

MELA PRASTARA-S IN CARNATIC MUSIC - MATHEMATICAL POSTULATES IN THEORY AND PRACTICE

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Abstract

The term 'Mela' is derived from the Sanskrit word 'mela', which means 'combination/coming together' and 'Prastāra' means 'Permutation' or literally speaking, extension or expansion. Prastara, a general mathematical concept, seems to have been borrowed from Shat-Pratyayas of metrics and incorporated into music and thereby into rhythm. The study of permutations and combinations seems to have been existing since the Vedic times and has been applied in various spheres of life, including music. Infact, Music has progressed and evolved from one note to seven and a svara saptaka consisted of 22 sruti-s. Svara-s resulting from the unison of Srutis, with the system of prastāra, resulted in the enumeration of different permutational note-series, leading to a variety of raga formulations. The Mela-Janya system of raga classification emerged when the Grama-Murcchana-Jati system fell into disuse. Idea of mela prastara or working out the possible number of melas by the use of permutations and combinations was probably inspired by the tana prastara, svara prastara and tala prastara-s expounded in great detail in the Sangita Ratnakara and other works. A study of the history of mela prastara from the time of Somanatha, the originator of the scheme of melas as such, down to the period of Govinda (Acharya) brings to light the other mela schemes formulated by various lakshanakaras. Inspired by the prastaras in Sruti Melas concept, some modern-day scholars have also tried to expand the scheme of 72 melas. Through this paper, a humble attempt is being made to give an account of the various models of mela prastara-s proposed in the musical treatises of the medieval and modern period, on the basis of permutations and combinations of sruti-s and svaras.

Keywords: Mela, Prastara, Sruti Mela, Svara Mela, Carnatic Music, Music and Mathematics

INTRODUCTION

The term 'Mela' is derived from the Sanskrit word 'mela', which means 'combination/coming together' and 'Prastara' means 'Permutation' or literally speaking, extension or expansion. The idea of mela prastara or working out the possible number of mela-s by the use of permutation and combination was probably inspired by tana prastara-s and tala prastara-s expounded in great detail in the Sangita Ratnakara and other works.

After the period of Brihaddesi and Ratnakara, a decline in the grama system led to the development of a fixed tonic note system and all the later works considered the seven Svara-s of Shadja Grama as Suddha Svara-s and the other Svara-s as Vikrita Svara-s based on the concept of 22 Sruti-s. In the Post Ratnakara period, the Suddha-Vikrita Svara-s explained by Sarngadeva gave a beginning to all the later writers as these formed the primary base in classifying rāga-s of the mēla system following a few modifications in the description of Suddha Vikrita Svara-s.

22 Sruti-s were considered for the formation of svara places with a number of svara variations and in the evolution of the svara system and their contribution towards the various theories that came up to be standardized in the present format, Shadja and Panchama have attained the status of fixed notes or prakriti svara-s. As can be traced from the history of music, the note Madhyama seems to have been an important reason in the development of various theories.

Centuries of experimentation and development of music led to an increase in the number of raga-s and this necessitated a proper classification of raga-s. In such a situation, raga-s were classified based on the arrangement of svara-s which had affinity to certain fundamental scales. Thus, the janaka-janya system of classification came into existence during the early medieval period.

In relation to the Adhara Shadja, arrangement of svara-s, one higher than the other, was termed as Mela. The Suddha, Vikrita Jatis of the early part of the 14th century, slowly evolved into mela-s. However, defining Mela with the meaning 'Janaka or Parent Raga' had come into being only during the 14th Century. Prior to this period, the concept of mela and janya was interpreted in a musically flexible manner, where emphasis was

more on the classifying function, with a good number of janyas grouped under the melas. A raga having all the svaras in both ascent and descent together were considered as a mela and thus, janya ragas also had a scope in the list of melas.

A study of the history of mela prastara from the time of Somanatha, the originator of the scheme of melas as such, down to the period of Govinda(acharya) brings to light the other mela schemes formulated by various Lakshanakaras.

MELA PRASTARAS

A Study of Musical treatises reveals that Mela prastara-s have been hypothesised and formulated based on various permutations and combinations of Sruti-s and also Svara-s.

