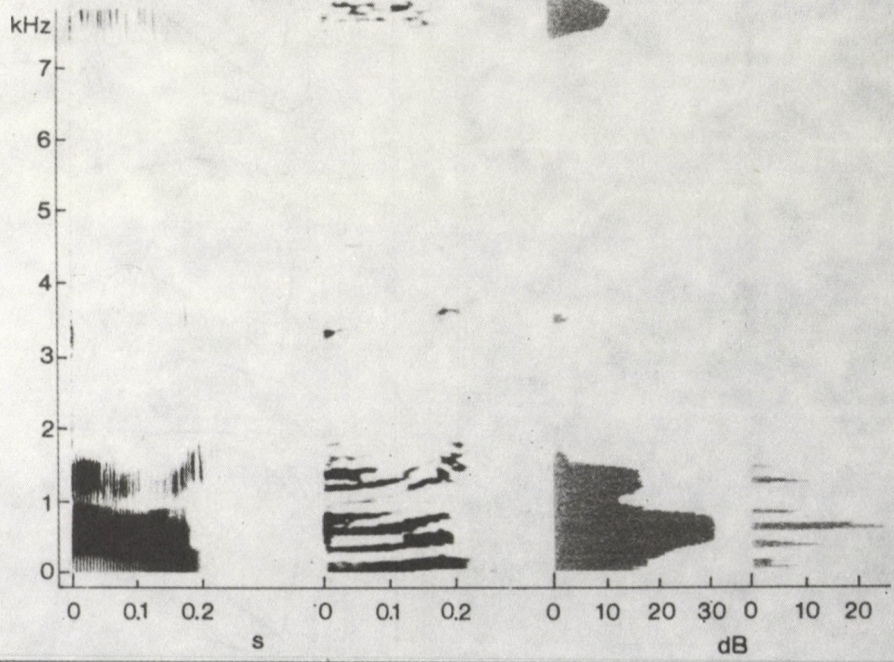
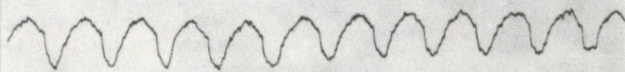
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[tɛt]

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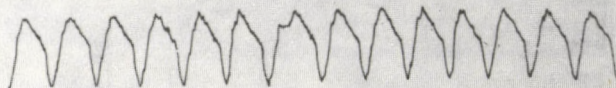
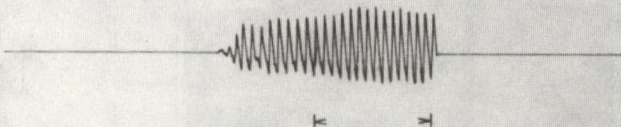
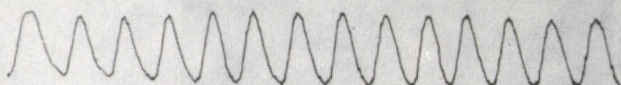


87

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kHz

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3

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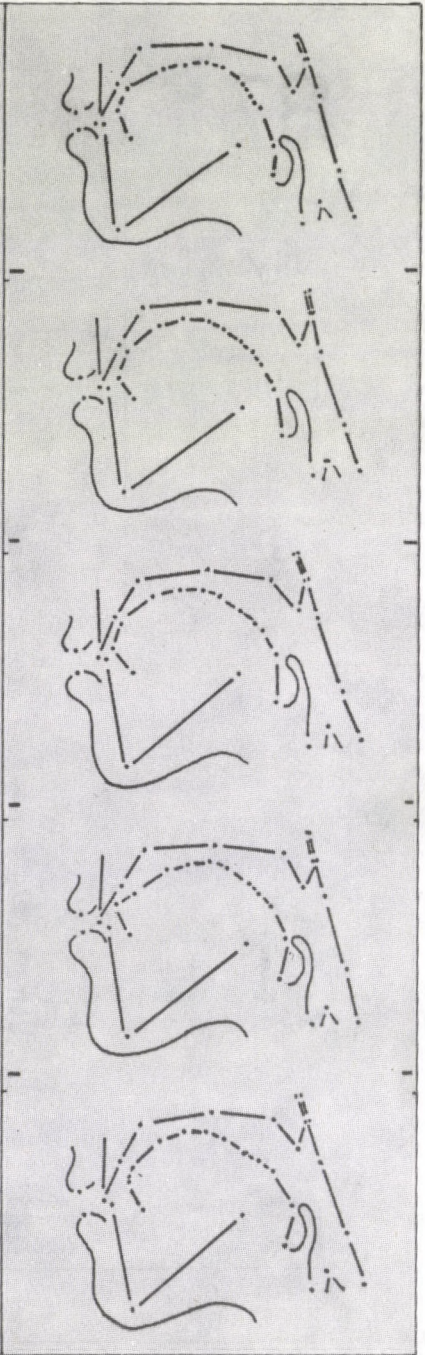
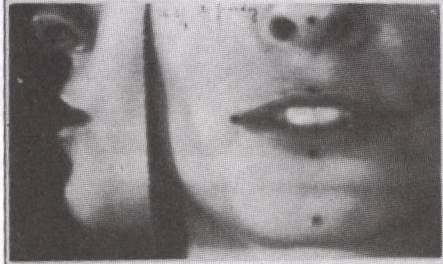
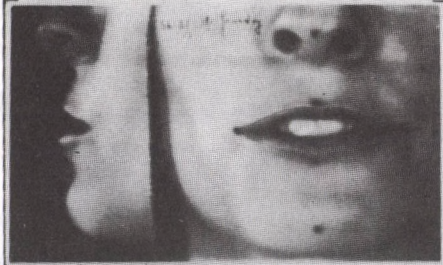
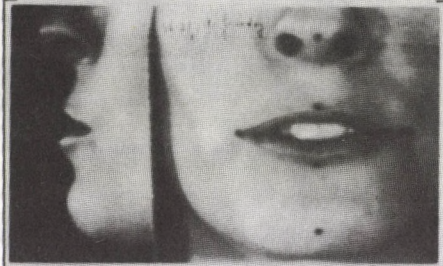
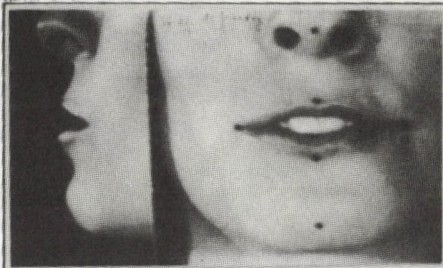
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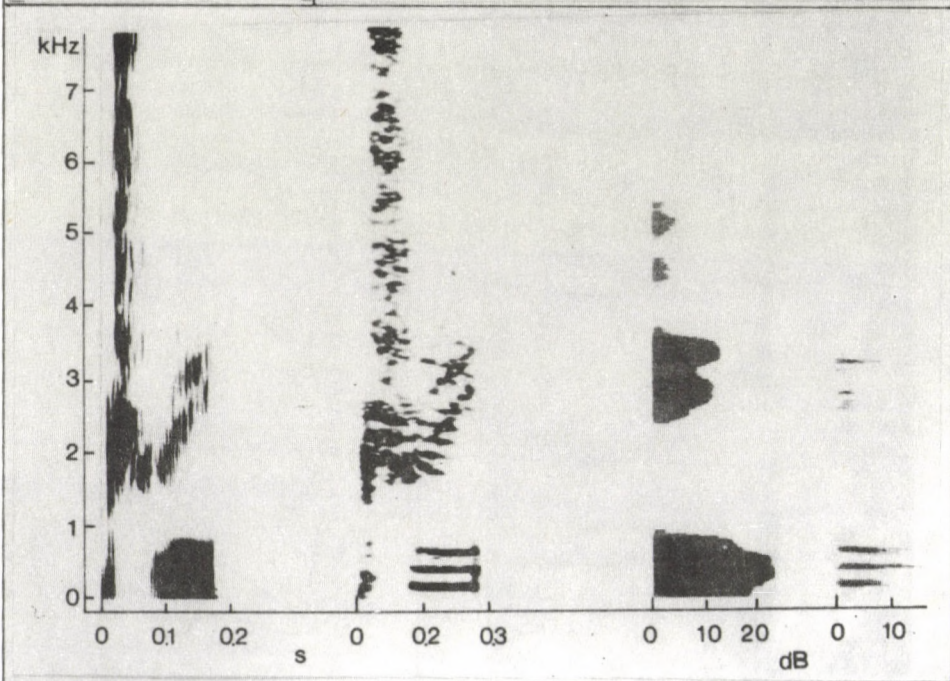
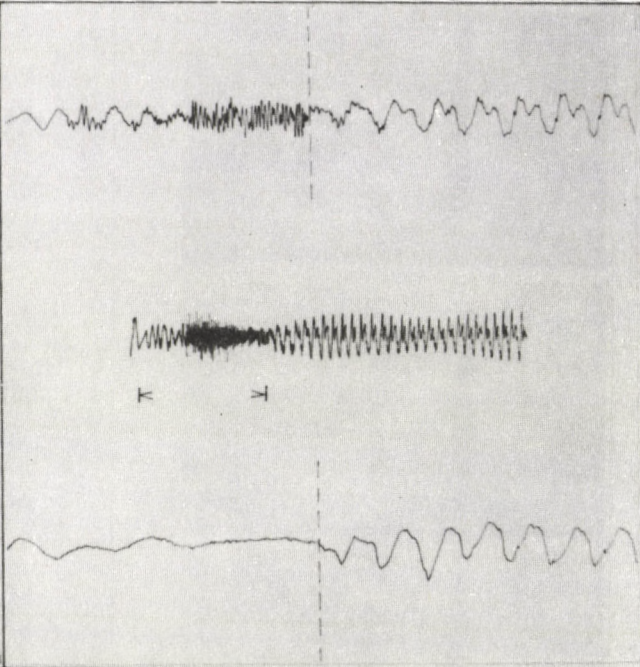


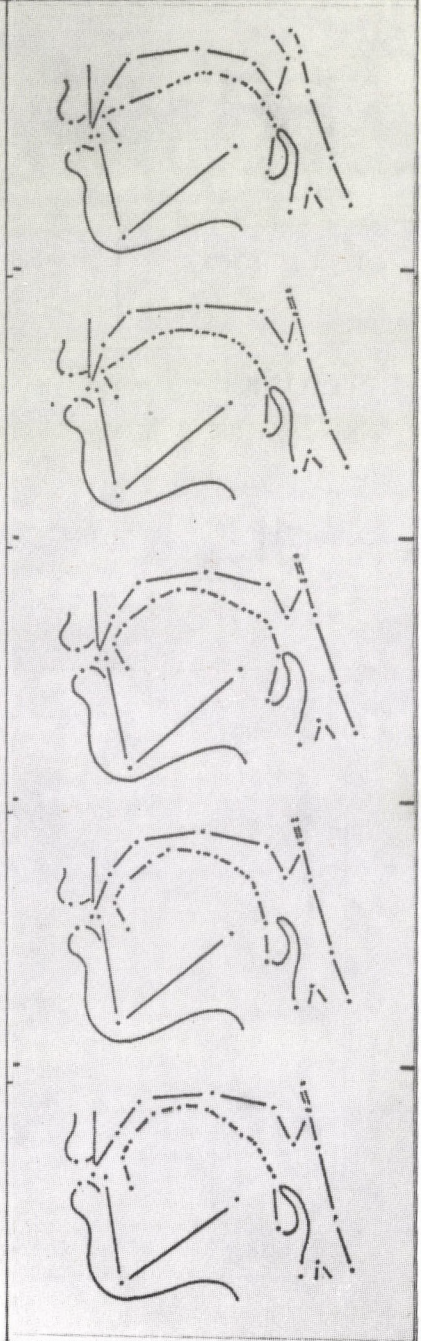
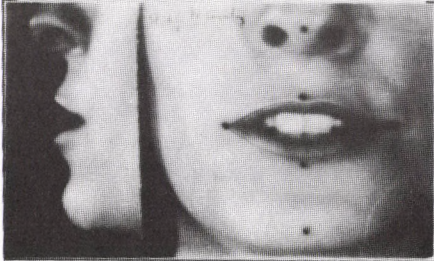
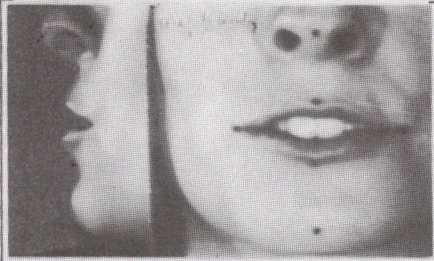
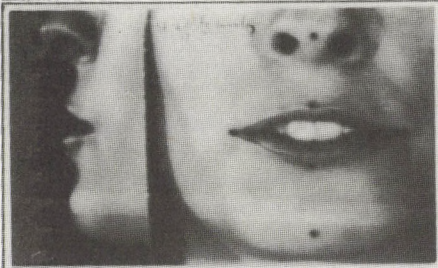
88

foundry

[faʊndrɪ]

dr



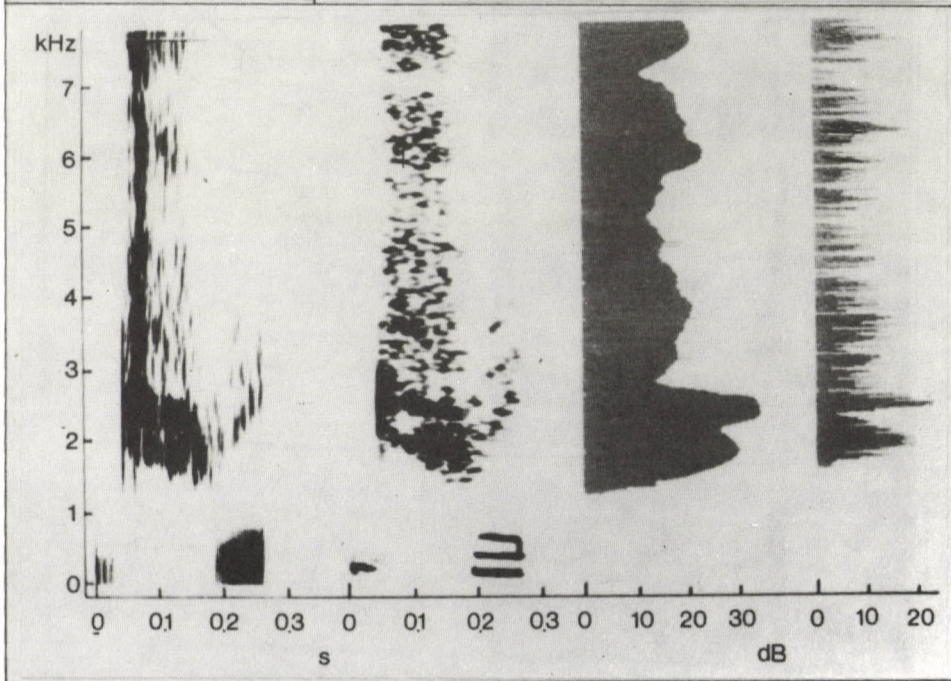
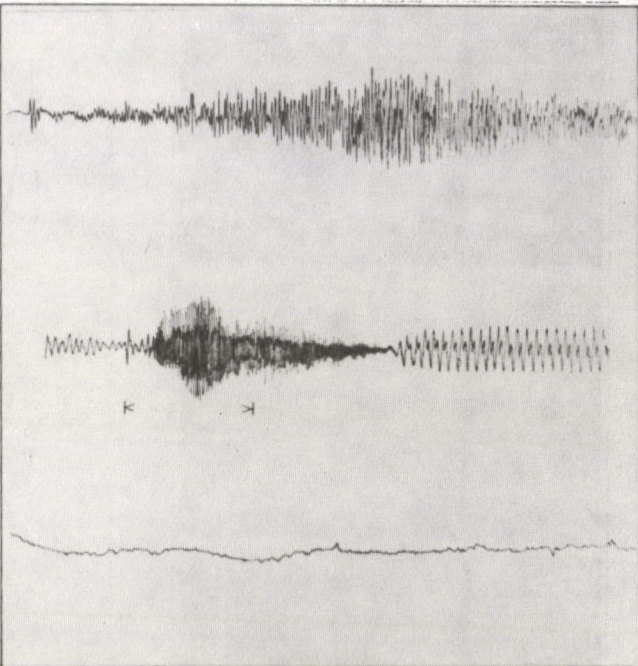


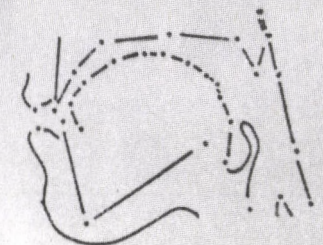
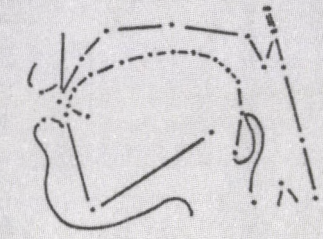
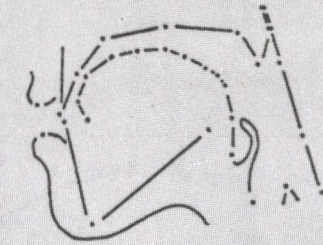
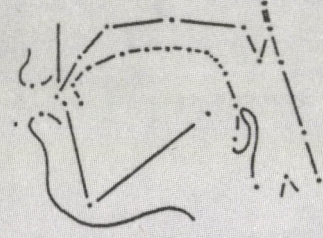
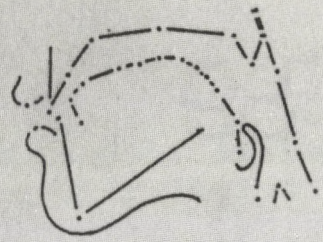
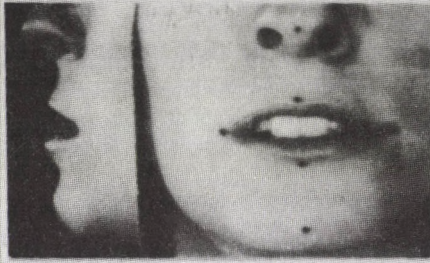
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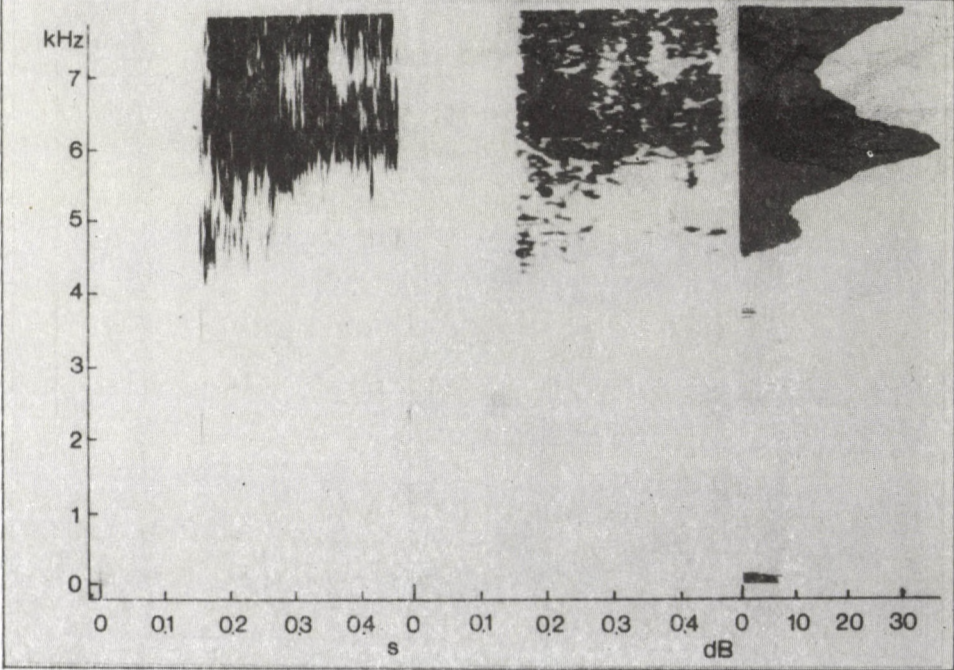
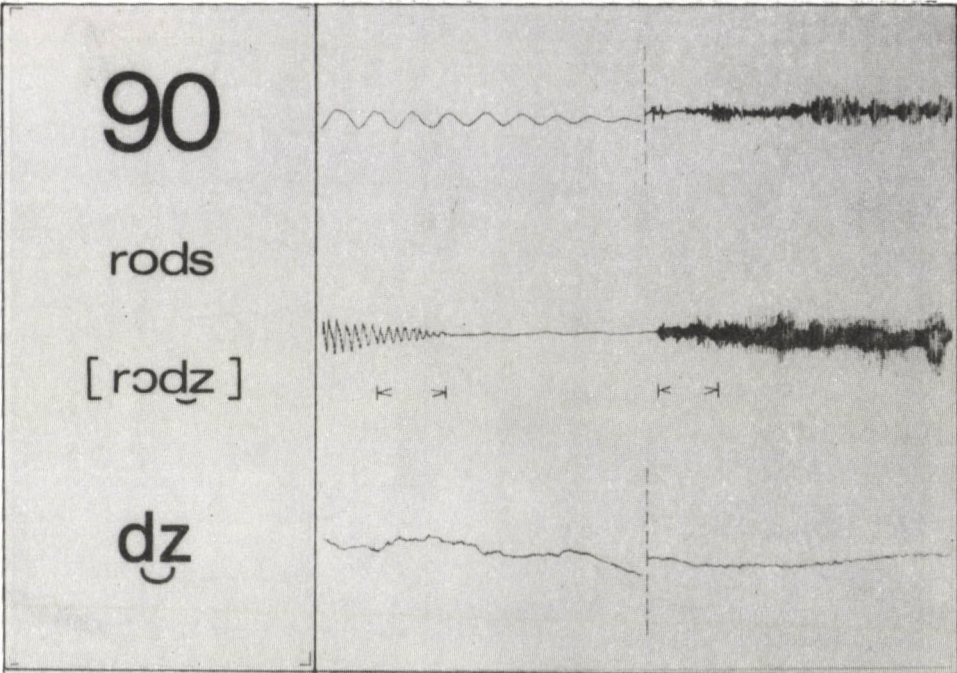
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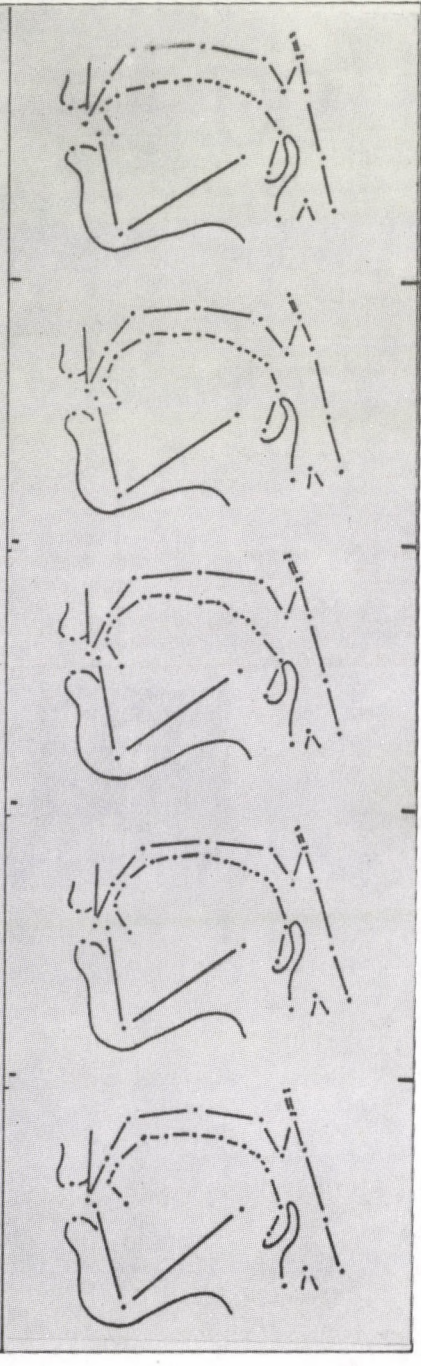
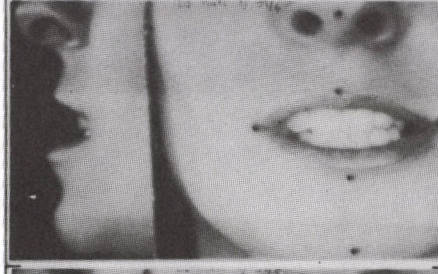
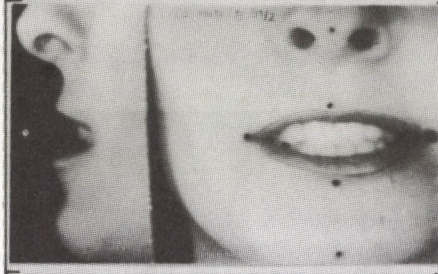
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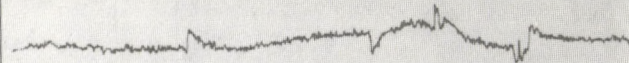


91

hats

[hæts]

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kHz

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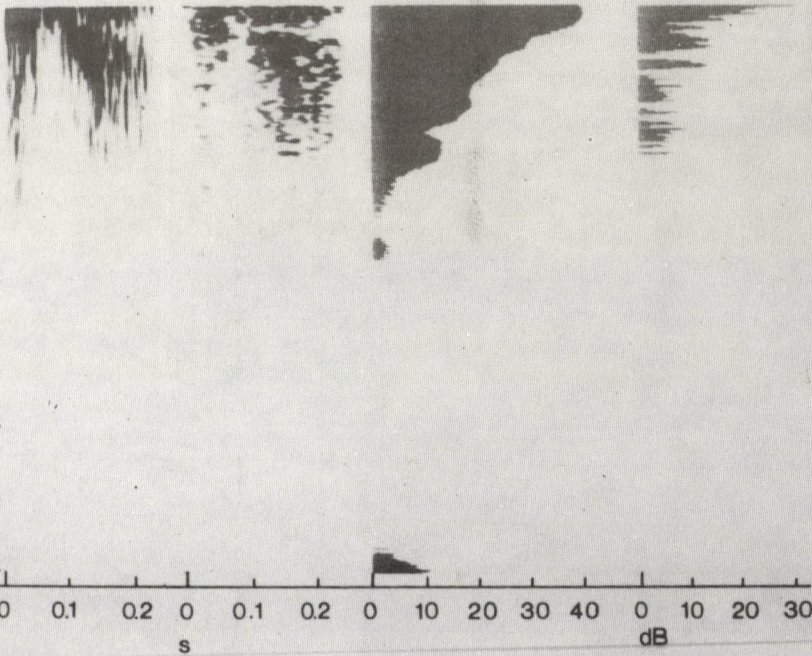
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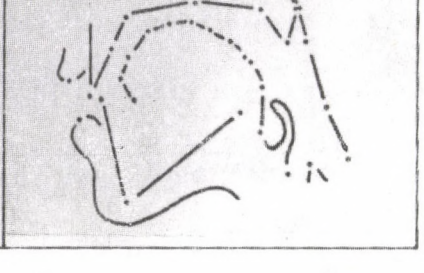
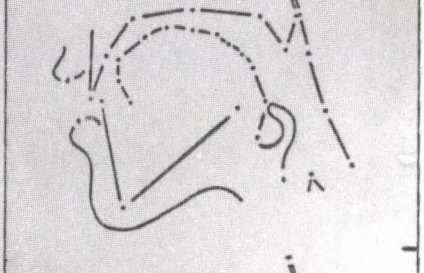
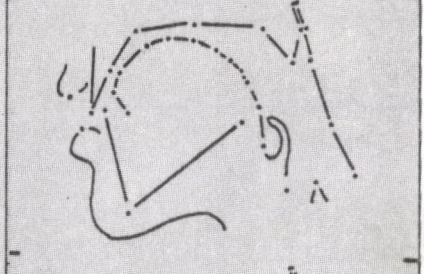
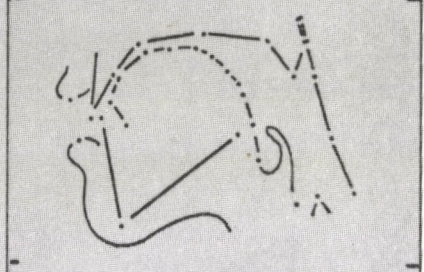
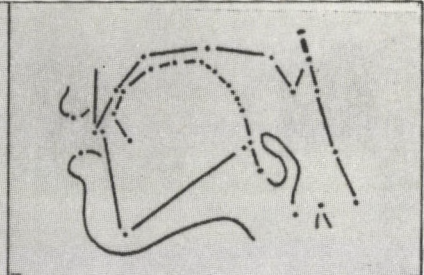
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s

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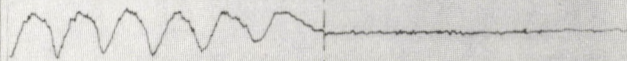
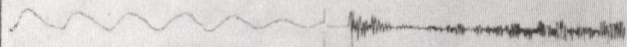


92

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dʒ



kHz

7

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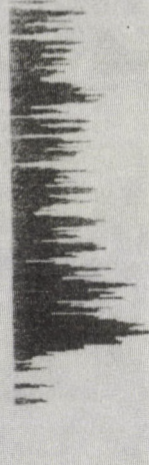
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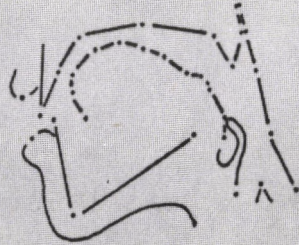
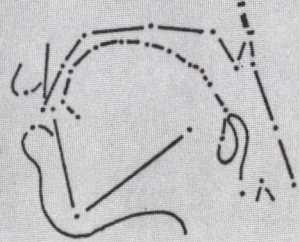
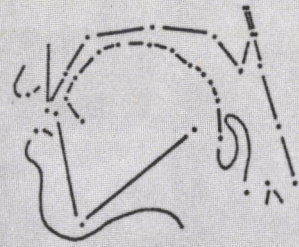
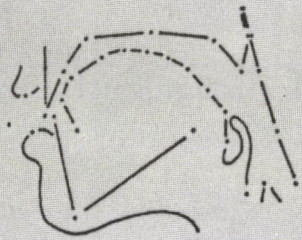
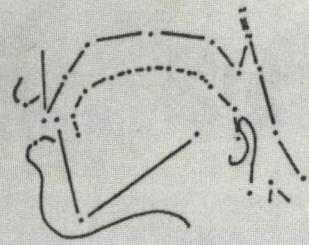
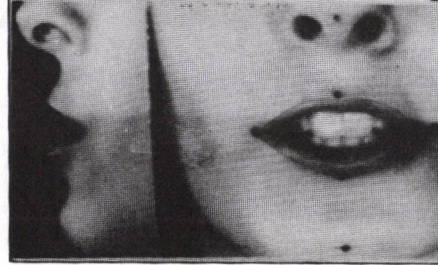
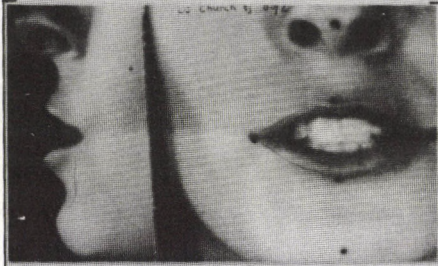


dB

0

10

20

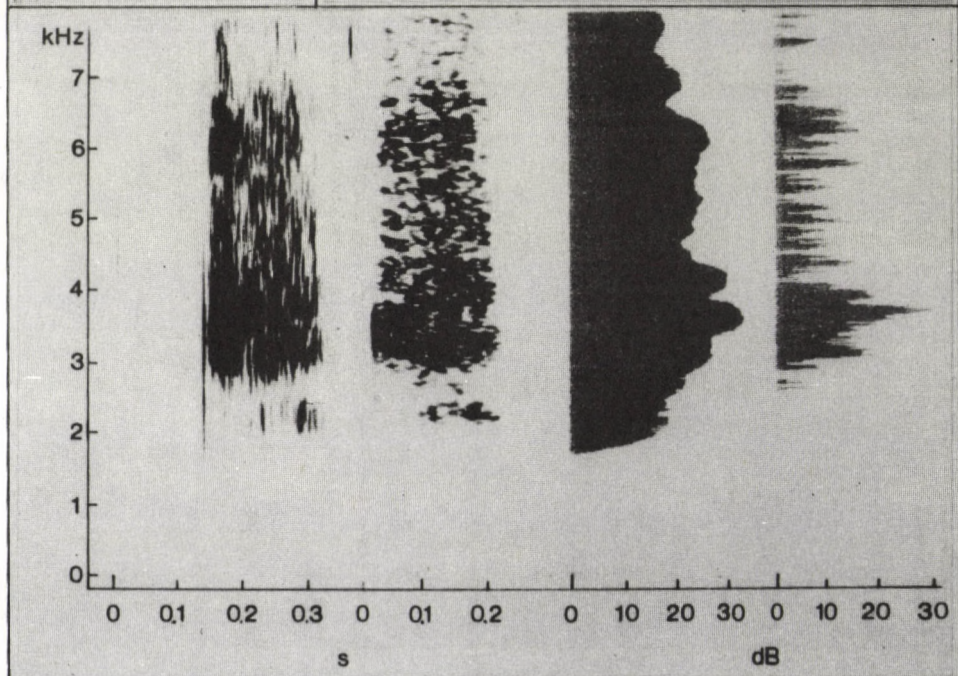
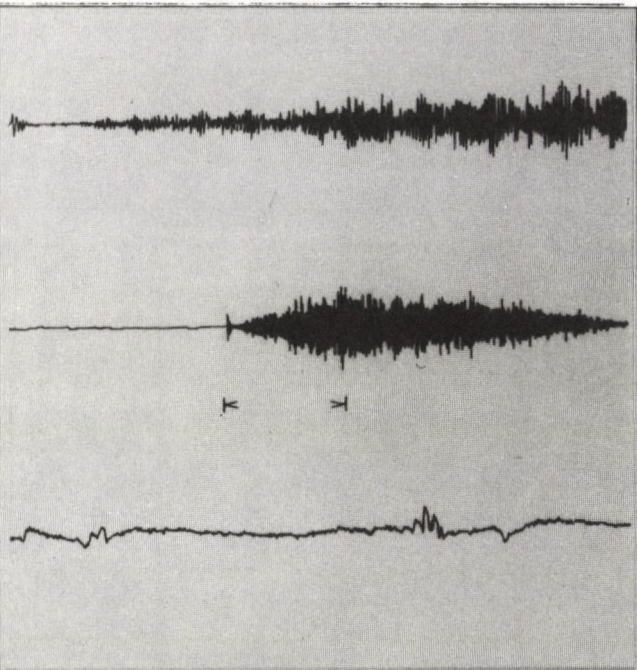


93

church

[tʃʰ:ʃ]

tʃ



DYNAMIC LABIOGRAM DATA OF MEASUREMENT FOR ENGLISH SPEECH SOUNDS

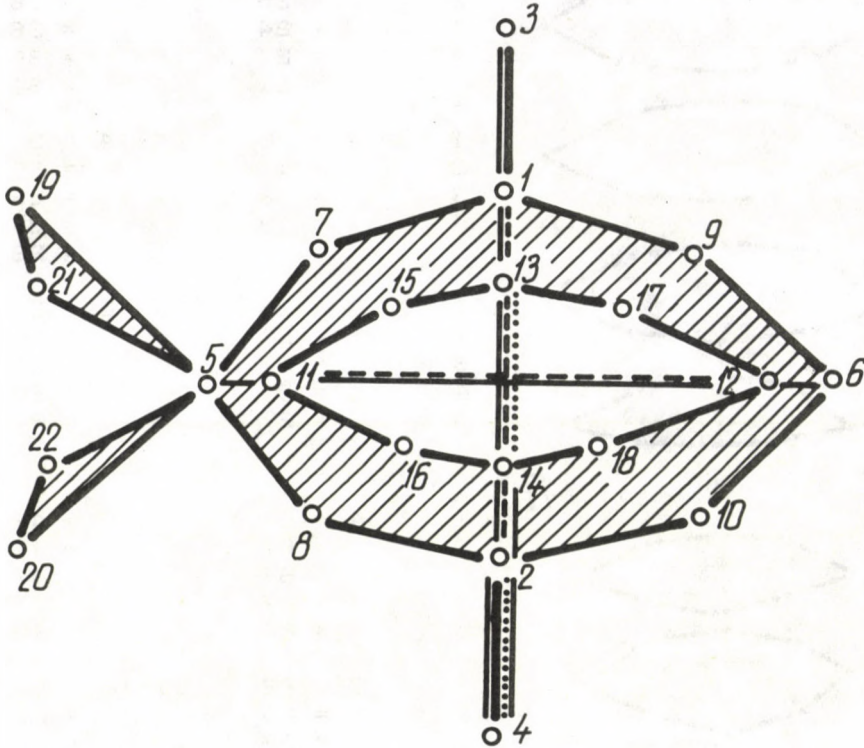
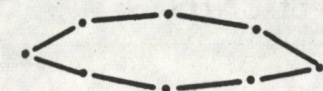


Figure 1

This schematic labiogram contour shows the location of measurement points for the investigations of lip activity. The pairs of points linked by solid lines represent the measurement relations in terms of which the data given in the tables (pp. 214--261.) are to be interpreted. The area data of the lip orifice, marked by points 11 to 18, are given in the tables on pp. 359--364. in relative percentage of the orifice area of the 3rd frame (= the pure phase of the sound involved).

2

[a]



1	3-4 = 67	5-6 = 49
2	= 67	= 48
3	= 66	= 48
4	= 66	= 48
5	= 64	= 50



1	1-2 = 22	11-12 = 31
2	= 25	= 36
3	= 24	= 36
4	= 24	= 36
5	= 21	= 31



1	13-14 = 9	4-14 = 30
2	= 14	= 26
3	= 13	= 26
4	= 13	= 26
5	= 9	= 28



1	3-13 = 28	4-2 = 22
2	= 27	= 20
3	= 27	= 20
4	= 27	= 20
5	= 27	= 21



3

[b]



1	3-4 = 64	5-6 = 49
2	= 67	= 47
3	= 67	= 47
4	= 67	= 47
5	= 66	= 49



1	1-2 = 22	11-12 = 29
2	= 26	= 28
3	= 29	= 29
4	= 28	= 31
5	= 25	= 32



1	13-14 = 10	4-14 = 26
2	= 13	= 26
3	= 16	= 23
4	= 14	= 25
5	= 12	= 27



1	3-13 = 28	4-2 = 19
2	= 28	= 19
3	= 28	= 16
4	= 28	= 17
5	= 27	= 19

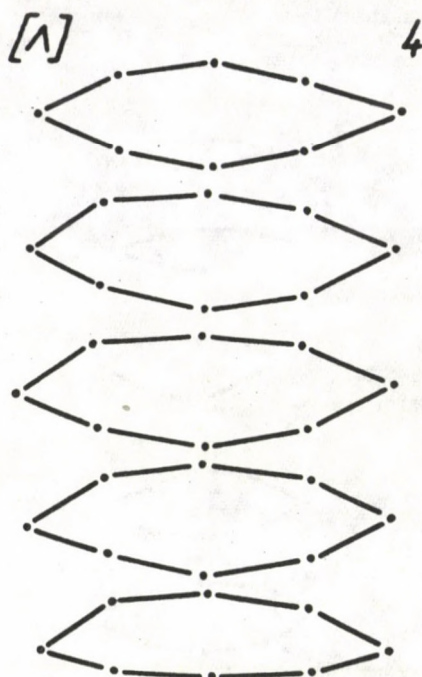


1	3-4 = 67	5-6 = 51
2	= 67	= 49
3	= 67	= 49
4	= 67	= 49
5	= 67	= 49

1	1-2 = 25	11-12 = 38
2	= 27	= 38
3	= 26	= 39
4	= 26	= 38
5	= 23	= 36

1	13-14 = 13	4-14 = 26
2	= 15	= 24
3	= 15	= 24
4	= 14	= 25
5	= 11	= 28

1	3-13 = 28	4-2 = 19
2	= 28	= 18
3	= 28	= 19
4	= 28	= 19
5	= 28	= 21

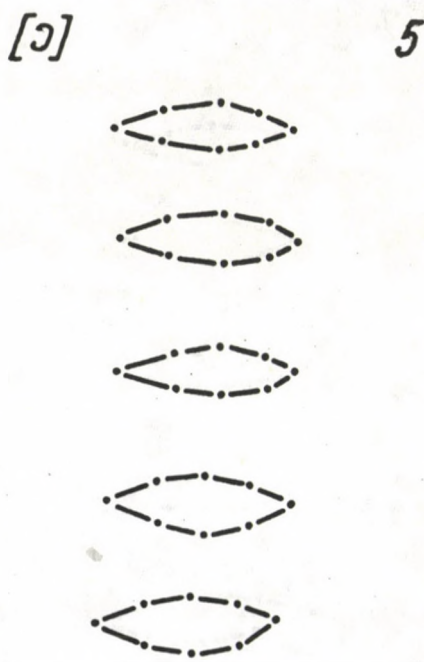


1	3-4 = 64	5-6 = 44
2	= 64	= 44
3	= 66	= 45
4	= 59	= 45
5	= 65	= 44

1	1-2 = 18	11-12 = 19
2	= 18	= 19
3	= 20	= 19
4	= 20	= 20
5	= 20	= 19

1	13-14 = 6	4-14 = 27
2	= 6	= 27
3	= 6	= 29
4	= 7	= 28
5	= 7	= 27

1	3-13 = 31	4-2 = 20
2	= 31	= 20
3	= 31	= 21
4	= 24	= 21
5	= 31	= 20



6

[v]



1	3-4 = 66	5-6 = 44
2	= 67	= 46
3	= 67	= 46
4	= 67	= 47
5	= 67	= 46

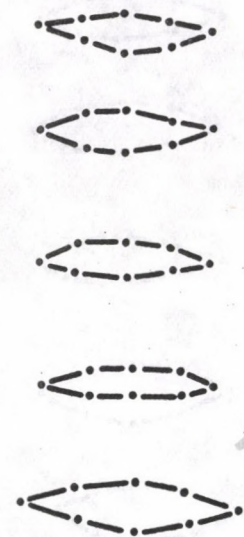
1	1-2 = 18	11-12 = 14
2	= 19	= 19
3	= 20	= 19
4	= 21	= 22
5	= 22	= 24

1	13-14 = 3	4-14 = 30
2	= 5	= 29
3	= 7	= 28
4	= 9	= 28
5	= 9	= 27

1	3-13 = 33	4-2 = 22
2	= 33	= 22
3	= 32	= 22
4	= 30	= 21
5	= 31	= 20

7

[u:]



1	3-4 = 66	5-6 = 47
2	= 66	= 47
3	= 66	= 47
4	= 65	= 47
5	= 66	= 48

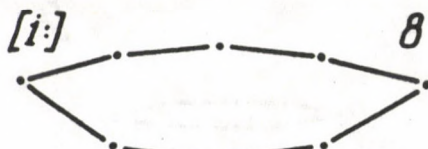
1	1-2 = 19	11-12 = 18
2	= 19	= 18
3	= 18	= 18
4	= 18	= 18
5	= 21	= 23

1	13-14 = 5	4-14 = 27
2	= 5	= 27
3	= 4	= 28
4	= 3	= 29
5	= 6	= 28

1	3-13 = 34	4-2 = 20
2	= 34	= 20
3	= 34	= 21
4	= 33	= 21
5	= 32	= 20

1 3-4 = 67
 2 = 67
 3 = 67
 4 = 67
 5 = 67

5-6 = 53
 = 52
 = 53
 = 53
 = 52



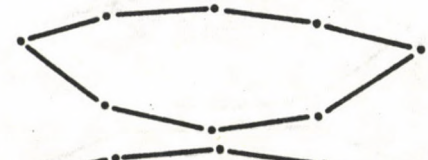
1 1-2 = 26
 2 = 27
 3 = 27
 4 = 26
 5 = 24

11-12 = 43
 = 43
 = 42
 = 44
 = 41



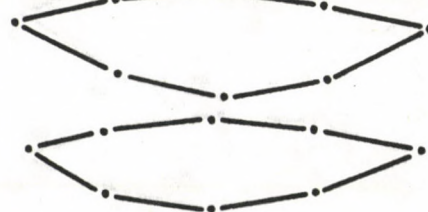
1 13-14 = 14
 2 = 15
 3 = 15
 4 = 14
 5 = 11

4-14 = 23
 = 22
 = 22
 = 23
 = 25



1 3-13 = 30
 2 = 30
 3 = 30
 4 = 30
 5 = 31

4-2 = 16
 = 15
 = 15
 = 16
 = 18



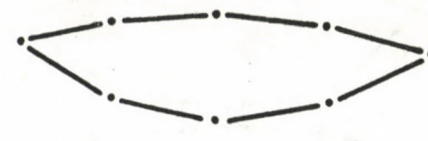
1 3-4 = 63
 2 = 64
 3 = 64
 4 = 64
 5 = 62

5-6 = 51
 = 51
 = 51
 = 51
 = 52



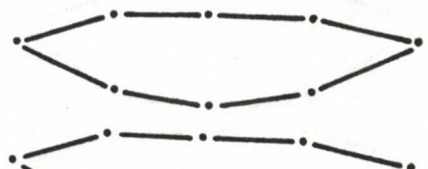
1 1-2 = 25
 2 = 25
 3 = 25
 4 = 25
 5 = 23

11-12 = 42
 = 44
 = 42
 = 42
 = 41



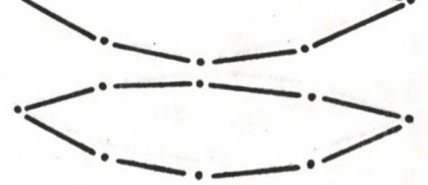
1 13-14 = 14
 2 = 14
 3 = 12
 4 = 12
 5 = 12

4-14 = 24
 = 25
 = 26
 = 26
 = 25



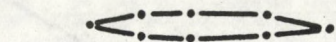
1 3-13 = 25
 2 = 25
 3 = 26
 4 = 26
 5 = 25

4-2 = 18
 = 19
 = 19
 = 19
 = 19



10

[ε]



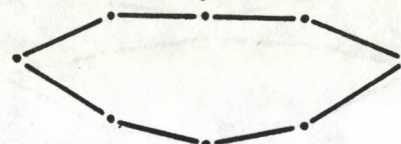
1	3-4 = 66	5-6 = 50
2	= 67	= 50
3	= 67	= 51
4	= 67	= 52
5	= 67	= 52



1	1-2 = 15	11-12 = 25
2	= 25	= 39
3	= 29	= 39
4	= 29	= 41
5	= 25	= 41



1	13-14 = 3	4-14 = 32
2	= 13	= 25
3	= 16	= 23
4	= 16	= 23
5	= 12	= 27



1	3-13 = 31	4-2 = 27
2	= 29	= 19
3	= 28	= 16
4	= 26	= 16
5	= 28	= 20

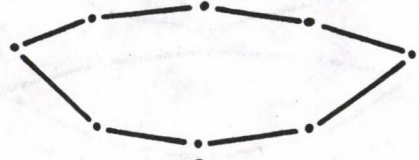


11

[æ]



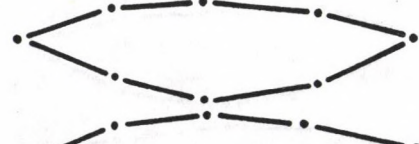
1	3-4 = 67	5-6 = 50
2	= 67	= 50
3	= 67	= 52
4	= 66	= 52
5	= 65	= 54



1	1-2 = 30	11-12 = 42
2	= 32	= 42
3	= 29	= 42
4	= 25	= 42
5	= 23	= 41



1	13-14 = 19	4-14 = 21
2	= 19	= 22
3	= 16	= 23
4	= 16	= 25
5	= 11	= 27



1	3-13 = 27	4-2 = 14
2	= 27	= 14
3	= 28	= 16
4	= 29	= 19
5	= 27	= 20



1	3-4	= 65
2		= 65
3		= 64
4		= 64
5		= 64

5-6	= 50
	= 51
	= 51
	= 50
	= 50

[3:]

12



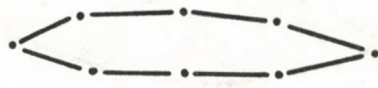
1	1-2	= 22
2		= 22
3		= 22
4		= 22
5		= 21

11-12	= 36
	= 37
	= 38
	= 38
	= 38



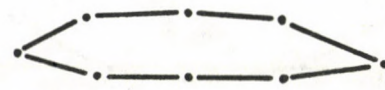
1	13-14	= 9
2		= 9
3		= 8
4		= 8
5		= 8

4-14	= 28
	= 28
	= 28
	= 28
	= 28



1	3-13	= 28
2		= 28
3		= 28
4		= 28
5		= 28

4-2	= 21
	= 21
	= 20
	= 20
	= 21



1	3-4	= 61
2		= 62
3		= 63
4		= 62
5		= 62

5-6	= 51
	= 51
	= 51
	= 52
	= 51

[a]

