The Devanagari Script

By David Templin

The Devanagari Script (देवनागरी लिपि) is the most impressive writing system that I have ever studied. It impresses me for many reasons, for instance:

- The ordering of the letters is according to precise scientific principles.
- Each letter transcribes a distinct sound.
- It recognizes subtle distinctions in sound.

I also find Devanagari to be a very beautiful script.

Note that this article will discuss the Devanagari Script as it is adapted for the Hindi language.

The Ordering of Letters

In order to appreciate the significance of the ordering of letters in Devanagari, some background information is necessary.

Place of Articulation

Consonants can be classified according to the place within the mouth that they are articulated.

- **Velar** consonants are pronounced with the back of the tongue touching the soft palate. Examples of velar consontants in English include "k" as in "keep", and "g" as in "good".
- **Palatal** consonants are pronounced with the tongue touching the hard palate. Examples of palatal consonants in English include "ch" as in "change" and "j" as in "job".
- **Retroflex** consonants are pronounced with the tongue curled slightly backward and touching the front portion of the hard palate. There are no retroflex consonants in English. As an example, try pronouncing the "t" in "tip", yet curl your tongue backward.
- **Dental** consonants are pronounced with the tip of the tongue touching the back of the upper front teeth. Examples of dental consontants in English include the "th" in "the", and the "th" in "thin".
- **Labial** consonants are pronounced with the lips. Examples of labial consonants in English include the "p" in "pit", the "b" in "boy", and the "m" in "man".

Manner of articulation

Consonants can also be classified according to their manner of articulation.

- **Unvoiced** consonants are pronounced without vibrating the vocal cords. Examples of unvoiced consonants in English include the "s" in "sit", the "p" in "pit", the "t" in "time", etc.
- **Voiced** consonants are pronounced by vibrating the vocal cords. Examples of voiced consonants in English include the "z" in "zoo", and the "g" in "good".

- **Unaspirated** consonants are pronounced without a breath of air following the consonant. Contrast the pronunciation of the "p" in "spit" and the "p" in "pit"; the former is unaspirated, whereas the latter is aspirated.
- **Aspirated** consonants are pronounced with a strong breath of air following the consonant, as the "p" in "pit".
- **Nasal** consonants are pronounced with some air flowing through the nose. Examples of nasal consonants in English include the "n" in "English", the "n" in "punch", and the "m" in "me".

Now, consider the following chart of the first 25 consonants of the Devanagari script:

Hindi Consonants

	Stops				
	Unvoiced		**Voiced**		**Nasals**
	Unaspirated	Aspirated	Unaspirated	Aspirated	
Velar	क	ख	ग	घ	ङ
Palatal	च	छ	ज	झ	ञ
Retroflex	ट	ठ	ड (ड़)	ढ (ढ़)	ण
Dental	त	थ	द	ध	न
Labial	प	फ (फ़)	ब	भ	म

Next, consider the ordering of the same 25 consonants in the Devanagari script, from left to right:

क ख ग घ ङ च छ ज झ ञ ट ठ ड (ड़) ढ (ढ़) ण त थ द ध न प फ (फ़) ब भ म

Note that if you read the chart from left to right and top to bottom, it corresponds to the ordering of the letters in Devanagari! This is remarkable because this has been the ordering of the Devanagari script for centuries. This fact is a testament to the advanced state of the study of phonetics in ancient India.

Ordering of Vowels

The vowels in Hindi are likewise ordered scientifically.

Place of Articulation of Vowels

- **Velar/Guttural** vowels are pronounced near the back of the throat, as the "a" in "amid".
- **Palatal** vowels are pronounced with the tip of the tongue raised toward the hard palatte, as the "i" in "sing".
- **Labial** vowels are pronounced using the lips, as the "oo" in "boot".

- **Retroflex** vowels are pronounced with the tongue curled backward. There are no retroflex vowels in English.
- **Palato-Guttural** vowels are pronounced as a combination of palatal and velar articulation.
- **Labio-Guttural** vowels are pronounced as a combination of labial and velar articulation.

Manner of Articulation of Vowels

The manner of articulation of vowels can be classified according to many categories, but we will discuss two particular categories:

- **Short** vowels are sustained for a relatively shorter duration of time.
- **Long** vowels are sustained for a relatively longer duration of time.

Monophthongs are vowels pronounced as a single, pure sound, whereas *diphthongs* are vowels pronounced as two adjacent sounds glided together within the same syllable.