- **Vidyāraṇya Svāmi in his work 'Saṅgīta Sāra'** (14th century) enumerated rāga-s in a sort of a 'Janaka-Janya' system of classification, mentioning 15 Mēḷa rāga-s and 50 Janya rāga-s.
- **Lōchana Kavi's 'Rāga Taraṅgiṇi'**, also belonging to the 14th century, is the next work to mention rāga-s under the categories of primary rāga-s and derivatives. He mentioned 12 Thāt's (Hindustani system of Music) and classified his list of 75 janya rāga-s under them.
- Later, **Rāmāmātya in his 'Svaramēḷa Kalānidhi'** (16th century) had listed 20 Mēḷa-s and 64 Janya rāga-s. Rāmāmātya was the first lakṣhaṇakāra to devote an entire chapter in elucidating the topic of mēḷa in his work.
- **Somanatha in his 'Raga Vibodha'** (early 17th century) was the first Lakshanakara to think of a scheme of Sruti mela-s. Apart from his proposal of 23 Svara Mela-s and 76 Janya raga-s, he formulated a scheme of 960 sruti melas based on 7 Suddha Svaras and 15 Vikrita Svaras comprising the 22 srutis. Somanatha recognized three varieties of Ri, Dha and Ni, four varieties of Ga, two varieties of Ma besides the usual suddha svaras. In recognizing the vikritas even in suddha positions, many svaras have been found to have dual names and this fact had contributed to the repetitions of scales in the scheme. Finding the 960 melas as rather impracticable, he finally reconciled himself to the theory of 23 melas. However, his idea of a scheme of melas had been the seed for the mela-raga classifications of later writers.
- **Ahobala in his treatise 'Sangita Parijata'** had classified Mela-s as - Purna, Shadava and Audava. Like Somanatha, Ahobala also formulated a formidable scheme of 11,340 sruti melas based on his concept of 7 Suddha Svaras and 22 Vikrita Svaras. It is not possible to conjecture how the author arrived at such a colossal number. It is evidently due to the recognition of Audava, Shadava and Sampurna varieties of melas.
- **Chaturdandi Prakasika of Venkatamakhi** mentioned 19 prasiddha melas and 55 janya ragas classified under them. He also devised and explained the scheme of 72 Melas using the 12 svara places of 7 svaras with 16 svara variations and grouped them under 12 chakras, each comprising of 6 mela ragas. The first half of these melas take Suddha madhyama as a constant note and the second half of melas take the Prati madhyama. The svara notes were indicated by means of vowel syllable variations - a, i, u. Thus, Ra, Ri, Ru, Ga, Gi, Gu, Ma, Mi, Dha, Dhi, Dhu, Na, Ni, Nu denoted the svara bhedas. While Ri and Ga changed from Chakra to Chakra, Dha and Ni changed from Mela to Mela.

Though Venkatamakhi formulated only the theoretical postulate of the 72 melas on a melodic foundation, he did not attempt a proper nomenclature of the melas. He classified melas as Kalpita, Kalpyamana and Kalpishyamana and considered the 19 prasiddha melas described by him as Kalpita Melas. Those that were in the process of attaining popularity were known as Kalpyamana melas and those which were to become popular in future were called Kalpishyamana melas.

- **Sangita Saramrita of Tulaja** also talked of 19 Prasiddha Melas and explained in detail, 112 janya ragas. It was after this period that the earlier ‘Kanakambari-Phenadyuti’ nomenclature was enunciated by a scholar.
- In the 18th Century, the author of the treatise ‘**Meladhikara Lakshana**’, propounded a scheme of 4,624 sruti melas taking the 24 srutis of an octave with 34 swarasthanas.
- Similarly, belonging to the 18th century itself, another contemporary work **Sangita Sara Sangraha of Tiruvenkata kavi**, also devised a scheme of 4,624 sruti melas with the help of 24 srutis and 34 swara variations.

In both these treatises, apart from Shadja and Panchama, 7 kinds of Rishabha and Gandhara, 7 kinds of Dhaivata and Nishada and four kinds of Madhyama have been considered, which can be briefly explained as –

S, P	-	1 variation each	-	2
R, D, G, N	-	7 variations each x 4	-	28
M	-	4 variations	-	<u>4</u> <u>34</u>

Hence, $34 \times 34 = 1,156$ melas $\times$ 4 madhyama variations = **4,624**

The 4,624 melas are grouped under 136 chakras, each consisting of 34 melas. For every 34 Chakras, the Madhyama changes. The Rishabha and Gandhara remain constant within a chakra whereas Dhaivata and Nishada change from mela to mela within a chakra.

The author of Sangita Sara Sangraha talks of three veenas named Brahma Veena, Vishnu Veena and Rudra Veena. The Scheme of 4,624 sruti melas as discussed above is attributed to the Brahma Veena with 24 frets. The Vishnu Veena and Rudra Veena are said to have 12 frets each and talks of 100 melas for the Vishnu Veena, though this scheme has not been discussed. With the help of Rudra Veena, the author derives 72 melas which is based on 3 varieties of R, G, D, N and 2 varieties of M other than S and P. This scheme is similar to the one used in current practice.

- **Sangita Nibandhah**, another 18th century treatise of Unknown Authorship, also mentions a scheme of Sruti melas, numbering 6,084. This work also considers 24 srutis and 34 swara variations yielded with 7 variations each of R, G, D, N and their combinations, giving rise to 1,521 melas. These 1,521 melas with 4 variations of Madhyama result in the formulation of **6,084** sruti melas.