13



1	1-2	= 17
2		= 19
3		= 21
4		= 21
5		= 21

11-12	= 26
	= 26
	= 30
	= 31
	= 30



1	13-14	= 5
2		= 7
3		= 9
4		= 9
5		= 9

4-14	= 23
	= 27
	= 27
	= 26
	= 26



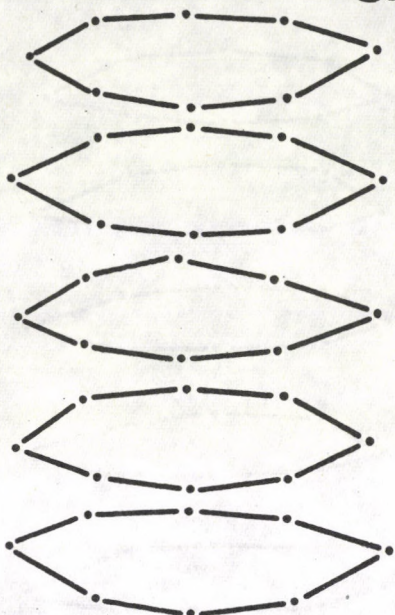
1	3-13	= 20
2		= 23
3		= 27
4		= 27
5		= 27

4-2	= 21
	= 20
	= 20
	= 19
	= 19



14

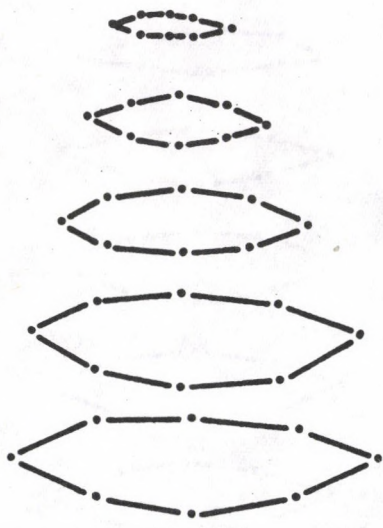
[ar]



1	3- 4 = 66	5- 6 = 50
2	= 67	= 49
3	= 67	= 49
4	= 67	= 49
5	= 67	= 51
1	1- 2 = 24	11-12 = 37
2	= 27	= 39
3	= 27	= 38
4	= 26	= 37
5	= 26	= 40
1	13-14 = 12	4-14 = 27
2	= 14	= 26
3	= 13	= 27
4	= 13	= 27
5	= 14	= 25
1	3-13 = 27	4- 2 = 20
2	= 27	= 19
3	= 27	= 19
4	= 27	= 20
5	= 28	= 19

15

[ar]



1	3- 4 = 62	5- 6 = 48
2	= 65	= 46
3	= 64	= 48
4	= 67	= 50
5	= 67	= 52
1	1- 2 = 18	11-12 = 12
2	= 19	= 19
3	= 20	= 26
4	= 24	= 35
5	= 24	= 39
1	13-14 = 2	4-14 = 28
2	= 6	= 28
3	= 8	= 27
4	= 12	= 26
5	= 12	= 26
1	3-13 = 32	4- 2 = 20
2	= 31	= 21
3	= 28	= 20
4	= 25	= 20
5	= 23	= 20

1 3-4 = 60
 2 = 67
 3 = 60
 4 = 65
 5 = 66

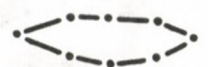
5-6 = 48
 = 47
 = 47
 = 50
 = 49

[yI]

16

1 1-2 = 18
 2 = 13
 3 = 19
 4 = 24
 5 = 26

11-12 = 20
 = 13
 = 17
 = 34
 = 37



1 13-14 = 7
 2 = 6
 3 = 6
 4 = 13
 5 = 13

4-14 = 26
 = 26
 = 26
 = 25
 = 26



1 3-13 = 27
 2 = 41
 3 = 28
 4 = 27
 5 = 27

4-2 = 20
 = 18
 = 19
 = 19
 = 15



1 3-4 = 67
 2 = 67
 3 = 67
 4 = 67
 5 = 67

5-6 = 48
 = 50
 = 52
 = 52
 = 53

[eI]

17

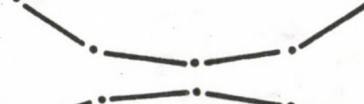
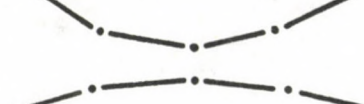
1 1-2 = 25
 2 = 30
 3 = 27
 4 = 25
 5 = 26

11-12 = 33
 = 39
 = 41
 = 38
 = 37



1 13-14 = 11
 2 = 17
 3 = 14
 4 = 13
 5 = 13

4-14 = 24
 = 20
 = 23
 = 25
 = 25



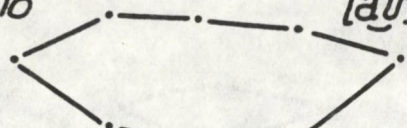
1 3-13 = 32
 2 = 30
 3 = 30
 4 = 29
 5 = 29

4-2 = 17
 = 13
 = 16
 = 19
 = 18



18

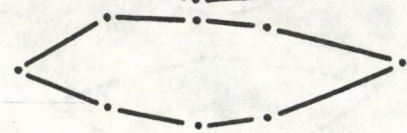
[av]



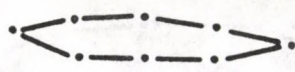
1	3-4 = 67	5-6 = 51
2	= 67	= 49
3	= 67	= 51
4	= 64	= 49
5	= 63	= 49



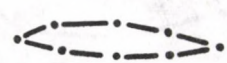
1	1-2 = 28	11-12 = 41
2	= 32	= 41
3	= 26	= 40
4	= 21	= 29
5	= 19	= 21



1	13-14 = 16	4-14 = 23
2	= 20	= 20
3	= 14	= 25
4	= 5	= 29
5	= 4	= 29

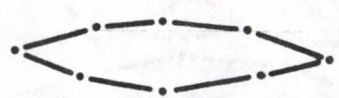


1	3-13 = 28	4-2 = 17
2	= 27	= 13
3	= 28	= 13
4	= 30	= 20
5	= 30	= 20

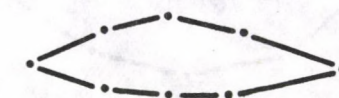


19

[av]



1	3-4 = 65	5-6 = 52
2	= 66	= 49
3	= 64	= 50
4	= 61	= 51
5	= 63	= 51



1	1-2 = 22	11-12 = 33
2	= 24	= 33
3	= 21	= 31
4	= 18	= 25
5	= 20	= 23



1	13-14 = 9	4-14 = 27
2	= 10	= 26
3	= 7	= 28
4	= 6	= 27
5	= 7	= 27



1	3-13 = 29	4-2 = 20
2	= 28	= 20
3	= 29	= 20
4	= 28	= 20
5	= 29	= 20



1 3-4 = 56
 2 = 59
 3 = 62
 4 = 62
 5 = 62

5-6 = 47
 = 46
 = 47
 = 48
 = 48

[və]

20

1 1-2 = 18
 2 = 13
 3 = 21
 4 = 23
 5 = 23

11-12 = 20
 = 20
 = 28
 = 33
 = 35

1 13-14 = 7
 2 = 4
 3 = 3
 4 = 10
 5 = 11

4-14 = 25
 = 26
 = 26
 = 26
 = 25

1 3-13 = 27
 2 = 29
 3 = 28
 4 = 26
 5 = 26

4-2 = 19
 = 19
 = 19
 = 18
 = 18

1 3-4 = 60
 2 = 61
 3 = 61
 4 = 62
 5 = 62

5-6 = 44
 = 43
 = 43
 = 42
 = 44

[v·]

21

1 1-2 = 18
 2 = 19
 3 = 18
 4 = 19
 5 = 20

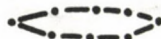
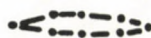
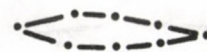
11-12 = 14
 = 16
 = 15
 = 18
 = 24

1 13-14 = 2
 2 = 4
 3 = 3
 4 = 4
 5 = 7

4-14 = 28
 = 27
 = 27
 = 27
 = 27

1 3-13 = 30
 2 = 30
 3 = 31
 4 = 31
 5 = 28

4-2 = 19
 = 19
 = 19
 = 20
 = 20



22

[ɪə]



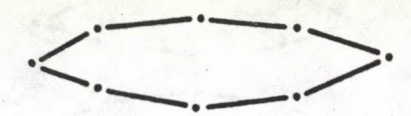
1	3-4 = 67	5-6 = 52
2	= 67	= 51
3	= 67	= 52
4	= 67	= 51
5	= 66	= 52



1	1-2 = 26	11-12 = 41
2	= 26	= 39
3	= 26	= 40
4	= 24	= 38
5	= 22	= 41



1	13-14 = 14	4-14 = 24
2	= 13	= 25
3	= 13	= 25
4	= 11	= 27
5	= 10	= 27

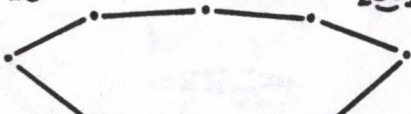


1	3-13 = 29	4-2 = 17
2	= 29	= 17
3	= 29	= 18
4	= 29	= 20
5	= 29	= 21

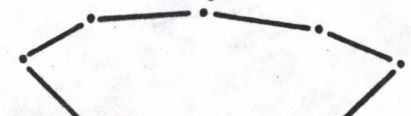


23

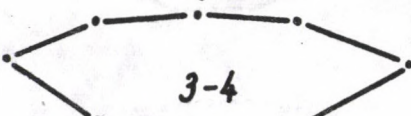
[ɛə]



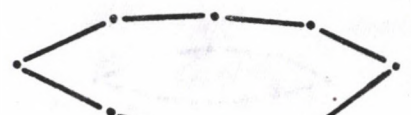
1	3-4 = 67	5-6 = 50
2	= 67	= 50
3	= 67	= 51
4	= 67	= 50
5	= 67	= 50



1	1-2 = 32	11-12 = 42
2	= 32	= 40
3	= 30	= 42
4	= 30	= 43
5	= 27	= 40



1	13-14 = 19	4-14 = 18
2	= 19	= 19
3	= 17	= 21
4	= 17	= 21
5	= 15	= 23



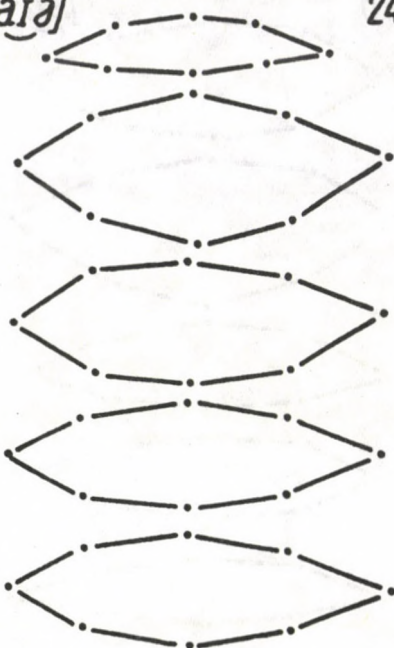
1	3-13 = 30	4-2 = 11
2	= 29	= 12
3	= 29	= 14
4	= 29	= 14
5	= 29	= 17

1 3-4 = 61
 2 = 67
 3 = 67
 4 = 67
 5 = 67

5-6 = 52
 = 49
 = 50
 = 50
 = 50

[ara]

24



1 1-2 = 16
 2 = 30
 3 = 27
 4 = 24
 5 = 24

11-12 = 30
 = 40
 = 39
 = 40
 = 40

1 13-14 = 7
 2 = 20
 3 = 16
 4 = 14
 5 = 14

4-14 = 27
 = 19
 = 22
 = 24
 = 24

1 3-13 = 27
 2 = 28
 3 = 29
 4 = 29
 5 = 29

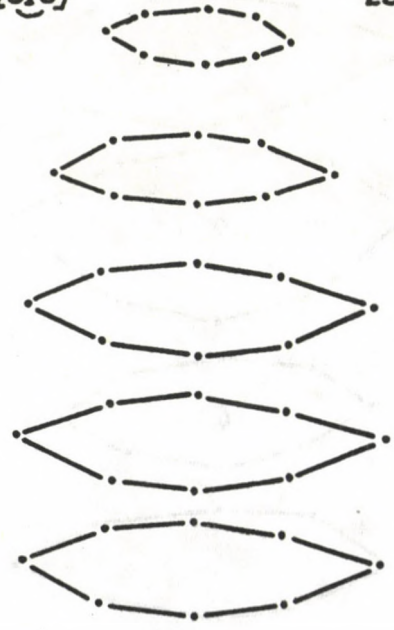
4-2 = 22
 = 13
 = 16
 = 16
 = 16

1 3-4 = 63
 2 = 67
 3 = 67
 4 = 67
 5 = 67

5-6 = 48
 = 50
 = 51
 = 51
 = 51

[ara]

25



1 1-2 = 20
 2 = 21
 3 = 24
 4 = 24
 5 = 24

11-12 = 20
 = 30
 = 36
 = 39
 = 38

1 13-14 = 7
 2 = 8
 3 = 12
 4 = 12
 5 = 12

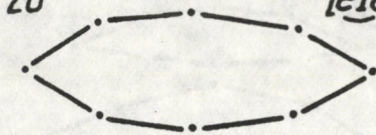
4-14 = 27
 = 28
 = 26
 = 26
 = 26

1 3-13 = 29
 2 = 30
 3 = 29
 4 = 29
 5 = 29

4-2 = 20
 = 21
 = 19
 = 19
 = 19

26

[eja]



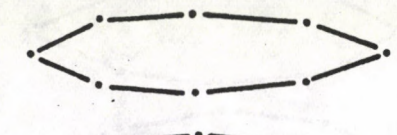
1	3-4 = 67	5-6 = 50
2	= 67	= 48
3	= 67	= 51
4	= 67	= 55
5	= 65	= 51



1	1-2 = 27	11-12 = 37
2	= 32	= 41
3	= 24	= 38
4	= 23	= 38
5	= 22	= 40



1	13-14 = 15	4-14 = 21
2	= 19	= 18
3	= 11	= 27
4	= 10	= 27
5	= 8	= 27

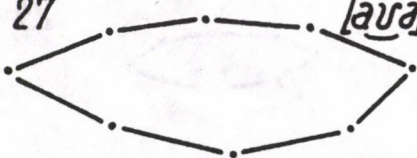


1	3-13 = 31	4-2 = 15
2	= 30	= 11
3	= 28	= 20
4	= 30	= 20
5	= 30	= 20

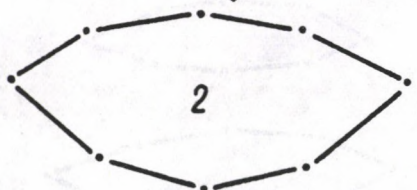


27

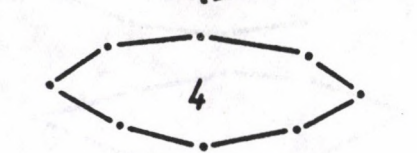
[ava]



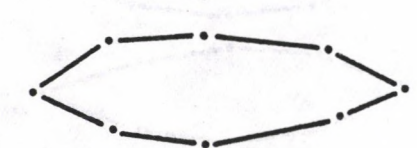
1	3-4 = 67	5-6 = 51
2	= 67	= 48
3	= 67	= 49
4	= 67	= 50
5	= 67	= 51



1	1-2 = 28	11-12 = 43
2	= 36	= 42
3	= 28	= 36
4	= 27	= 33
5	= 27	= 39



1	13-14 = 13	4-14 = 21
2	= 23	= 17
3	= 17	= 22
4	= 14	= 25
5	= 14	= 25



1	1-15 = 26	4-2 = 15
2	= 27	= 10
3	= 26	= 16
4	= 28	= 18
5	= 26	= 18

1 3-4 = 67
 2 = 67
 3 = 66
 4 = 67
 5 = 65

5-6 = 51
 = 48
 = 48
 = 50
 = 51

[jra]

28



1 1-2 = 26
 2 = 28
 3 = 20
 4 = 26
 5 = 24

11-12 = 39
 = 34
 = 23
 = 35
 = 38



1 13-14 = 14
 2 = 15
 3 = 6
 4 = 13
 5 = 11

4-14 = 25
 = 24
 = 30
 = 26
 = 27



1 3-13 = 28
 2 = 28
 3 = 30
 4 = 28
 5 = 27

4-2 = 19
 = 17
 = 22
 = 19
 = 20



1 3-4 = 58
 2 = 58
 3 = 59
 4 = 59
 5 = 64

5-6 = 50
 = 50
 = 48
 = 49
 = 51

[b]

29



1 1-2 = 14
 2 = 14
 3 = 14
 4 = 15
 5 = 21

11-12 = 27
 = 28
 = 28
 = 30
 = 32



1 13-14 = 1
 2 = 1
 3 = 1
 4 = 1
 5 = 6

4-14 = 26
 = 26
 = 27
 = 27
 = 27



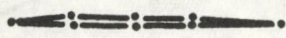
1 3-13 = 31
 2 = 31
 3 = 31
 4 = 31
 5 = 31

4-2 = 20
 = 20
 = 20
 = 26
 = 19
 = 19

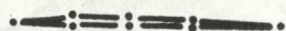


30

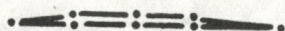
[p]



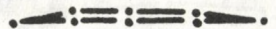
1	3-4 = 58	5-6 = 48
2	= 59	= 48
3	= 59	= 48
4	= 63	= 50
5	= 65	= 51



1	1-2 = 13	11-12 = 29
2	= 14	= 29
3	= 14	= 29
4	= 20	= 27
5	= 22	= 30



1	13-14 = 1	4-14 = 27
2	= 1	= 27
3	= 1	= 27
4	= 1	= 31
5	= 8	= 27

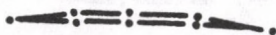


1	3-13 = 31	4-2 = 21
2	= 31	= 20
3	= 31	= 20
4	= 31	= 19
5	= 30	= 19

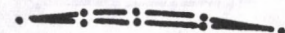


31

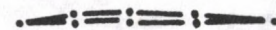
[m]



1	3-4 = 58	5-6 = 48
2	= 59	= 48
3	= 59	= 48
4	= 62	= 48
5	= 68	= 49



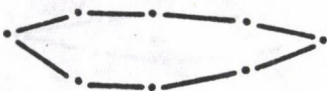
1	1-2 = 13	11-12 = 28
2	= 14	= 28
3	= 13	= 27
4	= 15	= 27
5	= 24	= 34



1	13-14 = 1	4-14 = 28
2	= 1	= 28
3	= 1	= 28
4	= 1	= 31
5	= 9	= 28



1	3-13 = 29	4-2 = 21
2	= 30	= 21
3	= 30	= 22
4	= 30	= 23
5	= 30	= 21



1 3-4 = 65
 2 = 64
 3 = 65
 4 = 66
 5 = 66

5-6 = 53
 = 53
 = 53
 = 52
 = 51

[d]

32



1 1-2 = 23
 2 = 23
 3 = 24
 4 = 25
 5 = 24

11-12 = 33
 = 32
 = 33
 = 34
 = 36



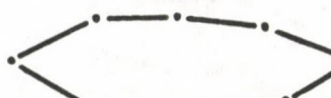
1 13-14 = 11
 2 = 11
 3 = 11
 4 = 12
 5 = 12

4-14 = 27
 = 26
 = 27
 = 27
 = 27



1 3-13 = 27
 2 = 27
 3 = 27
 4 = 27
 5 = 27

4-2 = 20
 = 19
 = 19
 = 19
 = 20



1 3-4 = 66
 2 = 62
 3 = 63
 4 = 65
 5 = 66

5-6 = 51
 = 50
 = 50
 = 49
 = 50

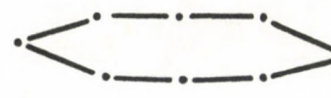
[t]

33



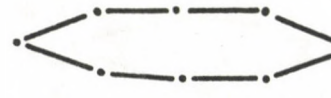
1 1-2 = 25
 2 = 22
 3 = 23
 4 = 24
 5 = 25

11-12 = 36
 = 35
 = 35
 = 35
 = 35



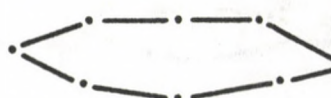
1 13-14 = 12
 2 = 8
 3 = 9
 4 = 11
 5 = 12

4-14 = 27
 = 27
 = 27
 = 27
 = 27



1 3-13 = 27
 2 = 27
 3 = 27
 4 = 27
 5 = 27

4-2 = 19
 = 18
 = 19
 = 19
 = 20



34

[n]



1	3-4 = 61	5-6 = 50
2	= 62	= 50
3	= 37	= 48
4	= 64	= 47
5	= 65	= 47



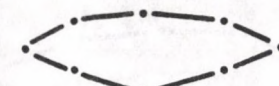
1	1-2 = 21	11-12 = 27
2	= 21	= 28
3	= 23	= 26
4	= 22	= 28
5	= 23	= 26



1	13-14 = 9	4-14 = 26
2	= 9	= 27
3	= 8	= 27
4	= 8	= 27
5	= 9	= 27



1	3-13 = 26	4-2 = 19
2	= 26	= 20
3	= 23	= 18
4	= 29	= 19
5	= 29	= 19



35

[d']



1	3-4 = 60	5-6 = 51
2	= 61	= 51
3	= 61	= 50
4	= 63	= 49
5	= 62	= 49



1	1-2 = 20	11-12 = 27
2	= 20	= 27
3	= 21	= 27
4	= 21	= 28
5	= 21	= 25



1	13-14 = 6	4-14 = 26
2	= 8	= 27
3	= 8	= 26
4	= 6	= 28
5	= 7	= 27



1	3-13 = 26	4-2 = 19
2	= 26	= 20
3	= 27	= 18
4	= 27	= 20
5	= 28	= 15



1 3-4 = 59
 2 = 60
 3 = 60
 4 = 60
 5 = 60

5-6 = 48
 = 48
 = 48
 = 48
 = 48

[t']

36



1 1-2 = 20
 2 = 20
 3 = 20
 4 = 20
 5 = 20

11-12 = 24
 = 24
 = 24
 = 24
 = 24



1 13-14 = 7
 2 = 7
 3 = 7
 4 = 7
 5 = 7

4-14 = 26
 = 26
 = 26
 = 26
 = 26



1 3-13 = 26
 2 = 27
 3 = 27
 4 = 27
 5 = 27

4-2 = 19
 = 19
 = 19
 = 19
 = 19



1 3-4 = 61
 2 = 61
 3 = 62
 4 = 62
 5 = 62

5-6 = 47
 = 47
 = 47
 = 47
 = 47

[n']

37



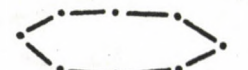
1 1-2 = 21
 2 = 22
 3 = 21
 4 = 22
 5 = 22

11-12 = 23
 = 23
 = 24
 = 22
 = 22



1 13-14 = 7
 2 = 8
 3 = 8
 4 = 8
 5 = 7

4-14 = 27
 = 26
 = 27
 = 27
 = 27



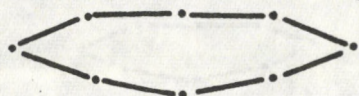
1 3-13 = 27
 2 = 27
 3 = 27
 4 = 27
 5 = 28

4-2 = 19
 = 18
 = 19
 = 19
 = 19



38

[g]



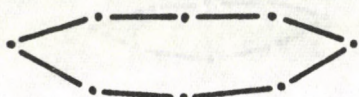
1	3-4 = 63	5-6 = 51
2	= 64	= 50
3	= 63	= 51
4	= 65	= 51
5	= 65	= 51



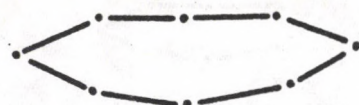
1	1-2 = 24	11-12 = 36
2	= 23	= 36
3	= 23	= 36
4	= 24	= 36
5	= 25	= 36



1	13-14 = 10	4-14 = 26
2	= 10	= 27
3	= 11	= 26
4	= 10	= 27
5	= 11	= 26



1	3-13 = 27	4-2 = 18
2	= 27	= 19
3	= 26	= 19
4	= 28	= 19
5	= 28	= 18



39

[k]



1	3-4 = 65	5-6 = 50
2	= 66	= 50
3	= 66	= 50
4	= 66	= 50
5	= 66	= 50



1	1-2 = 24	11-12 = 36
2	= 25	= 36
3	= 25	= 36
4	= 25	= 36
5	= 25	= 36



1	13-14 = 12	4-14 = 26
2	= 12	= 27
3	= 12	= 27
4	= 12	= 27
5	= 12	= 27



1	3-13 = 27	4-2 = 19
2	= 27	= 19
3	= 27	= 19
4	= 27	= 19
5	= 27	= 19



1	3-4	= 67
2		= 67
3		= 67
4		= 67
5		= 67

5-6	= 51
	= 51
	= 51
	= 51
	= 51

[d]

40



1	1-2	= 27
2		= 27
3		= 27
4		= 28
5		= 29

11-12	= 38
	= 38
	= 38
	= 38
	= 38



1	13-14	= 13
2		= 13
3		= 14
4		= 14
5		= 16

4-14	= 26
	= 26
	= 25
	= 25
	= 23



1	3-13	= 28
2		= 28
3		= 28
4		= 28
5		= 28

4-2	= 18
	= 18
	= 18
	= 17
	= 16



1	3-4	= 62
2		= 60
3		= 60
4		= 61
5		= 65

5-6	= 45
	= 46
	= 45
	= 46
	= 45

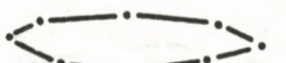
[r]

41



1	1-2	= 18
2		= 17
3		= 18
4		= 18
5		= 23

11-12	= 28
	= 26
	= 28
	= 28
	= 28



1	13-14	= 6
2		= 7
3		= 7
4		= 7
5		= 13

4-14	= 27
	= 25
	= 26
	= 27
	= 28



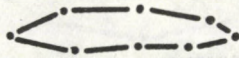
1	3-13	= 27
2		= 27
3		= 27
4		= 27
5		= 27

4-2	= 21
	= 20
	= 20
	= 21
	= 20

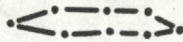


42

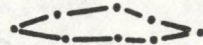
[w]



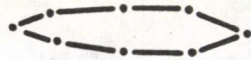
1	3-4 = 60	5-6 = 42
2	= 61	= 41
3	= 61	= 43
4	= 64	= 42
5	= 67	= 44



1	1-2 = 15	11-12 = 24
2	= 15	= 18
3	= 16	= 20
4	= 20	= 25
5	= 23	= 27



1	13-14 = 5	4-14 = 25
2	= 3	= 27
3	= 4	= 27
4	= 6	= 28
5	= 12	= 26

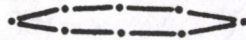


1	3-13 = 30	4-2 = 20
2	= 31	= 21
3	= 30	= 21
4	= 30	= 20
5	= 29	= 20

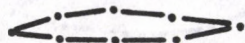


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[v]



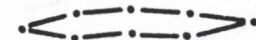
1	3-4 = 56	5-6 = 50
2	= 56	= 50
3	= 56	= 50
4	= 56	= 50
5	= 62	= 50



1	1-2 = 13	11-12 = 25
2	= 13	= 24
3	= 13	= 25
4	= 13	= 25
5	= 17	= 28



1	13-14 = 3	4-14 = 25
2	= 4	= 25
3	= 3	= 25
4	= 4	= 25
5	= 5	= 29



1	3-13 = 28	4-2 = 19
2	= 27	= 19
3	= 28	= 19
4	= 27	= 19
5	= 28	= 22

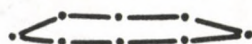


1	3-4	= 58
2		= 58
3		= 58
4		= 58
5		= 58

5-6	= 48
	= 46
	= 48
	= 48
	= 48

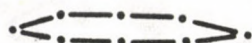
[f]

44



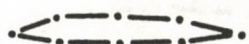
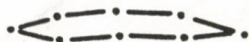
1	1-2	= 15
2		= 15
3		= 15
4		= 14
5		= 15

11-12	= 25
	= 25
	= 25
	= 25
	= 25



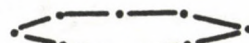
1	13-14	= 3
2		= 3
3		= 3
4		= 3
5		= 5

4-14	= 27
	= 27
	= 27
	= 27
	= 25



1	3-13	= 28
2		= 28
3		= 28
4		= 28
5		= 28

4-2	= 20
	= 20
	= 20
	= 21
	= 20



1	3-4	= 61
2		= 58
3		= 58
4		= 58
5		= 58

5-6	= 50
	= 50
	= 50
	= 49
	= 49

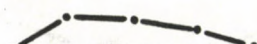
[m]

45



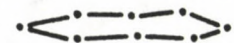
1	1-2	= 20
2		= 17
3		= 17
4		= 16
5		= 17

11-12	= 36
	= 26
	= 23
	= 22
	= 22



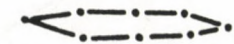
1	13-14	= 8
2		= 5
3		= 4
4		= 3
5		= 3

4-14	= 26
	= 27
	= 27
	= 28
	= 28



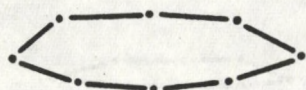
1	3-13	= 27
2		= 27
3		= 27
4		= 27
5		= 28

4-2	= 19
	= 20
	= 19
	= 20
	= 20

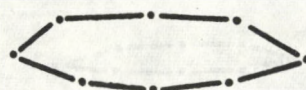


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[3]



1	3-4 = 62	5-6 = 47
2	= 62	= 47
3	= 62	= 47
4	= 62	= 47
5	= 62	= 47



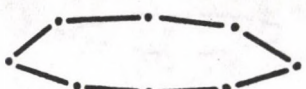
1	1-2 = 21	11-12 = 31
2	= 21	= 31
3	= 21	= 31
4	= 21	= 31
5	= 21	= 31



1	13-14 = 10	4-14 = 26
2	= 10	= 26
3	= 10	= 26
4	= 10	= 26
5	= 10	= 26



1	3-13 = 26	4-2 = 19
2	= 26	= 19
3	= 26	= 19
4	= 26	= 19
5	= 26	= 19

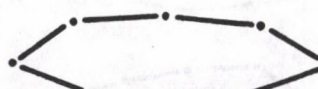


47

[8]



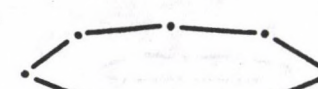
1	3-4 = 64	5-6 = 49
2	= 64	= 49
3	= 64	= 49
4	= 64	= 49
5	= 64	= 49



1	1-2 = 23	11-12 = 33
2	= 23	= 33
3	= 23	= 33
4	= 23	= 33
5	= 23	= 33



1	13-14 = 11	4-14 = 26
2	= 11	= 26
3	= 11	= 26
4	= 11	= 26
5	= 11	= 26



1	3-13 = 27	4-2 = 19
2	= 27	= 19
3	= 27	= 19
4	= 27	= 19
5	= 27	= 19



1 3-4 = 59
 2 = 59
 3 = 59
 4 = 59
 5 = 59

5-6 = 48
 = 48
 = 48
 = 48
 = 48

[z]

48



1 1-2 = 19
 2 = 19
 3 = 19
 4 = 19
 5 = 19

11-12 = 26
 = 26
 = 26
 = 24
 = 23



1 13-14 = 7
 2 = 7
 3 = 7
 4 = 7
 5 = 7

4-14 = 26
 = 26
 = 26
 = 26
 = 26



1 3-13 = 26
 2 = 26
 3 = 26
 4 = 26
 5 = 26

4-2 = 19
 = 19
 = 19
 = 19
 = 19

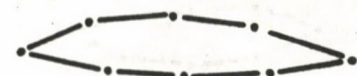


1 3-4 = 61
 2 = 61
 3 = 61
 4 = 61
 5 = 64

5-6 = 49
 = 49
 = 49
 = 49
 = 50

[s]

49



1 1-2 = 22
 2 = 22
 3 = 22
 4 = 23
 5 = 24

11-12 = 35
 = 35
 = 35
 = 35
 = 36



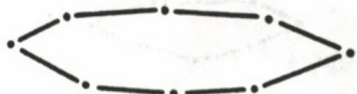
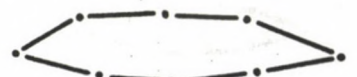
1 13-14 = 8
 2 = 8
 3 = 8
 4 = 9
 5 = 11

4-14 = 26
 = 26
 = 26
 = 26
 = 26



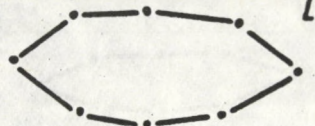
1 3-13 = 27
 2 = 27
 3 = 27
 4 = 26
 5 = 27

4-2 = 18
 = 18
 = 18
 = 18
 = 19



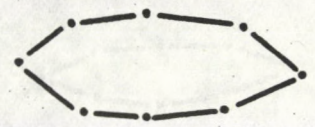
50

[3]



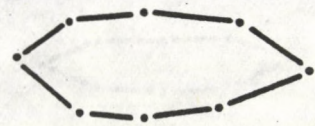
$$\begin{array}{l} 1 \quad 3-4 = 62 \\ 2 \quad \quad = 62 \\ 3 \quad \quad = 62 \\ 4 \quad \quad = 62 \\ 5 \quad \quad = 62 \end{array}$$

$$\begin{array}{l} 5-6 = 49 \\ \quad = 49 \\ \quad = 49 \\ \quad = 49 \\ \quad = 49 \end{array}$$



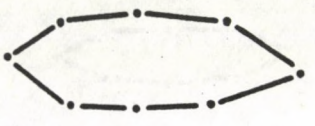
$$\begin{array}{l} 1 \quad 1-2 = 25 \\ 2 \quad \quad = 23 \\ 3 \quad \quad = 24 \\ 4 \quad \quad = 24 \\ 5 \quad \quad = 24 \end{array}$$

$$\begin{array}{l} 11-12 = 30 \\ \quad = 30 \\ \quad = 31 \\ \quad = 31 \\ \quad = 30 \end{array}$$



$$\begin{array}{l} 1 \quad 13-14 = 14 \\ 2 \quad \quad = 13 \\ 3 \quad \quad = 13 \\ 4 \quad \quad = 13 \\ 5 \quad \quad = 12 \end{array}$$

$$\begin{array}{l} 4-14 = 23 \\ \quad = 24 \\ \quad = 24 \\ \quad = 24 \\ \quad = 25 \end{array}$$



$$\begin{array}{l} 1 \quad 3-13 = 25 \\ 2 \quad \quad = 25 \\ 3 \quad \quad = 25 \\ 4 \quad \quad = 25 \\ 5 \quad \quad = 25 \end{array}$$

$$\begin{array}{l} 4-2 = 16 \\ \quad = 18 \\ \quad = 17 \\ \quad = 17 \\ \quad = 18 \end{array}$$



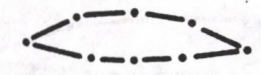
51

[5]



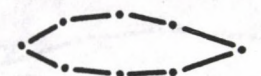
$$\begin{array}{l} 1 \quad 3-4 = 60 \\ 2 \quad \quad = 60 \\ 3 \quad \quad = 59 \\ 4 \quad \quad = 60 \\ 5 \quad \quad = 60 \end{array}$$

$$\begin{array}{l} 5-6 = 49 \\ \quad = 48 \\ \quad = 47 \\ \quad = 47 \\ \quad = 47 \end{array}$$



$$\begin{array}{l} 1 \quad 1-2 = 20 \\ 2 \quad \quad = 21 \\ 3 \quad \quad = 20 \\ 4 \quad \quad = 19 \\ 5 \quad \quad = 21 \end{array}$$

$$\begin{array}{l} 11-12 = 26 \\ \quad = 24 \\ \quad = 24 \\ \quad = 22 \\ \quad = 22 \end{array}$$



$$\begin{array}{l} 1 \quad 13-14 = 7 \\ 2 \quad \quad = 6 \\ 3 \quad \quad = 8 \\ 4 \quad \quad = 7 \\ 5 \quad \quad = 7 \end{array}$$

$$\begin{array}{l} 4-14 = 26 \\ \quad = 27 \\ \quad = 25 \\ \quad = 27 \\ \quad = 26 \end{array}$$



$$\begin{array}{l} 1 \quad 3-13 = 27 \\ 2 \quad \quad = 27 \\ 3 \quad \quad = 26 \\ 4 \quad \quad = 26 \\ 5 \quad \quad = 27 \end{array}$$

$$\begin{array}{l} 4-2 = 19 \\ \quad = 18 \\ \quad = 18 \\ \quad = 20 \\ \quad = 18 \end{array}$$



1 3-4 = 60
 2 = 59
 3 = 59
 4 = 59
 5 = 60

5-6 = 50
 = 49
 = 50
 = 49
 = 48

[j]

52



1 1-2 = 20
 2 = 21
 3 = 20
 4 = 21
 5 = 20

11-12 = 26
 = 26
 = 26
 = 24
 = 21



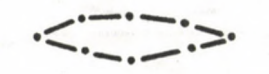
1 13-14 = 7
 2 = 8
 3 = 8
 4 = 7
 5 = 6

4-14 = 27
 = 26
 = 26
 = 27
 = 27



1 3-13 = 26
 2 = 25
 3 = 25
 4 = 25
 5 = 27

4-2 = 19
 = 18
 = 18
 = 18
 = 19



1 3-4 = 60
 2 = 61
 3 = 61
 4 = 61
 5 = 61

5-6 = 49
 = 49
 = 49
 = 49
 = 49

[ç]

53



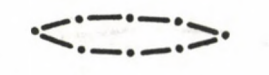
1 1-2 = 19
 2 = 20
 3 = 19
 4 = 19
 5 = 20

11-12 = 18
 = 18
 = 18
 = 20
 = 20



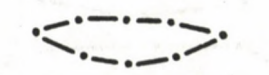
1 13-14 = 3
 2 = 5
 3 = 5
 4 = 5
 5 = 6

4-14 = 28
 = 27
 = 27
 = 28
 = 27



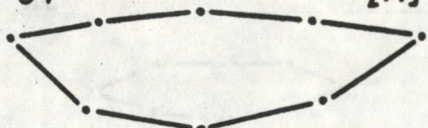
1 3-13 = 29
 2 = 29
 3 = 29
 4 = 28
 5 = 28

4-2 = 19
 = 19
 = 20
 = 20
 = 19

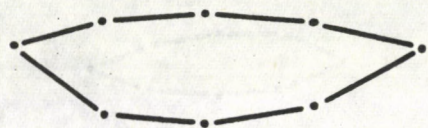


54

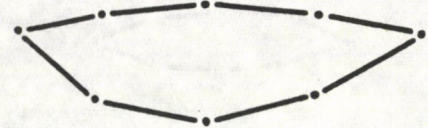
[h]



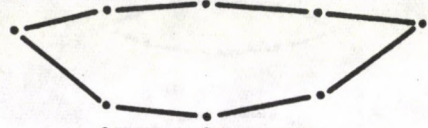
1	3-4 = 67	5-6 = 52
2	= 67	= 52
3	= 67	= 52
4	= 67	= 52
5	= 66	= 52



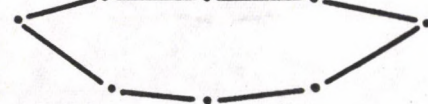
1	1-2 = 27	11-12 = 43
2	= 27	= 43
3	= 28	= 43
4	= 28	= 44
5	= 27	= 44



1	13-14 = 15	4-14 = 26
2	= 14	= 27
3	= 15	= 26
4	= 15	= 26
5	= 14	= 26

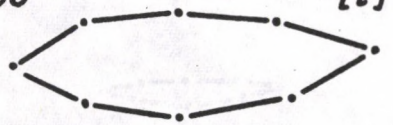


1	3-13 = 26	4-2 = 19
2	= 26	= 19
3	= 26	= 18
4	= 26	= 18
5	= 26	= 13

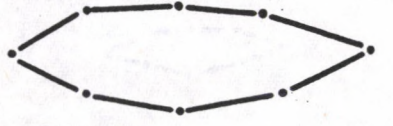


55

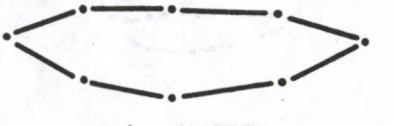
[t]



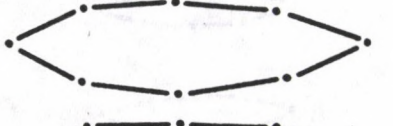
1	3-4 = 65	5-6 = 50
2	= 65	= 50
3	= 65	= 50
4	= 65	= 50
5	= 65	= 49



1	1-2 = 25	11-12 = 38
2	= 25	= 38
3	= 26	= 38
4	= 26	= 38
5	= 25	= 38



1	13-14 = 13	4-14 = 26
2	= 13	= 25
3	= 12	= 26
4	= 12	= 26
5	= 11	= 27



1	3-13 = 26	4-2 = 19
2	= 27	= 18
3	= 27	= 18
4	= 27	= 18
5	= 27	= 19



1 3-4 = 67
 2 = 67
 3 = 67
 4 = 67
 5 = 67

5-6 = 48
 = 48
 = 48
 = 49
 = 50

[l]

56



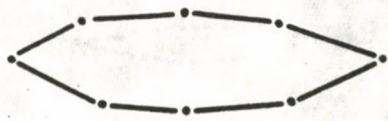
1 1-2 = 27
 2 = 27
 3 = 27
 4 = 27
 5 = 27

11-12 = 39
 = 39
 = 39
 = 39
 = 39



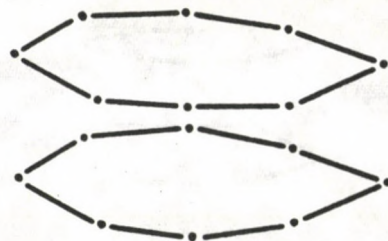
1 13-14 = 14
 2 = 14
 3 = 13
 4 = 13
 5 = 14

4-14 = 26
 = 26
 = 27
 = 27
 = 26



1 3-13 = 27
 2 = 27
 3 = 27
 4 = 27
 5 = 27

4-2 = 19
 = 19
 = 19
 = 19
 = 19



1 3-4 = 57
 2 = 57
 3 = 57
 4 = 59
 5 = 64

5-6 = 50
 = 50
 = 49
 = 50
 = 49

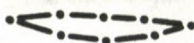
[dr]

57



1 1-2 = 16
 2 = 16
 3 = 16
 4 = 18
 5 = 23

11-12 = 20
 = 19
 = 17
 = 25
 = 28



1 13-14 = 3
 2 = 3
 3 = 3
 4 = 4
 5 = 10

4-14 = 27
 = 27
 = 27
 = 28
 = 27



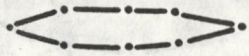
1 3-13 = 27
 2 = 27
 3 = 27
 4 = 27
 5 = 27

4-2 = 19
 = 19
 = 20
 = 20
 = 20



58

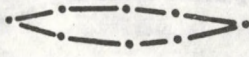
[tr]



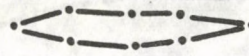
1	3-4 = 58	5-6 = 51
2	= 58	= 51
3	= 58	= 50
4	= 58	= 50
5	= 61	= 51



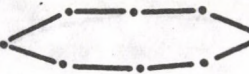
1	1-2 = 18	11-12 = 25
2	= 18	= 24
3	= 18	= 25
4	= 18	= 25
5	= 20	= 28



1	13-14 = 5	4-14 = 27
2	= 5	= 27
3	= 5	= 27
4	= 5	= 27
5	= 8	= 27

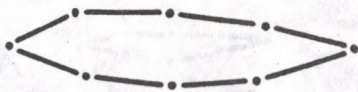


1	3-13 = 26	4-2 = 20
2	= 26	= 20
3	= 26	= 20
4	= 26	= 20
5	= 26	= 20

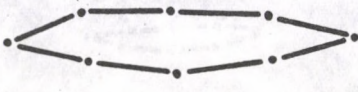


59

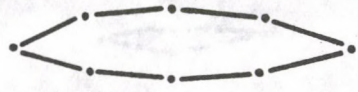
[dz]



1	3-4 = 62	5-6 = 50
2	= 61	= 49
3	= 61	= 49
4	= 61	= 50
5	= 60	= 50



1	1-2 = 22	11-12 = 36
2	= 22	= 37
3	= 21	= 36
4	= 21	= 36
5	= 21	= 36



1	13-14 = 9	4-14 = 26
2	= 9	= 26
3	= 9	= 26
4	= 9	= 26
5	= 9	= 25



1	3-13 = 27	4-2 = 19
2	= 27	= 18
3	= 26	= 19
4	= 26	= 19
5	= 26	= 19



1 3-4 = 60
 2 = 61
 3 = 62
 4 = 62
 5 = 64

5-6 = 49
 = 51
 = 49
 = 49
 = 49

[ts]

60



1 1-2 = 19
 2 = 20
 3 = 19
 4 = 20
 5 = 22

11-12 = 31
 = 31
 = 33
 = 33
 = 35



1 13-14 = 8
 2 = 8
 3 = 9
 4 = 9
 5 = 11

4-14 = 26
 = 27
 = 27
 = 27
 = 27



1 3-13 = 26
 2 = 26
 3 = 26
 4 = 26
 5 = 26

4-2 = 20
 = 20
 = 21
 = 20
 = 20



1 3-4 = 60
 2 = 60
 3 = 60
 4 = 60
 5 = 60

5-6 = 47
 = 47
 = 47
 = 47
 = 47

[dʒ]

61



1 1-2 = 20
 2 = 20
 3 = 20
 4 = 20
 5 = 20

11-12 = 24
 = 24
 = 24
 = 24
 = 24



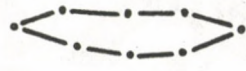
1 13-14 = 6
 2 = 6
 3 = 6
 4 = 6
 5 = 6

4-14 = 27
 = 27
 = 27
 = 27
 = 27



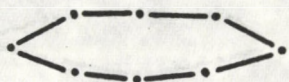
1 3-13 = 27
 2 = 27
 3 = 27
 4 = 27
 5 = 27

4-2 = 19
 = 19
 = 19
 = 19
 = 19

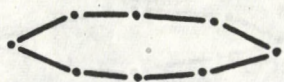


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[tj]



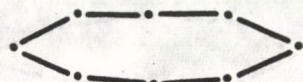
1	3-4 = 60	5-6 = 50
2	= 61	= 50
3	= 61	= 49
4	= 62	= 50
5	= 64	= 48



1	1-2 = 20	11-12 = 29
2	= 21	= 28
3	= 22	= 28
4	= 23	= 30
5	= 24	= 30



1	13-14 = 8	4-14 = 27
2	= 8	= 27
3	= 8	= 27
4	= 9	= 27
5	= 12	= 27



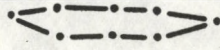
1	3-13 = 25	4-2 = 20
2	= 26	= 19
3	= 26	= 19
4	= 26	= 19
5	= 25	= 19



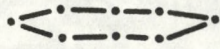
**VARIATIONS OF CONSONANTS CONDITIONED BY THE
DIFFERENCE OF THE PHONETIC POSITION**

63

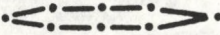
[b]



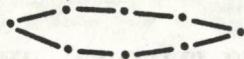
1	3-4 = 58	5-6 = 47
2	= 58	= 47
3	= 61	= 48
4	= 62	= 48
5	= 63	= 48



1	1-2 = 17	11-12 = 21
2	= 17	= 21
3	= 18	= 22
4	= 21	= 24
5	= 21	= 27



1	13-14 = 3	4-14 = 26
2	= 3	= 26
3	= 2	= 26
4	= 6	= 27
5	= 7	= 27

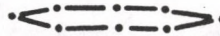


1	3-13 = 28	4-2 = 19
2	= 29	= 19
3	= 31	= 19
4	= 29	= 19
5	= 28	= 19

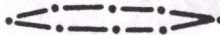


64

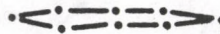
[p]



1	3-4 = 57	5-6 = 46
2	= 57	= 46
3	= 57	= 46
4	= 57	= 46
5	= 62	= 47



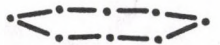
1	1-2 = 15	11-12 = 22
2	= 15	= 22
3	= 16	= 22
4	= 17	= 22
5	= 17	= 20



1	13-14 = 2	4-14 = 25
2	= 2	= 25
3	= 2	= 25
4	= 3	= 25
5	= 3	= 26



1	3-13 = 30	4-2 = 19
2	= 30	= 19
3	= 30	= 19
4	= 29	= 17
5	= 28	= 20

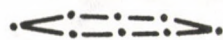


1 3-4 = 56
 2 = 57
 3 = 57
 4 = 57
 5 = 57

5-6 = 46
 = 48
 = 48
 = 48
 = 48

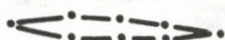
[m]

