

PHONETICS OF THE MICRONESIAN LANGUAGE OF THE MARSHALL ISLANDS

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A PHONETIC survey of a number of American Indian languages recently carried on at the University of California revealed certain features common to a number of these tongues that in other respects are distinct. Particularly the stopped consonants are in many cases characterized by being organically only one at each point of articulation, and differentiated according to position in the word. Those that precede vowels are in many languages neither wholly surd nor wholly sonant but "intermediate." The author's record some years ago of a number of words from the dialects of Mortlock and Ponape in the Caroline Islands showed so great an inconsistency in the writing of surd and sonant stops as to force the suspicion that an analogous situation existed in these languages, in that there might be only one series of intermediate stops. The Polynesian languages possess only one class of stops, indicating the possibility of a further case of the occurrence of intermediates; and this is rendered more probable on account of the occasional employment of sonant stops in the early writing of these tongues, whereas the modern standardized orthography recognizes only surds. Compare taboo and tapu.

The arrival at San Francisco in April 1911 of the German trading schooner *Triton*, with a crew of Marshall Islanders, furnished an opportunity to ascertain whether this phenomenon of intermediates, or any others of a similar nature, extended to other regions than the western part of North America. Through the courtesy of Captain Othmer, the desired work was made possible. The *Triton* remained in the harbor only a short time, and the crew was generally needed for work about the vessel. The opportunities for study were therefore limited; but the willingness of several of the natives, especially of Hans Taramij, made it possible to obtain information as to some of the principal phonetic features of the language.¹

¹The *Triton* was lost within twenty-four hours after sailing from San Francisco. The entire crew returned safely in a life boat. The author's informants, however, had deserted before the vessel left port.

As Father B. A. Erdland's dictionary and grammar of the Marshall dialect, which were published in 1906 as the fourth volume of the *Archiv für Deutsche Kolonialsprachen*, are based on a far more extended acquaintance with the language than the author could hope to attain, it was decided to devote the available time to mechanical experiments, which do not appear to have been made for any Micronesian or in fact any Malayo-Polynesian language. The apparatus consisted of needles attached to rubber diaphragms at the end of tubes, inscribing on smoked paper covering a revolving drum. About four hundred tracings were secured simultaneously from mouth and throat, nose and throat or mouth and nose, or from the mouth alone. A selection from these is reproduced in the appended plates.

Father Erdland's orthography, while perhaps not above criticism on theoretical grounds, seems to be practically satisfactory, as he appears to have distinguished all the sounds of the language and to have represented them consistently. His choice of characters has therefore been followed here. That his description of the sounds is somewhat incomplete, certain of the most remarkable phenomena not being mentioned, is not surprising, as many of these traits are so unusual as to be possible of detection only by a practiced phonetician or through laboratory facilities.

VOWELS

Tracings of vowels do not lend themselves readily to analysis. A few aural impressions may therefore be in place. Erdland gives the vowels as i, e, a, o, u, with the additional umlaut qualities ä, ö, ü. Two mixed vowels of ö and ü type certainly occur; but they are considerably different from close and open ö and ü of German. The sound ä is of another character, being essentially an open e. O has two qualities, the more open of which is distinguished by Erdland as ô. Thus tô, rope, nearly like English taw. The other o is closer, but probably not so much so as in English or German "so." Its quality is probably between that of open and close o in most west European languages. The relation of ä and e seems to be parallel to that of ô and o. For i and u a similar distinction was not observed: each seemed to be, analogous to

o and e, midway between the close and open qualities of the same sound as spoken by Europeans.

All initial vowels were generally heard with a preceding aspiration. This is weaker than English h, and has not been recorded, or at least not written, by Erdland. As it is the normal approach of every initial vowel, its orthographic designation is perhaps unnecessary. The natives accept either hemen or emen as correct renderings of their word for four; probably 'emen comes nearest a true representation. In the tracings the aspiration usually shows as a slight rise preceding the voice vibrations of the vowel. That at times it does not thus appear is probably due to the weakness of the sound.