These 6,084 melas are grouped under 156 chakras, each consisting of 39 melas. For every 39 Chakras, the Madhyama changes. The Rishabha and Gandhara remain constant within a chakra whereas Dhaivata and Nishada change from mela to mela within a chakra.

- Though **Govinda(acharya) in his Sangraha Chudamani** has accepted and modified the scheme of 72 melakartas on the basis of 12 Swarasthanas, 16 Swara names and 22 srutis as used in current practice, he too tried his hand at mela prastara in the steps of his predecessors and explained his scheme of 2,704 sruti melas, which considers 22 srutis and 30 swara variations. This scheme recognizes 6 varieties each of R, G, D, N and four varieties of M. 26 permutations-combinations of R, G and 26 permutations-combinations of D and N resulted in $26 \times 26 = 676$ melas and these, with the combination of 4 variations of madhyama, resulted in $676 \times 4 =$ **2,704** sruti melas.

However, the ‘Kanakangi-Ratnangi’ nomenclature, also a creation of Govinda of Sangraha Chudamani, came into existence with the added merit of conforming to the ‘ka-ta-pa-ya-adi’ requirements. It was Govinda(acharya) who defined mela in its modern terms and assigned three properties as essential for

assigning the status of a mela. They are : a. Kramatva of Swaras, b. Sampurnatva of arohana and avarohana c. Ekagunatva of the swaras in the ascent and descent

Given these properties/rules, there cannot be more than 72 sampurna raga-s. Because of the need for ascending order of tones the permissible combinations of Rishabha- Gandhara and Dhaivata-Nishada are limited to 6 each. So, with 2 Madhyamas, the number of possible Sampurna Raga-s is $6 \times 6 \times 2 = 72$.

Thus, he propounded a scheme of 72 Melakartas using the 'Kanakangi-Ratnangi' names and explained 294 janya ragas through Lakshana Gitas. This scheme was accepted as sound by all scholars and composers. The Kanakangi-Ratnangi nomenclature has continued sacro sanct ever since, being accepted by all Scholars and Composers.

Seeing the advantage of the katapayaadi prefixes for mela names, a later scholar improved the earlier Kanakambari system by introducing the katapayaadi prefixes where necessary. This was followed by Muthuswami Dikshitar. Even this later Kanakambari nomenclature underwent some changes in the hands of Subbarama Deekshitar.

MĒLA-S - MODERN DAY REPRESENTATIONS

Inspired by the prastaras in Sruti Melas concept, some modern day scholars have also tried to expand the scheme of 72 melas.

- A scheme of 108 melas has been devised including the possible 36 vikrita panchama melas i.e, melakartas taking both the madhyamas, without the panchama. Since these 36 melas lack the perfect 5th or panchama and also the concept of panchama as an avikrita swara is mutilated, the utility of the scheme seems to be doubtful.
- Another extension of the 72 melakarta scheme is the Scheme of 144 Melas. Herein, the first 72 comprise the present melas. The remaining 72 are the misra melas, wherein for each suddha madhyama mela in the arohana, there is its corresponding prati madhyama mela in the avarohana. Similarly, for each prati madhyama mela in the arohana, there is the corresponding suddha madhyama mela in the avarohana. Keeping aside the value of its practical relevance, this scheme also seems to distort the principle of ekagunatva of swaras essential for a mela.
- In similar lines, Prof. Sambamurthy has also formulated a scheme of 5,184 melas following the concept of compound scales. His scheme includes the 72 melakartas termed suddha melas and 5,112 misra melas which have been obtained by keeping the arohana of each mela constant and taking each of the avarohana of all the other melas. Thus $72 \times 72 = 5,184$ melas. This ambitious scheme seems to be a logical extension of the 72 melakarta scheme to increase the gamut of ragas but goes against the principle of ekagunatva of a mela.

CONCLUSION

Considering these new schemes that have been devised, it is felt that these new varieties can as well be considered as new ragas similar to that of the existing compound ragas like Mohana Kalyani, instead of considering them as melas by deviating from the principles laid down for melakarta-s.

We can definitely say that Govinda's insistence on sampurna arohana-avarohana paved way to a system which is more elegant from a mathematical viewpoint and represented the ideal stage in the history of mela prastara and raga classification.

Though the different mela schemes propounded with a number of sruti-s and svara-s may be comparatively of little practical value as such, they may be considered rather important from the historical and theoretical perspectives.

However, contemporary Carnatic music, in its present form, rests on the structure set out in the 72 Melakarta Scheme. Today this scheme is considered one of the most scientific, comprehensive and beautiful schemes in the music systems of the world and this formulation is an event of far reaching significance in the history of Carnatic Music.

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