

The fascinating generation of the South Indian Suladi Talas

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Abstract: The thirty-five Suladi Talas of the South Indian Carnatic Classical Music, which are converted to the percussion instruments Mrdangam, Ghatam and Kanjira, are important as a frame for the Carnatic Music as well as for certain South Indian Classical Dances such as Mohiniattam or Bharatanatyam. South Indian Talas in the sense of musical time signatures are taught by mnemonic syllables (Solkattu) and are based on seven Talas: Dhruva, Matya, Rupaka, Triputa, Jhampa, Ata and Eka Tala. These can be varied in each case in five sub-groups (Jatis), each of these being formed from specific combinations of Talas. Each Tala is divided into three additive used construction elements (Angams), containing a different number of beats (Aksharakalas). Angams consist of Drutam (two beats), Anudrutam (One beat) and the variable (Laghu) of the five Jatis (three, four, five, seven, nine beats). By special formulas of the seven Talas not only 35 Talas can be generated, but 175 by adding a sublevel (Gati) to all Talas. The fascination is caused by the fact, how seven simple formulas with complex possibilities can be developed to 175 Talas.

Keywords

Rhythm, Ethnomusicology, India, Carnatic Music, Talas, Mrdangam, Solkattu, Drums

Introduction

In early musical treatises on Indian Music, the term "Tala" is used both for the designation of the entire rhythmic system and for one of the eight hand gestures, which, like a metronome, indicate the speed and subdivision of a meter, which makes its perception possible. These movements of the hands may be audible or inaudible, which corresponds to the terms "Sasabda Kriya" and "Nihsabda Kriya" (Chaudhary 1997,12).

Rowell (1992,191) divides the Indian Tala system into fifteen essential aspects, which for the most part take on importance up to the present time and represent the complex hierarchy of Indian rhythm. Rowell describes the **first five aspects of each Tala** as "infrastructure of musical rhythm". The term "Kala" means division of time by Tala who, in contrast to Pata, happens by inaudible hand gestures (Nihsabda Kriya).

Pata "describes an audible hand gesture (Sasabda Kriya), which is usually represented by clapping. The term itself means "fall" derived from the verbal root "pat":

In the falling of an object there is the production of sound and the purpose of saśabdakriyā is to produce a sound which can be heard. Time does not become perceptible without the sounded action. (Chaudhary 1997,12)

"Laya" describes the speed of a Tala, which can take place in three stages: druta, madhya and vilambita (fast, medium, slow). Chaudhary translates the term "Laya" into "rest" in the sense of a rest following an action. The average speed contains twice as much rest as the fast speed and vilambita Laya contains twice as much rest as Madhya Laya (Chaudhary 1997, 28).

"Yati" determines the different sequences in which the three Layas are used, as well as the order within the sequences. Here is a distinction between Sama Yati, SrotogataYati and GopucchaYati. Sama Yati describes a constant speed from the beginning to the end of a musical arrangement, SrotogataYati a slow start with speed increase to the end and GopucchaYati, which translates to "cow tail", starts at a fast pace and ends at slow speed in two to three gradations (Chaudhary 1997,55).

"Pani", also known as "Graha" ("catch"), determines the synchronicity of the beginning between musicians as well as between musicians and dancers. Sama describes a simultaneous beginning of all performers, Visama the staggered entry, which can be done either before the other performers (Atita) or after (Anagrata) (Chadhary 1997, 56).

The other six aspects of a Tala form the "structure level" according to Rowell (1992, 191): "Padabhaga" describes the formal unity of a foursome. Padabhagas consist of two or four Kalas, the four Padabhagas being called "Matras". In general, all Talas - consisting of long, short and final syllables - can be attributed to the two forms Caturasra (consisting of 4 Matras or beats) and Tryasra (three Matras). Due to the syllable variations, these forms are also called "Cancatputa" and

"Cacaputa" in the NāṭyaŚāstra by Bharatamuni, the combination of which results in the Misra Tala (7 Matras).

Matra means a phrase consisting of four Padabhagas and is subsequently also used as the smallest unit of rhythmic-musical timekeeping - just like the term "Aksharakala" (Pesch 2009, 449).

"Parivarta" means the repetition of a formal rhythmic unity and "Vidari" is an internal break of melodic phrases, sections of a line within a musical arrangement, and thus a phrase ending with such a pause or cadence (Rowell 1992).

The same author describes "Anga" as a musical section consisting of several phrases or poetic lines. Anga also means a part of a category above it, a section within the composition, a part of an instrument and the division of a Tala (Pesch 2009, 392).

