

# The structure of *Raga* music—Part I. *Swara* and *Tala*

Raja Ramanna

While there is general awareness of the deep cultural values of classical Karnatic music amongst the general public, there is a lack of appreciation of its theory and structure. It is the existence of structure which makes music classical, logical and a part of philosophy. All this gives it a permanence and scope for development and makes it survive through the ages.

Though the structure of *Raga* music has had a long period of development and has been stabilized over the centuries (Appendix 1), recent developments in science and technology and the influence of other cultures have had an impact, which makes the study of structures essential for satisfactory performance, interpretation and appreciation. Political and economic developments have also changed the nature of the audience and music has become a people's art. Gone are the days of *Maharajas* and *Zamindars*, who in the past supported the development of the arts in a profound way. Temple musical culture continues to help in the preservation of music, particularly in the great dance forms like *Bharata Natyam*.

Classical *Raga* music is no longer the chamber music that it used to be, and to present classical music to large audiences, high-fidelity reproduction has become essential; this requires technologists who have a working knowledge of musical theory and structure. In the West, the interaction between musicians and technologists has been well established. In matters concerning instruments, recording, amplification and faithfulness of reproduction with respect to a given hall, the developments in physics, particularly by Helmholtz<sup>1</sup>, and the theory of materials of construction have played an important part. This has helped in refining the tastes of the public. In fact, many discriminating musicians refuse to perform in halls with bad acoustics or bad reproduction facilities. Modern electronics, especially compact discs, have demonstrated the meaning of faithful reproduction and will soon have an impact on Indian music. However, all this would not have been possible but for the close interaction of musical theory, physics, modern electronic technology, the acoustics of auditoria, etc.

For this transformation to take place in India, not only musicians but also audiences and the technical

people must have the opportunity of acquiring a working knowledge of the structure of the music, firstly to understand it better, secondly to recognize frequency and rhythmic distortion and lastly to help in the development of new ideas. The need to understand the theory of ornamentation (*Gamakas*), which is a special dimension of Karnatic music, requires a finely trained ear. Unfortunately, the improvisatory nature of ornamentation makes the writing of this aspect of music difficult, but it can be put on paper once the notation is properly correlated with actual performance.

## Swaras

The *Sama Veda*, which is dated to earlier than 1500 BC, has the statement that a *Raga* has at most only seven *Swaras* or notes in an octave. In principle, an octave can be divided into any number of parts, but musical value of a *Raga* restricts these to a maximum of only seven out of altogether 22 intervals. In keyboard music, the total number of intervals is only 12. The frequency ratios of the *Swaras* (notes) play the most important part in the creation of a *Raga* or a scale. The only scale in which all the 12 notes of a scale are used is the chromatic scale in European music and it is used mostly for special effects. However, in the 19th century, the use of a continuous change of the tonic in chromatic sequences in an extended piece of work, called chromatic harmony, has changed the nature of European music. Change is greatly encouraged in the West and the coming of electronic music with its immense possibilities has been used to the maximum extent. It has, however, raised the basic question as to what is the very nature of music.

A short discussion on notation is required at this stage to make all this clear. We have three notations at our disposal (Table 1): (1) the European staff notation; (2) the Venkatamakhin notation; and (3) the method of giving subscript numbers to *Swaras* (notes) to indicate the frequency depression or enhancement.

In European notation the sign ♭, called the 'flat', is used to denote a fixed depression in the frequency and the sign ♯, called the 'sharp', an enhancement. The corresponding words in Indian music are '*Laghu*' and '*Tivra*'.

The staff notation used in European music during the last 400 years is based on equal temperament, i.e. the scale is divided into 12 equal parts where each of which is called a semitone, i.e. 100 cents\*.

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\*1 cent =  $\frac{1}{1200} \log_e \frac{f_2}{f_1}$ , where  $f_1$  and  $f_2$  are the frequencies of the notes comprising the interval.

Table 1. Different types of notations and their frequency ratios

Staff notation																						
Names of notes	C	D <sup>b</sup>	D	D <sup>#</sup>	D <sup>x</sup>	E <sup>b</sup>	E	E <sup>#</sup>	F <sup>b</sup>	F	F <sup>#</sup>	G	A <sup>b</sup>	A	A <sup>#</sup>	B <sup>b</sup>	B	B <sup>#</sup>	C'			
Freq. ratios			200				400			500		700		900		1100			1200 Cents			
Venkatamakhin notation	Sa	ra	ri	ru	re	ga	gi	gu	gc	ma	mi	mu	Pa	dha	dhi	dhu	dha	na	ni	nu	ne	Sa
Freq. ratios	1	112	182	204	394	316	386	408	589	520	590	610	702	792	814	884	906	996	1018	1088	1110	1200
Presently used notation	Sa	ri1	ri2	ri3		ga1	ga2	ga3		ma1	ma2		Pa	dha1	dha2	dha3		na1	na2	na3		Sa

- The set of notes is called a major scale if starting from the tonic (say C) the intervals are  
 2 semitones; 2 semitones, 1 semitone, 2 semitones,  
 CD DE EF FG  
 2 semitones, 2 semitones, 1 semitone  
 GA AB BC
- The set of notes is called a harmonic minor scale if the intervals from tonic are  
 2 semitones, 1 semitone, 2 semitones, 2 semitones,  
 CD DE<sup>b</sup> E<sup>#</sup>F FG  
 1 semitone, 3 semitones, 1 semitone  
 GA<sup>#</sup> A<sup>b</sup>B BC
- The set of notes is called a melodic minor scale if the intervals starting from the tonic in the ascending part of the scale are  
 2 semitones, 1 semitone, 2 semitones, 2 semitones,  
 CD DE<sup>b</sup> E<sup>#</sup>F FG  
 2 semitones, 2 semitones, 1 semitone  
 GA AB BC  
 and in the descending part are  
 2 semitones, 2 semitones, 1 semitone, 2 semitones,  
 CB<sup>#</sup> B<sup>a</sup>A<sup>b</sup> A<sup>#</sup>G GF  
 2 semitones, 1 semitone, 2 semitones  
 FE<sup>#</sup> E<sup>b</sup>D DC

The frequency ratios between the European scale and the *Raga* system are not in one-to-one correspondence but only roughly so. This is due to the differences in temperament. European scales have the advantage that a change of tonic, i.e. in *Sruti*, keeps the intervals of a scale unchanged and this is of great advantage in modulation (change of tonic as to be explained later), in tuning musical ensembles, orchestra, etc. Its disadvantage is that it introduces some mistuning even in important intervals such as the tonic-to-dominant interval C-G (Sa-Pa). Staff notation, however, has the advantage that one can hear the music through the eyes if one is trained to do so. The great composer Beethoven wrote his later very complex works when

he was totally deaf, which indicates the possibilities of the staff notation.

In the Venkatamakhin scheme, the octave is divided into 7 *Swaras* of different intervals in 72 different ways. The frequency ratios of the 22 *Swaras* as measured by Clements<sup>2</sup> are also shown in Table 1. The 72 combinations are known as *Melkarta Ragas* or the basic *Ragas* from which other *Ragas* are derived. In all, several hundred *Ragas* can be recognized. Though some appear identical, they differ in the way they are played.

The Venkatamakhin method of generating all the *Melkarta Ragas* is ingenious, in that there are always 7 notes in both the ascending and the descending scale. Dividing the octave into 12 notes, the first four notes of a *Raga*, i.e. the lower tetrachord, are chosen between *Swaras* C (Sa) and F (Ma) and the subsequent notes for the upper tetrachord between G (Pa) and C' (Sa). We note that there is only one G (Pa) and two F (Ma)'s and F<sup>#</sup> (Mi). In a systematic manner, 36 *Ragas* are developed firstly with F (Ma) as the 4th note in the first tetrachord and are called *Suddha Madhyama Ragas* (Figure 1) and another 36 with F<sup>#</sup> (Mi) instead of F (Ma), called *Prati Madhyama Ragas* (Figure 2). The gaps are filled by the remaining notes subject to the constraints that the notes are in rising or falling order respectively, and not more than two semitones appear consecutively. Figure 2 gives all the possibilities and the names of each *Melkarta Raga*. Over and above this, the *Ragas* derived from each of the *Melkarta Ragas* are given in Figure 3.

