

# ON THE DISTRIBUTION OF CONSONANTS AND VOWELS IN MONOSYLLABIC BASE WORDS IN CONTEMPORARY HAWAIIAN

Nina Pilszczikowa-Chodak

"The phoneme combinations in every language are governed by laws and rules that are valid only for the particular language and must be established separately for each language" (Trubetzkoy 1969: p248).

The purpose of this article is to find out the laws and rules governing the distribution of consonants and vowels in monosyllabic base words of Contemporary Hawaiian.

The distribution of consonants and vowels in the Hawaiian language is of special interest, since this language has one of the smallest inventories of consonants within the Polynesian languages: Tongan, with 12 (twelve) consonants has the largest inventory, while Hawaiian has only 8 (eight) (see Lynch, 1998:78). In *Pocket Hawaiian Grammar* (Schutz, Kanada and Cook, 2005:211), marked here 'PHG', it is stated that the "Hawaiian language has long been regarded as an unusual language because of the low number of its consonants and vowels."

It should be noted that in 1981 Albert J. Schutz questioned this opinion about Hawaiian vowels. In his innovative article: 'Reanalysis of the Hawaiian Vowel System' (Schutz, 1981:1-43) he comes to far-reaching conclusions, which are reaffirmed in 'PHG', where, under the heading: "Vowel System", we read: "Because there are five vowel letters in the Hawaiian alphabet (a, e, i, o, u), even some current descriptions state that the language has five vowels. However, another way to look at the system is to consider which vowels and vowel combinations (diphthongs) can function as the nucleus of a one-syllable word. This gives a very different picture of the vowel system. To the 5 (five) short vowels (a, e, i, o, u) add another five long vowels (ā, ē, ī, ō, ū). Next, add nine short diphthongs (iu, ei, eu, ai, ae, ao, au, oi, ou) and six long diphthongs (ai, au, ae, ao, ei, ou). In summary, if we go beyond the Hawaiian alphabet and look at vowels in terms of their function, we see that the vowel system is not as simple as has been thought". (PHG:211). Of interest to note, in their 1968 work, *The Sound Pattern of English* (p.20), Chomsky and Halle wrote that vowels, as such, have higher power than consonants and figure prominently as syllabics. This observation adds additional weight to Schutz's findings.

It is well-known that vowels play a more important role in the Hawaiian language than

consonants - the role of syllabics is assumed solely by vowels. Consonants are limited to the onset of the syllable and some syllables (and words) do not have a consonant at all.

The term "base word", according to PHG, "is a content word that can function as the center of a phrase, such as a noun or a verb, as opposed to a word that cannot function in that way, such as grammatical markers or modifiers." If the base words have only one syllable, they have a long vowel (e.g. ku) or a diphthong (e.g. 'ai) in it (PHG:31). This term "base word" corresponds to the "Major Stem Classes: noun, verb, adjective, adverb" used by Dougherty in her article: 'Reduplication in West Fetuna' (1977:207).

The focus of this article is on monosyllabic base words since they constitute a small closed group of words with either one of 5 long vowels or 9 short diphthongs which could be preceded by one of 8 consonants or no consonant at all.

In the 1986 *Revised and Enlarged Edition of the Hawaiian Dictionary* by Pukui and Elbert were found 108 (one hundred and eight) monosyllabic base words. Most of these words have corresponding or related words in other Polynesian languages, as can be seen in Tregear's *Maori-Polynesian Comparative Dictionary* marked here: MPCD. However, to find these corresponding words, it became necessary to look through the "Interchange of Consonants" table on the page xxiii of MPCD. The analysis of this table shows :

1. The absence of Polynesian /k/ in Hawaiian. The Polynesian /k/ in Hawaiian was replaced with the glottal stop / ' /. (See words with glottal stop on page 7 of this article.) About such consonant changes Krupa,1982:16 wrote: "a characteristic feature of the development of the Polynesian consonantism is the backward shift of the place of articulation.
2. The Maori's /ng/, /n/, /g/ and /wh/ in MCPD correspond to the Hawaiian /n/ and /h/.
3. The Hawaiian /l/ is within the same group of liquids as the consonant /r/ of Maori and Tahitian. Samoan and Tongan also have /l/, as does Hawaiian.
4. Hawaiian (the same as Maori) has [bilabial, +grave] /w/, while all other Polynesian languages have [labiodental, +grave] /v/. Krupa,1982:21 wrote: "Everywhere we may observe both bilabial and labiodental pronunciation of the voiced 'v/' 'w.' The script seems to indicate which of the two variants is dominant." In Contemporary Hawaiian it is /w/.

5. The replacement of Proto-Polynesian \*t with the /k/ in Hawaiian resulted in the Contemporary Hawaiian becoming the only Polynesian language without [t]. (See table in Krupa,1982:18-19). The cases when some varieties of the language have retained the /t/ pronunciation, do not change the fact that Contemporary Hawaiian has /k/. It is this change of the dental [-grave] consonant /t/ into the velar [+grave] consonant /k/ that has become the most decisive point within the reorganization of the Hawaiian consonantal system. It makes Krupa's "backward shift of the place of articulation" especially consequential for Hawaiian.

As already stated, the Hawaiian language has only 8 (eight) consonants while Tongan has 12 (twelve). In *The Polynesian Languages* by Krupa (1982) on pages 24-27 there are tables of consonants of 17 (seventeen) Polynesian languages. The Tongan's table, the biggest, includes the following consonants: /v, m, f, p, l, n, s, t, n, k, h, ?/. (The glottal stop /?/ will be shown here as: / ' /).

All consonants within these 17 (seventeen) tables are described with the help of the distinctive features : [+/- diffuse], [ +/- grave], [+/- sonant], [+/- continuant]. Within these distinctive features there is no [+/- voice] since, on the page 21 of this book, it states: "There is no opposition of voiced versus voiceless consonants". However, one can look at these Polynesian consonants from a different point of view, taking under consideration the fact that the consonants /v, l, m, n, n/ are sonants, voiced, while the rest of consonants: /f, p, s, t, k, h, '/ are all voiceless. These are two groups of consonants - voiced and voiceless. This makes it possible to conclude that, behind these voiced and voiceless consonants, there is a very consequential division of consonants into [+voice] sonants : /v, m, l, n, n/ and [-voice] obstruents: /f, p, s, t, k, h, '/. Hence, all Polynesian consonants, presented in 17 (seventeen) tables, on pages 24-27, we divide here into two groups : voiced sonants (they will be called "sonorants") and voiceless consonants designated as obstruents in contrast to sonorants (Trubetzkoy,1969:141). Chomsky and Halle in their above mentioned book also speak about this division. On page 85 they write that "the feature 'sonorant' is redundant in English, though not in all languages", and on page 223 they speak about "a cross-classification into obstruents and sonorants. The latter category containing nasals, liquids and glides".

The 8 (eight) Hawaiian consonants: /w, m, p, l, n, k, h, ' / are divided here into voiced sonorants : /l, m,n,w/ and into voiceless obstruents : / ', k, h, p/.

All Hawaiian obstruents : / ', k, h, p / are [+grave]. This is the most important result of the above-mentioned replacement of [-grave] dental /t/ by [+grave] velar /k/. The resulting shift shows that the feature [grave] plays an important role in the sound system of the Hawaiian language.

Of the above-mentioned 108 (one hundred and eight monosyllabic base words only 8 (eight) words are without an initial consonant (there is a prevalence of words with an initial consonant). 40 (forty) words have long vowels. 67 (sixty-seven) have short diphthongs. All 108 (one hundred and eight) monosyllabic base words are divided here into 9 (nine) groups. Out of these 9 (nine) groups, the first one does not have a consonant. The other two groups, 2 (two) to 5 (five), begin with an initial [-voice ] obstruent : / ', k, h, p/ and groups 6 (six) to 9 (nine) begin with an initial [+voice] sonorant : / l, m, n, w/. Each entry below has the Hawaiian word on the first line and other Polynesian languages on the following lines.

Group 1 : Without an Initial Consonant:

a. nvi. Jaw, cheekbone.

Maori, a , n. Collar-bone. Tahitian, ta'a , n. Chin or jawbone. Tongan, a, n. Jaw-bone (MPCD). Samoan, a v. Be (like) what?, be how? (only in questions).

o. nvi. To answer, reply yes, talk, say; vi. To survive, go on; n. Food provision for a journey.

Maori, o, n. Provision for a journey; whaka-o v. To answer. Tahitian, o, n. Gift, present; provision for a journey. Tongan, o, v. To go (db. and pl.), to go with.

