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**The *Ṭhāt* System of Seventeenth-Century
North Indian *Rāgas*:
a Preliminary Report on the Treatises of Kāmilkhānī**
by
Katherine Butler Brown

It would seem to be paradigmatic in the study of Indian classical music to say that one major difference between Karnatic music and its North Indian counterpart lies in their conception of the *rāgas* and how they are classified.¹ Beginning with Rāmāmātya's radical break with the past in the *Swaramelakalānidhi* (1550), the South Indian *rāgas* were no longer to be organised according to the old method of parent *rāgas* and *jātis*, but conceived according to their basic scalar material (te Nijenhuis 1977:20). Rāmāmātya's proposition of nineteen basic scales, or *melas*,² led eventually to the development and enthusiastic adoption of a highly logical and practically-based system of seventy-two *melakārta* that account for all possible tonal permutations of the *rāgas*. The North Indian *rāgas*, however, were conceptualised until the twentieth century as a rather looser conglomeration of individual entities organised according to the male-female-child principle of the *rāga-rāgīnī* system. This principle of melodic classification dates back at least as early as the twelfth-century *Gītālamkāra* (9).³ However the *rāga-rāgīnī* system in its fully-fledged form probably first emerged in the fourteenth century, beginning with Sudhākalaśa's *Saṅgītopaniṣatsāroddhāra* (1350) (15). Since that time, the North Indian *rāgas* have largely been distinguished by their unique aesthetic properties, such as the times and seasons of their performance, characteristic motifs and ornaments, association with deities and moods, purported magical properties, and so on.

At the beginning of the twentieth century, dissatisfied with the illogicality and contradictions inherent in this system (Bhatkhande 1990:1-2), the musicologist V. N. Bhatkhande codified a new system, based on earlier Sanskrit theoretical models and related to the South Indian *mela* concept, of ten basic *ṭhāts* or scales by which all Hindustani *rāgas* could be classified. As a method of redefining the Hindustani *rāga* system, Bhatkhande's *ṭhāt* have met with some resistance in North India, especially from hereditary musicians. As Daniel Neuman so succinctly put it, "when *rāg Malkauns* ceases to be the *rāg* of jinns and becomes a pentatonic scale, the music *becomes* something different because it *means* something different" (1980: 212). Nevertheless, the *ṭhāt* system has proved to be a useful tool in identifying, discussing and communicating the basic modal material of individual *rāgas*, and as such, this "novel" construct is now firmly ensconced in the verbal and ideational repertoire of even the most "traditional" North Indian musician.

Or so the historiography goes, at any rate. The problem is that this view of the *ṭhāt* system as a relatively artificial twentieth-century phenomenon is undermined by the hitherto unsuspected existence of a highly developed *ṭhāt* system elaborated in 1668 in two Indo-Persian treatises by the Mughal theorist 'Iwaz Moḥammed Kāmilkhānī.⁴ Written in Persian, the court language of the Mughal Empire, these works are the *Risāle-i 'Iwaz Moḥammed Kāmilkhānī dar 'amal-i bīn va thāthe-i rāghā-i Hindī*, or the "Treatise on playing the *bīn* and the *ṭhāts* of the Indian *rāgas*," and the *Risāle-i Kāmil Khān dar bayān-i thāte ya 'ni navākhtan-i sāzhā*, or the "Treatise on the explanation of *ṭhāts*, that is, the playing of instruments." Entirely unrelated to Sanskrit theoretical traditions, these two treatises are based solely on the performance practice of the North Indian *bīn*, as witnessed and participated in by the author at the Mughal court in Delhi during the reign of the Emperor Aurangzeb (r.1658-1707). Kāmilkhānī's work in some respects resembles that of the more mainstream Indo-Persian musical theorists of his time, and like them he acknowledges the ideological preeminence of the *rāga-rāgīnī* system of classification in North India.⁵ However, he diverges radically from all established precedent, making little more than an honorific gesture towards the *rāga-rāgīnī* system. Rather, the two areas of unique importance in Kāmilkhānī's works are in his development of a twelve-semitone scale from the harmonic division of the fundamental Sa string of the *bīn*, and his elaboration of a *ṭhāt* system related directly to the fretting patterns used in setting up the *bīn* for the performance of *rāga*. A number of Sanskrit treatises written at approximately the same time testify to an upsurge of interest in applying the *mela* system to the North Indian *rāgas*, and, following the mid-seventeenth-century publication of Ahobala's seminal *Saṅgītapārijāta*, in defining the *śuddh* scale according to divisions of the string.⁶ However, Kāmilkhānī's writings are the first and only works of pre-modern North Indian theory explicitly to link the derivation of the Hindustani scale from harmonic divisions of the string to the extensive refinement of a discrete, performance-based system of *ṭhāts* defining the tuning systems of all known *rāgas*. This paper provides a brief summary and evaluation of the contents of Kāmilkhānī's treatises, preliminary to the translation and critical edition of the two manuscripts I am currently undertaking.