In the derived scales, there is some symmetry in the derivations. For example: (a) the number of identical *Swaras* for the ascending and descending parts of a *Raga* is different for different *Melkarta Ragas*. (b) For the 8th *Melkarta Raga*, the identifying *Swara* is the second note, i.e. D<sup>b</sup> (Ri) and it is invariably present, and if not in the ascending scale, it is in the descending scale. (c) In the *Melkarta Raga*, many a missing 3rd implies a missing 7th, probably due to the close relation

36 MELKARTA RAGAS (SHUDDA MADHYAM)  
with names and triads describing the mela ragas

UPPER TETRACHORD ---->

LOWER TETRACHORD

CHAKRA NO. 1

M 10	SI. No.01	M 20	SI. No.02	M 30	SI. No.03	M 40	SI. No.04	M 50	SI. No.05	M 60	SI. No.06
KANAKANGI		RATNANGI		GANAMURTI		VANASPATI		MANAVATI		TANAROOPI	

CHAKRA NO. 2

M 70	SI. No.07	M 80	SI. No.08	M 90	SI. No.09	M 01	SI. No.10	M 11	SI. No.11	M 21	SI. No.12
SENAPATI		HANUMATODI		DHENUKA		NATAKAPRIYA		KOKILAPRIYA		RUPAVATI	

CHAKRA NO. 3

M 31	SI. No.13	M 41	SI. No.14	M 51	SI. No.15	M 61	SI. No.16	M 71	SI. No.17	M 81	SI. No.18
GAYAKAPRIYA		VAKULABHARA NAM		MAYAMALAVA GAULA		CAKRAVAKAM		SURYAKANTAM		HATAKAMBARI	

CHAKRA NO. 4

M 91	SI. No.19	M 02	SI. No.20	M 12	SI. No.21	M 22	SI. No.22	M 32	SI. No.23	M 42	SI. No.24
JHANKARA DHVANI		NARABHAIRAVI		KEERAVANI		KARAHARA PRIYA		GAURI MANOHARI		VARUNAPRIYA	

CHAKRA NO. 5

M 52	SI. No.25	M 62	SI. No.26	M 72	SI. No.27	M 82	SI. No.28	M 92	SI. No.29	M 03	SI. No.30
MAARARANJANI		CARUKESI		SARASANGI		HARIKAMBHOJI		DHEERA SHAN- KARABHARANA		NAGANANDINI	

CHAKRA NO. 6

M 13	SI. No.31	M 23	SI. No.32	M 33	SI. No.33	M 43	SI. No.34	M 53	SI. No.35	M 63	SI. No.36
YAGAPRIYA		RAGAVARDHANI		GANGEYA- BHUSHANI		VAGADISWARI		SULINI		CALANATA	

Figure 1. 36 Melakarta Ragas (Shudda Madhyama) with names and triads describing the Mela Ragas.

to the interval of the 5th. It is, perhaps, for these reasons, even listeners not necessarily trained in music can differentiate between *Ragas* in almost an instant.

### Change of Raga with tonic shift

The change of tonic in a piece of Karnatic music is strictly forbidden. This has, perhaps, come about due to the fact that any change of tonic requires a retuning of all the notes in a non-even temperament system. If this can be overcome by computer devices, Karnatic music can have the advantage of tonic modulation where a raga can be heard with a different tonic. This may break monotony and add freshness to music.

A change of tonic in consecutive steps of a *Raga* also gives rise to other *Ragas* and these form a family. However, a great many of the combination of notes produced in this way are sterile and do not lead to new *Ragas* as they will not all conform to the rules of *Raga* structure.

The following analysis gives a method of determining other valid *Ragas* by means of a tonic change.

The set of *Ragas* arising from a change of *Sruti* show the interplay between the *Suddha Madhyama Ragas* (SMR) and the *Prati Madhyama Ragas* (PMR) though at first sight they seem very different.

To determine which of the SMRs can be converted by a *Sruti* change to either PMR or another SMR, the following mathematical scheme is developed.

36 MELKARTA RAGAS (PRATI MADHYAMA)  
with names and triads describing the mela ragas



Figure 2. 36 Melakarta Ragas (Prati Madhyama) with names and triads describing the Mela Ragas.

Let  $S_1, S_2, S_3, S_4, S_5, S_6,$  and  $S_7$  be a sequence of musical intervals forming a *Melakarta Raga*, i.e. it has in all 12 semitones. For a SMR, the following conditions hold:

$$S_1 + S_2 + S_3 = 5, \quad S_5 + S_6 + S_7 = 5, \quad \text{and} \quad S_4 = 2. \quad (1)$$

Here the sum 5 refers to the total number of semitones in the two tetrachords and 2 to the interval between the subdominant and the dominant in a SMR.

Case 1

Let there be a tonic shift such that the sequence of

intervals is shifted cyclically to the second (II) position. The sequence now becomes  $S_2, S_3, S_4, S_5, S_6, S_7, S_1$ . If this has to be a PMR, the following conditions have also to be satisfied:

$$S_2 + S_3 + S_4 = 6, \quad S_6 + S_7 + S_1 = 5, \quad \text{and} \quad S_5 = 1. \quad (2)$$

The interval  $S_5$  is just one semitone in the PMR as it corresponds to the interval  $F^\#$  to  $G$ . Combining (1) and (2), we have

$$S_2 + S_3 = 4, \quad \text{and} \quad S_6 + S_7 = 4. \quad (2a)$$

8.0 HANUMA TODI  
MELAKARTA RÁGA

1 Sa Ra Gi Ma Pa Dha Ni Sa Sa Ni Dha Pa Ma Gi Ra Sa

8.1 AMRUTA DHANYASI

3 Sa Ra Gi Ma Pa - Ni Sa Sa Ni - Pa Ma Gi Ra

8.2 ASÁVERI

5 Sa Ra - Ma Pa Dha - Sa Sa Ni Sa Pa Dha Ni Dha Pa Ma Gi Ra Sa

8.3 DESYA TODI

7 Sa Gi Ma Pa Dha Ni Sa Sa Ni Dha Pa Ma Gi Ra Sa

8.4 DHANYASI

9 Sa - Gi Ma Pa - Ni Sa Sa Ni Dha Pa Ma Gi Ra Sa

8.5 GHANTA

11 Sa Gi Ra Gi Ma Pa Dha Ni Sa Sa Ni Dha Pa Ma Gi Ra Sa

8.6 MEGHÁRANJINI

13 Sa Ra Gi Ma - - Ni Sa Sa Ni - - Ma Gi Ra Sa

8.7 PUNNÁGAVARALI

15 Ni Sa Ra Gi Ma Pa Dha Ni Ni Dha Pa Ma Gi Ra Sa Ni

8.8 SUDDHA SIMANTINI

17 Sa Ra Gi Ma Pa Dhi - Sa Sa - Dha Pa Ma Gi Ra Sa

15.0 MÁYÁMÁLAVA GOULA  
MELKARTA RÁGA

Sa Ra Gu Ma Pa Dha Nu Sa Sa Nu Dha Pa Ma Gu Ra Sa

15.1 ÁRDRADESI

3 Sa Ra Gu Ma Pa Dha Nu Sa Sa - Dha Pa Ma Gu Ra Sa

15.2 BHAULI

5 Sa Ra Gu Pa Dha - Sa Sa Nu Dha Pa - Gu Ra Sa

15.3 GAULA

7 Sa Ra - Ma Pa Nu - Sa Sa Nu - Pa Ma Ra Gu Ma Ra Sa

15.4 GAULIPANTHU

9 Sa Ra - Ma Pa - Nu Sa Sa Nu Dha Pa Ma Pa Dha Ma Gu Ra Sa

15.5 GAURI

11 Sa Ra - Ma Pa Nu - Sa Sa Nu Dha Pa Ma Gu Ra Sa

15.6 GURJARI

13 Sa Ra Gu Ma Pa Dha Nu Sa Sa Dha Nu Pa Ma Gu Ra Sa

15.7 GUMMAKÁMBHOJI

15 Sa Ra Gu - Pa Dha Nu Dha Sa Sa Dha Nu Pa Ma Gu Ra Sa

15.8 GUNDÁKRIYA

17 Sa Ra - Ma Pa - Nu Sa Sa Nu Pa Dha Pa Ma Gu Ra Sa

15.9 JAGANMOHINI

19 Sa - Gu Ma Pa - Nu Sa Sa Nu - Pa Ma Gu Ra Sa

15.10 KANNADA BANGÁLA

21 Sa Ra Gu Ma Gu Ma Pa Dha - Sa Sa - Dha Pa Ma Gu Ra Sa

15.11 KRISHNA VENI

23 Sa Ra Gu Ma Pa - Nu Sa Sa Nu - Pa Ma Gu Ra Sa

15.12 MALAHARI

25 Sa Ra - Ma Pa Dha - Sa Sa - Dha Pa Ma Gu Ra Sa

Figure 3. (Contd.)

