Authority, Critique, and Revision in the Sanskrit Music-Theoretic Tradition: Rereading the *Svara-mela-kalānidhi*

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Abstract: *The influential sixteenth-century Sanskrit treatise* Svara-mela-kalānidhi *describes a novel system of naming tones, of organizing* rāga*-s by pitch content, and of reckoning* svara*-s on 12 fret positions rather than 22* śruti*-s. Contrary to its common construal as a sudden rupture in tradition, we highlight the rhetorical means by which the treatise systematically grounds its authority (and that of its ambitious patron, Rāmarāya) in the canon of* saṅgīta*-*śāstra*. We also offer a new translation and a new (non-Pythagorean) interpretation of its* svayambhu*-based tuning system.*

Indian music has a vast textual tradition. Music historians are faced with a corpus of hundreds of treatises, in Sanskrit, Persian, Tamil, and various vernaculars, spanning two thousand years. It is unclear how best to approach this variegated literature, much of which comes down to us without clear authorship, oral tradition, or historical context. Over the last century or so, two contrasting stances have emerged.[1] One familiar stance regards music-theoretic texts—particularly those in the Sanskrit tradition—with great reverence, reading them as scriptures composed by sages, offering timeless musical truth (e.g., Tagore 1896, 50–51; Prajnananda 1973, 18–22; Veer 1986, 138–40; Daniélou [1943] 1995, 84–87). Another familiar stance regards such texts with skepticism, reading them as scholarly documents produced by fallible humans: full of contradictions to be resolved, pitches to be calculated, and claims to be tested against empirical observation (e.g., Bhatkhande [ca. 1912] 2012, passim; Forster 2010, 570–74; Ramanathan 1992, 80–83; Thatte 2010, 44–49). The latter stance tends to regard stylized rhetoric, claims to authority, and arcane myth as mere noise: distractions from the task of the critical musicologist. Consider V. N. Bhatkhande's dismissal of mythic claims about music's origin:

> How could a curious student like you be satisfied with a definition of classical music as "that which was sung for Śiva by Bharata?" You will surely ask: "Who was this Brahmadev? And who was his disciple Bharata? When did they live? How will I be able to answer these questions?" . . . The authors of [these treatises] sometimes write so cryptically that it is impossible to make sense of it. We should

> not think that they themselves have unraveled these matters. (Bhatkhande [ca. 1912] 2012, 59)

The stakes of taking one stance or the other would seem to be quite high. Amartya Sen has argued that Indologists who emphasize the "nonmaterial and arcane" over the "rationalistic and analytical" end up "undermining an adequately pluralist understanding of Indian intellectual traditions," encouraging a "separatist" politics of identity founded on a vision of a religiously defined, timeless, univocal Indian culture (2005, 159–60). Others have argued that a critical, analytic attitude toward Indian music theory represents a significant rupture from the past, a novel attempt to "cast a disciplinary net around the ragas" (Bakhle 2005, 240), a project alien to music's hereditary practitioners, toxic to orthodox structures of authority, and indelibly marked by a colonial encounter with European scholarly models (Neuman 2004, 86; Qureshi 1991, 159; Weidman 2006, 237–40).[2] In this light, one's approach to music treatises would seem to bear not just on structures of melody but also on structures of knowledge and power: To what extent did Indian music-theoretic traditions allow critique? When Indian music theorists question their authoritative treatises, are they merely reproducing Western intellectual habits? Or are they carrying on an Indian tradition of argumentation, performing a distinctively Indian secular modernity stripped of mythological ornament, with its own traditions of empiricism, rationalism, and critique?

The treatise we discuss here is widely construed to be the origin of just such a critical, rational, and yet decidedly precolonial way of knowing music: the *Svara-mela-kalānidhi*, (Compendium of *svara*-s and *mela*-s, hereafter *SMK*). The *SMK* was written in 1550 by one Rāmāmātya, a prominent court scholar at Vijayanagara, located on the Deccan plateau in Southern India. It describes a new system of naming tones, a novel method of setting frets on a *vīnā*, and a system of organizing *rāga*-s by pitch content, or *mela*. It establishes a tonal schema that seems to be oriented to a fixed system tonic, and a way of reckoning tones that obviates the ancient system of 22 *śruti*-s, presenting instead a system of measuring 12 tone-values on frets without explicitly measuring the intervals between them. This last point is particularly important in light of politically contentious debates over Indian intonation in the past century, often presented as a stark conflict between an indigenous system of 22 *śruti*-s and a Western system of 12 semitones, and thus between Indian tradition and colonial modernity (cf. Van der Meer 2005; Jairazbhoy 2008; Rahaim 2011). Coincidentally, the *SMK* was completed just a few decades before Chinese theorist Zhu Zaiyu calculated 12-tone equal temperament. Though the resultant tuning systems were quite different, their presentation was quite similar: Zhu Zaiyu and Rāmāmātya framed their revisions as conservative extensions

of canonical sources. Yet each has been interpreted by twentieth-century scholars as an exceptional appearance of a modern sensibility in an otherwise rigidly orthodox music-theoretic tradition (see Kuttner 1975).