Samoan, o, v. Go side by side, together with.

u. n. Breast, teat, udder; vs. Moist, soaked, to drip.

Maori, u, n. Breast of a female, udder. Tahitian, u, n. Milk; Breast. Tongan, u, v. To be sheltered (from wind or rain). Samoan, u v. Grip, bite on, sting (insect); susu n. The breast (of a woman); v. To suck.

ai nvi. Coition, to have sexual relations, cohabit.

Maori, ai , v. To lie with a female, to procreate. Tahitian, ai, v. To copulate.

Tongan, 'ai, v. To do, to put or place. Samoan, ai particle: There, hereby.

ao. nvi. Light, day; daylight, dawn; to dawn.

Maori, ao, n. Day-time, a day; .Tahitian, ao, n. Day, light. Tongan, 'ao, n. A cloud.  
Samoan, ao, n. Day, light.

au. nvi. Period of time, age, era; nvi. Current, to flow as a current.

Maori, au, n. Smoke; Gall; Cloud or fog; Current. Tahitian, au, n. Current, vapor, smoke. Tongan, 'au n. Current, stream. Samoan, au, v. To flow on, continue; n. A current at sea.

oi . vi. To move, to turn sideways, to pull away as in anger.

Maori, oi, v. To shudder, to shake, to shiver. Tahitian, oi, v. To veer, turn.  
Samoan, oi, v. To groan, moan.

ou. n. Float, as on a net (rare); vs. To lean on something (rare).

Samoan, ou, v. To bark (dog); n. Bark.

#### Monosyllabic Base words without an Initial Consonant :

Hawaiian has only words with [+grave, +back] long vowels /o/ and /u/, and /a/ and the diphthongs with these vowels: / ai, ao, au, oi, ou/. There are no words with [- grave, front] vowels /e/ and /i/; there are no diphthongs with /e/ : /ei, eu, ae/, and no diphthong /iu/. The vowel /a/ seems to be independent, free of all conditions that there are for other vowels and also the most frequent. 13

All other Polynesian languages have corresponding monosyllabic base words without an initial consonant. But Tahitian has ta'a 'chin' or 'jaw-bone' with the initial consonant /t/, and glottal stop between vowels, and it is disyllabic. The question is whether Tahitian preserved the Proto-Polynesian \*t and the Proto-Polynesian glottal stop in ta'a , 'chin'? Tongan, on the other side, preserves the Proto-Polynesian glottal stop before diphthongs with the vowel /a/: 'ai, 'ao, 'au. Samoan, in case of Hawaiian u 'breast', has susu which is disyllabic with two /s/. This way, in some Polynesian languages, disyllabic words correspond to monosyllabic Hawaiian ones and have initial consonants.

Other Polynesian languages also do not have base words with long [-grave +front]

vowel /e/ or diphthongs: /ei , eu , ae/ with the vowel /e/ and they also do not have a diphthong /iu/. However, Samoan has e , n. 'loud laughter'.

Also of interest is the fact that the other Polynesian languages have [-grave, +front] long vowel /i/ absent in Hawaiian monosyllabic base words: Maori has i, v. 'to ferment, turn sour.' Tahitian, i , v. 'to prepare fermented food for magi.' Samoan, i , v. 'feel empty (stomach).' Tongan, i , n. 'fan.'

### Group 2 : With the Initial Glottal Stop /'/ :

'a. nvi. Fiery, burning, fire, to burn.

Maori, ka v. To be lighted, to take fire. Tahitian, 'a, n. The state of burning. Tongan, 'a, n. Fence, wall, pen; ka , v. To hawk, to clear the throat. Samoan, 'a'asa, v, adj. Be red hot.

'e. nvs. Different, strange, other; elsewhere.

Maori, ke, adj. Different, strange. Tahitian, 'e , adj. Strange, different. Tongan, 'e, v. Call out, shout; kehe, adj. Strange, odd, different. Samoan, 'e , v. Call out, shout, 'ese, v. adj. Strange, different.

'i nvi. To say, speak; n. Supreme, great, best.

Maori, ki, v. To say, to think. Tahitian, 'i , To speak (obsolete). Tongan, ki, v. To squeak. Samoan, 'i, v. To cry, yell

'o. loc.n. There, yonder, beyond; n. Fork, pin.

Maori, ko, n. Yonder place; A distant point of time. Tahitian, 'o, n. Garden (biblical). Tongan, ko, n. Yonder place. Samoan, 'o, n. Yonder.

'u. vi. To grunt, groan, moan, grieve; vi. To hold the breath.

Maori, ku, v. Be silent; v. To be worn out. Tahitian, 'u, v. To dye. Tongan, ku as kuku v. To grasp. Samoan, 'u, v. Hold fast, grip.

'ae. vt. interj. Yes, to say yes, consent, conform, agree; n. Sap from taro, seaweed.

Maori, ae, vi. Assent, agree; whaka-ae, vi. Say yes, consent. Tahitian, 'ae, v. Say 'yes'. Samoan, 'ae, v. Rejoice.

'ai. nvt. Food, food plant; to eat.

Maori, kai, n. Food; v. To eat. Tahitian, 'ai, v. To eat. Tongan, kai, v. To eat; n. Eating, meal, food. Samoan, 'ai, v. To eat, n. Food.

'ao. n. A new shoot, leaf, bud, esp. of taro.

Maori, kao, n. A dried kumara. Tahitian 'ao, n. Heart of banana stalk. Tongan,

'ao, n. Cloud(s). Samoan ao, n. Cloud.

'au. vi. To swim, travel by sea; n. The current in the ocean.

Maori, kau, v. To swim, to wade. Tahitian, 'au, v. To swim, to bathe. Tongan, 'au,

n. Current, stream; kakau, v. To swim. Samoan, 'a'au, v. To swim.

'eu. nvi. Mischievous, playful, naughty; vi. To crawl along; to rise

Maori, keu, v.t. To move, roll, rumble. Tahitian, 'eu, v. Dab off. Tongan, 'eu, To walk (as lame), n. Edge, corner; keu, n. Yam. Samoan, 'eu, to remove something bad, filthy.

'iu. nvs. Lofty, sacred, revered (only in Hawaiian).

'oi. nvs. Sharp, acute; sharpness; nvs. Best, superior.

Maori, koi, kokoi, adj. Sharp; v. To sharpen. Tahitian, 'oi, adj. Sharp. Samoan, 'oi, adj. Exclamation of surprise.

'ou. nvs. Sharp, protruding, piercing; to protrude.

Maori, kou, n. Knob, end, stump, protuberance. Tahitian, 'ou, Reply to being called: 'I hear you'! Tongan, kou, a.vi. Uncircumcised (Ch).

### Monosyllabic Base Words with the Initial Glottal Stop /' / :

Hawaiian has all long vowels and all short diphthongs except /ei/.

In other Polynesian languages corresponding words begin with the consonant /k/ in Maori; in Tongan it is /k/ or the glottal stop, and it is the glottal stop in Samoan and Tahitian.

These languages also have all long vowels after an initial consonant and no diphthong /ei/. Yet they all have no diphthong /iu/. Most have diphthongs with an initial [a] and the diphthongs : /eu/, oi/, ou/.

All in all, there are fewer diphthongs in Tahitian (7), Samoan (6), and Tongan (5) corresponding to (9) Hawaiian words with diphthongs. In Tongan, the Hawaiian word 'e, 'strange' corresponds to the disyllabic kehe, 'strange, odd.'; in Samoan, Hawaiian 'e, 'strange' corresponds to 'ese. Both forms kehe, and 'ese, preserve the Proto-Polynesian consonants.

Group 3 : With the Initial Obstruent /h/):

ha. num. Four, fourth; nvi. To breathe, exhale, breathe life.

Maori, ha. n. Breath. Tahitian, ha. n. A prayer or incantation used for healing. Tongan, fa. v. to be hoarse (of voice); ha. v. Appear, show.

Samoan, fa. v. To be hoarse, to lose the voice.

he. n. Grave; n. General name for caterpillar; vt. Scrape, rub.

Maori, whe, n. A caterpillar. Tahitian, he, n. A caterpillar. Tongan, he, v. To stray, err, go astray. Samoan, se, n. A stick-insect.

hi. vt. To cast or troll; nvt. Dysentery, diarrhea; to flow, hiss.

Maori, hi, v. To hiss. hihi, to be affected with diarrhea. Tahitian, hi, n. Diarrhea.

Tongan, hi, n. Semen; fi, v. To plait, to twist together. Samoan, si, n. Semen.

ho. vt. To give, transfer; vi. To wheeze, breathe hard.