It will be seen that initial voiced consonants in Marshall normally begin with a flow of surd breath; that is to say, sonancy commences only some time after the sound is under way. The aspiration of initial vowels is evidently only part of the same tendency.

W, pronounced as in English, according to Erdland, did not appear in the words observed by the writer.

STOPS

Stopped consonants are formed in three positions, corresponding to p, t, and k. T is dental. K is more forward than in most American Indian languages, which on the whole form the sound farther to the rear than English, German, or French.

The character of the stopped consonants differs radically according to their position in the word, at least as much as has been noted in any American language.

In *initial position* it was found that sonancy regularly commenced a very short time, averaging probably less than a twenty-fifth of a second, after the beginning of the explosion. This is exactly the condition ascertained for most of the languages of California. In short, the Marshall initial stops are intermediate between true surds and true sonants, the occlusion and beginning of the explosion being unvoiced, the greater part of the explosion voiced. After its first inception, the voicing increases very rapidly, reaching a maximum, which surpasses the strength of the voicing of the fol-

lowing vowel, within a very few hundredths of a second. In most American languages, the commencement of the vibrations of the vocal chords in intermediate stops presents a different character in tracings: the needle connected with the throat drops a short distance, indicating a slight retraction of the surface of the larynx, and at the same time the vibrations begin to appear, increasing in strength more gradually than in the Marshall records. Otherwise the sounds seem identical in the two groups of languages.

As regards strength of explosion, the Marshall initial stops resemble European surd stops, though they lack any sustained aspiration or rush of breath.

Erdland, while denying a p, writes both t and d, k and g. After a little familiarity with native words, these sounds are usually recognizable as distinct, though they are far less different than in English. An examination of tracings of words commencing with t and k as compared with d and g however fails to show any difference between the two classes as regards either duration or strength of sonancy, force of explosion, or continuance of aspiration. But, strange to say, it was discovered that in words written by Erdland with an initial surd stop, the occlusion is normally somewhat longer than in those of which the first sound is represented by a character for a sonant stop. This difference is clearest for the dentals. In "d" the occlusion is almost always less than a fifth of a second; in "t" it lasts from a fourth to a third of a second. For "g" and "k" the observed difference is not so pronounced, but the average duration of the occlusion in the former sound runs somewhat below and of the latter above a fifth of a second, corresponding to tracing lengths of respectively less and more than a centimeter. It is remarkable that two sounds that appear to be identical except for this difference in duration of occlusion should to the European ear give somewhat the effect of sonant and surd stops.

In *medial position*, at least between vowels, the sounds written as stops by Erdland were usually heard and always observed as fricatives, and generally voiced. The tracings present a marked dip, though without the definite vertical and horizontal contour of stops. The voice vibrations usually show through the whole period of the sound both in the mouth and the throat record, though

in some instances enough of the original stop character, with its surd occlusion, remains for at least part of the fricative to be unvoiced.

A similar tendency toward the substitution of fricatives for stops was at times noted in initial position, though less regularly than medially, and usually confined to the explosion. That is to say, such modified initial sounds usually show at least some remains of an occlusion, but the curve for the explosion is that of a fricative instead of a stop. They are probably not mere affricatives, as tracings of these normally present the character of stops. This fricative quality of initial stops was sometimes also perceived by the ear; and, in their imperfect rendering of English, the natives employ initial stops and fricatives almost indiscriminately. Thus "fienty" for plenty, but "pish" for fish; "thongue" for tongue; and either "shome" or "djome" for some.

Final stops possess a firm occlusion, but no perceptible explosion from the mouth. The lips or tongue make a closure which is either indefinitely sustained or concluded after the breath pressure necessary for speech has ceased. Hence final stops are very faint to the ear. Bād, smoke, is not quite bāt and almost bā; "Gilbert" is either kilua or kiluat. In some cases a distinct explosion through the nose was observed, and a tube from the nostril to a flame usually showed a puff when the explosion would be expected in an English stop. Many tracings from the nose however reveal no explosion whatever; so that it is possible that the nasal explosion is due merely to an occasional unintended opening of the naso-oral passage before the release of the mouth closure and cessation of breath pressure. If the sounds are essentially nasal stops, they differ from m, n, and ñ in that they possess an occlusion which is complete for nose as well as mouth. They certainly do not markedly resemble final nasal continuants, although these, like final stops, are entirely surd in the Marshall dialect.