Finally, "Vastu" denotes the longer type of a formal component as well as the stanza of a song.

The **two subsequent aspects of a Tala**, according to Rowell (1992, 192), form the "suprastructure" that encompasses the entire level of a composition:

"Prakarana" describes the collective term for the seven types of melodies (Saptarupa or Gitakas) of ancient ritual music. Of these, the two forms of Asarita and Vardhamana already mentioned by Bharata formed the basis for dance, in which the above-mentioned Tala types Caturasra and Tryasra were used. The song forms Chandaka and Panika could also be performed in combination with dance, while in the GitakasRk, Gatha and Sama the Tala as Metrum was given no importance. (Chaudhary 1997, 152-153).

"Avayava" includes alternative versions of the Gitakas, which are created by variations in performance.

According to Rowell (1992), the last two aspects are contained in all levels of rhythmic hierarchy: "Giti" - the setting of a lyrics in four variations, and "Marga" - the relative intensity of events within a given period. This indicates both the measure of each Kriya and the full duration of a Tala.

In the Nāṭya Śāstra, written by Bharatamuni around 100 before or after Christ, five Marga Talas were mentioned, consisting of a different sequence of short (Laghu), long (Guru) and extended (Pluta) sequences in the ratio 1: 2: 3. These are represented by the letters "I", "S" and "Ś": The Tala Caccatputah therefore consists of the combination Guru - Guru - Laghu - Pluta (SSIS), Cacaputah from Guru - Laghu - Laghu - Guru (SIIS), Satpitaputrakah from Pluta - Laghu - Guru - Guru - Laghu - Pluta (ISSIS), Sampakvestakah from Pluta - Guru - Guru - Guru - Pluta (SSSS), and Udghattah from Guru - Guru - Guru (SSS). These talas were constructed in three stages: Ekakala (simple), Dvikala (double), and Catuskala (quadrupled), both proportions and the length of the rhythmic phrase being doubled or quadrupled in the latter two stages. The temporal dimensions of the Tala Satpitaputrakah therefore comprise six, twelve, and twenty-four Kalas (Rowell 1992, 196-200).

The above mentioned Nāṭya Śāstra of Bharatamuni represents the earliest source of a detailed and complete description of the contemporary musical rhythm system of India, the explanations of

which have been further clarified and supplemented in later works such as the *Abhinavabharati* by *Abhinavagupta* and the *Sangitaratnakara* by *Sarngadeva*.

A variety of other sources of information on Indian music and rhythmic are mentioned by the South Indian musicologist *Sambamoorthy* (1960, 17-19), with significant written sources written in Sanskrit, Telugu and Tamil. Authorities of ancient works include *Brahma*, *Yashtika*, *Kasyapa*, *Tumburu*, *Anjaneya*, *Somesvara*, *Vena*, *Shanmukha*, *Agastya*, *Durgasakti*, *Chandi*, *Bhringi*, *Daksha Prajapati*, *Devendra* and *Ravana*.

The same author also mentions some books on dance that include chapters on music, such as the works "*NatyaChudamani*" by *Somanarya*, "*Nritta Ratnavali*" by *Jayasena* and "*Natya Darpana*" by *Ramachandra* and *Gunacharya*. Other sources include the commentaries on *Bharata's "Nāṭya Śāstra"* and the book "*Sangita Ratnakara*" by *Sarngadeva*, as well as the written traditions of the "*Vedas*", "*Brahmanas*", "*Upanishads*", "*Ramayana*", "*Mahabharata*", "*Vayu Purana*", the books of *Kalidasa*, the "*Yataka*" legends, "*Panchatantra*", "*Kamikagamam*", "*Tolkappiyam*", "*Silappadikaram*", "*Pattupattu*", "*Kalladam*" and others.

Other sources include sculptures and paintings in various caves and temples such as the sculptures in *Amaravati*, *Sanchi* and *Barhut*, the frescoes of the *Ajanta Caves*, the temples in *Chidambaram*, *Tanjore* and *Vriddhachalam*. Likewise, coins feature musical imprints, and governmental documents relating to the governments of various kings contain texts about music and musicians who played for the kings. District leaves, travelogues, copper plates, palm leaves and papers contain information as well as compositions. Copper records with songs, titles and awards from the "*Tallapakam*" composers are stored in *Tirupati* (*Sambamoorthy* 1960,21-22).

Finally, *Sambamoorthy* mentions the book "*Butavetalavaguppu*" ("*Tiruppugazh*") of *Arunagirinathar*, which contains a description of the *Ragas* (Melodies) and *Talas* from the Medieval Period. Prize songs by students about their teachers and composers are just as good a source as letters and oral traditions of well-known families (such as *Shyama Shastri*).

