SEIJO ENGLISH MONOGRAPHS

———— NO. 31 ————

PHONOLOGICAL CONTRASTS BETWEEN

ENGLISH AND JAPANESE

BY
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Contents

0. Introduction

The population of Japan is officially reported as many as 125 million and Japanese is one of the major languages in the world in view of the number of its users. However, it is not recognized as an official language for the U. N. assemblies, attracting by far the less learners of it than English and a couple of other European languages.

Rumor has it that Japanese is a very difficult language to learn because it has uncontrollable Chinese characters in its writing and, furthermore, because it has three different writing systems: Kanji, Hiragana and Katakana. The fact is that those native speakers of English who are visiting or staying in Japan speak Japanese rather well enough to communicate with the Japanese people in daily lives after a short period of learning to speak it. Why is that? The reason is that the Japanese sound systems in terms of vowels and consonants are easy for English speakers, although there are some phonetic features of Japanese that are necessary for English speakers to acquire.

This paper is intended to give the learner of Japanese and linguistics a brief view of the Japanese sound system, phonetically and phonologically. The analysis is based on the contrastive way between English and Japanese.

1. Typological differences

A language has its own system, phonologically, syntactically and semantically. Each language is typologically unique. Languages are classified into some types from the typological point of view, but the classification is usually not clear-cut.

Eskimo is often quoted as having a long word unit, such as 'angyaghllangyugtug[1)]' (meaning 'he wants to acquire a big boat,' a typical example of the agglutinative language. Japanese has some features of an agglutinative language as is shown in the following examples.

1. watashi [wataʃi][2)] (meaning *I*)
2. watashiwa [-wa] ~ desu [desu] (*I am*)
3. watashiwa kyoindesu [-kjo:indesu]
(*I am a teacher.*)

In the above example, the word to be given by 'am' in English is 'wa ~ desu', consisting of two detatched elements and added to the core elements, 'watashi' and 'kyoin'. Here the agglutinating way of morphemic forms will be queer if looked into from the English point of view, because 'am' is expressed by two forms combined in Japanese, where two semantic components of 'am' are represented by two morphemic forms. One of the semantic components in 'am' is 'a word preceding it is the subject', and the other is 'the subject is in the state, position or... expressed by the following word.' The former component is expressed by the morpheme 'wa' and the latter by 'desu' in Japanese.

Many instances of agglutination are found in Japanese, but compared with a typical agglutinative language like Eskimo, where 'Qajar-taa-va asirur-sima-vuq' (kayak-new-his break-done-it; His new kayak has been destroyed.) consists of two words, Japanese can be said to be less agglutinative, showing another typological feature. The following examples indicate that there is an inflectional feature in Japanese.

- **a.** Mari*wa* tegami*o* kai*ta*. (Mari wrote a letter.)
- **b.** Mari*ga* tegami*o* kai*ta*. (Mari wrote a letter; It's Mari who wrote a letter.)
- **c.** Mari*e* tegami*o* kai*ta*. ([I] wrote a letter to Mari.)
- **d.** Mari*no* tegami*ga* ki*ta*. (Mari's letter came [to me].)
- **e.** Mari*kara* tegami*ga* ki*ta*. (A letter came from Mari.)

In the above examples there are inflection-like word finals in each utterance; they are of two different kinds. The element 'ta' denotes the grammatical meaning of 'past' form of a verb, which is just like the use of '-ed' in English. In utterance **a**, there are two other word endings, that is *wa* and *o*, which are particles to be attached to nouns to indicate their grammatical functions as to whether they are a subject, an object, an adjectival noun, or else.

In English grammar, inflection is regarded as the way to show a different meaning of the grammatical function, such as tense, person, number and case, by the change of the form of a word. Examples are: walk*ed*, walk*s* (a verb form indicating its subject is a third person singular), walker*s*, and walker'*s* (a prossessive form). If we take 'gender' in the grammatical function to be expressed by an

inflected form, as by '-ess' (in steward*ess*, where -*ess* indicates the word having this ending is female), other derivative elements such as 'un-' (in '*un*believable'), '-ment' (in 'settle*ment*') must be dealt with as one of the types of inflection. Here the definition of inflection doesn't seem clear.

Latin is introduced as a good example of an inflectional language, where '*o*' in *amo* expresses the grammatical functions of 'first' person singular, present active and indicative. English also has the same characteristic, even though a segment or element normally carries on fewer grammatical functions at a time.

Many languages are hard to define as to type if based on the traditional typological analysis, which roughly classifies languages into three types: isolated, inflectional and agglutinative. English, in which the isolating feature is conspicuous, is actually a composite of the three types: word order is the representation of an isolating feature, the formation of a plural by the use of '-s', as in 'girls', is the representation of inflection, and compounding, as in 'ready-to-wear', and derivation, as in '*re*-align-*ment*', show that English has a characteristic of an agglutinating language.

Looking into the Japanese language, the agglutinative feature is remarkable, but the inflectional and isolating features are also noticeable. Japanese is a composite of the three types regarding the typological classification just like English, but it has more of an agglutinating nature than English due to the use of particles that are attached to nouns.

Discussion about which type a language in question is classified into will be of little meaning because a language is likely to have all of the three different typological features. However, it will be

helpful to say which feature is dominant or remarkable in one language and which in another language. English is more isolating than Japanese, and Japanese is more agglutinative than English. Both of them have similar structural features syntactically.

Are they different typologically on phonology? The answer depends on how minutely an analysis is made.

2. Phonological differences

The phonological structures of English and Japanese are the same in that they consist of vowels and consonants on segmental sounds. The International Phonetic Alphabet (IPA) has about 70 phonetic alphabets to describe the sounds to be used possibly in all languages of the world, and the number of consonants is similar between English and Japanese; 23 for English and 20 for Japanese, and 16 sounds are common between them, although affricates are excluded because the IPA chart does not contain them. The fact shows that the two languages are very similar in the use of consonants; the exceptions are [f], [v], [θ], [ð] and [l] of English, and [ɴ], [ɸ], [ç] of Japanese. A detailed explanation will appear in a later section. As to vowels, Japanese uses only five: [a], [i], [u], [e], [o], but English uses 12 to 14, the number differing depending on what dialect it is.

The comparison between English and Japanese vowels shows that Japanese has less than half as many vowel phonemes as English, which means that a Japanese vowel can accept as allophones more than one English vowels used as different phonemes in the language. For example, the Japanese vowel phoneme /i/ has two allophones of [i] and [ɪ] which are different phonemes in English. The Japanese phoneme /a/ has five allophones, [a], [ɑ], [æ], [ʌ] and [ə], which can be different phonemes in English. The actual sound of the Japanese phoneme /a/ is between [a] and [ɑ] of the normal (Mid-Western) American English from an articulatory phonetic point of view.

For three other Japanese vowels /e/, /o/, /u/, English has two

allophones respectively: [e] and [ɛ] for /e/, [o] and [ɔ] for /o/, [u] and [ʊ] for /u/.

As to the vowel system English is more complicated than Japanese, because besides single vowels it has 4 to 8 diphthongs, and two triphthongs on some occasion.

Japanese usually doesn't have diphthongs. 'Usually' means 'if it's not in casual speech'. When words are carefully read, no diphthongs are used in them, but if a speech is casual or normal in daily conversation, diphthongs often appear. Thus, *ai* [a-i][3] (love) is actually pronounced as the diphthong [ai] in casual speech. Whether formal or casual is a crucial point to differentiate the uses of sounds.

There are two types of diphthongs in English: falling and rising, but normally falling ones are used in speech and rising ones are reported to appear in the case when stresses influence the surrounding phonetic environment of the second vowel of a dihpthong.[4] In the Japanese language diphthongs are not usual because its syllable is a composite of a consonant and a vowel (C+V) or only a vowel, and if two vowels are adjacent they belong to two different syllables; thus, in *suraisu* [sura-isu] (*Eng.* slice) 'ai' is not pronounced as a diphthong, but 'a' and 'i' should be pronounced separately as two different sounds. (Syllables of Japanese are described and explained in a later section.)

