**Course Name: 'Introduction to Pāṇinian Grammar'**
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Welcome, I welcome you all to this lecture in the course Introduction to Pāṇinian grammar. In this lecture, we continue to study the Process of speech production and we study the Features of the produced speech by this particular process. The source that we have been studying for some time now is the Pāṇinīyaśikṣā and the verses that are displayed on the slide, "ātmā buddhyā sametyārthān mano yuṅkte vivakṣayā manaḥ kāyāgnim āhanti sa prerayati mārutaṁ mārutastūrasi caran mandraṁ janayati svaram sodīrṇo mūrdhnyabhihato vaktramāpadya mārutaḥ varṇān janayate".

These verses can be arranged in terms of stages in this manner. There are 8 stages that are described in these verses. The first stage is 'ātmā buddhyā sametyārthān', the second one is 'mano yuṅkte vivakṣayā', the third one is 'manaḥ kāyāgnim āhanti', the fourth one is 'sa prerayati mārutaṁ', the fifth one is 'mārutastūrasi caran mandraṁ janayati svaram', the sixth one is 'sodīrṇo mūrdhnyabhihato', the seventh one is 'vaktramāpadya mārutaḥ' and the final and the eighth stage in this process is 'varṇān janayate'.

We have also seen that the first two 'ātmā buddhyā sametyārthān' and 'mano yuṅkte vivakṣayā', these two they form the part of the internal cognitive process and can be termed as or are in fact, termed as the cause for this entire physical process described in the rest of the stages. So, these two are more internal they are the cause. And it is, in fact, they are very important and that is why we have studied these two in quite a lot of detail which is not done in any of the traditional sources. And, then from three onwards are the physical or the biological processes, until the eighth stage arises when the sounds are actually produced. And, then there are lots of internal factors playing key roles namely māruta, the wind. And, then the wind being propelled up hitting the roof of the windpipe or the oral cavity; and then entering the mouth and hitting on the various places and then generating the sounds, generating the speech.

In this entire process there is one most important means which plays a very crucial role in the oral cavity that is recognized and described in the traditional sources. And that is jihvā or tongue it is said jihvā is considered to be the karaṇa. karaṇa is traditionally interpreted as the most effective means the such a means which when gets activated brings about the result of the performed action. So, jihvā is such a important means in the process of speech production primarily because the tongue shapes the wind flow in the oral cavity by directing itself towards the places of articulation. And we shall see which are those places recognized in the traditional sources and in the Pāṇinian grammar. The tongue also touches actually touches the places of

articulation in oral cavity to produce sounds. Tongue also lies down in order for the air flow to pass unhindered freely out of the oral cavity.

The other important part is also the oral aparture that we shall study later on, but jihvā is recognized as the most important means in the oral cavity. And then the sounds that are produced the speech that is produced through this particular process described can be shown on this particular slide. On the left hand side we have artha, and this left hand side represents the first two stages namely 'ātmā buddhyā sametyārthān' and 'mano yuṅkte vivakṣayā', these two stages and out of them as we have already studied śabdākāśa and arthākāśa these are those two places; these are those two aspects. Now, they both are collected over here they both are part of this.

Here we have not explicitly stated the śabdākāśa, but we have actually stated the arthākāśa. Now, from this it is assumed that śabdākāśa also exists over here because of the want of space we have not mentioned śabdākāśa, but it is assumed very much assumed and when this all gets activated, it actually generates these sounds these speech signals mentioned here as arthākāśa.

So, from the artha the śabda gets generated. So, this is the arthākāśa together with it there exists also a śabdākāśa and then it generates the entire process at the end of which these sounds, these signals are produced and they are all produced as one unit. So, that is why there is a square bracket at the end of each and every sentence. And since these sentences are uttered in close proximity one after another there is also a broad domain in which these sentences are spoken the broad context because of which the interrelation between the sentences will be clear. For example, in the first sentence you have 'Rāmo vanaṁ gacchati' which means Ram goes to forest.

Now, the second sentence because the context demands the arthākāśa as well as the śabdākāśa demands that we do not need to utter the word Rāma again, in its place we can use the pronoun which is saḥ. Now, this saḥ will depend on this Rāmaḥ because of the context now. So, he then does the penance in the forest. So, that is what is understood by this sentence and this he is nothing but Rāma that is decided by this context. So, the domain now of these five sentences will be also helpful in clearly understanding this sentence and this and such sentences and then thereby the communication process will take place.