Erdland writes both d and t, but only b and k, at the end of words. As in the case of initial stops, these show no difference in point of sonancy, which, as just stated, is completely lacking. It seems that there may be a longer occlusion for t and k than for d and b, just as when they are initial; but this is not certain, as

the end of the occlusion is discernible in but very few tracings.

Stops closing syllables that precede a consonant are treated as final. In bödökdök, blood, the first k is of final quality, the following d initial, and only the first d of medial character. Erdland says that in such words the final surd stop of the first syllable often becomes sonant—and presumably fricative—and is followed by a vowel. In conformity to this statement, nugenuk and bödögödök were sometimes heard instead of nuknuk and bödökdök; but the majority of tracings do not show the change.

NASALS

The nasal continuants, m, n, ñ, correspond to b, d, g in position of articulation. They also resemble the stops in being at least partly voiced when initial, formed with imperfect mouth closure when intervocalic, and entirely surd when final. Initial sonancy commences gradually and some cases were observed where it seemed to begin after mouth closure, so that the first part of the sound would be surd. Medial nasals are heavily voiced, and, as the vibrations show in mouth tracings, it appears that the mouth is closed imperfectly. The metal mouthpiece employed has been found by the writer to interfere at times with tight lip closure after a wide vowel, so that an effort at clear enunciation is often necessary to produce a true closure effect for medial m. In the Marshall tracings, n, to which this defect of the apparatus would not apply, is, however, recorded as voiced from the mouth as well as m, and medial m shows much heavier vibrations than those occasionally traced in English words: so that it is clear that the typical intervocalic nasals in Marshall are made with very loose contact of the mouth parts. The surdness of the final nasals is usually complete; sometimes the voice of the preceding vowel continues to die away in the first part of the succeeding nasal. This is a phenomenon that has been observed in several American languages.

It is obvious that the difference shown by stops and nasals, according as they are initial, medial, or final in Marshall, does not point to so many organically distinct classes of sounds, but to a single sound of each type which becomes radically modified according to its position in the word.

P. Paulinus (*Anthropos*, v, 809-810, 1910) has described not only p, t, and k, but m, n, l, f, and th as occurring in the Micronesian dialect of Yap, in the Caroline Islands, with accompanying glottal closure. The effect of some of these sounds must resemble somewhat that of the final stops and nasals of the Marshall dialect, but neither observation nor mechanical records have given any indication of glottal affection, nor of independent glottal stops, in this dialect.

AFFRICATIVES

Erdland writes j with the value of English j, that is dj. This affricative was found to agree exactly with the stops in its essential features. It is "intermediate" as to sonancy when initial, surd and without explosion when final, and frequently with slurred occlusion and explosion, that is, an approach to fricative quality, when intervocalic. The average length of the occlusion in initial position is less than a fifth of a second (9 mm.), and thus of the "d" rather than "t" type.

Marshall j corresponds to usual Malayo-Polynesian t or s: jilu, three, tol; meja, eye, mata; lo-jiliñö, ear, telña; juon, one, sa.