The examples of words, which have diphthongs if used in English and have two syllabic vowels if used in Japanese, are given below.

Those words are used both in English and Japanese, but they keep up to the Japanese phonetic rule, resulting in two adjoining pure vowels instead of one diphthong.

1. E. [eit] (eight)　　J. [e-i-to] (eight)
2. E. [bait] (bite)　　J. [ba-i-to] (side job)
3. E. [kau] (cow)　　J. [ka-u] (buy)
4. E. [tɔi] (toy)　　J. [to-i][5] (eaves)
5. E. [tou] (toe)　　J. [to-u] (*v.* question)

English diphthongs must be cut into two independent elements which constitute two syllables. Centering diphthongs, such as *iə*, can be analyzed in the same way if 'ə' is dealt with as on equivalent to the Japanese [a], that is an allophone of /a/ in Japanese.

Although there is a tendency especially among the young generation to simplify triphthongal syllables, some triphthongs are noticed in English, as in 'fire' [*faiə*], 'tower' [tauə] and 'hour' [auə]. Japanese doesn't have triphthongs in either careful ar casual speech, but triphthongs are uttered with three syllables. If 'fire' [faiə] is pronounced in the Japanese way, it will be [ɸa-i-ja].

3. Materials — Standard language

A variety of Japanese from which examples are picked out to analyze in this paper is Standard Japanese or Tokyo dialect, which is spoken in the Metropolitan Tokyo area. With its long history, Japan has many regional varieties of language; the Okinawa dialect (the Ryūkyū language) and the Ainu [ainu] language are especially very different from the mainland (Honshū) dialects, the former being of the independent monarchy in the Southernmost islands and the latter being of the now almost extinct tribe in the northernmost district of Japan.

Some linguists classify Japanese dialects roughly into nine groups depending on regional differences from the north to the south. Although there are a good many dialectal speeches spoken in the country, people do not seem to have much difficulty in understanding Standard Japanese, because schools on primary and secondary levels are recommended to teach the standard language and the mass media are influential sources of the standard language prevailing in the society.

When you think about what a standard language is from the English point of view, you may not be able to tell that there is a unanimously agreed nationwide standard variety in the framework of the English language. Supposing you are a native American English speaker, you would think that the so-called Mid-West type of speech is the most common because it has a very large number of users, but it cannot be the standard English for all Americans.

'Standard' is sometimes vague about what is exactly meant by it, and there are at least two types of 'standard language': one is

instituted by a state's law or a govermental ordinance, and the other is loosely regarded as standard by people who think of the bundles of linguistic forms as favorable ones for them to keep up to in the daily use.

If you are British you might feel that there is Standard English in the framework of British English; often Standard English seems to point to a southern variety of the U. K. which is heard through the BBC news and commentators. Linguistic publications mention that only three percent of speakers in Britain can speak Standard English. What is the standard to be the standard language in a country? It should be the one people are somewhat forced to look up to as a good model as a way of speaking. If there are many varieties of dialects in a country, a standard language had better be set up to be a kind of lingua franca.

Nowadays, English is widely used in the world as a lingua franca in the fields of trade and politics, and it is deformed especially phonetically, some varieties of English uprising as useful means of communication among peoples.

Japanese is in a different situation. Japanese society has a history of esteeming the orders of the national government, whose educational system has been effectively organized especially on the primary level and was successful in expelling illiteracy among people in the period of less than one hundred years. The Ministry of Education has wielded strong power as a center for instituting various minute systems; thus, it helped the Tokyo dialect to penetrate into every corner of the country by education through government-operated primary schools. Although there is no official label of the Tokyo dialect being Standard Japanese, people won't resist saying

that there is Standard Japanese which is accepted by the Japanese with the common conception of what it is.

I, as one of the speakers of the Tokyo dialect, can produce the examples of standard Japanese sounds, which will be analyzed together with the collected experimental and written data of Japanese speech.

4. The vowel system

4.01 The contrastive chart of vowels

English   Japanese

/i/ ⎫
/ɪ/ ⎭ → /i/

/e/ ⎫
/ɛ/ ⎭ → /e/

/ɑ/ ⎫
/a/ ⎪
/ə/ ⎬ → /a/
(/ʌ/) ⎪
(/æ/) ⎭

/o/ ⎫
/ɔ/ ⎭ → /o/

/u/ ⎫
/ʊ/ ⎭ → /u/

4.02 Positions of English vowels spoken by the native speaker and the Japanese.

Shown in the following (Figures 1, 2 & 3) are the charts of vowel positions analyzed by the device of Kay, Multispeech. Research has been made by the JACET (Japan Association of College English Teachers) Audio Language Research Section, the chief of which is Y. Igarashi.[6]
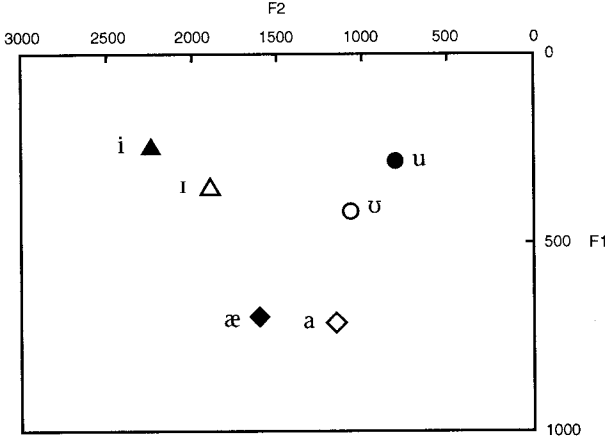
Figure 1 (By an American ; after Ladefoged)

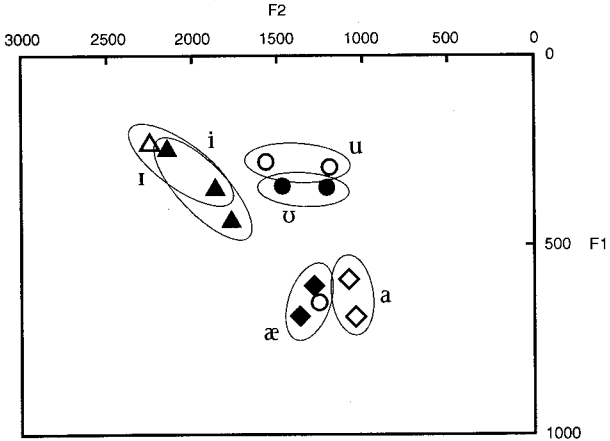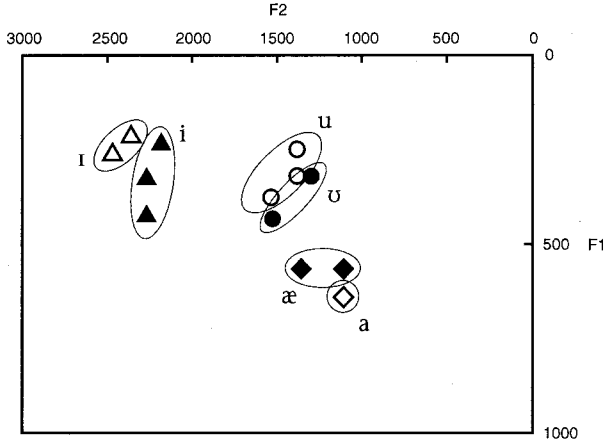**Figure 2** (By a Japanese, 1)[6]

Figure 3 (By a Japanese, 2)

The figures suggest that the Japanese don't clearly recognize phonemic differences of vowels in such a way as native speakers of English do ; for them there are no phonemic differences between [i] and [ɪ], [u] and [ʊ], and [a] and [æ].

The charts show that vowels range in a smaller area among Japanese speakers.

4.1 Vowel differences — phonemically

Phonemically, Japanese vowels number five: /a/, /i/, /u/, /e/, /o/. The symbols used to designate these five phonemes are the ones which are phonetically closer to actual sounds than other symbols;

for example, the symbol 'a' is adopted because the Japanese open or low vowel is closer to [a] than[ɑ] in the openness of the mouth.