***Risāle-i 'Iwaz Moḥammed Kāmilkhānī
dar 'amal-i bīn va thāthe-i rāghā-i Hindī***

Kāmilkhānī's "Treatise on playing the *bīn* and the *ṭhāts* of the Indian *rāgas*" is located in the Bodleian Library, Oxford (Ouseley 158: ff.123a-132b). Written in very small, neat *shekaste-amīz*, with a few wormholes, it is bound together with two other manuscripts. The first, written in the same hand, is entitled *Risāle-i Kāmil Khān dar bayān-i*

thāte ya'ni navākhtan-i sāzhā or “Kāmil Khān's treatise on the explanation of *thāts*, that is, the playing of instruments” (ff.133b-136a). It appears to be a first draft of or preparatory notes for the *Risāle dar 'amal-i bīn*, although the material it covers diverges significantly from the final draft. The *Risāle-i Kāmil Khān* is dated 1078 A.H. (1667/8), and it is therefore almost certain that the *Risāle dar 'amal-i bīn* was completed at around the same time. Following the *Risāle-i Kāmil Khān* is a new treatise on the same paper (ff.136b-137b) but in a different hand. Essentially, it is a list of the *swara* patterns of the common Hindustani *rāgas* and the specific times allocated for their performance. It explicitly states in the preface that it is describing current practice, and was completed in Shahjahanabad (Delhi) in 1079 A.H. (1668/9). Yet another treatise in the same volume – the well-known collection of 1004 *dhrupads* composed by the fifteenth-century master musician Nāyak Bakhshū, known as the *Sahasras* (ff. 20b-) – is written in the same hand as Kāmilkhānī's treatises. It was commissioned by the Mughal nobleman Diyānat Khān, an important patron and collector of theoretical treatises on music, and completed in Shahjahanabad in 1078 A.H.

Although the evidence is fairly circumstantial, it is certainly possible that Diyānat Khān was also the person for whom Kāmilkhānī wrote his two treatises. Mīr 'Abd'ul Qādir Diyānat Khān came from a distinguished and greatly honoured family of Mughal noblemen who originally emigrated to India from Herat (Shāh Nawāz Khān 1999, vol. i 221). The family were renowned for their loyalty, honesty and cultural accomplishments. Diyānat Khān, who outlived Aurangzeb, himself held the rank of 2000 *zāt*, eventually becoming governor of the Deccan, and of Aurangabad, Aurangzeb's Deccani capital (473). According to Shāh Nawāz Khān, Diyānat Khān had Sufi leanings, and is remembered for his learning and the encouragement of his children in scholastic and artistic endeavour (475). Although he is not mentioned specifically as a patron of music in the *Maāsir ul-Umarā*, Shāh Nawāz Khān's exhaustive biography of important Mughal noblemen, it is certain that he had a keen interest in music. As well as the copy of the *Sahasras* in the Bodleian, a large collection of manuscripts on Persian and Arabic music, written or copied under his auspices in Shahjahanabad between 1663 and 1665, is held in the British Library (Or. 2361). Kāmilkhānī himself is not mentioned in the *Maāsir ul-Umarā*. It is clear nevertheless that he was possessed of considerable learning, and was moreover a close companion of members of the nobility and comfortable in elite circles. Although he does not mention a patron, it is reasonable to suggest that Kāmilkhānī may have been a minor nobleman in the employ of Diyānat Khān, who was residing in the imperial capital during the period these treatises were written. There is another possibility that he was Diyānat Khān's social equal rather than his employee; Athar Ali lists a “Kāmil

Khān” as having been a nobleman of very similar rank to Diyānat Khān during Aurangzeb’s reign (1966:197).

