INTRODUCTION
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“वेदां सामवेदोद्स्ति” 1

“Of vēḍās, I am Sāmavēḍa”, says Kṛṣhṇa.

The four vēḍās – Rk, Yajus, Sāma and Athharva - are the foundation and source of Indian culture, traditions and philosophy. They form the base for all the arts and sciences of Indian origin. The term “vēḍāvākya” has earned the status of being used to indicate the ultimate word or principle to be followed in any subject. Sāma is considered to be most prominent among vēḍās. The word sāma has a meaning – “that which consoles.” Further, Sāmavēḍa is the most musical one and its chanting was the main source for the development of Indian music. It might be the superior status of the Sāmavēḍa, including its capacity to soothe human mind through the soft music, which made Lord Kṛṣhṇa compare Himself to it.

1 Sreemad Bhagavadgeetha – 10th Chapter –Vibhoothivistharañyoga: - Śloka No.22
Indian Music is considered to have originated from the monotonic chanting (Ekaswarēegāyana) of Ṛgveda in the worship of God, accompanied by the monochord harp. The monotony necessitated changes in chanting. As a result, the number of notes were increased gradually and rested with seven - the sapthaswafās. The experiments and attempts for further improvement continued. New observations were made and the concept of twentytwo śruthis evolved as the major milestone in the development of Indian music.

The twentytwo śruthis were used in Shadjagrāma and Maḍhyamagrāma. It was the quest of Bhaṭṭāraka to determine the distance between or the placement of the notes in the scale of Shadjagrāma that led to the experiment of Dhruvaveeṇa and Chalaveeṇa. The attempt ended successfully with the establishment of the principles in theory and practice of music, such as twentytwo śruthis and types of intervals figuring in them.
The meaning of śrūthi is - that which is heard. So, the unheard ones do not come under the purview. It was on the basis of these heard ones that the edifice of twentytwo śrūthis was built by ancient masters.

Still we are using the same number as heard and identifiable ones. The only difference is that, since s and p became achalaswarās with the emergence of the concept of rāga, the distribution has come to a different mode. Now, we are having shadja and panchama with one śrūthi each since they were made achalaswarās. The other five notes take four śrūthis each. But, when the common reference is made of swarās, only two varieties are being mentioned. E.g. sud'dha ńishabha, chathusśruthi ńishabha etc. But, while rendering music, we apply these two varieties of swarās with their own internal varieties of śrūthis, knowingly or unknowingly, in rāgās in which they occur. For example, we are very much used to the practice of singing mad'hyama of Śankaṝābhaṝaṇa and that of Bēgada in their own ways. In common practice, both are referred to as sud'dha mad'hyama. The mad'hyama of Bēgada is
generally not referred to as *theevra śuddha madhyama*. But, it is rendered with a wide oscillation from $g$ to $p$. i.e.- $m$ ; ; - is rendered as- $g, p m, p m$, - even if the frequency of the note is not known. If the analytical approach of identifying this higher *madhyama* as *theevra śuddha madhyama* or a note of higher frequency value (27/20) is carried out in the course of ṛāga study, it becomes scholarly and exhaustive in nature. Such studies also help us appreciate the depth of the physics of music.

An octave with seven notes, twelve swaṛasthānās and twenty-two śruthis is the hard-rock foundation on which the Indian melody is built. It is the life and soul of our prestigious and monumental ṛāga system. Melody-based Indian music system is the only one in the world that developed and has been using innumerable varieties of ṛāgās. Ṛāga is the pivot around which the melodic system revolves. The fact that ṛāga is enjoyable and that it can influence the listeners is based upon so many factors.
Gamakās are the equipments or tools that highlight the bhāva of a rāga. A rāga without gamaka is only a scale, which is not capable of creating any influence. If we take the scale of Thōdi for example, it is very difficult for one to identify the rāga, if the notes of the scale i.e. mere ārōhaṇa and avarōhaṇa are sung as plain notes. It is the gamakās or embellishments and manipulations like curves, links and stress, which create life in a scale. Western music is enriched by harmony and there, the total effect or the harmonised effect is brought out. But, in India, gamakās play the centre role in establishing the beauty of a melody.