LATERALS

Erdland distinguishes two l sounds, l and l̥. In regard to the latter he says that it sounds "als ob ein l anklingt dem ein nachdrücklicheres in Verbindung mit dem folgenden Vokale folgt." The difference between the two sounds is difficult to perceive, and tracings of them are similar. Both are voiced. Records of both show a drop or dip near the beginning of the sound. English medial l usually begins with a drop and ends with a sudden short ascent. It is thus registered at a lower altitude than the adjacent vowels, no doubt because the partial closure of the mouth by the tongue permits the escape of less breath. In most American languages, on the other hand, tracings of l regularly commence with, and often largely consist of, a single marked dip, that is to say, a prominent drop and quick recovery. The cause of this form of record is unexplained, unless it is due to a more sudden lateral movement of the tongue than in English. Marshall l and l̥ are intermediate between the English and American Indian types, both forms having

been recorded. Erdland suggests that l̥ may be analogous to r, which appears to be a stopped sound. No trace of an occlusion was however found in any tracing of l̥, so that this supposition does not seem probable. When l and l̥ are initial, tracings show a regular rather slow rise of the breath pressure for some time before sonancy sets in. Final l and l̥ seem to begin as sonants but to lose their voice before completion.

Both Marshall l and l̥ seem to correspond to Malayo-Polynesian l-r: lo, tongue, lida, arero, lapi; al, sun, alo, ari.

TRILLS

Erdland recognizes also two r sounds, r and r̥, which proved to be somewhat easier to distinguish than l and l̥. In regard to r he says: "Die Zungenspitze steht beinahe gegen das Zahnfleisch. Die dann durch die Enge getriebene Luft bringt den r-Laut hervor. Es scheint falsch zu sein, diesen Konsonanten als ein r, dem ein d vorklingt, zu bezeichnen." The last statement may be contested. The sound r̥ was first written dj, then j, r, or dj, and until the last it continued to give the effect nearly of dr. Unfortunately it was recorded only in initial position, but there normally shows a definite occlusion. That in some cases the tracing of this occlusion is much rounded, indicating slurring of close stoppage of the breath, is a feature shared by this sound with all other stops, particularly b. Sonancy also begins at the usual point, namely a small fraction of a second after the beginning of the release. The duration of the occlusion varies from an eighth to a third of a second; the average is about a fifth, so that it is difficult to assign r̥ to either the "t" or "d" type of stops. It is, however, true that tracings of r̥ differ from those of other stops in that the line of the explosion does not immediately run into the vowel vibrations, but is followed by a gradual rise, or even a drop and a rise, which may contain three or four oscillations of the kind usually found in r tracings and due to flaps of the tongue. The sound may therefore be defined as an alveolar stop with a continuant release of more or less r quality.

This sound, in spite of its stop character, seems to be a development from original Malayo-Polynesian r: ri, bone, suri; ren,

water, rano (Madagascar, Motu), tanu (Rotuma), tun (Santa Maria).

The other *r* presents no anomalies except in initial position, when the "trill" vibrations which one should expect are normally absent. Instead there is a surd breath approach to the voicing, much as in the case of Marshall I. When intervocalic, *r* regularly shows three to four distinct voiced trills or flaps of the tongue; in the one set of records obtained of a word in which it is final, the flicks are regularly six in number and apparently surd, as the mouth tracings show no voice vibrations, and simultaneous glottal records happened not to be secured.

SUMMARY

It is clear that the character of Marshall consonants is greatly affected by their position in the word. With the exception of *l*, and possibly *l*, *r*, and *r*, all final consonants are entirely surd, and even in these laterals and trills the voice fades away before the breath pressure and articulation cease. All medial, that is intervocalic, sounds are sonant. All initial consonants begin as surds, though as they approach the vowel they are invariably voiced. In the case of stops this means that the occlusion is surd, at least the last part of the explosion sonant; in the case of continuants, that there is some flow of breath before the voicing sets in. It is also clear that the nature of the consonants is determined by the following rather than the preceding vowels, that is to say that *k* leans upon a more in *ka* than in *ak*. This is shown by the fact that finals are entirely surd, initials partly sonant, medials entirely sonant.

In all essentials, these phonetic traits are duplicated in the Pima-Papago language of Arizona, and several individual features recur in a number of American languages; but, as regards the allied tongues of Malayo-Polynesian stock, the Marshall dialect seems to be phonetically greatly specialized.