The *Risāle dar ‘amal-i bīn*, in common with other Indo-Persian musical treatises of the period, begins with a statement of the author’s purpose in writing. It appears that Kāmilkhānī was intrigued by the fact that every *rāga* had its own specific time of performance, and that performances that conformed to the time theory were regarded as especially emotionally effective. However, on consulting the scholars, teachers, composers, master performers, and connoisseurs, he found that no one could explain the theory to him, nor, they told him, was it expounded in the *saṅgītaśāstras*. So he resolved to write a guide on the subject of the seasons/circumstances of *rāgas*, music more generally, and instruments. In order to do this he spent much time in discussion with the singers and composers of Hindustānī music, the instrumentalists, and those of his friends who were connoisseurs of music. In addition, he himself learnt how to play instruments and to sing, and seems to have looked at writings or oral traditions on the arts of music and astrology, and at the pronouncements of Islamic commentators on the subject.

From my analysis I have come to the conclusion that the *Risāle dar ‘amal-i bīn* is primarily based on Kāmilkhānī’s own observation and analysis of and participation in Indian classical music as it was practised at the Mughal court. Seventeenth-century Indo-Persian theoretical treatises can roughly be divided into two groups; those that are openly translations of and commentaries on Sanskrit *saṅgītaśāstras*, and those that do not make this claim. The former, whether they are translations of a specific treatise, such as the *Tarjome-i Pārijātak* (1666), Mīrzā Raushan Zamīr’s virtually contemporaneous translation of Ahobala’s *Saṅgītapārijāta*, or whether they are compilations of various Sanskrit sources such as Mīrza Khān’s *Toḥfat al-Hind* (c.1675), are invariably explicit in associating themselves with Sanskrit models as a source of authority and prestige⁷. Beginning with a preface that explores Indo-Muslim ideas on the origins of music alongside various Islamic traditions on the legality of listening to music, these treatises then usually follow more or less the traditional seven-chapter structure first laid down in the *Saṅgītaratnākara*. They nevertheless often incorporate original material that comments on current performance practice and diverges from the *saṅgītaśāstra* tradition (Delvoye 1994:103).⁸ Treatises that do not claim to derive from the Sanskrit *saṅgītaśāstras* also include the standard Indo-Persian preface, but by and large do not follow the traditional Sanskrit structure. While this has the effect of making them seem more original and practically based – and this is often the case – many of them demonstrate some level of familiarity with theoretical concepts derived from the *saṅgītaśāstras*, often in a garbled form, and it is possible that

some may occasionally incorporate unacknowledged material from Sanskrit sources.

Kāmilkhānī's treatise is a prime example of the second group of treatises. He begins with a statement on the origins of the seven *swaras* based on the Perso-Greek philosophical idea that they were created by the rotation of the seven stars at the beginning of the world, and then mentions various *hadīs* concerning the acceptability of musical performance in Islam. However, following this he goes into great detail on how the North Indian *bīn* is constructed, followed by a brief summary of the six principal *rāgas*, their five wives and children, and the names of the seven *swaras*. After this he discusses how the exact pitches of the seven *swaras* in the *śuddh* scale are derived by placing the frets (*sārs*) of the *bīn* in correspondence to quasi-Pythagorean fractional divisions of the string, many of which produce natural harmonics. This fretting pattern he calls a *thāt*, which also seems to refer to its corresponding scale. It is apparent that he is using a *bīn* with moveable frets, two of which, Sa and Pa, always remain fixed in the same position; all performances of Hindustani *rāgas* begin and end on *maddhya* Sa, which he calls the "moon fret", and all Persian music is founded on *mandar* Pa, which he calls the "sun fret". The other frets are named after the five planets, because these "stars" have vacillating orbits, and in the same way, these 5 frets are moved according to the requirements of different *rāgas*. It is not clear whether Kāmilkhānī invented this association of specific stars with the *swaras*, but it was certainly popular and widespread enough for it to be mentioned in the *Shams al-Aṣwāt* (1698) by the most distinguished hereditary performer of the day, Ras Baras Khān Kalāwant (*S-a-A* SJ, f.33b)⁹, and again nearly a century later in the *Uṣūl-i naghmāt al-Āsaft* (1793) (*U-N-A* SJ, ff.34b-5a).