Though a performing artist can render a rāga or a kṛthi on the basis of practical knowledge and lakshya jñāna, yet the dedication to the subject creates in him a zeal to identify and understand them from the point of view of lakshaṇa.

The thesis entitled “The Concepts and Application of Śrūthis and Gamakās in South Indian Classical Music” is an
attempt to analyse the different concepts of śrūthīs and gamakās and their application in practical music.

The first half of the thesis deals with the physics of sound i.e. acoustics, in which there is detailed study of the production of sound, sound-wave, wave motion etc. A basic knowledge about the science of sound will add much to the theoretical and performing aspects of music. The relationships among pitch, frequency, tension, mass etc. are applicable to musical instruments, why not, to vocal chords also. In fact, if one has knowledge about the behaviour of vocal chords, he can attempt voice culture in a better way.

Śrūthīs and gamakās are dealt with in the second half of the thesis. The frequencies used in different ārāgas have been discussed. Different systems of gamakās and the signs used for them by ancient masters have been analysed. The interaction of śrūthīs and gamakās in various ārāgas, and their role in creating the mood (bhāva) of the ārāga as well as that of the sāhityya, have been
subjected to analytical study. Observations have been made with the help of a number of compositions.

**Review of earlier research on this topic**

Studies have been made earlier in the field of śruthis and gamakās. The approach of each work shows a different angle of exposition. However, in those, either the field of śrūthi or that of gamaka was taken as the focal point.


3. Śrūthis figuring in the ōgās of South Indian Music – Padma Rangachari, 1st half yearly report, Madras University.

4. Gamakās and their growth in Karnataka and Hindustani Music – Annapoorini. J.

**Methodology adopted**

The topic is a combination of theoretical and practical aspects. It is the practice in the field of performing arts that lakshya is followed by lakshaña. The whole topic has been viewed with due importance to each of them. A lot of analytical work on practical and application aspects has been conducted. Textual analysis has been done and views expressed with the support of quotations. Practical experience in the field has helped this authoress a lot to arrive at certain conclusions. Informal interviews and discussions with veteran personalities, veeña experts, musicologists, performing artists, students and listeners have been undertaken. Thematic concerts were attended to from the point of view of observation. Ŗasikās were met personally to get feedback about the present musical trend and its impact on them.
Materials of primary relevance are included in the body and that of secondary relevance are given in the appendix.

An audiostream containing the Navagraha Kritis of Muththuswamy Deekshithar and the ata thāña varṇam Viñibōni in Bhairavi rāga composed by Pachchimiriyam Ādiyappayya is also submitted along with this thesis.

**Chapterisation**

The thesis is divided into two parts.

**Part 1** contains two chapters.

**Chapter 1** starts with the primordial sound Aum and develops through topics dealing with generation, transmission, perception and hearing of sound.

**Chapter 2** deals with the physics of sound such as waves, vibrations, aspects of wave motion,
forced vibration, resonance and echo. Since śrūthi is based on frequency values, a study of the physics of sound is unavoidable even for an entry into the subject. The characteristics of musical sound are also dealt with in this chapter. It also covers the evolution of swaṛās and musical scales, stage by stage. The gradual development of music from a single note to seven notes is detailed here.

**Part 2**

This forms the nucleus of the thesis and contains three chapters.

**Chapter 1.**

The concepts of śrūthi, definition and evolution, frequencies and ratios, different interpretations etc. are explained in this chapter.
Chapter 2 opens up with definition and classification of gamakās. The different concepts of gamakās are analytically discussed.

Chapter 3 deals with the application of śrūthis and gamakās with respect to the ōgabhāva and the sāhithyabhāva, followed by the study and analysis of compositions.

The aim of the project

In the student days, the concept of śrūthis seemed to stand apart from the arena of practical implication. Gamakās were learnt from lakshaṇa granthhās, but a study of their relationship with practical music was lacking. Though gamakās are the life and breath of our ōgās, inability to identify many of them while singing, remained a draw back. Sources of information to identify the gamakās and elucidate them with respect to ōgabhāva was felt a necessity. This work is aimed at the benefit of the students, to help them develop a tendency of observing ōgās from various angles.