The enormous variety of traditions illustrates the problems of each research project in relation to the evolutionary history of Indian rhythmic, which without knowledge of the Sanskrit language cannot dive into the full depth.

The Suladi Talas

In the thirteenth century, the division into the North Indian *Hindustani* and the South Indian *Carnatic Music* took place. The former fell under the influence of Persian and Afghan music, while South Indian music developed in its own tradition and individuality (*Bhagyalekshmi* 2004,2).

The application of South Indian *Tala* systems varies according to the tradition of sacred or profane musical genres and has developed over the centuries, which will not be considered in this article. Besides the *Carnatic Talas* different rhythm systems are existing till today in relation to certain kinds of music ensembles and their functions in South India's daily or ritual life.

Essential for us is to know, that only a part of full range of *Suladi Talas* and its metric shortened variants (*Chapu Talas*) are used in the *Classical Carnatic Music* and for the accompaniment of *Mohiniattam*, *Bharatanatyam* and *Ottam Thullal Performances* until the present time (*Bindu* 2013, 65).

In the ancient medieval writings on music there was no notation, music was transmitted orally. Fragments of lyrics were engraved on sheets or copper plates. According to Sambamoorthy, the need for a notation arose only through the complicated compositions of the musical trinity (Tyagaraja, Syama Shastri and Muttuswami Dikshitar, who lived between 18th and middle of the 19th century (Sambamoorthy 1960, 188-189).

Later written symbols for the Angas of the Suladi Talas consisted only of the letters I (for the Laghu), U (Anudrutam), O (Drutam) and E for Guru.

The integration of western notation in written music records became popular towards the end of the 19th century: in the publications of Tachur Singaracharlu (1873) short and long letters were used for the notes, as well as commas. 1892 T.M. Venkatesa Sastri used points for octave notes and lines for the duration of the notes in the book *Sangita Svayambodhini*.

In 1904 Subbarama Dikshitar created a sophisticated set of symbols in the book *Sangita Sampradaya Pradarsini* to record the various Gamakas (Ornamentations). Sambamoorthy used for the first time small and large letters from the English alphabet to differentiate the time units in his "South Indian Music Book". Here the small letters of the seven notes "s", "r", "g", "m", "p", "d", "n" meant a timeline of an Aksharakala, their capitalization two Aksharakalas. Likewise, for the first time Sambamoorthy placed the numbers next to the Laghu sign to mark the variations of the Jatis in Carnatic Music: beside the sign "I" (for Laghu) he noted either the numbers "3", "4", "5", "7" or "9" depending on whether it was Tisra (3), Chaturasra (4), Khanda (5), Misra (7) or Sankirna (9) Jati. Other characters such as "+" and "-" were also used for Eduppu, which is the starting point of a Tala cycle (Sambamoorthy 1960, 193).

This point-the count in the tāla cycle on which a piece, a new section of a piece, or a main phrase of a piece begins- is named *eduppu* (a Tamil word) or *graha* (a Sanskrit word). The tāla count on which eduppu falls depends on the composition.....Completion of melodic phrases, even in improvisation that is based on a composition, is marked by the repetition of a particular melodic phrase, beginning at eduppu. Thus eduppu is an important place for rhythmic cadences. (Wade 1987, 126)

The entire cycle of a Tala is called "Avarta", which is divided into Angas, the first beat of a cycle is known as "Sam" or "Samam", symbolized by an "x", as you will see in the figure of Bhagyalekshmi.

As mentioned in the abstract above the Suladi Talas of Carnatic music are based on seven Talas, the so-called "Sapta Talas", which are each variable in five Jatis. Each of these Talas is made up of specific combinations of three symbolic Angas: Anudrutam (U) comprising one beat, Drutam (O) two strokes, and Laghu (Iⁿ) a variable number of strokes depending on the Jati of the Tala is played. Each of the seven Talas can be played in all five Jatis, where in the Laghu signature the "n" is replaced by the respective number of strokes: Tisra Jati (3) contains three strokes, Khanda Jati (5) five strokes, Chaturasra Jati (4) four strokes, Misra Jati (7) seven strokes and Sangirna Jati (9) nine (Wade 1987, 22).

