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# Visharad Poorna Theory

**2006 Syllabus**: Akhil Bharatiya Gandharva Mahavidyalay Mandal – India

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# Theory: Written Exam Paper # 1:

## Chapter 10:

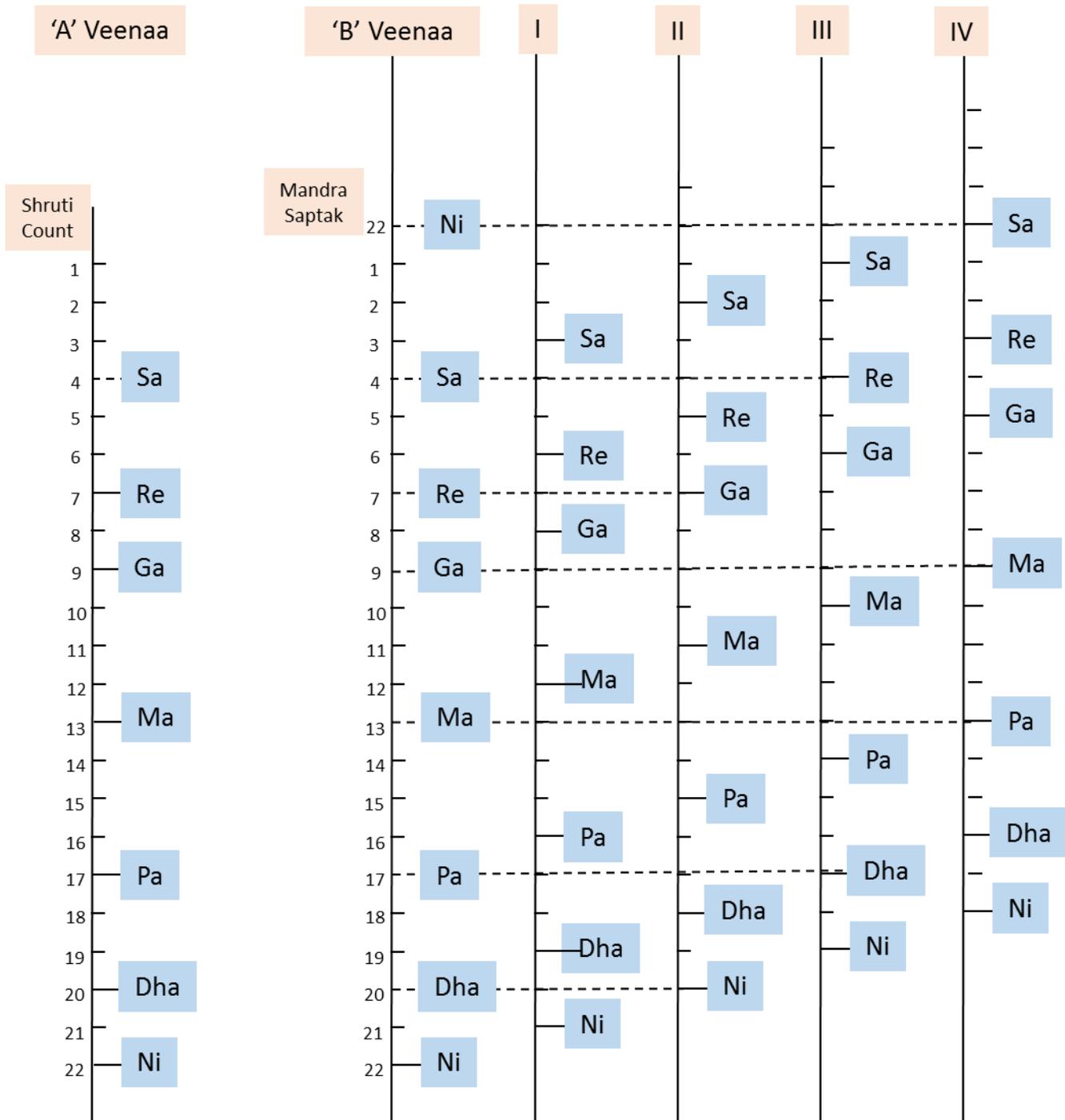## Saaranaa Chatushtayee Experiments by Bharat and Shaarngadeva

Before we discuss the theory of 'Saaranaa Chatushtayee' established by Bharat and Shaarngadev, let us briefly look at the theory's background. In Saamaved's time before Bharat, saptak (octave) consisted of descending swar and it started with Madhyam swar (Madhyam graam). On the other hand, during Bharat's time, saptak started with Shadja and it included ascending notes (Shadja graam). This theory attempted to coordinate these two arrangements of saptak.