Hindi vowels

Articulation	**Vowels**		
	Monophthongs		**Diphthongs**
	Short	**Long**	
Guttural	अ	आ	
Palatal	इ	ई	
Labial	उ	ऊ	
Retroflex	ऋ	-	
Palato-Guttural		ए	ऐ
Labio-Guttural		ओ	औ

Now consider the vowels in their order within the Devanagari script:

अ आ इ ई उ ऊ ऋ ए ऐ ओ औ

Once again, note that the ordering corresponds to the ordering in the table, if the table is ordered from left to right and top to bottom.

The technical distinction between the vowel pairs in Hindi (such as इ ई) is the vowel length, although modern Hindi speakers tend to pronounce the vowels distinctly, regardless of the duration. इ is pronounced like the "i" in "bit" whereas ई is pronounced like the "ee" in "feet", and उ is pronounced like the "u" in "put" whereas ऊ is pronounced like the "oo" in "boot".

Also note that the complement of the letter ऋ is marked as "-" because it is not commonly employed in Hindi, but it is used in other applications of Devanagari, such as in Sanskrit.

Miscellaneous Ordering

The final consonants in the Devanagari script are organized into three categories: semivowels/approximants, sibilants, and a glottal.

Semivowels/Approximants

य र ल व

Sibilants

श ष स

Glottal

ह

Application to Hindi

Now, I'll discuss the application of Devanagari to Hindi.

Hindi is written using the Devanagari script.

Devanagari is also used to write other languages, such as Nepali and Marathi, and is the most common script used to write Sanskrit. Several other languages have scripts which are related to Devanagari, such as Bengali, Punjabi, and Gujarati.

The Devanagari script represents the sounds of the Hindi language with remarkable consistency. Whereas many letters of the English alphabet can be pronounced many different ways, the letters of the Devanagari script are pronounced consistently (with a few minor exceptions). Thus, Devanagari is relatively easy to learn.

Devanagari consists of 11 vowels and 33 consonants, and is written from left to right.

Basic Genius

Devanagari is not actually an alphabet, but a so-called *alphasyllabary*. An alphasyllabary is a writing system which is primarily based on consonants, and in which vowel symbols are requisite yet secondary. As such, the fundamental genius of Devanagari is that every letter represents a consonant which is followed by an inherent schwa vowel, अ. For example, the letter स is read "sa". In order to suppress the inherent vowel, one of two methods is required: a diacritical mark called a *halant*, or a ligature, called a *conjunct*. In order to indicate a vowel other than the inherent vowel, diacritical marks called *maatraas* are used. For vowels independent of consonants, there exist full letters to transcribe vowels.

Vowels

Hindi has 11 vowels. 10 vowels are transcribed in two distinct forms: the independent form, and the dependent (*maatraa*) form. The independent form is used when the vowel letter appears alone, at the beginning of a word, or immediately following another vowel letter. The dependent form is used when the vowel follows a consonant.

Vowels in Independent Form

अ आ इ ई उ ऊ ऋ ए ऐ ओ औ

The following table lists the vowel in its independent form, and its description. The best way to learn the pronunciation is to learn from a native speaker.

Vowels

Vowel	Description
अ	as in "but", "again"
आ	as in father, far
इ	as in "fit", "hit"
ई	as in "feet", "heat"
उ	as in "put", "pull"
ऊ	as in "pool", "shoot"
ऋ	as is "rip", "rib" with the tongue curled back
ए	as in "ate", "day"
ऐ	as in "Khyber"
ओ	as in "go", "boat"
औ	as in "owl"

Vowels in Dependent (*maatraa*) Form

When a vowel follows a consonant, it is written in its respective *maatraa* form, which is appended to the consonant. Matraa forms never appear at the beginning of a word or after another vowel. The first vowel, अ, has no particular maatraa form. Instead it is the default vowel. It is assumed to be present unless the maatraa form of another vowel is explicitly appended to a consonant. In Sanskrit, the vowel अ is pronounced at the end of a word. In Hindi, however, it is not pronounced, except at the end of single-letter words. The following table lists each vowel in its independent form, its corresponding dependent form, and how it would appear with the consonant क ("k").

Maatraa Forms of Vowels

Independent	Dependent	With क
अ	(none)	क
आ	ा	का
इ	ि	कि
ई	ी	की
उ	ु	कु
ऊ	ू	कू
ऋ	ृ	कृ
ए	े	के
ऐ	ै	कै
ओ	ो	को
औ	ौ	कौ

Allophones

As mentioned earlier, the distinction between the vowels इ and ई is the *duration* of the pronunciation of the vowel - the former is shorter, and the latter longer. However, in practice, the vowel इ is pronounced more like the English "i" as in the word "it", as described in the corresponding text. The same is so for the vowels उ and ऊ.