Besides [a], the phoneme /a/ has as allophones other vowel sounds, [ɑ], [ə], [ɜ], [ʌ] which are different from each other in their actual pronunciation but are closer to [a], a typical Japanese open vowel, than to other four vowel phonemes.

In normal speech, [a] is heard most commonly,while [a] and [ɜ] are heard without being realized as they are, because the phonemic idealization of the Japanese speaker for the open vowel is only /a/. The occasion when people use [ə] instead of [a] is very rare, and if someone uses this sound instead of [a] he or she may well be asked about what he or she has pronounced, although context can help a hearer to guess what word may have been uttered regardless of the sound in question.

The sound [æ] is heard in casual Japanese speech, but its formal articulation is always accompanied by [j], forming the syllabic [jæ]; thus, [kæ²to] (cat) is, in accurate standard pronunciation, [kjæ² to]. This phenomenon is related to a unit of the Japanese syllabic system.

Thirteen vowels are counted as English phonemes in this study, including three vowels which are used in forming diphthongal sounds such as /ei/, /oʊ/ and /aɪ/.[7] The fact that English vowel phonemes are more than the Japanese ones in number means that native English speakers can succeed more easily in communicating with Japanese speakers when they have a chance of speaking Japanese, because their uttered vowels have broader phonetic areas in perception; as is shown in the contrastive list of English and Japanese vowels, both [i] and [ɪ] are acceptable in the pronunciation

of [i] for Japanese words. For example, for the first syllable of *kimono* (Japanese dress) [kimono], you may give either /i/ or /ɪ/ of English sounds, though [i], an allophone of the phoneme /i/ will give the hearer the impression of clear articulation for Japanese words.

The similar phenomenon is noticed in the relation between English /e/ and /ɛ/ and Japanese /e/. In pronouncing the Japanese word *beddo* (*Eng.* bed), pronounced as [beʔdo], both [e] and [ɛ] sounds are acceptable for the Japanese /e/. Native English speakers have a broader phonetic area for the Japanese /e/, which seems to make it easier for them to pronounce Japanese vowels.

4.2 Tense and Lax

In Japanese the contrast between 'tense' and 'lax' on vowels is not phonemic. Two sounds, which are different and phonemic in English speech, are recognized as one and the same vowel.

The difference between 'tense' and 'lax' is clear when vowels are high, or close, and in addition if in front. This difference is not necessary to be aware of in Japanese speech because those two features are not contrastive. The following pairs do not show any phonemic contrast in Japanese concerning the vowels used.

a. beat [bit] vs. bit [bɪt]
b. deed [did] vs. did [dɪd]
c. eat [it] vs. it [ɪt]
d. feet [fit] vs. [fɪt]
e. heat [hit] vs. hit [hɪt]

Native Japanese who are not trained well to differentiate the above-quoted two sounds will surely use the same sound for both: normally the tense vowel, [i]. Instead of the contrast of 'tense' versus 'lax', Japanese uses length to differentiate the two high, front vowels; thus, in speaking English, *beat* is [bi:t] and *bit* is [bit]. In speaking Japanese, the same phenomenon occurs. The examples are:

a.   *i:e* (*Eng.* no) vs. *ie* (house)[8]
b.   *bi:ru* (bear) vs. *biru* ([tall] building)
c.   *i:* (good) vs. *i* (stomach)
d.   *chi:ku* [tʃi:ku] (teak [tree]) vs. *chiku* [tʃiku] (district)
e.   *shi:ru* [ʃi:ru] (seal) vs. *shiru* [ʃiru] (juice)

For each word of pairs the vowel used is [i], and the length which is symbolized by ':' is the only crucial difference. For both English and Japanese words, no contrast between 'tense' and 'lax' is used, but the one between 'long' or 'short' is used by the Japanese speaker.

As is previously stated, Japanese usually does not have diphthongs, nor triphthongs, in careful speech, but it often has ones in casual, or normal, speech. It is often the case that two adjoining vowels are dealt with as two single, pure vowels and no diphthongal vowels occur.

4.3 Vowel length

A similar view is possible about length: a long vowel. In the above examples, 'i:' in **a**. [*i:e*] can be analyzed as consisting of two

vowels, 'i'+'i', resulting in [*iie*] (*Eng.* no). Japanese dictionaries adopt this represention in their spelling system. What can be said is that two representations, 'ii' and 'i:', are the realization of one vowel segment.

To any Japanese the above analysis is adaptable. Some of the examples are given below.

In careful speech	In casual speech
a. *ii*ai (quarrel)	*i*:ai
b. *ii*kagenna (random)	*i*:kagenna
c. *ii*kina (easygoing)	*i*:kina
d. *ii*kiru (declare)	*i*:kiru
e. *ii*ko (good boy)	*i*:ko

An examination of long vowels revealed that English loan words often appear in the minimal pairs of a single, pure vowel versus a long vowel; *bi:ru*, *chi:ku*, and *shi:ru* are some of the instances.

The tense and lax contrast is not so important for mid, front vowels such as /e/ and /ɛ/ in both English and Japanese. It is needless to say that the contrast is unimportant in Japanese, because those two elements which are phonemic respectively in English are not so in Japanese; they are just two allophones of the /e/ phoneme. In English, one phoneme in the mid, front vowel frame is used for a monophthong, that is /ɛ/, and the other is used for a diphthong, that is /e/ or /eɪ/. The two sounds, /ɛ/ and /e/, are not used contrastively in the framework of monophthongs, which gives the hearer a clue other than the tense or lax feature to differentiate two mid, front vowels. There are some dictionaries where only one

mid, front vowel is symbolized; *bed* is transcribed as [bed] and bade is [beɪd] in addition to [bæd].[9)]

Although there is a rigid linguistic attitude toward admitting of the tense and lax contrast in the frame of mid, front vowels, it does not seem to be a very helpful contrast in English.

4.4 Back vowels

The tense and lax contrast is found on back vowels when they are in the frames of 'high' and 'mid', although the perception of it is not so remarkable as in the frame of 'front'. When compared with high vowels, mid ones show the contrast less clearly, resulting in the use of only /ɔ/ for both a monophthong and a diphthong. For a diphthong, [o] may be used as the first element of [oʊ], but the British pronunciation often adopts [əʊ] instead of [oʊ]. The difference between two mid, back vowels, [ɔ] and [o], is not so great as to be carefully attended to. In English, at least British, /ɔ/ is the only phoneme useful in differentiating a monophthongal vowel. In Japanese too, just one vowel phoneme is recognized as useful in the frame of mid, back vowel and it is /o/, while it is /ɔ/ in British English. In American English, [o] appears in the word like *boat*, which is given the transcribing symbol of [o] or [oʊ]. The former symbol represents the view that the vowel in *boat* is a monophthong, but the close examination reveals that it is [o] tinted with [ʊ] and equivalent to [oʊ] to be exact. In American English, there is the tense and lax contrast for the mid, back frame: the contrast between /o/ and /ɔ/. Their actual shapes are [oʊ] and [ɔ:], which are of the contrast of diphthongs rather than that of monophthongs.

The Japanese tend to utter [ɔⁿ] when they want to produce [ɔː], which does not usually appear in normal Japanese speech. The instance when they try to pronounce the [ɔː] sound is in the EFL class, when the learner is asked to read 'bought'. As there is no phonemic contrast between [o] and [ɔ] in the Japanese sound system, with [o] as a main allophone of the phoneme /o/, the learner first tries to open the mouth wider than for the usual Japanese sound [o], and then the prolongation of the sound tends to put back the opening of the mouth to the normal position of [o], resulting in [ɔⁿ].

The empirical data given by the above incident of Japanese speakers show that they have difficulty in differentiating the sounds /o/, /ɔ/, /oʊ/ and /ɔː/ as different phonemes. Native speakers of English, whether British or American, do not need to be concerned about which sound of mid, back vowels they should choose when they want to produce the Japanese /o/.