15.13 MALLIKA VASANT

27 Sa - Gu Ma Pa - Nu Sa Sa Nu Dha Pa Ma Gu Ra Sa

15.14 MECHA BHAULI

29 Sa Ra Gu - Pa Dha - Sa Sa Nu Dha Pa Ma Gu Ra Sa

15.15 NÁDA NÁMA KRIYA

31 Sa Ra Gu Ma Pa Dha Nu - - Nu Dha Pa Ma Gu Ra Sa Nu

15.16 PÁDI

33 Sa Ra - Ma Pa - Nu Sa Sa Nu Dha Pa Ma - Ra Sa

15.17 PARAJU (FARAZ)

35 Sa - Gu Ma Pa Dha Nu Sa Sa Nu Dha Pa Ma Gu Ra Sa

15.18 PURVI

37 Sa Ra Gu Ma Pa Dha Nu Dha Sa Sa Nu - Pa Ma Gu Ra Sa

15.19 REVAGUPTI

39 Sa Ra Gu - Pa Dha - Sa Sa - Dha Pa - Gu Ra Sa

15.20 SÁRANGANATA

41 Sa Ra - Ma Pa Dha - Sa Sa Nu Sa Dha Pa Ma Gu Ra Sa

15.21 SÁVERI

43 Sa Ra - Ma Pa Dha - Sa Sa Nu Dha Pa Ma Gu Ra Sa

15.22 SINDHURÁMAKRIYA

45 Sa - Gu Ma Pa Dha Nu Sa Sa Nu Pa Dha Pa Ma Gu - Sa

15.23 MANGALA KAISHIKI

47 Sa - Ma Gu Ma Pa Ma Dha Nu Sa Sa Nu Dha Pa Ma Gu Ra Sa

15.24 BHUPÁLAM

49 Sa Ra Gu - Pa Dha - Sa Sa - Dha Pa - Gu Ra Sa

20.0 NATABHAIRAVI  
MELKARTA RÁGA

Sa Ri Gi Ma Pa Dha Ni Sa Sa Ni Dha Pa Ma Gi Ri Sa

20.1 AMRITHA VÁHINI

3 Sa Ri - Ma Pa Dha Ni Sa Sa Ni Dha - Ma Gi Ri Sa

20.2 BHAIRAVI

5 Sa Ri Gi Ma Pa Dhi Ni Sa Sa Ni Dha Pa Ma Gi Ri Sa

20.3 DILIPAKAM

7 Sa Ri Gi Ri Ma Pa Ni Dhi Ni Pa Dhi Ni Sa Sa Ni Dhi Pa Ma Gi Ri Sa

20.4 GOPIKA VASANTAM

9 Sa Ma Pa Ni Dhi Ni Sa Sa Ni Dha Pa Ma Gi - Sa

20.5 HINDOLAM

11 Sa Ma Gi Ma Dhi Ni Sa Sa Ni Dhi Ma Gi Sa

20.6 JAYANTHASRI

13 Sa Gi Ma Dha Ni Sa Sa Ni Dha Ma Pa Ma Gi Sa

20.7 JINGLA

15 Sa Ri Gi Ma Pa Dha Nu Dha Pa Sa Sa Ni Dha Pa Ma Gi Ri Sa

20.8 MANJI

17 Sa Ri Gi Ma Pa Dha Ni Sa Sa Ni Dha Pa Ma Gi Ri Sa

20.9 MÁRGA HINDOLA

19 Sa Ri Gi Ma Pa Dhi Ni Sa Sa Ni Dhi Pa Ma Gi Sa

20.10 SÁRAMATI

21 Sa Ri Gi Ma Pa Dha Ni Sa Sa Ni Dha Ma Gi Sa

20.11 SUDDHA DESI

23 Sa Ri - Ma Pa Dha Ni Sa Sa Ni Dha Pa Ma Gi Ri Sa

Figure 3. (Contd.)

22.0 KHARAHARA PRIYA  
MELKARTA RÁGA.

Sa Ri Gi Ma Pa Dhi Ni Sa Sa Ni Dhi Pa Ma Gi Ri Sa

22.1 ABHOGI

3 Sa Ri Gi Ma - Dhi - Sa Sa - Dhi - Ma Gi Ri

22.2 ÁNANDA BHAIRAVI

5 Sa Gi Ri Gi Ma Pa Dhi Pa Sa Sa Ni Dhi Pa Ma Gi Ri Sa

22.3 ÁNDOLIKA

7 Sa Ri - Ma Pa - Ni Sa Sa Ni Dhi - Ma - Ri Sa

22.4 BRINDÁVANA SÁRANGA

9 Sa Ri - Ma Pa - Ni Sa Sa Ni - Pa Ma Gi Ri Sa

22.5 CHITTARANJANI

11 Sa Ri Gi Ma Pa Dhi Ni - - Ni Dhi Pa Ma Ri Gi Ri Sa

22.6 DARBÁR

13 Sa Ri - Ma Pa Dhi Ni Sa Sa Ni Dhi Pa Ma Ri Gi Ri

22.7 DEVÁMRITA VARSHINI

15 Sa Ri Gi Ma - Ni Dhi Ni Sa Sa Ni Dhi Pa Ma Gi Ri Sa

22.8 HINDOLA VASANTA

17 Sa Ra Gi Ma Dha Ni Sa Sa Ni Dha Pa Ma Gi Ra Sa

22.9 HINDUSTANI - KÁPI

19 Sa Ri - Ma Pa - Ni Sa Sa Ni Dhi Ni Pa Ma Gi Ri Sa

22.10 HUSENI

21 Sa Ri Gi Ma Pa Ni Dhi Ni Sa Sa Ni Dhi Pa Ma Gi Ri Sa

22.11 JAYAMANOHARI

23 Sa Ri Ga Ma - Dhi - Sa Sa Ni Dhi - Ma Gi Ri Sa

22.12 JAYANÁRAYANI

25 Sa Ri - Ma - Dhi - Sa Sa Ni Dhi Pa Ma Gi Ri Sa

22.13 JAYANTASENA

27 Sa - Gi Ma Pa Dhi Sa Sa Ni Dhi Pa Ma Gi Sa

22.14 KALÁNIDHI

29 Sa Ri Gi Ma Sa Pa Ma Dhi Ni Sa Sa Ni Dhi Pa Ma Gi Ri Sa

22.15 KÁNADA

31 Sa Ri Pa Ma Ga Ma Dhi Ni Sa Sa Ni Pa Dhi Ni Pa Ma Gi Ma Ri Sa

22.16 KANNADA GAULA

33 Sa Ri Ga Ma Pa - Ni Sa Sa Ni Dhi Pa Ma Gi - Sa

22.17 KÁPI JINGLA

35 Sa Ni Sa Ri Gi Ma Ma Ga Ri Sa Ni Dhi Ni Sa

22.18 KARNATAKA KÁPI

37 Sa Ri Gi Gi Ma Gi Pa Ma Pa Dhi Ni Sa Sa Ni Dhi Pa Ma Gi Ma Ri Sa

22.19 MADHYMÁVATI

39 Sa Ri - Ma Pa - Ni Sa Sa Ni - Pa Ma - Ri Sa

22.20 MAALAVASRI

41 Sa - Gi Ma Pa Ni Dhi Ni Sa Sa Ni Dhi Pa Ma Gi - Sa

22.21 MANI RANGU

43 Sa Ri - Ma Pa - Ni Sa Sa Ni - Pa Ma Gi Ri Sa

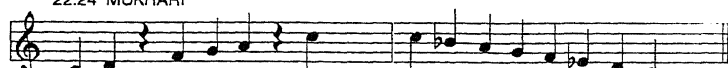
22.22 MANJARI

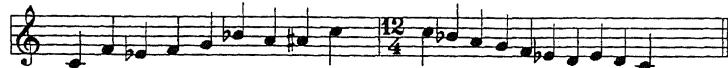
45 Sa Gi Ri G: Ma Pa Ni Dhi Ni Sa Sa Ni Dhi Pa Ma Gi Ri Sa

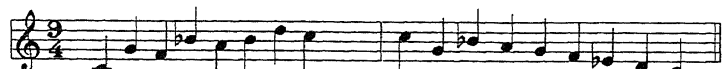
22.23 MANOHARI

47 Sa Gi Ri Gi Ma Pa Dhi - Sa Sa - Dhi Pa Ma Gi Ri Sa

Figure 3. (Contd.)