TABLE OF SOUNDS OF THE MARSHALL LANGUAGE

Vowels (with *h* approach when initial):

Open: *a*

Open: *ä*, *ö*

Medium close: *e*, *o*

Medium close: *i*, *u*

Mixed, of indistinct quality: *ö*, *ü*

Semivowel: *w*

Consonants (*x*-, initial; -*x*-, final; -*x*-, intervocalic):

| | Labial | Dental | Alveolar | Post-alveolar | Lateral | Palatal |
|--|--------|----------|----------|---------------|----------|----------|
| Long surd occlusion, sonant explosion | | t- | | | | k- |
| Short surd occlusion, sonant explosion sometimes fricative | b- | d- | r- | j- | | g- |
| Fricative, usually sonant, no true occlusion | -b- | -d-, -t- | | -j- | | -g-, -k- |
| Surd occlusion, no release through mouth, possibly through nose | -b | -d, -t | | -j | | -k |
| Nasal continuant with mouth closure and gradual voicing | m- | n- | | | | ñ- |
| Sonant nasal continuant with imperfect mouth closure | -m- | -n- | | | | -ñ- |
| Surd nasal continuant with mouth closure | -m | -n | | | | -ñ |
| Continuant, gradually voiced | | | | r- | l-, l- | |
| Sonant continuant, 3-4 tongue trills | | | | -r- | | |
| Continuant, probably surd, 6 tongue trills | | | | -r | | |
| Sonant continuant | | | | | -l-, -l- | |
| Continuant, beginning sonant, ending surd | | | | | -l, -l | |
| - <i>r</i> and - <i>r</i> - occur but their character has not been determined. | | | | | | |

EXPLANATIONS OF PLATES

The appended reproductions of tracings were simultaneously recorded from the throat and mouth (pls. xxv, xxvi), throat and nose or nose and mouth (pl. xxviii), and from the mouth alone (pl. xxvii). The vertical lines have been drawn to connect synchronous points in two tracings. In some cases, these also separate constituent sounds of the word; but their primary purpose is the indication, on the lower breath or nasal line, of the point corresponding to a change in sonancy, as

revealed in the throat line above. Such changes may or may not be equivalent to the transitions from one sound to another. It must also be observed that the vertical lines actually denote temporally coincident points in the two lines only when the lower tracing is near its base-level. As the mouth or nose line becomes considerably elevated owing to stronger breath pressure or impounding of the breath in the apparatus, the correspondence indicated by the vertical line is more and more lost, because the inscribing needle, being attached at one end, describes an arc instead of vertical strokes. In a high mouth or nose tracing, therefore, a point some distance to the right of the base of the vertical line corresponds in point of time to the point marked by the intersection of this vertical line with the upper or throat line.

Explanation of Plate XXV.

(Tracings from mouth below, from glottis above)

Fig. 1.—*dil*, louse nit. D with short occlusion, as in figure 2, as compared with the long occlusion of t in figures 3 and 4. L commences with a conspicuous dip, as in many American languages.

Fig. 2.—*dol*, mountain. L shows but a slight dip, as in European languages. As between this word and *dil* of the last figure, the l in the latter is regularly marked by a deeper dip in all the tracings obtained.

Fig. 3.—*tð*, rope. T with a long occlusion; beginning of sonancy marked by a drop in the glottal tracing—an American characteristic, unusual in Marshall.

Fig. 4.—*tð*, sugar cane (long open o). The inception of sonancy is of the normal Marshall type, to which figure 3 furnishes an exception.

With figures 1 to 4 compare figure 26.

Fig. 5.—*reb*, a worm. R has a clear occlusion, but the release from this is followed by a fricative sound of some duration, which is first surd, then sonant, and shows one or two waves of r type.