Bharat presented this theory with a string instrument Veenaa. He also wanted to show how to establish Shadja and Madhyam gram on Veenaa. In Bharat's time Shadja and Madhyam gram were prevalent. Gaandhaar gram had disappeared long before this time. There may have been two reasons for this disappearance: 1. Gaandhaar graam's construction was complex and difficult. 2. Scholars believe that Gaandhaar graam notes did not follow communication principle (Sanvaad-tattva). It was well known in Bharat's time that Indian swar-saptak is built using Sanvaad-tattva (communication principle). Music scholars from that time knew that Shadja-Pancham bhaav and Shadja-Madhyam bhaav is instinctively known to musicians. They also knew that when a Shadja string is plucked on Veenaa, some other swar like Gaandhaar and Pancham are generated automatically. To some extent, such intangible swar could be made tangible with the help of string instruments and beginner students could easily understand how a saptak is created. These days, Harmonium is a useful instrument to understand swar and their relations between each other. With Saaranaa Chatushtayee experiment, It became easier to compare the two graam.

Another opinion about this experiment is that the word 'Saaranaa' was not used by Bharat. He used a word 'Shrutinidarshan' (Demonstration of Shruti). Bharat used two identical Veenaa with seven strings each for his experiment. 'Saaranaa' word was used in Sangeet Ratnaakar by Shaarngadev. He used two identical Veenaa with 22 strings each for a 'Saaranaa Chatushtayee' experiment.

# Shrutinidarshan (Saaranaa Chatushtayee) experiment:

Take two totally identical Veenaa (length, strings, tone, shaft etc. are identical). Tune the strings of both Veenaa in Shadja graam. This was the prevalent saptak at that time. One Veenaa will be 'Dhruva' (Achala) Veenaa (Achala = stationary or immovable). Dhruva Veenaa strings will not be changed. Let us call this 'A' Veenaa. Second Veenaa will be 'Chala' (movable) and we will call it 'B' Veenaa. We will transform this 'B' Veenaa into Madhyam Graam Veenaa. This will allow us to compare the two graam.

| Shruti Count ('A') | 'A' Veenaa | Shruti Count ('B') | 'B' Veenaa | I | II | III | IV |
|---|---|---|---|---|---|---|---|
| | | 22 (Mandra Saptak) | Ni | | | | Sa |
| 1 | | 1 | | | | Sa | |
| 2 | | 2 | | | Sa | | |
| 3 | | 3 | | Sa | | | Re |
| 4 | Sa | 4 | Sa | | | Re | |
| 5 | | 5 | | | Re | | Ga |
| 6 | | 6 | | Re | | Ga | |
| 7 | Re | 7 | Re | | Ga | | |
| 8 | | 8 | | Ga | | | |
| 9 | Ga | 9 | Ga | | | | Ma |
| 10 | | 10 | | | | Ma | |
| 11 | | 11 | | | Ma | | |
| 12 | | 12 | | Ma | | | |
| 13 | Ma | 13 | Ma | | | | Pa |
| 14 | | 14 | | | | Pa | |
| 15 | | 15 | | | Pa | | |
| 16 | | 16 | | Pa | | | Dha |
| 17 | Pa | 17 | Pa | | | Dha | |
| 18 | | 18 | | | Dha | | Ni |
| 19 | | 19 | | Dha | | Ni | |
| 20 | Dha | 20 | Dha | | Ni | | |
| 21 | | 21 | | Ni | | | |
| 22 | Ni | 22 | Ni | | | | |