Kāmilkhānī calls his *śuddh* scale *thāt* Bhairava, mentions a number of other *rāgas* that can be played using this particular physical setup, and the time of their performance. Using *thāt* Bhairava as a basis, and moving one or two frets at a time into different positions, of which there are eleven in total (there is only one fret position for Dha¹⁰), he derives eight *thāts* that can be used as a shorthand when indicating how one should fret the *bīn* for different *rāgas*. His preliminary draft, the *Risāle-i Kāmil Khān*, has seventeen *thāts*, including, very interestingly, one with a three-quarter tone Re called *Ghazal*, which could presumably be used in setting up the *bīn* for the performance of Persian *maqāms*. It is unclear why he reduces these to eight in the final draft. The seventeen *thāt* system used in the first draft is somewhat confused; some of the *rāgas* appear in more than one *thāt* despite the fact that they are all different in their fretting pattern. It may be that many of the *thāts* were used only in the performance of rare or unusual *rāgas*.

Bhairava *thāt*, which has all the frets of the scale at their lowest positions, is composed of the following fractional divisions of the string:

mandar Sa is the open string at the *meru*, or upper bridge

maddhya Sa is exactly halfway

Pa = 1/3

Ma = 1/4

Ga = 1/6

Re = 1/16

Dha = 19/48

Ni = 7/16

Table 1 is Kāmilkhānī's original table of seventeen *thāts*. The first number is the distance of the fret from the lower bridge at the plucking end, the second is the distance from the *meru* or upper bridge at the peg end, and the third is the total number of divisions. The last two together give the fraction. Table 2 shows Kāmilkhānī's final eight *thāt* system against a scale diagram of their fractional divisions along the string. His eight *thāt* system is in fact the first eight *thāts* of his seventeen *thāt* system. To highlight this I have included the extra *thāts* of the seventeen *thāt* system below the eight in italics.

Table 1: Kāmilkhānī's original table of seventeen *thāts*

that	R	G	M	P	D	N
Bhairava	15, 1, 16	5, 1, 6	3, 1, 4	2, 1, 3	29,19,48	9, 7, 16
Sri Rag	15, 1, 16	19, 5, 24	3, 1, 4	2, 1, 3	29,19,48	9, 7, 16
Hindol	15, 1, 16	19, 5, 24	3, 1, 4	2, 1, 3	29,19,48	17,15,32
Kedara	7, 1, 8	19, 5, 24	3, 1, 4	2, 1, 3	29,19,48	17,15,32
Kalyan	7, 1, 8	19, 5, 24	33,15,48	2, 1, 3	29,19,48	17,15,32
Sarang	7, 1, 8	3, 1, 4	33,15,48	2, 1, 3	9, 7, 16	17,15,32
Megh	7, 1, 8	19, 5, 24	3, 1, 4	2, 1, 3	9, 7, 16	17,15,32
Kanhra	7, 1, 8	19, 5, 24	3, 1, 4	2, 1, 3	29,19,48	9, 7, 16
Bibhas	15, 1, 16	19, 5, 24	33,15,48	2, 1, 3	29,19,48	17,15,32
Kafi	7, 1, 8	5, 1, 6	3, 1, 4	2, 1, 3	29,19,48	9, 7, 16
Deskar	15, 1, 16	19, 5, 24	17, 7, 24	2, 1, 3	29,19,48	17,15,32
Marv	15, 1, 16	19, 5, 24	3, 1, 4	2, 1, 3	29,19,48	13,11,24
Sankara	7, 1, 8	19, 5, 24	3, 1, 4	2, 1, 3	29,19,48	17,15,32
Ghazal	11, 1, 12	19, 5, 24	3, 1, 4	2, 1, 3	29,19,48	17,15,32
Desi todi	15, 1, 16	39, 9, 48	3, 1, 4	2, 1, 3	29,19,48	13,11,24
Ramkali	15, 1, 16	39, 9, 48	3, 1, 4	2, 1, 3	29,19,48	17,15,32
Malkus	7, 1, 8	19, 5, 24	3, 1, 4	2, 1, 3	7, 5, 12	9, 7, 16