Maori, ho, n. Action of giving, presenting. Tahitian, ho, v. To give. Tongan, ho, v.

To breathe, puff; fo, v. To wash clothes. Samoan, fo, fofo, v. Massage. n.

Remedy, cure.

hu. nvi. To rise up or swell, as yeast; to ferment, overflow, boil over.

Maori, hu, n. Mud, swamp; v. To hiss, bubble up. Tahitian, hu, n. Wind emitted from the rectum. Tongan, hu, v. To enter, penetrate; fu, v. to clap the hands crosswise (Ch). Samoan, su, v. To be wet, moist.

hae. nvs. Wild, vicious, fierce; vi. To bark, growl, snap as a dog; vt. To tear.

Maori, hae, haehae, v. To tear, to slit, to cut repeatedly. Tahitian, hae, n. Anger, rage. Tongan, hae, v. To tear, reap. Samoan, sae, v. To tear off bark or skin.

hai. nvt. Offering, sacrifice; to offer sacrifice.

Maori, hai, n. The name of the principal stone in the game of ruru. Tahitian, hai, n. A sort of plantain. Tongan, fai, vt. To do, perform. Samoan, sai, n. Pigsty; v. Bind up; fai, v. Do, make; Say

hao. n. Iron, general name for metal tools, a bit.

Maori, hao, v. To draw a net etc. round anything so as to encompass fish, to enclose. Tahitian, hao, v. To enclose as fisherman. Tongan, fao, v. To stretch tight, make taut. Samoan, fao, n. Nail; v. Grab, snatch; rob.



hau. n. A lowland tree (*Hibiscus tiliaceus*); nvs. Cool, ice, frost, dew, snow; a cool breeze; to blow, of a cool breeze.

Maori, hau, n. Wind; dew, moisture. Tahitian, hau, n. Dew, peaceful, calm.

Tongan, hau, n. Beat, thrash ; fau, n. Kind of tree; giant hibiscus (Tui). Samoan, sau, n. Dew; fau, n. Tree hibiscus, sp.

hei. nvt. Net, snare, ruse; to ensnare, catch in a net; nvi. String figure, cat's cradle.

Andrews: hei, n. Wreath of green leaves. Fig. An ornament.

Maori, hei, n. A neck ornament. Tahitian, hei, n. Lei, neck garland; necklace. Tongan, hei, n. Aslant. Samoan, sei, v. To put a flower into the hair.

heu. nvs. Down or fine hair, fuzz, loose fibers or leaves.

Maori, heu, n. Eaves; Brushwood, overgrown with weeds. ; cf. weu, n. A single hair. Tahitian, heu, cf. veu, downy hair. Tongan, heu, v. To mix, to rake, to shuffle. Samoan, seu, n. Horn.

hiu. vt. To fling violently, to throw.

Maori, whiu, v. To fling, to throw. Tahitian, hui, adj. Glutted, satiated. Tongan, fiu, v. Be bored, weary, tired of (Tui), be satisfied (Thom). Samoan, fiu, be tired of, or bored (with); n. fatigue.

hoi. n. Bitter yam.

Maori, hoi, n. The lobe of the ear. Tahitian, hoi, n. A plant like the yam.

Samoan, soi, n. Wild yam.

hou. vs. New, fresh, recent; . vs. Again, more; vt. To stab, push, drill, pierce, inject.

Maori, hou, adj. New, fresh, recent. Tahitian, hou New, recently, lately. Tongan, hou, n. Rough, choppy sea; v. To be upset. Samoan, fou, v. Be new, fresh, recent; sou, v. (sea) be rough.

#### Monosyllabic Base Words with the Initial Obstruent /h/ :

Hawaiian has all long vowels and all short diphthongs. Hawaiian /h/ corresponds to words found in (MPCD), to Maori /h/, wh/, to Tahitian /h/, Tongan /h/, /f/, and Samoan /s/, f/.

Other Polynesian languages also have all long vowels. Maori dictionary (MPCD) has / wh/ in front of /e/, iu/. In Tongan all long vowels were found after initial /h/ and

/f/, in Samoan after initial /f/ : fa, fo or after /s/ : se , si , su. As for diphthongs, there are all of them, except /oi/ in Tongan.

Group 4 : With the Initial Obstruent /k/:

ka . nvt. To hit, strike, hack, throw, smite, thrust, hurl, dash; nvt. Canoe bailer.

Maori, ta, v. To dash down, to be violent; To beat, to strike with a stick. Tahitian, ta, v. To strike. Tongan, ta, n. A blow, strike. Samoan, ta, n. A hit, a blow.

ke . nvt. Protest, complaint, criticism; to criticize.

Maori, te, v. To crack, to snap, to give a sharp report. Tahitian, te, v.aux.

Tongan, te, vi. To float; bulge, protrude, stick out. Samoan, te, v. To be split open as chestnuts; to burst open.

ki . n. Ti, A woody plant in the lily family. (Cordyline terminalis).

Maori, ti, n. The name of trees (cabbage trees). Tahitian, ti, n. Root of Cordyline fruticosa. Tongan, ti, n. tea. Samoan, ti, n. (Bot. Cordylines, sp.)

ko. n. Sugar-cane.

Maori, to, n. The stems of tall straight plants as of maize. Tahitian, to, n. Sugar-cane. Tongan, to, n. Sugar-cane. Samoan, to, v. To plant sugar-cane.

ku. vs. To stand, stop, halt, anchor; to rise as dust, to hit.

Maori, tu, v. To stand, to set up. Tahitian, tu, v. To stand up, get up. Tongan, tu, v. To shake out or off. Samoan, tu, v. To stand, stand up.

kae. n. Refuse or rubbish, waste, excrement.

Maori, tae, n. Gum, exudation from plants; tutae, n. Excrement. Tahitian, tutae, n. Excrement. Tongan, tae, n. Excrement (MPCD); ta'e, n. Excrement, stool (Tu'i). Samoan, tae, n. Excrement.

kai. nvs. Sea, seawater; tide, current in the sea.

Maori, tai, n. The sea, the tide. Tahitian, tai, n. The sea, seawater. Tongan, tahi, n. The sea, seawater. Samoan, tai, n. The sea, the tide.

kao. nv. Dart, fish spear, javelin.

Maori, tao, n. A spear. Tahitian, tao, n. A spear. Tongan, tao, n. A spear or javelin. Samoan, tao, n. A spear.

kau. vt. To place, put, hang, suspend, affix, gird on, to set, perch, pose; n. Period of time, lifetime, any season, esp. summer.

Maori, tau, n. A year. Tahitian, tau , v. To perch; n. A season, era, age. Tongan, tau, v. Arrive, reach; ta'u n. Age, year (Tu'i). Samoan, tau , v. Reach, go to; tau, n. A season.

kei . nvt. To glory in, take pride in, dignified, proud.

Maori, tei, n. The name of the bird, the Brown Duck; teitei, adj. High, tall; n. The summit. Tahitian, teitei, adj. High, tall, exalted; v. To praise. Tongan, teitei, adj. Proud (MPCD); tei, (adv) nearly (in time), teitei, very nearly (Thom). Samoan, tei, n. Affectionate term for small brother or sister.

keu. vs. Remaining, extra, excessive, additional.

Tahitian, teu, v.n. To be naked, used contemptuously. Tongan, teu, v. Intend, get ready; preparing. Samoan, teu, v. put away, keep, store up.

kiu. .nvt. Spy, scout, to spy, observe secretly; Name of the strong wind (moderately cold): Malualua.

Maori, tiu, Moriori, the North-West wind. Tahitian, tiu , v. To beg or demand property. Samoan, tiu, n. fish esp. for sharks.

koi. nvi. To urge, implore, persuade, insist on, demand.

Maori, toi, v.i. Tingle. Be galled, be irritated; toi, n. Tip, summit, the peak.

Tahitian, toi, n. The name of a good fiber tree. Tongan, toi , v. to hide; n. Hardwood tree. Samoan, toi , n. Tree (Alphitonia sp.)

kou. n. A tree (Cordia subcordata).

Maori, tou , n. The anus; Actinia tenebrosa. Tahitian, tou , n. The cordia tree.

Tongan, tou , n. Cordia sp. Samoan, tou , n. Tree (cordia sp ).

### Monosyllabic Base Words with the Initial Obstruent /k/ :

Hawaiian has all long vowels and all short diphthongs after obstruent /k/.

In other Polynesian languages corresponding words begin with the consonant /t/. They also have all vowels and diphthongs except /eu/ in Maori and /iu/ in Tongan. Tongan's disyllabic words ta'u and tahi preserve the Proto-Polynesian consonants: glottal stop and h. There

are some reduplications in Tongan related to the meaning: teitei,  
'very nearly.'