The seven Talas are called Dhruva (with its formula Iⁿ O Iⁿ), Matya (Iⁿ O Iⁿ), Rupaka (O Iⁿ), Tripata (Iⁿ O O), Jhampa (Iⁿ U O), Ata (Iⁿ Iⁿ O O) and Eka (Iⁿ). By the possibilities of variation in

the respective five Jatis they form the 35 Suladi Talas of the Carnatic Music, as you see in the figure below.

<i>Tālas</i>	<i>Jāti Variations</i>	<i>Shortname</i>	<i>Symbols of the Angas</i>	<i>Akshara Kalas</i>
Dhruva	Tisra Jāti	Mani	I ³ OI ³ I ³	11
	Chaturasra Jāti	Srikara	I ⁴ OI ⁴ I ⁴	14
	Khanda Jāti	Pramana	I ⁵ OI ⁵ I ⁵	17
	Misra Jāti	Purna	I ⁷ OI ⁷ I ⁷	23
	Sangirna Jāti	Bhuvana	I ⁹ OI ⁹ I ⁹	29
Matya	Tisra Jāti	Sara	I ³ OI ³	8
	Chaturasra Jāti	Sama	I ⁴ OI ⁴	10
	Khanda Jāti	Udaya	I ⁵ OI ⁵	12
	Misra Jāti	Udirna	I ⁷ OI ⁷	16
	Sangirna Jāti	Rava	I ⁹ OI ⁹	20
Rupaka	Tisra Jāti	Chakra	OI ³	5
	Chaturasra Jāti	Patti	OI ⁴	6
	Khanda Jāti	Raja	OI ⁵	7
	Misra Jāti	Kala	OI ⁷	9
	Sangirna Jāti	Bindu	OI ⁹	11

Jhampa	Tisra Jāti	Kadamba	I ³ UO	6
	Chaturasra Jāti	Madhura	I ⁴ UO	7
	Khanda Jāti	Chana	I ⁵ UO	8
	Misra Jāti	Sura	I ⁷ UO	10
	Sangirna Jāti	Kara	I ⁹ UO	12
Tripata	Tisra Jāti	Sankha	I ³ OO	7
	Chaturasra Jāti	Adi	I ⁴ OO	8
	Khanda Jāti	Dushkara	I ⁵ OO	9
	Misra Jāti	Lila	I ⁷ OO	11
	Sangirna Jāti	Bhoga	I ⁹ OO	13
Ata	Tisra Jāti	Gupta	I ³ I ³ OO	10
	Chaturasra Jāti	Lekha	I ⁴ I ⁴ OO	12
	Khanda Jāti	Vidala	I ⁵ I ⁵ OO	14
	Misra Jāti	Laya	I ⁷ I ⁷ OO	18
	Sangirna Jāti	Dhira	I ⁹ I ⁹ OO	22
Eka	Tisra Jāti	Sudha	I ³	3
	Chaturasra Jāti	Mana	I ⁴	4

	Khanda Jāti	Ratha	I ⁵	5
	Misra Jāti	Raga	I ⁷	7
	Sangirna Jāti	Vasu	I ⁹	9

Figure 1: Suladi Talas, Bhagyalekshmy (2004, 17)

Before we proceed with the underlying level of Gati, you will ask how these Talas are applicable to any instrument and how it is possible to learn this Talas?

I started my career as a percussionist, when I first got to know Tablas, a North Indian Percussion Instrument, in 1991. My Gurus for Tablas in the years 1991 and 1992 have been K.J. Thomas from Kumily, Gopan and his Guru Manohar Keshkar from Trivandrum. K. J. Thomas, who died at a very young age, had also begun to teach me in Mrdangam, the Classical Percussion Instrument of the Carnatic Music. Although he had tried to explain the system of the Suladi Talas, it only happened during my first field research in 2004, that I started to understand that complex system of Talas.

The relation between pupil and Guru, as well as detailed informations about all Carnatic Music Instruments, such as Ghattam, Khanjira, Veena, Bansuri, Violin, Murchang and others will be left aside not to go beyond the scope of this article. The next figure will just show you how a South Indian Mrdangam, the main Percussion Instrument in the Carnatic Music, looks like.



Figure 2: Mrdangam Player Praveen in Trivandrum. Foto: Karin Bindu (2012)

What should be mentioned is, that you will not be able to study any of these instruments without a teacher and without getting initiated by him or her to the Deities of the Hindu Pantheon. The origin of Indian Music and Music Instruments is regarded to be devine, therefore Music is not only played for the people, but for the Deities as well.