As to the back vowels, there is a big difference between English and Japanese. It is lip-rounding. All British back vowels are of lip-rounding, and so are American ones except [ɑ]. Japanese back vowels are not of lip-rounding, which is the remarkable feature. However, the feature of lip-rounding does not affect the possibility of recognizing back vowels; that is, even though the speaker utters any vowel in the same frame, he or she will be understood as producing a Japanese sound. Examples are:

1. ushi [ɯʃi] (cow, or bull)
2. huton [hɯton] (futon, Japanese mattress)
3. kau [ka-ɯ] (buy)
4. oku [oku] (deep inside)

5. boku[bo̱ku] (*informal* I)
6. soto [so̱to] (outside, outdoor)

As there is only one phoneme respectively in the frames of 'high, back' and 'mid, back', in Japanese, no allophonic differences lead to the difference of meaning for words. For the accurate pronunciation of Japanese words such as Example 1, [u] must be [ɯ], but even if with lip-rounding the sound will be taken as passable in building up a meaningful unit in perception. In Japan the Roman alphabet spelling system is adopted to transcribe Japanese words when it is necessary to represent them in a way other than the Japanese orthography. The Roman alphabet here is exactly the same one as is used in English; no symbols of phonetic transcription are used but actually the Roman letters play a role of phonetic transcription. You will find that in the examples of Japanese words given in this section, the authograph and the transcription of a word are almost the same: *huton* vs. [huton], and *soto* vs. [soto].

The close examination of sounds shows that Japanese back vowels are not rounded, although /o/ may have a slight lip-rounding; they are better be represented by the symbols of 'ɯ' for 'u' and 'ɣ' for 'o' to make learners familiar with accurate Japanese sounds. For the Japanese /u/ phoneme, both [ɣ] and [o] can be allophones; 'o' may be accompanied by little lip-rounding and the actual sound will be between [ɣ] and [u] when it is uttered emphatically.

4.5 Low vowels

The case of low vowels, such as /æ/, /a/ and /ɑ/, is different

from that of high and mid vowels. The positions of those three low vowels range widely from 'front' to 'back' in the vowel chart, and the only one Japanese phoneme /a/ covers all this area, which means that native speakers of English can adapt to Japanese /a/ any of English /a/, /ɑ/ and /æ/. The British /ɒ/ is a low vowel, but it is excluded from the /a/ family because of its phonetic similarity in perception to /ɔ/, which is caused by its lip-rounding. /ɑ/ and /ɒ/ are both in the frame of low, back vowel, and its major contrastive feature is lip-rounding.

The English sound /ə/ is generally placed in the frame of 'mid, central' in the vowel chart and it seems to move around that position concerning the point of articulation depending on the surrounding phonetic context; the sound is unique to English, giving the Japanese learner an obscure auditory impression. If asked to classify into Japanese vowels, the hearer will put it in the category of /a/ due to the phonetic similarity.

It is known that the actual representations of English /ə/ vary widely depending on their phonetic contexts,[10] ranging from 'half-close' to 'open' positions in the vowel chart. A similar characteristic is seen concerning /ʌ/ according to different scholars.[11] Native speakers of English give at least two different allophones of /ʌ/: on is 'low' and its actual sound shape is nearing to /ɔ/, and the other is 'low-mid' and close to mid [ə]. Japanese lacks in these two sounds as phonemes, but if you utter either of these for the Japanese /a/, your word won't be misheard provided that its surrounding sounds are correctly pronounced.

Two English vowels, /ə/ and /ʌ/, can be said to correspond to Japanese /a/ if they are positioned in the central frames.

5. The consonant system

The comparison of consonants between English and Japanese is an easier work than on vowels, because almost all consonants have the counterparts of the same phonetic value in both languages.

5.1 Stops

[Voiceless] English   Japanese

/p/ (allophones [pʰ], [p], [p⁻])............./p/
/t/ ([tʰ], [t], [t⁻])..................................../t/
/k/ ([kʰ], [k], [k⁻])..................................../k/

[Voiced] English   Japanese

/b/ ([bʰ], [b]).../b/
/d/ ([dʰ], [d]).../d/
/g/ ([gʰ], [g]).../g/

While English stop sounds have a feature of aspiration which accompanies them in the stressed syllable, as in *pick* [pʰik⁻] and *deep* [dʰi:p⁻], Japanese counterparts do not have any such feature. It is because English is a language where stress is a phoneme (strong and weak; *or* primary, secondary and weak) and a strongly stressed syllable is uttered with the strong release of breath. On the other hand, Japanese does not use stresses as a phoneme to differentiate the meaning of words; usually a strong stress is used for

the emotional and emphatic effects. Among the allophones of English /p/, [p] is the most appropriate equivalent of Japanese /p/. Native speakers of English are recommended to speak the Japanese /p/ sound with as little and even stress as possible if they want to sound like native Japanese; however, a speech with a stress accent does not hinder its communicability.

Among the allophones of 'stop' phonemes, the one which has the phonetic feature of non-aspiration and non-release is most peculiar to the Japanese ears. In English it typically appears in a final position of a voiceless stop sound. In Japanese a vowel comes to the word-final position, forming a C+V syllable and giving no chance of stops being without release. The stop sound, as its another designation "plosive" suggests, consists of two sound features of the stop of air stream and its release. Aspiration occurs when the air is released rather strongly, and unaspiration occurs when the air is not released almost entirely or when released very softly, because a voiceless sound in the word-final position is followed by silence, that is, the word-final voiceless stops are half silent. So, they are likely to be unaspirated. Native speakers of English are encouraged to avoid strong aspiration if they want their sounds to be close to actual Japanese sounds; a recommended way is to try to always put a vowel at the word-final, except /N/ which is syllabic and can be used without a vowel ending. More detail is explained in the later section on Japanese syllables.

5.2 Fricatives

The major difference on the phonological structure between

English and Japanese, that English uses stress and Japanese uses pitch as a suprasegmental phoneme, influences the nature of fricative sounds of both languages. Among fricative sounds, the Japanese counterparts of sibilants such as /s/, /z/, /ʃ/ and /ʒ/ are not so keenly pronounced compared with English ones, partly because Japanese, being syllable-timed, does not have stress differences on syllables, and partly because a fricative itself is pronounced not so strongly as a stop, the stopped air stream being continuously released.

The fricatives that are common in English, such as /f/, /v/, /θ/ and /ð/, are not phonemic in Japanese. If English words which contain any of those sounds are borrowed into Japan, they are assimilated into the Japanese sound system as loan words, the fricative sounds being changed to those similar to them phonetically.

[Examples]

   (1) fight [fáit]   →   [ɸaito]
   (2) cover [kʌ́vər]   →   [kaba:]
   (3) three [θríː]   →   [s̱(ɯ)riː]
   (4) mother [mʌ́ðər] →   [maẕa:]

1. [f] is replaced by [ɸ], a bilabial fricative. However, [f] can be treated as an allophone if it is pronounced without a strong stress, which means that the difference between [f] and [ɸ] is less damaging to the whole sound shape of the word if there is the vowel [o] in the word-final. My view is that [faito] is better than [ɸaitˉ].

2. [v] is replaced by [b], because the labio-dental fricative is not

used as a phonemic sound in Japanese. Bi-labial [b] is the sound nearest in articulation to [v]. One speculation, which does not have any supportive evidence but is interesting, is that the showing of the teeth has been regarded as rude in the Japanese culture, which might have had some influence on not using labio-dental sounds in Japanese.

3. [θ] is replaced by [s]. Dental fricatives seem to be difficult to articulate for more people in the world than is expected by those who have those sounds as phonemes. The replacement of [θ] by [t] is seen among American children and in a speech of so-called Jamaican accent, as [tri:] instead of [θri:]. Japanese is also a language which evades the difficulty of producing this sound.

4. [ð] is replaced by [z]. Like [θ], no dental sounds are commonly used in Japanese if the articulatory point is the edge of the teeth, whether stops or fricatives. Generally, in producing Japanese consonants the tip of a tongue does not go further ahead of the teeth; stops [t] and [d], and fricatives [s] and [z] are alveolar, but they can be dental allophones if the back of the teeth is the articulatory point, that is the closest or touching point of the tip of the tongue.