65



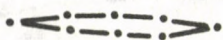
1 1-2 = 14
 2 = 15
 3 = 15
 4 = 15
 5 = 15

11-12 = 22
 = 22
 = 22
 = 22
 = 22



1 13-14 = 2
 2 = 2
 3 = 2
 4 = 2
 5 = 2

4-14 = 26
 = 27
 = 27
 = 27
 = 27



1 3-13 = 26
 2 = 26
 3 = 26
 4 = 26
 5 = 26

4-2 = 20
 = 20
 = 20
 = 20
 = 20

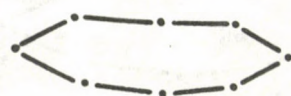


1 3-4 = 60
 2 = 60
 3 = 60
 4 = 60
 5 = 60

5-6 = 50
 = 50
 = 50
 = 50
 = 50

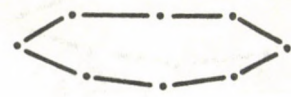
[d]

66



1 1-2 = 21
 2 = 21
 3 = 21
 4 = 21
 5 = 21

11-12 = 29
 = 29
 = 29
 = 29
 = 29



1 13-14 = 9
 2 = 9
 3 = 9
 4 = 9
 5 = 9

4-14 = 26
 = 26
 = 26
 = 26
 = 26



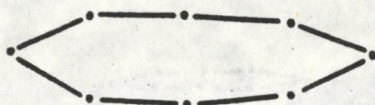
1 3-13 = 25
 2 = 25
 3 = 25
 4 = 25
 5 = 25

4-2 = 19
 = 19
 = 19
 = 19
 = 19

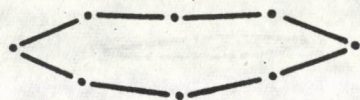


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[t]



1	3-4 = 63	5-6 = 51
2	= 62	= 50
3	= 62	= 50
4	= 62	= 50
5	= 62	= 50



1	1-2 = 24	11-12 = 38
2	= 22	= 36
3	= 22	= 36
4	= 22	= 36
5	= 22	= 36



1	13-14 = 11	4-14 = 26
2	= 19	= 25
3	= 10	= 25
4	= 10	= 25
5	= 10	= 25



1	3-13 = 26	4-2 = 18
2	= 27	= 19
3	= 27	= 19
4	= 27	= 19
5	= 27	= 19

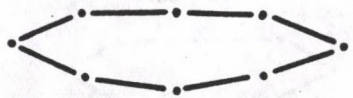


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[n]



1	3-4 = 63	5-6 = 51
2	= 62	= 49
3	= 61	= 50
4	= 61	= 50
5	= 61	= 50



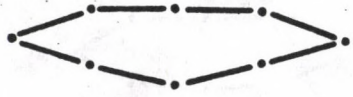
1	1-2 = 24	11-12 = 37
2	= 22	= 36
3	= 26	= 35
4	= 29	= 35
5	= 26	= 35



1	13-14 = 12	4-14 = 25
2	= 18	= 25
3	= 9	= 25
4	= 9	= 25
5	= 9	= 25



1	3-13 = 26	4-2 = 18
2	= 27	= 18
3	= 27	= 18
4	= 27	= 18
5	= 27	= 18



1 3-4 = 65
 2 = 65
 3 = 65
 4 = 65
 5 = 65

5-6 = 49
 = 49
 = 49
 = 49
 = 49

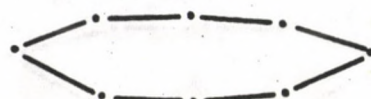
[g]

69



1 1-2 = 25
 2 = 25
 3 = 25
 4 = 25
 5 = 25

11-12 = 38
 = 38
 = 38
 = 38
 = 38



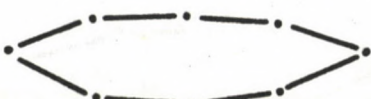
1 13-14 = 11
 2 = 11
 3 = 11
 4 = 11
 5 = 11

4-14 = 27
 = 27
 = 27
 = 27
 = 27



1 3-13 = 27
 2 = 27
 3 = 27
 4 = 27
 5 = 27

4-2 = 19
 = 19
 = 19
 = 19
 = 19

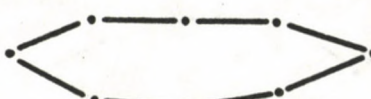


1 3-4 = 64
 2 = 64
 3 = 64
 4 = 64
 5 = 64

5-6 = 50
 = 50
 = 50
 = 50
 = 50

[k]

70



1 1-2 = 25
 2 = 25
 3 = 25
 4 = 25
 5 = 25

11-12 = 39
 = 39
 = 39
 = 39
 = 39



1 13-14 = 11
 2 = 11
 3 = 11
 4 = 11
 5 = 11

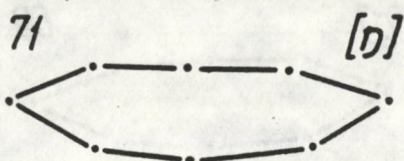
4-14 = 25
 = 25
 = 25
 = 25
 = 25



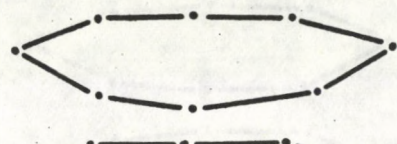
1 3-13 = 28
 2 = 28
 3 = 28
 4 = 28
 5 = 28

4-2 = 17
 = 17
 = 17
 = 17
 = 17

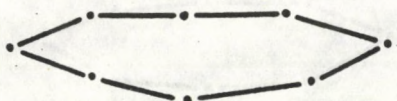




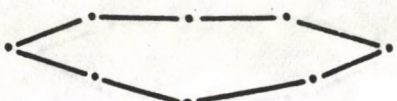
1	3-4 = 67	5-6 = 50
2	= 67	= 50
3	= 67	= 50
4	= 67	= 50
5	= 67	= 50



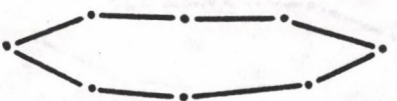
1	1-2 = 26	11-12 = 40
2	= 25	= 40
3	= 24	= 40
4	= 24	= 40
5	= 24	= 40



1	13-14 = 12	4-14 = 27
2	= 12	= 27
3	= 11	= 28
4	= 11	= 28
5	= 10	= 29



1	3-13 = 28	4-2 = 13
2	= 28	= 20
3	= 28	= 21
4	= 23	= 21
5	= 26	= 21



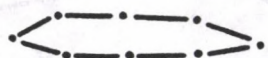
1	3-4 = 66	5-6 = 48
2	= 64	= 46
3	= 63	= 47
4	= 63	= 47
5	= 63	= 47



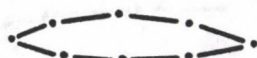
1	1-2 = 26	11-12 = 33
2	= 21	= 31
3	= 26	= 30
4	= 19	= 26
5	= 19	= 26



1	13-14 = 15	4-14 = 25
2	= 10	= 27
3	= 9	= 27
4	= 7	= 29
5	= 6	= 29



1	3-13 = 26	4-2 = 13
2	= 27	= 21
3	= 28	= 20
4	= 29	= 21
5	= 26	= 21



1	3-4	= 50
2		= 58
3		= 58
4		= 59
5		= 59

3-6	= 47
	= 47
	= 47
	= 47
	= 47

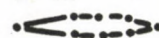
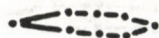
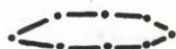
[w]

73



1	1-2	= 19
2		= 16
3		= 17
4		= 17
5		= 17

11-12	= 22
	= 17
	= 15
	= 15
	= 15



1	13-14	= 4
2		= 4
3		= 2
4		= 2
5		= 2

4-14	= 26
	= 27
	= 26
	= 27
	= 27

1	3-13	= 23
2		= 28
3		= 29
4		= 30
5		= 30

4-2	= 19
	= 20
	= 19
	= 19
	= 19

[v]

74

1	3-4	= 53
2		= 59
3		= 58
4		= 57
5		= 57

5-6	= 51
	= 51
	= 50
	= 49
	= 49



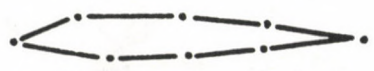
1	1-2	= 22
2		= 19
3		= 17
4		= 16
5		= 16

11-12	= 41
	= 41
	= 37
	= 37
	= 37



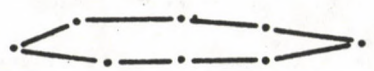
1	13-14	= 11
2		= 9
3		= 6
4		= 5
5		= 5

4-14	= 25
	= 23
	= 25
	= 25
	= 25



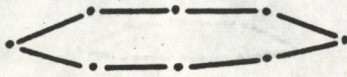
1	3-13	= 27
2		= 27
3		= 27
4		= 27
5		= 27

4-2	= 19
	= 18
	= 19
	= 19
	= 19

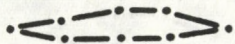


75

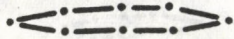
[f]



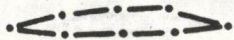
1	3-4 = 60	5-6 = 49
2	= 57	= 50
3	= 57	= 50
4	= 57	= 50
5	= 60	= 49



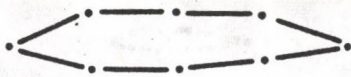
1	1-2 = 18	11-12 = 36
2	= 13	= 23
3	= 13	= 23
4	= 13	= 23
5	= 18	= 36



1	13-14 = 7	4-14 = 26
2	= 3	= 26
3	= 3	= 26
4	= 3	= 26
5	= 7	= 26



1	3-13 = 27	4-2 = 20
2	= 28	= 20
3	= 28	= 20
4	= 28	= 20
5	= 27	= 20



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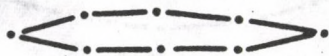
[m]



1	3-4 = 64	5-6 = 50
2	= 60	= 50
3	= 60	= 49
4	= 59	= 50
5	= 59	= 50



1	1-2 = 22	11-12 = 40
2	= 19	= 35
3	= 17	= 33
4	= 15	= 28
5	= 15	= 28



1	13-14 = 11	4-14 = 26
2	= 8	= 25
3	= 5	= 27
4	= 5	= 27
5	= 5	= 27



1	3-13 = 27	4-2 = 20
2	= 27	= 19
3	= 28	= 20
4	= 27	= 21
5	= 27	= 21

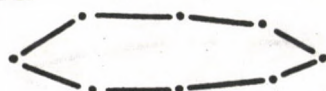


1 3-4 = 62
 2 = 62
 3 = 62
 4 = 62
 5 = 62

5-6 = 48
 = 48
 = 48
 = 48
 = 48

[8]

77



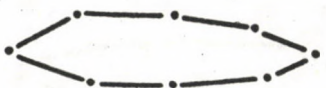
1 1-2 = 22
 2 = 22
 3 = 22
 4 = 22
 5 = 22

11-12 = 32
 = 32
 = 32
 = 32
 = 32



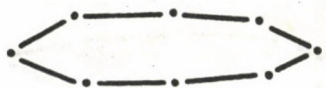
1 13-14 = 9
 2 = 9
 3 = 9
 4 = 9
 5 = 9

4-14 = 26
 = 26
 = 26
 = 26
 = 26



1 3-13 = 27
 2 = 27
 3 = 27
 4 = 27
 5 = 27

4-2 = 19
 = 19
 = 19
 = 19
 = 19



1 3-4 = 62
 2 = 62
 3 = 62
 4 = 62
 5 = 62

5-6 = 49
 = 49
 = 49
 = 49
 = 49

[9]

78



1 1-2 = 21
 2 = 21
 3 = 21
 4 = 21
 5 = 21

11-12 = 35
 = 35
 = 35
 = 35
 = 35



1 13-14 = 9
 2 = 9
 3 = 9
 4 = 9
 5 = 9

4-14 = 26
 = 26
 = 26
 = 26
 = 26



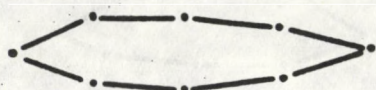
1 3-13 = 27
 2 = 27
 3 = 27
 4 = 27
 5 = 27

4-2 = 19
 = 19
 = 19
 = 19
 = 19

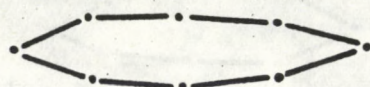


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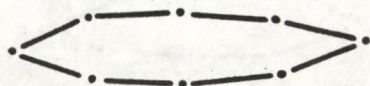
[z]



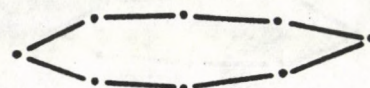
1	3-4 = 64	5-6 = 50
2	= 64	= 50
3	= 64	= 50
4	= 64	= 50
5	= 64	= 50



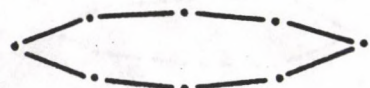
1	1-2 = 23	11-12 = 37
2	= 23	= 37
3	= 23	= 37
4	= 23	= 37
5	= 23	= 37



1	13-14 = 9	4-14 = 27
2	= 9	= 27
3	= 9	= 27
4	= 9	= 27
5	= 9	= 27



1	3-13 = 28	4-2 = 19
2	= 28	= 19
3	= 28	= 19
4	= 28	= 19
5	= 28	= 19



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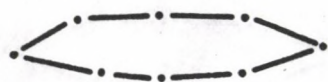
[s]



1	3-4 = 62	5-6 = 50
2	= 62	= 50
3	= 62	= 50
4	= 62	= 50
5	= 62	= 50



1	1-2 = 21	11-12 = 33
2	= 21	= 33
3	= 21	= 33
4	= 21	= 33
5	= 21	= 33



1	13-14 = 8	4-14 = 27
2	= 8	= 27
3	= 8	= 27
4	= 8	= 27
5	= 8	= 27



1	3-13 = 27	4-2 = 19
2	= 27	= 19
3	= 27	= 19
4	= 27	= 19
5	= 27	= 19



1	3-4	= 62	5-6	= 48
2		= 62		= 49
3		= 62		= 49
4		= 62		= 49
5		= 62		= 49

[3]

81



1	1-2	= 22	11-12	= 29
2		= 22		= 29
3		= 22		= 29
4		= 24		= 30
5		= 24		= 30



1	13-14	= 10	4-14	= 26
2		= 10		= 26
3		= 10		= 26
4		= 11		= 26
5		= 11		= 26



1	3-13	= 26	4-2	= 18
2		= 26		= 19
3		= 26		= 19
4		= 25		= 18
5		= 25		= 16



1	3-4	= 63	5-6	= 48
2		= 63		= 48
3		= 62		= 49
4		= 62		= 49
5		= 62		= 49

[5]

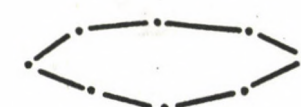
82



1	1-2	= 23	11-12	= 30
2		= 23		= 30
3		= 23		= 30
4		= 23		= 30
5		= 23		= 30



1	13-14	= 10	4-14	= 26
2		= 10		= 26
3		= 11		= 25
4		= 11		= 25
5		= 11		= 25

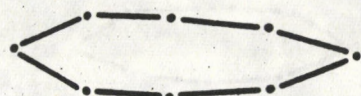


1	3-13	= 27	4-2	= 16
2		= 27		= 16
3		= 26		= 16
4		= 26		= 18
5		= 26		= 18

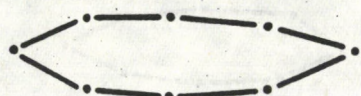


83

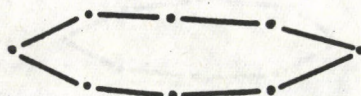
[j]



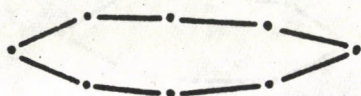
1	3-4 = 63	5-6 = 50
2	= 63	= 50
3	= 63	= 50
4	= 63	= 50
5	= 65	= 49



1	1-2 = 24	11-12 = 36
2	= 24	= 36
3	= 24	= 36
4	= 24	= 36
5	= 25	= 36



1	13-14 = 10	4-14 = 26
2	= 10	= 26
3	= 10	= 26
4	= 10	= 26
5	= 12	= 26



1	3-13 = 27	4-2 = 18
2	= 27	= 18
3	= 27	= 18
4	= 27	= 18
5	= 27	= 18

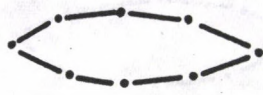


84

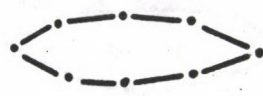
[ç]



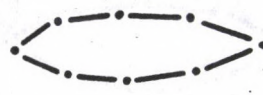
1	3-4 = 62	5-6 = 47
2	= 62	= 47
3	= 62	= 47
4	= 62	= 47
5	= 62	= 47



1	1-2 = 21	11-12 = 26
2	= 21	= 26
3	= 21	= 26
4	= 21	= 26
5	= 20	= 24



1	13-14 = 9	4-14 = 26
2	= 9	= 26
3	= 9	= 26
4	= 9	= 26
5	= 7	= 26



1	3-13 = 27	4-2 = 19
2	= 27	= 19
3	= 27	= 19
4	= 27	= 19
5	= 29	= 19



1 3-4 = 66
 2 = 66
 3 = 68
 4 = 68
 5 = 68

5-6 = 49
 = 49
 = 50
 = 50
 = 30

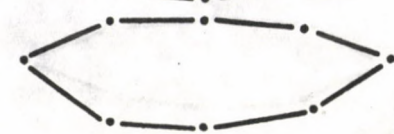
[h]

85



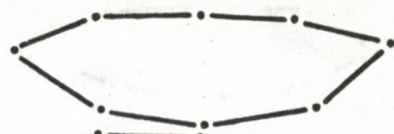
1 1-2 = 26
 2 = 27
 3 = 29
 4 = 29
 5 = 29

11-12 = 39
 = 39
 = 40
 = 40
 = 40



1 13-14 = 12
 2 = 14
 3 = 15
 4 = 15
 5 = 15

4-14 = 26
 = 25
 = 25
 = 25
 = 25



1 3-13 = 28
 2 = 27
 3 = 28
 4 = 28
 5 = 26

4-2 = 18
 = 17
 = 17
 = 17
 = 17

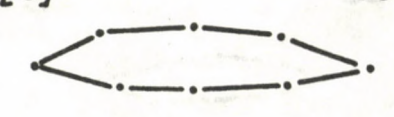


1 3-4 = 63
 2 = 63
 3 = 63
 4 = 63
 5 = 63

5-6 = 50
 = 50
 = 50
 = 50
 = 50

[t]

86



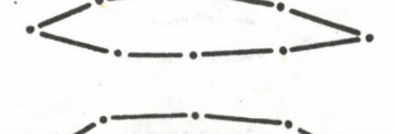
1 1-2 = 22
 2 = 22
 3 = 23
 4 = 23
 5 = 23

11-12 = 36
 = 36
 = 36
 = 36
 = 36



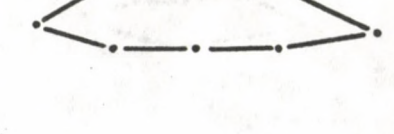
1 13-14 = 8
 2 = 8
 3 = 8
 4 = 8
 5 = 9

4-14 = 27
 = 27
 = 27
 = 27
 = 27



1 3-13 = 29
 2 = 26
 3 = 28
 4 = 28
 5 = 27

4-2 = 18
 = 18
 = 18
 = 18
 = 18

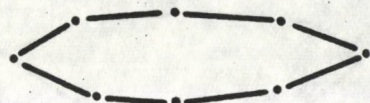


87

[l]



1	3-4 = 65	5-6 = 49
2	= 65	= 51
3	= 65	= 51
4	= 65	= 51
5	= 65	= 51



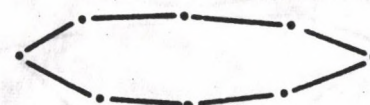
1	1-2 = 26	11-12 = 36
2	= 26	= 38
3	= 26	= 38
4	= 26	= 38
5	= 26	= 38



1	13-14 = 12	4-14 = 26
2	= 12	= 26
3	= 12	= 26
4	= 12	= 26
5	= 12	= 26

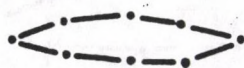


1	3-13 = 27	4-2 = 18
2	= 27	= 18
3	= 27	= 18
4	= 27	= 18
5	= 27	= 18



88

[dr]



1	3-4 = 58	5-6 = 50
2	= 58	= 50
3	= 58	= 50
4	= 58	= 50
5	= 58	= 50



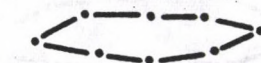
1	1-2 = 18	11-12 = 24
2	= 18	= 25
3	= 18	= 25
4	= 18	= 25
5	= 18	= 24



1	13-14 = 6	4-14 = 26
2	= 6	= 26
3	= 6	= 26
4	= 6	= 26
5	= 6	= 27



1	3-13 = 26	4-2 = 19
2	= 26	= 19
3	= 26	= 19
4	= 26	= 18
5	= 26	= 19



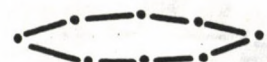
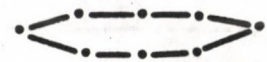
1	3-4 = 59	5-6 = 49
2	= 59	= 49
3	= 59	= 49
4	= 59	= 49
5	= 63	= 50

[tr]

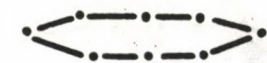
89



1	1-2 = 18	11-12 = 25
2	= 18	= 25
3	= 18	= 25
4	= 18	= 25
5	= 21	= 27



1	13-14 = 6	4-14 = 27
2	= 5	= 27
3	= 6	= 27
4	= 7	= 27
5	= 8	= 27



1	3-13 = 26	4-2 = 20
2	= 27	= 20
3	= 26	= 20
4	= 27	= 20
5	= 25	= 19



1	3-4 = 59	5-6 = 48
2	= 59	= 48
3	= 61	= 48
4	= 63	= 48
5	= 63	= 48

[dz]

90



1	1-2 = 19	11-12 = 28
2	= 20	= 28
3	= 20	= 28
4	= 21	= 28
5	= 21	= 28



1	13-14 = 7	4-14 = 26
2	= 7	= 26
3	= 7	= 26
4	= 8	= 29
5	= 8	= 29

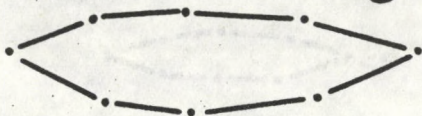


1	3-13 = 26	4-2 = 19
2	= 26	= 18
3	= 26	= 20
4	= 26	= 21
5	= 26	= 21

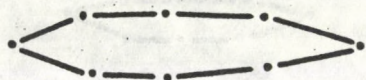


91

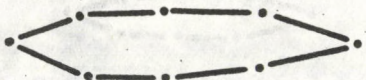
[ts]



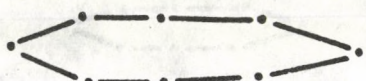
1	3-4 = 63	5-6 = 53
2	= 60	= 51
3	= 60	= 51
4	= 60	= 51
5	= 63	= 51



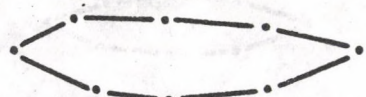
1	1-2 = 24	11-12 = 43
2	= 21	= 37
3	= 22	= 37
4	= 22	= 37
5	= 24	= 37



1	13-14 = 13	4-14 = 25
2	= 6	= 26
3	= 8	= 26
4	= 8	= 26
5	= 10	= 27



1	3-13 = 25	4-2 = 16
2	= 26	= 18
3	= 26	= 17
4	= 26	= 17
5	= 26	= 18

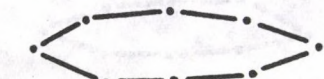


92

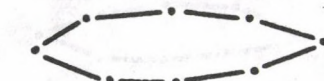
[dz]



1	3-4 = 63	5-6 = 50
2	= 60	= 50
3	= 60	= 50
4	= 60	= 50
5	= 60	= 50



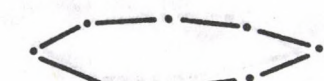
1	1-2 = 20	11-12 = 35
2	= 21	= 30
3	= 20	= 30
4	= 20	= 30
5	= 20	= 30



1	13-14 = 11	4-14 = 25
2	= 9	= 26
3	= 9	= 26
4	= 9	= 26
5	= 9	= 26



1	3-13 = 27	4-2 = 18
2	= 25	= 18
3	= 25	= 13
4	= 25	= 13
5	= 25	= 13

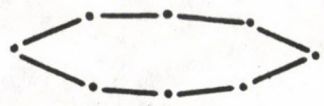


1 3-4 = 62
 2 = 60
 3 = 60
 4 = 60
 5 = 60

5-6 = 49
 = 49
 = 49
 = 49
 = 49

[t]

93



1 1-2 = 22
 2 = 21
 3 = 21
 4 = 21
 5 = 21

11-12 = 32
 = 31
 = 31
 = 31
 = 31



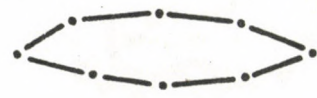
1 13-14 = 10
 2 = 9
 3 = 9
 4 = 9
 5 = 9

4-14 = 25
 = 25
 = 25
 = 25
 = 25



1 3-13 = 27
 2 = 26
 3 = 26
 4 = 26
 5 = 26

4-2 = 16
 = 18
 = 18
 = 18
 = 18



CINERADIOGRAPHIC DATA OF MEASUREMENT FOR ENGLISH SPEECH SOUNDS

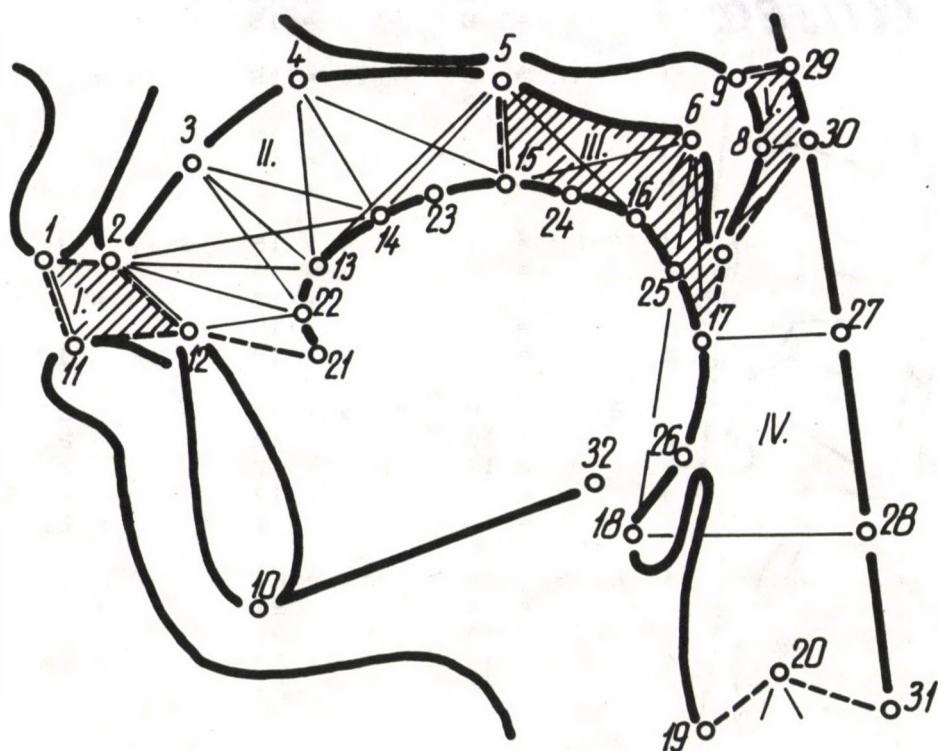




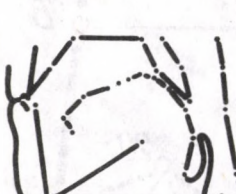
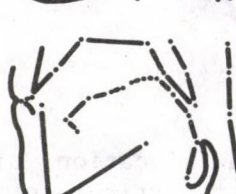

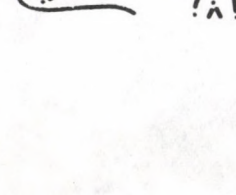
Figure 2

This schematic radiogram contour indicates the location of measurement points for the investigation of articulatory processes in the vocal tract. The pairs of points linked by solid lines represent the measurement relations for which distance values are given in the tables (pp. 264--357.). The areas marked I--V correspond to those sections of the vocal tract (labial, palatal, velar, pharyngeal, and nasal regions) for which area parameters are given in the tables on pp. 365--379. in relative percentage of the total area of the sagittal section of the vocal tract.

DATA OF MEASUREMENT

1.1

closed

	1	1-11 = 0	3-14 = 15	6-15 = 7
	2	= 0	= 15	= 7
	3	= 0	= 15	= 7
	4	= 0	= 15	= 7
	5	= 0	= 15	= 7
	1	2-12 = 3	4-13 = 16	6-16 = 1
	2	= 3	= 16	= 1
	3	= 3	= 16	= 1
	4	= 3	= 16	= 1
	5	= 3	= 16	= 1
	1	12-22 = 7	4-14 = 15	6-17 = 12
	2	= 7	= 15	= 12
	3	= 7	= 15	= 12
	4	= 7	= 15	= 12
	5	= 7	= 15	= 12
	1	2-22 = 10	4-15 = 17	6-18 = 27
	2	= 10	= 17	= 27
	3	= 10	= 17	= 27
	4	= 10	= 17	= 27
	5	= 10	= 17	= 27
	1	2-13 = 14	5-13 = 21	8-30 = 10
	2	= 14	= 21	= 10
	3	= 14	= 21	= 10
	4	= 14	= 21	= 10
	5	= 14	= 21	= 10
	1	2-14 = 20	5-14 = 15	9-29 = 13
	2	= 20	= 15	= 13
	3	= 20	= 15	= 13
	4	= 20	= 15	= 13
	5	= 20	= 15	= 13
	1	3-22 = 12	5-15 = 11	17-27 = 9
	2	= 12	= 11	= 9
	3	= 12	= 11	= 9
	4	= 12	= 11	= 9
	5	= 12	= 11	= 9
	1	3-13 = 11	5-16 = 9	18-28 = 12
	2	= 11	= 9	= 12
	3	= 11	= 9	= 12
	4	= 11	= 9	= 12
	5	= 11	= 9	= 12

DATA OF MEASUREMENT

1.2

open

1	1-11 = 4	3-14 = 12	6-15 = 9
2	= 4	= 12	= 9
3	= 4	= 12	= 9
4	= 4	= 12	= 9
5	= 4	= 12	= 9

1	2-12 = 2	4-13 = 14	6-16 = 4
2	= 2	= 14	= 4
3	= 2	= 14	= 4
4	= 2	= 14	= 4
5	= 2	= 14	= 4

1	12-22 = 4	4-14 = 12	6-17 = 12
2	= 4	= 12	= 12
3	= 4	= 12	= 12
4	= 4	= 12	= 12
5	= 4	= 12	= 13

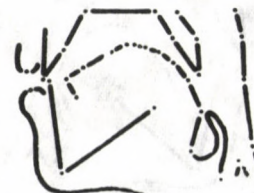
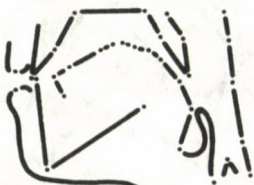
1	2-22 = 6	4-15 = 14	6-18 = 28
2	= 6	= 14	= 28
3	= 6	= 14	= 28
4	= 6	= 14	= 28
5	= 6	= 14	= 28

1	2-13 = 10	5-13 = 23	8-30 = 11
2	= 10	= 23	= 11
3	= 10	= 23	= 11
4	= 10	= 23	= 11
5	= 10	= 23	= 11

1	2-14 = 19	5-14 = 14	9-29 = 14
2	= 19	= 14	= 14
3	= 19	= 14	= 14
4	= 19	= 14	= 14
5	= 19	= 14	= 14

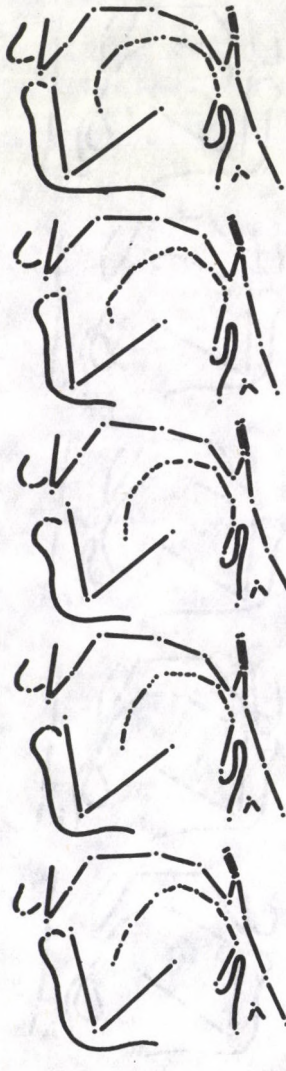
1	3-22 = 7	5-15 = 10	17-27 = 13
2	= 7	= 10	= 13
3	= 7	= 10	= 13
4	= 7	= 10	= 13
5	= 7	= 10	= 13

1	3-13 = 6	5-16 = 10	18-28 = 15
2	= 6	= 10	= 15
3	= 6	= 10	= 15
4	= 6	= 10	= 15
5	= 6	= 10	= 15



DATA OF MEASUREMENT

2
[a:]



1	1-11 = 3	3-14 = 14	6-15 = 10
2	= 11	= 18	= 11
3	= 9	= 17	= 11
4	= 10	= 19	= 11
5	= 8	= 20	= 11
1	2-12 = 3	4-13 = 16	6-16 = 4
2	= 5	= 19	= 5
3	= 6	= 19	= 6
4	= 6	= 20	= 5
5	= 5	= 19	= 5
1	12-22 = 11	4-14 = 12	6-17 = 13
2	= 12	= 16	= 14
3	= 15	= 17	= 17
4	= 15	= 18	= 14
5	= 13	= 19	= 14
1	2-22 = 14	4-15 = 18	6-18 = 28
2	= 17	= 18	= 29
3	= 21	= 19	= 29
4	= 20	= 19	= 29
5	= 18	= 20	= 29
1	2-13 = 14	5-13 = 21	8-30 = 0
2	= 18	= 21	= 0
3	= 20	= 19	= 0
4	= 20	= 20	= 0
5	= 20	= 19	= 0
1	2-14 = 21	5-14 = 12	9-29 = 0
2	= 22	= 14	= 0
3	= 22	= 15	= 0
4	= 25	= 12	= 0
5	= 26	= 11	= 0
1	3-22 = 14	5-15 = 7	17-27 = 5
2	= 17	= 9	= 5
3	= 22	= 9	= 4
4	= 18	= 9	= 4
5	= 19	= 9	= 4
1	3-13 = 11	5-16 = 11	18-28 = 12
2	= 16	= 12	= 11
3	= 17	= 11	= 10
4	= 17	= 12	= 10
5	= 17	= 13	= 12

DATA OF MEASUREMENT

3

[D]

1	1-11 = 9	3-14 = 12	6-15 = 15
2	= 9	= 19	= 12
3	= 9	= 17	= 14
4	= 6	= 19	= 15
5	= 7	= 11	= 13

1	2-12 = 4	4-13 = 14	6-16 = 7
2	= 6	= 17	= 5
3	= 7	= 18	= 5
4	= 6	= 20	= 6
5	= 4	= 13	= 6

1	12-22 = 10	4-14 = 6	6-17 = 12
2	= 11	= 16	= 13
3	= 16	= 16	= 14
4	= 16	= 18	= 13
5	= 10	= 11	= 13

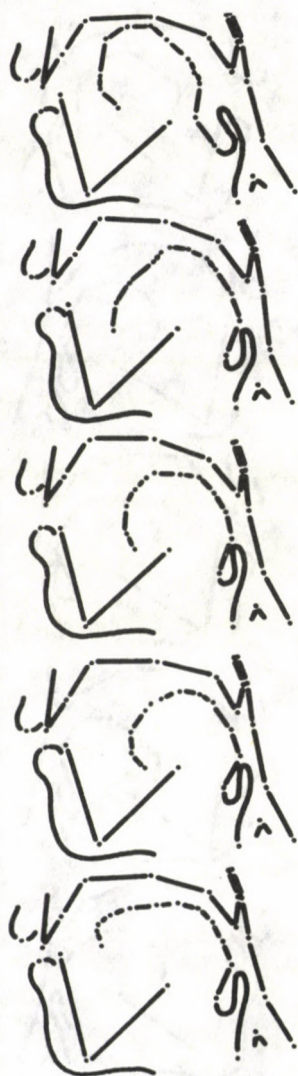
1	2-22 = 14	4-15 = 16	6-18 = 28
2	= 16	= 18	= 29
3	= 21	= 17	= 29
4	= 21	= 19	= 28
5	= 13	= 19	= 28

1	2-13 = 14	5-13 = 19	8-30 = 0
2	= 18	= 18	= 0
3	= 20	= 17	= 0
4	= 20	= 19	= 7
5	= 13	= 19	= 0

1	2-14 = 20	5-14 = 12	9-29 = 0
2	= 25	= 10	= 0
3	= 22	= 13	= 0
4	= 24	= 12	= 7
5	= 17	= 15	= 0

1	3-22 = 13	5-15 = 1	17-27 = 11
2	= 16	= 7	= 7
3	= 21	= 8	= 5
4	= 21	= 10	= 5
5	= 10	= 8	= 6

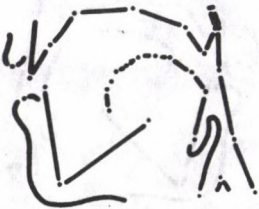
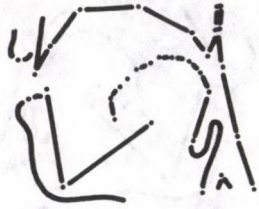
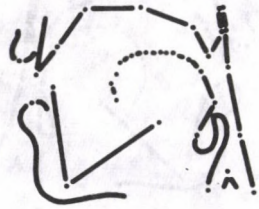
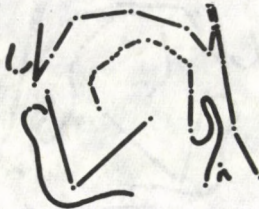
1	3-13 = 11	5-16 = 13	18-28 = 11
2	= 15	= 13	= 10
3	= 17	= 13	= 10
4	= 17	= 13	= 10
5	= 9	= 13	= 11



DATA OF MEASUREMENT

4

[A]



1	1-11 = 11	3-14 = 15	6-15 = 12
2	= 11	= 17	= 13
3	= 11	= 16	= 13
4	= 10	= 21	= 12
5	= 8	= 17	= 13

1	2-12 = 4	4-13 = 16	6-16 = 7
2	= 4	= 19	= 7
3	= 5	= 18	= 8
4	= 4	= 21	= 8
5	= 4	= 19	= 8

1	12-22 = 11	4-14 = 14	6-17 = 10
2	= 16	= 16	= 10
3	= 15	= 16	= 11
4	= 16	= 21	= 10
5	= 16	= 18	= 10

1	2-22 = 14	4-15 = 17	6-18 = 27
2	= 19	= 19	= 27
3	= 19	= 18	= 27
4	= 20	= 22	= 27
5	= 19	= 19	= 27

1	2-13 = 15	5-13 = 20	8-30 = 0
2	= 19	= 19	= 0
3	= 20	= 18	= 0
4	= 21	= 21	= 0
5	= 20	= 19	= 0

1	2-14 = 20	5-14 = 14	9-29 = 0
2	= 21	= 15	= 0
3	= 21	= 15	= 0
4	= 23	= 18	= 0
5	= 21	= 17	= 0

1	3-22 = 13	5-15 = 9	17-27 = 8
2	= 17	= 11	= 6
3	= 17	= 11	= 6
4	= 20	= 14	= 5
5	= 18	= 12	= 6

1	3-13 = 12	5-16 = 14	18-28 = 10
2	= 17	= 14	= 10
3	= 17	= 14	= 10
4	= 20	= 15	= 10
5	= 17	= 14	= 8

DATA OF MEASUREMENT

5

[5]

1	1-11 = 4	3-14 = 12	6-15 = 13
2	= 2	= 16	= 13
3	= 3	= 17	= 12
4	= 4	= 16	= 11
5	= 4	= 16	= 12

1	2-12 = 2	4-13 = 14	6-16 = 6
2	= 2	= 15	= 4
3	= 3	= 16	= 3
4	= 3	= 17	= 3
5	= 2	= 17	= 5

1	12-22 = 7	4-14 = 10	6-17 = 11
2	= 16	= 13	= 10
3	= 16	= 13	= 11
4	= 15	= 15	= 11
5	= 17	= 15	= 11

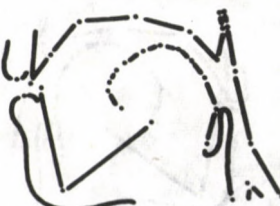
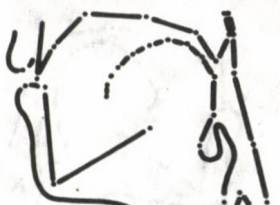
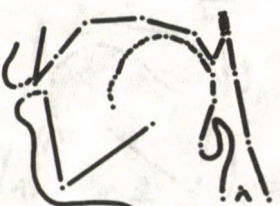
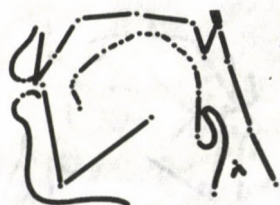
1	2-22 = 9	4-15 = 16	6-18 = 29
2	= 18	= 16	= 28
3	= 18	= 16	= 28
4	= 17	= 17	= 28
5	= 19	= 17	= 28

1	2-13 = 10	5-13 = 22	8-30 = 0
2	= 19	= 16	= 1
3	= 19	= 17	= 0
4	= 18	= 17	= 0
5	= 19	= 17	= 0

1	2-14 = 18	5-14 = 13	9-29 = 0
2	= 22	= 11	= 0
3	= 23	= 10	= 0
4	= 19	= 15	= 0
5	= 21	= 14	= 1

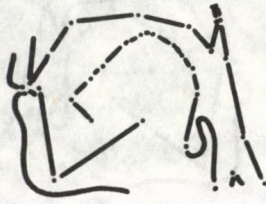
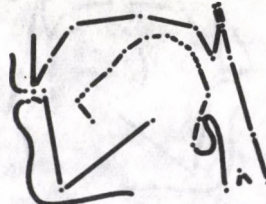
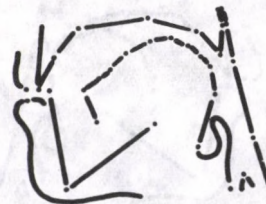


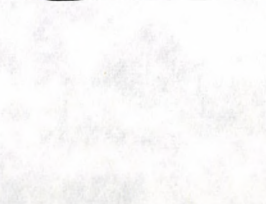
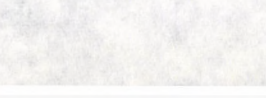
1	3-22 = 8	5-15 = 5	17-27 = 8
2	= 15	= 6	= 6
3	= 16	= 5	= 5
4	= 16	= 7	= 4
5	= 17	= 8	= 7

1	3-13 = 7	5-16 = 12	18-28 = 12
2	= 15	= 12	= 12
3	= 15	= 13	= 11
4	= 16	= 12	= 12
5	= 16	= 13	= 10



DATA OF MEASUREMENT

6
[v]

	1	1-11 = 1	3-14 = 13	6-15 = 12
	2	= 2	= 14	= 12
	3	= 2	= 14	= 12
	4	= 2	= 14	= 12
	5	= 3	= 14	= 12
	1	2-12 = 2	4-13 = 15	6-16 = 6
	2	= 3	= 16	= 5
	3	= 3	= 14	= 4
	4	= 2	= 14	= 4
	5	= 2	= 15	= 4
	1	12-22 = 9	4-14 = 13	6-17 = 10
	2	= 9	= 14	= 9
	3	= 8	= 13	= 9
	4	= 14	= 13	= 10
	5	= 14	= 13	= 10
	1	2-22 = 11	4-15 = 17	6-18 = 30
	2	= 11	= 18	= 29
	3	= 11	= 17	= 29
	4	= 16	= 16	= 29
	5	= 16	= 17	= 29
	1	2-13 = 15	5-13 = 20	8-30 = 0
	2	= 13	= 23	= 0
	3	= 15	= 19	= 0
	4	= 17	= 18	= 0
	5	= 16	= 19	= 0
	1	2-14 = 18	5-14 = 16	8-29 = 0
	2	= 19	= 15	= 0
	3	= 18	= 16	= 0
	4	= 20	= 14	= 0
	5	= 18	= 16	= 1
	1	3-22 = 12	5-15 = 5	17-27 = 8
	2	= 12	= 5	= 8
	3	= 11	= 5	= 6
	4	= 15	= 4	= 6
	5	= 15	= 5	= 7
	1	3-13 = 12	5-16 = 11	18-28 = 14
	2	= 11	= 11	= 14
	3	= 12	= 11	= 13
	4	= 13	= 10	= 14
	5	= 13	= 11	= 12

DATA OF MEASUREMENT

1	1-11 = 3	3-14 = 9	6-15 = 13
2	= 3	= 9	= 14
3	= 1	= 10	= 13
4	= 2	= 9	= 14
5	= 2	= 10	= 13

1	2-12 = 2	4-13 = 10	6-16 = 11
2	= 2	= 10	= 12
3	= 2	= 10	= 10
4	= 2	= 11	= 11
5	= 2	= 11	= 8

1	12-22 = 3	4-14 = 5	6-17 = 14
2	= 5	= 6	= 15
3	= 10	= 5	= 13
4	= 7	= 6	= 15
5	= 11	= 8	= 14

1	2-22 = 4	4-15 = 16	6-18 = 28
2	= 7	= 16	= 28
3	= 12	= 16	= 29
4	= 9	= 16	= 28
5	= 13	= 17	= 29

1	2-13 = 9	5-13 = 23	8-30 = 0
2	= 10	= 22	= 0
3	= 13	= 19	= 0
4	= 10	= 22	= 0
5	= 13	= 20	= 1

1	2-14 = 17	5-14 = 15	8-29 = 0
2	= 17	= 15	= 0
3	= 18	= 14	= 0
4	= 17	= 15	= 0
5	= 17	= 14	= 0

1	3-22 = 6	5-15 = 5	17-27 = 14
2	= 8	= 3	= 14
3	= 9	= 3	= 14
4	= 8	= 2	= 15
5	= 11	= 2	= 13

1	3-13 = 1	5-16 = 12	18-28 = 14
2	= 4	= 11	= 14
3	= 7	= 12	= 17
4	= 5	= 9	= 15
5	= 8	= 10	= 17

7

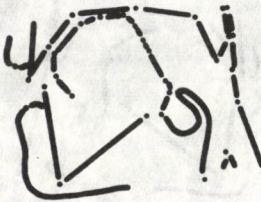

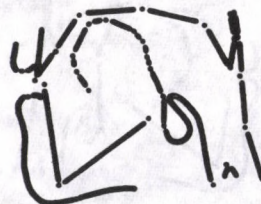
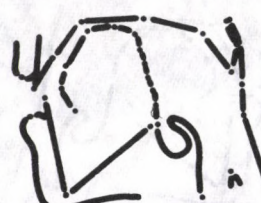

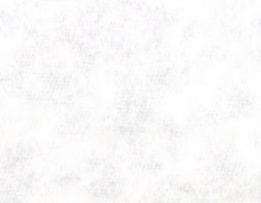
[u:]



DATA OF MEASUREMENT

8

[i:]

	1	1-11 = 10	3-14 = 10	6-15 = 17
	2	= 12	= 9	= 18
	3	= 6	= 11	= 17
	4	= 10	= 11	= 16
	5	= 8	= 11	= 16
	1	2-12 = 4	4-13 = 11	6-16 = 13
	2	= 4	= 11	= 13
	3	= 2	= 10	= 16
	4	= 3	= 12	= 16
	5	= 3	= 11	= 16
	1	12-22 = 4	4-14 = 3	6-17 = 17
	2	= 4	= 2	= 17
	3	= 9	= 3	= 17
	4	= 4	= 2	= 18
	5	= 6	= 3	= 18
	1	2-22 = 6	4-15 = 12	6-18 = 25
	2	= 6	= 11	= 26
	3	= 10	= 14	= 27
	4	= 6	= 13	= 25
	5	= 9	= 14	= 26
	1	2-13 = 8	5-13 = 23	8-30 = 0
	2	= 9	= 22	= 0
	3	= 11	= 20	= 0
	4	= 9	= 22	= 0
	5	= 10	= 21	= 0
	1	2-14 = 19	5-14 = 13	9-29 = 0
	2	= 18	= 14	= 0
	3	= 19	= 13	= 0
	4	= 18	= 14	= 0
	5	= 20	= 12	= 0
	1	3-22 = 7	5-15 = 4	17-27 = 15
	2	= 7	= 4	= 15
	3	= 7	= 5	= 21
	4	= 7	= 4	= 21
	5	= 7	= 6	= 21
	1	3-13 = 2	5-16 = 9	18-28 = 17
	2	= 3	= 9	= 18
	3	= 4	= 12	= 19
	4	= 4	= 11	= 20
	5	= 3	= 11	= 20