Table 2: Kāmilkhānī's thāts according to string divisions

		1/16	1/8	1/6	5/24	1/4	15/48	1/3	19/48	7/16	11/24	1/2
			1/12		9/48		7/24				5/12	15/32
Bhairava	S	R		G		M		P		D	N	S
Sri Rag	S	R		---	G	M		P		D	N	S
Hindol	S	R			G	M		P		D	-->	N S
Kedara*	S	----->	R		G	M		P		D		N S
Kalyan	S		R		G	----->	MP			D		N S
Sarang	S		R		---	G		MP		---	D	N S
Mallar	S		R		G	M		P		---	D	N S
Kanhra	S		R		G	M		P		D<-	N<-	S
<i>Bibhas</i>	S	R			G		MP			D		N S
<i>Kafi</i>	S		R	G		M		P		D	N	S
<i>Deskari</i>	S	R			G		M P			D		N S
<i>Marv</i>	S	R			G	M		P		D		N S
<i>Sankara*</i>	S		R		G	M		P		D		N S
<i>Ghazal</i>	S	R			G	M		P		D		N S
<i>Desi Todi</i>	S	R			G	M		P		D		N S
<i>Ramkali</i>	S	R			G	M		P		D		N S
<i>Malkus</i>	S		R		G	M		P		D	N	S

*Sankara and Kedara have the same fret pattern here; this is confirmed by the *Tarjome-i Pārtjātak* (T-i-P BL, f.62b; 69a)

How revolutionary is this treatise? Looking firstly at the internal evidence, it is obvious that, while Kāmilkhānī is aware of the existence and pre-eminence of the prestigious Sanskrit traditions (he refers in the brief summary section to obsolete concepts such as *murcchanā*), he is not at all familiar with it. For example, he uses the term *maddhya mela*, which Rāmāmātya, Somanātha and other important sixteenth- and seventeenth-century theorists use to refer to a particular tuning system on the *viṇā* (e.g. te Nijenhuis 1977:21; 24). However, instead of using it as the latter do to refer to the Pa-Sa-Pa-Sa tuning of the four open strings, Kāmilkhānī uses *maddhya mela* to refer to the middle octave of the scale on a single string, beginning on *maddhya* Sa. Even more revealing is the fact that he completely misunderstands the nature of the *śrutis*. All the earlier Sanskrit treatises that cover similar material to Kāmilkhānī attempt to reconcile the twenty-two equal divisions of the octave mandated by the *Saṅgītaratnākara* with the existence in reality of a twelve-semitone system. Kāmilkhānī is certainly aware of the significance of the number twenty-two, but instead of realising it refers to twenty-two microtonal divisions of a single octave, he ingeniously fits

it into his system by noting that the number of fret positions in two octaves of the *bin* add up to twenty-two. It is thus obvious that he has not read any of the relevant *saṅgītaśāstras* of the period, despite the existence of a Persian translation of the *Saṅgītapārijāta*. Kāmilkhānī's understanding of the *śrutis* must therefore reflect his experience of the current practice of a twelve-semitone octave. His claim in the preface to be basing his guide on his own experiences of learning to play and sing, and on conversations with composers, master musicians and connoisseurs therefore appears to be true.

Moreover, while Kāmilkhānī's treatises are sufficiently similar in subject matter to earlier Sanskrit treatises to suggest some common concerns and elements of performance practice, the differences between the *Risāle dar 'amal-i bīn* and the Sanskrit corpus are such that it is clear he derived his system independently of them. An interest in classifying *rāgas* according to their scale type or *mela* as represented on the frets of the *vīṇā*, and the emergence of what was obviously a twelve-semitone Pythagorean scale tuned according to consonant fifths and fourths horizontally across the four strings of the *vīṇā*, first emerged in Rāmāmātya's *Svaramelakalānidhi* (Powers and Widdess 2001:174). Although this was primarily a development in the South Indian system, Puṇḍarīka Viṭṭhala, who worked in North India during the late sixteenth century, theoretically attempted to apply his system of twenty *melas* to North Indian music as well (te Nijenhuis 1977:22-3). This interest in using the frets of the *vīṇā* as a physical method of demonstrating the relative location of the *swaras* extends right through to Ahobala's *Saṅgītapārijāta* (mid 17C) which certainly describes the North Indian system (Bhatkhande 1990:34). However, the *vīṇā* described in all of these treatises is quite different from the one Kāmilkhānī describes (cf. Ayyangar 1980:71-83; *T-i-P* BL, ff.89b-90a). Moreover, with one exception, the tuning of the scale in these systems (using a Pythagorean system of a cycle of perfect fifths horizontally across the frets) is entirely different to Kāmilkhānī's system (dividing the string length vertically according to harmonic fractions). A method of dividing the string fractionally also appears in the *Saṅgītapārijāta* and consequently in Mīrza Raushan Zamīr's translation (*T-i-P* BL, f.44a-b). However, the method of deriving the *swaras* and the basic fractions used for Re Dha and Ni are different from Kāmilkhānī, the eventual pitches of the strings are microtonally different, and Ahobala's *śuddh* scale is different (it uses *śuddh* Re).¹¹ In other words, Kāmilkhānī's system of dividing the string is independently derived.