I had mentioned above, that all Talas are taught through mnemonic syllables, which include their way how to be played on the instrument. These syllables are called "Konnakkol", "Solkattu", or "Nattuvangam": "Solkattu" syllables are used to teach percussion instruments, "Konnakkol" means <https://www.jsrd-humanities.com/>

the Solkattu syllables when presented by a vocalist / vocalist without instrumental accompaniment, and "Nattuvangam" syllables include combinations of syllables and punctuation deviating from the Solkattu to use standard phrases for dance movements (Pesch 2009, 206).

My first lesson with K.J. Thomas in Kerala, Kumily, 1992 contained the syllables "Ta", "Ti", "Dom", and "Nam". The first two syllables were played on the right head of the drum with the typical "spreading finger technique" on the black striking surface of powdered iron ore, where "Ta" is played with middle finger and ring finger and "Ti" by the index finger of the right hand. "Dom" is played with the flat hand on the sounding edge of the left drumhead and "Nam" is played with the index finger of the right hand on the sounding edge of the right drumhead, while the ring finger of the right hand muffles the black surface (Shyahi). I also had to spell out loud these syllables while playing, and practice them in three speeds, while my Guru moved his hands (Kriyas) indicating the Tala. The concept of Kriya will get explained later.

An analysis of all the syllables used by Brown, who was one of the first westerners to write down his complete Mrdangam lessons, showed that twelve lessons were used in the material of his lessons for which twenty-nine syllables appeared. The pronunciation of them varied a little to the syllables I had learnt.

Without regard to their relative importance or rarity, the twenty – nine syllables arranged in phonological order, that is, according to the place of pronunciation, are as follows: KA KI, KU, KUM, GA, GI, GU, HA, JO, ṬA, ḌA, ḌU, ṆA, ṆU, TA; TAN, TAM, TIN, TON, TOM, DI, DIN, DIM, NA, NAN, NAM, LAN, RI and MI. (Brown 1965, 97)

The syllable "Ta" was used for eight different single strokes as well as for three combinations of both hands. As I have learnt one of that combinations are made by playing the above described "Ta" on the right head with the full hand stroke "Ke" into the middle of the left drumhead. Instead of the "Ta" also a "lan" stroke – a slap with the small finger of the right hand to the sounding edge of the right drumhead can be combined with the left hand "Ke".

Syllable diversity can occur due to various reasons such as variations in the Talas, better spelling modes and others.

Here, syllable diversity is explained by the factor of assimilation or phonetic decay: by speeding up, "KI ṬA" becomes "KIDA" or "KETA" as I have learnt.

Filling the Jati levels of Suladi Talas with syllables

According to Brown (1965, 100) the following syllables mark the most common groupings: TAKA (2 beats), TAKITA (3 beats), TAKADIMI (4 beats), TAKA TAKITA (5 beats), TAKA TAKADIMI (6 beats), TAKITA TAKADIMI (7 beats), TAKADIMI TAKADIMI (8 strokes), TAKADIMI TAKA TAKITA (9 strokes).

These common groupings are very important for the Jati variations within the Suladi Talas. In the following figure I want to explain how groupings of syllables will get applied to a certain Tala. In that case it will be Triputa Tala Chaturasra Jati, which is very common in South India, and better known as Adi Tala with the structure I⁴OO.

1	2	3	4	5	6	7	8	<i>Akshara kalas</i>
X	1	2	3	X	V	X	V	<i>Kriya</i>
Ta	Ka	Di	Mi	Ta	Ka	Ge	No	<i>Solkattu</i>

Figure 3 : Structure of Adi Tala

What is striking here is the fact, that although the Kriya row shows the same Drutam symbols twice (x,v), the syllables below show variations. That combination of “Ge” and “No” is done in order to recognize the end of the Tala. Ge is played like the sounding “Dom” on the left head of the drum, “No” means the stroke “Nam” as explained above. The emphasis on the penultimate syllable gives the musician enough time to come back in time to the starting point of the Tala Avarta, the “Sam”. This is one of the most important aims in Carnatic Ensemble play. Variations, improvisations and communications between the players (Jugalbandhi) can be done, but a common start on the “Eduppu” is a must.

If we apply the same system on Ata Tala Tisra Jati (I³POO), it’s generation by syllables will be like that. Instead of the repetition of “Ta” and “Ke” on the ninth and tenth beat again “Ge” and “No” are placed.

1	2	3	4	5	6	7	8	9	10
X	1	2	x	1	2	x	v	x	v
Ta	Ke	Ta	Ta	Ke	Ta	Ta	Ka	Ge	No

Figure 4: Ata Tala Tisra Jati

To understand the middle row of the handgestures (Kriyas) it is important to know, that during a Carnatic Classical Concert either the vocalist is steadily doing Kriyas or an additional person, who is only sitting on the stage to guarantee the correct timing of the Tala. The Indian audience, which is categorized depending on having knowledge as music insider or just consuming outsider, uses to follow the Talas of the Concert by doing the Kriyas on their legs or their hands. That means that vocalists and audience form a kind of “living metronome”.