Final Schwa

The schwa, अ, is normally not pronounced at the end of a word. Thus, कान is pronounced "kaan", not "kaana". An exception occurs when a word ends in a conjunct. In this case, the word may be pronounced with a slight final schwa, as in मित्र, literally "mitr", but often pronounced like "mitr(a)", with a soft final schwa.

Monophthongs versus Diphthongs

Native English speakers should be careful not to pronounce the Hindi vowels that are monophthongs as diphthongs. For instance, ओ is a pure sound, not a glide like the English "o" as in the word "low". Many vowel letters in English can represent diphthongs. Thus, whereas English may represent a diphthong with the letter "i" as in the word "site", in Devanagari, this diphthong would be more precisely transcribed as two monopthongs, आ and इ: साइट

Schwa Syncope

Sometimes, the inherent vowel is not pronounced, despite its implicit presence and the lack of any modifying diacritic. This phenomenon is called *schwa syncope*, or alternatively *schwa*

deletion. For instance, consider the word नमकीन, literally "namakeen". The second inherent vowel is not pronounced, as if the word were written नम्कीन ("namkeen"). There is no rule which can predict this phenomenon with absolute accuracy, yet one generally useful heuristic is that the inherent vowel is deleted after a consonant which is between two vocalic consonants. Thus, the word देवनागरी itself is pronounced with the first schwa deleted, like "Devnagari", and not "Devanagari", even though it is still transliterated as "Devanagari".

Occasionally, the schwa will not be totally deleted, but will be very slightly pronounced.

Schwa Pronunciation in Context

The Hindi inherent vowel, अ, may be pronounced as [ɛ], a vowel which is similar to the English "e" as in the word "bed", but only in certain contexts, namely, when two अ vowels appear on both sides of the consonant ह, as in the verb पहनना ("to wear"). Both schwa vowels are often pronounced as [ɛ] in such circumstances. Thus, although the phrase पहन लो is literally "pahan lo", it is often pronounced "pehen lo". Occasionally, however, this phenomenon occurs when only one schwa vowel is beside the consonant ह, as in the word बहिन ("sister"). In this case, both vowels adjacent to ह are converted to [ɛ], and thus, although the word is literally "bahin", it is pronounced "behen".

Nasalization of Vowels

All vowels in Hindi can be nasalized, except for ऋ. Nasalization is indicated by either the symbol " ◌̇ " or by the symbol " ◌̃ ". The former symbol is called *bindu* ("dot"), and the latter symbol is called *chandrabindu* ("moon and dot"). The bindu is used when part or all of the vowel symbol extends above the horizontal line. The chandrabindu is used when no part of the vowel symbol extends above the horizontal line. The bindu is more common is modern written Hindi, and may even be used exclusively.

The following examples summarize the use of the bindu and chandrabindu:

अँ आँ इँ ईं उँ ऊँ एँ ऐं ओं औं

कँ काँ किं कीं कुँ कूँ कें कैं कों कौं

A special diacritic is sometimes used with the vowel आ to transcribe the English "o" vowel sound as in "college": कॉलेज

Consonants

Velar Consonants

Letter	Description
क	unaspirated "k"
ख	aspirated "k"
ग	unaspirated "g"
घ	aspirated "g"

Letter	Description
ङ	n, as in "sing"

Note that the velar nasal consonant does not appear as the first letter of any word.

Palatal Consonants

Letter	Description
च	unaspirated "ch", as in "cheese"
छ	aspirated "ch"
ज	unaspirated "j"
झ	aspirated "j"
ञ	n, as in "punch"

Retroflex Consonants

Letter	Description
ट	like "t", but retroflex and unaspirated
ठ	like "t", but retroflex and aspirated
ड	like "d", but retroflex and unaspirated
ढ	like "d", but retroflex and aspirated
ण	like "n", but retroflex

Hindi additionally employs two flap consonants: ड़ and ढ़. The symbols for these consonants are formed by placing a diacritical mark called a *nuqta*, which is a subscript dot, underneath the consonant symbols ड and ढ respectively.

ड़ is pronounced by flapping the tongue from the retroflex position forward, toward the alveolar ridge. ढ़ is pronounced similarly, except with aspiration.

English does have an alveolar flap consonant, as the "t" in the word "better", or the "d" as in "bedding" as in American English. The Hindi flaps are retroflex, however.