Ahobala's twelve pitches however, are close enough to Kāmilkhānī's to suggest that this scale really was used in performance practice in North India. Moreover, Mīrza Raushan Zamīr consistently translates the word *mela* as *ṭhāt* (e.g. *T-i-P* BL, f.49b),¹² and the Andhran

theorist Somanātha confirms in the *Rāgavibodha* (1609) that *ṭhāt* was indeed the vernacular word for *mela* (Ayyangar 1980:136). Thus, even though Ahobala does not systematically set out a *ṭhāt* system, this indicates that the “South Indian” *mela* system was used widely in North India – but not as a theoretical abstraction. Rather it was a shorthand for use in performance, as the title of Kāmilkhānī’s first draft suggests, a little like knowing what a key signature indicates in terms of finger patterns on the Western violin. Mīrza Raushan Zamīr’s translation indicates this further when he introduces examples of *rāgas* with statements like “This *rāga* is in the same *ṭhāt* as Sankarabharan” (*T-i-P* BL, f.62b), implying that the *ṭhāt* did not have a fixed name, but was conceived as a fret pattern common to many *rāgas*. This understanding is confirmed by its preservation in the oral traditions of late nineteenth-century *sitār* players, primarily in Delhi. Resurfacing in the written tradition in the 1870s in several handbooks on *sitār* playing, it leads Miner to conclude that “on the *sitār*, *ṭhāt*. . . became a term for indicating the correct fret setting for each *rāga*” (1997:45). The practical, performance-based nature of the *ṭhāt* system in seventeenth-century North India would have allowed the all-important aesthetic properties of *rāgas* to continue in parallel as the main basis for *rāga* classification. Like his sixteenth-century Sanskrit counterparts Puṇḍarīka Viṭṭhala and Śrīkantha (te Nijenhuis 1977:22-4) it seems that Kāmilkhānī believed it was possible to venerate the ideational *rāga-rāgiṇī* system while at the same time allowing for the co-existence of another, scale-based system for conceiving Hindustānī *rāgas* in the context of performance.

To summarise; the *Risāle dar ‘amal-i bīn* is without precedent in its systematic and practical elaboration, exclusively for North Indian music, of a system of *ṭhāts* from a twelve-semitone scale derived from the fractional division of the string. In consequence, Kāmilkhānī’s treatises are of radical importance for our understanding of performance practice at this time. Not only are they original and unique, they are almost certainly based on observation of and participation in practical music making, and they are sufficiently similar to other treatises of the period to suggest they describe a common, widespread performance practice. At least in the North, the *Risāle dar ‘amal-i bīn* demonstrates that a twelve-semitone scale derived from the harmonic division of the octave was widely used, and that the *rāgas* were conceived in practical terms as belonging to a discrete number of fret patterns based on this scale known as *ṭhāts* - somewhere between eight (Kāmilkhānī) and twenty (Puṇḍarīka Viṭṭhala). That Kāmilkhānī’s *ṭhāt* system represented widespread and continuing practice in North India, and particularly in the Mughal court, is demonstrated by several references to the use of *ṭhāts* in Hindustānī music in later treatises, on the *tanbur* as well as the *bīn*.¹³ For the first time we have demonstrative proof that the *ṭhāt* system, supposedly little more than a century old, had substantial

precedent before the late nineteenth century. Indeed, it was practised as early as the seventeenth century, at a centre as important and prestigious as the Mughal court itself.