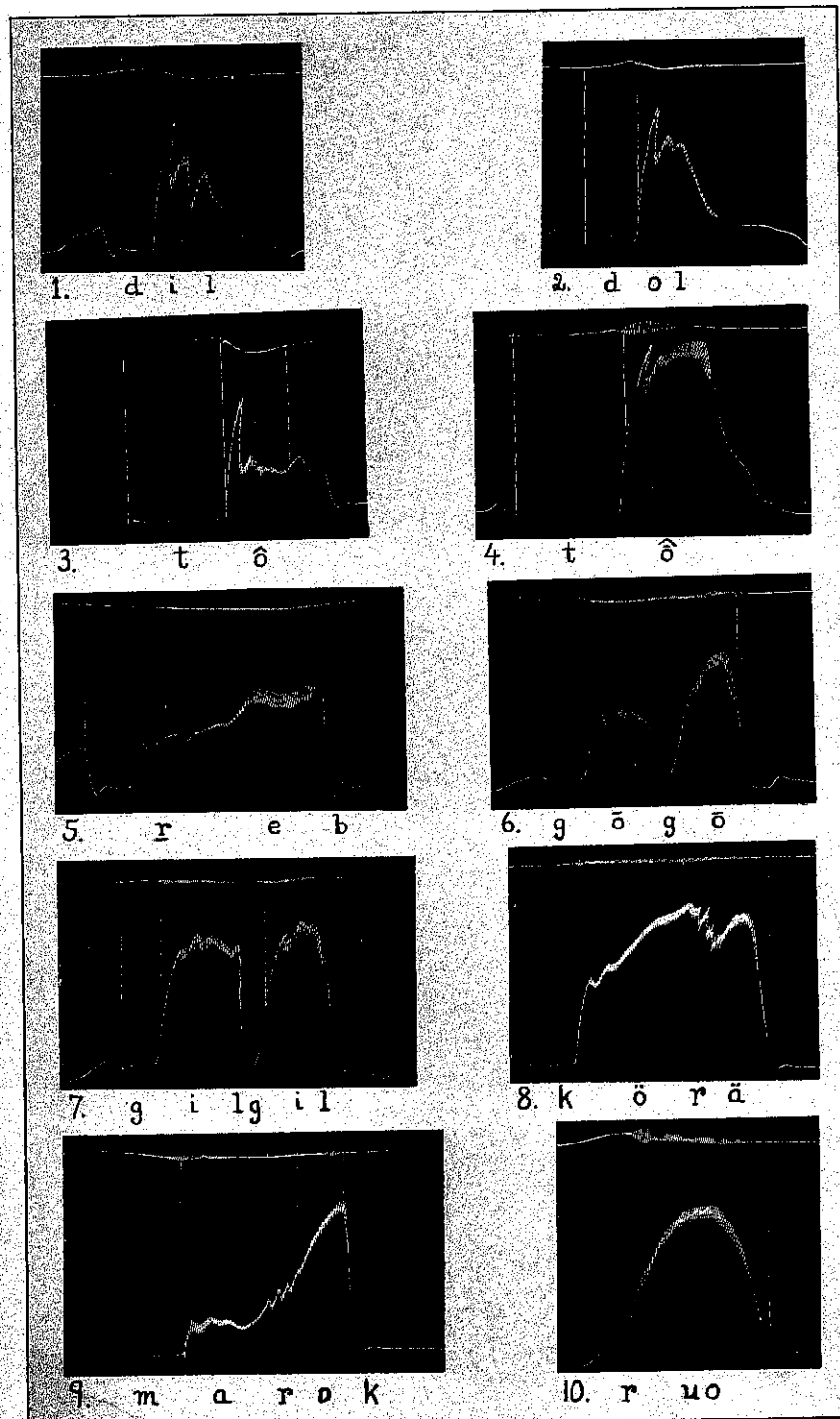
Fig. 6.—*gōgō*, a species of fish. Initial g of stop type, with short occlusion; medial g a voiced fricative.

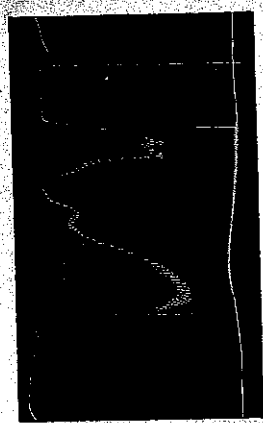
Fig. 7.—*gilgil*, a species of fish. The first g is of normal initial type, with short occlusion. The unvoiced middle portion of the glottal line and simultaneous dip in the mouth line probably mark the surd end of the first l and beginning of the second g.