Now, the sentences that are produced here and let me read the sentences for you. First let me read the artha which says 'Rama goes to a forest'. there he does penance then he slays Bali, then 'he slays Ravana', then he comes back these are the meanings associated with it and then the respective śabdas are selected and then the process starts.

And finally, as an output of this process we get the following śabdas following speech which is audible and that is 'Rāmo vanaṁ gacchati, vane saḥ tapaḥ karoti, tataḥ saḥ vālinaṁ hanti, tataḥ saḥ Rāvaṇaṁ hanti, tataḥ saḥ pratyāgacchati'. These are the five sentences which are audible which are the output of this entire process, but quite a lot goes behind the curtains so, to speak in producing these sentences and these speech symbols. And we have actually studied what goes inside.

So, these sentences are produced at the as the output of this process of speech production. And they are made up of the sound sound sequences, groups of sounds which are displayed on this particular slide in a structured manner. First of all we see a i u ṛ ḷ e ai o au as sounds separately written from the rest for some specific purpose.

We shall see why. Then, there are some other sounds which are arranged in five columns and five rows format each column is named 1, 2, 3, 4 and 5; C1, C2, C3, C4 and C5 and each row is named R1, R2, R3, R4 and R5; and then there are these consonants k kh g gh ṅ c ch j jh ñ ṭ ṭh ḍ ḍh ṇ t th d dh n p ph b bh m y r l v ś ṣ s and h.

This is the traditional sound inventory we had studied this when we learned how to form the pratyāhāra. Now, let us study the importance of this arrangement and now so certain principles on which this arrangement is made. So, the features of these sounds were extremely important from this point of view. For example, there are these features which are stated in this particular verse from the Pāṇinīyaśikṣā. It says, 'svarataḥ kālataḥ sthānāt praytnānupradānataḥ'. So, there are four features stated here. The first one is svara, then kāla, then sthāna and praytnānupradāna that is the last one.

Now, for our purpose we take kāla the first one length kāla are also called as pramāṇa. Then, we study the place of articulation namely the sthāna; then the prayatna which is described as effort of articulation and finally, the pitch or tone which is also the svara. So, these are the four very important features of these sounds. And now let us study each one of them in detail.

So, let us look at the first feature of the sounds namely the length of the sound also known as pramāṇa. So, the length of the sound which is measured in terms of the time that it takes to produce is an important feature. The traditional measurement is called mātra which can be also measured using the modern technological tools and it comes to a few seconds.

Now, using mātra as a measurement to measure the length of the sound, we can classify sounds. In fact, half a mātra time is taken by certain sounds to get produced and they are in fact,

classified as a separate group of sounds and they are called consonants also known as hal in the Pāṇinian grammatical terminology.

And we have already studied what 'hal' is all the consonants. It is said about the consonants that they cannot be produced without the support of vowels. Of course, in continuation you can produce them individually, but when it is a sequence, sequence of sounds produced to convey some meaning in the process of communication; then you cannot have groups of consonants coming together without having a vowel in between to support them.

There are some exceptions where you can have a cluster of consonants, but that is only an exception which proves the rule that the consonants cannot be produced without the vowels support. Now, if half a mātra length is considered as the criterion to classify some sounds and call them consonants; then one mātra or more than one mātra is also considered to be a measurement which using which sounds can be classified and these sounds are called vowels.

And in the traditional terminology Pāṇinian terminology using the pratyāhāra, we can call them 'ac' we have seen what 'ac' is in contrast to what 'hal' is all the vowels in the 14 sūtras that we have studied which are used to form pratyāhāra. So, this is how length plays a crucial role as far as the classification of sound as a feature.

So, here we can show in the traditional inventory why a i u ṛ ḷ e ai o au are separated from the rest; primarily because they require one mātra or more than one mātra at time to get produced and that is why they are called they are classified separately from the rest because the rest of them they take only half a mātra time to get produced. This is the biggest difference and these consonants and these sounds which are called consonants and also known as hal or vyañjana in Sanskrit these sounds they cannot appear in sequence for a long space, maximum four consonants can come together without getting a vowel in between, but that is only rarely that is an exception otherwise a consonant cluster is generally a cluster of two consonants coming together without any vowel in between generally.