In the introduction we learnt about inaudible Kriyas (Nihsabda Kriya) and audible hand gestures (Sasabda Kriya). These gestures are important to mark the “Angas” of a Tala, for the Indian rhythm system is an additive system (in contrast to the western divisive system of notation). Anudrutam, consisting of one stroke is expressed here by clapping (in the notation

indicated by the symbol “x” or “+”). Drutam is expressed by clapping and "wave", that means the palm of the right hand moves in a half circle to the right side, the palm shows towards the sky. A Laghu is done by "finger counts", which are partly inaudible, partly audible to follow an Anudrutam. Here, the number "1" symbolizes the little finger, "2" the ring finger, "3" the middle finger, "4" the index finger and "5" the thumb.

The hand movement of the "finger counts" can be done in several ways: according to Wade and to my own observations, the respective fingers are typed on the thumb tip of the same hand, on the right thigh, or on the palm of the left hand, the movement always leads from the little finger in the direction of the thumb. If Laghus are to be displayed with seven or nine strokes, the Kriyas as described above continue in the direction of the thumb, the "7" starts again at the little finger, "8" takes place at the ring finger, and the "9" ends at the middle finger (Wade 1987, 124-125).

If we apply our knowledge now to the Jhampa Tala Misra Jati (I⁷UO), as you see in figure 5, claps will be on the first, eight and ninth stroke.

1	2	3	4	5	6	7	8	9	10
X	1	2	3	4	5	6	x	x	v
Ta	Ke	Ta	Ta	Ka	Di	Mi	Ta	Ge	No

Figure 5: Jhampa Tala Misra Jati

In the same way all 35 Suladi Talas, shown in the chart above, can be filled by that basic strokes, but the tricky fact is, when used as accompanying Tala during a concert, other syllables indicating other sound patterns and playing techniques are used as noted in figure 6.

1	2	3	4	5	6	7	8
X	1	2	3	X	V	X	V
Kum tatim	timmtim	kum tatim	timmtim	kum tatim	timmtim	kum tatim	Ketatake tareketa

Figure 6: Adi Tala as played by K.J. Thomas 1994 (Bindu 2013, 78)

Here the syllable “Kum” means “Dom”, “tim” is played like “Na”, but to the inner ring of the right drumhead. If we would compare that structure to the western notation system and would see the whole structure as 8/4, the first “Kumtatim” would be Triplets, followed by two eight notes (“timmtim”), and the last phrase “Ketataketareketa”, which is very popular at the end of a Tala Avarta, would be 32th notes.

The following figure shows the South Indian way of notation in Suladi Alankaras, sung by students in three speeds only for practice purposes. The title line lists the corresponding Tala, its name, the number of Aksharakalas, and the symbols of the Angas. That is the whole information a Percussionist will get in Carnatic Music books!

14.32.Chaturasra Eka, Maana, 4-l laghu

x 1 2 3	x 1 2 3	x 1 2 3
s r g m	r g m p	g m p d
m p d n	p d n s	s n d p
n d p m	d p m g	p m g r
		m g r s

15-3.Khanda Dhruva-Pramana, 17-IOII

x 1 2 3 4	x ✓	x 1 2 3 4	x 1 2 3 4
s r , g ,	s r	s , r g ,	s r g m ,
r g , m ,	r g	r , g m ,	r g m p ,
g m , p ,	g m	g , m p ,	g m p d ,
m p , d ,	m p	m , p d ,	m p d n ,
p d , n ,	p d	p , d n ,	p d n s ,
s n , d ,	s n	s , n d ,	s n d p ,
n d , p ,	n d	n , d p ,	n d p m ,
d p , m ,	d p	d , p m ,	d p m g ,
p m , g ,	p m	p , m g ,	p m g r ,
m g , r ,	m g	m , g r ,	m g r s ,

Figure 7: Chaturasra EkaTala, Khanda Dhruva Tala, Bhagyalekshmy (2004, 25)

Generating Gati levels to create 175 Talas

However, each Akshara of all Suladi Talas can be further divided into four Matras, three, five, seven and nine - this subdivision is called "Gati". Accordingly, a distinction can be made between Tisra Gati, Chaturasra Gati, Khanda Gati, Misra Gati and Sangirna Gati. Through this additional subdivision of all Sapta Talas - described in the image of Suresh as "Step -3", there are a total of 175 rhythmic combination options that are available by percussionists for the accompaniment of Carnatic music and performing arts. It must also be remarked, that mostly a small selection of all possibilities is used, between ten and 15 Talas in particular.