Retroflex Flap Consonants

Letter	Description
ड़	like a flapped "d", flapping tongue from retroflex to alveolar ridge position
ढ़	like flapped "d", flapping tongue from retroflex to alveolar ridge position, and aspirated

Dental Consonants

Letter	Description
त	like "t", but dental and unaspirated
थ	like "t", but dental and aspirated
द	like "d", but dental and unaspirated
ध	like "d", but dental and aspirated
न	like "n" in "name", but dental

Labial Consonants

Letter	Description
प	like "p", but unaspirated
फ	like "p", but aspirated
ब	like "b", but unaspirated
भ	like "b", but aspirated
म	"m"

Semivowels

Letter	Description
य	"y", as in "young"
र	like "r", but often rolled
ल	"l", as in "lip"
व	either "w", or "v"

The Hindi "r" sound is typically a flap. However, some speakers may trill the "r" sound occasionally, or may even occasionally pronounce it closer to an unflapped approximant sound, as in the English "r" in "red".

Sibilants

Letter	Description
श	"sh", as in "shave"
ष	like "sh", but retroflex

Letter	Description
स	"s", as in "save"

Glottal

Letter	Description
ह	like "h", but voiced

Allophony of "w" and "v" in Hindi

A *phoneme* is an equivalent class of atomic, discrete sounds which can produce a difference in meaning when spoken, yet cannot produce a difference in meaning when substituted for one another. A "phone" is simply a distinct sound. For instance, in English the "p" in the word "spit" and in the word "pit" are pronounced distinctly: the former is unaspirated, the latter is aspirated. Thus, they are two distinct phones. However, they are both members of the same phoneme, since substituting one for the other can never produce a difference in meaning, even though substitution may be perceived as slightly awkward by native speakers. Two distinct phones which are both members of the same phoneme are called "allophones" (from Greek, "different sounds").

In Hindi, the sounds associated with the English letters "w" and "v" are allophones. Both are transcribed with one letter, व. Analogously to the English example above, these sounds are typically pronounced consistently in words, but they do not constitute meaningful differences in utterances. For example, the word वो is typically pronounced as "vo", whereas the suffix -वाला is typically pronounced "wala". Hindi speakers are not generally aware of this distinction, even though they pronounce the distinction fairly consistently, just as English speakers are not aware of the differences of aspiration in certain letters, yet pronounce aspiration consistently.

Thus, व may be pronounced as "w" or "v". Some speakers may even pronounce an intermediate sound.

Semi-Allophones "j" and "z" in Hindi

Likewise, Hindi speakers do not generally maintain any strict distinction between the English "j" and "z" sounds either, but will typically pronounce words consistently. This situation is not quite the same as "w" and "v", since technically, the "z" sound can be represented distinctly from the "j" sound by placing a dot (nuqta) underneath the letter, and some speakers are aware of this distinction. For instance, the word जो is pronounced as "jo". There is some variation, however, in some words such as ज़्यादा - some speakers pronounce this as "zyada", and some as "jyada".

Sibilants

In modern Hindi, both श and ष and pronounced the same. ष occurs mostly in Sankrit loanwords.

English Alveolar Consonants

There is no equivalent of the English "t" or "d" in Hindi. These English sounds are pronounced with the tongue on the tip of the alveolar ridge, behind the top teeth. This place

of articulation is between the Devanagari retroflex and dental positions, although the English pronunciation will sound much closer to the retroflex pronunciation to Hindi speakers. English loanwords containing "t" or "d" are therefore transcribed with retroflex approximations.

Capital Letters

Devanagari has no capital letters.

Special Matraa Forms of उ and ऊ with र

र + उ = रु

र + ऊ = रू

Borrowed Sounds

There are 6 additional sounds used in Hindi which have no corresponding symbols in Devanagari. These sounds are represented by placing the *nuqta* underneath a symbol which is phonetically similar. These symbols represent sounds from other languages, such as Persian, Arabic, and English.

Foreign Sounds

Letter	Approximation
क़	like "k", but pronounced in the back of the mouth
ख़	velar fricative, like "Bach" in German
ग़	velar sound, similar to ख़ but voiced
ज़	just as English "s", as in "is"
झ़	similar to the s in English "vision"
फ़	just as English "f"

Only two of the borrowed sounds are typically pronounced distinctly from the non-nuqta forms, though: ज़ and फ़

Summary of Consonants

Hindi Consonants

	Stops				
	Unvoiced		Voiced		Nasals
	Unaspirated	Aspirated	Unaspirated	Aspirated	
Velar	क	ख	ग	घ	ङ

Palatal	च	छ	ज	झ	ञ
Retroflex	ट	ठ	ड (ड़)	ढ (ढ़)	ण
Dental	त	थ	द	ध	न
Labial	प	फ (फ़)	ब	भ	म

Semivowels/Approximants

य र ल व

Sibilants

श ष स

Glottal

ह

Conjuncts

Since any consonant that is not explicitly followed by a vowel symbol is implicitly followed by the inherent vowel, अ, Devanagari provides two means of suppressing the inherent vowel:

1. The *halant (* ्) a diacritical subscript, e.g. क्
2. A *conjunct*, a ligature synthesized by conjoining two consonant symbols. This method is much more common. The halant is typically only used when typographical difficulties make it difficult to use conjuncts.