Group 5 : With the Initial Obstruent /p/:

pa. nvi. Fence, wall, corral, pen, sty, enclosure, yard; to build a fence.

Maori, pa, v. To touch, To hold personal communication with, to affect.

Tahitian, pa, n. Fortification, rampart. Tongan, pa, v. Bang, burst, explode; pa, n.  
A shield. Samoan, pa, n. Fence.

pe. vs. Crushed, flattened; humble, modest; to anoint.

Maori, pe, pepe, adj. Crushed, mashed. Tahitian, pe, adj. Decayed, rotten.

Tongan, pe, adv. Only, neither more or less. Samoan, pe, v. Die, be dead (of  
animals); pe, v. (of tide) (be) low, be out.

pi. nvs. Stingy, miserly; stinginess. nvi. Sputtering, smoldering; vt. To sprinkle as water  
with the fingers. (PPN pihi.)

Maori, pi, v. To begin to flow (with the tide). Tahitian, pi, pipi, v. Sprinkle.

Tongan, pi, n. wasp, hornet; v. splash water. Samoan, pi, v. Make water (esp.  
children).

po. nvs. Night, darkness, obscurity, dark; formerly the period of 24 hours beginning with  
nightfall.

Maori, po, n. Night, to become night; a season. Tahitian, po, n. Night. Tongan,  
po, n. Night. Samoan, po, n. Night; po, n. day (of 24 hours).

pu. n. Large triton conch, or helmet; shell as used for trumpets; any wind instrument.

Maori, pu, v.i. Blow gently; n. pu, Pipe, tube, flute. Tahitian, pu, n. A conch  
shell. Tongan, pu, v. To break wind through the back passage. Samoan, pu, n. A  
trumpet shell, conch.

pae. nvs. Cluster, row, group, bank as of taro patch, level as of a platform; vi. To land,  
disembark.

Maori, pae, n. The horizon; Region, direction; A perch, horizontal ridges.

Tahitian, pae, n. Side, direction. Tongan, pae, n. A sill, a dam; paepae, n. A  
house platform. Samoan, pae, n. A side, a part, a division.

pai. vt. To urge, encourage, rouse, stir up, excite, vt. To raise, lift up, increase;, vt. To laud, praise.

Maori, pai, n. goodness, to be pleased, approve. Tahitian, pai, v. To wrap carefully, as fish in leaves, to be baked. Tongan, pai, a.v.i. Permanently bent or crooked. Samoan, pa'i, v. To touch.

pao. vt. To scoop out, dug out, as a log for a canoe, to chisel out, erode, bore. vt. To insert, stick in.

Maori, pao, v. To strike with an instrument such as a hammer; to crack, to break. Tahitian, pao, v. To dig, to excavate. Tongan, pao, v. To push. Samoan, pao, v. To stop, to interrupt.

pau. vs. Finished, ended, through, completed, all done; to be completely possessed, consumed, destroyed.

Maori, pau, v. To be consumed, exhausted, finished. Tahitian, pau, adj. consumed, expended. Tongan, pau, (adv.v) certain, definite; decided, made up. Samoan, pau, v. End, stop; be limited.

pei. vs. Bent (rare).

Maori, pei, v. To drive out, to banish. Tahitian, pei, v. To raise up, turn over; juggle. Samoan, pei, v. To be broken, as a cup; crack (nuts).

peu. vi. To thrust up, push up, uproot, prod, bunt, nudge upward, to raise up.

Maori, peu, n. Part of a bird snare - pewa. Tahitian, peu, n. A custom, habit, manner.

piu. ( MPCD ) : Hawaiian, n. The distance or length of three yards.

Maori, piu, v. To throw or swing by a cord. Tahitian, piu, v. pull a fishing line. Tongan, piu, n. A fan palm. Samoan, piu, n. A fan palm.

poi. n. 1. Poi, the Hawaiian staff of life, made from taro corms, dish of taro.

Maori, poi, n. A ball, lump. Tahitian, poi, n. A season, the time of birth or death, v. to fasten. Samoan, poi, n. Kind of food.

pou. n. Post, pole, pillar, shaft, n. Ridge, as of nose; n. Mast of a canoe .

Maori, pou, n. A post, a pole. Tahitian, pou, n. A post, a pillar. Tongan, pou, n. A post, a pillar. Samoan, pou, n. A post or pillar.

Monosyllabic Base Words with the Initial Obstruent /p/:

Hawaiian has all long vowels and all short diphthongs. It needs to be stated that the word *piu* for Hawaiian was only found in the *Maori Polynesian Comparative Dictionary* (MCPD). It might show that Hawaiian had *piu* in the past with the narrow meaning of "the distance or length of three yards".

Other Polynesian languages have all vowels and all diphthongs, except /ei/ /eu/ /oi/ in Tongan and /eu/ in Samoan. There are some reduplications, such as: in Maori, *pe, pepe*, v. 'crushed', Tahitian, *pi, pipi*, v. 'to sprinkle'.

Group 6 : With Initial Sonorant /l/ :

la. nvs. Sun, sun heat, sunny; n. Day, date.

Maori, *ra* , n. The sun. Tahitian, *ra* , n. The sun, daylight. Tongan, *la* , n. Sail, canvas (Thom); *la'a*, n. The sun, sunlight (Tu'i). Samoan, *la*, n. The sun.

le. vs. To go about aimlessly, to do no work; listless, lazy.

Tahitian, *re*, n. Victory, prize.

li. nvi. Chills, to have chills, to tremble with cold, shuddery, feeling of horror, nvt. Lace, as of shoes, to lace or tie, nvt. To hang, gird.

Maori, *ri*, v. To shut out with a screen. Tahitian, *ri*, v. To hang or suspend.

Tongan, *li*, v. To throw, to toss. Samoan, *li*, v. To grin, to set firmly together (as teeth).

lo. n. A black insect, earwig (Dermaptera). (PPN *loo*.)

Maori, *ro* , n. The name of insect or stick-insect. Tahitian, *ro*, n. An ant. Tongan, *lo*, n. An ant. Samoan, *lo*, n. An ant.

lu. vt. To scatter, throw, as ashes, to sow.

Maori, *ru*, v. To shake, to rumble, *ruru* , to shake violently; hurry. Tahitian, *ru*, n. Impatience, hustle, be in a rush. Tongan, *lu*, n. Taro leaves (food). Samoan, *lu* n. Dish made with taro leaves.

lae. n. Forehead, brow, n. Cape, point, n. Wisdom.

Maori, *rae*, n. Forehead, temple. Tahitian, *rae*, n. Forehead. Tongan, *la'e* , n. Brow, forehead (Tu'i). Samoan, *lae*, n. The part between the lip and the chin.

lai. n. A fish of the genus scomberoides.

Maori, rai, n. Fish. Tahitian, rai, n. The sky; also Heaven; the highest chief.

Tongan, lai, n. Fish (Ch) Samoan, lai, n. Fish (scomberoides sp.).

lau. nvi. Leaf, frond, greens; to leaf out, n. Dragnet, seine, n. Sheet, surface.

Maori, rau, n. A leaf. Tahitian, rau, n. A leaf. Tongan, lau, n. A leaf. Samoan, lau, n. A leaf.

lei. n. Lei, garland, wreath, necklace of flowers, leaves, shells, ivory, feathers, any ornament.

Maori, rei, n. A task or large tooth; Anything of ivory. Tahitian, rei, n. The back part of the neck. Tongan, lei, n. Ivory (Tu'i); whale's tooth, task. (CH). Samoan, lei, n. Whale's teeth, ivory, a necklace.

leu. n. Loins (rare, in a chant).

Maori, reu, n. The outer palisading of a pa. Samoan, leu, v. Touch something accidentally.

liu. nvt. Leakage, bilge water, to leak, of a canoe or ship.

Maori, riu, n. The bilge of a canoe. Tahitian, riu, n. Bilge water, a leak. Tongan, liu, n. Hole of a vessel, bilge-water. Samoan, liu, n. Bilge-water.

loi. vt. To look over critically, scrutinize.

Maori, roi, n. Fern root. Tahitian, roi, n. A kind of black-bass. Tongan, loi, n. lie, humbug. Samoan, loi, n. Ant.

lou. nvi. Hook, to hook, to fasten with a hook,;; nvi. Very long fruit-plucking pole. (PPN lohu.)

Maori, rou, n. A long stick to reach anything. Tahitian, rou, n. A pole with a hook used to pull in fruit. Tongan, lohu, n. A fork (MPCD); Long forked stick used for picking fruit

picking fruit (Ch). Samoan, lou, n. A long pole, hook, stick.