As one of the fricative phonemes Japanese has /h/ as in English. However, there are two actual allophonic representations of /h/, which are presented in the following examples.

   (1) ha [ha] (*Eng.* tooth, teeth)
   (2) hi [çi] (fire)
   (3) hu [ɸu] (pawn; music score)
   (4) he [he] (wind; fart)

(5) ho [ho] (sail; step; wheat-ear)

The above examples have the same pitch pattern: 'level'.

In the minimal pair context of '#__V', /h/ shows that it is phonemic in Japanese. However, if the context is '#__ {i̯u}', two phonological rules are adapted to /h/, and [ç] or [ɸ] is deducted form /h/ as an allophone of complementary distribution. They are,

(a) /h/   →   palatal/____i
(b) /h/   →   bilabial/____u

These two rules are the phonetic realization of assimilation, that is, in (a) [h] is attracted by a front vowel, the articulatory point moving forward to the palatal position, and in (b) the lip-rounding of [u], even if it's slight, attracts [h] to the bilabial fricative.

In the syllable of 'hu', [f] and [h] can be allophones of /h/ besides [ɸ], although the application of a phonological rule makes its major realization the [ɸ] sound in the context of '__i'. Both [ɸ] and [f] are labials, having similarity on phonetic effect, the Japanese hearer may not find so big a difference as to eliminate [f] as a different phoneme.

In the Japanese sound system, a syllable is basically a morpheme, and the syllabary is the whole set of nine subsets of morphemic syllables and two syllables of 'wa' and 'N'. In this syllabary, only the subset of 'h-' (ha, hi, hu, he, ho) is unique in having two different allophonic sounds which are commonly used in that set. More details are given in the section on syllabary.

The palato-alveolar fricative [ʒ] sounds very much like [dʒ], an

affricate, in Japanese, because the characteristic that no clear difference of stress is necessary on syllables makes an affricate sound like a fricative from a point of perception. However, touching of the tongue to the palate is recommended if the speaker wants to produce a sound of [tʃ] familiar to the Japanese.

[Counterparts in fricatives]

English		Japanese
f	(replaced by)	h
v	(replaced by)	b
θ	(replaced by)	s
ð	(replaced by)	z
s		s
z		z
ʃ		ʃ
ʒ	(replaced by)	dʒ
h		h

5.3 Affricates

Affricates /tʃ/ and /dʒ/ are the same in articulation in both English and Japanese, but the particular feature of Japanese that it is a syllable-timed language makes the sounds soft compared with English, sometimes their actual sounds becoming near to [ts] and [z], especially among the youth.

5.4 Nasals

English nasals /m/, /n/ and /ŋ/ all appear in the Japanese pronunciation. In the word-initial position, /m/ and /n/ are common, but in careful, deliberate speech /m/ is not used in the word-final position, the reason of which is that a Japanese syllable usually ends with a vowel, and a word is a composite of syllables of this kind.

(1) mama [mama] (*English* mama)
(2) nasu [na:su] (nurse)
(3) sam [sam] (Sam)
(4) kan [kaɴ] (*n*.can)

Examples (1) and (2) are good, but Example (3) has a problem, because [m] is used at the end of the word; to be passable in good pronunciation of Japanese it should be [samu], with the ending vowel added to [m].

When /n/ comes to the word-final, it should undergo the phonological rule of "n → N / ____#". The Japanese uvular nasal [ɴ] is the sound in which the airstream is emitted from both the nasal and oral cavities, and there is no stoppage in the oral cavity, while in English the air comes out through the nose only with the uvula preventing the air from flowing out of the mouth. So, [ɴ] is likely to be a vowel-like sound, which enables it to be syllabic and be positioned at the end of a word as a final syllable. [ɴ] is peculiar in that it can be a word-final and syllabic sound. [ɴ] will remind you of dark [l] in English, which is actually close to the [u] sound; some

consonants become vocalic and syllabic.

English /l/ and Japanese /n/ have the similar characteristics; /l/ has the allophone of [ɫ] in the word-final position and the combination of 'C+C' as in [midɫ] (middle) and [miɫk] (milk), while Japanese /n/ has the allophone of [ɴ] in that position, as in [kaɴ] (Eng. *can*) and [paɴda] (*panda*); /n/ in the word-initial position is [n], an alveolar nasal. An examination of nasals shows that there is a close relationship between English [ŋ] and Japanese [ɴ], the former being a velar and the latter a uvular. Their articulatory points are near to each other and their distribution is the same.

One interesting thing about [ŋ] is that it can be an allophone of /g/ in Japanese from the perceptual point of view. As a particle to indicate a noun's grammatical role, as in 'watashi ga iku' [wataʃi {ga/ya}iku] (Eng. I, *not others*, go), [ŋ] has been used instead of [g] by seniors. Some educated people recommed to use [ŋ] instead of [g], saying that [ŋ] in such a phonetic context is good and proper considering orthodox Japanese.

5.5 Liquids

/l/ and /r/ are sometimes dealt with as 'liquids', although 'lateral' for /l/ and 'semi-vowel' for /r/ are common designations for them in Japanese schools. It is known widely that these two sounds are typically difficult for Japanese learners to differentiate in pronunciation, especially in perception.

The position of the tongue touching the teethridge in English /l/ is similar to that of Japanese /r/, which is either dental, actually the back of the teeth touched, or alveolar. A flapped 'r', Japanese

[ɾ], has a lighter touch with the shorter duration than [l]. The Japanese flapped sound [ɾ] can be categorized into the /l/ phoneme from the perceptual and productive points of view even though the IPA treats these two sounds differently. In this respect it seems to be appropriate to include /l/ and /r/ in the same category. Japanese /r/ has a set of syllables with the structure of 'r+V', such as 'ra', 'ri', 'ru', 're', 'ro', all of which begin with the voiced [ɾ]; also in Japanese an allophone of /r/, where no touching of the tongue occurs, may be possible. While in English a voiceless sound [ɹ̥] is in complementary distribution to [r], [ɹ̥] is not in Japanese.

As normal, standard English has the /r/ sound in which the tip of the tongue does not touch the teethridge, native speakers of English had better think that Japanese /r/ is equivalent to English /l/, as in *l*ive and *l*ight, in that the tip of the tongue touches the upper side of the oral cavity, giving the similar perceptual effect.

5.6 Approximants

Both English and Japanese have the same approximants or what are often called semi-vowels: /j/ and /w/. If not pronounced with any friction sound, /r/ may be categorized into this type of sound, because 'approximant' means that articulatory organs, that is the tongue and the teethridge in this case, are not close enough to make a friction sound. This kind of articulation is not usual in Japanese, and /r/ may not be recognized as an approximant; /r/ in Japanese is always a flapped sound and it surely is a consonant without a continuous airstream flowing.

There are some linguists who classify [l] and [ɫ] into the category

of approximant, which is defined as having narrowing and being continuant. If their view is accepted, /r/ (phonetically [ɹ], that is [r] without a friction) should be dealt with as an approximant instead of a fricative, because it has the same phonetic feature as /l/. There is validify for classifying /l/ and /r/ in the same group.

5.7 Glottal stop

Glottal stop [ʔ] is not used in Japanese as a phoneme in such a way as it is used in English, where it replaces a sound like the intervocalic 't' (bu*tt*er) or the first element of a consonant cluster in an unstressed syllable (moun*tain*). A glottal stop is used in Japanese on the occasion when the speaker expresses some astonishment. More important, ejective stop ['] is used phonemically to differentiate words as follows.

a.	hato	[hato]	(*Eng.* pigeon)
b.	hatto	[ha'to]	(suddenly)
c.	oto	[oto]	(sound)
d.	otto	[o'to]	(husband)

Here I use the symbol /'/ to denote Japanese 'Sokuon', geminated consonants, from the economical point of view. Related comments will be given in the section on syllabary.

6. The Japanese syllabary

In any language, 'word' is a useful and important unit in speech as an indicator of meaning. To form a word in Japanese, syllables play a more important role than English, because a syllable is a meaningful unit as a pronounceable morpheme. In English a morpheme may be either a single sound (phoneme) or a combination of two or more sounds, some of which form a syllable.The following are English examples.

a. Kate wants some refreshment.
b. Kate wanted a lovely dog.
c. I want a cup of coffee.