## 1. Counting Shruti and the First Saaranaa (Refer to the above diagram)

In the beginning both 'A' and 'B' Veenaa have Pancham swar (Pa) on 17$^{th}$ shruti. In this first Saaranaa this Pancham will be reduced by one shruti in Veenaa 'B' and it will be on 16$^{th}$ shruti. To decide on the measurement of the correct frequency of a shruti, a musician's ear (musical ear) is considered to be accurate. In another approach it can be said that reduce Pancham to where the reduced Pancham string will establish a Shadja-Madhyam Bhaav (relation) with the Rishabh string which is on 7$^{th}$ shruti. Note: Shadja –Pancham Bhaav or Sa-Pa relation has distance of 13 shruti. Sa-Ma relation or Shadja-Madhyam Bhaav has nine shruti between them. Hence Original Re on 7$^{th}$ shruti has Sa-Ma relation or 9 shruti between the reduced Pancham on 16$^{th}$ shruti. In this manner all other strings are also reduced by one shruti each. Hence 'B' Veenaa's strings are respectively tuned to shruti 3, 6, 8, 12,16, 19 and 21.

## 2. Second Saaranaa

In Second Saaranaa, Ga and Dha strings of Veenaa B are tuned to same frequencies as Re and Dha strings of Veenaa A. Thus Veenaa 'B' now has strings successively tuned to 2, 5, 7, 11, 15, 18, 20 shruti.

## 3. Third Saaranaa

Reducing Pancham string by one more shruti in Veenaa B will place Pancham string on shruti number 14. Reducing all other strings on Veenaa B same way will match frequencies of Re-Dha strings from Veenaa 'B' to Sa-Pa strings on Veenaa 'A'. Here the seven strings on Veenaa 'B' are now on shruti 1, 4, 6, 10, 14, 17, 19 respectively.

## 4. Fourth Saaranaa

Reducing the pancham frequency by one more shruti at this step puts Pancham of Veenaa 'B' on 13$^{th}$ shruti. Each string on Veenaa 'B' is now reduced by 4 shruti compared to same strings on Veenaa 'A'. Hence Pa-Ma-Sa from Veenaa 'B' are matched with Ma-Ga-Ni of Veenaa 'A'. Now the seven swar on Veenaa 'B' are on shruti 22 (Mandra Saptak), 3, 5, 9, 13, 16, 18$^{th}$ shruti.

Interpretation of Saaranaa Chatushtayee experiments conducted by Bharat and Shaarngadev:
1. Experiments by Bharat and Shaarngadev are based on the same principle. Bharat used a Veenaa with seven strings and Shaarngadev used a Shrutimandal with 22 strings to explain the experiment. According to Dr. G. H. Taralekar, according to Shaarngadev in his book Sangeet Ratnaakar, 'doing a Saaranaa on a swar means loosening a string of the swar from chala Veenaa (Veenaa 'B') and tune it to a particular swar'. On the other hand, word 'Saaranaa or Saarikaa' is not used in Bharat's Naatyashaastra.
2. Communication Principle (Sanvaad Tattva)
   Bharat has clearly stated that saptak is strictly constructed on the basis on communication principle. Differences in Swar specifications are: Vaadi, Sanvaadi, Vivaadi and Anuvaadi. The two swar pairs that have nine or thirteen shruti distance between them, are said to have Shadja-Madhyam and Shadja-Pancham sanvaad. Bharat specified following pairs of swar in Shadja Graam: Sa-Pa, Re-Dha, Ga-Ni, and Sa-Ma. In Madhyam Graam, instead of Sa-Pa, Re-Pa communication is observed. The two swar that have only one shruti distance between them are called Vivaadi swar. Examples of Vivaadi swar are: Re-Ga and Dha-Ni.
3. Music scholars have two different opinions about whether the ancient shruti were equi-distant. Bharat's pairs of swar indicate that he considered those swar to be based on shruti with equal distance between them. Some scholars tried to mathematically measure and prove shruti frequency-distance was unequal. It is also said that 'Comma' in Greek music theory is the same as Bharat's measurement of shruti. There is still lot of confusion in this topic. Both opinions are said to have some merit according to late G. H. Ranade.