22.24 MUKHARI  
  
 49 Sa Ri - Ma Pa Dhi - Sa Sa Ni Dhi Pa Ma Gi Ri Sa

22.25 NÁDACHINTAMANI  
  
 51 Sa Ma Gi Ma Pa Ni Dhi Ni Sa Sa Ni Dhi Pa Ma Gi Ri Gi Ri Sa

22.26 NÁDAVARÁNGINI  
  
 53 Sa Pa Ma Ni Dhi Ni Ri Sa Sa Pa Ni Dhi Pa Ma Gi Ri Sa

22.27 NÁYAKI  
  
 55 Sa Ri - Ma Pa Dhi Ni Dhi Pa Sa Sa Ni Dhi Pa Ma Ri Ga Ri Sa

22.28 PHALAMANJARI  
  
 57 Sa - Gi Ma - Dhi Sa Sa Ni Dhi Pa Ma Gi Ma Ri Sa


22.29 PANCHAMA  
  
 59 Sa Ri - Pa Dhi Pa - Ni Sa Sa Ni Dhi Pa Ma Gi Ri Sa

22.30 PURNASHADJAM  
  
 61 Sa Ri Gi Ma - - Ni Sa Sa Ni - Pa Ma Gi Ri Sa

22.31 PUSHPALATIKA  
  
 63 Sa Ri Gi Ma Pa Ni - Sa Sa Ni - Pa Ma Gi Ri Sa

22.32 RITIGAULA  
  
 65 Sa Gi Ri Gi Ma - Ni Dhi Ma Ni Sa Sa Ni Dhi - Ma Gi Ma Pa Ma Gi Ri Sa

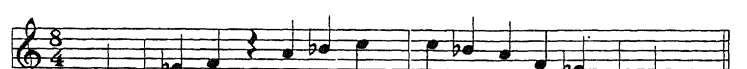
22.33 RUDRAPRIYA  
  
 67 Sa Ri Gi Ma Pa Dhi Ni Sa Sa Ni - Pa Ma Gi Ri Sa

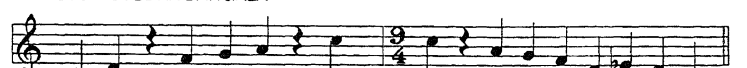
22.34 SAINDHAVI  
  
 69 Ni Dhi Ni Sa Ri Gi Ma Pa Dhi Ni Dhi Pa Ma Gi Ri Sa Ni Dhi Ni Sa

22.35 SÁLAGA BHAIRAVI  
  
 71 Sa Ri - Ma Pa Dhi - Sa Sa Ni Dhi Pa Ma Gi Ri Sa

22.36 SIDDHASENA  
  
 73 Sa Gi Ri Gi Ma Pa Dhi - Sa Sa Ni Dhi Pa Ma Ri Gi Ri Sa

22.37 SRIRÁGA  
  
 75 Sa Ri - Ma Pa - Ni Sa Sa Ni Pa Ma Ri Gi Ri Sa

22.38 SRIRANJINI  
  
 77 Sa Ri Gi Ma - Dhi Ni Sa Sa Ni Dhi Ma Gi Ri Sa

22.39 SUDDHA BANGÁLA  
  
 79 Sa Ri - Ma Pa Dhi - Sa Sa - Dhi Pa Ma Ri Gi Ri Sa

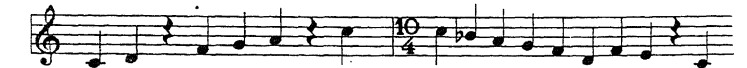
22.40 SUDDHA DHANYÁSI  
  
 81 Sa - Gi Ma Pa - Ni Sa Sa Ni - Pa Ma Gi - Sa

22.41 SVARA BHUSHANI  
  
 83 Sa - Gi Ma Pa Dhi Ni Sa Sa Ni Dhi Pa Ma - Ri Sa

22.42 UDAYA RAVI CHANDRIKA  
  
 85 Sa - Gi Ma Pa - Ni Sa Sa Ni - Pa Ma Gi - Sa

28.0 HARIKÁMBODHI  
 MELAKARTA RÁGA  
  
 Sa Ri Gu Ma Pa Dhi Ni Sa Sa Ni Dhi Pa Ma Gu Ra Sa

28.1 BAHUDÁRI  
  
 3 Sa Gu - Ma Pa Dhi Ni Sa Sa Ni - Pa Ma Gu - Sa

28.2 BALAHAMSA  
  
 5 Sa Ri - Ma Pa Dhi - Sa Sa Ni Dhi Pa Ma Ri Ma Gu - Sa

28.3 CHÁYÁ TARANGINI  
  
 7 Sa Ri Ma Gu Ma Pa Ni Sa Sa Ni Dhi Pa Ma Ri Ma Gu - Sa

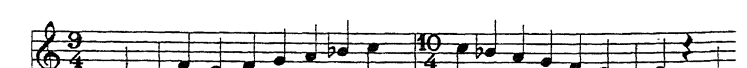
28.4 DVIJÁVANTHI  
  
 9 Sa Ri Ma Gu Ma Pa Dhi Ni Sa Sa Ni Dhi Pa Ma Gu Ri Gu - Sa

Figure 3. (Contd.)



28.5 ISAMANOHARI  
  
 11 Sa Ri Gu Ma Pa Dhi Ni Sa Sa Ni Dhi Pa Ma Ri Ma Gu Ri Sa

28.6 JHUNJOOTI  
  
 13 Dhi Sa Ri Gu Ma Pa Dhi Ni - - - Dhi Pa Ma Gu Ri Sa Ni Dhi Pa

28.7 JUJAHULI  
  
 15 Sa Ma Gu Ma Pa Dhi Ni Sa Sa Dhi Ni Dhi Pa Ma Gu Sa


28.8 KÁMBODHI  
  
 17 Sa Ri Gu Ma Pa Dhi - Sa Sa Ni Dhi Pa Ma Gu Ri Sa

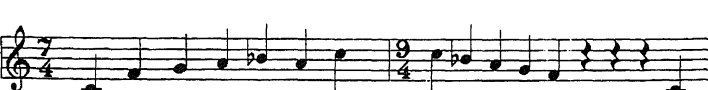
28.9 KÁPI NÁRÁYANI  
  
 19 Sa Ri - Ma Pa Dhi Ni Sa Sa Ni Dhi Pa Ma Gu Ri Gu Ri Sa


28.10 KARNÁTKA BEHÁG  
  
 21 Sa Ri Gu Ma Pa Dhi Ni Sa Sa Ni Dhi Ni Pa Dhi Ma Gu Ri Gu - Sa


28.11 KEDÁRA GAULA  
  
 23 Sa Ri - Ma Pa - Ni Sa Sa Ni Dhi Pa Ma Gu Ri Sa

28.12 KHAMÁS  
  
 25 Sa Ma Gu Ma Pa Dhi Ni Sa Sa Ni Dhi Pa Ma Gu - Sa

28.13 KOKILADHVANI  
  
 27 Sa Ri Gu Ma - Dhi Ni Dhi - Sa Sa Ni Dhi Ni Pa Ma Gu Ri Sa

28.14 KUNTALAVARÁLI  
  
 29 Sa Ma Pa Dhi Ni Dhi Sa Sa Ni Dhi Pa Ma - - - Sa

28.15 MÁLAVI  
  
 31 Sa Ri Gu Ma Pa Ni Ma Dhi Ni Sa Sa Ni Dhi Ni Pa Ma Gu Ma Ri Sa

28.16 MOHANA  
  
 33 Sa Ri Gu - Pa Dhi - Sa Sa - Dhi Pa - Gu Ri Sa


28.17 NÁGASWARÁVALI  
  
 35 Sa - Gu Ma Pa Dhi - Sa Sa - Dhi Pa Ma Gu - Sa

28.18 NÁRÁYANA GAULA  
  
 37 Sa Ri - Ma Pa - Ni Dhi Ni Sa Sa Ni Dhi Pa Ma Gu Ri Gu Ri Sa

28.19 NÁRÁYANI  
  
 39 Sa Ri - Ma Pa Dhi Sa Sa Ni Dhi Pa Ma - Ri Sa

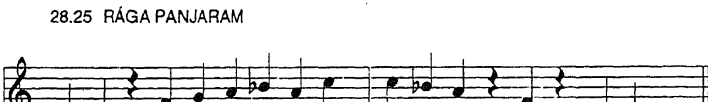
28.20 NÁTAKURANJI  
  
 41 Sa Ri Gu Ma - Dhi Ni Sa Sa Ni Dhi - Ma Gu - Sa


28.21 NAVARASA KALÁNIDHI  
  
 43 Sa Ri - Ma Pa - - Sa Ni Sa Sa Ni Ni Dhi Pa Ma Gu Ri Sa

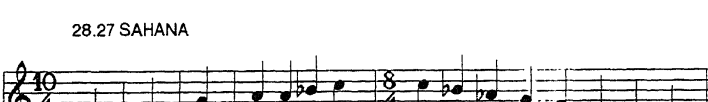
28.22 NAVARASA KANNADA  
  
 45 Sa - Gu Ma Pa - - Sa Sa Ni Dhi - Ma Gu Ri Sa

28.23 PRATÁPAVARÁLI  
  
 47 Sa Ri - Ma Pa - - Sa Sa - - Dhi Pa Ma Gu Ri Sa

28.24 PRAVALAJYOTHI  
  
 49 Sa Ri - Ma Pa Dhi Ni Sa Sa Ni Dhi Ni Pa Ma Gu - Sa

28.25 RÁGA PANJARAM  
  
 51 Sa Ri - Ma Pa Dhi Ni Dhi Sa Sa Ni Dhi - Ma - Ri Sa

28.26 RAVICHANDRIKA  
  
 53 Sa Ri Gu Ma - Dhi Ni Dhi Sa Sa Ni Dhi - Ma Gu Ri Sa

28.27 SAHANA  
  
 55 Sa Ri Gu Ma Pa Ma Dhi Ni Sa Sa Ni Dhi Pa Ma Gu Ri Sa

28.28 SÁMA  
  
 57 Sa Ri - Ma Pa Dhi - Sa Sa - Dhi Pa Ma Gu Ri Sa

Figure 3. (Contd.)