DATA OF MEASUREMENT

9

[I]

1	1-11 = 10	3-14 = 9	6-15 = 12
2	= 12	= 11	= 12
3	= 9	= 11	= 15
4	= 10	= 10	= 12
5	= 8	= 11	= 12

1	2-12 = 4	4-13 = 11	6-16 = 10
2	= 4	= 11	= 10
3	= 4	= 10	= 11
4	= 4	= 10	= 11
5	= 4	= 11	= 9

1	12-22 = 4	4-14 = 4	6-17 = 13
2	= 8	= 6	= 15
3	= 8	= 5	= 14
4	= 7	= 4	= 14
5	= 5	= 6	= 12

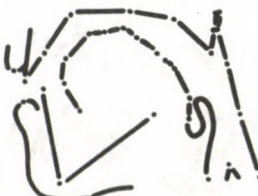
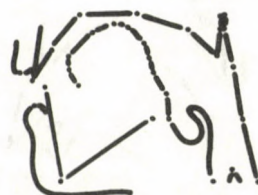
1	2-22 = 8	4-15 = 12	6-18 = 25
2	= 9	= 13	= 26
3	= 9	= 11	= 23
4	= 9	= 13	= 25
5	= 8	= 13	= 25

1	2-13 = 10	5-13 = 20	8-30 = 0
2	= 10	= 20	= 0
3	= 11	= 20	= 0
4	= 11	= 20	= 1
5	= 10	= 20	= 0

1	2-14 = 18	5-14 = 13	9-29 = 0
2	= 19	= 12	= 0
3	= 19	= 12	= 0
4	= 18	= 13	= 0
5	= 19	= 12	= 0

1	3-22 = 7	5-15 = 4	17-27 = 15
2	= 6	= 4	= 18
3	= 6	= 4	= 18
4	= 7	= 4	= 17
5	= 9	= 4	= 13

1	3-13 = 4	5-16 = 11	18-28 = 16
2	= 4	= 7	= 17
3	= 4	= 11	= 16
4	= 4	= 7	= 17
5	= 4	= 10	= 12



DATA OF MEASUREMENT

10
[ε]

	1	1-11 = 4	3-14 = 12	6-15 = 16
	2	= 9	= 11	= 14
	3	= 10	= 12	= 14
	4	= 11	= 11	= 14
	5	= 10	= 13	= 12
	1	2-12 = 4	4-13 = 12	6-16 = 11
	2	= 6	= 13	= 11
	3	= 7	= 12	= 14
	4	= 6	= 13	= 11
	5	= 4	= 13	= 11
	1	12-22 = 2	4-14 = 11	6-17 = 15
	2	= 2	= 11	= 14
	3	= 2	= 11	= 17
	4	= 2	= 11	= 16
	5	= 3	= 11	= 15
	1	2-22 = 6	4-15 = 14	6-18 = 28
	2	= 7	= 16	= 28
	3	= 8	= 17	= 29
	4	= 7	= 17	= 28
	5	= 7	= 18	= 29
	1	2-13 = 11	5-13 = 21	8-30 = 3
	2	= 9	= 21	= 1
	3	= 13	= 19	= 0
	4	= 10	= 22	= 0
	5	= 10	= 22	= 3
	1	2-14 = 18	5-14 = 14	9-29 = 2
	2	= 16	= 14	= 1
	3	= 18	= 14	= 0
	4	= 17	= 15	= 0
	5	= 18	= 14	= 3
	1	3-22 = 10	5-15 = 11	17-27 = 16
	2	= 14	= 10	= 15
	3	= 14	= 11	= 18
	4	= 11	= 11	= 15
	5	= 9	= 10	= 13
	1	3-13 = 7	5-16 = 15	18-28 = 14
	2	= 8	= 12	= 13
	3	= 9	= 16	= 14
	4	= 7	= 15	= 13
	5	= 7	= 14	= 13

DATA OF MEASUREMENT

11

[æ]

1	1-11 = 16	3-14 = 14	6-15 = 12
2	= 15	= 16	= 13
3	= 15	= 16	= 13
4	= 15	= 16	= 14
5	= 14	= 16	= 13

1	2-12 = 9	4-13 = 15	6-16 = 8
2	= 9	= 17	= 9
3	= 8	= 18	= 9
4	= 9	= 16	= 10
5	= 6	= 17	= 9

1	12-22 = 4	4-14 = 14	6-17 = 11
2	= 3	= 16	= 13
3	= 5	= 16	= 11
4	= 4	= 16	= 13
5	= 8	= 16	= 14

1	2-22 = 13	4-15 = 18	6-18 = 27
2	= 11	= 18	= 28
3	= 13	= 18	= 27
4	= 13	= 19	= 28
5	= 13	= 18	= 27

1	2-13 = 16	5-13 = 19	8-30 = 0
2	= 17	= 18	= 0
3	= 14	= 22	= 0
4	= 15	= 20	= 0
5	= 16	= 20	= 0

1	2-14 = 19	5-14 = 15	9-29 = 0
2	= 20	= 14	= 0
3	= 20	= 15	= 0
4	= 21	= 15	= 0
5	= 20	= 15	= 0

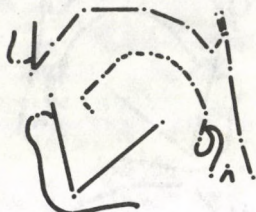
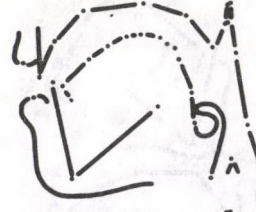
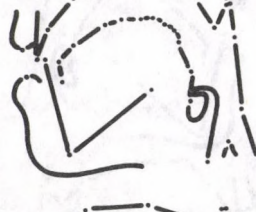


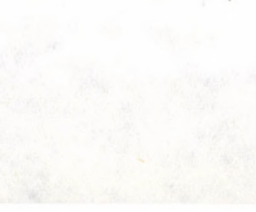
1	3-22 = 16	5-15 = 10	17-27 = 9
2	= 16	= 10	= 10
3	= 17	= 11	= 11
4	= 16	= 12	= 10
5	= 16	= 11	= 10

1	3-13 = 13	5-16 = 14	18-28 = 9
2	= 15	= 14	= 9
3	= 13	= 14	= 9
4	= 12	= 15	= 9
5	= 14	= 13	= 9



12
[3:]

DATA OF MEASUREMENT

	1	1-11 = 14	3-14 = 16	6-15 = 14
	2	= 8	= 13	= 13
	3	= 7	= 13	= 14
	4	= 7	= 13	= 14
	5	= 7	= 13	= 14
	1	2-12 = 6	4-13 = 17	6-16 = 9
	2	= 3	= 12	= 8
	3	= 2	= 13	= 10
	4	= 2	= 13	= 8
	5	= 2	= 12	= 8
	1	12-22 = 7	4-14 = 15	6-17 = 14
	2	= 3	= 11	= 10
	3	= 4	= 10	= 12
	4	= 3	= 11	= 11
	5	= 3	= 10	= 11
	1	2-22 = 13	4-15 = 17	6-18 = 28
	2	= 6	= 16	= 27
	3	= 5	= 17	= 28
	4	= 5	= 16	= 28
	5	= 5	= 15	= 28
	1	2-13 = 16	5-13 = 20	8-30 = 0
	2	= 13	= 19	= 0
	3	= 9	= 22	= 0
	4	= 11	= 21	= 0
	5	= 11	= 21	= 0
	1	2-14 = 20	5-14 = 14	9-29 = 1
	2	= 18	= 13	= 0
	3	= 19	= 13	= 0
	4	= 18	= 13	= 0
	5	= 18	= 13	= 0
	1	3-22 = 15	5-15 = 11	17-27 = 9
	2	= 11	= 8	= 13
	3	= 10	= 8	= 13
	4	= 9	= 8	= 13
	5	= 9	= 8	= 13
	1	3-13 = 14	5-16 = 13	18-28 = 10
	2	= 9	= 11	= 12
	3	= 7	= 12	= 13
	4	= 8	= 12	= 13
	5	= 8	= 12	= 13

DATA OF MEASUREMENT

13

[ə]

1	1-11 = 6	3-14 = 12	6-15 = 14
2	= 6	= 12	= 13
3	= 6	= 13	= 14
4	= 6	= 13	= 14
5	= 6	= 12	= 13

1	2-12 = 2	4-13 = 13	6-16 = 9
2	= 2	= 11	= 8
3	= 2	= 15	= 8
4	= 2	= 12	= 11
5	= 2	= 11	= 9

1	12-22 = 7	4-14 = 10	6-17 = 11
2	= 7	= 10	= 10
3	= 8	= 14	= 12
4	= 3	= 13	= 13
5	= 3	= 11	= 11

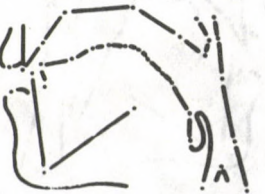
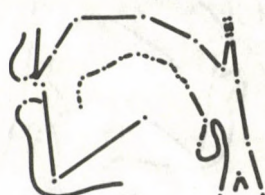
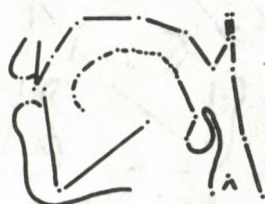
1	2-22 = 9	4-15 = 15	6-18 = 27
2	= 9	= 15	= 27
3	= 10	= 17	= 26
4	= 5	= 18	= 27
5	= 4	= 17	= 26

1	2-13 = 11	5-13 = 21	8-30 = 0
2	= 13	= 19	= 0
3	= 11	= 22	= 0
4	= 11	= 21	= 2
5	= 13	= 19	= 2

1	2-14 = 18	5-14 = 13	9-29 = 0
2	= 18	= 14	= 0
3	= 17	= 16	= 0
4	= 18	= 15	= 3
5	= 18	= 14	= 2

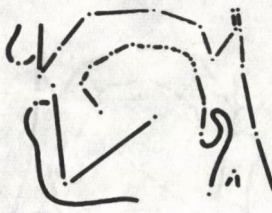
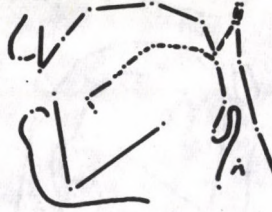
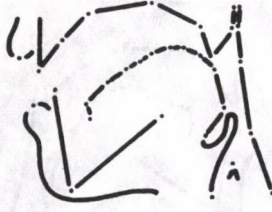
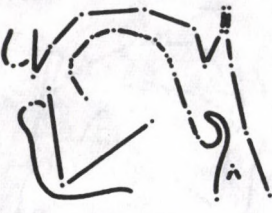
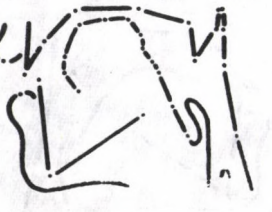

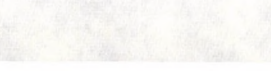
1	3-22 = 11	5-15 = 8	17-27 = 13
2	= 10	= 8	= 13
3	= 11	= 9	= 11
4	= 7	= 10	= 13
5	= 5	= 9	= 12

1	3-13 = 8	5-16 = 11	18-28 = 13
2	= 8	= 12	= 13
3	= 9	= 13	= 11
4	= 7	= 15	= 11
5	= 8	= 14	= 10



DATA OF MEASUREMENT

14
[ai]

	1	1-11 = 11	3-14 = 13	6-15 = 13
	2	= 14	= 16	= 13
	3	= 12	= 17	= 13
	4	= 10	= 10	= 12
	5	= 9	= 9	= 14
	1	2-12 = 4	4-13 = 13	6-16 = 8
	2	= 6	= 17	= 7
	3	= 6	= 17	= 6
	4	= 4	= 11	= 9
	5	= 3	= 11	= 12
	1	12-22 = 7	4-14 = 11	6-17 = 10
	2	= 8	= 17	= 11
	3	= 9	= 16	= 11
	4	= 6	= 6	= 12
	5	= 6	= 3	= 13
	1	2-22 = 10	4-15 = 17	6-18 = 27
	2	= 13	= 18	= 27
	3	= 14	= 18	= 27
	4	= 9	= 16	= 27
	5	= 9	= 13	= 28
	1	2-13 = 12	5-13 = 21	8-30 = 0
	2	= 18	= 20	= 0
	3	= 17	= 21	= 0
	4	= 10	= 21	= 0
	5	= 10	= 21	= 1
	1	2-14 = 18	5-14 = 14	9-29 = 0
	2	= 20	= 17	= 0
	3	= 21	= 17	= 0
	4	= 18	= 14	= 0
	5	= 18	= 15	= 0
	1	3-22 = 10	5-15 = 9	17-27 = 11
	2	= 16	= 10	= 5
	3	= 17	= 12	= 6
	4	= 8	= 6	= 13
	5	= 9	= 4	= 15
	1	3-13 = 9	5-16 = 12	18-28 = 13
	2	= 15	= 13	= 10
	3	= 15	= 13	= 10
	4	= 6	= 13	= 11
	5	= 6	= 10	= 11

DATA OF MEASUREMENT

15

[51]

1	1-11 = 2	3-14 = 15	6-15 = 14
2	= 5	= 17	= 13
3	= 6	= 13	= 14
4	= 10	= 10	= 19
5	= 7	= 12	= 16

1	2-12 = 3	4-13 = 13	6-16 = 6
2	= 7	= 17	= 4
3	= 6	= 13	= 11
4	= 4	= 11	= 13
5	= 2	= 11	= 13

1	12-22 = 12	4-14 = 12	6-17 = 11
2	= 12	= 15	= 12
3	= 6	= 9	= 13
4	= 7	= 4	= 14
5	= 6	= 4	= 15

1	2-22 = 14	4-15 = 17	6-18 = 29
2	= 18	= 16	= 28
3	= 10	= 17	= 28
4	= 9	= 10	= 27
5	= 8	= 13	= 27

1	2-13 = 15	5-13 = 19	8-30 = 0
2	= 18	= 19	= 0
3	= 12	= 21	= 0
4	= 11	= 21	= 0
5	= 11	= 21	= 0

1	2-14 = 21	5-14 = 13	9-29 = 0
2	= 22	= 14	= 0
3	= 20	= 12	= 0
4	= 19	= 13	= 0
5	= 20	= 13	= 0

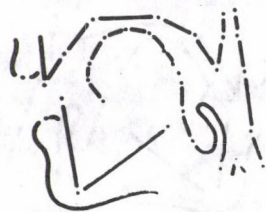
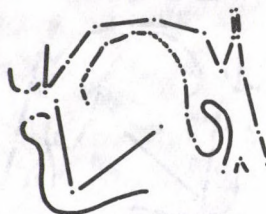
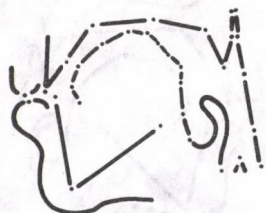
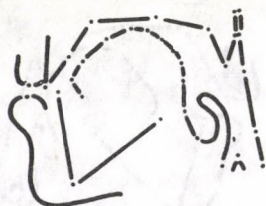
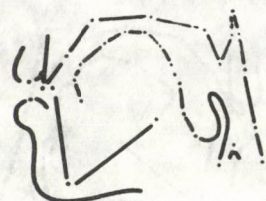
1	3-22 = 11	5-15 = 8	17-27 = 6
2	= 17	= 6	= 5
3	= 10	= 7	= 12
4	= 8	= 6	= 16
5	= 6	= 4	= 16

1	3-13 = 11	5-16 = 14	18-28 = 12
2	= 15	= 14	= 12
3	= 8	= 14	= 12
4	= 5	= 15	= 13
5	= 5	= 14	= 15



DATA OF MEASUREMENT

16
[vr]



1	1-11 = 4	3-14 = 10	6-15 = 15
2	= 2	= 10	= 15
3	= 1	= 10	= 14
4	= 2	= 10	= 14
5	= 12	= 10	= 12

1	2-12 = 2	4-13 = 11	6-16 = 12
2	= 3	= 10	= 10
3	= 3	= 10	= 10
4	= 2	= 10	= 10
5	= 5	= 11	= 9

1	12-22 = 5	4-14 = 6	6-17 = 14
2	= 4	= 6	= 14
3	= 5	= 5	= 14
4	= 6	= 5	= 13
5	= 8	= 5	= 11

1	2-22 = 7	4-15 = 13	6-18 = 26
2	= 6	= 14	= 27
3	= 7	= 14	= 27
4	= 7	= 14	= 27
5	= 10	= 14	= 26

1	2-13 = 10	5-13 = 22	8-30 = 1
2	= 11	= 22	= 0
3	= 11	= 22	= 0
4	= 11	= 22	= 0
5	= 12	= 21	= 3

1	2-14 = 18	5-14 = 14	8-29 = 0
2	= 19	= 13	= 0
3	= 19	= 13	= 0
4	= 19	= 13	= 0
5	= 18	= 14	= 3

1	3-22 = 6	5-15 = 4	17-27 = 16
2	= 6	= 4	= 14
3	= 6	= 3	= 15
4	= 5	= 3	= 14
5	= 8	= 4	= 15

1	3-13 = 4	5-16 = 13	18-28 = 14
2	= 3	= 9	= 14
3	= 3	= 9	= 15
4	= 3	= 8	= 15
5	= 6	= 13	= 14

DATA OF MEASUREMENT

17

[er]

1	1-11 = 12	3-14 = 12	6-15 = 15
2	= 12	= 11	= 14
3	= 12	= 9	= 13
4	= 10	= 9	= 12
5	= 7	= 8	= 12

1	2-12 = 6	4-13 = 12	6-16 = 10
2	= 7	= 15	= 11
3	= 6	= 13	= 11
4	= 5	= 11	= 11
5	= 3	= 9	= 11

1	12-22 = 5	4-14 = 10	6-17 = 12
2	= 6	= 9	= 13
3	= 6	= 7	= 13
4	= 4	= 4	= 13
5	= 3	= 4	= 13

1	2-22 = 10	4-15 = 15	6-18 = 28
2	= 11	= 15	= 29
3	= 12	= 15	= 29
4	= 8	= 14	= 29
5	= 4	= 15	= 27

1	2-13 = 13	5-13 = 18	8-30 = 0
2	= 11	= 23	= 0
3	= 11	= 21	= 0
4	= 10	= 22	= 0
5	= 9	= 23	= 0

1	2-14 = 18	5-14 = 13	9-29 = 0
2	= 18	= 14	= 0
3	= 17	= 15	= 0
4	= 18	= 15	= 0
5	= 17	= 16	= 0

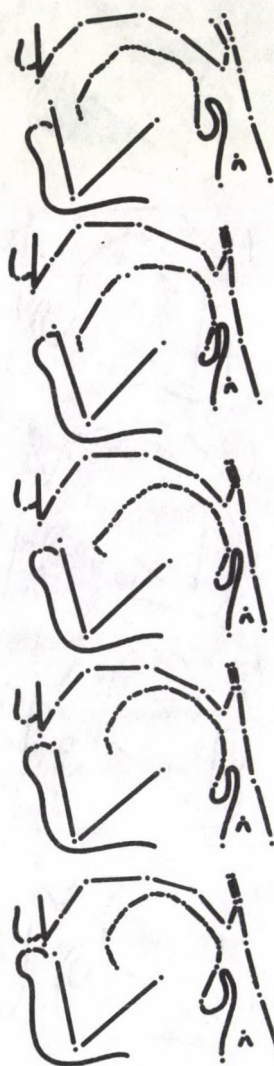
1	3-22 = 13	5-15 = 9	17-27 = 14
2	= 12	= 7	= 14
3	= 13	= 5	= 16
4	= 9	= 4	= 18
5	= 6	= 5	= 18

1	3-13 = 9	5-16 = 14	18-28 = 11
2	= 8	= 13	= 11
3	= 8	= 13	= 14
4	= 5	= 12	= 13
5	= 3	= 12	= 14



DATA OF MEASUREMENT

18
[au]



1	1-11 = 15	3-14 = 13	6-15 = 12
2	= 16	= 17	= 17
3	= 11	= 17	= 12
4	= 7	= 15	= 13
5	= 2	= 14	= 10
1	2-12 = 6	4-13 = 13	6-16 = 5
2	= 10	= 18	= 6
3	= 6	= 18	= 4
4	= 4	= 16	= 3
5	= 3	= 15	= 4
1	12-22 = 7	4-14 = 11	6-17 = 13
2	= 7	= 16	= 10
3	= 9	= 16	= 14
4	= 13	= 13	= 11
5	= 13	= 12	= 16
1	2-22 = 12	4-15 = 13	6-18 = 25
2	= 16	= 17	= 24
3	= 15	= 17	= 26
4	= 17	= 16	= 24
5	= 16	= 16	= 28
1	2-13 = 13	5-13 = 20	8-30 = 3
2	= 18	= 19	= 0
3	= 18	= 19	= 0
4	= 17	= 19	= 0
5	= 16	= 18	= 0
1	2-14 = 18	5-14 = 14	9-29 = 3
2	= 22	= 15	= 0
3	= 22	= 14	= 0
4	= 20	= 13	= 0
5	= 20	= 13	= 0
1	3-22 = 15	5-15 = 9	17-27 = 10
2	= 21	= 11	= 5
3	= 16	= 8	= 5
4	= 15	= 6	= 5
5	= 14	= 4	= 6
1	3-13 = 11	5-16 = 13	18-28 = 12
2	= 16	= 17	= 9
3	= 16	= 13	= 8
4	= 14	= 14	= 9
5	= 13	= 10	= 13

DATA OF MEASUREMENT

1	1-11 = 8	3-14 = 12	6-15 = 12
2	= 7	= 12	= 14
3	= 4	= 12	= 13
4	= 2	= 12	= 14
5	= 4	= 12	= 15

1	2-12 = 2	4-13 = 13	6-16 = 4
2	= 3	= 14	= 7
3	= 2	= 14	= 7
4	= 2	= 13	= 6
5	= 2	= 14	= 6

1	12-22 = 7	4-14 = 11	6-17 = 9
2	= 11	= 11	= 11
3	= 8	= 9	= 11
4	= 7	= 9	= 10
5	= 9	= 9	= 10

1	2-22 = 9	4-15 = 14	6-18 = 27
2	= 13	= 14	= 29
3	= 10	= 13	= 29
4	= 9	= 13	= 28
5	= 11	= 13	= 28

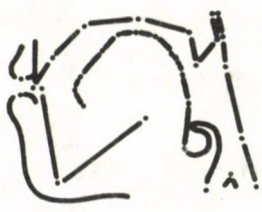
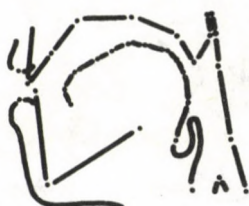
1	2-13 = 12	5-13 = 20	8-30 = 0
2	= 14	= 19	= 0
3	= 11	= 21	= 0
4	= 11	= 20	= 0
5	= 13	= 19	= 0

1	2-14 = 19	5-14 = 13	9-29 = 0
2	= 19	= 13	= 0
3	= 19	= 12	= 0
4	= 19	= 12	= 0
5	= 19	= 12	= 0

1	3-22 = 10	5-15 = 7	17-27 = 8
2	= 12	= 7	= 10
3	= 10	= 3	= 10
4	= 7	= 3	= 10
5	= 10	= 2	= 10

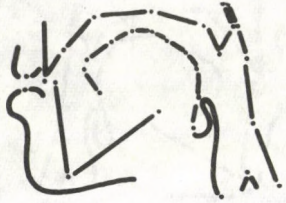
1	3-13 = 7	5-16 = 13	18-28 = 13
2	= 10	= 12	= 13
3	= 9	= 12	= 13
4	= 6	= 12	= 14
5	= 9	= 13	= 15

19
[əv]



DATA OF MEASUREMENT

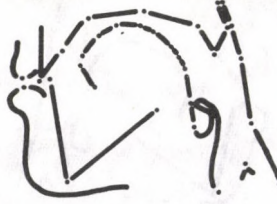
20
[va]



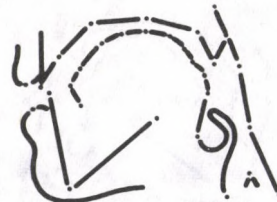
1	1-11 = 3	3-14 = 11	6-15 = 13
2	= 3	= 14	= 13
3	= 6	= 11	= 13
4	= 9	= 14	= 15
5	= 9	= 14	= 15

1	2-12 = 2	4-13 = 11	6-16 = 8
2	= 2	= 11	= 8
3	= 2	= 12	= 5
4	= 3	= 15	= 7
5	= 3	= 14	= 9

1	12-22 = 8	4-14 = 7	6-17 = 11
2	= 8	= 6	= 11
3	= 5	= 6	= 10
4	= 8	= 14	= 10
5	= 7	= 13	= 13



1	2-22 = 10	4-15 = 14	6-18 = 26
2	= 10	= 14	= 26
3	= 7	= 14	= 26
4	= 11	= 16	= 26
5	= 10	= 16	= 26



1	2-13 = 11	5-13 = 21	8-30 = 0
2	= 11	= 21	= 0
3	= 10	= 21	= 0
4	= 14	= 20	= 0
5	= 14	= 19	= 0



1	2-14 = 19	5-14 = 13	9-29 = 0
2	= 23	= 9	= 0
3	= 18	= 13	= 0
4	= 20	= 14	= 0
5	= 19	= 15	= 0



1	3-22 = 6	5-15 = 5	17-27 = 11
2	= 6	= 3	= 13
3	= 8	= 3	= 8
4	= 13	= 9	= 9
5	= 12	= 10	= 9

1	3-13 = 5	5-16 = 13	18-28 = 14
2	= 4	= 11	= 13
3	= 6	= 12	= 12
4	= 11	= 12	= 9
5	= 11	= 14	= 9

DATA OF MEASUREMENT

21

[5.]

1	1-11 = 1	3-14 = 16	6-15 = 11
2	= 4	= 17	= 9
3	= 4	= 19	= 7
4	= 4	= 19	= 8
5	= 5	= 17	= 12

1	2-12 = 3	4-13 = 14	6-16 = 5
2	= 4	= 16	= 3
3	= 7	= 17	= 5
4	= 6	= 18	= 7
5	= 4	= 16	= 7

1	12-22 = 16	4-14 = 13	6-17 = 15
2	= 17	= 14	= 13
3	= 15	= 15	= 15
4	= 16	= 16	= 17
5	= 9	= 15	= 13

1	2-22 = 19	4-15 = 15	6-18 = 32
2	= 20	= 17	= 29
3	= 21	= 21	= 31
4	= 21	= 18	= 32
5	= 13	= 18	= 29

1	2-13 = 21	5-13 = 15	8-30 = 2
2	= 21	= 16	= 0
3	= 21	= 17	= 0
4	= 21	= 17	= 0
5	= 17	= 19	= 0

1	2-14 = 22	5-14 = 13	9-29 = 0
2	= 21	= 14	= 0
3	= 26	= 10	= 0
4	= 24	= 13	= 0
5	= 22	= 13	= 0

1	3-22 = 15	5-15 = 6	17-27 = 8
2	= 18	= 4	= 7
3	= 19	= 6	= 5
4	= 19	= 6	= 6
5	= 13	= 7	= 7

1	3-13 = 15	5-16 = 10	18-28 = 15
2	= 17	= 9	= 13
3	= 17	= 10	= 12
4	= 18	= 11	= 12
5	= 14	= 11	= 12



DATA OF MEASUREMENT

22

[1a]



1	1-11 = 10	3-14 = 11	6-15 = 12
2	= 9	= 11	= 13
3	= 9	= 13	= 12
4	= 7	= 15	= 14
5	= 5	= 15	= 14
1	2-12 = 3	4-13 = 11	6-16 = 9
2	= 4	= 11	= 11
3	= 3	= 13	= 8
4	= 3	= 14	= 11
5	= 2	= 16	= 10
1	12-22 = 4	4-14 = 3	6-17 = 13
2	= 5	= 2	= 14
3	= 7	= 10	= 13
4	= 8	= 13	= 14
5	= 11	= 14	= 14
1	2-22 = 7	4-15 = 13	6-18 = 26
2	= 7	= 12	= 26
3	= 10	= 15	= 28
4	= 11	= 16	= 28
5	= 13	= 17	= 26
1	2-13 = 10	5-13 = 22	8-30 = 0
2	= 10	= 22	= 0
3	= 13	= 20	= 0
4	= 16	= 19	= 0
5	= 15	= 20	= 0
1	2-14 = 20	5-14 = 13	9-29 = 0
2	= 19	= 14	= 0
3	= 20	= 13	= 0
4	= 20	= 14	= 0
5	= 20	= 14	= 0
1	3-22 = 7	5-15 = 4	17-27 = 14
2	= 8	= 5	= 15
3	= 10	= 7	= 10
4	= 12	= 10	= 10
5	= 16	= 11	= 8
1	3-13 = 2	5-16 = 10	18-28 = 16
2	= 3	= 12	= 15
3	= 9	= 10	= 9
4	= 12	= 13	= 8
5	= 12	= 13	= 8

DATA OF MEASUREMENT

23

[εə]

1	1-11 = 12	3-14 = 13	6-15 = 13
2	= 9	= 13	= 14
3	= 9	= 14	= 14
4	= 8	= 15	= 15
5	= 6	= 16	= 13

1	2-12 = 8	4-13 = 13	6-16 = 10
2	= 8	= 13	= 11
3	= 6	= 14	= 11
4	= 5	= 16	= 11
5	= 4	= 16	= 11

1	12-22 = 3	4-14 = 11	6-17 = 13
2	= 3	= 12	= 14
3	= 4	= 13	= 15
4	= 9	= 15	= 14
5	= 8	= 15	= 14

1	2-22 = 11	4-15 = 15	6-18 = 29
2	= 11	= 17	= 30
3	= 10	= 16	= 31
4	= 14	= 17	= 30
5	= 11	= 18	= 31

1	2-13 = 14	5-13 = 19	8-30 = 0
2	= 14	= 19	= 0
3	= 15	= 19	= 0
4	= 16	= 21	= 0
5	= 15	= 20	= 0

1	2-14 = 20	5-14 = 13	9-29 = 0
2	= 19	= 14	= 0
3	= 20	= 14	= 0
4	= 20	= 15	= 0
5	= 22	= 14	= 0

1	3-22 = 15	5-15 = 8	17-27 = 11
2	= 15	= 10	= 13
3	= 13	= 10	= 11
4	= 14	= 12	= 10
5	= 13	= 11	= 8

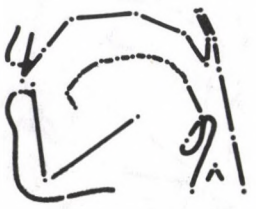
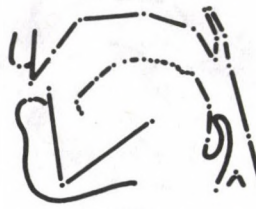
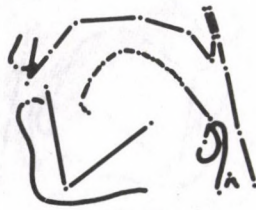
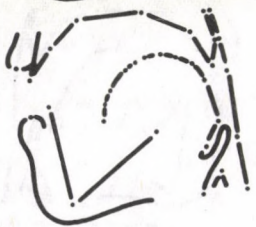
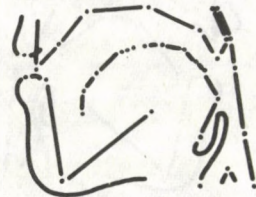
1	3-13 = 10	5-16 = 12	18-28 = 10
2	= 10	= 13	= 9
3	= 11	= 12	= 9
4	= 13	= 13	= 9
5	= 12	= 13	= 9



DATA OF MEASUREMENT

24

[ara]



1	1-11 = 3	3-14 = 16	6-15 = 14
2	= 13	= 19	= 13
3	= 10	= 13	= 13
4	= 8	= 15	= 14
5	= 7	= 14	= 14

1	2-12 = 4	4-13 = 16	6-16 = 6
2	= 8	= 19	= 7
3	= 4	= 15	= 10
4	= 4	= 15	= 10
5	= 3	= 14	= 9

1	12-22 = 9	4-14 = 13	6-17 = 10
2	= 14	= 17	= 12
3	= 10	= 12	= 12
4	= 8	= 14	= 11
5	= 8	= 14	= 12

1	2-22 = 13	4-15 = 17	6-18 = 27
2	= 20	= 19	= 28
3	= 14	= 17	= 27
4	= 12	= 18	= 27
5	= 11	= 18	= 28

1	2-13 = 15	5-13 = 22	8-30 = 0
2	= 20	= 21	= 0
3	= 15	= 20	= 0
4	= 16	= 19	= 1
5	= 14	= 21	= 1

1	2-14 = 22	5-14 = 13	9-29 = 0
2	= 24	= 14	= 0
3	= 19	= 15	= 0
4	= 21	= 15	= 0
5	= 20	= 15	= 0

1	3-22 = 13	5-15 = 10	17-27 = 7
2	= 19	= 11	= 5
3	= 15	= 9	= 12
4	= 13	= 11	= 9
5	= 13	= 11	= 9

1	3-13 = 12	5-16 = 13	18-28 = 10
2	= 18	= 13	= 7
3	= 12	= 14	= 8
4	= 13	= 14	= 9
5	= 11	= 14	= 11

DATA OF MEASUREMENT

1	1-11 = 3	3-14 = 10	6-15 = 14
2	= 6	= 13	= 15
3	= 8	= 10	= 14
4	= 9	= 12	= 15
5	= 8	= 14	= 13

1	2-12 = 2	4-13 = 12	6-16 = 7
2	= 3	= 14	= 6
3	= 3	= 10	= 11
4	= 3	= 13	= 10
5	= 3	= 15	= 9

1	12-22 = 7	4-14 = 9	6-17 = 12
2	= 11	= 12	= 12
3	= 7	= 6	= 13
4	= 7	= 11	= 14
5	= 8	= 13	= 13

1	2-22 = 9	4-15 = 15	6-18 = 26
2	= 14	= 15	= 26
3	= 9	= 15	= 24
4	= 10	= 16	= 28
5	= 11	= 17	= 27

1	2-13 = 12	5-13 = 21	8-30 = 0
2	= 15	= 19	= 0
3	= 11	= 21	= 0
4	= 12	= 21	= 0
5	= 14	= 20	= 0

1	2-14 = 17	5-14 = 14	9-29 = 0
2	= 19	= 14	= 0
3	= 18	= 14	= 0
4	= 18	= 14	= 0
5	= 19	= 15	= 0

1	3-22 = 10	5-15 = 4	17-27 = 7
2	= 11	= 6	= 6
3	= 6	= 7	= 15
4	= 11	= 9	= 9
5	= 12	= 10	= 8

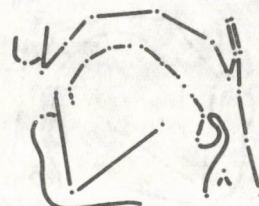
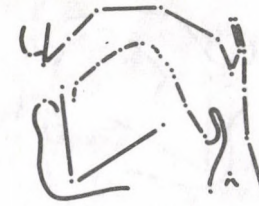
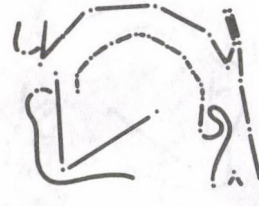




1	3-13 = 7	5-16 = 12	18-28 = 11
2	= 11	= 12	= 10
3	= 4	= 13	= 9
4	= 9	= 13	= 7
5	= 12	= 13	= 8

25
[ɔɪə]



26
[era]

DATA OF MEASUREMENT

	1	1-11 = 14	3-14 = 11	6-15 = 17
	2	= 12	= 13	= 16
	3	= 11	= 12	= 15
	4	= 10	= 16	= 14
	5	= 7	= 16	= 17
	1	2-12 = 6	4-13 = 11	6-16 = 12
	2	= 7	= 13	= 14
	3	= 4	= 12	= 8
	4	= 4	= 15	= 6
	5	= 3	= 15	= 9
	1	12-22 = 3	4-14 = 9	6-17 = 15
	2	= 3	= 11	= 14
	3	= 5	= 10	= 13
	4	= 9	= 16	= 13
	5	= 8	= 16	= 14
	1	2-22 = 8	4-15 = 14	6-18 = 25
	2	= 9	= 17	= 25
	3	= 9	= 16	= 25
	4	= 13	= 19	= 25
	5	= 11	= 19	= 25
	1	2-13 = 12	5-13 = 21	8-30 = 0
	2	= 13	= 21	= 0
	3	= 12	= 21	= 0
	4	= 16	= 20	= 0
	5	= 16	= 20	= 0
	1	2-14 = 18	5-14 = 15	9-29 = 0
	2	= 19	= 15	= 0
	3	= 18	= 15	= 0
	4	= 20	= 17	= 0
	5	= 20	= 17	= 0
	1	3-22 = 12	5-15 = 9	17-27 = 11
	2	= 11	= 10	= 17
	3	= 11	= 8	= 9
	4	= 14	= 11	= 5
	5	= 12	= 13	= 5
	1	3-13 = 7	5-16 = 17	18-28 = 11
	2	= 9	= 14	= 10
	3	= 9	= 14	= 11
	4	= 13	= 14	= 6
	5	= 13	= 16	= 7

DATA OF MEASUREMENT

27

[ava]

1	1-11 = 19	3-14 = 16	6-15 = 14
2	= 13	= 17	= 13
3	= 8	= 16	= 14
4	= 8	= 17	= 15
5	= 5	= 15	= 12

1	2-12 = 11	4-13 = 17	6-16 = 7
2	= 10	= 18	= 6
3	= 4	= 16	= 5
4	= 4	= 15	= 8
5	= 3	= 15	= 8

1	12-22 = 9	4-14 = 16	6-17 = 13
2	= 12	= 16	= 13
3	= 10	= 15	= 12
4	= 9	= 16	= 12
5	= 7	= 14	= 12

1	2-22 = 15	4-15 = 17	6-18 = 27
2	= 20	= 17	= 28
3	= 14	= 17	= 26
4	= 12	= 17	= 26
5	= 10	= 19	= 25

1	2-13 = 18	5-13 = 19	8-30 = 0
2	= 20	= 18	= 0
3	= 17	= 18	= 0
4	= 20	= 14	= 0
5	= 15	= 19	= 0

1	2-14 = 20	5-14 = 15	9-29 = 0
2	= 22	= 14	= 0
3	= 20	= 14	= 0
4	= 24	= 11	= 0
5	= 19	= 15	= 0

1	3-22 = 17	5-15 = 9	17-27 = 7
2	= 21	= 8	= 7
3	= 14	= 8	= 7
4	= 16	= 10	= 11
5	= 10	= 10	= 12

1	3-13 = 15	5-16 = 13	18-28 = 9
2	= 17	= 13	= 8
3	= 15	= 12	= 10
4	= 15	= 14	= 9
5	= 12	= 13	= 9



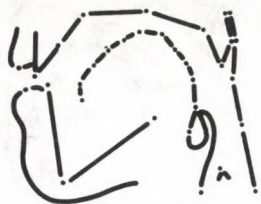
DATA OF MEASUREMENT

28

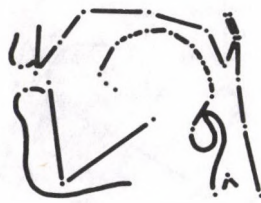
[ɔʊə]



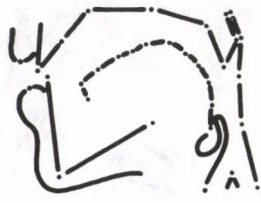
1	1-11 = 9	3-14 = 12	6-15 = 16
2	= 6	= 13	= 15
3	= 5	= 14	= 14
4	= 8	= 14	= 15
5	= 9	= 17	= 17



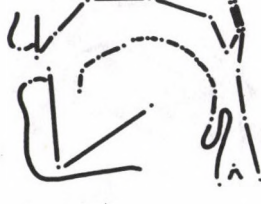
1	2-12 = 4	4-13 = 12	6-16 = 9
2	= 4	= 13	= 8
3	= 4	= 16	= 6
4	= 4	= 15	= 9
5	= 4	= 15	= 10



1	12-22 = 6	4-14 = 10	6-17 = 14
2	= 8	= 11	= 13
3	= 14	= 11	= 13
4	= 8	= 14	= 14
5	= 8	= 14	= 15



1	2-22 = 9	4-15 = 15	6-18 = 26
2	= 11	= 15	= 26
3	= 17	= 16	= 26
4	= 11	= 17	= 26
5	= 11	= 17	= 26



1	2-13 = 12	5-13 = 21	8-30 = 0
2	= 14	= 19	= 0
3	= 16	= 20	= 0
4	= 15	= 19	= 0
5	= 15	= 19	= 0



1	2-14 = 19	5-14 = 13	9-29 = 0
2	= 19	= 14	= 0
3	= 21	= 11	= 0
4	= 20	= 15	= 0
5	= 22	= 13	= 0

1	3-22 = 9	5-15 = 7	17-27 = 9
2	= 12	= 6	= 9
3	= 15	= 5	= 6
4	= 13	= 9	= 6
5	= 11	= 10	= 6

1	3-13 = 7	5-16 = 14	18-28 = 11
2	= 10	= 13	= 12
3	= 13	= 14	= 12
4	= 12	= 13	= 7
5	= 12	= 14	= 7

DATA OF MEASUREMENT

29

[b]

1	1-11 = 0	3-14 = 12	6-15 = 15
2	= 0	= 12	= 16
3	= 0	= 11	= 15
4	= 0	= 12	= 15
5	= 0	= 13	= 15

1	2-12 = 3	4-13 = 12	6-16 = 13
2	= 3	= 12	= 13
3	= 2	= 12	= 13
4	= 2	= 12	= 13
5	= 3	= 12	= 15

1	12-22 = 5	4-14 = 10	6-17 = 17
2	= 6	= 11	= 16
3	= 6	= 11	= 16
4	= 6	= 11	= 17
5	= 2	= 11	= 18

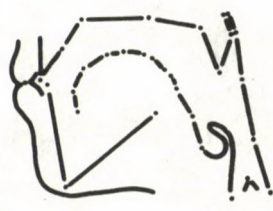
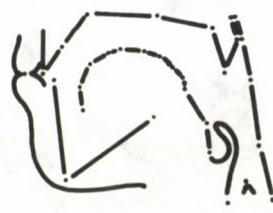
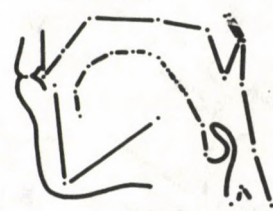
1	2-22 = 9	4-15 = 17	6-18 = 31
2	= 9	= 17	= 31
3	= 9	= 17	= 30
4	= 9	= 17	= 31
5	= 5	= 19	= 31

1	2-13 = 11	5-13 = 21	8-30 = 0
2	= 12	= 20	= 0
3	= 11	= 21	= 0
4	= 11	= 21	= 0
5	= 11	= 21	= 0

1	2-14 = 18	5-14 = 14	9-29 = 0
2	= 18	= 14	= 0
3	= 18	= 14	= 0
4	= 18	= 14	= 0
5	= 18	= 14	= 0

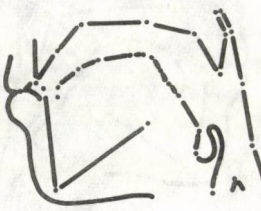
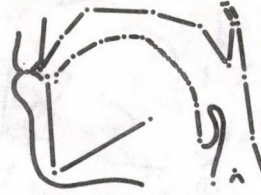
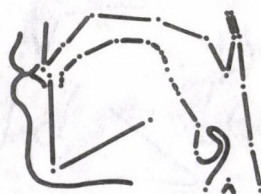
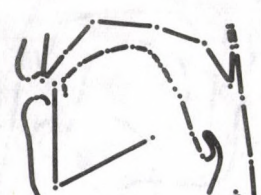
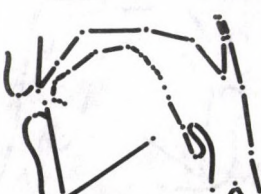

1	3-22 = 10	5-15 = 8	17-27 = 13
2	= 11	= 9	= 15
3	= 11	= 9	= 15
4	= 10	= 9	= 15
5	= 9	= 9	= 16

1	3-13 = 7	5-16 = 12	18-28 = 11
2	= 8	= 14	= 11
3	= 7	= 13	= 12
4	= 7	= 13	= 12
5	= 7	= 14	= 13



30
[p]

DATA OF MEASUREMENT

	1	1-11 = 0	3-14 = 10	6-15 = 13
	2	= 0	= 10	= 13
	3	= 0	= 13	= 14
	4	= 5	= 10	= 13
	5	= 6	= 9	= 13
	1	2-12 = 2	4-13 = 11	6-16 = 12
	2	= 2	= 11	= 11
	3	= 2	= 11	= 12
	4	= 3	= 11	= 12
	5	= 4	= 11	= 12
	1	12-22 = 3	4-14 = 10	6-17 = 16
	2	= 2	= 8	= 14
	3	= 2	= 8	= 15
	4	= 2	= 8	= 14
	5	= 4	= 6	= 15
	1	2-22 = 5	4-15 = 17	6-18 = 29
	2	= 4	= 15	= 29
	3	= 4	= 15	= 28
	4	= 5	= 15	= 28
	5	= 4	= 15	= 29
	1	2-13 = 11	5-13 = 20	8-30 = 0
	2	= 9	= 22	= 0
	3	= 9	= 22	= 0
	4	= 10	= 21	= 0
	5	= 9	= 22	= 1
	1	2-14 = 16	5-14 = 15	9-29 = 0
	2	= 17	= 14	= 0
	3	= 19	= 12	= 0
	4	= 17	= 14	= 0
	5	= 17	= 14	= 1
	1	3-22 = 9	5-15 = 8	17-27 = 15
	2	= 9	= 6	= 13
	3	= 8	= 6	= 15
	4	= 7	= 6	= 15
	5	= 5	= 6	= 17
	1	3-13 = 6	5-16 = 12	18-28 = 13
	2	= 5	= 12	= 12
	3	= 5	= 12	= 13
	4	= 5	= 14	= 11
	5	= 3	= 12	= 13

DATA OF MEASUREMENT

31

[m]

1	1-11 = 0	3-14 = 11	6-15 = 13
2	= 0	= 11	= 14
3	= 0	= 11	= 14
4	= 0	= 11	= 14
5	= 2	= 11	= 13

1	2-12 = 4	4-13 = 13	6-16 = 11
2	= 4	= 13	= 11
3	= 4	= 13	= 9
4	= 4	= 12	= 12
5	= 4	= 11	= 10

1	12-22 = 5	4-14 = 10	6-17 = 14
2	= 4	= 11	= 14
3	= 3	= 10	= 14
4	= 3	= 11	= 16
5	= 3	= 10	= 12

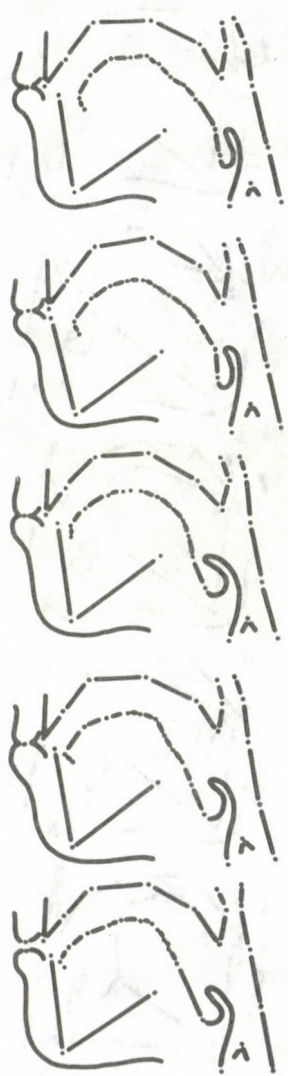
1	2-22 = 9	4-15 = 16	6-18 = 28
2	= 8	= 15	= 28
3	= 7	= 14	= 23
4	= 6	= 15	= 28
5	= 6	= 14	= 28