### Monosyllabic Base Words with the Initial Sonorant /l/:

Hawaiian has all long vowels and short diphthongs, except /ao/.

In other Polynesian languages, Samoan and Tongan have the initial /l/ in corresponding words, while Maori and Tahitian have /r/. After initial sonorants /l/r/ were found all

long vowels, except [+mid, -grave] vowel /e/, which is found only in Tahitian: re 'victory; price,' with a different meaning than Hawaiian le, 'to do no work; lazy'. Diphthongs /ai/, /eu/ were not found in Tongan and Tahitian and there is no /ao/ in all Polynesian languages. The Hawaiian words: lou, 'hook, pole' in Tongan is disyllabic lohu, 'fork' (MPCD), 'long forked stick used for picking fruit' (Ch.); la, 'sun' is in Tongan la'a, 'sun, sunlight' (Tu'i); lae, 'forehead' is in Tongan la'e. 'forehead'. These disyllabic Tongan words preserve the Proto-Polynesian consonants /h/ and glottal stop. Hawaiian lou. 'hook, pole' in Tongan is disyllabic lohu 'fork' (MPCD), 'long forked stick used for picking fruit' (Ch); la, 'sun' is in Tongan la'a, 'sun, sunlight' (Tu'i); lae, 'forehead' in Tongan is la'e, 'forehead' (Tu'i). These disyllabic Tongan words preserve the Proto-Polynesian consonants [h] and glottal stop.

Group 7 : With the Initial Sonorant /m/ :

ma. vs. Faded, wilted, perished, stained.

Maori, ma, adj. White, pale, clean. Tahitian, ma, adj. Clean, not soiled. Tongan, ma, adj. Ashamed, timid. HAW. ma, v. To fade, to blush as one ashamed (MPCD). Samoan, ma, v. Be ashamed.

me. vt. To lap as a dog.

Tongan, me, v. To bleat (of a goat or sheep) (Thom).

mi. vi. Urine, to urinate (less used than mimi); mimi, nvi. Urine, urinate.

Maori, mi, v. To urinate, to make water. Tahitian, mimi, (outdated) n. Urine, to make urine. Tongan, mimi, v. to make water (Tu'i). Samoan, mi, miaga, n. Urine; mimi, v. urinate.

mo. short for moku. moku vs. To be cut, severed; n. District, island, section, forest, grove, clump, fragment.

Samoan, mo, n. Fat pig with short legs.

mu. n. General name of distractive insect, moth; vs. Silent, to shut the lips; vi. Gather together (of crowds).

Maori, mu, n. Insects; v. Silent, dumb. Tahitian, mu, A buzz or confused noise or din. Tongan, mu, n. Moth. Samoan, mu, v. Burn. mumu, v. Swarm, crowd (like flies).



mae. vi. To fade, wilt, wither, droop.

Maori, mae, adj. Languid, listless. Tahitian, mae, ma'e, adj. withered. Tongan, mae, v. Droop, wither, fade. Samoan, mae, v. Dry up, wither.

mai. Directional part., Towards the speaker, this way. mai. Hither, almost. (HHD)

Maori, mai,, adv. Hither; n. Clothing, garment. Tahitian, mai, v.n. Come here! Come on! This way! Tongan, mai, Bring to me, to us, forth, towards (Tu'i). Samoan, mai, a particle.

mao. vs. To clear up, as rain, alleviate, to pass as sadness.

Maori, mao, maomao, v. Leave off raining. Tahitian, mao, v. To cease (as rain). Tongan, mao, n. Steam, vapo. Samoan, mao, v. Do accidentally, by chance.

mau. vs. Always, steady, constant, permanent, stationary, continual; To continue, persevere, endure, last. persevere, endure, last. Preservation, continuation.

persevere, endure, last; Preservation, continuation.

Maori, mau. n. Food products; v.t. Carry, bring. Tahitian, mau. v.

Set, be fastened; n. Seize, hold. Tongan, ma'u, v. acquire, gain, fast, secure, tight (Tu'i). Samoan, mau, v. To keep, retain.

mei. Tahitian, adj. Full, stuffed, as a bag. Tongan, mei, n. Breadfruit (Tu'i).

meu. vs. Blunt; v. To meet, touch as persons kissing, to cohabit.

Tahitian, meu, n. The cry of a cat; adj. Third in a game.

miu. vs. Attractive.

moi. n. Threadfish.

Maori, moi, v. To turn sour, to ferment. Tahitian, moi, n. Catfish.

mou. nvi. var. of mouo. nvi. Buoy, float as on a fishing net; to lie at anchor.

Tahitian, mou, v. To fail, perish, vanish, become extinct. Samoan, mou, v. Vanish, disappear.

### Monosyllabic Base Words with the Initial Sonorant /m/:

Hawaiian has all long vowels (but the word mo is short for moku 'to be cut') and mou is var. of mouo. It has all short diphthongs, except /ei/. In Hawaiian, mai is used both as a marker and a base.

In other Polynesian languages there are no [mid] vowels /e/ and /o/, except

Tongan has /e/: me, v. 'to bleat' (goat, sheep), while Samoan has /o/: mo, n. 'fat pig with short legs'. They all have diphthongs with /a/ as first element: mae, mai, mao, mau. However, diphthongs ei, eu, oi, ou, iu are found only in one or two languages. Hence, in other Polynesian languages, diphthongs with mid vowels, the same as mid vowels themselves, are quite restricted in their usage after sonorant [m]. While there is no mei in Hawaiian, in Tongan there is mei, n. 'the breadfruit' and in Tahitian mei. adj. 'full, stuffed as a bag'.

Hawaiian mau corresponds to Tongan disyllabic ma'u. The same as in some other cases, Tongan word preserves the Proto-Polynesian glottal stop.

#### GROUP 8 : With the Initial Sonorant /n/ :

na. vs. Calmed, quieted, pacified, soothed; settled, as a claim.

Maori, na , v. To be satisfied. Tahitian, na , v. Stop crying. Tongan, na, v. Hush, be still (MPCD), na'a, v. To stop crying (Tu'i). Samoan, na, v. To quiet (a child).

ne. vi. Fretting, teasing; murmuring, as the sea; Short of nele. nvs. Lacking, destitute.

Maori, nge, n. A noise, ngeenge , adj. Weary, tired. Tongan, ge, v. To cough (MPCD). Samoan, ne, v. Hesitate, be embarrassed.

no. nvi. Seepage, to leak, ooze, seep, sink.

Maori, no, adv. On account of, owing to. Tongan, no, v. Charter, hire, borrow money. Samoan, no, see nono, v. Borrow.

nu. nvi. To cough, to roar as wind; groaning, moaning.

Maori, ngungu , v. To gnaw. Tongan, ngu, n. Grunt, to growl. Samoan, gu v. To growl.

nae. nvi. Shortness of breath, to puff for breath.

Maori, nae, Failing of breath, ngahengahe, Wasted, weak. Samoan, gase, (of animals) to breathe hard.

nao. nvs. Ripple, groove; crevice, as in rocks; vt. To thrust the hands into an opening, to probe (PPN nao).

Maori, nao , nanao , v. To handle, to feel with the hand, to take hold. Tahitian, nao, nanao , v. To thrust the hand into the cavity. Tongan, ngao, n. Molar teeth. Samoan, ngao , n. The palate.

nau. nvt. To chew, munch, masticate, gnash the teeth.

Maori, nau, vt. Take up. Ngau, v. To bite, to gnaw. Tahitian, nau, n. Name of medicinal grass. Tongan, ngau, v. Chew(Tu'i). Samoan, nau, see naunau, v.

Desire, want; gau, Chew.

nei. 1. nvi. To rumble, as an earthquake, sighing, sighing as of the wind, indistinct sound.

Maori, nei, n. Denoting. Tahitian, nei, adv. Here, in this place.

niu. n. The coconut palm (*Cocos nucifera*).

Maori, niu, n. Small sticks used for purposes of divination. Tahitian, niu, n. A native spear made of the niu, the coconut (ancient name). Tongan, niu, n. The coconut tree. Samoan, niu, n. Any palm, the coconut.

noi. nvt. To ask for something, request, solicit, appeal, make a motion, propose; Plea, proposal, petition.

Maori, noi, v. To be elevated, to be high up; To beg, to prey. Tahitian noi, v.

Outdone, cowed, silenced. Marquesan, nonoi, To demand; to beg for.

nou. nvt. To throw, pelt, cast, pitch, hurl; throwing, pitcher.