Fig. 8.—*kōrā*, woman. K is of normal type, with heavy voicing at the end of its explosion. R shows three or four tongue movements, which appear even in the glottal tracing above.

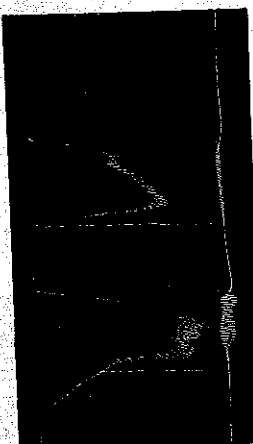
Fig. 9.—*marok*, darkness. M becomes sonant very gradually, probably some time after closure of the lips; a shows a wavering in force of breath that is frequent in many languages in vowels preceding r or l; r has about four trills, and is less strongly voiced than either vowel; o reveals an increase in strength of sonancy toward the end that often appears immediately preceding a final surd stop, such as the following k, which does not show in the tracing.

Fig. 10.—*ruo*, two. R begins surd, but quickly reaches maximum sonancy whereupon its tracing runs into that of the vowels. The r is without tongue flaps. This trait is normal in initial position.

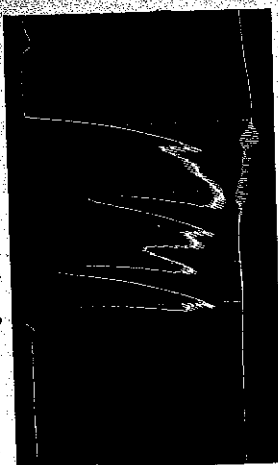




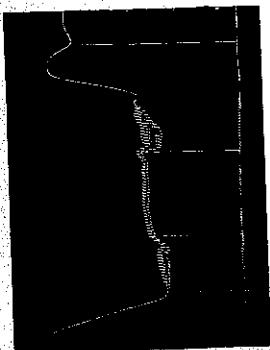
11. k e n u a m



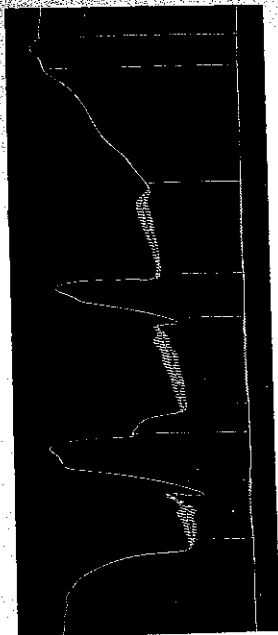
12. g a ñ g ü ñ



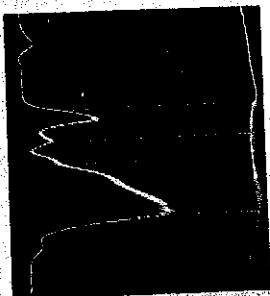
13. b ö d ö k d ö k



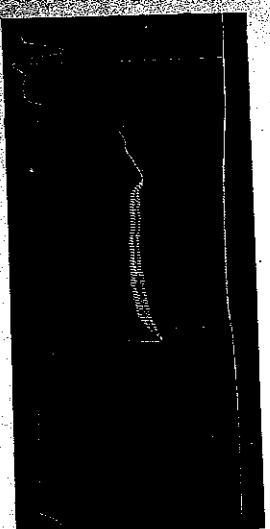
15. j i l u



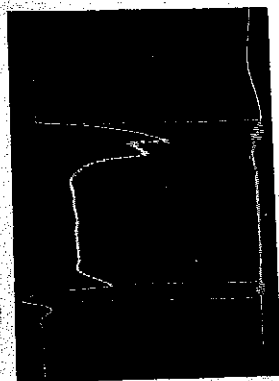
14. b ö d ö k d ö k



16. j i l u



17. b a d



18. b a d