1	2-13 = 11	5-13 = 20	8-30 = 5
2	= 11	= 21	= 5
3	= 10	= 21	= 4
4	= 10	= 20	= 5
5	= 11	= 19	= 12

1	2-14 = 17	5-14 = 13	9-29 = 3
2	= 17	= 15	= 4
3	= 17	= 14	= 5
4	= 17	= 14	= 4
5	= 17	= 14	= 5

1	3-22 = 10	5-15 = 9	17-27 = 13
2	= 11	= 10	= 13
3	= 10	= 9	= 15
4	= 11	= 9	= 16
5	= 12	= 9	= 19

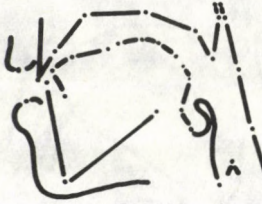
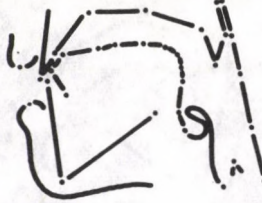
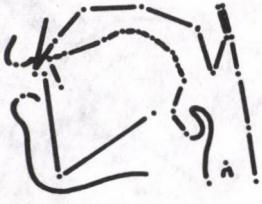
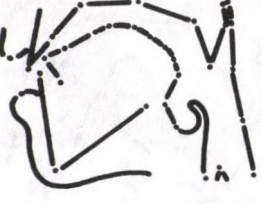



1	3-13 = 7	5-16 = 15	18-28 = 11
2	= 8	= 16	= 11
3	= 7	= 15	= 13
4	= 6	= 16	= 13
5	= 7	= 11	= 14



DATA OF MEASUREMENT

32

[d]

	1	1-11 = 8	3-14 = 13	6-15 = 13
	2	= 9	= 11	= 14
	3	= 8	= 12	= 14
	4	= 9	= 14	= 14
	5	= 10	= 11	= 13
	1	2-12 = 2	4-13 = 12	6-16 = 8
	2	= 2	= 12	= 8
	3	= 2	= 12	= 8
	4	= 2	= 12	= 9
	5	= 1	= 12	= 11
	1	12-22 = 3	4-14 = 10	6-17 = 12
	2	= 3	= 9	= 14
	3	= 4	= 9	= 14
	4	= 3	= 8	= 14
	5	= 6	= 5	= 15
	1	2-22 = 4	4-15 = 15	6-18 = 25
	2	= 4	= 15	= 25
	3	= 5	= 15	= 26
	4	= 4	= 14	= 26
	5	= 7	= 15	= 26
	1	2-13 = 9	5-13 = 21	8-30 = 1
	2	= 8	= 22	= 1
	3	= 9	= 22	= 0
	4	= 9	= 21	= 0
	5	= 9	= 21	= 0
	1	2-14 = 18	5-14 = 13	9-29 = 1
	2	= 17	= 14	= 0
	3	= 18	= 12	= 0
	4	= 17	= 13	= 0
	5	= 18	= 13	= 0
	1	3-22 = 5	5-15 = 7	17-27 = 12
	2	= 4	= 8	= 14
	3	= 4	= 7	= 13
	4	= 2	= 6	= 13
	5	= 8	= 7	= 18
	1	3-13 = 4	5-16 = 13	18-28 = 14
	2	= 2	= 13	= 16
	3	= 4	= 14	= 15
	4	= 6	= 13	= 16
	5	= 4	= 13	= 16

DATA OF MEASUREMENT

33

[t]

1	1-11 = 7	3-14 = 9	6-15 = 12
2	= 7	= 9	= 12
3	= 9	= 9	= 12
4	= 10	= 10	= 13
5	= 12	= 9	= 12

1	2-12 = 2	4-13 = 11	6-16 = 8
2	= 1	= 10	= 8
3	= 1	= 11	= 9
4	= 1	= 10	= 9
5	= 4	= 10	= 8

1	12-22 = 3	4-14 = 6	6-17 = 12
2	= 4	= 6	= 13
3	= 5	= 5	= 13
4	= 5	= 6	= 13
5	= 4	= 6	= 12

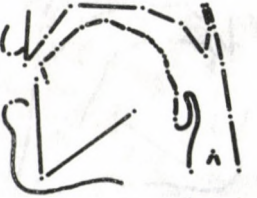
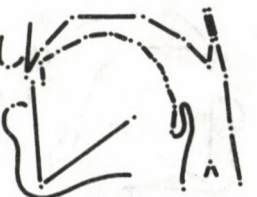
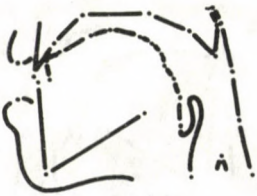
1	2-22 = 4	4-15 = 16	6-18 = 24
2	= 4	= 16	= 25
3	= 5	= 15	= 24
4	= 5	= 15	= 24
5	= 4	= 16	= 24

1	2-13 = 9	5-13 = 23	8-30 = 0
2	= 8	= 24	= 0
3	= 8	= 24	= 0
4	= 9	= 23	= 0
5	= 9	= 22	= 0

1	2-14 = 17	5-14 = 15	9-29 = 0
2	= 17	= 15	= 0
3	= 17	= 15	= 0
4	= 17	= 15	= 0
5	= 17	= 15	= 0

1	3-22 = 5	5-15 = 5	17-27 = 13
2	= 4	= 5	= 13
3	= 4	= 6	= 14
4	= 3	= 7	= 14
5	= 6	= 5	= 13

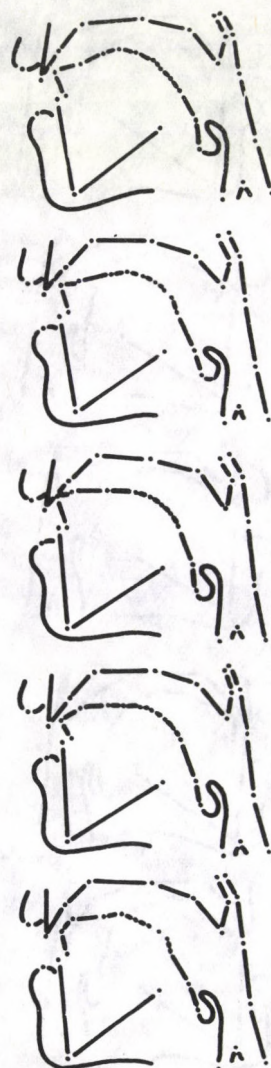
1	3-13 = 3	5-16 = 11	18-28 = 14
2	= 1	= 11	= 14
3	= 2	= 11	= 14
4	= 3	= 11	= 14
5	= 4	= 10	= 13



DATA OF MEASUREMENT

34

[n]



1	1-11 = 11	3-14 = 11	6-15 = 14
2	= 12	= 11	= 13
3	= 11	= 10	= 15
4	= 12	= 10	= 14
5	= 12	= 10	= 14
1	2-12 = 6	4-13 = 10	6-16 = 12
2	= 6	= 10	= 11
3	= 6	= 12	= 12
4	= 6	= 9	= 11
5	= 6	= 11	= 12
1	12-22 = 7	4-14 = 9	6-17 = 15
2	= 8	= 9	= 14
3	= 8	= 9	= 15
4	= 6	= 9	= 14
5	= 7	= 10	= 15
1	2-22 = 4	4-15 = 15	6-18 = 30
2	= 4	= 15	= 30
3	= 5	= 13	= 30
4	= 4	= 14	= 30
5	= 4	= 15	= 29
1	2-13 = 11	5-13 = 19	8-30 = 2
2	= 9	= 21	= 2
3	= 9	= 21	= 2
4	= 9	= 21	= 2
5	= 9	= 21	= 2
1	2-14 = 17	5-14 = 13	9-29 = 1
2	= 17	= 13	= 2
3	= 17	= 13	= 2
4	= 16	= 14	= 1
5	= 16	= 14	= 2
1	3-22 = 5	5-15 = 9	17-27 = 14
2	= 4	= 9	= 15
3	= 5	= 9	= 16
4	= 5	= 9	= 15
5	= 6	= 9	= 17
1	3-13 = 6	5-16 = 12	18-28 = 13
2	= 4	= 12	= 12
3	= 3	= 12	= 13
4	= 4	= 12	= 12
5	= 4	= 12	= 12

DATA OF MEASUREMENT

35

[d']

1	1-11 = 4	3-14 = 10	6-15 = 12
2	= 5	= 9	= 13
3	= 4	= 9	= 12
4	= 5	= 10	= 12
5	= 4	= 10	= 12

1	2-12 = 2	4-13 = 10	6-16 = 6
2	= 3	= 9	= 9
3	= 2	= 10	= 9
4	= 3	= 10	= 12
5	= 1	= 10	= 11

1	12-22 = 3	4-14 = 7	6-17 = 13
2	= 4	= 4	= 13
3	= 3	= 2	= 14
4	= 2	= 4	= 16
5	= 6	= 5	= 15

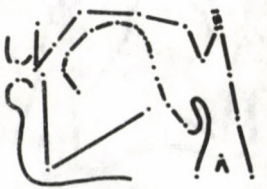
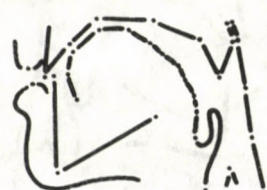
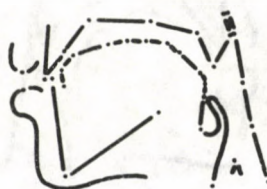
1	2-22 = 5	4-15 = 15	6-18 = 24
2	= 6	= 14	= 24
3	= 5	= 14	= 25
4	= 4	= 13	= 25
5	= 7	= 14	= 25

1	2-13 = 9	5-13 = 21	8-30 = 0
2	= 10	= 21	= 0
3	= 9	= 22	= 0
4	= 9	= 21	= 0
5	= 9	= 21	= 0

1	2-14 = 17	5-14 = 13	9-29 = 0
2	= 18	= 13	= 0
3	= 18	= 13	= 0
4	= 18	= 13	= 0
5	= 18	= 13	= 0

1	3-22 = 4	5-15 = 5	17-27 = 9
2	= 9	= 4	= 12
3	= 7	= 5	= 12
4	= 5	= 3	= 18
5	= 6	= 3	= 17

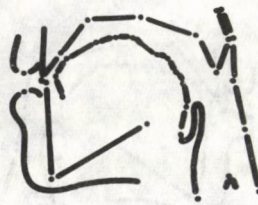
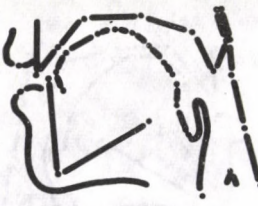
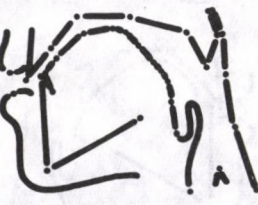
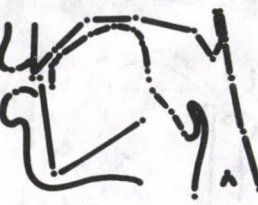


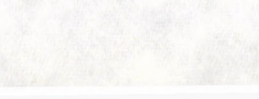
1	3-13 = 2	5-16 = 11	18-28 = 12
2	= 2	= 11	= 12
3	= 1	= 13	= 13
4	= 2	= 12	= 11
5	= 4	= 11	= 12



DATA OF MEASUREMENT

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[t']

	1	1-11 = 5	3-14 = 10	6-15 = 15
	2	= 6	= 11	= 15
	3	= 5	= 9	= 15
	4	= 6	= 10	= 15
	5	= 6	= 11	= 15
	1	2-12 = 2	4-13 = 11	6-16 = 9
	2	= 3	= 10	= 11
	3	= 3	= 12	= 11
	4	= 2	= 11	= 16
	5	= 2	= 12	= 13
	1	12-22 = 2	4-14 = 7	6-17 = 13
	2	= 1	= 5	= 14
	3	= 1	= 4	= 14
	4	= 4	= 3	= 18
	5	= 8	= 4	= 16
	1	2-22 = 4	4-15 = 13	6-18 = 26
	2	= 4	= 13	= 26
	3	= 4	= 13	= 26
	4	= 5	= 12	= 26
	5	= 10	= 12	= 26
	1	2-13 = 9	5-13 = 22	8-30 = 0
	2	= 9	= 21	= 0
	3	= 9	= 21	= 0
	4	= 8	= 22	= 0
	5	= 10	= 21	= 0
	1	2-14 = 17	5-14 = 13	9-29 = 0
	2	= 19	= 12	= 0
	3	= 18	= 13	= 0
	4	= 18	= 13	= 0
	5	= 19	= 12	= 0
	1	3-22 = 6	5-15 = 6	17-27 = 11
	2	= 6	= 5	= 13
	3	= 6	= 4	= 14
	4	= 4	= 3	= 19
	5	= 9	= 3	= 20
	1	3-13 = 3	5-16 = 13	18-28 = 15
	2	= 2	= 13	= 13
	3	= 2	= 13	= 14
	4	= 1	= 14	= 14
	5	= 5	= 6	= 13

DATA OF MEASUREMENT

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[n']

1	1-11 = 6	3-14 = 12	6-15 = 15
2	= 6	= 12	= 14
3	= 6	= 11	= 15
4	= 7	= 11	= 14
5	= 6	= 10	= 14

1	2-12 = 1	4-13 = 13	6-16 = 12
2	= 2	= 12	= 14
3	= 2	= 12	= 12
4	= 2	= 12	= 12
5	= 2	= 12	= 12

1	12-22 = 4	4-14 = 9	6-17 = 15
2	= 3	= 9	= 16
3	= 4	= 10	= 14
4	= 7	= 5	= 16
5	= 5	= 6	= 14

1	2-22 = 4	4-15 = 13	6-18 = 29
2	= 4	= 14	= 29
3	= 5	= 14	= 28
4	= 9	= 12	= 30
5	= 6	= 13	= 28

1	2-13 = 9	5-13 = 22	8-30 = 2
2	= 9	= 21	= 4
3	= 9	= 21	= 4
4	= 10	= 21	= 4
5	= 9	= 21	= 4

1	2-14 = 19	5-14 = 12	9-29 = 3
2	= 19	= 12	= 5
3	= 18	= 13	= 3
4	= 19	= 12	= 4
5	= 19	= 11	= 3

1	3-22 = 4	5-15 = 7	17-27 = 16
2	= 4	= 8	= 19
3	= 5	= 8	= 17
4	= 7	= 5	= 19
5	= 4	= 6	= 17

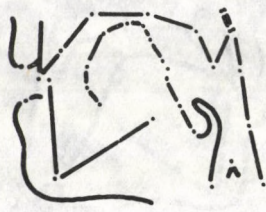
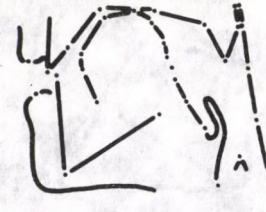
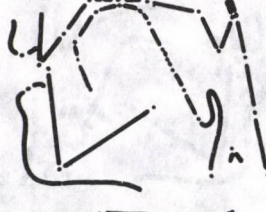

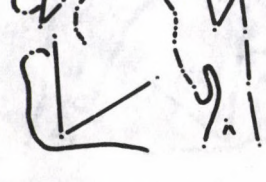


1	3-13 = 3	5-16 = 13	18-28 = 11
2	= 2	= 14	= 13
3	= 2	= 12	= 12
4	= 5	= 8	= 14
5	= 2	= 12	= 12



DATA OF MEASUREMENT

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[g]

	1	1-11 = 8	3-14 = 11	6-15 = 13
	2	= 8	= 11	= 13
	3	= 8	= 9	= 14
	4	= 9	= 12	= 13
	5	= 10	= 11	= 14
	1	2-12 = 2	4-13 = 13	6-16 = 11
	2	= 2	= 12	= 13
	3	= 2	= 11	= 13
	4	= 2	= 13	= 9
	5	= 4	= 12	= 10
	1	12-22 = 9	4-14 = 6	6-17 = 14
	2	= 6	= 2	= 16
	3	= 7	= 2	= 15
	4	= 6	= 2	= 13
	5	= 5	= 2	= 15
	1	2-22 = 11	4-15 = 13	6-18 = 25
	2	= 8	= 13	= 26
	3	= 9	= 13	= 26
	4	= 8	= 12	= 25
	5	= 8	= 12	= 25
	1	2-13 = 11	5-13 = 20	8-30 = 0
	2	= 9	= 21	= 0
	3	= 10	= 21	= 0
	4	= 9	= 22	= 0
	5	= 9	= 21	= 0
	1	2-14 = 19	5-14 = 12	9-29 = 0
	2	= 19	= 13	= 0
	3	= 19	= 13	= 0
	4	= 20	= 12	= 0
	5	= 20	= 12	= 0
	1	3-22 = 11	5-15 = 3	17-27 = 17
	2	= 6	= 3	= 17
	3	= 7	= 2	= 17
	4	= 8	= 2	= 16
	5	= 9	= 3	= 17
	1	3-13 = 7	5-16 = 13	18-28 = 13
	2	= 4	= 12	= 12
	3	= 3	= 13	= 13
	4	= 5	= 6	= 13
	5	= 4	= 13	= 13

DATA OF MEASUREMENT

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[k]

1	1-11 = 8	3-14 = 9	6-15 = 13
2	= 9	= 9	= 13
3	= 9	= 11	= 12
4	= 11	= 11	= 13
5	= 11	= 11	= 13

1	2-12 = 3	4-13 = 9	6-16 = 11
2	= 2	= 9	= 11
3	= 2	= 10	= 9
4	= 3	= 13	= 13
5	= 3	= 13	= 13

1	12-22 = 4	4-14 = 3	6-17 = 13
2	= 4	= 1	= 16
3	= 5	= 1	= 12
4	= 5	= 2	= 15
5	= 5	= 2	= 15

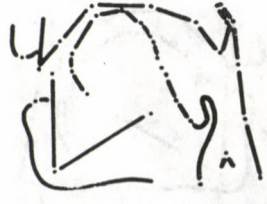
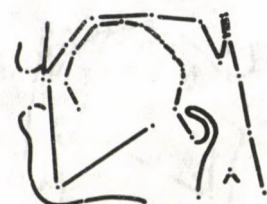
1	2-22 = 7	4-15 = 13	6-18 = 27
2	= 6	= 13	= 29
3	= 7	= 13	= 26
4	= 8	= 13	= 25
5	= 8	= 13	= 25

1	2-13 = 11	5-13 = 20	8-30 = 0
2	= 11	= 21	= 0
3	= 11	= 21	= 0
4	= 9	= 22	= 0
5	= 9	= 22	= 0

1	2-14 = 18	5-14 = 14	9-29 = 0
2	= 19	= 14	= 0
3	= 21	= 13	= 0
4	= 20	= 13	= 0
5	= 20	= 13	= 0

1	3-22 = 9	5-15 = 3	17-27 = 15
2	= 10	= 3	= 13
3	= 7	= 3	= 13
4	= 8	= 4	= 16
5	= 8	= 4	= 16

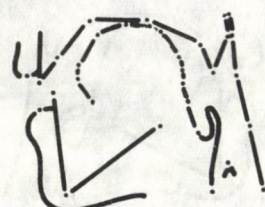
1	3-13 = 4	5-16 = 13	18-28 = 14
2	= 3	= 11	= 14
3	= 3	= 13	= 13
4	= 4	= 13	= 11
5	= 4	= 13	= 10



DATA OF MEASUREMENT

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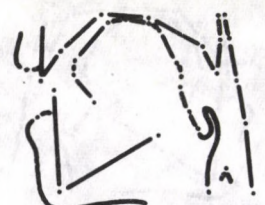
[b]



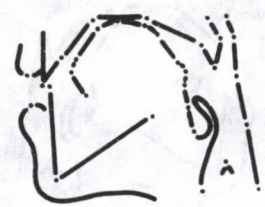
1	1-11 = 9	3-14 = 10	6-15 = 15
2	= 12	= 13	= 15
3	= 8	= 12	= 15
4	= 8	= 14	= 15
5	= 7	= 14	= 15

1	2-12 = 4	4-13 = 12	6-16 = 6
2	= 4	= 14	= 7
3	= 2	= 11	= 6
4	= 2	= 13	= 6
5	= 2	= 14	= 7

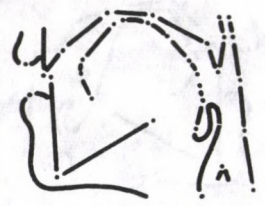
1	12-22 = 7	4-14 = 4	6-17 = 11
2	= 6	= 2	= 10
3	= 6	= 3	= 11
4	= 7	= 3	= 10
5	= 6	= 7	= 9



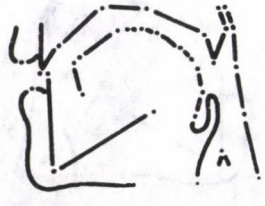
1	2-22 = 9	4-15 = 13	6-18 = 22
2	= 8	= 11	= 21
3	= 9	= 13	= 21
4	= 9	= 10	= 22
5	= 8	= 12	= 21



1	2-13 = 10	5-13 = 21	8-30 = 0
2	= 9	= 21	= 2
3	= 11	= 20	= 3
4	= 10	= 21	= 2
5	= 9	= 21	= 1



1	2-14 = 18	5-14 = 13	9-29 = 0
2	= 22	= 10	= 2
3	= 21	= 11	= 4
4	= 22	= 9	= 2
5	= 21	= 9	= 1



1	3-22 = 7	5-15 = 1	17-27 = 12
2	= 7	= 0	= 13
3	= 5	= 0	= 12
4	= 7	= 2	= 9
5	= 6	= 6	= 9

1	3-13 = 5	5-16 = 13	18-28 = 12
2	= 4	= 13	= 11
3	= 4	= 14	= 12
4	= 5	= 14	= 11
5	= 6	= 14	= 11

DATA OF MEASUREMENT

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[r]

1	1-11 = 3	3-14 = 12	6-15 = 12
2	= 3	= 12	= 12
3	= 2	= 12	= 12
4	= 2	= 12	= 13
5	= 2	= 13	= 12

1	2-12 = 2	4-13 = 13	6-16 = 7
2	= 2	= 11	= 7
3	= 2	= 10	= 6
4	= 2	= 11	= 7
5	= 2	= 12	= 7

1	12-22 = 8	4-14 = 10	6-17 = 13
2	= 4	= 9	= 13
3	= 4	= 8	= 13
4	= 3	= 10	= 13
5	= 3	= 10	= 12

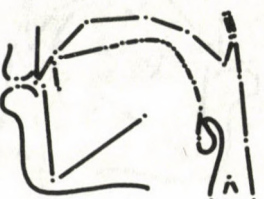
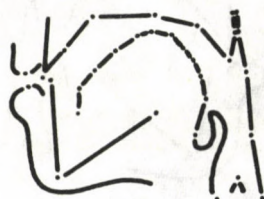
1	2-22 = 9	4-15 = 14	6-18 = 28
2	= 6	= 14	= 29
3	= 6	= 14	= 28
4	= 5	= 15	= 28
5	= 4	= 15	= 28

1	2-13 = 12	5-13 = 21	8-30 = 0
2	= 3	= 23	= 0
3	= 10	= 22	= 0
4	= 8	= 23	= 0
5	= 11	= 21	= 0

1	2-14 = 19	5-14 = 13	9-29 = 0
2	= 19	= 13	= 0
3	= 20	= 12	= 0
4	= 19	= 13	= 0
5	= 20	= 13	= 0

1	3-22 = 10	5-15 = 5	17-27 = 11
2	= 4	= 5	= 12
3	= 3	= 6	= 11
4	= 4	= 7	= 11
5	= 5	= 7	= 10

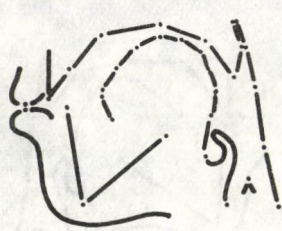
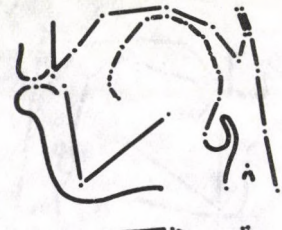
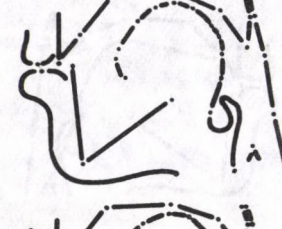

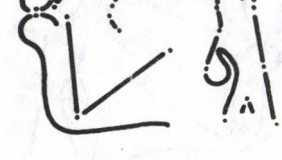
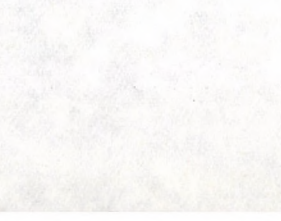
1	3-13 = 8	5-16 = 11	18-28 = 13
2	= 2	= 11	= 11
3	= 2	= 11	= 11
4	= 1	= 11	= 12
5	= 6	= 12	= 11



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[w]

DATA OF MEASUREMENT

	1	1-11 = 1	3-14 = 12	6-15 = 11
	2	= 1	= 12	= 11
	3	= 2	= 14	= 11
	4	= 2	= 12	= 11
	5	= 2	= 12	= 11
	1	2-12 = 4	4-13 = 14	6-16 = 3
	2	= 4	= 15	= 3
	3	= 3	= 14	= 4
	4	= 4	= 15	= 4
	5	= 4	= 15	= 4
	1	12-22 = 9	4-14 = 9	6-17 = 12
	2	= 11	= 9	= 11
	3	= 11	= 9	= 11
	4	= 11	= 9	= 12
	5	= 11	= 9	= 12
	1	2-22 = 13	4-15 = 15	6-18 = 27
	2	= 14	= 16	= 26
	3	= 14	= 15	= 26
	4	= 14	= 16	= 27
	5	= 14	= 16	= 27
	1	2-13 = 13	5-13 = 22	8-30 = 0
	2	= 14	= 22	= 0
	3	= 14	= 21	= 0
	4	= 14	= 22	= 0
	5	= 14	= 22	= 0
	1	2-14 = 19	5-14 = 15	9-29 = 0
	2	= 19	= 15	= 0
	3	= 21	= 12	= 0
	4	= 19	= 15	= 0
	5	= 19	= 15	= 0
	1	3-22 = 10	5-15 = 2	17-27 = 9
	2	= 12	= 2	= 9
	3	= 11	= 3	= 10
	4	= 12	= 2	= 9
	5	= 12	= 2	= 9
	1	3-13 = 9	5-16 = 11	18-28 = 14
	2	= 11	= 11	= 14
	3	= 10	= 12	= 15
	4	= 11	= 11	= 14
	5	= 11	= 11	= 14

DATA OF MEASUREMENT

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[v]

1	1-11 =	2	3-14 =	11	6-15 =	17
2	=	1	=	11	=	17
3	=	3	=	11	=	18
4	=	3	=	12	=	17
5	=	3	=	12	=	17

1	2-12 =	3	4-13 =	10	6-16 =	11
2	=	3	=	10	=	11
3	=	3	=	13	=	12
4	=	3	=	13	=	11
5	=	3	=	12	=	11

1	12-22 =	2	4-14 =	8	6-17 =	13
2	=	1	=	8	=	13
3	=	4	=	8	=	13
4	=	3	=	8	=	12
5	=	3	=	8	=	12

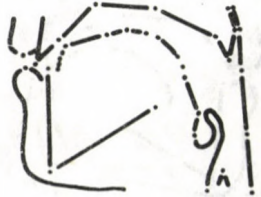
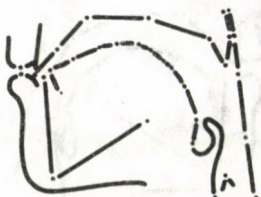
1	2-22 =	5	4-15 =	14	6-18 =	26
2	=	4	=	14	=	26
3	=	6	=	14	=	25
4	=	5	=	14	=	25
5	=	5	=	14	=	25

1	2-13 =	11	5-13 =	21	8-30 =	0
2	=	11	=	21	=	0
3	=	8	=	24	=	0
4	=	10	=	22	=	0
5	=	10	=	22	=	0

1	2-14 =	19	5-14 =	14	9-29 =	0
2	=	19	=	14	=	0
3	=	18	=	14	=	0
4	=	19	=	13	=	0
5	=	19	=	13	=	0

1	3-22 =	5	5-15 =	7	17-27 =	13
2	=	5	=	7	=	13
3	=	4	=	6	=	13
4	=	4	=	6	=	14
5	=	4	=	6	=	14

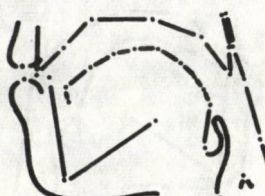
1	3-13 =	4	5-16 =	14	18-28 =	13
2	=	4	=	14	=	13
3	=	4	=	14	=	12
4	=	5	=	13	=	13
5	=	4	=	13	=	13



DATA OF MEASUREMENT

44

[f]

	1	1-11 = 3	3-14 = 12	6-15 = 14
	2	= 3	= 12	= 14
	3	= 3	= 13	= 14
	4	= 4	= 17	= 13
	5	= 4	= 16	= 14
	1	2-12 = 3	4-13 = 12	6-16 = 9
	2	= 3	= 11	= 9
	3	= 2	= 11	= 7
	4	= 4	= 16	= 4
	5	= 3	= 16	= 4
	1	12-22 = 4	4-14 = 10	6-17 = 13
	2	= 4	= 10	= 13
	3	= 4	= 9	= 12
	4	= 11	= 14	= 13
	5	= 13	= 15	= 14
	1	2-22 = 7	4-15 = 15	6-18 = 28
	2	= 7	= 15	= 28
	3	= 6	= 15	= 27
	4	= 15	= 17	= 27
	5	= 16	= 17	= 28
	1	2-13 = 12	5-13 = 20	8-30 = 0
	2	= 12	= 19	= 0
	3	= 10	= 21	= 0
	4	= 18	= 18	= 0
	5	= 18	= 18	= 0
	1	2-14 = 19	5-14 = 13	9-29 = 0
	2	= 19	= 13	= 0
	3	= 19	= 13	= 0
	4	= 21	= 14	= 0
	5	= 20	= 15	= 0
	1	3-22 = 10	5-15 = 8	17-27 = 10
	2	= 10	= 8	= 10
	3	= 9	= 8	= 9
	4	= 15	= 9	= 5
	5	= 16	= 9	= 4
	1	3-13 = 8	5-16 = 14	18-28 = 13
	2	= 7	= 14	= 13
	3	= 6	= 13	= 13
	4	= 15	= 13	= 11
	5	= 15	= 13	= 11

DATA OF MEASUREMENT

45

[m]

1	1-11 = 6	3-14 = 11	6-15 = 14
2	= 4	= 13	= 13
3	= 2	= 12	= 14
4	= 2	= 14	= 12
5	= 3	= 13	= 13

1	2-12 = 2	4-13 = 13	6-16 = 14
2	= 4	= 13	= 9
3	= 2	= 14	= 8
4	= 2	= 15	= 6
5	= 2	= 15	= 6

1	12-22 = 3	4-14 = 5	6-17 = 14
2	= 2	= 9	= 10
3	= 3	= 9	= 12
4	= 10	= 12	= 11
5	= 9	= 10	= 11

1	2-22 = 4	4-15 = 13	6-18 = 25
2	= 5	= 15	= 25
3	= 5	= 14	= 26
4	= 12	= 15	= 26
5	= 11	= 15	= 26

1	2-13 = 9	5-13 = 24	8-30 = 2
2	= 10	= 22	= 3
3	= 9	= 23	= 3
4	= 14	= 21	= 2
5	= 13	= 21	= 2

1	2-14 = 19	5-14 = 14	9-29 = 2
2	= 20	= 13	= 2
3	= 19	= 14	= 3
4	= 20	= 14	= 3
5	= 19	= 13	= 1

1	3-22 = 6	5-15 = 7	17-27 = 19
2	= 9	= 8	= 13
3	= 8	= 9	= 12
4	= 13	= 8	= 9
5	= 12	= 8	= 9

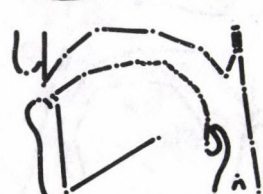
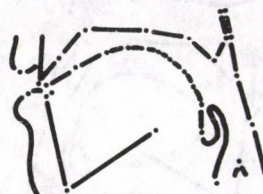
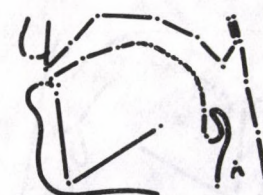
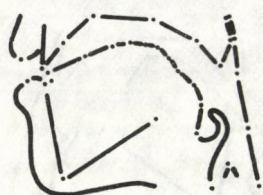
1	3-13 = 3	5-16 = 14	18-28 = 15
2	= 6	= 13	= 13
3	= 6	= 13	= 14
4	= 11	= 13	= 13
5	= 10	= 13	= 12



DATA OF MEASUREMENT

46

[ð]



1	1-11 = 6	3-14 = 13	6-15 = 11
2	= 6	= 13	= 11
3	= 6	= 12	= 11
4	= 7	= 13	= 11
5	= 8	= 13	= 13

1	2-12 = 4	4-13 = 11	6-16 = 7
2	= 5	= 11	= 7
3	= 5	= 12	= 7
4	= 5	= 10	= 7
5	= 4	= 11	= 8

1	12-22 = 1	4-14 = 10	6-17 = 11
2	= 3	= 10	= 12
3	= 3	= 9	= 12
4	= 3	= 8	= 12
5	= 1	= 10	= 12

1	2-22 = 3	4-15 = 16	6-18 = 23
2	= 2	= 16	= 24
3	= 2	= 15	= 24
4	= 2	= 15	= 24
5	= 4	= 15	= 24

1	2-13 = 11	5-13 = 19	8-30 = 0
2	= 10	= 20	= 0
3	= 9	= 21	= 0
4	= 11	= 20	= 0
5	= 10	= 20	= 0

1	2-14 = 19	5-14 = 12	9-29 = 0
2	= 19	= 12	= 0
3	= 19	= 12	= 0
4	= 20	= 11	= 0
5	= 19	= 13	= 0

1	3-22 = 9	5-15 = 7	17-27 = 9
2	= 10	= 7	= 9
3	= 10	= 7	= 10
4	= 9	= 5	= 9
5	= 10	= 8	= 10

1	3-13 = 7	5-16 = 11	18-28 = 11
2	= 6	= 11	= 12
3	= 5	= 13	= 12
4	= 6	= 10	= 11
5	= 6	= 12	= 10

DATA OF MEASUREMENT

47

[θ]

1	1-11 = 6	3-14 = 13	6-15 = 14
2	= 8	= 15	= 14
3	= 7	= 12	= 14
4	= 8	= 15	= 14
5	= 6	= 13	= 13

1	2-12 = 4	4-13 = 11	6-16 = 8
2	= 4	= 11	= 8
3	= 4	= 12	= 8
4	= 4	= 11	= 8
5	= 5	= 11	= 8

1	12-22 = 2	4-14 = 11	6-17 = 12
2	= 1	= 11	= 11
3	= 2	= 9	= 12
4	= 1	= 11	= 11
5	= 3	= 9	= 12

1	2-22 = 2	4-15 = 15	6-18 = 25
2	= 2	= 15	= 25
3	= 2	= 15	= 24
4	= 2	= 15	= 25
5	= 2	= 15	= 25

1	2-13 = 12	5-13 = 19	8-30 = 0
2	= 12	= 19	= 0
3	= 9	= 22	= 0
4	= 12	= 19	= 0
5	= 9	= 21	= 0

1	2-14 = 19	5-14 = 13	9-29 = 0
2	= 20	= 12	= 0
3	= 19	= 13	= 0
4	= 20	= 12	= 0
5	= 20	= 11	= 0

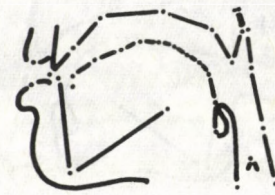
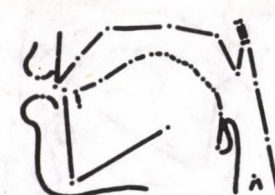
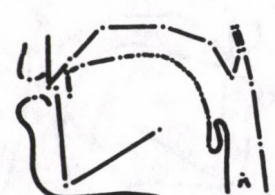

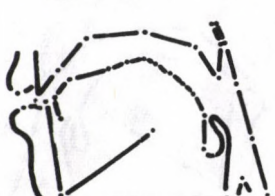

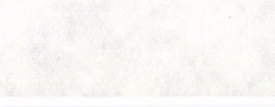
1	3-22 = 9	5-15 = 8	17-27 = 10
2	= 9	= 8	= 10
3	= 9	= 7	= 10
4	= 9	= 8	= 10
5	= 9	= 6	= 10

1	3-13 = 8	5-16 = 12	18-28 = 14
2	= 9	= 12	= 14
3	= 7	= 13	= 13
4	= 9	= 12	= 14
5	= 5	= 12	= 13



48
[z]

DATA OF MEASUREMENT

	1	1-11 = 5	3-14 = 12	6-15 = 13
	2	= 4	= 12	= 14
	3	= 4	= 12	= 13
	4	= 4	= 12	= 13
	5	= 4	= 12	= 13
	1	2-12 = 2	4-13 = 11	6-16 = 8
	2	= 2	= 13	= 11
	3	= 2	= 10	= 9
	4	= 2	= 12	= 9
	5	= 2	= 11	= 9
	1	12-22 = 3	4-14 = 9	6-17 = 11
	2	= 2	= 9	= 14
	3	= 4	= 9	= 13
	4	= 2	= 9	= 12
	5	= 2	= 9	= 12
	1	2-22 = 5	4-15 = 15	6-18 = 25
	2	= 4	= 15	= 28
	3	= 6	= 15	= 26
	4	= 4	= 15	= 26
	5	= 4	= 15	= 26
	1	2-13 = 11	5-13 = 21	8-30 = 0
	2	= 10	= 22	= 0
	3	= 9	= 22	= 0
	4	= 10	= 21	= 0
	5	= 11	= 21	= 0
	1	2-14 = 18	5-14 = 13	9-29 = 0
	2	= 18	= 13	= 0
	3	= 19	= 13	= 0
	4	= 18	= 13	= 0
	5	= 18	= 13	= 0
	1	3-22 = 7	5-15 = 7	17-27 = 10
	2	= 8	= 7	= 10
	3	= 3	= 7	= 12
	4	= 8	= 7	= 10
	5	= 8	= 7	= 10
	1	3-13 = 6	5-16 = 12	18-28 = 11
	2	= 7	= 11	= 12
	3	= 2	= 13	= 12
	4	= 6	= 11	= 12
	5	= 6	= 11	= 12

DATA OF MEASUREMENT

49

[s]

1	1-11 = 7	3-14 = 10	6-15 = 13
2	= 8	= 10	= 13
3	= 8	= 9	= 13
4	= 12	= 11	= 12
5	= 8	= 10	= 14

1	2-12 = 2	4-13 = 13	6-16 = 10
2	= 1	= 12	= 11
3	= 2	= 10	= 8
4	= 6	= 12	= 6
5	= 2	= 11	= 8

1	12-22 = 1	4-14 = 9	6-17 = 14
2	= 3	= 8	= 14
3	= 2	= 7	= 13
4	= 2	= 9	= 9
5	= 2	= 7	= 13

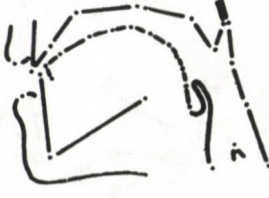
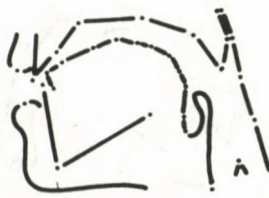
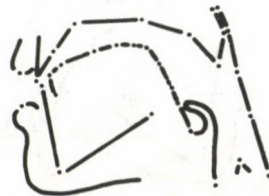
1	2-22 = 3	4-15 = 15	6-18 = 24
2	= 4	= 16	= 24
3	= 4	= 15	= 24
4	= 5	= 16	= 21
5	= 3	= 14	= 23

1	2-13 = 6	5-13 = 25	8-30 = 0
2	= 7	= 24	= 0
3	= 9	= 22	= 0
4	= 9	= 22	= 0
5	= 8	= 22	= 0

1	2-14 = 17	5-14 = 14	9-29 = 0
2	= 17	= 14	= 0
3	= 17	= 13	= 0
4	= 17	= 14	= 0
5	= 17	= 13	= 0

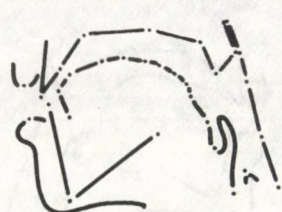
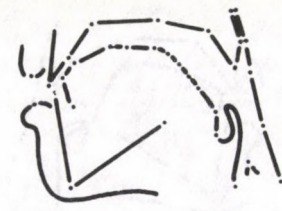
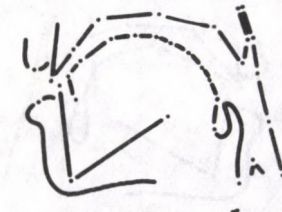




1	3-22 = 7	5-15 = 7	17-27 = 15
2	= 5	= 7	= 16
3	= 6	= 6	= 13
4	= 9	= 6	= 14
5	= 5	= 5	= 12

1	3-13 = 4	5-16 = 13	18-28 = 15
2	= 4	= 12	= 15
3	= 2	= 12	= 16
4	= 6	= 12	= 13
5	= 3	= 12	= 13



50
[3]

DATA OF MEASUREMENT

	1	1-11 = 8	3-14 = 10	6-15 = 14
	2	= 7	= 10	= 14
	3	= 7	= 9	= 13
	4	= 8	= 10	= 13
	5	= 7	= 10	= 13
	1	2-12 = 2	4-13 = 10	6-16 = 10
	2	= 2	= 10	= 11
	3	= 2	= 10	= 8
	4	= 2	= 9	= 11
	5	= 2	= 10	= 9
	1	12-22 = 4	4-14 = 7	6-17 = 13
	2	= 3	= 6	= 14
	3	= 3	= 5	= 13
	4	= 3	= 5	= 13
	5	= 5	= 4	= 12
	1	2-22 = 4	4-15 = 16	6-18 = 26
	2	= 4	= 16	= 26
	3	= 4	= 15	= 25
	4	= 4	= 16	= 26
	5	= 7	= 16	= 24
	1	2-13 = 9	5-13 = 22	8-30 = 1
	2	= 8	= 23	= 0
	3	= 9	= 22	= 0
	4	= 9	= 23	= 0
	5	= 9	= 22	= 0
	1	2-14 = 17	5-14 = 14	9-29 = 0
	2	= 18	= 13	= 0
	3	= 19	= 13	= 0
	4	= 18	= 14	= 0
	5	= 17	= 15	= 0
	1	3-22 = 5	5-15 = 7	17-27 = 13
	2	= 5	= 7	= 13
	3	= 6	= 5	= 11
	4	= 5	= 6	= 10
	5	= 7	= 5	= 10
	1	3-13 = 2	5-16 = 11	18-28 = 11
	2	= 1	= 12	= 11
	3	= 2	= 12	= 12
	4	= 1	= 12	= 12
	5	= 4	= 11	= 12

DATA OF MEASUREMENT

51

[s]

1	1-11 = 5	3-14 = 10	6-15 = 14
2	= 4	= 9	= 13
3	= 4	= 11	= 14
4	= 4	= 12	= 14
5	= 5	= 11	= 15

1	2-12 = 3	4-13 = 11	6-16 = 8
2	= 2	= 10	= 10
3	= 2	= 9	= 11
4	= 3	= 12	= 9
5	= 3	= 10	= 9

1	12-22 = 2	4-14 = 4	6-17 = 13
2	= 3	= 4	= 14
3	= 3	= 7	= 14
4	= 2	= 4	= 11
5	= 4	= 4	= 12

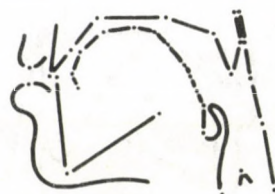
1	2-22 = 5	4-15 = 13	6-18 = 24
2	= 5	= 15	= 25
3	= 5	= 15	= 24
4	= 5	= 14	= 23
5	= 7	= 13	= 23

1	2-13 = 9	5-13 = 23	8-30 = 0
2	= 9	= 23	= 0
3	= 10	= 23	= 0
4	= 9	= 23	= 0
5	= 11	= 22	= 0

1	2-14 = 18	5-14 = 14	9-29 = 0
2	= 18	= 16	= 0
3	= 18	= 14	= 0
4	= 20	= 13	= 0
5	= 20	= 13	= 0

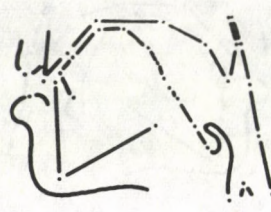
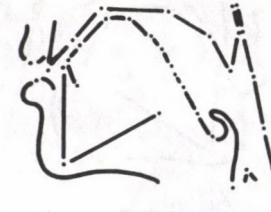




1	3-22 = 5	5-15 = 4	17-27 = 14
2	= 6	= 4	= 13
3	= 5	= 5	= 13
4	= 5	= 3	= 12
5	= 6	= 4	= 13

1	3-13 = 1	5-16 = 12	18-28 = 14
2	= 2	= 13	= 14
3	= 2	= 13	= 13
4	= 2	= 12	= 14
5	= 2	= 12	= 13



52
[j]

DATA OF MEASUREMENT

	1	1-11 = 5	3-14 = 10	6-15 = 14
	2	= 5	= 10	= 14
	3	= 5	= 9	= 17
	4	= 5	= 10	= 14
	5	= 5	= 10	= 13
	1	2-12 = 3	4-13 = 11	6-16 = 13
	2	= 3	= 11	= 13
	3	= 2	= 10	= 15
	4	= 3	= 10	= 13
	5	= 3	= 10	= 11
	1	12-22 = 2	4-14 = 2	6-17 = 15
	2	= 2	= 2	= 15
	3	= 3	= 2	= 17
	4	= 2	= 1	= 16
	5	= 2	= 1	= 16
	1	2-22 = 4	4-15 = 15	6-18 = 25
	2	= 4	= 15	= 25
	3	= 4	= 9	= 26
	4	= 5	= 14	= 26
	5	= 5	= 14	= 26
	1	2-13 = 9	5-13 = 25	8-30 = 0
	2	= 9	= 25	= 0
	3	= 10	= 24	= 0
	4	= 9	= 25	= 0
	5	= 9	= 25	= 0
	1	2-14 = 19	5-14 = 16	9-29 = 0
	2	= 19	= 16	= 0
	3	= 19	= 16	= 0
	4	= 19	= 16	= 0
	5	= 19	= 16	= 0
	1	3-22 = 5	5-15 = 8	17-27 = 17
	2	= 5	= 8	= 17
	3	= 6	= 9	= 19
	4	= 7	= 8	= 18
	5	= 7	= 7	= 18
	1	3-13 = 1	5-16 = 14	18-28 = 12
	2	= 1	= 14	= 12
	3	= 1	= 15	= 12
	4	= 1	= 15	= 13
	5	= 1	= 14	= 12

DATA OF MEASUREMENT

53
[ç]

1	1-11 = 2	3-14 = 10	6-15 = 16
2	= 2	= 10	= 16
3	= 4	= 10	= 13
4	= 6	= 10	= 16
5	= 6	= 9	= 16

1	2-12 = 4	4-13 = 10	6-16 = 13
2	= 4	= 9	= 13
3	= 3	= 10	= 9
4	= 4	= 10	= 13
5	= 3	= 9	= 13

1	12-22 = 2	4-14 = 2	6-17 = 15
2	= 3	= 3	= 14
3	= 3	= 4	= 14
4	= 2	= 3	= 14
5	= 4	= 2	= 14

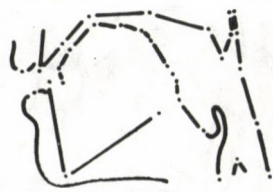
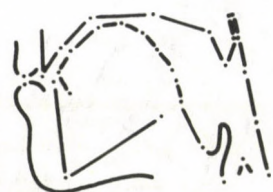
1	2-22 = 4	4-15 = 14	6-18 = 25
2	= 4	= 14	= 29
3	= 4	= 14	= 25
4	= 4	= 14	= 25
5	= 4	= 14	= 25

1	2-13 = 8	5-13 = 23	8-30 = 0
2	= 9	= 22	= 0
3	= 9	= 22	= 0
4	= 9	= 22	= 0
5	= 9	= 22	= 0

1	2-14 = 18	5-14 = 14	9-29 = 0
2	= 18	= 13	= 0
3	= 18	= 13	= 0
4	= 19	= 13	= 0
5	= 18	= 14	= 0