#### Monosyllabic Base Words with the Initial Sonorant /n/ :

Hawaiian has all long vowels except [front, high,-grave] vowel /i/ and all short diphthongs except /ai/ and /eu/.

Hawaiian /n/ was found in corresponding words of MPCD as /n/g/ng/ in Maori, in Tongan /n/g/ng/, in Tahitian /n/, in Samoan /n/g/. In Maori, Tongan and Samoan /g/ and /ng/ mark the phoneme / /. They are written here as in the dictionaries. There are reduplications, especially in Maori.

Other Polynesian languages, the same as Hawaiian, after initial /n/ do not have the long vowel /i/ and Tahitian does not have base words ne, no, nu. Out of all long vowels, it has only /a/: na, adj. 'quiet' (applied to a child that has ceased crying). In Polynesian languages corresponding words also do not have the diphthongs /ai/ and /eu/, the same as Hawaiian, and they have no /ou/. All together, in each language

different number of words with diphthongs were found after sonorant /n/. Out of nine, Maori has 6 (six), Tahitian has 5 (five), Tongan has 3 (three) and Samoan has 4 (four) words with diphthongs. Tongan has only 7 (seven) words corresponding to Hawaiian: (na, ge, no, ngu, ngao, ngau, niu). In the Tongan dictionary /n/ and /ng/ both take only 2 (two) pages. Hawaiian na is in Tongan disyllabic na'a; it preserves the glottal stop of ancestral Proto-Polynesian language, as in many cases mentioned before. Out of 9 (nine) diphthongs only 3 (three) diphthongs : ao, au and iu were found in all other Polynesian languages after sonorant /n/. While Tahitian is limited to the usage of long vowels (it has only one long vowel /a/), in all other Polynesian languages there are limitations on the usage of diphthongs after sonorant /n/ in monosyllabic base words, especially in Tongan and Samoan. Besides Hawaiian, Maori seems to have more diphthongs in the structure of monosyllabic base words with initial sonorants than other Polynesian languages.

#### GROUP 9 : With the Initial Sonorant /w/ :

wa. n. Period of time, epoch, era, occasion, season, age; n. Tense, in grammar; n. Space, interval (between objects or time).

Maori, wa, n. Local extension, distance, definite space, interval, a region. The time, season or space in time. Tahitian, va , Space in time. Tongan, va , distance between, or apart (Thom). Samoan, va , v. Be divided; distance, a space between.

we. vt. To sift (rare).

Maori, we , n. Thought, idea; wewe,v. To yelp as a dog. Hawaiian, we, To weep, to cry (MPCD).

wi . nvi. Famine, to suffer a famine. To squeal, squeak, tinkle, the sound of wind, of gnashing teeth. n. The wi tree, n. The tamarind.

Maori, wi, n. Iron, agate, wiwi, n. dread, trouble. Tahitian, vi, v. To be subdued, be subjugated; n. mango. Samoan, vi, n. Large tree (spondias sp.).

wae. nvt, To choose, select, pick out, sort, discriminate, separated, cull, to draft as soldiers; n. U-shaped canoe spreader, cull; Leg (rare), n. Rib of a ship.

Maori, wae, n. The leg, the foot; wawae, to divide, to separate. Tahitian, vae , v.

To share out or divide food. Tongan, va'e, n. The foot, paw of animal (Tu'i).

Samoan, vae, vavae, v. Divide, separate. The leg or foot of an animal.

wai. nvs. Water, liquid of any kind other than sea-water, juice, sap, honey, to flow like water, fluid.

Maori, wai, n. Water. Tahitian, vai, n. Water. Tongan, vai, n. Water, medicine, any liquid. Samoan, vai, n. Water.

wao, n. A general term for inland region usually forested, often uninhabited.

Maori, wao, n. Forest. Tahitian, vao, The extremities of the inland valleys.

Tongan, vao, n. Forest, bushland. Samoan, vao, n. The bush, forest. vau. Tahitian, v. To shave, to bark a tree. Tongan, vau, v. To scrape, to grate (coarsely) (Tu'i).

weu. nvs. same as weuweu, Herbage, grass, greenery; Bushy or fuzzy, as a beard, fluffy.

Maori, weu, n. A rootlet, a fiber, a wood, a forest. Tahitian, veu, n. Downy hair, a wooly kind of hair. Haw (MPCD), weu, to be covered with beard or down as a young, unshaven boy.

wiu. Maori, v. To whip, to punish.

#### Monosyllabic Base Words with the Initial Sonorant /w/ :

Hawaiian bilabial /w/ corresponds to Maori /w/, while in Tahitian, Samoan, and Tongan all have the labiodental /v/.

After initial sonorants /w/ v/ only the low vowel /a/, front vowels /e/. /i/, and three diphthongs with the /a/ as the first element of diphthongs /ae, ai, ao / were found in Hawaiian and other Polynesian languages. The diphthong /au/ was found only in Tahitian and Tongan, /eu/ was found in Hawaiian, Maori and Tahitian. The [+front, -grave] vowel /i/ was found in all languages, except Tongan, while the [+front, -grave] vowel /e/ was found only in Hawaiian and Maori.

It should be stressed that, in this group after the initial sonorants / w/v /, there are no words with long [+back, +grave] vowels /o/ and /u/ and no diphthongs: ei, oi, ou, iu. Except: Maori has the diphthong iu: wiu, 'to whip, to punish'.

Hence, after [+grave] sonorants /w/v/ there is quite a drastic limitation on the usage of both: vowels (even [front] ones), and diphthongs and no [+grave] long vowels /o/

and /u/ at all. There are reduplications: *wewe*, *wiwi*, *wawae* in Maori and *weuweu* in Hawaiian, all related to the meaning: continuing, repeated action.

### CONCLUSIONS

This analysis of the distribution of vowels and diphthongs within 108 (one hundred and eight) monosyllabic base words after voiced sonorants, voiceless obstruents and in words without an initial consonant shows the importance and decisive role of the distinctive features of [voice] and [grave] in Contemporary Hawaiian. Most of these words begin with a consonant - in 99 (ninety-nine) out of 108 (one hundred and eight) cases. For this study, 108 (one hundred and eight) monosyllabic base words were divided into 9 (nine) groups. One group is without an initial consonant and there are 8 (eight) groups, each beginning with 1 (one) out of 8 (eight) Hawaiian consonants /ʻ, h, k, p, l, m, n, w/.

Group 1 does not have an initial consonant and contains only 8 (eight) words. Although it is only a small group of words, it plays an important role in our analysis since it shows that in Hawaiian (and comparison with other Polynesian languages supports it) there are base words containing solely long vowels or short diphthongs.

It also shows that, although vowels play a more important role in Hawaiian than consonants, the absence of an initial consonant in monosyllabic base words determines the quality of long vowels and short diphthongs of these words. These words can have only the [+low] vowel /a/, the [+grave] vowels /o/ and /u/ and short diphthongs with these vowels. The feature [grave] in monosyllabic base words without an initial consonant defines the quality of long vowels and short diphthongs.

Other Polynesian languages also have base words without an initial consonant with long vowels /a, o, u/ and short diphthongs. They also do not have base words with [-grave] vowel /e/, except Samoan has the word: *e*, n. ‘loud laughter’, but they all have base words with [-grave] vowel /i/, absent in Hawaiian, which has only [+grave] vowels in base words without an initial consonant.

Groups 2 to 9 contain 99 (ninety-nine) base words. Each group begins with one of 8 (eight) Hawaiian consonants: four obstruents and four sonorants.

Groups 2 to 5, fifty-five words, begin with [-voice] obstruents /ʻ, h, k, p/. These

obstruents in Hawaiian monosyllabic base words are found before all long vowels /a, e, i, o, u/ and all short diphthongs /ae, ai, ao, au, eu, oi, ou, iu/, except the diphthong [ei] which is not found after the glottal stop. It is the only exception for words with initial obstruents in Hawaiian monosyllabic base words. In other Polynesian languages after obstruents were found all long vowels and short diphthongs as in Hawaiian (with the same exceptions) but, after obstruent /p/, we found only diphthongs with /a/ but the rest, words with /ei, eu, oi, ou/, were found only in one or two languages.

Groups 6 to 9, forty-four words, begin with [+voice] sonorants /l, m, n, w/. As for these groups with initial sonorants, each group needs to be considered separately when it is used before long vowels and when it is used before short diphthongs. Each group has its own limitations.