But, otherwise as I said earlier this exception proves the rule that the consonants cannot appear on their own without the support of a vowel in Sanskrit. So, these consonants so, these consonants they are grouped together and that is the reason why they are all placed in one place separated from these vowels.

These are the 'ac' or svara and these ones they are the consonants or 'hal' or vyañjanas. And, we have already read these sounds we have already read the sounds that correspond with these

written symbols. So, let us proceed further this is how the time plays an important role this is how the pramāṇa plays an important role as a feature in classification of sounds.

Then, comes within the vowels - the vowels can further be classified depending on the length or the kāla. So, there are three groups that can be made; one is called hrasva, the other one is called dīrgha and the third one is pluta. hrasva vowel is a short vowel and it takes only one mātra time for its pronunciation; whereas, dīrgha vowel takes two mātra and pluta vowel takes three mātra for its pronunciation its production. And that is why dīrgh is called long pluta is called prolated. So, here are three further classifications of the vowels on the basis of the time that the sounds take for completion in the process of speech production.

The next important feature of these sounds in the process of speech production is sthāna. sthāna is the place of articulation and in the Pāṇinīyaśikṣā, 8 such places of articulation are described. And they are "aṣṭau sthānāni varṇānām uraḥ kaṇṭhaḥ śirastathā, jihvāmūlaṁ ca dantāśca nāsikoṣṭhau ca tālu ca", these 8 places are uras kaṇṭha śiras jihvāmūla nāsikā oṣṭha and tālu. And let us see what these places of articulation are, and which are the sounds which are produced through these places of articulation.

First of all what is a place of articulation. So, when the air flow comes into the oral cavity through the windpipe, this airflow or airstream then is shaped by the position of the tongue. And, then this tongue either touches certain places in the oral cavity or directs the wind stream, air stream towards these places; and then these places are called the place of articulation.

So, points in the oral cavity where the airstream strikes and then is thrown out is called the place of articulation. They are as listed earlier kaṇṭha tālu mūrdhan danta oṣṭhau jihvāmūla nāsikā and the uras. And, here are some sounds that are produced using these places of articulation for example, kaṇṭha which is velum and a is produced using kaṇṭha. And, also the all the sounds mentioned in the first row k kh g gh ṅ they are also produced using kaṇṭha as the place of articulation.

Similarly, tālu palate is used to produce the vowel i, and also amongst the consonants the second row c ch j jh ñ. Then, comes mūrdhan and mūrdhan means roof of the oral cavity; and amongst the vowel ṛ is produced using mūrdhan. Similarly, the third row namely ṭ ṭh ḍ ḍh ṇ this is produced using mūrdhan.

Then comes danta, the tooth or teeth; lru is produced using danta and the fourth row is also used is also produced using danta namely t th d dh n and oṣṭhau both the lips. They are used in

producing the vowel u as well as the fifth row namely p ph b bh and m jihvāmūla namely the root of the tongue is used to produce the sound jihvāmūlīya

Nāsika is used to produce the consonants in the fifth column. They are ṅ ñ ṇ n and m and finally, uras through which is produced a special sound 'h' so this is how the place of articulation works and classifies the sounds produced through the process of speech production.

So, here is the traditional sound inventory highlighting the sthāna. And, you see now there are some additional sounds mentioned here 'a' and 'h' along with k kh g gh ṅ they are produced using kaṇṭha. Similarly, i y and ś apart from c ch j jh ñ they are produced using the place tālu within the oral cavity.

Then from mūrdhan are produced ṛ and r and ṭ ṭh ḍ ḍh and ṇ then, from ḷ and l and t th d dh n; from oṣṭhau u and v and p ph b bh m. These are the sounds that are produced from kaṇṭha tālu two places of articulation coming together e and ai are produced. From kaṇṭha oṣṭhau again two places of articulation coming together o and au are produced

Now, let us look at the effort of articulation - the effort of articulation stands for the quality of air stream or volume touching the windpipe or vocal cord etcetera. And, these efforts of articulation are of two kinds ābhyantara internal inside the oral cavity or bāhya external that is out of oral cavity in the windpipe, etcetera.

So, there are four types of ābhyantara listed down spṛṣṭa meaning contact, touch of the tongue with the place of articulation that is all row from 1 to 5 columns 1 C1 to C5. All of them they are having the effort ābhyantara effort namely spṛṣṭa, then iṣatspṛṣṭa slight contact slight touch of the tongue with the place of articulation.