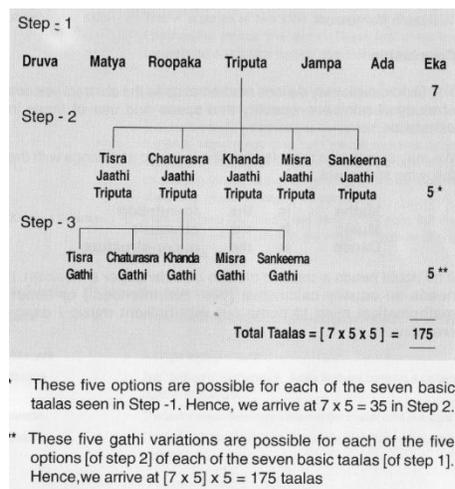


Figure 1: Variations of Adi Tala in Jatis and Gatis (Suresh 2002, 25)

To illustrate this further generation possibility, we take Eka Tala Khanda Jati, which has got the structure I⁵ as an example in all possible Gati variations.

1	2	3
X	1	2
Ta Ke Ta Ke Ta	Ta Ke Ta Ke Ta	Ta Ke Ta Ge No

Figure 9: Eka Tala KhandaJatiTisraGati, 15 Aksharakalas

1	2	3	4
X	1	2	3
Ta Ke Ta Ke Ta	Ta Ke Ta Ke Ta	Ta Ke Ta Ke Ta	Ta Ke Ta Ge No

Figure 10: Eka Tala KhandaJatiChaturasraGati, 20 Aksharakalas

1	2	3	4	5
X	1	2	3	4
Ta Ke Ta Ke Ta	Ta Ke Ta Ge No			

Figure 11: Eka Tala KhandaJati Khanda Gati, 25 Aksharakalas

1	2	3	4	5	6	7
X	1	2	3	4	5	6
Ta Ke Ta Ke Ta	Ta Ke Ta Ge No					

Figure 12: Eka Tala KhandaJatiMisraGati, 35 Aksharakalas

1	2	3	4	5	6	7	8	9
X	1	2	3	4	5	6	7	8
Ta Ke Ta Ke Ta	Ta Ke Ta Ge No							

Figure 13: Eka Tala Khanda Jati Sangirna Gati, 45 Aksharakalas

Remember, that this example contains just one of the five Jati variations of Eka Tala. If you vary Eka Tala Chaturasra Jati in all Gati variations, the syllables of the last row will be “Ta Ka Di Mi” and “Ta Ka Ge No” in the last column. In that way Eka Tala Chaturasra Jati will increase to 12, 15, 20, 28, 36 Aksharakalas by generating Tisra, Chaturasra, Khanda, Misra and Sangirna Gati levels. If you go back to figure 6 you can imagine, how many variations of additional structures by all applied Talas for concert or dance accompaniment could be done, you will realize that the fascination of generating Talas will be a never-ending story.

Conclusion

Bharatamuni's work Nāṭya Śāstra contained the first detailed descriptions of systematic music and dance traditions of India. Systematic remarks were subsequently supplemented by further explanations, for example in the Abhinavabharati of Abhinavagupta (1000 AD) and in the Sangitaratnakara of Sarngadeva (around 1240 AD).

One of the most important functional distinctions of two musical genres was already made in the Nāṭya Śāstra: the Gandharva tradition included timeless, sacred and composed musical forms practiced by the Gandharvas, the lower deities of Hinduism, while the Gana tradition had profane, improvisational character. Locally differentiated styles served the entertainment of the people. Since Sarngadeva, these terms have been renamed Marga and Desi Sangita, both of which include combinations of song (Gita), instrumental music (Vadya), and abstract dance (Nrta).

Both traditions are subdivided into temporal order systems by complex hierarchical rhythmic musical structures - the Talas -, which according to Rowell (1992) contain fifteen important aspects.

The thirty-five Suladi Talas of South Indian Carnatic music, which are transposed on the percussion instruments Mrdangam, Ghatam and Kanjira are and learned by syllables (Solattu). They are based on seven Talas - the so-called "Sapta Talas" Dhruva, Matya, Rupaka, Triputa, Jhampa, Ata and Eka. Each Tala is variable into five subgroups (Jatis) and formed from specific combinations of three symbolic Angas: Anudrutam comprises one beat, Drutam two strokes and Laghu a variable number of strokes which depends on which of the five Jatis of the Tala is played: Tisra Jati contains three strokes, Khanda Jati five strokes, Chaturasra Jati four strokes, Misra Jati seven strokes and Sangirna Jati nine strokes.