Group 6 with the initial sonorant /l/ in Hawaiian, has all long vowels and short diphthongs, except /ao/. In other Polynesian languages, after an initial /l/r/, there are no base words with the [mid, front, -grave] vowel /e/ (except the Tahitian word : re 'victory, prize', with a different meaning than in Hawaiian word le, 'to do no work, lazy'). Out of 9 (nine) diphthongs, 6 (six) : /ae, au, ei, oi, ou, iu/ were found in all of them. /Ai/ and /eu/ were found only in one or two languages. There is no diphthong /ao/ in any of them, the same as in Hawaiian.

Group 7, with the initial sonorant /m/, in Hawaiian has all long vowels and short diphthongs except /ei/. In other Polynesian languages, there are no [mid] vowels /e/ or /o/ except Tongan which has the word : me, 'to bleat (goat, sheep)' and Samoan has mo, 'fat pig with short legs'. They all have diphthongs with /a/ as first element / ae, ai, ao, au/, however, diphthongs /ei, eu, oi, ou and iu/ are found only in one or two languages. Hence, the diphthongs with mid vowels, the same as mid vowels themselves, are quite restricted in their usage after sonorant /m/.

Group 8, with the initial sonorant /n/, in Hawaiian has all long vowels except the [+front, -grave] vowel /i/ and has all short diphthongs (except /ai/ and /eu/). Other Polynesian languages, as in Hawaiian, do not have the vowel /i/ and Tahitian does not have base words : ne, no, nu. All of them, as in Hawaiian, do not have diphthongs /ai/ and /eu/ and also no diphthong /ou/. The diphthongs /ao, au, ei, oi / are found only in one or two Polynesian languages. Out of 9 (nine), only 3 (three) diphthongs /ao, au, iu/, were found in all Polynesian languages. Hence, while Tahitian is limited with the usage of long vowels (except /a/), other Polynesian languages have fewer diphthongs after sonorant /n/ - especially Tongan and Samoan.

Group 9 with the initial bilabial sonorant /w/ in Hawaiian, has the bilabial /w/ in Maori

and the labiodental /v/ in Tahitian, Tongan, and Samoan languages. In this group of words, there are only 3 (three) long vowels and 6 (six) diphthongs. In Hawaiian and in other Polynesian languages, after initial sonorants /w/ or /v/ only the [low] vowel /a/ and 3 (three) diphthongs with /a/ (ae, ai, ao) were found in all languages. The [+front, -grave] vowel /i/ was found in all languages except Tongan, while [+front,-grave] /e/ was found only in Hawaiian and Maori. In this group there are no [+back, +grave] vowels /o/ and /u/ in all languages and no diphthongs /ei, oi,ou, iu/, except Maori, which has the diphthong /iu/:(wiu, v. 'to whip, to punish').

Looking back at all these groups, it is clear that the most limitations were found in groups 1(one) and 9 (nine). This is reflected in the small number of base words in these groups. In Contemporary Hawaiian, the limitations in Group 1, without an initial consonant, are in relation to the [+front, -grave] vowels /e/ and /i/ and in Group 9, with the initial [+grave] sonorants /w/ v/, in relation to the [+back, +grave] vowels /o/ and /u/. Both the sonorants /w/v/ and [+back] vowels /o/ and /u/ are [+grave].

The above analysis of Groups 2 to 9 shows that the division of consonants into [-voice] obstruents and [+voice] sonorants was dictated by the differences in the distribution of long vowels and short diphthongs after obstruents and sonorants of monosyllabic base words.

The [-voice] feature of obstruents determines their usage with all long vowels and all short diphthongs (with only one exception). The [+voice] groups with initial sonorants obviously are much more limited in their usage with long vowels and short diphthongs than obstruents. Sonorants in Hawaiian, on the other hand, are less limited in their usage than sonorants in other Polynesian languages. Hawaiian has all long vowels after sonorants /l/ and /m/ but shows the same limitations as other Polynesian languages after /n/ and /w/. Other Polynesian languages show limitations on long vowels after all sonorants.

There are :

- no [front, mid] vowel /e/ after sonorants /l/r/ (with one exception);
- no [mid ] vowels /e/ and /o/ after sonorant /m/ ( with some exceptions);
- no [front, high] vowel /i/ after sonorant /n/ ( the same as in Hawaiian);
- no [back] vowels /o/ and /u/ after /w/v/ ( the same as in Hawaiian).

Another feature of importance for the distribution of consonants and vowels besides the feature [voice] is the feature [grave] which can relate to both consonants and vowels. The [-



grave] vowels /e/ and /i/ are much more limited in their usage than [+grave] vowels /o/ and /u/ (as was seen in our material). The [low] vowel /a/ seems to be used without limitations that are found in the distribution of both [-grave] and [+grave] vowels in this language and it seems to secure the usage of diphthongs with /a/ after sonorants :/ ae, ai, ao, au / after /m/, and /ao, au/ after /n/, and/ ae, ai, ao/ after /w/v/ .

The comparison of the Hawaiian language with other Polynesian languages shows that the loss of glottal stop and /h/ resulted in the appearance of long vowels and diphthongs in a new monosyllabic shape of these words. Maori here is closer to Hawaiian, but in both languages short diphthongs seems to be more widely used within the structure of monosyllabic base words than in other Polynesian languages.

To sum up:

In this analysis, the most important finding was a realization that Hawaiian and Polynesian consonants shown in Krupa's *The Polynesian Languages* 1982, on pages 24-27, contrary to the statement on page 21: "there is no opposition of voiced versus voiceless consonants" contain two distinct groups of consonants divided by the feature [+/- voice]. One group includes voiced sonorants ("sonants" in Krupa's) / v, l, m, n, n/, and the other includes voiceless consonants :/f, p, s, t, k, h, /, called here "obstruents" (Trubetzkoy, 1969:141, and Chomsky and Halle, 1968:223.)

In Hawaiian, voiced sonorants are : /l, m, n, w/ and voiceless obstruents are : /', k, h, p/ as stated above. This division first became obvious from the differences in the distribution of long vowels and short diphthongs after consonants of monosyllabic base words in Hawaiian. It is also supported by the analysis of disyllabic base words (see note 14 on the diphthong /iu/).

The other very important finding was the need to divide base words into words with initial consonants (99 words out of 108), and words without an initial consonant (8 base words). Although 8 words make up a small group, they play a very important role in this analysis, since they show that in Hawaiian, and in other Polynesian languages, there are base words with and without an initial consonant. In Hawaiian monosyllabics, the absence of an initial consonant determined the quality of long vowels and diphthongs of these 8 words (marked Group 1). Group 1 consists of long vowels /a/, /o/, /u/, and diphthongs /ai, ao, au, oi, ou/. The vowels /o/ and /u/ are [+grave], as for /a/, this vowel in the Introduction to Linguistics, Wardhaugh 1972:46

is considered to be [+grave]. There are no [-grave] vowels /e/, /i/ and diphthongs /ai, ei, eu, iu/ in this group in Hawaiian. Here the distinctive feature [grave], which can relate to both consonants and vowels, helps to better explain their relationship, and the feature [grave] will be even more visible in disyllabic base words. [Grave] is a very important feature in Hawaiian.

All these findings: the division of consonants into voiceless obstruents and voiced sonorants, the division of base words into words with and without an initial consonant, and the finding of the role of the distinctive feature [grave], made possible the analysis of 1595 disyllabic base words, presented in the Part II of this work.

Theoretical linguistics attempts to penetrate the nature of languages. Linguists want to know how languages are organized and, especially, what kind of arrangements of sounds can be found in different languages. Each language is unique. This work presents the search for and findings of such arrangements of sounds in the Hawaiian language.