In **a,** '-s' is a morpheme, but it is not pronouceable independently as a syllable. In **b,** '-ed' [id]' is syllabic and pronounceable independently but cannot be used as a word. In **c,** 'want' is syllabic and forms a word. In English a morpheme has a meaning related to its context whether it is syllabic or not.

English syllables have the structural patterns of (a) V (example: A [ei]), (b) C+V (*ex.* pa [paː]), (c) V+C (*ex.* up [ʌp]), (d) C+V+C (*ex.* come [kʌm]), etc., indicating that a consonant or consonants can occur before or/and after a vowel and form a multi-phonemic syllable, such as *texts* [teksts] where four consonants follow the vowel nucleus. On the other hand, Japanese syllables consist of either one vowel or one/two consonants and a vowel : (a) V (*ex.* e [e] *Eng.* picture), (b) C+V (*ex.* te [te] *Eng.* hand) and (c) C+C+V (*ex.* kyo [kjo] *Eng.* vacant).

Syllables of type (b) are very common in Japanese, and in those of type (c) the second consonant is almost always an approximant, such as /j/. Type (c) is called 'Yōon [jo:oɴ], that is a syllable with a palatal between a consonant and a vowel.

The following table of Japanese syllabary is a whole set of syllables.

6.1 Simple syllables (Japanese: *Chokuon* [tʃokuoɴ])

Each syllable can be denoted by one 'kana' letter.

(a)

1.	a	i	u	e	o
2.	ka	ki	ku	ke	ko
3.	sa	si *or* shi	su	se	so
4.	ta	ti *or* chi	tu *or* tsu	te	to
5.	na	ni	nu	ne	no
6.	ha	hi	hu	he	ho
7.	ma	mi	mu	me	mo
8.	ya		yu		yo
9.	ra	ri	ru	re	ro
10.	wa				
11.	N				

/ɴ/ is unique in that it is syllabic in spite of being a consonant, and called "Hatsuon [hatsuon]"

(b)

12.	ga	gi	gu	ge	go
13	za	zi *or* ji	zu	ze	zo
14.	da			de	do

15.	ba	bi	bu	be	bo
(**c**)					
	pa	pi	pu	pe	po

Each set of syllables is listed here in the order of the customary presentation in Japan. Syllables presented in (b) are so-called "Dakuon" [dakuoɴ])", which literally means a thick, voiced sound. It actually indicates a sound which has a diacritic mark '゛' on a Kana letter, as in 'ガ [ga]', while 'カ' is [ka]. The categorization of Japanese syllables is based on orthographic spellings.

The set of (c) is called 'Han (= semi) dakuon' and syllables in it have /p/ as their first sound described with the diacritic symbol of '゜' on the upper right side, as in 'パ [pa]', while 'ハ' is [ha].

Thus, the usual Japanese syllabary is given based on the writing system.

Besides simple syllables, there are 'Yoon [joːon]' syllables.

6.2 Complex syllables (Japanese: *Yoon* [joːon]

'Yoon' is a syllable with a palatalized semi-vowel between a consonant and a vowel.

1.	kya [kja]	kyu [kju]	kyo [kjo]
2.	nya [nja]	nju [nju]	nyo [njo]
3.	hya [hja]	hyu [hju]	hyo [hjo]
4.	mya [mja]	myu [mju]	myo [mjo]
5.	rya [rja]	ryu [rju]	ryo [rjo]

There have been three other sets to be included in the Yoon category, but in my view they are now replaced by simple syllables as follows.

6. sya, syu, syo   →   sha [ʃa], shu [ʃu], sho [ʃo]
7. tya, tyu, tyo   →   cha [tʃa], chu [tʃu], cho [tʃo]
8. dya, dyu, dyo   →   ja [dʒa], ju [dʒu], jo [dʒo]

It is not yet known whether the cause of this change was the influence of the influx of foreign sounds or the tendency toward simplicity in sound production.

6.3 Geminated syllables (Japanese: *Sokuon* [sokuoɴ])

'Sokuon' is a unique sound because it shows itself as the same sound as its following one and it is just a stop which does not have the release of airstream. As it assimilates to the adjoining sound its articulatory point varies depending on the following sound.

1. katta [ka'ta] (*Eng.* won)
2. satta [sa'ta] (gone)
3. kassha [ka'ʃa] (a pully)
4. sassato [sa'sato] (quickly)
5. kicchiri [ki'tʃiri] (exactly)

In (1), the exact transcription will be [kat'ta], and (2) will be [sat'ta], (3) [kaʃ'ʃa], (4) [sas'sato], and (5) [kit'tʃiri]. All the first elements of doubled consonants are ejective stops the same as the

second elements. From the economical point of view, to minimize the number of phonemes, I use the symbol of '', instead of using [t'], [s'], [ʃ'] and so on. '' is a phoneme to differentiate words . However, it cannot be used independently as a syllable; geminated syllables are used instead.

7. Length

A phoneme is the smallest unit of sound, by which the indicated meaning changes: *pen* /pen / changes to *ten* /ten/ in English with the exchange of /p/ and /t/. Here, /p/ is recognized as a different phoneme from /t/.

In Japanese too, /p/ and /t/ are different phonemes because there is a contrastive pair of words, such as /pen/ [peɴ] and / ten / [teɴ]. There are vowel phonemes and consonant phonemes, and besides, one more phoneme should be recognized as a segmental phoneme in Japanese. It is the length phoneme which is usually treated as 'mora [moːra]' or 'haku [haku]' (beat). In a syllable-timed language like Japanese, whether a sound is long or short is a contrastive feature, length making two words different in meaning: *me* /me/ (eye) contrasts with *mē*/meː/ (*v.* bleat).

For native speakers of English, length difference in Japanese vowels may be troublesome. Firstly, speakers of General American English seem to have a tendency to give less attention to the length difference between tense /i/ and lax /ɪ/, the difference of phonetic quality being more important although there is a difference in length between them. Americans seem to be more remarkable in this attitude than British English speakers.

Secondly, it is customary in Japan to spell the names of humans and the addresses of residence and streets without giving a length mark in the writing of the Roman alphabet: *Tōyo* [toːjoː] (the Orient) will be confused with *toyo* [tojo] (eaves) by people who try to pronounce these words by just looking at letters visually.

Things are the same about other instances. Although you will

see many words written in the Roman alphabet for the names of streets, humans and corporations, you will not meet with a chance of reading a sentence written in the Roman alphabetical letters so often in Japan, because it is unnecessary for the general public to do so in daily life. However, if asked to write in the Roman alphabet, their way of spelling words follows the principle previously described: no difference on the length of vowels. This is a great convenience for learners of Japanese, and a long vowel, or a vowel which has two moras, is better be given the diacritic symbol of '⁻' above a vowel letter; as in ā [aː] and ī [iː], where the quality of the vowel is retained as long as the second element.

For native speakers of Japanese, length causes a phonemic difference of sound, and the hearer will naturally be keen to whether a vowel in question is long or short. Some of the Japanese examples which show the phonemic contrast based on the difference in length are given below.

1. ko-i [koi] (love) vs. kō-i [koːi] (action)
2. e-go [ego] (ego) vs. ē-go [eːgo] (English)
3. ko-mon [komoɴ] (adviser) vs. kō-mon [koːmoɴ] (school gate)
4. chi-zu [tʃizu] (map) vs. chī-zu [tʃiːzu] (cheese)
5. shō-jo[ʃoːdʒo] (girl) vs. shō-jō [ʃoːdʒoː] (sympton)

The symbol '⁻' between two letters indicates that there is a syllable boundary, which I used here for the reader's convenience.

8. Mora and syllable

Japanese has a specific sound feature called 'mora', which some linguists define as 'a minimal unit of rhythmical time equivalent to a short syllable.' Let's take up the Japanese word 'kusuri' (medicine; drug). Each of *ku*, *su*, and *ri* is a syllabic unit respectively, and the word consists of three moras but it can be uttered with one mora if it is spoken as in English like [kəsúri] even though it originally consists of three syllables. All this is due to the fact that Japanese is a syllable-timed language and English is a stress-timed language.