And we have y r l and v produced from this produced using this effort of articulation. Then, vivṛta openness of the oral aperture all the vowels except a short a is produced using this ābhyantaraprayatna and ś ṣ s and h are also produced by this ābhyantaraprayatna. The short a is produced by closed aperture. So, it is called saṁvṛta ābhyantaraprayatna using which a is produced.

Once again we have the traditional sound inventory with the marks of the ābhyantaraprayatna the effort of articulation. So, all the vowels except a they are vivṛta and a is saṁvṛta. All these 5

rows plus 5 columns they are called spṛṣṭa, y v r l they are called iṣatspṛṣṭa and ś ṣ s h; they are also called vivṛta because there ābhyantaraprayatna is vivṛta.

Next we go to the effort of articulation which is bāhyaprayatna. And, here there are a number of prayatnas that are listed down and on this slide we note them and also point the consonants which are having that particular bāhyaprayatna. Generally, these bāhyaprayatna are described of only these consonants. So, that is why they are listed here.

So, for example, śvāsa which is breath. So, heavy breath this is used to produce columns 1 and 2 and ś ṣ s, nāda that is resonance this is the bāhyaprayatna of columns 3, 4, and 5; and h aghoṣa voiceless this is the bāhyaprayatna of column 1 and 2; and ś ṣ s h ghoṣa that is voice this is once again the bāhyaprayatna of columns 3, 4, 5 and h.

vivāra openness is the bāhyaprayatna of columns 1 and 2 plus ś ṣ s and saṁvra is the bāhyaprayatna closure of columns 3, 4 and 5 and h. In addition to them there is alpaprāṇa less aspirate which is the bāhyaprayatna of columns 1, 3 and 5 and mahāprāṇa more aspirate which is the bāhyaprayatna of columns 2 and 4 plus ś ṣ s and h.

Let us look at the traditional sound inventory with the information of bāhyaprayatna included. So, here we have column 1 śvāsa aghoṣa vivāra, column 2 nāda ghoṣa saṁvāra and mahāprāṇa. So, this column is alpaprāṇa we have not mentioned a here for the sake of avoiding ambiguity.

But because of this ma which is mahāprāṇa it should be clear that this is alpaprāṇa this is mahāprāṇa. So, let us look at the traditional sound inventory with the marks of the bāhyaprayatna. So, here are the bāhyaprayatna marked on the consonants. So, the first column is called śvāsa aghoṣa and vivāra having these bāhyaprayatna. So, second column has nāda ghoṣa saṁvāra and mahāprāṇa in contrast with mahāprāṇa C1 is alpaprāṇa, C3 is also alpaprāṇa, C5 is also alpaprāṇa.

But we have not mentioned a again to avoid the ambiguity, but the absence of that fourth feature mentioned here and the fourth feature mentioned here should make it clear that this is alpaprāṇa only mahāprāṇa is explicitly mentioned otherwise every consonant is alpaprāna. So, śvāsa aghoṣa and vivāra this is the bāhyaprayatna of column 1, nāda ghoṣa saṁvāra and mahāprāṇa is the bāhyaprayatna of column 2, śvāsa aghoṣa and vivāra again is the bāhyaprayatna of column 3, nāda ghoṣa saṁvāra and mahāprāṇa is again the bāhyaprayatna of column 4 and śvāsa aghoṣa and vivāra is once again the bāhyaprayatna of column 5.

Now, even the ś ṣ s they are said to possess the śvāsa aghoṣa vivāra and mahāprāṇa. And, h is said to possess the nāda ghoṣa saṁvāra and mahāprāṇa. So, this is how the bāhyaprayatna are marked over sounds and sounds can be classified in accordance with the bāhyaprayatna.

And as we shall see later on it is these bāhyaprayatna which will become very important when we decide about a substitute in place of a substituent. Now, the last feature which is used to describe these sounds is pitch or tone also known as svara accent. And there are three accents noted namely udātta acute, anudātta grave, and svarita namely circumflex. And all these are the features of vowels these can never be the features of consonants in Sanskrit.

To summarize, we study the features of sounds produced by the process of speech production as described in the traditional sources of Pāṇinian grammar. Let us take each individual sound and now study what features it possesses. These features served as parameters for selection of a substitute in place of a substituent, we shall study this in the coming lecture.

Thank you for your attention.