### FOOTNOTES

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2. The vowel length is phonemic, lengthening the vowel can change the meaning of the word. Long vowels are always accented. The length is marked by the macron [ ̄ ].
3. A diphthong in Hawaiian is a combination of two vowels that fit into one syllable, with accent on the first vowel (short or long).
4. With regard to short and long diphthongs see: PHG (*Pocket Hawaiian Grammar in Dictionary Form*) p.50 and 211. In the *Hawaiian Dictionary* Pukui and Elbert (1986:xvii) the 8 (eight) diphthongs : ei, eu, oi, ou, ai, ae, ao, au are called Rising Diphthongs. They are always stressed on the first element. The diphthong /iu/ is called there the Even Diphthong. Long and short diphthongs are mentioned in the dictionary on page xviii.
5. It is of interest to note that both vowels of long diphthongs /ei/ and /ou/ do agree to the feature [ grave]: [-grave]:/ei/, and [+grave]: /ou/. Only short diphthongs were found in monosyllabic base words (see 7 below). In disyllabic base words there are both short and long vowels and short and long diphthongs. The long diphthongs are not as frequent as short ones in Hawaiian. However, we can add here that the long vowels are also much less frequent than the short ones: see the table of relative frequency of sounds in Pukui and Elbert, (1979:34), where long vowels are significantly less frequent than the short ones: for ex. short vowel /a/ - 22,2%, long vowel /a/ - 2,7%; short /i/ - 11,3 %, long /i/ - 0,7%.
6. For example, the average power for different English vowels is from 9.47 microwatts, while for consonants it ranges between 0.08 and 2.11 microwatts. (Chomsky and Halle, 1968:20).
7. Monosyllabic (content) base words, found in Pukui and Elbert's Dictionary (1986), have either long vowels or short diphthongs.
8. *The Maori-Polynesian Comparative Dictionary'* (in this text marked as MPCD) by

Edward Tregear was published in 1891 in Wellington, New Zealand, reprinted in 1969 in the Netherlands. In this dictionary the vowel length is marked inconsistently. Most often the vowel length is marked only for Maori or Tongan words. As for the other languages, the marking is not reliable at all. The dictionaries of Tahitian, Samoan, and Tongan languages, used in this analysis, show all corresponding base words in these languages with long vowels, as they are in Hawaiian. The vowel length in Maori is marked here by the macron as in other languages.

9. The [-grave] phonemes are dental and palatal consonants and front vowels. The [+grave] are labial and velar consonants and back vowels, articulated with a retraction of the tongue, vs. front vowels with advanced tongue. See: Jakobson, Fant, Halle, 1972:30. The feature [grave] can relate to both consonants and vowels and helps to understand and explain the relationship between consonants and vowels somewhat better.
10. About the division into obstruents and sonorants Ladefoged (1971:58) wrote: "We will use the term sonorant for a particular group of sounds, which we will define as those sounds with an auditory property which arises from their having a comparatively large amount of acoustic energy within a clearly defined formant structure. Sonorants as opposed to stops and fricatives which are non-sonorants or obstruents." In his book, table 66 (sixty-six) shows nasals, liquids and glides : m, n, l, r, w, y as sonorants. On page 109 Ladefoged also writes: "Our definition makes voicing a prerequisite for sonorants." Trubetzkoy, (1969:141) writes: "The occlusives and the fricatives may also be designated as obstruents in contrast to the sonorants." In April of 2015, during my discussion of this paper with Professor Keith Johnson at UC Berkeley he mentioned that Chomsky and Halle wrote about this division in their 1968 book: *The Sound Pattern of English*. On page 85 of this book I found: "The feature "sonorant" is redundant in English, though not in all languages." And on the page 223: "We have already discussed the analysis of consonants into true consonants, glides, and liquids, and have pointed out that there is a cross-classification into obstruents and sonorants, the latter category containing nasals, liquids, and glides."
11. The sonorant /m/ is [+grave], both vowels of the diphthong /ei/ are [-grave].
12. The diphthong /ei/ is absent in Group 1 (without an initial consonant), also in Group 2, after the glottal stop, and in Group 7, after the sonorant /m/.

13. In the *Introduction to Linguistics*, Wardhaugh; 1972:46 the vowel /a/ is considered to be [+grave].
14. See the note on /iu/ on a separate two page: 29-31.

## THE DIPHTHONG “IU” IN THE HAWAIIAN LANGUAGE

The *Hawaiian Grammar* by Elbert and Pukui, 1979 contains only 8 (eight) diphthongs: / ai, ae, ao, au, ei, eu, oi, ou/. /Iu/ was introduced as a diphthong in Albert J. Schutz's 1981 article: 'A Reanalysis of the Hawaiian Vowel System' where, on page 22, we find /iu/ together with 8 (eight) other diphthongs: /iu, ei, eu, ai, ae, ao, au, oi, ou/. On page 24 /iu/ is mentioned as “the ninth diphthong of a different nature but also common in other languages (e.g. Fijian): sequence of 2 (two) vowels of relatively low sonority /iu/”.

In the *Hawaiian Dictionary* by Pukui and Elbert, 1986, we find, on the page xvii: Rising Diphthongs : ei, eu, oi, ou, ai, ae, ao, au , and also: Even diphthong iu. Finally, on 2005, *Pocket Hawaiian Grammar in Dictionary Form* by Schutz, Kanada, Cook, on page xiii, gives “a complete list of short diphthongs: ai, ae, ao, au, ei, eu, oi, ou, iu. Except for iu, each diphthong is a combination of a lower vowel followed by a higher vowel”.

Within the previous analysis of monosyllabic base words, nothing special was noted about this diphthong. It was found after all voiceless obstruents: /ʻ, k, h, p/:

‘iu. nvs. Lofty, sacred (only in Hawaiian);  
 kiu. nvt. Spy, scout;  
 hiu. vt. To fling, to throw;  
 piu. n. (only in MPCD Dictionary) the distance of 3 yards;

and also after all voiced sonorants: /l, m, n, w/:

liu. nvt. Bilge water, to leak;  
 miu. vs. Attractive (only in Hawaiian);  
 niu. n. The coconut palm;

wiu. v. To whip, to punish (only in Maori).

Some words were found only in Hawaiian or Maori.

The diphthong /iu/ was not found in monosyllabic base words without an initial consonant. This could be expected, since in monosyllabic base words of Hawaiian, without an initial consonant, were found only base words with the long vowels :/a/, [+grave] vowels /o/ and /u/, and diphthongs with these vowels.

It shows that, while vowels are more important in Hawaiian than consonants, the absence of an initial consonant leads to the appearance in monosyllabic base words only of [+grave] vowels but not the others.

The analysis of 465 (four hundred and sixty-five) disyllabic base words with diphthongs within the first, second, or both syllables revealed that there is no diphthong /iu/ not only in 8 (eight) monosyllabic base words without an initial consonant but also within the first syllable of disyllabic base words without an initial consonant.

It was also found that there are no diphthong /iu/ within the first syllable of 126 (one hundred and twenty-six) disyllabic base words with initial sonorants.

Within the first syllable of disyllabic base words, the diphthong /iu/ was found only in 3 (three) words and only after obstruents. They are:

‘iui. n. Ceremonial feeding by High Chief of messenger carrying  
the image of Lono about the island during the Makahiki  
festivals;

hiua. n. A game like Checkers; vs. Menstrual;

piula. n. Mule, donkey. vs. Tired, exhausted.

(The words “piuka”. n. ‘Pewter’ and piuke, n. ‘Beauty’ are borrowings from English and are excluded from our analysis.)

Within the second syllable, the diphthong /iu/ was found in 15 (fifteen) out of 309 (three hundred and nine) disyllabic base words and only where the first syllable begins with an obstruent. The vowel in the first syllable could be long (marked by a dot) or short.

Here they are:

‘a.hiu. vs. Wild, untamed;  
 ‘o.niu. nvt. Aspinning to, to spin a tio;  
 ‘u.kiu. same as ‘ukiukiu. N. Name of a chilly wind;  
 ‘akiu. vt. To scratch, probe;  
 ka.hiu. See pule kahi. N. A prayer for victory;  
 kaniu. nvs. Lump under the skin;  
 ko.’iu. Same as ko.’iu’iu (Kel.);  
 ha.kiu. vt. To spy, examine;  
 ha.liu. vt. To turn, look;  
 ha.niu. n. Heavy end of a coconut frond;  
 hihiu. Vs. Wild, untamed;  
 hiliu. N. Sound or call of a wind instrument or conch shell;  
 hohiu. N. A native fern;  
 po.niu. nvs. Dizzy, giddy;  
 pu.niu. n. Polished coconut shell or bowl, small drum.

( Words are written here as they are written in the Hawaiian Dictionary.)

Hence, the distribution of the diphthong /iu/ in Hawaiian shows the importance of the division of consonants into voiced sonorants and voiceless obstruents. That is, the importance of the feature [+/- voice] for consonants and, also, the importance of the presence of an initial consonant within the word. The diphthong /iu/ was found in monosyllabic base words after all initial consonants, voiced and voiceless.

In disyllabic base words, however, the diphthong /iu/ was found within the first syllable only in 3 (three) words and only after obstruents: ‘iui, hiua, piula. It was found within the second syllable after both sonorants and obstruents as in monosyllabic base words, but only in words in which the first syllable begins with an obstruent (see 15 words above). Hence, within the second syllable, we find /iu/ after most consonants as in monosyllabic words. The limitations are only upon the first syllable.

All the above, shown in the analysis of monosyllabic base words and, here, within the

very small part of disyllabic base words material, reveals that the Hawaiian language has quite complex and refined sound system.

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