28.29 SARASVATI MANOHARI

59 Sa Ri Gu Ma - Dhi - Sa Sa - Dhi Ni - Pa Ma Gu Ri Sa

28.30 SINDHU KANNADA

61 Sa - Ma Gu Ma Ri Gu Ma Pa Dhi Pa Sa Sa Ni Dhi Pa Ma Gu Ri Sa

28.31 SUDHA TARANGINI

63 Sa Ri - Ma Ri Ma Pa Dhi Ni Dhi Sa Sa Ni Dhi Pa Ma Gu Ri Sa

28.32 SUPOSHINI

65 Sa Ri Sa - - Ma Pa Ni Dhi Sa Sa Dhi Ni Pa Ma - Ri Ma - Sa

28.33 SURATI

67 Sa Ri - Ma Pa - Ni Sa Sa Ni Dhi Pa Ma Gu Pa Ma Ri Sa

28.34 SVARÁVALI

69 Sa - - Ma Gu Ma Pa Ni Dhi Ni Sa Sa Ni Pa Dhi Ma Gu Ri Sa

28.35 VARAVEDI

71 Sa - Ma Gu Ma Pa Ni Dhi Ni Sa Sa Dhi Ni Dhi Ni Pa Ma Gu -

28.36 UMÁBHARANAM

73 Sa Ri Gu Ma Pa Dhi Ni Sa Sa Ni - Pa Ma Ri Gu Ma Ri Sa

28.37 VALAJI

75 Sa - Gu - Pa Dhi Ni Sa Sa Ni Dhi Pa - Gu - Ri

28.38 VIVARDHINI

77 Sa Ri - Ma Pa - - Sa Sa Ni Dhi Pa Ma Gu Ri Sa

28.39 YADUKULA KÁMBODHI

79 Sa Ri - Ma Pa Dhi - Sa Sa Ni Dhi Pa Ma Gu Ri

29.0 DHEERA SANKARA BHARANA  
MELAKARTA RÁGA

Sa Ri Gu Ma Pa Dhi Nu Sa Sa Nu Dhi Pa Ma Gu Ri Sa

29.1 ÁRABHI

3 Sa Ri - Ma Pa Dhi - Sa Sa Nu Dhi Pa Ma Gu Ri Sa

29.2 ATÁNA

5 Sa Ri - Ma Pa - Nu Sa Sa Nu Dhi Pa Ma Pa Gu Ma Ri Sa

29.3 BANGÁLA

7 Sa Ri Gu Ma Pa Sa Sa Ni - Pa Ma Ri Gu Ri Sa

29.4 BEGADA

9 Sa Gu Ri Gu Ma Pa Dhi Pa - - Sa Sa Nu Dhi Pa Ma Gu Ri Sa

29.5 BEHÁG

11 Sa - Ri Ma Pa Nu Dhi Nu Sa Sa Nu Dhi Pa Ma Gu Ri Sa

29.6 BILAHARI

13 Sa Ri Gu - Pa Dhi - Sa Sa Nu Dhi Pa Ma Gu Ri Sa

29.7 DESAKSHI

15 Sa Ma Gu - Pa Dhi - Sa Sa Nu Dhi Pa Ma - Ri Sa

29.8 DEVAGANDHARI

17 Sa Ri - Ma Pa Dhi - Sa Sa Nu Dhi Pa Ma Gu Ri Sa

29.9 GARUDA DHVANI

19 Sa Ri Gu Ma Pa Dhi Nu Sa Sa - Dhi Pa - Gu Ri Sa

29.10 HAMSADHVANI

21 Sa Ri Gu - Pa - Nu Sa Sa Nu - Pa - Gu Ri Sa

29.11 HINDUSTANI BEHAG

23 Sa - Gu Ma Pa Nu Dhi Nu Sa Sa Nu Dhi Nu Pa Ma Gu Ri Sa

Figure 3. (Contd.)

29.12 JANARANJANI  
25 Sa Ri Gu Ma Pa Dhi Pa Nu Sa Sa Dhi Pa Ma Ri Sa

29.13 KANNADA  
27 Sa Ma Gu Ma Dhi Nu Sa Sa Dhi Pa Ma Gu Ma Ri Sa

29.14 KADANA KUTUHALAM  
29 Sa Ri - Ma - Dhi Nu Gu Pa Sa Sa Ni Dhi Pa Ma Gu Ri Sa

29.15 KEDARAM  
31 Sa - Ma Gu Ma Pa Nu - Sa Sa Nu - Pa Ma Gu Ri Sa

29.16 KOLAHALAM  
33 Sa - Pa Ma Gu Ma Pa Dhi Nu Sa Sa Nu Dhi Pa Ma Gu Ri Sa

29.17 KURANJI  
35 Sa Nu Sa Ri Gu Ma Pa Dhi - - - - Dhi Pa Ma Gu Ri Sa Nu Sa

29.18 KUTUHALAM  
37 Sa - Ri Ma Pa Nu Dhi Pa Nu Sa Sa Nu Dhi Pa Ma Gu Ri Sa

29.19 MAND  
39 Sa - Gu Ma Pa Dhi - Sa Sa Nu Dhi Pa Ma Gu Ri Sa

29.20 NAVROJ  
41 Pa Dhi Nu Sa Ri Ga Ma Pa - - - - - Ma Gu Ri Sa Nu Dhi Pa

29.21 NILAMBARI  
43 Sa Ri Gu Ma Pa Dhi Pa Nu Sa Sa Nu Pa Ma Gu Ri Gu Sa

29.22 PURNA CHANDRIKA  
45 Sa Ri Gu Ma Pa Dhi Pa - Sa Sa Nu - Pa Ma Ri Gu Ma Ri Sa

29.23 SINDHU MANDARI  
47 Sa Ri Gu Ma Pa Dhi Pa Sa Sa Nu Dhi Pa Gu Ma Dhi Pa Ma Ri Sa

Figure 3. Commonly used *Melakarta Ragas* (nos. 8, 15, 20, 22, 28 and 29) and their derivatives. The symbol ‘;’ used here is to represent a missing note from the *Mela Raga* and is not a time measure. The symbol ‘~’ above the notes of the *Melakarta ragas* refer to the *Gamakas* given in Appendix II.

Case 2

If the tonic is shifted to the third place (III), the sequence now starts with  $S_3$  and

$$S_3 + S_4 + S_5 = 6, \quad S_7 + S_1 + S_2 = 5, \quad \text{and} \quad S_6 = 1. \quad (3)$$

From (1) and (3) we have,

$$S_5 + S_7 = 4, \quad \text{and} \quad S_3 + S_6 = 4. \quad (3a)$$

Case 3

In a similar manner, for a tonic shift to the fourth place (IV), we have

$$S_5 + S_6 = 4, \quad 1 + D_2 + S_3 = 5. \quad (4)$$

This case gives the largest number of possibilities as the first condition in (4) repeats itself and we have to depend only on condition (1).

Case 4

If the tonic is shifted to the fifth place (V), the condition becomes inconsistent in that  $S_5 + S_6 + S_7$  has to become both 5 and 6, which means that no PMRs are possible from a tonic transfer to the dominant.

Case 5

For the tonic transfer to the sixth place (VI), the following conditions are required for transfer of a SMR to PMR:

$$S_3 + S_5 = 3, \quad S_1 + S_3 = 4. \quad (6)$$

Case 6

For a tonic transfer to the seventh place (VII), the conditions are:

$$S_1 + S_2 = 4, \quad S_5 + S_6 = 3. \quad (7)$$





*Natya Shastra* states that all song word and dance is derived by *Tala*. The rules are clearly laid out and there is wide scope for interesting combinations of various sorts. Indian rhythmic notation is based on seven patterns, the *Sapta-Tala* system (Table 4). U, called *Anudruta*, stands for one unit of time and could be a quaver or semiquaver depending upon the tempo of the work. In the above table, the unit of time in staff notation is a quaver and I stands for 4 quavers.

O, called *Druta*, stands for 2 units of time.

I, called *Laghu* in general, stands for 3, 4, 5, 7, 9, etc., units of time and is written as I<sub>3</sub>, I<sub>5</sub>, I<sub>7</sub>, etc., respectively. The units 6 and 8 are described by their smaller multiples.

In staff notation, the unit of time is denoted by the symbol O, called the semibreve. The semibreve can be broken rhythmically into equal beats of shorter durations, as shown in Figure 4.



Figure 4. The semibreve = 2 minims = 4 crochets = 8 quavers = 16 semiquavers, etc.

In European music, rhythm is indicated by two numbers immediately at the beginning of a work, e.g.

- 4 means 4 crochets in a bar,
- 6 means 6 quavers in a bar, and
- 8 means 8 semiquavers in a bar, etc.

The top number refers to the units of time in a bar and the bottom one refers to the type of unit. The minim is given the number 2, the crochet 4, the quaver 8 and the semiquaver 16. These numbers correspond to the number of such units equal to a semibreve.

Table 4. The seven patterns of rhythm (*Tala*)

Tala	Symbols	Equivalence in staff notation
1. <i>Dhruva</i>	I <sub>4</sub> O I <sub>4</sub>	
2. <i>Mathya</i>	I <sub>4</sub> O I <sub>4</sub>	
3. <i>Roopaka</i>	O I <sub>4</sub>	
4. <i>Jhampe</i>	I <sub>4</sub> U O	
5. <i>Tripata</i>	I <sub>4</sub> O O	
6. <i>Ata</i>	I <sub>4</sub> I <sub>4</sub> O O	
7. <i>Eka</i>	I <sub>4</sub>	

A musical work is usually divided into bars (*Avarta*), each bar being a measure of time with a fixed number of smaller units of time. Only in *Alapanas*, bars are not required as they are often improvisation on a *Raga*, without rhythm.