In a stress-timed language like English, a nucleus which has a strong, centered stress forms a central rhythmic unit and other constituents gather around it, causing multi-syllables to become one lump.

'Mora', or *haku* in Japanese, is a peculiar but important feature to the ears of native speakers of English; it almost accords to a syllable, but its notable characteristic is duration. If the previously quoted example 'kusuri', is pronounced articulately by careful speakers, each syllable of *ku*, *su*, *ri* has about the same duration. To be exact, duration slightly changes according to the phonetic environment, but the psychological concept of 'mora' seems to exist in the mind of native speakers of Japanese.

A mora and a syllable as a unit are closely related with each other in Japanese, and one syllable can be thought of as equivalent to one mora. This means that if you want to pronounce 'model [mɒdl; madl] in the Japanese way, [mo-de-ru] is the right way. While the Japanese *moderu* has three moras, the English *model* may have one or two moras even though it is usually analyzed as

having two syllables with the final 'l' regarded as syllabic. The comparison between English and Japanese on the point of mora will become erroneous, because English does not have the concept of syllables which accords with that of mora. The point is that English speakers should be attentive to the phonetic value of mora in speaking Japanese if they really want to acquire the skill of producing standard Japanese.

To mention the close relationship between a syllable and a mora leads to the explanation of one particular sound in Japanese, /n/. This sound, which is actually [N] and rare only in the syllable-initial position, is a syllabic sound and has one mora. It occurs at any position of a word: initial, medial, and final. Examples are given below.

1. nto [N-to] (much; very)
2. onna [oN-na] (woman)
3. kan [ka-N]

In (1), 'nto' is colloquial and a usual, frequent form is *unto* [uN-to]; it is rather rare for a syllabic /n/ to appear in the word-initial position. The syllabic [N] does not appear in this position in careful speech. In (2) and (3), [N] is produced with the air coming out both from the mouth and the nose at the same time with the uvula raised up to make the airstream go freely into two directions. It does not have any blockade for the airstream, nor any friction, so its quality is almost that of a vowel, which is likely to make it syllabic.

In allophones of the Japanese /n/ phoneme, [N] is overwhelming

in use and /N/ might be proper in representing this nasal phoneme, but Japanese Roman orthography which is commonly used to describe English words adopts 'n', and it might be comfortable for the public to follow the conventional way.

As to nasals, just like English, regressive assimilation occurs very often when /n/ is followed by a syllable which has an initial stop consonant. Examples are:

1.   ban [baɴ] (guarding) → bannin [ba'niɴ] or [baɴniɴ] (a guard)
2.   kan [kaɴ] (*v.* dry) → kanpai [kampai] or [kaɴpai] (toast; cheers)
3.   han [haɴ] (*n.* print) → hanga [haŋga] or [haɴga] (lithograph)

In those circumstances, in phonetic contexts where [ŋ] is used, [ɴ] and [ŋ] are interchangeable and in free variation. However, there is one instance where [ŋ] is strongly supported by advocates of speaking good Japanese; that is the pronunciation of the particle 'ga' which is added to a noun and shows the noun's grammatical relation in a sentence.

1.   karega [kareŋa] (*He is* [a Major League player])
2.   sakkāga[sa'ka:ŋa] ([I like] *soccer.*)

Native speakers of English do not have to worry about which is the right pronunciation of Japanese nasals when they think of communicability, because no big perceptual difference seems to exit to the ears of Japanese speakers.

9. Pitch

9.1 Pitch accent

Pitch in the Japanese sound system plays a more important role than in English. In both languages the pitch accompanies a syllable, but it is not phonemic at all in English with regard to a word's meaning; it is only phonemic when it is used in the final position of a phrase or clause (or sentence). Please look at the following utterance.

In his old age [P1], the poet Walt Whitman spoke of his lifelong preoccupation [P2] with a distinctively American language [P3].

Here, 'P3' indicates that a certain pitch can be used to give some meaning to the preceding phrase different from when another pitch is used. Pitch can be high or low; if high in the normal, stating phrase, an utterance is suggestive of being continuous, and if low to end there. 'P1' is a high pitch, which indicates that the preceding phrase 'In his old age' is part of a longer utterance; 'P2' is high and indicates that the preceding phrase continues to the next one, and if it is given a low pitch with a pause after it shows the end of an utterance. 'P3' is a low pitch, telling that the utterance finishes there.

Although pitch is placed on a syllable, the pitch variation overriding at least two syllables is meaningful and phonemic in Japanese. A good example is the contrast between two words as follows.

a me [ame] (rain) vs. a me [a me] (candy)
h l   l h

The letter 'h' is the abbreviation of 'high pitch', and 'l' is the abbreviation of 'low pitch'.

In the above example, segmental phonemes are the same and only the different pitch patterns are the clue to different meanings. Pitch cannot be phonemic in one syllable: *e* [e] (picture) may be uttered with either high or low pitch, and no difference of meaning appears in it.

Some other contrastive examples are given below.

1. a ki (autumn) *vs.* a ki (vacancy)
   h l   l h

2. a ka (red) *vs.* a ka (dirt)
   h l   l h

3. i ka (below) *vs.* i ka (squid)
   h l   l h

4. u mi (sea) *vs.* u mi (pus)
   h l   l h

5. o ku (inner part) *vs.* o ku (*v.* place)
   h l   l h

6. i ttō [iˊto:] (a head [of animal]) *vs.* i ttō (the first class)
   h l   l h

The pitch pattern of 'h-l' is phonemic contrasted with 'l-h'. Pitch only makes two words different in meaning.

9.2 Pitch patterns

K. Kindaichi classified pitch patterns of Japanese words into seven types, giving an illustrated chart which uses black and white dots to denote syllables. Words were patternized according to the rise and fall of pitch. The patterns were also decided by the types of a following particle such as 'wa' : rise, level or fall.[12]

Type	Example 1	Example 2
①	e-wa (picture)	a-sa-wa (morning)
②	i-ke-wa (pond)	a-sa-ga-o-wa (morning glory)
③	o-to-ko-wa (man)	mu-gi-ba-ta-ke-wa (wheat field)
④	o-to-o-to-wa	shi-da-re-ya-na-gi-wa (weeping willow)
⑤	o-sho-o-ga-tsu-wa (New Year's days)	ku-sa-ka-ri-ga-ma-wa (scythe)
⑥	mi-ka-zu-ki-sa-ma-wa (crescent)	
⓪	hi-wa (day)	u-shi-wa (cow)
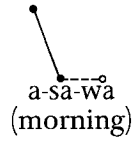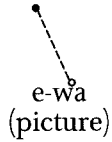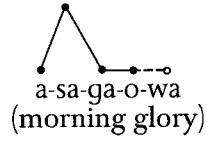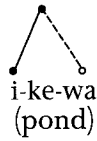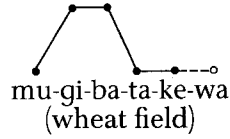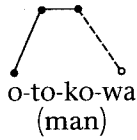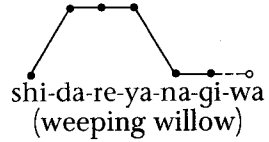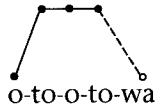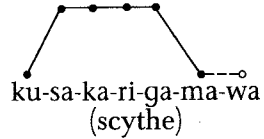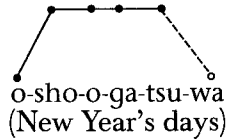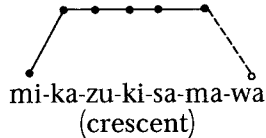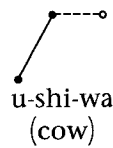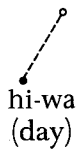
As to pitch patterns, often called 'akusento (accent)' in Japan, NHK (the Japan Broadcasting Corporation) publishes an exhaustive and authoritative dictionary on them, where various patterns are introduced and explained with the help of syntactical features. In this paper a try is made to find out regularities on pitch patterns with the focus on the category of compound noun. Regarding the change of pitch patterns, examples of compounds are given below to be contrasted with those quoted in **9.1.**

1. a ki → a ki ka ze (autumn wind)
   h l   l h l l

2. a ki → a ki ya (vacant house)
   l h   l h h

3. a ka → a ka i ro (red color)
   h l   l h h h

4. a ka → a ka to ri (the implement to eliminate dirt)
   l h   l h h h

5. i ka → i ka dō bu n (the below part is the same as
   h l   h l l l l   before)

6. i ka → i ka sō me n (thinly sliced squid)
   l h   l h h l l

7. u mi → u mi ga me (sea tortoise)
   h l   l h h h

8. u mi → u mi shi ru (pus)
   l h   l h h h

9. o ku → o ku yu ki (depth)
   h l   l h h h

10. i ttō → i ttō sha (a first class-carriage)
   l h   l h l

Within the small number of data quoted above, no rule or regularity seems to be detected. Does any syntactic information help solve the problem? No answer is given here.