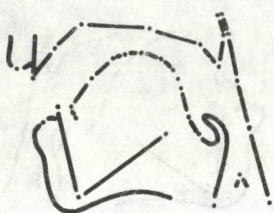
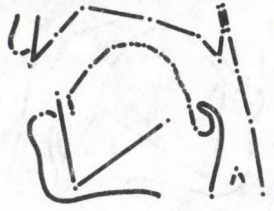




1	3-22 = 6	5-15 = 5	17-27 = 17
2	= 6	= 5	= 16
3	= 5	= 4	= 17
4	= 6	= 4	= 17
5	= 6	= 5	= 16

1	3-13 = 1	5-16 = 15	18-28 = 12
2	= 2	= 15	= 13
3	= 2	= 12	= 13
4	= 1	= 14	= 11
5	= 1	= 15	= 12



DATA OF MEASUREMENT

54
[h]

	1	1-11 = 14	3-14 = 14	6-15 = 14
	2	= 16	= 13	= 14
	3	= 16	= 15	= 15
	4	= 11	= 15	= 15
	5	= 16	= 15	= 15
	1	2-12 = 9	4-13 = 14	6-16 = 9
	2	= 8	= 14	= 9
	3	= 8	= 14	= 10
	4	= 8	= 14	= 9
	5	= 8	= 15	= 9
	1	12-22 = 3	4-14 = 11	6-17 = 12
	2	= 3	= 11	= 13
	3	= 4	= 13	= 12
	4	= 4	= 14	= 11
	5	= 4	= 14	= 11
	1	2-22 = 12	4-15 = 16	6-18 = 22
	2	= 11	= 16	= 22
	3	= 12	= 16	= 23
	4	= 11	= 17	= 23
	5	= 12	= 16	= 23
	1	2-13 = 14	5-13 = 19	8-30 = 0
	2	= 14	= 18	= 0
	3	= 15	= 18	= 0
	4	= 14	= 19	= 0
	5	= 15	= 18	= 0
	1	2-14 = 20	5-14 = 12	9-29 = 0
	2	= 20	= 11	= 0
	3	= 20	= 13	= 0
	4	= 20	= 13	= 0
	5	= 20	= 13	= 0
	1	3-22 = 16	5-15 = 7	17-27 = 13
	2	= 15	= 6	= 13
	3	= 15	= 8	= 14
	4	= 15	= 8	= 12
	5	= 15	= 8	= 11
	1	3-13 = 11	5-16 = 13	18-28 = 12
	2	= 11	= 13	= 13
	3	= 11	= 13	= 12
	4	= 11	= 13	= 11
	5	= 11	= 13	= 12

DATA OF MEASUREMENT

55

[t]

1	1-11 = 4	3-14 = 11	6-15 = 13
2	= 4	= 11	= 13
3	= 3	= 12	= 14
4	= 4	= 12	= 13
5	= 4	= 13	= 13

1	2-12 = 2	4-13 = 10	6-16 = 6
2	= 3	= 11	= 6
3	= 3	= 12	= 4
4	= 2	= 13	= 4
5	= 2	= 11	= 5

1	12-22 = 3	4-14 = 9	6-17 = 13
2	= 3	= 9	= 13
3	= 4	= 10	= 13
4	= 3	= 11	= 14
5	= 3	= 10	= 13

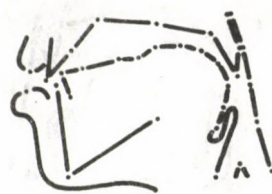
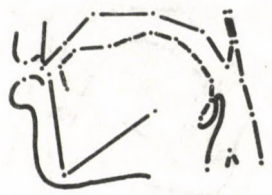
1	2-22 = 4	4-15 = 15	6-18 = 22
2	= 4	= 15	= 22
3	= 6	= 16	= 22
4	= 4	= 16	= 23
5	= 5	= 17	= 23

1	2-13 = 9	5-13 = 22	8-30 = 0
2	= 9	= 22	= 0
3	= 9	= 22	= 0
4	= 9	= 23	= 0
5	= 10	= 21	= 0

1	2-14 = 18	5-14 = 14	9-29 = 0
2	= 18	= 13	= 0
3	= 19	= 13	= 0
4	= 19	= 13	= 0
5	= 19	= 13	= 0

1	3-22 = 6	5-15 = 5	17-27 = 7
2	= 5	= 5	= 8
3	= 4	= 6	= 6
4	= 6	= 6	= 5
5	= 8	= 7	= 7

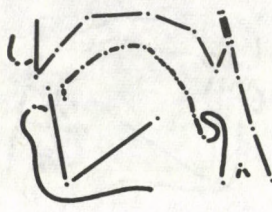
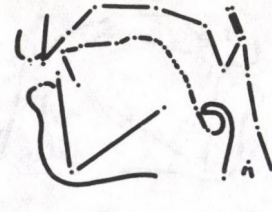
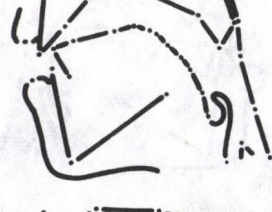


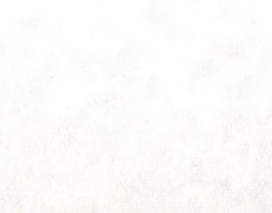
1	3-13 = 3	5-16 = 11	18-28 = 12
2	= 3	= 11	= 12
3	= 4	= 12	= 10
4	= 4	= 12	= 9
5	= 6	= 12	= 9



DATA OF MEASUREMENT

56

[1]

	1	1-11 = 12	3-14 = 12	6-15 = 12
	2	= 6	= 11	= 14
	3	= 12	= 12	= 12
	4	= 13	= 12	= 15
	5	= 14	= 12	= 15
	1	2-12 = 4	4-13 = 12	6-16 = 10
	2	= 4	= 11	= 12
	3	= 4	= 11	= 10
	4	= 5	= 10	= 14
	5	= 6	= 11	= 12
	1	12-22 = 4	4-14 = 9	6-17 = 14
	2	= 5	= 10	= 16
	3	= 5	= 10	= 13
	4	= 5	= 9	= 16
	5	= 2	= 9	= 16
	1	2-22 = 8	4-15 = 16	6-18 = 26
	2	= 5	= 16	= 26
	3	= 4	= 16	= 25
	4	= 4	= 16	= 27
	5	= 6	= 16	= 27
	1	2-13 = 11	5-13 = 21	8-30 = 0
	2	= 9	= 21	= 0
	3	= 9	= 22	= 0
	4	= 9	= 21	= 0
	5	= 10	= 21	= 0
	1	2-14 = 18	5-14 = 13	9-29 = 0
	2	= 18	= 13	= 0
	3	= 19	= 13	= 0
	4	= 18	= 13	= 0
	5	= 18	= 13	= 0
	1	3-22 = 10	5-15 = 8	17-27 = 12
	2	= 5	= 8	= 14
	3	= 6	= 9	= 12
	4	= 5	= 8	= 15
	5	= 9	= 8	= 15
	1	3-13 = 8	5-16 = 14	18-28 = 11
	2	= 4	= 14	= 11
	3	= 4	= 14	= 11
	4	= 4	= 13	= 12
	5	= 6	= 13	= 11

DATA OF MEASUREMENT

57

[dr]

1	1-11 = 3	3-14 = 10	6-15 = 12
2	= 3	= 9	= 13
3	= 3	= 9	= 12
4	= 3	= 11	= 13
5	= 3	= 9	= 12

1	2-12 = 2	4-13 = 10	6-16 = 8
2	= 1	= 11	= 9
3	= 2	= 11	= 7
4	= 1	= 11	= 7
5	= 2	= 11	= 7

1	12-22 = 1	4-14 = 4	6-17 = 12
2	= 1	= 7	= 13
3	= 3	= 5	= 12
4	= 2	= 6	= 11
5	= 2	= 6	= 12

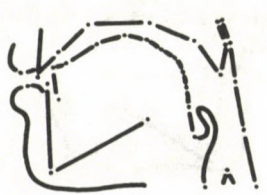
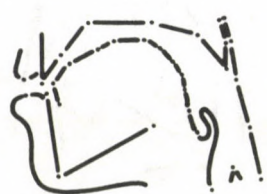
1	2-22 = 3	4-15 = 15	6-18 = 24
2	= 2	= 15	= 25
3	= 4	= 15	= 24
4	= 3	= 14	= 23
5	= 4	= 16	= 25

1	2-13 = 8	5-13 = 23	8-30 = 0
2	= 9	= 22	= 0
3	= 9	= 22	= 0
4	= 9	= 22	= 0
5	= 9	= 22	= 0

1	2-14 = 18	5-14 = 14	9-29 = 0
2	= 17	= 14	= 0
3	= 17	= 14	= 0
4	= 18	= 13	= 0
5	= 17	= 14	= 0

1	3-22 = 6	5-15 = 3	17-27 = 13
2	= 8	= 4	= 12
3	= 4	= 4	= 12
4	= 5	= 4	= 8
5	= 5	= 4	= 8

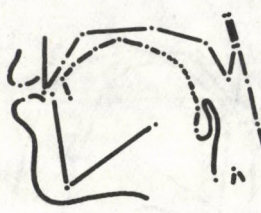
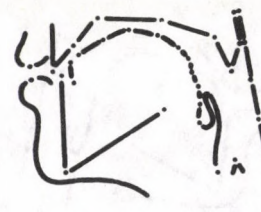
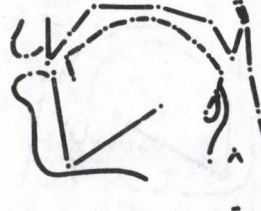



1	3-13 = 2	5-16 = 11	18-28 = 12
2	= 3	= 11	= 12
3	= 3	= 11	= 12
4	= 4	= 11	= 11
5	= 3	= 11	= 12



DATA OF MEASUREMENT

58

[tr]

	1	1-11 = 3	3-14 = 9	6-15 = 14
	2	= 3	= 8	= 14
	3	= 4	= 9	= 14
	4	= 6	= 9	= 13
	5	= 8	= 6	= 14
	1	2-12 = 2	4-13 = 9	6-16 = 8
	2	= 2	= 10	= 9
	3	= 2	= 9	= 6
	4	= 2	= 10	= 6
	5	= 3	= 9	= 8
	1	12-22 = 4	4-14 = 5	6-17 = 14
	2	= 4	= 5	= 14
	3	= 5	= 6	= 13
	4	= 2	= 5	= 12
	5	= 4	= 5	= 15
	1	2-22 = 5	4-15 = 16	6-18 = 22
	2	= 5	= 16	= 22
	3	= 4	= 15	= 23
	4	= 3	= 16	= 22
	5	= 3	= 16	= 23
	1	2-13 = 9	5-13 = 22	8-30 = 0
	2	= 8	= 23	= 0
	3	= 10	= 20	= 0
	4	= 9	= 22	= 0
	5	= 9	= 22	= 0
	1	2-14 = 16	5-14 = 15	9-29 = 0
	2	= 16	= 15	= 0
	3	= 17	= 14	= 0
	4	= 16	= 15	= 0
	5	= 14	= 17	= 0
	1	3-22 = 4	5-15 = 4	17-27 = 13
	2	= 4	= 4	= 12
	3	= 5	= 3	= 7
	4	= 5	= 4	= 8
	5	= 6	= 4	= 7
	1	3-13 = 2	5-16 = 12	18-28 = 14
	2	= 2	= 12	= 14
	3	= 4	= 13	= 13
	4	= 2	= 11	= 12
	5	= 3	= 12	= 11

DATA OF MEASUREMENT

59

[dz]

1	1-11 = 6	3-14 = 9	6-15 = 14
2	= 6	= 9	= 14
3	= 6	= 9	= 14
4	= 6	= 9	= 14
5	= 7	= 11	= 13

1	2-12 = 1	4-13 = 8	6-16 = 11
2	= 1	= 8	= 11
3	= 1	= 9	= 11
4	= 1	= 9	= 6
5	= 1	= 10	= 6

1	12-22 = 3	4-14 = 4	6-17 = 13
2	= 4	= 4	= 14
3	= 4	= 4	= 14
4	= 3	= 5	= 12
5	= 3	= 9	= 12

1	2-22 = 3	4-15 = 14	6-18 = 23
2	= 3	= 14	= 23
3	= 4	= 14	= 24
4	= 4	= 15	= 24
5	= 3	= 16	= 23

1	2-13 = 8	5-13 = 22	8-30 = 0
2	= 8	= 22	= 0
3	= 9	= 22	= 0
4	= 9	= 20	= 0
5	= 10	= 20	= 0

1	2-14 = 16	5-14 = 15	9-29 = 0
2	= 15	= 15	= 0
3	= 16	= 15	= 0
4	= 17	= 13	= 0
5	= 17	= 13	= 0

1	3-22 = 5	5-15 = 4	17-27 = 14
2	= 4	= 4	= 14
3	= 4	= 4	= 14
4	= 5	= 4	= 9
5	= 6	= 5	= 9

1	3-13 = 2	5-16 = 13	18-28 = 11
2	= 2	= 13	= 14
3	= 2	= 13	= 14
4	= 4	= 13	= 13
5	= 5	= 13	= 13



DATA OF MEASUREMENT

60
[ts]

	1	1-11 = 6	3-14 = 11	6-15 = 15
	2	= 5	= 12	= 13
	3	= 5	= 11	= 13
	4	= 5	= 11	= 14
	5	= 6	= 11	= 12
	1	2-12 = 2	4-13 = 10	6-16 = 9
	2	= 2	= 12	= 8
	3	= 2	= 12	= 7
	4	= 2	= 11	= 8
	5	= 2	= 11	= 7
	1	12-22 = 3	4-14 = 9	6-17 = 12
	2	= 4	= 11	= 12
	3	= 4	= 9	= 11
	4	= 3	= 9	= 11
	5	= 2	= 9	= 11
	1	2-22 = 4	4-15 = 16	6-18 = 25
	2	= 5	= 17	= 25
	3	= 5	= 16	= 24
	4	= 4	= 17	= 24
	5	= 4	= 17	= 24
	1	2-13 = 11	5-13 = 21	8-30 = 0
	2	= 9	= 22	= 0
	3	= 8	= 23	= 0
	4	= 9	= 22	= 0
	5	= 10	= 21	= 0
	1	2-14 = 17	5-14 = 14	9-29 = 0
	2	= 18	= 14	= 0
	3	= 17	= 14	= 0
	4	= 17	= 14	= 0
	5	= 17	= 14	= 0
	1	3-22 = 6	5-15 = 5	17-27 = 10
	2	= 4	= 6	= 11
	3	= 4	= 6	= 10
	4	= 4	= 6	= 11
	5	= 7	= 5	= 11
	1	3-13 = 6	5-16 = 11	18-28 = 11
	2	= 6	= 12	= 12
	3	= 4	= 12	= 11
	4	= 4	= 13	= 11
	5	= 6	= 12	= 12

DATA OF MEASUREMENT

61

[d₃]

1	1-11 = 5	3-14 = 9	6-15 = 15
2	= 4	= 10	= 14
3	= 5	= 9	= 13
4	= 6	= 10	= 15
5	= 6	= 9	= 15

1	2-12 = 1	4-13 = 12	6-16 = 11
2	= 2	= 10	= 11
3	= 1	= 10	= 11
4	= 1	= 10	= 11
5	= 3	= 9	= 10

1	12-22 = 4	4-14 = 4	6-17 = 14
2	= 4	= 4	= 14
3	= 5	= 4	= 14
4	= 3	= 5	= 14
5	= 4	= 3	= 13

1	2-22 = 4	4-15 = 14	6-18 = 25
2	= 4	= 15	= 25
3	= 6	= 15	= 26
4	= 4	= 14	= 25
5	= 5	= 15	= 25

1	2-13 = 8	5-13 = 25	8-30 = 0
2	= 9	= 23	= 0
3	= 9	= 24	= 0
4	= 9	= 23	= 0
5	= 9	= 23	= 0

1	2-14 = 18	5-14 = 15	9-29 = 0
2	= 18	= 15	= 0
3	= 18	= 15	= 0
4	= 18	= 14	= 0
5	= 18	= 15	= 0

1	3-22 = 5	5-15 = 4	17-27 = 13
2	= 5	= 4	= 13
3	= 3	= 4	= 12
4	= 5	= 4	= 11
5	= 6	= 4	= 11

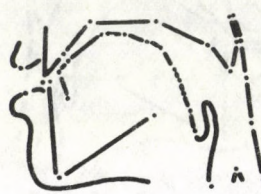
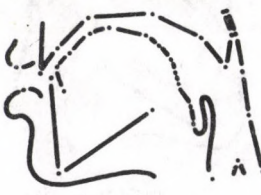
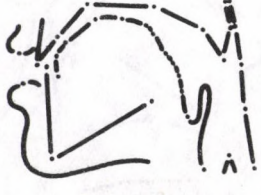


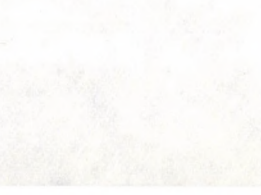
1	3-13 = 1	5-16 = 12	18-28 = 11
2	= 1	= 11	= 12
3	= 0	= 12	= 11
4	= 1	= 12	= 11
5	= 3	= 12	= 10



DATA OF MEASUREMENT

62

[tʃ]

	1	1-11 = 6	3-14 = 10	6-15 = 14
	2	= 6	= 9	= 14
	3	= 7	= 10	= 14
	4	= 9	= 8	= 14
	5	= 9	= 9	= 13
	1	2-12 = 2	4-13 = 11	6-16 = 11
	2	= 3	= 9	= 10
	3	= 2	= 11	= 11
	4	= 3	= 10	= 8
	5	= 3	= 9	= 6
	1	12-22 = 3	4-14 = 4	6-17 = 13
	2	= 2	= 3	= 13
	3	= 4	= 4	= 13
	4	= 4	= 4	= 14
	5	= 3	= 6	= 11
	1	2-22 = 5	4-15 = 15	6-18 = 22
	2	= 4	= 15	= 22
	3	= 5	= 15	= 22
	4	= 5	= 15	= 21
	5	= 4	= 16	= 22
	1	2-13 = 8	5-13 = 24	8-30 = 0
	2	= 9	= 23	= 0
	3	= 8	= 24	= 0
	4	= 9	= 23	= 0
	5	= 10	= 22	= 0
	1	2-14 = 18	5-14 = 14	9-29 = 0
	2	= 17	= 16	= 0
	3	= 18	= 14	= 0
	4	= 17	= 16	= 0
	5	= 17	= 14	= 0
	1	3-22 = 4	5-15 = 5	17-27 = 15
	2	= 5	= 5	= 15
	3	= 4	= 5	= 15
	4	= 4	= 6	= 11
	5	= 5	= 5	= 9
	1	3-13 = 1	5-16 = 14	18-28 = 14
	2	= 2	= 13	= 13
	3	= 1	= 12	= 14
	4	= 1	= 13	= 12
	5	= 2	= 14	= 11

DATA OF MEASUREMENT

63

[b]

1	1-11 = 3	3-14 = 12	6-15 = 15
2	= 3	= 12	= 15
3	= 1	= 11	= 13
4	= 2	= 11	= 16
5	= 2	= 14	= 18

1	2-12 = 2	4-13 = 11	6-16 = 8
2	= 3	= 12	= 8
3	= 2	= 11	= 8
4	= 2	= 11	= 7
5	= 2	= 13	= 12

1	12-22 = 12	4-14 = 8	6-17 = 12
2	= 13	= 8	= 11
3	= 8	= 6	= 11
4	= 12	= 7	= 10
5	= 16	= 13	= 11

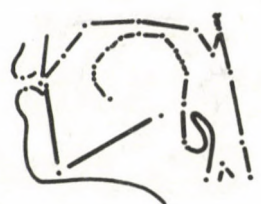
1	2-22 = 14	4-15 = 14	6-18 = 30
2	= 15	= 13	= 30
3	= 10	= 16	= 29
4	= 14	= 14	= 27
5	= 18	= 15	= 28

1	2-13 = 15	5-13 = 17	8-30 = 0
2	= 14	= 17	= 0
3	= 11	= 22	= 0
4	= 15	= 16	= 0
5	= 18	= 15	= 0

1	2-14 = 19	5-14 = 11	9-29 = 0
2	= 19	= 11	= 0
3	= 19	= 14	= 0
4	= 19	= 11	= 0
5	= 21	= 12	= 0

1	3-22 = 11	5-15 = 4	17-27 = 11
2	= 12	= 3	= 11
3	= 9	= 1	= 12
4	= 11	= 2	= 11
5	= 14	= 8	= 13

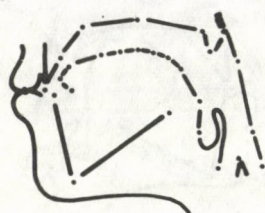
1	3-13 = 9	5-16 = 13	18-28 = 15
2	= 10	= 11	= 15
3	= 6	= 9	= 16
4	= 9	= 12	= 13
5	= 13	= 13	= 14



DATA OF MEASUREMENT

64

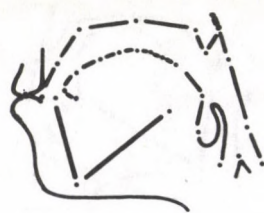
[p]



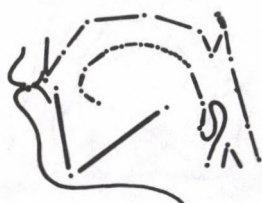
1	1-11 = 1	3-14 = 11	6-15 = 17
2	= 1	= 12	= 17
3	= 1	= 12	= 16
4	= 1	= 12	= 17
5	= 3	= 12	= 16

1	2-12 = 3	4-13 = 11	6-16 = 12
2	= 3	= 11	= 12
3	= 4	= 12	= 10
4	= 3	= 14	= 11
5	= 3	= 12	= 11

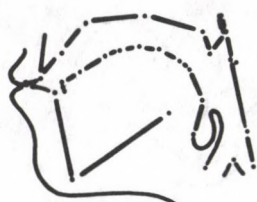
1	12-22 = 3	4-14 = 9	6-17 = 12
2	= 3	= 9	= 12
3	= 2	= 9	= 10
4	= 2	= 12	= 11
5	= 3	= 12	= 10



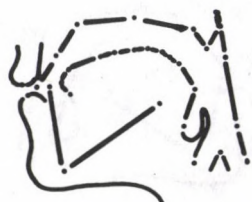
1	2-22 = 4	4-15 = 16	6-18 = 27
2	= 6	= 16	= 27
3	= 6	= 16	= 27
4	= 4	= 17	= 27
5	= 6	= 17	= 26



1	2-13 = 10	5-13 = 22	8-30 = 0
2	= 10	= 22	= 0
3	= 11	= 21	= 0
4	= 9	= 23	= 0
5	= 9	= 22	= 0



1	2-14 = 18	5-14 = 14	9-29 = 0
2	= 19	= 13	= 1
3	= 18	= 13	= 0
4	= 18	= 14	= 0
5	= 18	= 15	= 0



1	3-22 = 6	5-15 = 9	17-27 = 13
2	= 9	= 9	= 13
3	= 11	= 8	= 11
4	= 7	= 8	= 12
5	= 7	= 9	= 13

1	3-13 = 4	5-16 = 13	18-28 = 13
2	= 6	= 13	= 13
3	= 8	= 12	= 13
4	= 6	= 13	= 14
5	= 6	= 13	= 14

DATA OF MEASUREMENT

65

[m]

1	1-11 = 2	3-14 = 12	6-15 = 14
2	= 2	= 12	= 15
3	= 3	= 12	= 10
4	= 3	= 12	= 15
5	= 4	= 12	= 14

1	2-12 = 2	4-13 = 12	6-16 = 9
2	= 2	= 13	= 9
3	= 2	= 14	= 4
4	= 2	= 14	= 8
5	= 2	= 13	= 8

1	12-22 = 4	4-14 = 9	6-17 = 10
2	= 4	= 11	= 11
3	= 8	= 12	= 8
4	= 2	= 11	= 10
5	= 2	= 10	= 11

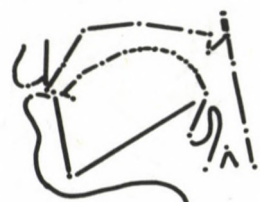
1	2-22 = 6	4-15 = 15	6-18 = 29
2	= 6	= 16	= 29
3	= 10	= 16	= 26
4	= 4	= 16	= 29
5	= 4	= 16	= 30

1	2-13 = 10	5-13 = 22	8-30 = 4
2	= 10	= 21	= 5
3	= 11	= 21	= 4
4	= 9	= 23	= 4
5	= 9	= 22	= 5

1	2-14 = 18	5-14 = 14	9-29 = 5
2	= 17	= 14	= 5
3	= 18	= 14	= 6
4	= 17	= 14	= 5
5	= 17	= 14	= 5

1	3-22 = 8	5-15 = 7	17-27 = 13
2	= 8	= 8	= 11
3	= 9	= 9	= 11
4	= 7	= 8	= 11
5	= 9	= 7	= 11

1	3-13 = 6	5-16 = 12	18-28 = 14
2	= 6	= 13	= 14
3	= 8	= 12	= 13
4	= 6	= 12	= 14
5	= 7	= 12	= 16



DATA OF MEASUREMENT

66

[d]



1	1-11 = 3	3-14 = 11	6-15 = 15
2	= 4	= 10	= 15
3	= 3	= 11	= 15
4	= 4	= 12	= 14
5	= 4	= 11	= 14
1	2-12 = 2	4-13 = 12	6-16 = 8
2	= 2	= 10	= 9
3	= 1	= 10	= 9
4	= 1	= 12	= 8
5	= 2	= 12	= 9
1	12-22 = 3	4-14 = 10	6-17 = 11
2	= 4	= 8	= 12
3	= 5	= 9	= 10
4	= 4	= 12	= 11
5	= 4	= 11	= 11
1	2-22 = 4	4-15 = 16	6-18 = 28
2	= 6	= 15	= 27
3	= 6	= 14	= 28
4	= 4	= 17	= 29
5	= 5	= 16	= 28
1	2-13 = 9	5-13 = 22	8-30 = 0
2	= 8	= 22	= 0
3	= 10	= 22	= 0
4	= 8	= 22	= 0
5	= 9	= 22	= 0
1	2-14 = 17	5-14 = 14	9-29 = 1
2	= 17	= 14	= 0
3	= 18	= 14	= 1
4	= 18	= 14	= 0
5	= 18	= 14	= 0
1	3-22 = 6	5-15 = 7	17-27 = 12
2	= 4	= 5	= 13
3	= 3	= 7	= 12
4	= 6	= 8	= 12
5	= 5	= 7	= 14
1	3-13 = 4	5-16 = 11	18-28 = 13
2	= 2	= 11	= 14
3	= 2	= 12	= 14
4	= 4	= 12	= 15
5	= 4	= 12	= 16

DATA OF MEASUREMENT

67

[t]

1	1-11 = 5	3-14 = 12	6-15 = 15
2	= 4	= 10	= 14
3	= 4	= 10	= 14
4	= 4	= 10	= 12
5	= 4	= 10	= 13

1	2-12 = 2	4-13 = 12	6-16 = 9
2	= 2	= 11	= 8
3	= 2	= 10	= 8
4	= 2	= 11	= 8
5	= 2	= 10	= 8

1	12-22 = 6	4-14 = 10	6-17 = 11
2	= 4	= 7	= 11
3	= 4	= 7	= 10
4	= 4	= 7	= 11
5	= 4	= 6	= 11

1	2-22 = 7	4-15 = 17	6-18 = 28
2	= 4	= 17	= 29
3	= 5	= 16	= 28
4	= 5	= 17	= 29
5	= 5	= 15	= 28

1	2-13 = 9	5-13 = 22	8-30 = 0
2	= 9	= 23	= 0
3	= 10	= 22	= 2
4	= 9	= 23	= 0
5	= 9	= 23	= 0

1	2-14 = 18	5-14 = 14	9-29 = 1
2	= 18	= 14	= 0
3	= 18	= 14	= 0
4	= 18	= 14	= 1
5	= 18	= 14	= 0



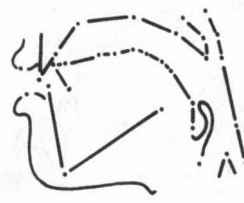
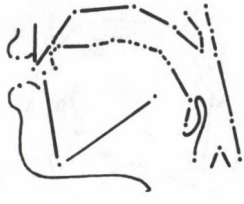
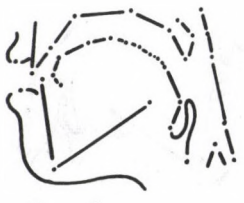

1	3-22 = 5	5-15 = 10	17-27 = 12
2	= 5	= 3	= 11
3	= 5	= 7	= 11
4	= 5	= 4	= 10
5	= 6	= 5	= 10

1	3-13 = 4	5-16 = 13	18-28 = 14
2	= 2	= 12	= 15
3	= 2	= 13	= 15
4	= 2	= 10	= 14
5	= 3	= 11	= 15



68
[n]

DATA OF MEASUREMENT

	1	1-11 = 9	3-14 = 11	6-15 = 13
	2	= 7	= 11	= 12
	3	= 5	= 11	= 12
	4	= 5	= 10	= 12
	5	= 5	= 10	= 12
	1	2-12 = 5	4-13 = 13	6-16 = 9
	2	= 4	= 11	= 9
	3	= 3	= 10	= 8
	4	= 3	= 11	= 8
	5	= 3	= 11	= 8
	1	12-22 = 4	4-14 = 10	6-17 = 10
	2	= 6	= 9	= 10
	3	= 5	= 10	= 10
	4	= 2	= 9	= 10
	5	= 2	= 9	= 10
	1	2-22 = 8	4-15 = 17	6-18 = 26
	2	= 5	= 17	= 26
	3	= 6	= 17	= 26
	4	= 5	= 16	= 26
	5	= 5	= 16	= 26
	1	2-13 = 10	5-13 = 22	8-30 = 4
	2	= 9	= 23	= 4
	3	= 9	= 23	= 3
	4	= 9	= 22	= 5
	5	= 9	= 22	= 5
	1	2-14 = 17	5-14 = 15	9-29 = 6
	2	= 17	= 14	= 7
	3	= 17	= 16	= 5
	4	= 17	= 15	= 7
	5	= 17	= 15	= 7
	1	3-22 = 9	5-15 = 10	17-27 = 14
	2	= 4	= 9	= 13
	3	= 3	= 10	= 13
	4	= 7	= 8	= 14
	5	= 7	= 8	= 14
	1	3-13 = 6	5-16 = 14	18-28 = 10
	2	= 3	= 13	= 9
	3	= 2	= 13	= 12
	4	= 4	= 13	= 14
	5	= 4	= 13	= 14

DATA OF MEASUREMENT

69

[g]

1	1-11 = 8	3-14 = 10	6-15 = 15
2	= 7	= 9	= 14
3	= 7	= 9	= 16
4	= 7	= 9	= 16
5	= 6	= 10	= 16

1	2-12 = 3	4-13 = 10	6-16 = 14
2	= 3	= 9	= 11
3	= 2	= 10	= 9
4	= 2	= 10	= 8
5	= 2	= 10	= 9

1	12-22 = 9	4-14 = 5	6-17 = 15
2	= 6	= 3	= 14
3	= 8	= 4	= 12
4	= 8	= 2	= 12
5	= 9	= 4	= 13

1	2-22 = 10	4-15 = 14	6-18 = 27
2	= 9	= 14	= 26
3	= 10	= 13	= 27
4	= 9	= 14	= 27
5	= 10	= 15	= 27

1	2-13 = 11	5-13 = 19	8-30 = 1
2	= 11	= 20	= 0
3	= 11	= 20	= 0
4	= 11	= 21	= 0
5	= 11	= 20	= 0

1	2-14 = 18	5-14 = 13	9-29 = 0
2	= 18	= 14	= 1
3	= 18	= 13	= 1
4	= 18	= 15	= 1
5	= 18	= 13	= 1








1	3-22 = 8	5-15 = 3	17-27 = 19
2	= 8	= 2	= 18
3	= 9	= 2	= 15
4	= 6	= 1	= 13
5	= 8	= 1	= 14

1	3-13 = 5	5-16 = 13	18-28 = 13
2	= 4	= 12	= 13
3	= 4	= 14	= 16
4	= 4	= 12	= 16
5	= 4	= 14	= 15



70
[k]

DATA OF MEASUREMENT

	1	1-11 = 8	3-14 = 9	6-15 = 13
	2	= 8	= 9	= 13
	3	= 7	= 9	= 12
	4	= 8	= 9	= 13
	5	= 8	= 9	= 13
	1	2-12 = 3	4-13 = 10	6-16 = 5
	2	= 4	= 10	= 5
	3	= 4	= 9	= 5
	4	= 4	= 10	= 5
	5	= 4	= 11	= 5
	1	12-22 = 8	4-14 = 4	6-17 = 11
	2	= 9	= 3	= 10
	3	= 8	= 3	= 10
	4	= 7	= 4	= 11
	5	= 9	= 5	= 10
	1	2-22 = 10	4-15 = 15	6-18 = 27
	2	= 12	= 15	= 26
	3	= 11	= 16	= 28
	4	= 9	= 16	= 27
	5	= 11	= 15	= 27
	1	2-13 = 12	5-13 = 21	8-30 = 0
	2	= 12	= 21	= 1
	3	= 13	= 21	= 0
	4	= 11	= 22	= 1
	5	= 11	= 21	= 1
	1	2-14 = 18	5-14 = 14	9-29 = 0
	2	= 18	= 15	= 0
	3	= 19	= 15	= 0
	4	= 18	= 16	= 0
	5	= 18	= 15	= 0
	1	3-22 = 7	5-15 = 1	17-27 = 10
	2	= 11	= 1	= 10
	3	= 9	= 1	= 10
	4	= 7	= 1	= 10
	5	= 8	= 2	= 10
	1	3-13 = 5	5-16 = 11	18-28 = 14
	2	= 7	= 11	= 13
	3	= 5	= 11	= 14
	4	= 4	= 11	= 14
	5	= 6	= 11	= 14

DATA OF MEASUREMENT

71
[b]

1	1-11 = 9	3-14 = 10	6-15 = 11
2	= 8	= 11	= 11
3	= 8	= 11	= 12
4	= 8	= 10	= 11
5	= 8	= 9	= 11

1	2-12 = 2	4-13 = 11	6-16 = 6
2	= 2	= 11	= 6
3	= 2	= 12	= 7
4	= 2	= 11	= 4
5	= 2	= 10	= 5

1	12-22 = 6	4-14 = 4	6-17 = 11
2	= 6	= 4	= 11
3	= 7	= 6	= 11
4	= 9	= 6	= 10
5	= 6	= 5	= 10

1	2-22 = 7	4-15 = 17	6-18 = 27
2	= 8	= 17	= 28
3	= 9	= 17	= 28
4	= 10	= 16	= 27
5	= 8	= 17	= 27

1	2-13 = 10	5-13 = 22	8-30 = 1
2	= 10	= 22	= 2
3	= 11	= 21	= 2
4	= 12	= 21	= 2
5	= 11	= 22	= 1

1	2-14 = 19	5-14 = 15	9-29 = 1
2	= 19	= 15	= 2
3	= 18	= 14	= 3
4	= 18	= 15	= 2
5	= 18	= 15	= 2

1	3-22 = 6	5-15 = 1	17-27 = 11
2	= 6	= 1	= 10
3	= 9	= 2	= 10
4	= 7	= 3	= 10
5	= 8	= 1	= 9

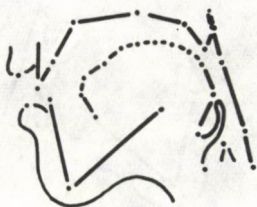




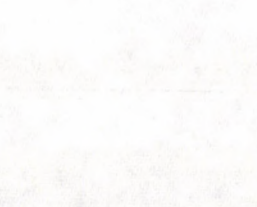

1	3-13 = 4	5-16 = 10	18-28 = 12
2	= 4	= 11	= 11
3	= 6	= 10	= 12
4	= 5	= 11	= 12
5	= 3	= 10	= 12



DATA OF MEASUREMENT

72

[r]

	1	1-11 = 6	3-14 = 14	6-15 = 13
	2	= 6	= 14	= 13
	3	= 6	= 13	= 14
	4	= 7	= 13	= 14
	5	= 7	= 16	= 13
	1	2-12 = 4	4-13 = 16	6-16 = 6
	2	= 4	= 15	= 6
	3	= 5	= 13	= 7
	4	= 5	= 14	= 7
	5	= 4	= 18	= 6
	1	12-22 = 9	4-14 = 14	6-17 = 11
	2	= 7	= 14	= 11
	3	= 11	= 14	= 12
	4	= 11	= 11	= 12
	5	= 14	= 15	= 11
	1	2-22 = 12	4-15 = 18	6-18 = 29
	2	= 10	= 18	= 29
	3	= 12	= 18	= 30
	4	= 13	= 18	= 30
	5	= 17	= 18	= 29
	1	2-13 = 13	5-13 = 23	8-30 = 0
	2	= 13	= 22	= 0
	3	= 13	= 21	= 0
	4	= 13	= 21	= 0
	5	= 17	= 22	= 0
	1	2-14 = 20	5-14 = 16	9-29 = 1
	2	= 20	= 16	= 0
	3	= 19	= 16	= 0
	4	= 19	= 15	= 0
	5	= 21	= 16	= 0
	1	3-22 = 13	5-15 = 8	17-27 = 6
	2	= 12	= 8	= 6
	3	= 9	= 8	= 5
	4	= 11	= 8	= 5
	5	= 16	= 9	= 6
	1	3-13 = 11	5-16 = 13	18-28 = 12
	2	= 10	= 13	= 11
	3	= 8	= 12	= 11
	4	= 10	= 13	= 11
	5	= 15	= 13	= 12

DATA OF MEASUREMENT

73

[w]

1	1-11 = 3	3-14 = 11	6-15 = 13
2	= 2	= 12	= 14
3	= 2	= 11	= 14
4	= 2	= 11	= 13
5	= 3	= 12	= 13

1	2-12 = 4	4-13 = 13	6-16 = 6
2	= 4	= 12	= 6
3	= 4	= 13	= 5
4	= 4	= 13	= 6
5	= 4	= 15	= 5

1	12-22 = 12	4-14 = 9	6-17 = 12
2	= 11	= 10	= 12
3	= 12	= 9	= 12
4	= 11	= 10	= 12
5	= 11	= 11	= 11

1	2-22 = 14	4-15 = 17	6-18 = 31
2	= 13	= 17	= 30
3	= 14	= 16	= 31
4	= 13	= 18	= 30
5	= 14	= 18	= 30

1	2-13 = 13	5-13 = 20	8-30 = 0
2	= 14	= 20	= 0
3	= 14	= 21	= 1
4	= 14	= 21	= 0
5	= 14	= 21	= 0

1	2-14 = 18	5-14 = 14	9-29 = 0
2	= 19	= 14	= 0
3	= 19	= 14	= 0
4	= 18	= 15	= 0
5	= 19	= 15	= 0

1	3-22 = 11	5-15 = 4	17-27 = 5
2	= 10	= 4	= 6
3	= 11	= 3	= 6
4	= 10	= 5	= 6
5	= 13	= 4	= 6

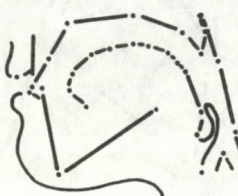
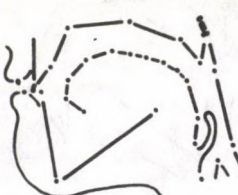




1	3-13 = 9	5-16 = 13	18-28 = 12
2	= 9	= 12	= 12
3	= 9	= 12	= 12
4	= 9	= 11	= 13
5	= 10	= 13	= 13



DATA OF MEASUREMENT

74

[v]

	1	1-11 = 4	3-14 = 13	6-15 = 12
	2	= 3	= 11	= 13
	3	= 4	= 12	= 12
	4	= 4	= 14	= 14
	5	= 4	= 12	= 12
	1	2-12 = 3	4-13 = 14	6-16 = 6
	2	= 2	= 13	= 8
	3	= 3	= 13	= 6
	4	= 3	= 14	= 8
	5	= 3	= 12	= 7
	1	12-22 = 7	4-14 = 11	6-17 = 11
	2	= 7	= 9	= 11
	3	= 7	= 10	= 10
	4	= 7	= 11	= 11
	5	= 11	= 11	= 11
	1	2-22 = 10	4-15 = 19	6-18 = 28
	2	= 9	= 18	= 28
	3	= 10	= 19	= 28
	4	= 10	= 19	= 29
	5	= 14	= 18	= 28
	1	2-13 = 11	5-13 = 23	8-30 = 0
	2	= 11	= 23	= 0
	3	= 11	= 22	= 0
	4	= 11	= 23	= 0
	5	= 15	= 19	= 0
	1	2-14 = 19	5-14 = 16	9-29 = 0
	2	= 17	= 16	= 0
	3	= 18	= 15	= 0
	4	= 20	= 14	= 0
	5	= 19	= 15	= 0
	1	3-22 = 11	5-15 = 8	17-27 = 9
	2	= 10	= 9	= 9
	3	= 11	= 8	= 9
	4	= 11	= 9	= 9
	5	= 10	= 8	= 9
	1	3-13 = 9	5-16 = 14	18-28 = 10
	2	= 7	= 14	= 10
	3	= 8	= 13	= 10
	4	= 9	= 14	= 10
	5	= 9	= 14	= 11

DATA OF MEASUREMENT

75
[f]

1	1-11 = 4	3-14 = 11	6-15 = 15
2	= 2	= 10	= 16
3	= 3	= 11	= 16
4	= 3	= 11	= 17
5	= 4	= 13	= 17

1	2-12 = 3	4-13 = 12	6-16 = 10
2	= 2	= 12	= 11
3	= 3	= 13	= 11
4	= 2	= 13	= 11
5	= 2	= 12	= 11

1	12-22 = 6	4-14 = 6	6-17 = 16
2	= 6	= 6	= 14
3	= 7	= 9	= 14
4	= 7	= 10	= 14
5	= 7	= 11	= 14

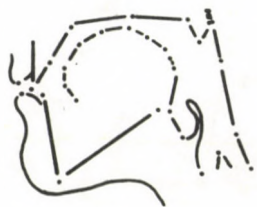
1	2-22 = 8	4-15 = 17	6-18 = 32
2	= 8	= 16	= 31
3	= 10	= 17	= 32
4	= 9	= 17	= 32
5	= 9	= 18	= 32

1	2-13 = 10	5-13 = 22	8-30 = 1
2	= 10	= 23	= 0
3	= 12	= 22	= 0
4	= 10	= 23	= 1
5	= 12	= 21	= 1

1	2-14 = 18	5-14 = 14	9-29 = 0
2	= 18	= 15	= 0
3	= 18	= 15	= 1
4	= 18	= 15	= 0
5	= 19	= 14	= 0

1	3-22 = 9	5-15 = 3	17-27 = 13
2	= 8	= 3	= 13
3	= 9	= 6	= 10
4	= 8	= 8	= 10
5	= 9	= 8	= 8

1	3-13 = 5	5-16 = 13	18-28 = 13
2	= 5	= 13	= 14
3	= 7	= 13	= 14
4	= 5	= 13	= 14
5	= 8	= 13	= 13



DATA OF MEASUREMENT

76
[m]



1	1-11 = 1	3-14 = 11	6-15 = 9
2	= 1	= 10	= 11
3	= 3	= 11	= 11
4	= 2	= 12	= 11
5	= 2	= 12	= 12

1	2-12 = 2	4-13 = 12	6-16 = 4
2	= 2	= 12	= 4
3	= 3	= 12	= 4
4	= 2	= 12	= 4
5	= 3	= 13	= 4

1	12-22 = 8	4-14 = 9	6-17 = 12
2	= 8	= 9	= 12
3	= 8	= 9	= 12
4	= 9	= 10	= 11
5	= 8	= 10	= 10

1	2-22 = 10	4-15 = 16	6-18 = 28
2	= 10	= 16	= 27
3	= 11	= 16	= 28
4	= 11	= 17	= 27
5	= 11	= 17	= 26

1	2-13 = 10	5-13 = 21	8-30 = 3
2	= 10	= 22	= 4
3	= 12	= 21	= 3
4	= 11	= 21	= 3
5	= 11	= 21	= 3

1	2-14 = 17	5-14 = 15	9-29 = 7
2	= 17	= 16	= 8
3	= 18	= 14	= 7
4	= 17	= 14	= 7
5	= 18	= 14	= 7

1	3-22 = 8	5-15 = 7	17-27 = 8
2	= 8	= 6	= 7
3	= 8	= 7	= 7
4	= 11	= 7	= 7
5	= 10	= 8	= 7

1	3-13 = 7	5-16 = 13	18-28 = 12
2	= 6	= 13	= 12
3	= 7	= 12	= 12
4	= 8	= 13	= 14
5	= 8	= 13	= 13

DATA OF MEASUREMENT

77

[δ]

1	1-11 = 4	3-14 = 12	6-15 = 13
2	= 4	= 10	= 12
3	= 3	= 11	= 13
4	= 4	= 11	= 12
5	= 4	= 10	= 13

1	2-12 = 3	4-13 = 12	6-16 = 7
2	= 3	= 10	= 6
3	= 3	= 12	= 6
4	= 3	= 12	= 6
5	= 3	= 12	= 6

1	12-22 = 9	4-14 = 10	6-17 = 10
2	= 4	= 7	= 11
3	= 4	= 9	= 9
4	= 4	= 9	= 10
5	= 6	= 9	= 10

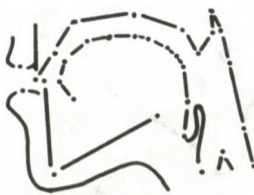
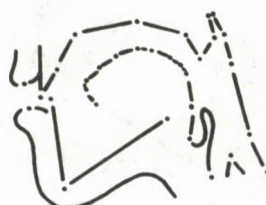
1	2-22 = 12	4-15 = 16	6-18 = 28
2	= 7	= 17	= 28
3	= 6	= 16	= 27
4	= 7	= 17	= 28
5	= 9	= 17	= 28

1	2-13 = 12	5-13 = 21	8-30 = 1
2	= 11	= 22	= 2
3	= 10	= 23	= 2
4	= 11	= 22	= 2
5	= 11	= 23	= 1

1	2-14 = 18	5-14 = 15	9-29 = 0
2	= 18	= 14	= 0
3	= 18	= 15	= 0
4	= 18	= 15	= 0
5	= 18	= 16	= 0


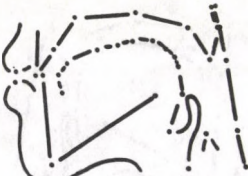




1	3-22 = 10	5-15 = 8	17-27 = 12
2	= 8	= 7	= 12
3	= 10	= 7	= 9
4	= 8	= 7	= 10
5	= 9	= 8	= 9

1	3-13 = 8	5-16 = 12	18-28 = 15
2	= 4	= 13	= 16
3	= 6	= 13	= 15
4	= 6	= 13	= 14
5	= 6	= 13	= 14



78
[θ]

DATA OF MEASUREMENT

	1	1-11 = 1	3-14 = 11	6-15 = 13
	2	= 2	= 12	= 15
	3	= 2	= 12	= 16
	4	= 3	= 11	= 15
	5	= 5	= 11	= 14
	1	2-12 = 2	4-13 = 11	6-16 = 8
	2	= 2	= 13	= 8
	3	= 3	= 12	= 8
	4	= 2	= 11	= 8
	5	= 2	= 13	= 9
	1	12-22 = 8	4-14 = 6	6-17 = 11
	2	= 4	= 11	= 11
	3	= 3	= 11	= 10
	4	= 4	= 9	= 11
	5	= 4	= 10	= 12
	1	2-22 = 10	4-15 = 15	6-18 = 28
	2	= 6	= 17	= 29
	3	= 6	= 17	= 28
	4	= 6	= 17	= 28
	5	= 6	= 17	= 28
	1	2-13 = 12	5-13 = 21	8-30 = 0
	2	= 9	= 24	= 0
	3	= 10	= 22	= 0
	4	= 8	= 24	= 0
	5	= 9	= 24	= 0
	1	2-14 = 18	5-14 = 13	9-29 = 0
	2	= 18	= 14	= 0
	3	= 18	= 14	= 0
	4	= 18	= 14	= 0
	5	= 18	= 15	= 0
	1	3-22 = 8	5-15 = 2	17-27 = 14
	2	= 8	= 8	= 12
	3	= 7	= 8	= 11
	4	= 3	= 8	= 10
	5	= 7	= 7	= 9
	1	3-13 = 7	5-16 = 12	18-28 = 17
	2	= 6	= 13	= 17
	3	= 6	= 12	= 14
	4	= 2	= 13	= 15
	5	= 6	= 14	= 15