The Angas themselves are accompanied by hand movements (Kriyas) or marked by their symbols in the notation. A further subdivision of the Suladi Tala into underlying three, four, five, seven and nine Gati plains allows them to be generated in a total of 175 Talas, which would be available for the accompaniment of Carnatic Music and Performing Arts. Generally, only an increasingly small selection of Talas is needed for the current repertoire.

Structuring inserts such as Yati (Break), Mora (finishing Phrase), Korvai and Faran belong to the most amazing arithmetic and logistical feats of a player, who must have mathematical mind to calculate the phrases in a way, that they always reach the starting point in time.

These phrases as well as deeper knowledge about compositional elements and speed variations could not get attention within this article.

Apart from gaining deeper understanding about South Indian rhythmic systems by following a huge variety of written and architectonic sources, new research developments in music technology, analysis and synthesis are made by MIR (Music Information Research), which develops Tala

tracking systems to note rhythms automatically and develops into further structural analysis of music pieces (Srinivasamurthi 2016).

Indian Carnatic Rhythmic Structures can also be used by all kind of drummers to get adapted into the language of other drums and instruments, what has been done by Darren Moore and is done by Jazz drummers.

For training and perfection in Classical Carnatic Rhythms a personal Guru is highly recommended and necessary to meet the high musical expectations of an Indian audience.

References

- (1) Bhagyalekshmi, Dr. S. *Karnatic Music Reader 1*. Nagercoil 629003 S. India: CBH Publications, 2004
- (2) Bindu, Karin. *Percussion Art Forms. Aspekte der Produktion und Kommunikation südindischer Talas im Kutiyyattam*. Vienna/Munich: LIT Verlag, 2013
- (3) Brown, Robert. *The Mrdanga: a study of drumming in South India*. Volume I: Text, Volume II: One hundred and fifty-two Mrdanga Lessons. Dissertation. Los Angeles: University of California, 1965
- (4) Chaudari, Subhadra. *Time measure and compositional types in Indian Music. A Historical and Analytical Study of Tāla, Chanda and Nibaddha Musical Forms*. Published by Pradeep Kumar Goel for Aditya Prakashan. New Delhi: Crescent Printing Works (Pvt.), Ltd., 1997
- (5) Deva, B. Chaitanya. *Musical Instruments of India. Their History and Development*. New Delhi: Munishiram Manoharlal Publishers, 2000
- (6) Moore, Darren. *The Adeptation of Indian Carnatic Rhythmic Structures and Improvisation Methods into Drumset Language and Performance Practice*. Dissertation. Queensland Conservatorium: Griffith University, 2013.
URL: https://www120.secure.griffith.edu.au/rch/file/97701d73-2863-4a14-a0d9-13b44113a3ec/1/Moore_2013_02Thesis.pdf; Accessed February 2019.
- (7) Pesch, Ludwig. *The Illustrated Companion to South Indian Classical Music*. Second Edition 2009. New Delhi: Oxford University Press, 1999
- (8) Rowell, Lewis. *Music and Musical Thought in Early India*. London: University of Chicago Press, 1992
- (9) Sambamoorthy, P. *History of Indian Music*. Madras –1: The Indian Music Publishing House, 1960
- (10) Sen, A.K. *Indian Concept of Rhythm*. Kanishka Publishers, Distributors. Published by Madan Sachdeva for Kanishka Publishers. New Delhi: Efficient Offset Printers, 1994
- (11) Srinivasamurthy, Ajay. *A Data-driven Bayesian Approach to Automatic Rhythm Analysis of Indian Art Music*. Thesis Doctoral. Barcelona: UPF, 2016.
URL <https://compmusic.upf.edu/phd-thesis-ajay/>; Accessed February 2019

- (12) Suresh, Vidya Bhavani. *Getting Closer to Carnatic Music*. Demystifying Fine Arts-Volume 3. Chennai: Skanda Trust, 2001
- (13) Suresh, Vidya Bhavani. *Maths in Music and Dance*. Demystifying Fine Arts-Volume 1. Chennai: Skanda Trust, Third Reprint, 2002
- (14) Wade, Bonnie. *Music in India: The Classical Traditions*. New Delhi: Manohar Publications, 1987