While these indications give the number of units in the bar, they give no idea of the accents within the bar. The accents within the bar play an important role in Indian music, since it has developed from the chanting of the *Vedas* and it is thus closely related to the prosody of various Indian languages, particularly Sanskrit. These accents form the most important aspect of *Tala*.

If we associate a quaver with an *Anudruta*, it follows that the *Laghus*, as shown in Figure 5.

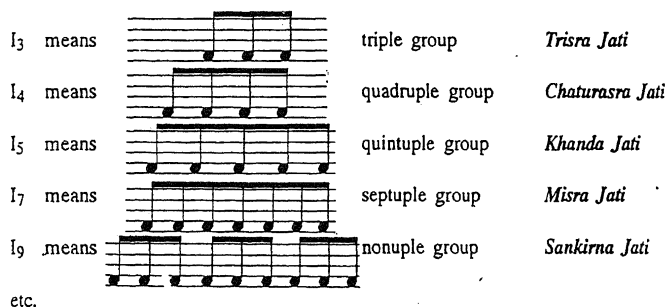


Figure 5.

A piece of music is said to be in *Chaturasra Jati* (quadruple time) and *Dhruva Tala* if the number of notes in a bar is 4 + 2 + 4 + 4 = 14, i.e.

Laghu 1 Dhruva 1 Laghu 1 Laghu 1  
written as I<sub>4</sub> O I<sub>4</sub> I<sub>4</sub>

In staff notation on a monotone, it is equivalent to that shown in Figure 6.

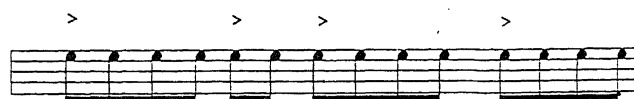


Figure 6.

This *Tala*, as an exercise on the *Raga Mayamalavagoula*, takes the form shown in Figure 7.



Figure 7.

*Mayamalavagoula Raga* is usually chosen for such exercises as the sequence of notes are adjacent semitones and come easily on the frets of a *Veena*.

In principle, the different *Laghus* can be broken up

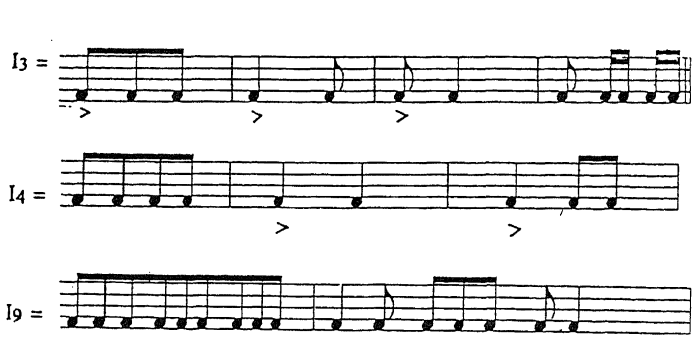


Figure 8.

into different unit components as long as the accents are maintained in the same place, as shown in Figure 8. The mark '>' means that the note is accented. The flexibility of the rhythms depends mainly on these accents and the seven *Talas* are sufficient to encompass a wide range of possible rhythms. The choice of the seven combinations is due to Purandaradasa (1484–1564), who is called the father of Karnatic music. He standardized the basic rhythmic requirements into just these seven schemes. There are many other schemes involving a larger grouping of *Laghus* but these classifications do not find a place in our introductory exposition. That the *Sapta-Tala* scheme covers most of the requirements of accents is evident from the following.

A 3-beat rhythm can have any one of the 3 modes of accents (Figure 9). In the *Sapta-Tala* system, (1) is available as *Eka Tala Trisra Jati* and (2) is available as *Rupaka Tala Chaturasra Jati*, as U 0 (in crochets), and (3) is not indistinguishable from (2) in a running piece of music.



Figure 9.

A 5-beat rhythm can have one of the 10 modes shown in Figure 10. Modes (4a) to (5c) are found in *Tala* collections. It is seen that the commonly used *Talas* are in the *Sapta-Tala* and the 108 enumeration has only one addition and perhaps is not much used. The bigger compilation only completes the list.

In the 7-beat rhythm, the possibilities after excluding *Talas* of more than 4 accents, as it would be unmusical to have a large number of accents, are 19 in number, of which many are merely inversions. Only 7 of these appear as separate (Figure 11).

Of these, the *Sapta-Tala* system accounts for 1, 3, 6 and 7. The 108-*Tala* system has nothing basically new to add. The compilation of all *Talas* by Sundaram<sup>3</sup> includes the rest. The 108-*Tala* system is of great

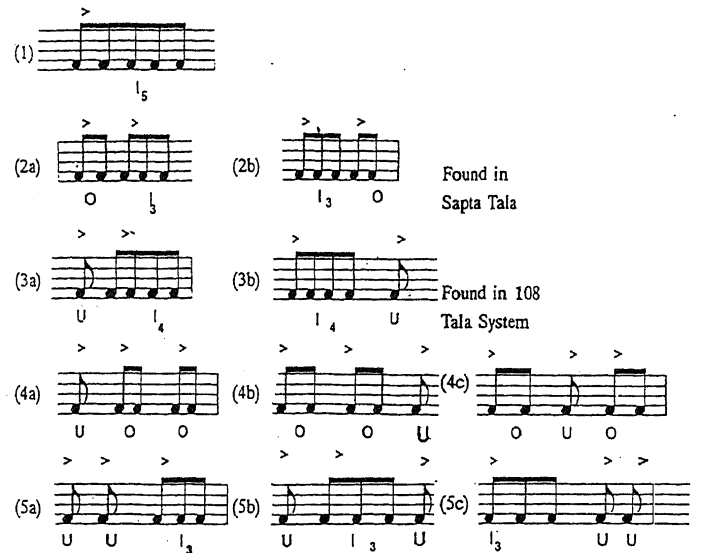


Figure 10.

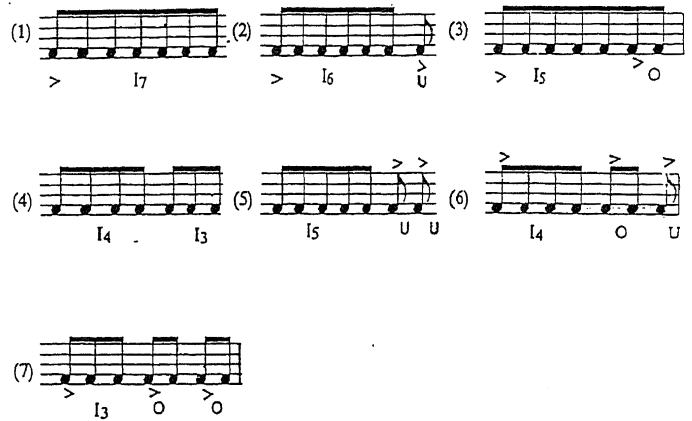


Figure 11.

significance, as it is closely connected with the art of classical dance – *Bharata Natyam*. Usually the *Talas* are classified as (a) the tailing ones, (b) the spreading ones like a river, (c) the number of units decreasing and then increasing or vice versa like the shape of *Dhamaruga*, the drum of *Shiva* or a *Tabala*, respectively, and (d) as a random set. Some examples of (a), (b), (c) and (d) are as follows:

- (a) I<sub>12</sub> I<sub>8</sub> I<sub>4</sub> O U
- (b) U O I<sub>4</sub> I<sub>8</sub> I<sub>2</sub>

Combinations of (a) and (b) are also possible:

- (c) I<sub>12</sub> I<sub>8</sub> I<sub>4</sub> O U O I<sub>4</sub> I<sub>8</sub> I<sub>12</sub> or  
U O I<sub>4</sub> I<sub>8</sub> I<sub>12</sub> I<sub>8</sub> I<sub>4</sub> O U
- (d) I<sub>4</sub> O I<sub>8</sub> I<sub>4</sub> U O I<sub>8</sub> I<sub>4</sub> I<sub>8</sub> I<sub>4</sub>

There are many other classifications of interest to the expert, as found in ref. 3.

Polyrhythmic musical interludes are a common feature of Karnatic music concerts and provide some of the most exciting aspects of multiple rhythms. These require much preparation though they appear to be an improvisation.

Table 5.