DATA OF MEASUREMENT

79

[z]

1	1-11 = 7	3-14 = 12	6-15 = 15
2	= 7	= 12	= 14
3	= 7	= 12	= 15
4	= 5	= 12	= 15
5	= 5	= 12	= 15

1	2-12 = 6	4-13 = 13	6-16 = 10
2	= 6	= 11	= 9
3	= 6	= 11	= 10
4	= 6	= 12	= 11
5	= 4	= 11	= 10

1	12-22 = 4	4-14 = 11	6-17 = 12
2	= 7	= 11	= 11
3	= 9	= 11	= 12
4	= 8	= 12	= 13
5	= 3	= 11	= 12

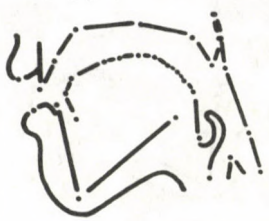
1	2-22 = 7	4-15 = 18	6-18 = 28
2	= 5	= 18	= 26
3	= 6	= 18	= 27
4	= 6	= 18	= 28
5	= 5	= 18	= 27

1	2-13 = 9	5-13 = 23	8-30 = 0
2	= 9	= 22	= 0
3	= 8	= 24	= 0
4	= 9	= 23	= 0
5	= 9	= 22	= 0

1	2-14 = 18	5-14 = 14	9-29 = 0
2	= 18	= 14	= 1
3	= 17	= 15	= 0
4	= 18	= 14	= 0
5	= 18	= 14	= 0

1	3-22 = 9	5-15 = 9	17-27 = 12
2	= 5	= 9	= 13
3	= 3	= 9	= 13
4	= 5	= 9	= 13
5	= 7	= 9	= 13

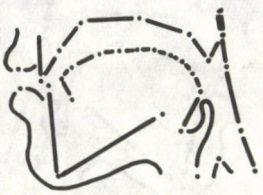
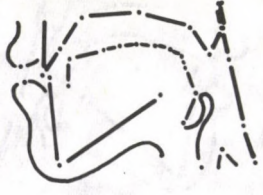


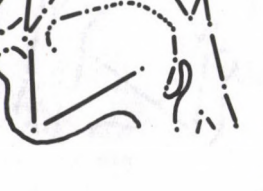
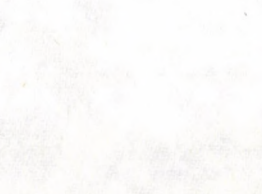

1	3-13 = 6	5-16 = 14	18-28 = 13
2	= 4	= 14	= 12
3	= 3	= 13	= 12
4	= 4	= 13	= 12
5	= 4	= 14	= 14



DATA OF MEASUREMENT

80

[s]

	1	1-11 = 4	3-14 = 12	6-15 = 14
	2	= 2	= 12	= 15
	3	= 3	= 11	= 15
	4	= 3	= 11	= 14
	5	= 4	= 11	= 13
	1	2-12 = 3	4-13 = 12	6-16 = 8
	2	= 2	= 12	= 8
	3	= 2	= 11	= 8
	4	= 2	= 11	= 7
	5	= 2	= 12	= 7
	1	12-22 = 4	4-14 = 10	6-17 = 11
	2	= 3	= 11	= 11
	3	= 6	= 9	= 11
	4	= 4	= 9	= 11
	5	= 4	= 9	= 10
	1	2-22 = 6	4-15 = 17	6-18 = 26
	2	= 5	= 17	= 26
	3	= 7	= 17	= 26
	4	= 6	= 16	= 27
	5	= 6	= 17	= 26
	1	2-13 = 9	5-13 = 23	8-30 = 0
	2	= 9	= 23	= 0
	3	= 9	= 23	= 0
	4	= 10	= 22	= 0
	5	= 9	= 22	= 0
	1	2-14 = 19	5-14 = 13	9-29 = 0
	2	= 18	= 14	= 0
	3	= 19	= 13	= 0
	4	= 18	= 14	= 0
	5	= 18	= 13	= 0
	1	3-22 = 8	5-15 = 8	17-27 = 9
	2	= 5	= 9	= 11
	3	= 3	= 8	= 11
	4	= 4	= 6	= 10
	5	= 6	= 7	= 9
	1	3-13 = 6	5-16 = 13	18-28 = 15
	2	= 4	= 13	= 15
	3	= 2	= 13	= 15
	4	= 2	= 13	= 16
	5	= 4	= 12	= 15

DATA OF MEASUREMENT

81

[3]

1	1-11 = 3	3-14 = 10	6-15 = 15
2	= 3	= 9	= 16
3	= 4	= 10	= 15
4	= 4	= 10	= 15
5	= 6	= 10	= 15

1	2-12 = 2	4-13 = 10	6-16 = 13
2	= 2	= 10	= 11
3	= 2	= 9	= 9
4	= 1	= 10	= 9
5	= 2	= 10	= 9

1	12-22 = 4	4-14 = 3	6-17 = 15
2	= 5	= 4	= 12
3	= 5	= 4	= 11
4	= 4	= 4	= 10
5	= 6	= 5	= 10

1	2-22 = 6	4-15 = 14	6-18 = 28
2	= 6	= 14	= 27
3	= 7	= 14	= 26
4	= 5	= 14	= 26
5	= 7	= 14	= 27

1	2-13 = 11	5-13 = 22	8-30 = 0
2	= 11	= 22	= 0
3	= 11	= 21	= 0
4	= 10	= 22	= 0
5	= 10	= 21	= 0

1	2-14 = 20	5-14 = 14	9-29 = 0
2	= 20	= 14	= 0
3	= 19	= 14	= 0
4	= 19	= 14	= 0
5	= 18	= 13	= 0

1	3-22 = 5	5-15 = 4	17-27 = 21
2	= 5	= 5	= 16
3	= 5	= 4	= 14
4	= 7	= 4	= 12
5	= 6	= 4	= 12

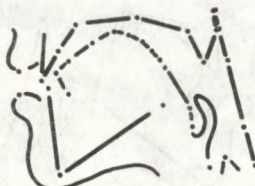






1	3-13 = 2	5-16 = 11	18-28 = 21
2	= 1	= 11	= 18
3	= 3	= 12	= 15
4	= 3	= 12	= 16
5	= 4	= 12	= 14



82

[ʃ]

DATA OF MEASUREMENT

	1	1-11 = 4	3-14 = 10	6-15 = 16
	2	= 3	= 9	= 15
	3	= 3	= 8	= 17
	4	= 5	= 9	= 15
	5	= 4	= 9	= 15
	1	2-12 = 2	4-13 = 9	6-16 = 11
	2	= 2	= 9	= 10
	3	= 2	= 10	= 13
	4	= 2	= 10	= 11
	5	= 3	= 9	= 10
	1	12-22 = 4	4-14 = 6	6-17 = 12
	2	= 5	= 5	= 12
	3	= 4	= 4	= 13
	4	= 4	= 4	= 12
	5	= 3	= 4	= 11
	1	2-22 = 5	4-15 = 13	6-18 = 25
	2	= 6	= 14	= 27
	3	= 6	= 14	= 26
	4	= 6	= 14	= 27
	5	= 5	= 14	= 27
	1	2-13 = 10	5-13 = 22	8-30 = 0
	2	= 10	= 22	= 0
	3	= 10	= 22	= 0
	4	= 10	= 22	= 0
	5	= 11	= 21	= 0
	1	2-14 = 18	5-14 = 13	9-29 = 0
	2	= 18	= 14	= 0
	3	= 18	= 15	= 0
	4	= 18	= 14	= 0
	5	= 18	= 14	= 0
	1	3-22 = 5	5-15 = 6	17-27 = 17
	2	= 5	= 5	= 13
	3	= 5	= 6	= 15
	4	= 5	= 5	= 14
	5	= 6	= 5	= 13
	1	3-13 = 4	5-16 = 10	18-28 = 13
	2	= 3	= 13	= 14
	3	= 1	= 10	= 15
	4	= 1	= 11	= 14
	5	= 2	= 13	= 15

DATA OF MEASUREMENT

83

[j]

1	1-11 = 8	3-14 = 9	6-15 = 16
2	= 7	= 9	= 17
3	= 7	= 10	= 16
4	= 7	= 11	= 16
5	= 8	= 9	= 16

1	2-12 = 2	4-13 = 10	6-16 = 13
2	= 3	= 10	= 13
3	= 2	= 10	= 14
4	= 3	= 10	= 11
5	= 4	= 10	= 13

1	12-22 = 4	4-14 = 3	6-17 = 14
2	= 4	= 3	= 16
3	= 4	= 3	= 16
4	= 4	= 3	= 13
5	= 5	= 2	= 15

1	2-22 = 5	4-15 = 14	6-18 = 27
2	= 5	= 13	= 28
3	= 5	= 15	= 28
4	= 6	= 15	= 28
5	= 6	= 13	= 28

1	2-13 = 10	5-13 = 21	8-30 = 0
2	= 11	= 22	= 0
3	= 11	= 22	= 0
4	= 11	= 22	= 0
5	= 10	= 23	= 0

1	2-14 = 18	5-14 = 14	9-29 = 0
2	= 18	= 15	= 0
3	= 20	= 14	= 0
4	= 21	= 14	= 0
5	= 19	= 15	= 0

1	3-22 = 5	5-15 = 3	17-27 = 17
2	= 6	= 4	= 19
3	= 7	= 4	= 18
4	= 5	= 4	= 17
5	= 5	= 4	= 18

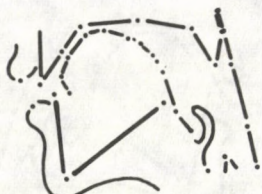
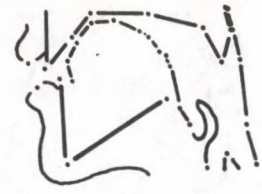
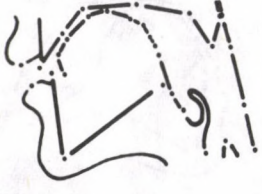



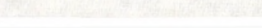
1	3-13 = 2	5-16 = 9	18-28 = 20
2	= 2	= 9	= 20
3	= 2	= 11	= 20
4	= 2	= 11	= 21
5	= 1	= 11	= 19



84

[ç]

DATA OF MEASUREMENT

	1	1-11 = 7	3-14 = 8	6-15 = 16
	2	= 7	= 8	= 16
	3	= 7	= 9	= 16
	4	= 7	= 9	= 16
	5	= 6	= 10	= 16
	1	2-12 = 4	4-13 = 9	6-16 = 12
	2	= 4	= 9	= 13
	3	= 4	= 9	= 13
	4	= 4	= 9	= 13
	5	= 3	= 9	= 12
	1	12-22 = 4	4-14 = 3	6-17 = 14
	2	= 4	= 3	= 14
	3	= 5	= 4	= 15
	4	= 5	= 4	= 15
	5	= 4	= 4	= 14
	1	2-22 = 5	4-15 = 14	6-18 = 27
	2	= 5	= 14	= 27
	3	= 6	= 14	= 27
	4	= 6	= 14	= 27
	5	= 5	= 13	= 27
	1	2-13 = 11	5-13 = 21	8-30 = 0
	2	= 11	= 21	= 0
	3	= 11	= 21	= 0
	4	= 11	= 21	= 0
	5	= 12	= 20	= 0
	1	2-14 = 18	5-14 = 14	9-29 = 0
	2	= 18	= 14	= 0
	3	= 19	= 13	= 0
	4	= 19	= 13	= 0
	5	= 20	= 13	= 0
	1	3-22 = 7	5-15 = 5	17-27 = 19
	2	= 7	= 5	= 19
	3	= 5	= 4	= 19
	4	= 5	= 4	= 19
	5	= 7	= 4	= 19
	1	3-13 = 2	5-16 = 11	18-28 = 14
	2	= 2	= 10	= 14
	3	= 2	= 10	= 15
	4	= 2	= 10	= 15
	5	= 3	= 12	= 15

DATA OF MEASUREMENT

85

[h]

1	1-11 = 11	3-14 = 14	6-15 = 16
2	= 11	= 12	= 17
3	= 12	= 13	= 17
4	= 13	= 11	= 18
5	= 13	= 12	= 19

1	2-12 = 5	4-13 = 16	6-16 = 10
2	= 5	= 14	= 13
3	= 6	= 15	= 12
4	= 7	= 13	= 14
5	= 7	= 13	= 14

1	12-22 = 7	4-14 = 15	6-17 = 12
2	= 5	= 13	= 15
3	= 4	= 14	= 13
4	= 4	= 11	= 14
5	= 5	= 11	= 15

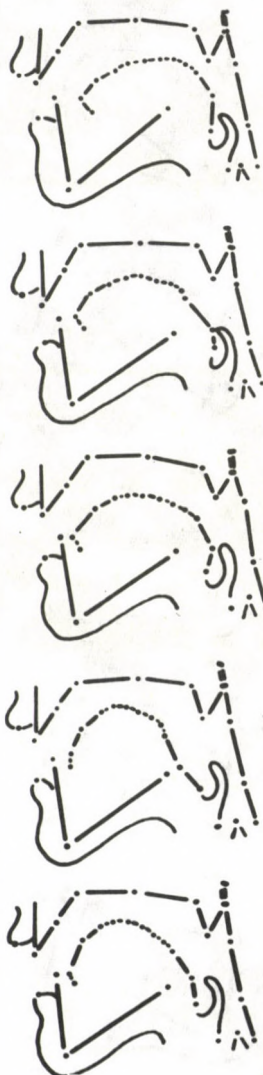
1	2-22 = 12	4-15 = 19	6-18 = 27
2	= 9	= 17	= 27
3	= 10	= 18	= 28
4	= 9	= 15	= 27
5	= 12	= 14	= 27

1	2-13 = 16	5-13 = 19	8-30 = 0
2	= 13	= 20	= 0
3	= 14	= 21	= 0
4	= 13	= 19	= 0
5	= 14	= 19	= 0

1	2-14 = 20	5-14 = 15	9-29 = 0
2	= 19	= 14	= 1
3	= 20	= 15	= 0
4	= 19	= 13	= 0
5	= 20	= 13	= 0

1	3-22 = 14	5-15 = 11	17-27 = 10
2	= 12	= 10	= 13
3	= 15	= 11	= 13
4	= 12	= 8	= 17
5	= 15	= 9	= 15

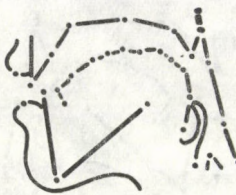



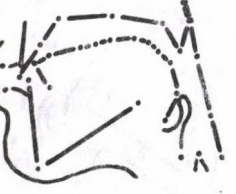
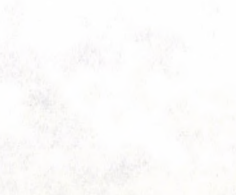

1	3-13 = 13	5-16 = 14	18-28 = 9
2	= 9	= 15	= 9
3	= 10	= 16	= 12
4	= 8	= 12	= 11
5	= 9	= 12	= 11



86

[t]

DATA OF MEASUREMENT

	1	1-11 = 9	3-14 = 9	6-15 = 15
	2	= 9	= 9	= 15
	3	= 9	= 10	= 15
	4	= 9	= 10	= 15
	5	= 9	= 10	= 15
	1	2-12 = 4	4-13 = 11	6-16 = 12
	2	= 4	= 11	= 12
	3	= 4	= 10	= 12
	4	= 4	= 10	= 12
	5	= 4	= 9	= 13
	1	12-22 = 5	4-14 = 5	6-17 = 14
	2	= 5	= 5	= 14
	3	= 6	= 6	= 13
	4	= 6	= 6	= 13
	5	= 6	= 6	= 15
	1	2-22 = 5	4-15 = 13	6-18 = 27
	2	= 5	= 13	= 27
	3	= 6	= 13	= 27
	4	= 6	= 13	= 27
	5	= 6	= 14	= 27
	1	2-13 = 11	5-13 = 21	8-30 = 0
	2	= 11	= 21	= 0
	3	= 11	= 21	= 0
	4	= 11	= 21	= 0
	5	= 11	= 21	= 0
	1	2-14 = 20	5-14 = 12	9-29 = 0
	2	= 20	= 12	= 0
	3	= 20	= 12	= 0
	4	= 20	= 12	= 0
	5	= 20	= 12	= 0
	1	3-22 = 7	5-15 = 6	17-27 = 18
	2	= 7	= 6	= 18
	3	= 5	= 5	= 16
	4	= 5	= 5	= 16
	5	= 5	= 5	= 18
	1	3-13 = 4	5-16 = 11	18-28 = 14
	2	= 4	= 11	= 14
	3	= 2	= 11	= 13
	4	= 2	= 11	= 13
	5	= 4	= 11	= 14

DATA OF MEASUREMENT

87

[1]

1	1-11 = 2	3-14 = 11	6-15 = 15
2	= 2	= 11	= 16
3	= 3	= 11	= 16
4	= 2	= 11	= 17
5	= 3	= 11	= 15

1	2-12 = 2	4-13 = 10	6-16 = 9
2	= 2	= 9	= 11
3	= 2	= 10	= 9
4	= 2	= 10	= 11
5	= 2	= 9	= 9

1	12-22 = 4	4-14 = 8	6-17 = 12
2	= 3	= 6	= 12
3	= 4	= 6	= 12
4	= 6	= 7	= 13
5	= 6	= 6	= 10

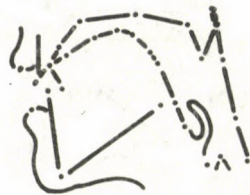
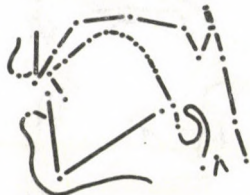
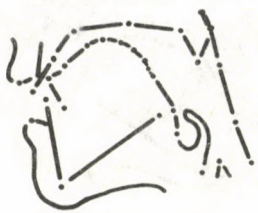
1	2-22 = 5	4-15 = 15	6-18 = 26
2	= 4	= 15	= 26
3	= 5	= 15	= 27
4	= 7	= 15	= 28
5	= 7	= 15	= 26

1	2-13 = 11	5-13 = 21	8-30 = 1
2	= 11	= 21	= 0
3	= 10	= 21	= 0
4	= 10	= 21	= 0
5	= 11	= 20	= 0

1	2-14 = 19	5-14 = 12	9-29 = 3
2	= 19	= 13	= 0
3	= 19	= 12	= 0
4	= 19	= 12	= 0
5	= 19	= 12	= 0

1	3-22 = 6	5-15 = 5	17-27 = 13
2	= 6	= 4	= 12
3	= 5	= 4	= 12
4	= 3	= 4	= 11
5	= 4	= 4	= 11

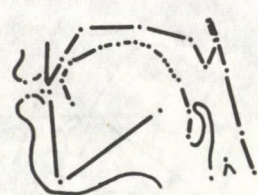




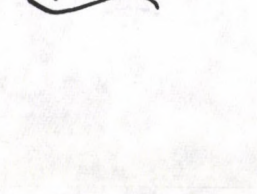
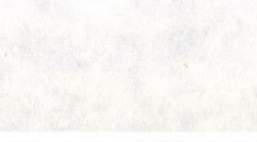
1	3-13 = 4	5-16 = 12	18-28 = 13
2	= 3	= 11	= 13
3	= 2	= 11	= 14
4	= 4	= 11	= 14
5	= 3	= 11	= 14



88

[dr]

DATA OF MEASUREMENT

	1	1-11 = 3	3-14 = 13	6-15 = 13
	2	= 3	= 11	= 14
	3	= 3	= 10	= 14
	4	= 3	= 10	= 15
	5	= 2	= 9	= 16
	1	2-12 = 1	4-13 = 10	6-16 = 6
	2	= 1	= 10	= 9
	3	= 2	= 10	= 7
	4	= 2	= 11	= 9
	5	= 2	= 10	= 9
	1	12-22 = 6	4-14 = 10	6-17 = 9
	2	= 5	= 8	= 11
	3	= 5	= 6	= 10
	4	= 5	= 6	= 11
	5	= 6	= 4	= 12
	1	2-22 = 6	4-15 = 15	6-18 = 25
	2	= 6	= 15	= 26
	3	= 6	= 15	= 25
	4	= 7	= 14	= 26
	5	= 7	= 14	= 26
	1	2-13 = 10	5-13 = 21	8-30 = 3
	2	= 11	= 21	= 2
	3	= 11	= 21	= 0
	4	= 10	= 22	= 0
	5	= 11	= 21	= 0
	1	2-14 = 19	5-14 = 13	9-29 = 3
	2	= 18	= 13	= 0
	3	= 19	= 13	= 0
	4	= 19	= 13	= 0
	5	= 18	= 14	= 0
	1	3-22 = 4	5-15 = 7	17-27 = 11
	2	= 5	= 6	= 12
	3	= 6	= 4	= 11
	4	= 6	= 5	= 12
	5	= 5	= 4	= 13
	1	3-13 = 5	5-16 = 13	18-28 = 14
	2	= 5	= 12	= 14
	3	= 4	= 11	= 15
	4	= 4	= 12	= 14
	5	= 3	= 11	= 13

DATA OF MEASUREMENT

89

[tr]

1	1-11 = 4	3-14 = 11	6-15 = 17
2	= 4	= 10	= 17
3	= 4	= 9	= 17
4	= 4	= 10	= 16
5	= 4	= 10	= 17

1	2-12 = 2	4-13 = 11	6-16 = 12
2	= 2	= 10	= 11
3	= 2	= 10	= 11
4	= 1	= 11	= 9
5	= 2	= 9	= 11

1	12-22 = 5	4-14 = 9	6-17 = 13
2	= 4	= 8	= 12
3	= 3	= 4	= 12
4	= 4	= 9	= 11
5	= 4	= 6	= 13

1	2-22 = 6	4-15 = 16	6-18 = 26
2	= 4	= 16	= 27
3	= 4	= 14	= 27
4	= 4	= 16	= 27
5	= 4	= 15	= 27

1	2-13 = 10	5-13 = 21	8-30 = 0
2	= 10	= 21	= 0
3	= 11	= 21	= 0
4	= 10	= 21	= 0
5	= 11	= 21	= 0

1	2-14 = 19	5-14 = 13	9-29 = 0
2	= 18	= 13	= 0
3	= 19	= 13	= 0
4	= 17	= 14	= 0
5	= 18	= 13	= 0

1	3-22 = 6	5-15 = 7	17-27 = 13
2	= 6	= 7	= 12
3	= 7	= 5	= 12
4	= 6	= 7	= 11
5	= 6	= 5	= 13

1	3-13 = 4	5-16 = 12	18-28 = 12
2	= 3	= 11	= 16
3	= 3	= 12	= 15
4	= 4	= 13	= 16
5	= 3	= 12	= 15



DATA OF MEASUREMENT

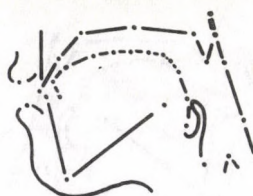
90

[dz]

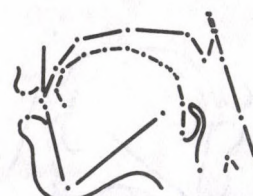


1	1-11 = 6	3-14 = 10	6-15 = 15
2	= 5	= 9	= 15
3	= 4	= 8	= 14
4	= 5	= 9	= 14
5	= 4	= 9	= 15

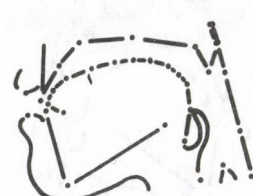
1	2-12 = 4	4-13 = 11	6-16 = 10
2	= 2	= 10	= 8
3	= 1	= 9	= 10
4	= 2	= 9	= 7
5	= 2	= 9	= 7



1	12-22 = 6	4-14 = 10	6-17 = 10
2	= 4	= 5	= 10
3	= 5	= 5	= 11
4	= 4	= 4	= 11
5	= 5	= 6	= 11



1	2-22 = 5	4-15 = 16	6-18 = 25
2	= 5	= 15	= 25
3	= 5	= 16	= 26
4	= 5	= 15	= 26
5	= 6	= 16	= 25



1	2-13 = 10	5-13 = 21	8-30 = 0
2	= 11	= 21	= 0
3	= 11	= 22	= 0
4	= 11	= 22	= 0
5	= 11	= 21	= 0



1	2-14 = 17	5-14 = 14	9-29 = 0
2	= 19	= 13	= 0
3	= 18	= 14	= 0
4	= 18	= 14	= 0
5	= 19	= 13	= 2



1	3-22 = 6	5-15 = 8	17-27 = 10
2	= 7	= 7	= 10
3	= 6	= 7	= 11
4	= 6	= 4	= 9
5	= 6	= 5	= 9

1	3-13 = 4	5-16 = 13	18-28 = 12
2	= 3	= 14	= 15
3	= 1	= 13	= 14
4	= 2	= 12	= 14
5	= 3	= 13	= 12

DATA OF MEASUREMENT

91

[ts]

1	1-11 = 5	3-14 = 9	6-15 = 15
2	= 5	= 9	= 15
3	= 4	= 9	= 15
4	= 5	= 9	= 16
5	= 5	= 9	= 16

1	2-12 = 2	4-13 = 9	6-16 = 11
2	= 2	= 9	= 10
3	= 2	= 9	= 10
4	= 2	= 10	= 9
5	= 2	= 9	= 10

1	12-22 = 4	4-14 = 4	6-17 = 14
2	= 4	= 3	= 13
3	= 4	= 4	= 13
4	= 6	= 4	= 12
5	= 6	= 6	= 12

1	2-22 = 6	4-15 = 14	6-18 = 26
2	= 6	= 14	= 27
3	= 7	= 14	= 26
4	= 8	= 13	= 26
5	= 7	= 13	= 25

1	2-13 = 11	5-13 = 21	8-30 = 0
2	= 11	= 20	= 0
3	= 12	= 20	= 0
4	= 11	= 20	= 0
5	= 12	= 19	= 0

1	2-14 = 20	5-14 = 12	9-29 = 0
2	= 20	= 12	= 0
3	= 19	= 13	= 0
4	= 19	= 13	= 0
5	= 19	= 12	= 0

1	3-22 = 6	5-15 = 4	17-27 = 17
2	= 6	= 4	= 16
3	= 6	= 4	= 15
4	= 6	= 4	= 12
5	= 6	= 5	= 13

1	3-13 = 1	5-16 = 11	18-28 = 16
2	= 1	= 10	= 16
3	= 2	= 11	= 15
4	= 4	= 11	= 16
5	= 4	= 11	= 15



DATA OF MEASUREMENT

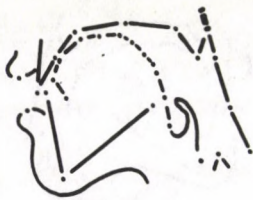
92

[d₃]

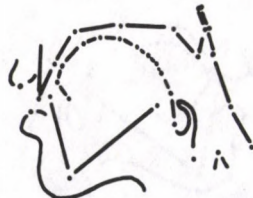


1	1-11 = 5	3-14 = 10	6-15 = 16
2	= 4	= 9	= 15
3	= 4	= 9	= 15
4	= 4	= 9	= 15
5	= 5	= 9	= 15

1	2-12 = 2	4-13 = 10	6-16 = 10
2	= 2	= 9	= 9
3	= 2	= 9	= 8
4	= 2	= 10	= 8
5	= 2	= 10	= 10



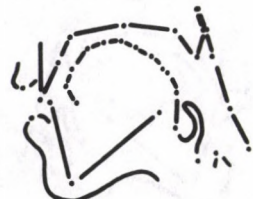
1	12-22 = 3	4-14 = 9	6-17 = 11
2	= 4	= 5	= 11
3	= 4	= 4	= 10
4	= 2	= 4	= 11
5	= 7	= 4	= 11



1	2-22 = 5	4-15 = 14	6-18 = 24
2	= 5	= 14	= 22
3	= 6	= 13	= 22
4	= 4	= 14	= 23
5	= 9	= 14	= 23



1	2-13 = 11	5-13 = 20	8-30 = 0
2	= 11	= 21	= 0
3	= 11	= 20	= 0
4	= 10	= 22	= 0
5	= 11	= 20	= 0



1	2-14 = 18	5-14 = 13	9-29 = 0
2	= 18	= 13	= 0
3	= 18	= 13	= 0
4	= 18	= 13	= 0
5	= 18	= 13	= 1



1	3-22 = 9	5-15 = 8	17-27 = 10
2	= 7	= 5	= 11
3	= 5	= 4	= 12
4	= 3	= 4	= 11
5	= 7	= 5	= 11

1	3-13 = 5	5-16 = 13	18-28 = 8
2	= 3	= 13	= 11
3	= 2	= 13	= 13
4	= 3	= 12	= 11
5	= 4	= 14	= 11

DATA OF MEASUREMENT

93

[tʃ]

1	1-11 = 5	3-14 = 12	6-15 = 15
2	= 5	= 12	= 16
3	= 5	= 12	= 14
4	= 4	= 12	= 14
5	= 4	= 12	= 14

1	2-12 = 4	4-13 = 14	6-16 = 8
2	= 4	= 11	= 6
3	= 3	= 11	= 6
4	= 2	= 11	= 6
5	= 2	= 11	= 6

1	12-22 = 5	4-14 = 12	6-17 = 12
2	= 3	= 10	= 10
3	= 5	= 12	= 11
4	= 4	= 11	= 10
5	= 5	= 11	= 10

1	2-22 = 8	4-15 = 17	6-18 = 27
2	= 6	= 15	= 26
3	= 6	= 17	= 26
4	= 6	= 17	= 26
5	= 6	= 17	= 26

1	2-13 = 12	5-13 = 21	8-30 = 0
2	= 11	= 19	= 0
3	= 10	= 21	= 0
4	= 10	= 21	= 0
5	= 10	= 21	= 0

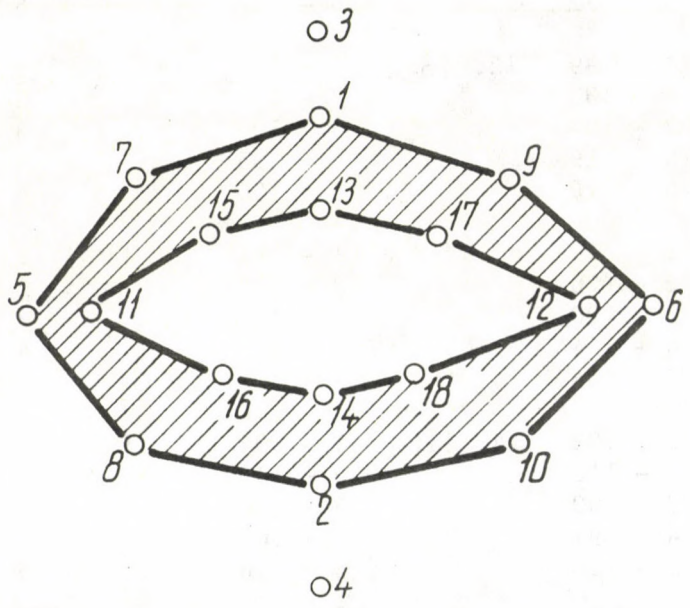
1	2-14 = 19	5-14 = 13	9-29 = 0
2	= 19	= 11	= 0
3	= 19	= 13	= 0
4	= 19	= 13	= 0
5	= 19	= 13	= 0

1	3-22 = 11	5-15 = 8	17-27 = 7
2	= 11	= 5	= 7
3	= 5	= 8	= 8
4	= 4	= 7	= 6
5	= 5	= 7	= 7

1	3-13 = 9	5-16 = 13	18-28 = 10
2	= 8	= 12	= 10
3	= 5	= 13	= 10
4	= 4	= 13	= 11
5	= 5	= 13	= 12



RELATIVE AREAS OF THE OPENING OF THE MOUTH
IN PERCENT



Sound	Relative areas in %	Sound	Relative areas in %	Sound	Relative areas in %
2. [ɑ:]	1 - 61 2 - 110 3 - 100 4 - 100 5 - 61	9. [ɪ]	1 - 110 2 - 112 3 - 100 4 - 100 5 - 94	16. [i]	1 - 127 2 - 117 3 - 100 4 - 351 5 - 415
3. [ɒ]	1 - 61 2 - 77 3 - 100 4 - 96 5 - 83	10. [ɛ]	1 - 15 2 - 79 3 - 100 4 - 105 5 - 76	17. [eɪ]	1 - 70 2 - 119 3 - 100 4 - 93 5 - 85
4. [ʌ]	1 - 83 2 - 98 3 - 100 4 - 91 5 - 72	11. [æ]	1 - 114 2 - 110 3 - 100 4 - 78 5 - 68	18. [aʊ]	1 - 125 2 - 144 3 - 100 4 - 34 5 - 21
5. [ɔ']	1 - 99 2 - 103 3 - 100 4 - 119 5 - 116	12. [ɜ:]	1 - 101 2 - 102 3 - 100 4 - 95 5 - 100	19. [əʊ]	1 - 125 2 - 136 3 - 100 4 - 70 5 - 89
6. [ʊ]	1 - 45 2 - 76 3 - 100 4 - 134 5 - 154	13. [ɚ]	1 - 51 2 - 75 3 - 100 4 - 108 5 - 102	20. [ʊə]	1 - 66 2 - 42 3 - 100 4 - 148 5 - 164
7. [u:]	1 - 103 2 - 110 3 - 100 4 - 91 5 - 150	14. [aɪ]	1 - 95 2 - 113 3 - 100 4 - 105 5 - 116	21. [ɔ̄]	1 - 76 2 - 109 3 - 100 4 - 120 5 - 224
8. [i:]	1 - 96 2 - 101 3 - 100 4 - 93 5 - 72	15. [ɔɪ]	1 - 24 2 - 56 3 - 100 4 - 188 5 - 207	22. [iə]	1 - 107 2 - 100 3 - 100 4 - 81 5 - 75

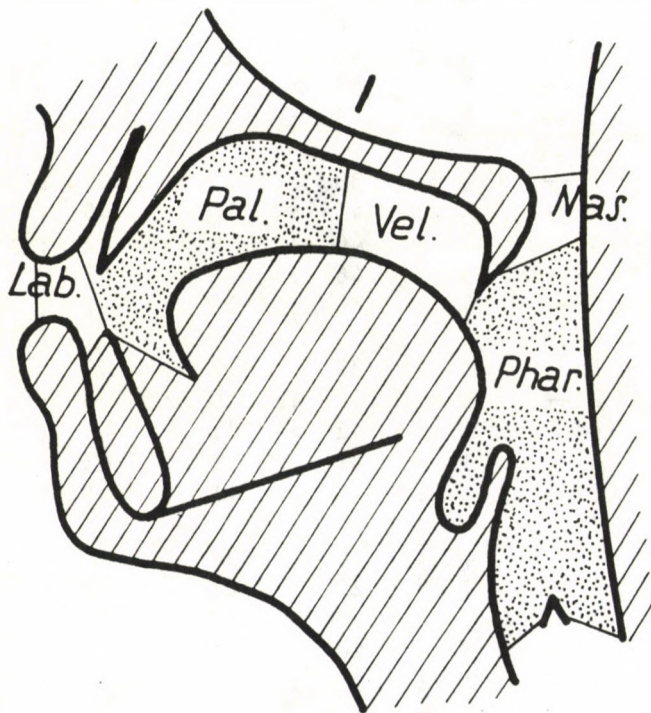
23. [ɛ̃ə]	1 - 112	30. [p]	1 - 98	37. [n']	1 - 93
	2 - 109		2 - 99		2 - 95
	3 - 100		3 - 100		3 - 100
	4 - 103		4 - 97		4 - 103
	5 - 89		5 - 497		5 - 90
24. [aɪə]	1 - 36	31. [m]	1 - 101	38. [g]	1 - 95
	2 - 116		2 - 102		2 - 94
	3 - 100		3 - 100		3 - 100
	4 - 87		4 - 100		4 - 103
	5 - 87		5 - 676		5 - 107
25. [ɔ̃ɪə]	1 - 38	32. [d]	1 - 99	39. [k]	1 - 99
	2 - 67		2 - 97		2 - 99
	3 - 100		3 - 100		3 - 100
	4 - 107		4 - 110		4 - 100
	5 - 103		5 - 122		5 - 100
26. [eɪə]	1 - 132	33. [t]	1 - 125	40. [ŋ]	1 - 92
	2 - 176		2 - 89		2 - 93
	3 - 100		3 - 100		3 - 100
	4 - 98		4 - 115		4 - 100
	5 - 81		5 - 125		5 - 115
27. [ayə]	1 - 124	34. [n]	1 - 113	41. [r]	1 - 121
	2 - 153		2 - 119		2 - 105
	3 - 100		3 - 100		3 - 100
	4 - 78		4 - 119		4 - 106
	5 - 91		5 - 108		5 - 161
28. [ɔ̃yə]	1 - 313	35. [d']	1 - 99	42. [w]	1 - 158
	2 - 299		2 - 100		2 - 88
	3 - 100		3 - 100		3 - 100
	4 - 274		4 - 102		4 - 180
	5 - 252		5 - 82		5 - 329
29. [b]	1 - 97	36. [t']	1 - 99	43. [v]	1 - 99
	2 - 100		2 - 99		2 - 105
	3 - 100		3 - 100		3 - 100
	4 - 104		4 - 100		4 - 108
	5 - 425		5 - 100		5 - 145

44. [f]	1 - 99	51. [ʃ]	1 - 101	58. [tr̥]	1 - 99
	2 - 99		2 - 82		2 - 98
	3 - 100		3 - 100		3 - 100
	4 - 100		4 - 82		4 - 100
	5 - 132		5 - 89		5 - 172
45. [ŋ]	1 - 353	52. [j]	1 - 95	59. [d͡z]	1 - 104
	2 - 175		2 - 99		2 - 95
	3 - 100		3 - 100		3 - 100
	4 - 105		4 - 85		4 - 100
	5 - 105		5 - 63		5 - 102
46. [ð]	1 - 99	53. [ç]	1 - 69	60. [t͡s]	1 - 82
	2 - 99		2 - 98		2 - 84
	3 - 100		3 - 100		3 - 100
	4 - 100		4 - 105		4 - 105
	5 - 100		5 - 123		5 - 134
47. [θ]	1 - 99	54. [h]	1 - 101	61. [d͡ʒ]	1 - 99
	2 - 99		2 - 98		2 - 99
	3 - 100		3 - 100		3 - 100
	4 - 100		4 - 102		4 - 100
	5 - 100		5 - 101		5 - 100
48. [z]	1 - 99	55. [ʒ]	1 - 109	62. [t͡ʃ]	1 - 101
	2 - 99		2 - 106		2 - 99
	3 - 100		3 - 100		3 - 100
	4 - 96		4 - 100		4 - 120
	5 - 83		5 - 103		5 - 151
49. [s]	1 - 100	56. [l]	1 - 102		
	2 - 99		2 - 98		
	3 - 100		3 - 100		
	4 - 114		4 - 98		
	5 - 148		5 - 101		
50. [ʒ]	1 - 105	57. [d͡r]	1 - 110		
	2 - 98		2 - 107		
	3 - 100		3 - 100		
	4 - 100		4 - 183		
	5 - 90		5 - 399		

63. [b]	1 - 124 2 - 125 3 - 100 4 - 204 5 - 240	70. [k]	1 - 99 2 - 99 3 - 100 4 - 97 5 - 97	77. [ð]	1 - 99 2 - 99 3 - 100 4 - 100 5 - 100
64. [p]	1 - 99 2 - 100 3 - 100 4 - 110 5 - 120	71. [ŋ]	1 - 112 2 - 113 3 - 100 4 - 97 5 - 99	78. [θ]	1 - 99 2 - 99 3 - 100 4 - 100 5 - 100
65. [m]	1 - 99 2 - 100 3 - 100 4 - 100 5 - 100	72. [r]	1 - 189 2 - 128 3 - 100 4 - 67 5 - 71	79. [z]	1 - 99 2 - 99 3 - 100 4 - 100 5 - 100
66. [d]	1 - 99 2 - 99 3 - 100 4 - 100 5 - 100	73. [w]	1 - 214 2 - 174 3 - 100 4 - 100 5 - 101	80. [s]	1 - 99 2 - 99 3 - 100 4 - 100 5 - 100
67. [t]	1 - 124 2 - 104 3 - 100 4 - 100 5 - 100	74. [v]	1 - 191 2 - 153 3 - 100 4 - 84 5 - 89	81. [ʒ]	1 - 98 2 - 99 3 - 100 4 - 111 5 - 111
68. [n]	1 - 147 2 - 113 3 - 100 4 - 100 5 - 100	75. [f]	1 - 304 2 - 99 3 - 100 4 - 100 5 - 305	82. [ʃ]	1 - 96 2 - 96 3 - 100 4 - 100 5 - 100
69. [g]	1 - 99 2 - 99 3 - 100 4 - 100 5 - 100	76. [ŋ]	1 - 226 2 - 145 3 - 100 4 - 75 5 - 75	83. [j]	1 - 99 2 - 99 3 - 100 4 - 100 5 - 113

- | | | | |
|-----------|---------|-----------|---------|
| 84. [ç] | 1 - 99 | 90. [dz̥] | 1 - 97 |
| | 2 - 99 | | 2 - 99 |
| | 3 - 100 | | 3 - 100 |
| | 4 - 100 | | 4 - 113 |
| | 5 - 79 | | 5 - 113 |
| 85. [h] | 1 - 81 | 91. [ts̥] | 1 - 161 |
| | 2 - 95 | | 2 - 99 |
| | 3 - 100 | | 3 - 100 |
| | 4 - 100 | | 4 - 100 |
| | 5 - 100 | | 5 - 116 |
| 86. [±] | 1 - 99 | 92. [d̥ʒ] | 1 - 129 |
| | 2 - 99 | | 2 - 100 |
| | 3 - 100 | | 3 - 100 |
| | 4 - 100 | | 4 - 100 |
| | 5 - 113 | | 5 - 100 |
| 87. [l] | 1 - 97 | 93. [t̥ʃ] | 1 - 115 |
| | 2 - 99 | | 2 - 99 |
| | 3 - 100 | | 3 - 100 |
| | 4 - 100 | | 4 - 100 |
| | 5 - 100 | | 5 - 100 |
| 88. [d̥r] | 1 - 99 | | |
| | 2 - 99 | | |
| | 3 - 100 | | |
| | 4 - 100 | | |
| | 5 - 105 | | |
| 89. [t̥r] | 1 - 99 | | |
| | 2 - 95 | | |
| | 3 - 100 | | |
| | 4 - 95 | | |
| | 5 - 129 | | |

RELATIVE AREAS OF THE SUPRAGLOTTAL CAVITIES
IN PRESENT



Sound		Relative areas in %				
		Lab.	Pal.	Vel.	Phar.	Nas.
2. [ɑ:]	1 --	3 :	45 :	12 :	39 :	0
	2 --	4 :	50 :	11 :	34 :	0
	3 --	5 :	54 :	13 :	27 :	0
	4 --	5 :	55 :	11 :	29 :	0
	5 --	4 :	53 :	13 :	30 :	0
3. [ɒ]	1 --	6 :	29 :	16 :	48 :	0
	2 --	5 :	49 :	14 :	31 :	0
	3 --	5 :	50 :	15 :	29 :	0
	4 --	5 :	51 :	14 :	30 :	0
	5 --	5 :	40 :	18 :	37 :	0
4. [ʌ]	1 --	6 :	42 :	15 :	37 :	0
	2 --	6 :	48 :	14 :	32 :	0
	3 --	6 :	46 :	16 :	32 :	0
	4 --	5 :	53 :	14 :	28 :	0
	5 --	4 :	49 :	16 :	30 :	0
5. [ɔ]	1 --	4 :	33 :	13 :	49 :	0
	2 --	4 :	41 :	10 :	45 :	0
	3 --	4 :	46 :	8 :	42 :	0
	4 --	3 :	46 :	8 :	41 :	0
	5 --	4 :	46 :	13 :	37 :	0
6. [ʊ]	1 --	2 :	39 :	12 :	46 :	0
	2 --	3 :	41 :	10 :	46 :	0
	3 --	3 :	42 :	11 :	44 :	0
	4 --	3 :	41 :	11 :	45 :	0
	5 --	4 :	43 :	11 :	41 :	0
7. [u:]	1 --	4 :	18 :	21 :	57 :	0
	2 --	3 :	20 :	21 :	55 :	0
	3 --	3 :	23 :	17 :	57 :	0
	4 --	3 :	20 :	20 :	57 :	0
	5 --	3 :	23 :	15 :	58 :	0
8. [i:]	1 --	5 :	13 :	29 :	52 :	0
	2 --	5 :	13 :	30 :	52 :	0
	3 --	3 :	16 :	30 :	51 :	0
	4 --	4 :	13 :	29 :	54 :	0
	5 --	4 :	15 :	27 :	54 :	0

9. [I]	1 --	4 :	19 :	22 :	55 :	0
	2 --	4 :	20 :	21 :	54 :	0
	3 --	5 :	18 :	21 :	55 :	0
	4 --	4 :	19 :	21 :	55 :	0
	5 --	5 :	24 :	21 :	50 :	0
10. [ε]	1 --	3 :	26 :	21 :	48 :	0
	2 --	6 :	28 :	20 :	46 :	0
	3 --	5 :	29 :	21 :	45 :	0
	4 --	5 :	29 :	23 :	43 :	0
	5 --	5 :	31 :	21 :	43 :	0
11. [æ]	1 --	8 :	45 :	18 :	28 :	0
	2 --	7 :	45 :	17 :	30 :	0
	3 --	6 :	45 :	17 :	31 :	0
	4 --	7 :	44 :	18 :	31 :	0
	5 --	6 :	44 :	20 :	30 :	0
12. [3:]	1 --	6 :	43 :	20 :	31 :	0
	2 --	4 :	32 :	17 :	47 :	0
	3 --	3 :	30 :	19 :	48 :	0
	4 --	4 :	31 :	19 :	46 :	0
	5 --	4 :	30 :	19 :	47 :	0
13. [ə]	1 --	4 :	31 :	19 :	46 :	0
	2 --	4 :	31 :	18 :	47 :	0
	3 --	5 :	37 :	21 :	37 :	0
	4 --	4 :	32 :	24 :	40 :	0
	5 --	5 :	30 :	22 :	42 :	0
14. [ai]	1 --	6 :	33 :	13 :	47 :	0
	2 --	8 :	47 :	12 :	32 :	0
	3 --	7 :	47 :	12 :	34 :	0
	4 --	6 :	30 :	17 :	50 :	0
	5 --	6 :	20 :	20 :	54 :	0
15. [əi]	1 --	4 :	41 :	14 :	39 :	0
	2 --	5 :	49 :	11 :	35 :	0
	3 --	5 :	33 :	21 :	41 :	0
	4 --	6 :	21 :	25 :	48 :	0
	5 --	5 :	18 :	26 :	51 :	0

16. [v̥i]	1 --	5 :	21 :	24 :	51 :	0
	2 --	4 :	20 :	23 :	52 :	0
	3 --	4 :	20 :	22 :	54 :	0
	4 --	4 :	20 :	20 :	55 :	0
	5 --	7 :	25 :	18 :	49 :	0
17. [ei]	1 --	6 :	33 :	21 :	40 :	0
	2 --	7 :	31 :	19 :	43 :	0
	3 --	7 :	26 :	19 :	48 :	0
	4 --	6 :	19 :	19 :	55 :	0
	5 --	6 :	15 :	20 :	59 :	0
18. [ay]	1 --	8 :	37 :	15 :	39 :	0
	2 --	7 :	51 :	16 :	26 :	0
	3 --	7 :	52 :	13 :	28 :	0
	4 --	5 :	48 :	11 :	36 :	0
	5 --	3 :	42 :	12 :	42 :	0
19. [əy]	1 --	5 :	34 :	12 :	49 :	0
	2 --	5 :	36 :	13 :	46 :	0
	3 --	4 :	30 :	12 :	54 :	0
	4 --	4 :	29 :	11 :	56 :	0
	5 --	4 :	30 :	11 :	54 :	0
20. [v̥ə]	1 --	4 :	25 :	15 :	56 :	0
	2 --	4 :	21 :	16 :	59 :	0
	3 --	5 :	26 :	12 :	56 :	0
	4 --	6 :	40 :	16 :	37 :	0
	5 --	5 :	39 :	20 :	35 :	0
21. [ɔ̇]	1 --	3 :	40 :	12 :	44 :	0
	2 --	4 :	48 :	8 :	40 :	0
	3 --	5 :	52 :	9 :	33 :	0
	4 --	5 :	52 :	9 :	35 :	0
	5 --	5 :	46 :	14 :	35 :	0
22. [i̇ə]	1 --	6 :	15 :	22 :	56 :	0
	2 --	6 :	16 :	23 :	55 :	0
	3 --	6 :	36 :	21 :	37 :	0
	4 --	5 :	41 :	23 :	31 :	0
	5 --	4 :	45 :	22 :	29 :	0