To get a further clue to find if there is any rule in changing

pitch patterns, more examples are taken up in the following. They are from the 'a' entries of *Shogakukan's Japanese-English Dictionary*. The following list of words shows pitch patterns containing 'aka (red)' and used in the forms of a compound or unit larger than one word.

	aka	hl
1.	aka aka to	lhhhl
2.	a ka i	lhh (adj.)
3.	a ka i ha ne	lhhhh
4.	a ka i wa shi	lhhll
5.	a ka u mi ga me	lhhhll
6.	a ka e i	lhhh
7.	a ka e ri ka i tsu bu ri	lhhhhhhll
8.	a ka ga i	lhll
9.	a ka ga e ru	lhhll
10.	a ka ga shi	lhhh
11.	a ka ga ne	lhhh
12.	a ka ga mi	lhhh
13.	a ka gu ro i	lhhhl
14.	a ka ge	lhh
15.	a ka ge ttō	lhhl
16.	a ka ge ra	lhhh
17.	a ka go	lhh
18.	a ka kōnā	lhhl
19.	a ka za tō	lhhl
20.	a ka sa bi	lhhh
21.	a ka ji	lhh

22.	a ka shi o	lhhh
23.	a ka shō bi n	lhhll
24.	a ka shi n gō	lhhll
25.	a ka shi n bu n	lhhlll
26.	a ka da shi	lhhh
27.	a ka cha ke ru	lhhhl
28.	a ka cha n	hlll
29.	a ka chi n	lhhh
30.	a ka tsu chi	lhhh
31.	a ka de n sha	lhhll
32.	a ka to n bo	lhhll
33.	a ka ha ji	lhhh
34.	a ka ha ta	lhhh
35.	a ka ha da	lhhh
36.	a ka ha da ka	lhhll
37.	a ka ha na	lhhh
38.	a ka ha ra	lhhh
39.	a ka hi ge	lhhh
40.	a ka hu da	lhhh
41.	a ka bu dō shu	lhhhl
42.	a ka bō	lhh
43.	a ka ho n	lhhh
44.	a ka ma tsu	lhhh
45.	a ka mi	lhh
46.	a ka mi so	lhhh
47.	a ka mu ke	lhhh
48.	a ka mu shi	lhhh
49.	a ka me	lhh

50.	a ka me ru	lhhl
51.	a ka mo zu	lhhh
52.	a ka yū ta i	lhhll
53.	a ka ra ga o	lhhhh
54.	a ka ra mu	lhhl
55.	a ka ra me ru	lhhhl
56.	a ka n bō	lhhh

In the publications which dealt with pitch patterns of compound forms, there has been no clear-cut explanation on their regularities and the comments on them are that there are no rules on them. In all words except one instance of 'akachan [akatʃaɴ]' (baby), the pitch pattern 'h-l' changes to 'l-h' in compound forms. There, high pitch is generally kept to the end of a word when it is a noun. If an attached part is composed of three or more moras, or syllables, the final syllable or the last two syllables are given 'low pitch'. All verbs have low pitch on the final syllable regardless of the number of attached syllables. Syntactic information on whether a word is a noun or a verb is helpful to find out the pitch pattern of a compound form.

If a compound noun contains five or more moras, or syllables, the last one or two syllables have low pitch, that is, pitch falls to low at the end of a word. Whether low pitch extends to two syllables or not depends on the existence of a long vowel. In normal cases, the last two syllables have low pitch if attached syllables number three or more. However, there are some exceptions.

The first type of exceptional cases is that if there is a long vowel in the last two syllables, low pitch falls only on the last syllable.

The example is 'a̱ ka bu do shu [akabudo̱:ʃu]'. Normally, in the Roman spelling which is commonly used in Japan, short and long vowels are not differentiated in spelling: 'do [do]' and 'do [do:]' are spelt in the same way without any reason though some time ago a long vowel was given the diacritical mark of '‾' above a long vowel, like 'ō [o:]'. In 'akabudoshu' (red wine) '-do-' is [do:], where one extra mora is in the syllable to be described as 'V+M', 'M' indicating one mora, and the syllable with two moras is equivalent to two syllables.

Two words in the list of the examples, 'akakōnā [akako:na:]' and 'akazatō [akazato:]', have a phonetic condition similar to the previous example, but 'akazato [akazato:]' has a long vowel on the last syllable only. The rule that allows low pitch on the last syllable of a word should be that there is one long vowel in the last two syllables.

There is another seemingly exceptional case. It is 'akashinbun [akaʃiɴbuɴ]'. Here, the rule that 'n' in the compound form of three or more than three added syllables is always given low pitch will solve the problem. The pitch pattern of this word can be 'a̱ ka shi n bu n,' so we can say that there are some words which

l   h   h   h   l   l
have allophonic pitch patterns.

As to a form with two added syllables, an instance is noticed where 'Yoon', an unvoiced[13] palatal or velar sound, appears: 'a̱ ka ge tto [akage'to]'.

l   h   h   l

The rule for this will be that the last syllable has low pitch when there is a Yoon before the final syllable.

Pitch is important in Japanese, because it is phonemic and

plays a role just like a segmental phoneme, differentiating the meaning of words with the use of high and low phonemes. While pitches in English can extend over the unit of words, as is indicated by the designation 'Suprasegmentals', pitches in Japanese work like stress phonemes in English . In this paper the expression 'pitch pattern' is used to apply for the frame of word. If a combination, or sequence, of pitches extending to an utterance, 'intonation' will be appropriate.

Pitch is very important in Japanese; however, much of it is still to be investigated hereafter, though analyses do not seem to lead to the disclosure of how and why words got their present pitch patterns. Patternization of pitch patterns is related to varieties in dialects, too. This is an unquestionably interesting field of furthur studies.

Notes

1. D. Crystal (1988), p. 90.
2. Japanese words are written here in the Roman alphabet with their pronunciation given in the IPA transcription in parentheses.
3. '-' indicates a syllabic boundary.
4. A. C. Gimson (1972), p. 144.
5. [ɔ] and [o] are in free variation in Japanese, and /o/ has two allophones which are used as different phonemes in English.
6. The Japanese subjects were asked to read the following sentences. Underlined parts are the checking points of vowels. The vowel /e/ was eliminated from this experiment with the focus on /i/, /a/, and /u/.
   (1) The cook has kicked a car in the park.
   (2) I can see a lot of sheep on the ship over there.
   (3) The dentist took out my footh yesterday.
   (4) A cat is having the soup now.
   (5) She put a cap on the chair.
7. P. Ladefoged (1975), p. 27.
8. The vowel length is shown using ':' for the clear difference.
9. *BBB English Dictionary*, (1992).
10. A. C. Gimson (1972), p. 124.
11. G. K. Pullum & W. A. Ladusaw (1986).
12. Kindaichi (1942)
13. The term 'unvoiced' is used here to stress that a sound is produced not to be voiced, although it is somewhat voiced when its neighboring sound is voiced.

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