Name	Unit of time	Commonly used symbol
<i>Anudruta</i>	1	U
<i>Druta</i>	2	O
<i>Druta Virama</i>	3	I <sub>3</sub>
<i>Laghu</i>	4	I <sub>4</sub>
<i>Laghu Virama</i>	5	I <sub>5</sub>
<i>Laghu Druta</i>	6	I <sub>6</sub>
<i>Laghu Druta Virama</i>	7	I <sub>7</sub>
<i>Guru</i>	8	I <sub>8</sub>
<i>Guru Virama</i>	9	I <sub>9</sub>
<i>Guru Druta</i>	10	I <sub>10</sub>
<i>Guru Druta Virama</i>	11	I <sub>11</sub>
<i>Pluta</i>	12	I <sub>12</sub>
<i>Pluta Virama</i>	13	I <sub>13</sub>
<i>Pluta Druta</i>	14	I <sub>14</sub>
<i>Pluta Druta Virama</i>	15	I <sub>15</sub>
<i>Kakupada</i>	16	I <sub>16</sub>

Musicians on different instruments start simultaneously using different *Talas*. By choosing appropriate combination of *Talas*, they conclude at the same time though the different *Talas* are independent of one another. They synthesize to produce an effect which is overwhelming. A person performing *Dhruva Tala* for 30 bars, *Mathya Tala* for 42 bars, *Roopaka Tala* for 70 bars, *Jhampe Tala* for 42 bars, *Tripata Tala* for 60 bars, *Ata Tala* for 35 bars and *Eka Tala* for 105, all end at the same time in a composition lasting 420 units of time.

The author remembers a performance by the late Palghat Mani Iyer and his group several years ago and recalls its psychological impact on the audience, which was quite unforgettable. At no time was an impression of randomness ever created. A fuller list of the names for the *Tala* division is given in Table 5.

## Part II—Forms, instruments and aesthetics

At a concert of Karnatic music, the positioning of the main performer and the instrumental accompanists who support him is traditional. Usually, on the left side of the main performer sits either the flutist or a violinist or less frequently a harmonium player, who supports him in a canon-like (imitative) manner. Occasionally, they take over the main activity themselves. Just behind the singer are the *Tanpuras* to give him the exact tonic (*Sruti*) as accurately as possible, for the singing of the *Swaras* in complex *Ragas* requires that the leading musician be exactly on the tonic. On his right side are placed the percussion instruments like the *Tabla*, *Mridangam*, *Morching* (Jew's harp), etc. On occasions where there are two main performers, they sit in the centre next to each other so that the support for one another is well coordinated.

Before the commencement of concert, the tuning of all the instruments starts. It takes up considerable time and immediately after this the musician begins the *Alapana* on the *Raga* of the first work to be performed. The *Alapana* is an important part of a musical concert and is meant to expose the *Raga* of the main work in many different ways, what Ananda Coomaraswamy calls 'moulds' of musical phrases. The main performer is supported by the instruments around him and more often than not the percussion instruments are silent during the *Alapana* as it does not always have a *Tala* structure.

The *Alapana* can last from a few minutes to several hours and there have been cases where it has lasted for several days. The *Alapana* is essentially improvisation on the 'moulds' of the *Raga*. Once the *Alapana* is over,

the main theme or *Pallavi* of the work is announced. It is repeated several times, each time with a different ornamentation. The *Pallavi* is followed by the *Anupallavi*, the counter theme. After completing the statement of *Pallavi* and *Anupallavi*, the main musician takes on elaboration of the two themes in which new forces are brought in, such as *Kalpana Swaras*, which makes use of Sa, Ri, Ga, Ma, etc., instead of words (*Sahitya*) and tempo changes are brought in. The musician often gets support from the use of *Chittaswaras* or subthemes given by the composer to be used in contrast with the *Pallavi* and *Anupallavi*.

The *Pallavi* elaboration is always supported by the percussion instruments exploring the details of the *Talas* to which it belongs. At some given stage, the entire proceedings is passed on to the percussion instruments, which take on the performance of a *Tala* exposition. It may or may not be supported by other instrumentalists. The *Tala* exposition has been described earlier and forms an important climax of the performance. It is likely, at this stage, that all the side instruments (*Pakkavadyas*) take part in the work and come to a climax with a resounding *Kalpana Swara* ending.

There are many variations to the elaboration in that a song may be sung as a *Ragamalika*, where the *Swaras* appear in different *Ragas* but all of them are based on the same tonic. Once the *Pallavi* and *Anupallavi* are elaborated, there is a great degree of freedom for the performer for further elaboration, *Swara*-wise and *Tala*-wise.

The form described constitutes the classical part of



the concert. The concert usually starts with a *Varna* (Etudes) and usually ends with a *Bhakti* (religious) or secular music. It always ends with a *Mangalam*, forming a hymn of finality to the concert.

In earlier times, the voice, the *Veena*, the flute and the percussion instruments were the basic instruments of performance. In recent times, the violin has been accepted as an integral part of the family of instruments at a concert. The flute belongs to an older period and the fine variations of *Swaras* are obtained by partial pressure applied on the holes on a flute and the air pressure exerted into the resonating column gives it great possibilities. In recent times, other European instruments have also been introduced into concerts such as the mandolin, guitar and even electronic instruments as principal instruments. Though the capability of electronic instruments is great, they are still not fully explored, and have not been given a permanent position at classical concerts. Vocal performance, however, has various advantages over instruments as lip and mouth movements can produce effects which cannot be imitated on instruments. Perhaps, a day may come when electronic instruments will take over at least part of the vocal possibilities.

In temple music, the main instrument is the *Nadaswaram* accompanied by percussion and has its own techniques, especially at open-air performances.

The essence of Karnatic music lies in the system of adorning notes called *Gamakas*. It is difficult to describe specific laws for the construction and use of *Gamakas*. As pointed out by Prof. P. Sambamurthy<sup>4</sup>, playing notes or singing of notes unadorned is rare in Karnatic music. Even in the first lesson in music in *Mayamalava Goula Raga*, one is taught to sing Ri and Dhi with *Gamaka* right from the beginning. He quotes from the *Natya Sastra*, saying 'Music without *Gamaka* is like a moonless night, a river without water, a creeper without flowers, a lady without ornaments and a flower without smell'. I quote again from Prof. Sambamurthy since it is the best description of *Gamakas* I have come across. He writes: 'the artistic and polished rendering of music consists in the notes of the melody being decorated

with appropriate *Gamakas*. The difference in the rendering of a piece by a senior musician and a junior musician lies mainly in the charming, stylish and graceful rendering by the former. *Gamakas* are a vital part of Indian music and they serve to determine the melodic character of a *Raga*. They are the backbone of *Ragas*, as much as harmony in European music. 'Two *Ragas* with identical *Arohana* and *Avarohana* and derived from the same *Janya Mela* might yet differ from each other on account of the characteristic *Gamakas* being present in one *Raga* and absent in the other. *Arabhi* and *Sama*, and *Manji* and *Bhairavi* are instances in point. The same variety of *Gamaka* appears with different degrees of intensity, rapidity and range in different ragas.

*Gamaka* is a comprehensive term meaning and including not only the shakes but also the manipulation of a note in any manner resulting in a musical effect. In other words, when the plain character of a note is altered so as to result in a musical effect, it is a *Gamaka*. There are *Gamakas* peculiar to vocal music and *Gamakas* peculiar to instrumental music. *Gamakas* make music pulsate with life. In graceful *Gamakas*, a fine web of microtonal variations is woven.

It will be difficult to indicate in notation all the grace notes used in a musical composition. But persons conversant with the *Bhava* and the true melodic picture of *Ragas* will supply the grace notes and shakes instinctively and render the music in an artistic manner.'

Appendix II gives the list of definable *Gamakas* in European notation purely as example. It is here that the student of Karnatic music has to depend on the phrase *Guru-Shisya Parampara* (the ecstatic relation between the teacher and the taught).

1. Helmholtz, *On the Sensations of Tone as a Physiological Basis for the Theory of Music*, 1875.
2. Clements, E. H., *I.C.S.: Ragas of Tanjore*, 1913, reedited by Caxton Publication, Delhi, 1988.
3. Sundaram, B. M., *Tala Sangraha*, Percussive Arts Centre, Bangalore.
4. Sambamurthy, P., *South Indian Music*, The Indian Music Publishing House, Madras, 1983, vol. I to VI.
5. Krishna Rao, H. P., *First Steps in Hindu Music in English Notation*, Weekes & Co, Hanover Street, Regent Street W, 1906.