23. [εə]	1 --	6 :	35 :	19 :	40 :	0
	2 --	5 :	35 :	20 :	39 :	0
	3 --	4 :	37 :	21 :	36 :	0
	4 --	4 :	40 :	20 :	35 :	0
	5 --	4 :	43 :	19 :	33 :	0
24. [aiə]	1 --	4 :	46 :	16 :	34 :	0
	2 --	7 :	55 :	15 :	22 :	0
	3 --	5 :	41 :	20 :	34 :	0
	4 --	4 :	42 :	19 :	33 :	0
	5 --	4 :	42 :	20 :	34 :	0
25. [ɔiə]	1 --	5 :	34 :	18 :	42 :	0
	2 --	5 :	42 :	17 :	36 :	0
	3 --	6 :	25 :	25 :	43 :	0
	4 --	6 :	37 :	24 :	33 :	0
	5 --	6 :	42 :	21 :	31 :	0
26. [eiə]	1 --	8 :	30 :	28 :	34 :	0
	2 --	7 :	32 :	22 :	39 :	0
	3 --	6 :	33 :	22 :	38 :	0
	4 --	6 :	48 :	20 :	25 :	0
	5 --	5 :	44 :	26 :	25 :	0
27. [auə]	1 --	9 :	51 :	15 :	25 :	0
	2 --	8 :	54 :	13 :	24 :	0
	3 --	5 :	46 :	14 :	34 :	0
	4 --	5 :	42 :	19 :	34 :	0
	5 --	4 :	42 :	17 :	37 :	0
28. [ɔuə]	1 --	6 :	32 :	22 :	39 :	0
	2 --	5 :	35 :	19 :	41 :	0
	3 --	5 :	40 :	15 :	40 :	0
	4 --	5 :	43 :	21 :	31 :	0
	5 --	6 :	42 :	24 :	28 :	0
29. [b]	1 --	3 :	31 :	25 :	41 :	0
	2 --	3 :	31 :	23 :	43 :	0
	3 --	3 :	30 :	23 :	44 :	0
	4 --	3 :	30 :	23 :	44 :	0
	5 --	3 :	27 :	24 :	46 :	0

30. [p]	1 --	3 :	28 :	23 :	46 :	0
	2 --	3 :	25 :	24 :	47 :	0
	3 --	3 :	24 :	25 :	48 :	0
	4 --	5 :	23 :	24 :	47 :	0
	5 --	6 :	18 :	25 :	52 :	0
31. [m]	1 --	3 :	28 :	21 :	43 :	5
	2 --	3 :	28 :	22 :	41 :	6
	3 --	3 :	25 :	20 :	47 :	4
	4 --	3 :	24 :	21 :	46 :	5
	5 --	4 :	24 :	17 :	47 :	8
32. [d]	1 --	5 :	25 :	17 :	52 :	0
	2 --	5 :	22 :	19 :	53 :	0
	3 --	5 :	23 :	21 :	51 :	0
	4 --	5 :	21 :	21 :	53 :	0
	5 --	4 :	21 :	21 :	53 :	0
33. [t]	1 --	5 :	19 :	20 :	55 :	0
	2 --	5 :	18 :	21 :	56 :	0
	3 --	5 :	19 :	21 :	54 :	0
	4 --	6 :	19 :	22 :	52 :	0
	5 --	8 :	21 :	20 :	50 :	0
34. [n]	1 --	6 :	22 :	22 :	47 :	2
	2 --	6 :	22 :	20 :	49 :	3
	3 --	6 :	20 :	22 :	49 :	3
	4 --	6 :	21 :	22 :	49 :	2
	5 --	6 :	22 :	21 :	48 :	3
35. [d']	1 --	5 :	22 :	17 :	55 :	0
	2 --	5 :	16 :	21 :	57 :	0
	3 --	4 :	15 :	23 :	58 :	0
	4 --	5 :	14 :	24 :	57 :	0
	5 --	4 :	19 :	21 :	56 :	0
36. [t']	1 --	4 :	19 :	23 :	53 :	0
	2 --	5 :	16 :	24 :	55 :	0
	3 --	4 :	13 :	24 :	58 :	0
	4 --	4 :	10 :	26 :	59 :	0
	5 --	5 :	18 :	21 :	56 :	0

37. [n']	1 --	4 :	20 :	23 :	50 :	3
	2 --	4 :	18 :	22 :	52 :	5
	3 --	4 :	21 :	21 :	50 :	4
	4 --	4 :	17 :	21 :	53 :	5
	5 --	4 :	16 :	22 :	53 :	5
38. [g]	1 --	5 :	23 :	20 :	52 :	0
	2 --	5 :	17 :	24 :	54 :	0
	3 --	5 :	16 :	23 :	56 :	0
	4 --	6 :	17 :	19 :	58 :	0
	5 --	6 :	16 :	21 :	56 :	0
39. [k]	1 --	6 :	16 :	20 :	57 :	0
	2 --	6 :	14 :	21 :	59 :	0
	3 --	6 :	16 :	19 :	59 :	0
	4 --	7 :	17 :	24 :	51 :	0
	5 --	7 :	18 :	25 :	50 :	0
40. [η]	1 --	7 :	23 :	14 :	55 :	1
	2 --	9 :	20 :	15 :	52 :	4
	3 --	6 :	16 :	15 :	58 :	5
	4 --	7 :	23 :	15 :	51 :	4
	5 --	5 :	30 :	18 :	46 :	1
41. [r]	1 --	3 :	31 :	16 :	49 :	0
	2 --	3 :	24 :	20 :	53 :	0
	3 --	4 :	22 :	21 :	53 :	0
	4 --	3 :	24 :	21 :	51 :	0
	5 --	4 :	29 :	18 :	49 :	0
42. [w]	1 --	4 :	35 :	10 :	50 :	0
	2 --	4 :	36 :	9 :	50 :	0
	3 --	4 :	35 :	10 :	50 :	0
	4 --	4 :	37 :	11 :	47 :	0
	5 --	4 :	37 :	11 :	47 :	0
43. [v]	1 --	3 :	23 :	24 :	50 :	0
	2 --	3 :	23 :	25 :	50 :	0
	3 --	3 :	23 :	24 :	49 :	0
	4 --	3 :	23 :	22 :	51 :	0
	5 --	3 :	23 :	22 :	52 :	0

44. [f]	1 --	3 :	31 :	22 :	44 :	0
	2 --	3 :	31 :	22 :	44 :	0
	3 --	3 :	30 :	20 :	46 :	0
	4 --	3 :	47 :	14 :	36 :	0
	5 --	3 :	47 :	14 :	35 :	0
45. [ŋ]	1 --	4 :	16 :	22 :	57 :	1
	2 --	3 :	29 :	17 :	49 :	3
	3 --	3 :	27 :	20 :	46 :	4
	4 --	3 :	39 :	14 :	41 :	3
	5 --	3 :	37 :	15 :	43 :	2
46. [ð]	1 --	5 :	32 :	19 :	43 :	0
	2 --	6 :	30 :	19 :	45 :	0
	3 --	5 :	28 :	19 :	47 :	0
	4 --	5 :	27 :	18 :	48 :	0
	5 --	6 :	32 :	20 :	42 :	0
47. [θ]	1 --	5 :	30 :	21 :	43 :	0
	2 --	5 :	30 :	21 :	44 :	0
	3 --	5 :	27 :	21 :	46 :	0
	4 --	5 :	30 :	21 :	44 :	0
	5 --	5 :	26 :	22 :	47 :	0
48. [z]	1 --	4 :	30 :	20 :	46 :	0
	2 --	4 :	30 :	23 :	43 :	0
	3 --	4 :	24 :	23 :	48 :	0
	4 --	4 :	30 :	21 :	45 :	0
	5 --	4 :	29 :	21 :	45 :	0
49. [s]	1 --	4 :	21 :	23 :	52 :	0
	2 --	4 :	21 :	23 :	52 :	0
	3 --	5 :	18 :	21 :	55 :	0
	4 --	8 :	28 :	15 :	49 :	0
	5 --	6 :	20 :	22 :	51 :	0
50. [ʒ]	1 --	6 :	24 :	21 :	48 :	1
	2 --	6 :	22 :	27 :	45 :	0
	3 --	6 :	20 :	26 :	48 :	0
	4 --	7 :	20 :	27 :	45 :	0
	5 --	6 :	24 :	24 :	46 :	0

51. [ʃ]	1 --	5 :	15 :	21 :	58 :	0
	2 --	5 :	15 :	24 :	55 :	0
	3 --	4 :	20 :	23 :	52 :	0
	4 --	5 :	16 :	23 :	56 :	0
	5 --	6 :	17 :	23 :	53 :	0
52. [j]	1 --	4 :	14 :	28 :	53 :	0
	2 --	4 :	14 :	28 :	53 :	0
	3 --	3 :	11 :	33 :	52 :	0
	4 --	4 :	12 :	28 :	55 :	0
	5 --	5 :	13 :	26 :	55 :	0
53. [ç]	1 --	5 :	12 :	27 :	55 :	0
	2 --	5 :	14 :	27 :	54 :	0
	3 --	5 :	15 :	23 :	57 :	0
	4 --	6 :	12 :	26 :	55 :	0
	5 --	5 :	13 :	27 :	55 :	0
54. [h]	1 --	7 :	34 :	16 :	44 :	0
	2 --	7 :	32 :	17 :	43 :	0
	3 --	7 :	34 :	17 :	42 :	0
	4 --	7 :	35 :	17 :	41 :	0
	5 --	7 :	36 :	17 :	40 :	0
55. [ʒ]	1 --	5 :	31 :	21 :	43 :	1
	2 --	5 :	30 :	21 :	43 :	0
	3 --	4 :	35 :	19 :	40 :	0
	4 --	5 :	39 :	17 :	38 :	0
	5 --	4 :	37 :	20 :	38 :	0
56. [l]	1 --	6 :	31 :	22 :	40 :	0
	2 --	5 :	27 :	25 :	43 :	0
	3 --	7 :	27 :	23 :	42 :	0
	4 --	7 :	22 :	25 :	45 :	0
	5 --	8 :	27 :	24 :	41 :	0
57. [dʒ]	1 --	5 :	15 :	22 :	58 :	1
	2 --	5 :	20 :	23 :	52 :	0
	3 --	4 :	19 :	22 :	54 :	0
	4 --	5 :	22 :	22 :	50 :	0
	5 --	6 :	22 :	22 :	50 :	0

58. [t _ɹ]	1 --	4 :	17 :	25 :	52 :	1
	2 --	5 :	18 :	25 :	52 :	0
	3 --	6 :	24 :	20 :	50 :	0
	4 --	7 :	22 :	20 :	50 :	0
	5 --	9 :	23 :	24 :	43 :	0
59. [d _ʒ]	1 --	6 :	14 :	26 :	53 :	0
	2 --	5 :	14 :	25 :	55 :	0
	3 --	5 :	15 :	25 :	55 :	0
	4 --	5 :	20 :	21 :	53 :	0
	5 --	6 :	28 :	18 :	48 :	0
60. [t _ʂ]	1 --	4 :	27 :	23 :	46 :	0
	2 --	4 :	30 :	20 :	45 :	0
	3 --	5 :	28 :	22 :	45 :	0
	4 --	4 :	28 :	22 :	45 :	0
	5 --	5 :	29 :	19 :	46 :	0
61. [d _{ʒ̂}]	1 --	5 :	17 :	25 :	50 :	0
	2 --	5 :	16 :	27 :	52 :	0
	3 --	5 :	17 :	27 :	49 :	0
	4 --	5 :	17 :	28 :	49 :	0
	5 --	7 :	13 :	28 :	51 :	0
62. [t _{ʃ̂}]	1 --	4 :	16 :	25 :	55 :	0
	2 --	5 :	15 :	26 :	53 :	0
	3 --	5 :	15 :	26 :	53 :	0
	4 --	7 :	18 :	26 :	48 :	0
	5 --	8 :	22 :	21 :	48 :	0

63. [b]	1 --	4 :	30 :	15 :	50 :	0
	2 --	4 :	30 :	14 :	51 :	0
	3 --	3 :	22 :	16 :	58 :	0
	4 --	4 :	31 :	14 :	51 :	0
	5 --	3 :	32 :	18 :	47 :	0
64. [p]	1 --	3 :	26 :	22 :	49 :	0
	2 --	3 :	29 :	22 :	46 :	0
	3 --	4 :	32 :	19 :	45 :	0
	4 --	3 :	30 :	20 :	48 :	0
	5 --	4 :	30 :	19 :	47 :	0
65. [m]	1 --	3 :	27 :	17 :	49 :	4
	2 --	3 :	30 :	18 :	45 :	4
	3 --	4 :	36 :	13 :	41 :	6
	4 --	4 :	30 :	18 :	44 :	5
	5 --	4 :	29 :	16 :	47 :	5
66. [d]	1 --	4 :	27 :	18 :	51 :	0
	2 --	5 :	21 :	19 :	55 :	0
	3 --	4 :	23 :	19 :	55 :	0
	4 --	4 :	29 :	17 :	51 :	0
	5 --	4 :	26 :	17 :	53 :	0
67. [t]	1 --	4 :	28 :	20 :	47 :	0
	2 --	4 :	24 :	19 :	52 :	0
	3 --	4 :	22 :	18 :	55 :	0
	4 --	5 :	23 :	18 :	53 :	0
	5 --	5 :	21 :	18 :	55 :	0
68. [n]	1 --	6 :	31 :	19 :	37 :	6
	2 --	6 :	28 :	20 :	39 :	7
	3 --	5 :	27 :	19 :	44 :	5
	4 --	5 :	25 :	17 :	46 :	8
	5 --	5 :	25 :	17 :	46 :	8
69. [g]	1 --	6 :	22 :	22 :	51 :	0
	2 --	6 :	17 :	19 :	57 :	0
	3 --	5 :	20 :	16 :	58 :	0
	4 --	6 :	17 :	17 :	60 :	0
	5 --	5 :	20 :	17 :	58 :	0

70. [k]	1 --	7 :	21 :	12 :	50 :	0
	2 --	7 :	25 :	10 :	56 :	0
	3 --	7 :	22 :	12 :	59 :	0
	4 --	8 :	21 :	12 :	59 :	0
	5 --	7 :	26 :	12 :	54 :	0
71. [η]	1 --	9 :	20 :	15 :	56 :	1
	2 --	8 :	22 :	15 :	52 :	3
	3 --	7 :	27 :	15 :	48 :	3
	4 --	8 :	28 :	11 :	50 :	3
	5 --	8 :	22 :	12 :	57 :	3
72. [r]	1 --	6 :	47 :	14 :	33 :	0
	2 --	6 :	47 :	14 :	32 :	0
	3 --	7 :	45 :	17 :	32 :	0
	4 --	7 :	44 :	17 :	32 :	0
	5 --	5 :	49 :	13 :	32 :	0
73. [w]	1 --	5 :	41 :	13 :	41 :	0
	2 --	4 :	40 :	13 :	43 :	0
	3 --	5 :	40 :	12 :	43 :	0
	4 --	4 :	40 :	13 :	42 :	0
	5 --	5 :	41 :	12 :	42 :	0
74. [v]	1 --	3 :	41 :	18 :	39 :	0
	2 --	3 :	37 :	20 :	40 :	0
	3 --	3 :	39 :	16 :	41 :	0
	4 --	3 :	39 :	18 :	40 :	0
	5 --	4 :	38 :	17 :	40 :	0
75. [f]	1 --	3 :	23 :	19 :	55 :	0
	2 --	3 :	22 :	18 :	58 :	0
	3 --	3 :	31 :	19 :	47 :	0
	4 --	3 :	30 :	21 :	46 :	0
	5 --	3 :	33 :	20 :	43 :	0
76. [m]	1 --	3 :	32 :	13 :	45 :	7
	2 --	3 :	32 :	12 :	44 :	8
	3 --	3 :	34 :	13 :	44 :	7
	4 --	4 :	34 :	12 :	45 :	6
	5 --	4 :	35 :	13 :	42 :	6

77. [ð]	1 --	4 :	31 :	14 :	50 :	0
	2 --	4 :	26 :	14 :	55 :	0
	3 --	4 :	30 :	14 :	51 :	0
	4 --	4 :	30 :	15 :	50 :	0
	5 --	5 :	32 :	15 :	48 :	0
78. [θ]	1 --	3 :	21 :	18 :	57 :	0
	2 --	3 :	30 :	19 :	47 :	0
	3 --	4 :	31 :	19 :	46 :	0
	4 --	4 :	27 :	20 :	48 :	0
	5 --	5 :	30 :	19 :	46 :	0
79. [z]	1 --	6 :	32 :	20 :	42 :	0
	2 --	6 :	30 :	19 :	45 :	0
	3 --	6 :	29 :	21 :	44 :	0
	4 --	5 :	29 :	21 :	45 :	0
	5 --	5 :	27 :	19 :	49 :	0
80. [s]	1 --	5 :	31 :	18 :	46 :	0
	2 --	3 :	28 :	20 :	49 :	0
	3 --	4 :	26 :	20 :	50 :	0
	4 --	4 :	25 :	18 :	53 :	0
	5 --	4 :	28 :	17 :	51 :	0
81. [ʒ]	1 --	4 :	11 :	19 :	62 :	0
	2 --	4 :	14 :	20 :	61 :	0
	3 --	5 :	18 :	19 :	58 :	0
	4 --	5 :	17 :	19 :	59 :	0
	5 --	6 :	20 :	20 :	53 :	0
82. [ʃ]	1 --	5 :	18 :	22 :	55 :	0
	2 --	5 :	18 :	22 :	55 :	0
	3 --	4 :	16 :	24 :	56 :	0
	4 --	5 :	16 :	23 :	55 :	0
	5 --	5 :	17 :	22 :	55 :	0
83. [j]	1 --	5 :	11 :	20 :	63 :	0
	2 --	5 :	10 :	22 :	63 :	0
	3 --	5 :	13 :	22 :	60 :	0
	4 --	5 :	12 :	21 :	62 :	0
	5 --	6 :	10 :	20 :	64 :	0

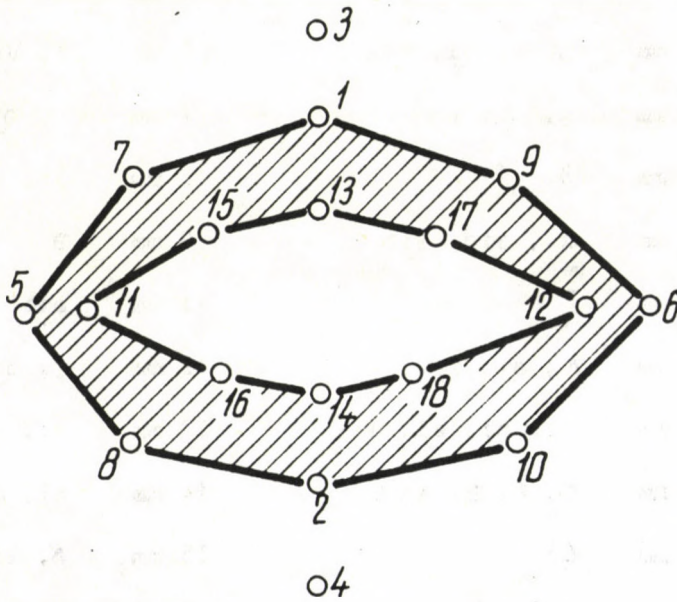
84. [ç]	1 --	6 :	14 :	23 :	56 :	0
	2 --	6 :	14 :	24 :	56 :	0
	3 --	5 :	13 :	25 :	57 :	0
	4 --	5 :	13 :	25 :	57 :	0
	5 --	5 :	15 :	23 :	57 :	0
85. [h]	1 --	7 :	42 :	19 :	32 :	0
	2 --	7 :	34 :	24 :	35 :	0
	3 --	7 :	35 :	21 :	36 :	0
	4 --	8 :	29 :	20 :	43 :	0
	5 --	7 :	32 :	23 :	37 :	0
86. [ğ]	1 --	5 :	39 :	19 :	37 :	0
	2 --	6 :	35 :	16 :	42 :	0
	3 --	5 :	35 :	16 :	44 :	0
	4 --	4 :	33 :	18 :	44 :	0
	5 --	5 :	33 :	18 :	44 :	0
87. [l]	1 --	6 :	17 :	22 :	54 :	0
	2 --	6 :	17 :	22 :	54 :	0
	3 --	6 :	17 :	22 :	54 :	0
	4 --	6 :	17 :	23 :	54 :	0
	5 --	5 :	18 :	23 :	53 :	0
88. [dr]	1 --	4 :	23 :	21 :	51 :	0
	2 --	4 :	19 :	25 :	51 :	0
	3 --	4 :	18 :	22 :	54 :	0
	4 --	4 :	22 :	24 :	50 :	0
	5 --	5 :	21 :	22 :	52 :	0
89. [tr]	1 --	4 :	29 :	15 :	51 :	0
	2 --	4 :	26 :	22 :	48 :	0
	3 --	5 :	22 :	16 :	57 :	0
	4 --	4 :	23 :	21 :	52 :	0
	5 --	4 :	19 :	22 :	54 :	0
90. [dz]	1 --	4 :	26 :	22 :	47 :	0
	2 --	4 :	21 :	21 :	53 :	0
	3 --	4 :	17 :	22 :	56 :	0
	4 --	4 :	24 :	19 :	52 :	0
	5 --	5 :	18 :	22 :	55 :	0

91. [t _v s]	1 --	6 :	29 :	22 :	43 :	0
	2 --	5 :	23 :	21 :	50 :	0
	3 --	4 :	21 :	23 :	51 :	0
	4 --	6 :	20 :	19 :	55 :	0
	5 --	5 :	25 :	20 :	50 :	0

92. [d ₃]	1 --	5 :	14 :	22 :	59 :	0
	2 --	5 :	13 :	22 :	60 :	0
	3 --	4 :	16 :	22 :	57 :	0
	4 --	5 :	19 :	21 :	55 :	0
	5 --	5 :	21 :	21 :	52 :	0

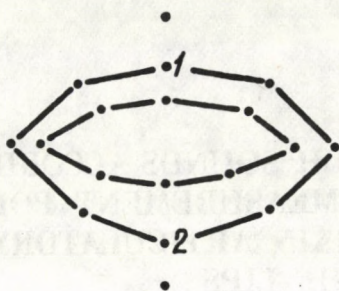
93. [t _f]	1 --	5 :	30 :	24 :	40 :	0
	2 --	5 :	22 :	22 :	50 :	0
	3 --	5 :	17 :	21 :	56 :	0
	4 --	5 :	19 :	23 :	52 :	0
	5 --	5 :	22 :	24 :	48 :	0

THE ORDER OF ENGLISH SPEECH SOUNDS ACCORDING
TO THE DISTANCE BETWEEN MEASUREMENT POINTS
CORRESPONDING TO THE MAIN ARTICULATORY
POSITION OF THE LIPS

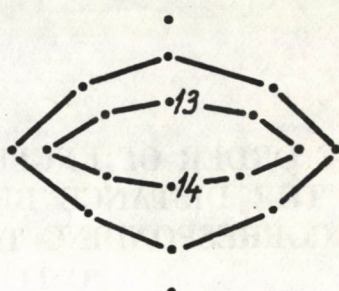


1. The order of vowels

1--2

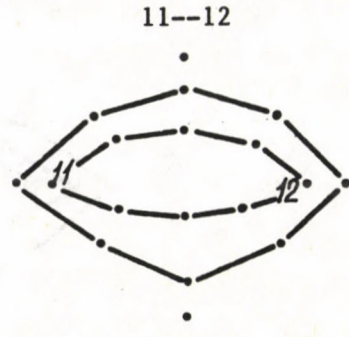
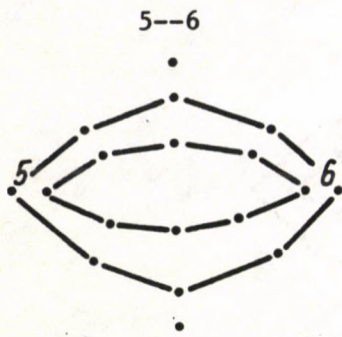


13--14



- 18 mm u:, ɔ'
- 19 mm ʋɪ
- 20 mm ɔ', ʋ, ɔɪ, ɔʋə
- 21 mm ə, əʋ ʋə
- 22 mm ɜ:
- 24 mm ɑ:, ɔɪə, eɪə
- 25 mm ɪ
- 26 mm ʌ, əʋ, ɪə
- 27 mm i:, əɪ, eɪ, aɪə
- 29 mm ʊ, ɛ, æ, əʋə
- 30 mm ɛə

- 3 mm ɔ'
- 4 mm u:
- 6 mm ɔ', ʋɪ, ɔʋə
- 7 mm ʋ, əʋ
- 8 mm ɜ:, ɔɪ, ʋə
- 9 mm ə
- 11 mm eɪə
- 12 mm ɪ, ɔɪə
- 13 mm ɑ:, əɪ, ɪə
- 14 mm eɪ, əʋ
- 15 mm ʌ, i:
- 16 mm ʊ, ɛ, æ, aɪə
- 17 mm ɛə, əʋə

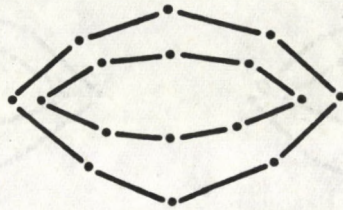


- 43 mm ɔ',
- 45 mm ɔ'
- 46 mm ʋ
- 47 mm ɒ, u:, ʋi, ʋə
- 48 mm ɑ:, ɔi, ɔʋə
- 49 mm ʌ, ai, aʋə
- 50 mm əʋ, aiə
- 51 mm ɪ, ɛ, ʒ:, ə,
- əʋ, ɛə, ɔiə,
- ei
- 52 mm æ, ei, iə
- 53 mm i:

- 15 mm ɔ'
- 17 mm ʋi
- 18 mm u:
- 19 mm ɔ', ʋ
- 23 mm ɔʋə
- 26 mm ɔi
- 28 mm ʋə
- 29 mm ɒ
- 30 mm ə
- 31 mm əʋ
- 36 mm ɑ:, ɔiə, aʋə
- 38 mm ʒ:, ai, eiə
- 39 mm ʌ, ɛ, aiə
- 40 mm əʋ, iə
- 41 mm ei
- 42 mm i:, ɪ, æ, ɛə

3--4

•3



•4

60 mm vi

61 mm ɔ

62 mm ʊə

63 mm ə

64 mm I, ɜ:, ɔi, əv

66 mm ɑ:, ɔ, u:, ɔvə

67 mm ʊ, ʌ, ʊ, i:,

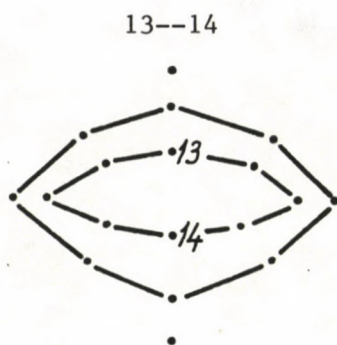
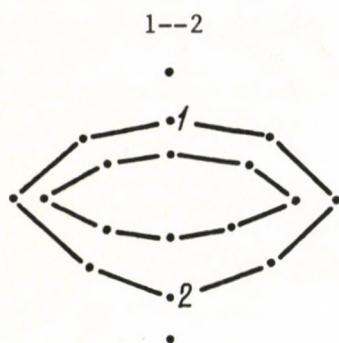
ɛ, æ, ai, ei,

av, iə, ɛə,

aiə, ɔiə, eiə,

avə

2. The order of consonants



13 mm m, v

14 mm b, p

15 mm f

16 mm w, dʒ

17 mm ʀ

18 mm r, tʀ

19 mm z, ʒ, tʂ

20 mm t', ʃ, j, dʒ̣

21 mm d', n', ʂ, dz

22 mm s, tʃ̣

23 mm t, n, g, θ

24 mm d, ʒ

25 mm k

26 mm ʔ

0 mm b, p, m

3 mm v, f, dʀ

4 mm w, ʀ

5 mm c, tʀ

6 mm d̂ʒ

7 mm t', r, z

8 mm n, d', n', s,

ʃ, j, tʃ̣

9 mm t, dz, tʂ

10 mm ʂ

11 mm d, g, θ

12 mm k, ʔ

13 mm ʒ, l

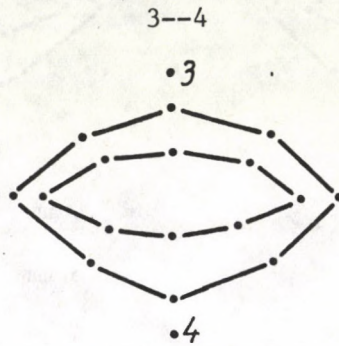
14 mm ʀ

36 mm g, k, dz

38 mm ɲ, ʃ

39 mm l

43 mm h



37 mm n

56 mm v

57 mm dʒ

58 mm f, ɲ, tʃ

59 mm b, p, m, z,

ʃ, j

60 mm t', r, dʒ

61 mm d', w, s, ʒ,

dʒ, tʃ

62 mm n', ʃ, ʒ, tʃ

63 mm t, g

64 mm θ

65 mm d, ʃ

66 mm k

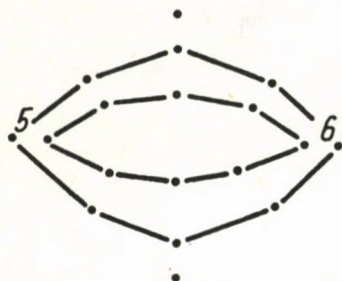
67 mm ɲ, h, l

27 mm η, 1

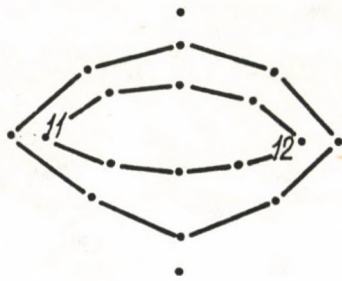
15 mm h

28 mm h

5--6



11-12



43 mm w

17 mm dr

45 mm r

18 mm ç

47 mm n', ð, ʃ, dʒ

20 mm w

48 mm n, t', f, z, 1

23 mm η

49 mm b, p, m, θ, s,

24 mm t', n', ʃ, dʒ

ʒ, ç, dr, dz,

25 mm v, f, tr

tʃ, tʃ

26 mm n, z, j

50 mm t, d', k, v, η,

27 mm m, d'

j, t, tr

28 mm b, r, tʃ

51 mm g, η

29 mm p

52 mm h

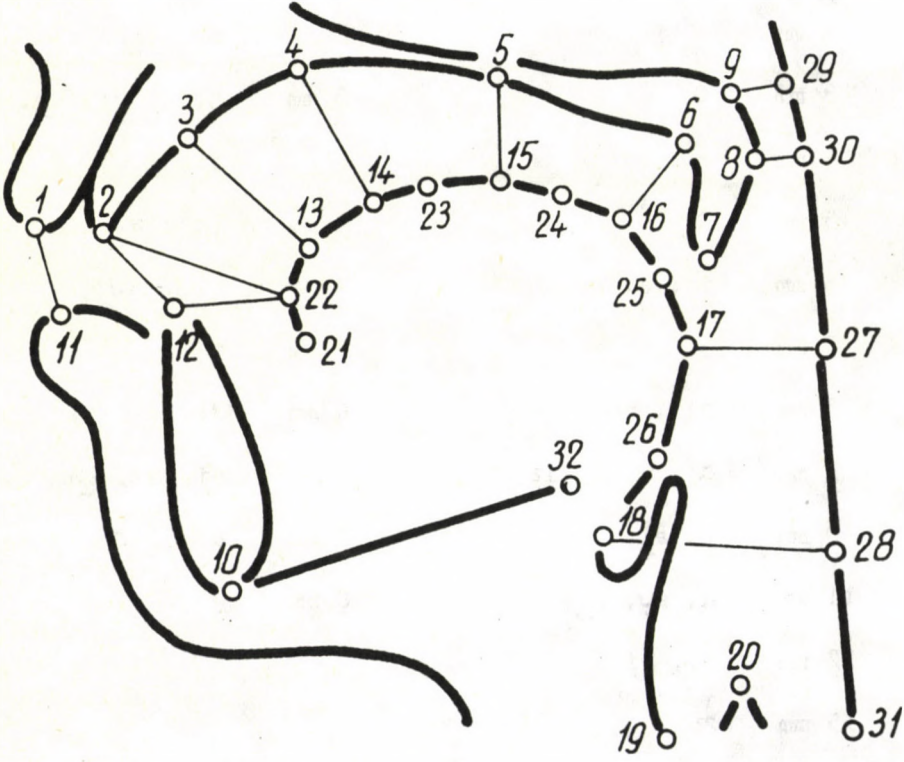
31 mm ð, ʒ

53 mm d

33 mm d, θ, tʃ

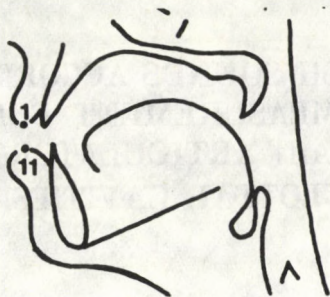
35 mm t, s

THE ORDER OF ENGLISH SPEECH SOUNDS ACCORDING TO THE DISTANCE BETWEEN MEASUREMENT POINTS CORRESPONDING TO THE MAIN ARTICULATORY POSITIONS OF THE SUPRAGLOTTAL CAVITIES



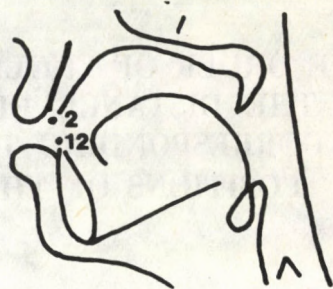
1. The order of vowels

1--11



- 1 mm u:, ʊi
- 2 mm ʊ
- 3 mm ɔ̄
- 4 mm əʊ, ɔʊ
- 5 mm ɔʊə
- 6 mm i:, ə, ɔi, ʊə
- 7 mm ɜ:
- 8 mm ɔiə, əʊə
- 9 mm ɑ:, ʊ, ɪ, iə, ɛə
- 10 mm ɛ, aiə
- 11 mm ʌ, əʊ, eiə
- 12 mm ai, ei
- 15 mm æ

2--12



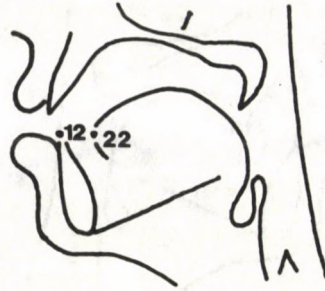
- 2 mm u:, i:, ɜ:, ə,
- əʊ, ʊə
- 3 mm ɔ̄, ʊ, ʊi, iə,
- ɔiə
- 4 mm ɪ, aiə, eiə,
- əʊə, ɔʊə
- 5 mm ʌ
- 6 mm ɑ:, ai, ɔi,
- ei, əʊ, ɛə
- 7 mm ʊ, ɛ, ɔ̄
- 8 mm æ

2--22



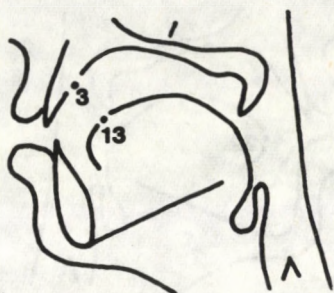
- 5 mm 3:
- 7 mm үі, үә
- 8 mm ɛ
- 9 mm ɪ, ɔ̃, eɪə
- 10 mm i:, ə, ɔ̃, əʏ,
iə, ɛə
- 11 mm ʊ
- 12 mm u:, eɪ
- 13 mm æ
- 14 mm aɪ, aɪə, aʏə
- 15 mm aʏ
- 17 mm ɔ̃ʏə
- 18 mm ɔ̃'
- 19 mm ʌ
- 21 mm ɑ:, ʊ, ɔ̃'

12--22



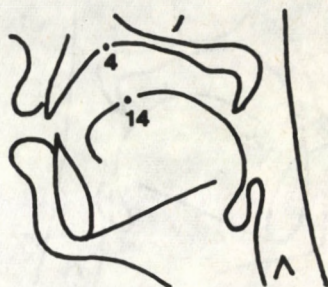
- 2 mm ɛ
- 4 mm 3:, ɛə
- 5 mm æ, үі, үә, eɪə
- 6 mm ɔ̃, eɪ
- 7 mm iə, ɔ̃ə
- 8 mm ʊ, ɪ, ə, əʏ
- 9 mm i:, aɪ, aʏ
- 10 mm u:, aɪə, aʏə
- 14 mm ɔ̃ʏə
- 15 mm ɑ:, ʌ, ɔ̃'
- 16 mm ʊ, ɔ̃'

3--13



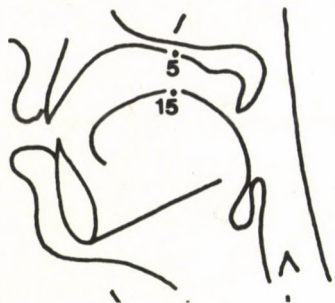
- 3 mm ʋi
- 4 mm i:, I, ɔiə
- 6 mm ʋə
- 7 mm u:, ʒ:
- 8 mm ɔi, ei
- 9 mm ɛ, ə, əʋ, iə, eiə
- 11 mm ɛə
- 12 mm ʋ, aiə
- 13 mm æ, ɔʋə
- 15 mm ɔ', ai, aʋə
- 16 mm aʋ
- 17 mm ɑ:, ɒ, ʌ, ɔ'

4--14



- 3 mm i:
- 5 mm u:, I, ʋi
- 6 mm ʋə, ɔiə
- 7 mm ei
- 9 mm ɔi, əʋ
- 10 mm ʒ:, iə, eiə
- 11 mm ɛ, ɔʋə
- 12 mm aiə
- 13 mm ɔ', ʋ, ɛə
- 14 mm ə
- 15 mm ɔ', aʋə
- 16 mm ɒ, ʌ, æ, ai, aʋ
- 17 mm ɑ:

5--15



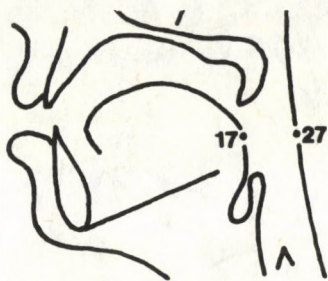
- 3 mm u:, ʋi, əʋ, ʋə
- 4 mm I
- 5 mm ɔ́, ʋ, i:, ei, ɔʋə
- 6 mm əʋ
- 7 mm ɔi, iə, ɔiə
- 8 mm ʋ, ʒ:, əʋ, eiə,
əʋə
- 9 mm ɑ:, ə, aiə
- 10 mm ɛə
- 11 mm ʌ, ɛ, æ
- 12 mm ai

6--16



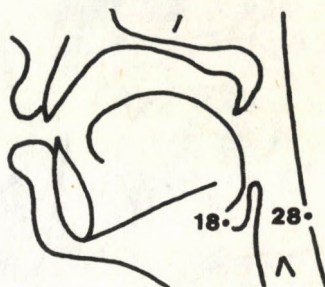
- 3 mm ɔ́
- 4 mm ʋ, əʋ
- 5 mm ʋ, ʋə, ɔ́, əʋə
- 6 mm ɑ:, ai, ɔʋə
- 7 mm əʋ
- 8 mm ʌ, ə, iə, eiə
- 9 mm æ
- 10 mm u:, ʒ:, ʋi, aiə
- 11 mm I, ɔi, ei, ɛə,
ɔiə
- 14 mm ɛ
- 16 mm i:

17--27



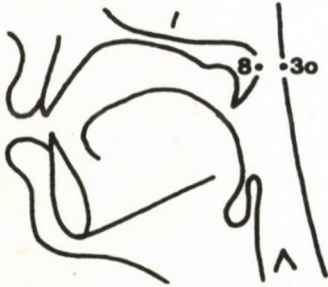
- 4 mm a:
- 5 mm ʊ, ɔ̇, aʊ, ɔ̇
- 6 mm ʌ, ʊ, ai, ɔʊə
- 7 mm aʊə
- 8 mm ʊə
- 9 mm eiə
- 10 mm əʊ, iə
- 11 mm æ, ə, ɛə
- 12 mm ɔ̇i, aiə
- 13 mm ɜ:
- 14 mm u:
- 15 mm ʊi, ɔ̇iə
- 16 mm ei
- 18 mm ɪ, ɛ
- 21 mm i:

18--28



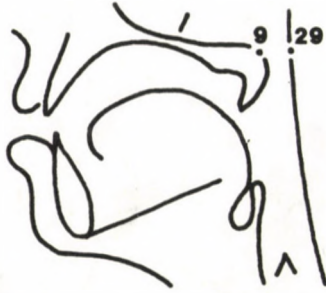
- 8 mm aʊ, aiə
- 9 mm æ, iə, ɛə, ɔ̇iə
- 10 mm a:, ʊ, ʌ, ai, aʊə
- 11 mm ɔ̇, ə, eiə
- 12 mm ɔ̇i, ʊə, ɔ̇, ɔʊə
- 13 mm ʊ, ɜ:, əʊ
- 14 mm ɛ, ei
- 15 mm ʊi
- 16 mm ɪ
- 17 mm u:
- 19 mm i:

8--30



0 mm а:, ы, ъ, џ,
 ы, u:, i:, I,
 э, э, з:, э,
 аі, џі, ыі,
 еі, ау, ау,
 ыэ, џ, іэ,
 ээ, аіэ, џіэ,
 еіэ, ауэ, џуэ

9--29



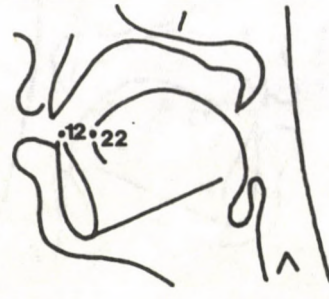
0 mm а:, ы, ъ, џ,
 ы, u:, i:, I,
 э, э, з:, э,
 аі, џі, ыі,
 еі, ау, ау,
 ыэ, џ, іэ,
 ээ, аіэ, џіэ,
 еіэ, ауэ, џуэ

2--22



- 2 mm ʃ, ʈ
- 4 mm p, t', s, ʒ, j,
 ç, l, dʀ, tʀ, dʒ
- 5 mm d, t, n, d', n',
 wʃ, ʃ, tʂ, tʃ̂
- 6 mm r, v, f, z, ʦ, dʒ̂
- 7 mm m, k
- 9 mm b, g, ŋ
- 12 mm h
- 14 mm w

12--22

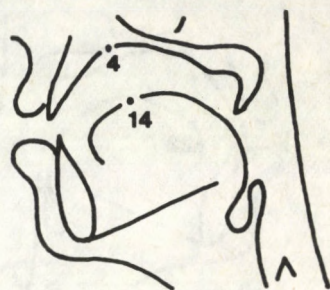


- 1 mm t'
- 2 mm p, ʈ, s
- 3 mm m, d', wʃ, ʃ, j, ç, dʀ
- 4 mm d, n', r, v,
 f, z, h, ʦ, dʒ
- tʂ, tʃ̂
- 5 mm t, k, l, tʀ,
 dʒ̂
- 6 mm b, ŋ
- 7 mm g
- 8 mm n
- 11 mm w

3--13

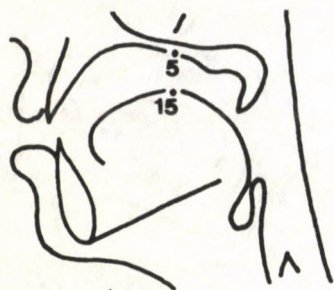


4--14



0 mm	$\hat{d}\hat{z}$	1 mm	k
1 mm	$d', j, \hat{t}\hat{f}$	2 mm	d', g, j
2 mm	$t, t', n', r, z,$ $s, \check{z}, \check{f}, \check{c}, \check{d}\check{z}$	3 mm	η
3 mm	$n', g, k, \check{d}\check{r}$	4 mm	$t', \check{c}, \check{d}\check{z}, \hat{d}\hat{z},$ $\hat{t}\hat{f}$
4 mm	$d, \eta, v, \check{t}, l,$ $\check{t}\check{r}, \check{t}\check{s}$	5 mm	$t, \check{d}\check{r}$
5 mm	$p, \check{\delta}$	6 mm	$\check{t}\check{r}$
6 mm	f, η	7 mm	s, \check{f}
7 mm	b, m, \ominus	8 mm	p, r, v
10 mm	w	9 mm	$d, n, w, f, \eta,$ $\check{\delta}, \ominus, z, \check{t}\check{s}$
11 mm	h	10 mm	m, n', \check{t}, l
		11 mm	b
		13 mm	h

5--15



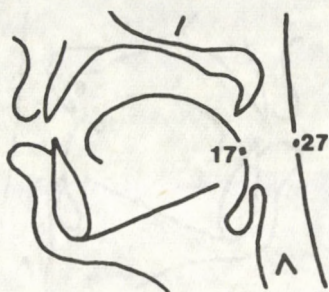
0 mm	ŋ
2 mm	g
3 mm	k, w, tr
4 mm	t', ç, dr, dz, d̂z
5 mm	d', ʒ, ʃ, t̂ʃ
6 mm	p, t, r, v, s, l, t̂s
7 mm	d, ʒ, ʃ, z
8 mm	n', f, h
9 mm	b, m, n, ŋ, j, l

6--16



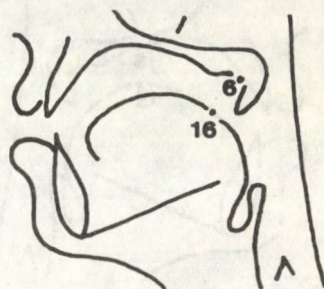
4 mm	w, ʒ
6 mm	ŋ, r, tr
7 mm	f, ʒ, dr, t̂s
8 mm	d, ŋ, ʃ, s, ʃ
9 mm	m, t, d', k, z, ç
10 mm	h, l
11 mm	t', ʃ, dz, d̂z, t̂ʃ
12 mm	p, n, n', v
13 mm	b, g
15 mm	j

17--27



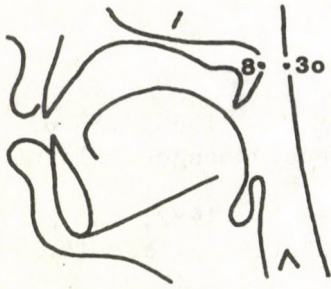
6 mm	ɛ
7 mm	ɥ
9 mm	f
10 mm	w, ʃ, ʈ, ts
11 mm	r, ʒ
12 mm	d', ɲ, ɳ, z, l, dʀ, dʒ
13 mm	d, k, v, s, ʃ
14 mm	t, t', h, dʒ
15 mm	b, p, m, tʃ
16 mm	n
17 mm	n', g, ʒ
19 mm	j

18--28



10 mm	ɛ
11 mm	r, l, ts, dʒ
12 mm	b, n', ɲ, v, ʃ, z, ʒ, j,
	h, dʀ
13 mm	p, m, n, d', g, k, f, ʈ, ʃ,
	ʒ, tʀ
14 mm	t, t', ɳ, dʒ, tʃ
15 mm	d, w
16 mm	s

8--30



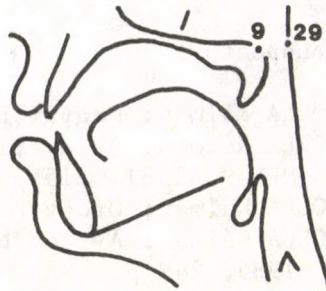
0 mm b, p, d, t, d',
 t', g, k, r, w,
 v, f, ʃ, ʈ, z, s,
 ʒ, ʒ, j, ɟ, h, ɬ,
 l, dr, tr, dz, ts,
 d͡ʒ, t͡ʃ

2 mm n

3 mm ŋ, ŋ

4 mm m, n'

9--29



0 mm b, p, d, t, d',
 t', g, k, r, w,
 v, f, ʃ, ʈ, z,
 s, ʒ, ʒ, j, ɟ,
 h, ɬ, l, dr,
 tr, dz, ts, d͡ʒ

t͡ʃ

2 mm n

3 mm n', ŋ

4 mm ŋ

5 mm m

CONSPECTUSES OF SPEECH SOUNDS PUBLISHED AND
FORTHCOMING IN THIS SERIES

1. Conspectuses which have come out

- BOLLA Kálmán: Magyar hangalbum. MFF 6. 1980, 167 p.
BOLLA Kálmán: Az amerikai angol beszédhangok atlasza.
MFF 9. 1981, 215 p.
BOLLA Kálmán: Orosz hangalbum. MFF 11. 1982, 286 p.
BOLLA Kálmán: A finn beszédhangok atlasza. MFF 14.
1985, 249 p.
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