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Notes

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2. In fact, Rāmāmāya organised the *rāgas* into twenty *melas*, but as te Nijenhuis points out, the scales *sāraṅganāṭa* and *kedāragaula* are identical (1977:21).
3. The author of the *Gītāṃkāra* described 36 *rāga*-like entities he called *varṇa*, which he classified as male (*puruṣa*), female (*strī*), or descendant (*apatya*) (te Nijenhuis 1977:9).
4. Non-standard diacriticals have been used for the following Persian letters: se = S, zad = z, tayn = t̤
5. The epistemology of seventeenth-century Indo-Persian treatises is discussed at length in Chapter Two of my forthcoming doctoral dissertation.
6. Namely Śrīnivāsa's *Rāgatattvavibodha*, Hṛdayanārāyaṇa's *Hṛdayaprakasa* and *Hṛdayakautuka*, and Locana Kavi's *Rāgatāraṅgiṇī*, all of which are unlikely to be earlier than Kāmilkhānī (te Nijenhuis 1977:29-30).
7. It is vital to note in passing that the *Tarjome-i Pārijātak* contains a complete translation of the chapter on dance that is missing from all extant copies of Ahobala's original treatise, making Mīrzā Raushan Zamīr's hitherto overlooked contemporary translation the only remaining source for this important chapter.
8. See for example the *tazkira* at the end of Faqīrullah's *Rāg Darpan* (1666) that lists a large number of contemporary musicians (Sarnadee 1996:187-211).
9. Ras Baras Khān Kalāwant was a member of the most distinguished family of musicians in the seventeenth century. His genealogy can be traced back directly to Tan Sen through the Indo-Persian sources. According to an anonymous early eighteenth-century treatise on *tāla* in the Edinburgh University Library, he was renowned not just as a theorist, but as the greatest *dhrupad* performer of his day (*R-d-T EUL*, f.59a).
9. This is something of a mystery. Kāmilkhānī's Dha fret is located on an unusual fraction of the string, 19/48. 19/48 is the closest fraction to the harmonic major sixth (2/5 or a ratio of 5:3) in the simplified Pythagorean tuning system, given that Kāmilkhānī was using geomancy to emphasise the supernatural qualities of his *thāt* system, and all of his denominators had to divide perfectly into 96 (which 5 does not). Comparing Kāmilkhānī's Dha fret with what Powers and Widdess call the "improbably" high positions of Ahobala's *komal* and *śuddh* Dha (2001:175), it is apparent that Kāmilkhānī's Dha falls in between the two, and is therefore unrelated. The fact that Kāmilkhānī's Dha is a natural harmonic ratio makes it likely that he

simply left out the fret position of *komal* Dha. This may be a case of the *śruti* tail wagging the *ṭhāt* dog; see below for a reason why he might have included only 11 fret positions.

11. Ahobala's *śuddh* scale is the same as the modern day Hindustani *Kāfi ṭhāt*. It is therefore significant that Mīrzā Raushan Zamīr calls Ahobala's *śuddh* scale *Kāfi ṭhāt* in his translation (*T-i-P* BL, f.44b).

12. Compare the sections delineating the *rāga lakṣaṇas* in the *Tarjome-i Pārījātak* (*T-i-P* BL, f.50a-77b) and the *Saṅgītapārījāta* (1971, 102-201).

13. These include a mid eighteenth-century *Risāle dar Rāg* produced for Muhammed Shah's library (*R-d-R* R, f.144b), and the undated *Risāle dar navākḥtan-i rāg dar ṭanbūr* (*R-N-R-T* NL).

Abbreviations

<i>R-N-R-T</i> NL	<i>Risāle dar navākḥtan-i rāg dar ṭanbūr</i> , National Library, Calcutta.
<i>R-d-R</i> R	<i>Risāle dar Rāg</i> , Raza Library, Rampur.
<i>R-d-T</i> EUL	<i>Risāle dar Tāl</i> , Edinburgh University Library.
<i>S-a-A</i> SJ	<i>Shams al-Aśwāt</i> , Salar Jung Museum Library, Hyderabad.
<i>T-i-P</i> BL	<i>Tarjome-i Pārījātak</i> , British Library, London.
<i>U-N-A</i> SJ	<i>Uṣūl-i naḡhmāt al-Āsafī</i> , Salar Jung Museum Library, Hyderabad.

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