Horizontal Conjuncts

Horizontal conjuncts are formed when the first letter of a conjunct contains a vertical line. The vertical line is deleted, then the modified consonant symbol is conjoined to the second consonant symbol. For example:

- न् + द = न्द, हिन्दी
- च् + छ = च्छ, अच्छा
- स् + त = स्त, नमस्ते
- ल् + ल = ल्ल, बिल्ली
- म् + ब = म्ब, लम्बा
- फ़् + त = फ़्त, मुफ़्त
- क् + य = क्य, क्यों

Note that in the last two examples, although neither क nor फ end in a vertical line, they still can be the first letter of a horizontal conjunct. The curve on the right side is shortened and adjoined to the following consonant.

Vertical Conjuncts

Consonants that do not end with a vertical line often form vertical conjuncts with the following consonant. The first consonant is written on top of the second consonant. For example:

- ट् + ट = ट्ट , छुट्टी
- ट् + ठ = ट्ठ, चिट्ठी

Other Conjuncts

Certain conjuncts are special, and should be observed:

Conjuncts with Nasal Consonants

If a nasal consonant is the first member of a conjunct, it may be written either using a "regular" conjunct (e.g. न् + द = न्द, हिन्दी), or an "anusvar", which is a dot written above the horizontal line, to the right side of the preceding consonant or vowel. For instance, हिन्दी could be spelled हिंदी, and अण्डा could alternatively be spelled अंडा. Note that the anusvar always indicates a so-called "homorganic" nasal consonant - in other words, it is articulated in the same location in the mouth as the following consonant is articulated. Thus, the anusvar in हिंदी must represent न्, which is a dental nasal consonant, since द, the following letter, represents a dental consonant. Likewise, the anusvar in अंडा must represent the retroflex nasal consonant ण since the following consonant, ड, is a retroflex consonant.

Note that the anusvar is not the same as the bindu (or chandrabindu). The anusvar represents a consonant which is the first letter of a conjunct, whereas the bindu and chandrabindu represent the nasalization of a vowel. The bindu in हैं cannot be considered an anusvar, since there is no conjunct. The anusvar in हिंदी is not considered a bindu since it represents a consonant that is the first member of a conjunct.

Conjuncts with र

As the first member of a conjunct, र appears like a small "hook" or "sickle" above and to the right of the *following* consonant:

- र् + म = र्म, शर्मा
- र् + ट + ई = र्टी, पार्टी

As the second member of a conjunct, र is indicated by a diagonal line adjoined to the vertical line of the *preceding* consonant:

- क् + र = क्र, शुक्रिया
- म् + र = म्र, उम्र

Four consonants, ट, ठ, ड, ढ, do not have any vertical line, so they indicate a following र with the symbol like an inverted "v", as follows:

- ट् + र = ट्र, राष्ट्र

Special Conjuncts

Some conjuncts look quite different than their component consonants, and are not obvious. Most of these occur in words borrowed from Sanskrit:

- क् + ष = क्ष
- त् + त = त्त
- त् + र = त्र
- ज् + ञ = ज्ञ
- द् + द = द्द
- द् + ध = द्ध
- द् + य = द्य
- द् + व = द्व
- श् + र = श्र
- ह् + म = ह्म

The conjunct ज + ञ = ज्ञ is pronounced as ग्य ("gya") in Hindi. Conjuncts are treated as a single unit, and a maatraa is placed before the entire conjunct.

There are hundreds of conjuncts, but most conjuncts are easily discernable.

Punctuation

Hindi has a punctuation sign, the *purn viraam*, which is a vertical line that terminates a sentence. In modern typography, periods are often used in place of the *purn viraam*, and other punctuation, such as commas and question marks, is also borrowed from English.

About the Author

David is a software engineer who currently resides in Birmingham, Alabama. He studies linguistics and languages as a hobby and has a special interest in the Hindi language because his wife, Richa, is a native Hindi speaker.

This article was adapted from the article about the Devanagari Script from David's website hindilanguage.info.

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