#### Appendix I. Musical events of historical importance

Period	Work	Person concerned	Remarks	Musical events in Europe	Major world events
1800-1001 BC	<i>Sama Veda</i>		Chants to <i>Vedic</i> hymns	-	Harappa and Mohenjodaro
1000-500 BC	<i>Parivrajaka</i>	Narada	Equivalent to Solfa system defined (Sa, Ri, Ga, ... Ni, etc.)	Egypt	
	<i>Upanishad</i>			Greek music	Confucius, Buddha
	Early Tamil school				

# GENERAL ARTICLES

## Appendix I. (Contd)

Period	Work	Person concerned	Remarks	Musical events in Europe	Major world events
4 BC	<i>Natya Sastra</i>	Bharata	Treatise on dance	—	
5 C AD	<i>Bruhaddesi</i>	Matanga	Early compilation of <i>Ragas</i> , then known as <i>Jatis</i>	—	Chola & Pallavas
11 C AD	<i>Sangita Samayasara</i>	Parsvadeva	Classification of <i>Bhashanga</i> and <i>Upanga Ragas</i>		
11 C AD	<i>Sangita Chaudamani</i>	Jagadeka Malla	Classification of gender and time <i>Ragas</i>		
12 C AD	<i>Geeta Govinda</i>	Jayadeva	One of the greatest musical poems ever written		
12 C AD	<i>Sangita Makaranda</i>	Narada	<i>Gamakas</i> classified		
1210-47	<i>Sangita Ratnakara</i>	Sarangadeva	<i>Pallavi</i> exposition 22 <i>Sruties</i> Distinction between <i>Margi</i> and <i>Desi Ragas</i>		
12 C AD	<i>Panditaradhya Charita</i>	Palkurini Somanath Kavi	Identification of <i>Sruties</i>		Muslim invasions in the North
12 C AD	<i>Sangita Sudhakara</i>	Hariपालदेवा			
14 C AD	<i>Raga-tarangini</i>	Lochana Kavi	<i>Raga</i> elaboration	Development of Christian music	
1450-1600					Renaissance
1453					Fall of Constantinople
1492					Columbus
1450-					Vijayanagar established (1336)
15 C AD	<i>Sangeetasara</i>	Vidyaranya (1320-80) Purandaradasa (1484-1564) Annamacharya (1424-1503) Kanakadasa Andhra School Tallapakkam Chinnayya Ramadas (17th Century)	<i>Alapana</i> development <i>Sapta-tala</i> system Composer, referred to as the father of Karnatic music. Introduced standardized teaching methods. Group singing introduced Composer, friend Collaborator of Purandaradasa <i>Bhajan Paddhati</i>		
1521				Josquin Des Prez Palestrina (1525-94)	Vasco-da-Gama Mughal Period
1550	<i>Swaramela Kalanidhi</i>	Ramamatya	Elaboration of <i>Ragas</i>	Shakespeare (1564-1616)	
1565					Battle of Talikota (Fall of Vijayanagar Empire)
1609	<i>Raga Vibodh</i>	Somanatha			
1594 (ca.)	<i>Chaturdandi Prakasika</i>	Venkatamakhin	<i>Melkarta</i> system perfected		
1660	<i>Sangita Parijata</i>	Ahobala		J. S. Bach (1685-1750)	
17 C AD	<i>Anupa Sangitha Vilasa</i>	Bhavabhata Tanjore School Shahoji, Maharaja of Tanjore (1684-1710)	Patron of music and composer	Viennese School	

Appendix I. (Contd)

Period	Work	Person concerned	Remarks	Musical events in Europe	Major world events
1789					French Revolution
18 C AD		Shyama Shastri (1762-1827) Thyagaraja (1767-1847) Muttuswamy Dikshitar (1775-1835)	Trinity of Karnatic music	Hayden (1732-1809) Mozart (1756-1791) Beethoven (1770-1827)	
19 C AD		Subbaraya Sastri (1803-1862) Swati Tirunal (1813-1847) Singaracharu (1834-1892) Maha Vaidyanatha Iyer (1844-1893) Patnam Subramanya Iyer (1845-1902) Veene Sheshanna (1852-1926) Bidar Krishnappa (1866-1931) Vasudevachar (1896-1961) Muthiah Bhagavatar (1877-1945)	Composer <i>Veena</i> <i>Pallavi</i> expert Composer/vocal Composer Composer/ <i>Veena</i> <i>Composer/Harikatha</i> /vocal Composer/vocal Composer/ <i>Harikatha</i>	Chopin (1810-1849) Liszt (1811-1886) Wagner (1813-1883) Verdi (1813-1901) Mussorgsky (1839-1881) Debussy (1862-1918)	Indian Mutiny       First World War       Second World War

Appendix II. Gamaka symbols<sup>5</sup>.

A composition is sung in Raga regulated by Tala and embellished by the following Gamakas, or graces:

1. *Jaru* (or the slur) (∩). The curved line ∩, called a slur, placed over two or more notes, shows that they are to be played in a connected style. The first note alone is struck, and the others are lightly sustained for their full value. When only two notes are connected by a slur, the intervening notes, if any, are gently slid over. When a slur connects two or more notes of the same name, the first is sustained during the value of all the notes.

2. *Linum* (∩). When a note merges slowly and gradually into another higher note, the symbol ∩, called linum, is used.

3. *Kampitam* (∩). The symbol ∩, called *Kampitam* (shake), placed over a note, shows that the note above it in the *Sthayi* are to be alternately repeated in quick succession (Figure A1).

Written                      Played                      Pronounced

N                      N S N S N S N S

*Ni-i-i-i-i-i-i.*

Figure A1.

4. The symbol ∩. A note with the symbol ∩ placed over it shows that the note and the note above it in the Raga are to be alternately and equally repeated, each twice in the time value of the written note (as shown in Figure A2).

Written                      Played                      Pronounced

P                      P D P D

*Pa-a-a-a.*

Figure A2.

5. *Anuswara*, or the grace note. In order to produce a sweet effect, two notes are sometimes blended together; one of the notes is the principal note and the other the grace note. The grace note is written smaller. It retains its pitch, but borrows its duration from the principal note. A grace note preceding a principal note assumes the name of the latter in singing, and gives it only an additional vowel sound; but when it succeeds it, the order of pronunciation is reversed and the grace note is sung as a vowel, as shown in Figure A3, where the pronunciation in singing is Pa-a, Ni-i and Dha-a.

Written                      Played

P N D                      D P N P D S

Figure A3.

6. *Humpitam* (∩). When a line is drawn through the stem of a grace note, it is played with the utmost rapidity, and the principal note hardly loses any time. The small note shows the point from which the principal note darts.

7. *Emphasis*. When a note is preceded by a grace note immediately above it in the *Sthayi* and is of the nature described in (6) above, the note is emphasized as M and D in *Sankarabharanam* in the ascent.

8. *Sphuritha*. Notes are sometimes used in pairs. When the second note of a pair is preceded by a grace note immediately below it in the *Sthayi* and is of the nature described in (6) above, the grace is called *Sphuritha* when the pairs are ascending (Figure A4).

Sphuritha

S S G G P P

Figure A4.

9. *Prathyahatha*. When the second note of a pair is preceded by a grace note immediately above it in the *Sthayi* and is of the nature described in (6) above, the grace is called *Prathyahatha* when the pairs are descending (Figure A5)

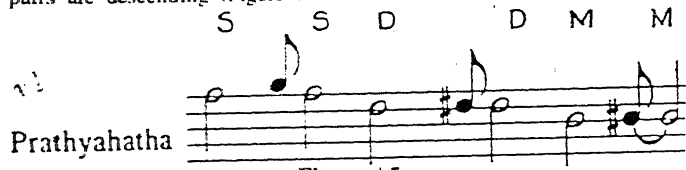


Figure A5.

10. *Andolitam* (—). The symbol — placed over a note shows that three-quarters of the note and a quarter of the note above it in the *Raga* are to be played in the time value of the written note (Figure A6).

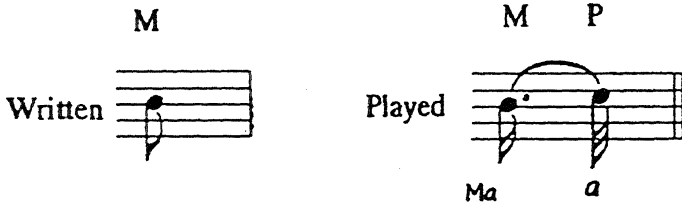


Figure A6.

11. *The symbol (=)*. When the symbol = is placed over a note, the mode of playing explained in the preceding paragraph is repeated twice (Figure A7). For *Kurulum*, *Thirup*, *Ullasitam*, etc., see the excellent work on music by Subrama Dikshitar of Ettayapuram<sup>5</sup>.

The following abbreviations are also useful:



Figure A7.

12. *The symbol (· · —)*. A note with the symbol · · — placed over it is played as shown in Figure A8.



Figure A8.

13. *The symbol (— · ·)*. A note with the symbol — · · placed over it is played as shown in Figure A9.

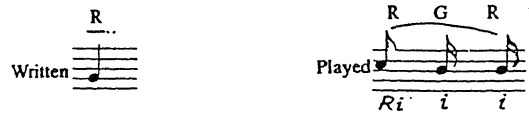


Figure A9.

14. *The symbol (∩)*. A note with the symbol ∩ placed over it is played as shown in Figure A10.

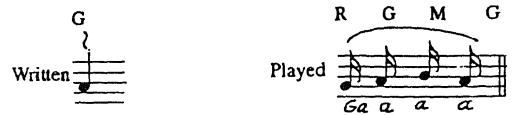


Figure A10.

15. *The symbol (~)*. A note with the symbol ~ placed over it is played as shown in Figure A11.

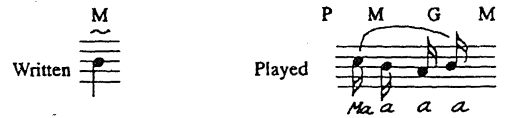


Figure A11.

16. *The symbol (‡)*. The symbol ‡ shows that the note over which it is placed is struck and at once stopped, silence continuing till the time indicated by the note expires (Figure A12).

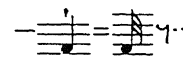


Figure A12.

The symbols  $\sim$ ,  $\cap$ ,  $\sim$ ,  $\cdot \cdot -$ , etc., are sometimes used under the notes.