In fact, the *SMK*'s reputation as an abrupt rupture in musical tradition reaches far beyond the technical details of its tonal system. M. S. Ramaswami Aiyar's highly influential 1932 English translation and commentary presents the *SMK* as a sort of sixteenth-century music reform project, replacing an "antiquated," "puerile," "fanciful" approach with a "new classifying method" (1932, lx). Amanda Weidman demonstrates that Ramaswami Aiyar, a passionate music modernizer, had rather different motives than Rāmāmātya evidently did, selectively trumpeting the *SMK*'s rational, "scientific" contributions and dismissing its rhetorical, mythic, and poetic form (2006, 236–39). Yet his specific construal of the *SMK* as an abrupt rupture in tradition has been quite influential. Subsequent writers have presented the *SMK* as a "landmark" (te Nijenhuis 1977, 20) that "revolutionized the theory and practice of music" (Forster 2010, 566). Such claims usually center around its supposed rationality: that it is "remarkably lucid and rational" in contrast to its precedents (Roy 1937, 31), "rationalizes intervals and scales" (Sathyanarayana 2001, 24), "rationalize[s] aspects of current practice" (Powers and Katz 2001, 159), introduces "rationally defined notes" (Grieg 1987, 354), or even that it introduces rational "Pythagorean" intervals to Indian music (te Nijenhuis 1977, 21). John Allen Grieg goes so far as to say that the *SMK* inaugurated an unprecedented "empirical" approach to music that worked to "force the questioning of orthodoxy and all accepted wisdom in favor of perceptual evidence" (1987, 346).[3]

Starting from a careful rereading of the Sanskrit original, placed in the context of its production at the Vijayanagara court, we attempt to give a fuller, richer picture of the *SMK*. While we fully agree that the *SMK* had a powerful influence on subsequent music theory, our reading calls into question its common construal as a revolutionary document of rationalism, empiricism, modernity, or Pythagoreanism. Instead, we aim to highlight the interplay of logic, authority, and the subtle processes by which the reader is led into a new tonal schema even while maintaining continuity with an older canonical tradition. In response to the regnant tendency (see Qureshi 1991, 152) to counterpose the already-given "musical authority" of stable Sanskrit texts against the shifting complexities of "mere oral tradition," we examine the rhetorical processes by which the *SMK* conjures its authority in the first place. This, we hope, will not only clear up some common misconceptions about the tonal system of the *SMK* in particular but also nuance the current understanding of canon formation and critique that have become so central to the intellectual history of music reform in India. More broadly, writing

as we are in an age of widespread anxiety about the "clash of civilizations" (Huntington 1993), we hope that our approach to this text may provide a way of thinking beyond a rigid dichotomy between secular, modern reason and religio-mythic, traditional authority.

The *Svara-mela-kalānidhi* as Text

The *SMK* is lean and tightly focused; it contains no discussion of metrical structure, dance, or even specific songs. It has only five short chapters: (1) an introduction, (2) a description of a tonal system, (3) a description of *vīnā*-s and their tuning, (4) a description of *mela*-s (pitch-sets), and (5) a description of *rāga*-s. The last two chapters consist largely of lists and have, we feel, been adequately translated and summarized by other authors (Ramaswami Aiyar 1932; Bhatta 1963; Forster 2010). We focus instead on the first three chapters: the heretofore neglected introductory section (chapter I) and the widely misconstrued chapters on tones (chapter II) and the setting of frets on a *vīnā* (chapter III). Our citations of the *SMK* will be in the format (chapter.verse)—for example, (III.4) refers to chapter III, fourth verse.[4]

The *SMK* was finished, according to Ramaswami Aiyar's precise but anachronistic reckoning, on a Thursday: August 21, 1550 (1932, xv). It seems to have been commissioned by Rāmarāya, the de facto ruler of the Vijayanagara Empire, soon after he officially presented himself as the sole sovereign. The author is called Rāmāmātya: "Rāma the minister" or, more likely, "the minister of Rāma."[5] He presents himself as a well-regarded administrator and music composer (*SMK*, I.15–22). As a reward for writing the *SMK*, he was presented the command of Koṇḍavīṭa fort on the eastern sea (the Bay of Bengal) and the township of Jeluri-Simhāsana on the western sea (the Arabian Sea), thereby making him a powerful lord as well (I.31, 33).

The *SMK* seems to have been both the most original and the most widely read of the Vijayanagara treatises on music. Not only was it cited and critiqued in subsequent works such as the *Caturdaṇḍīprakāśikā* but it was copied by hand and housed in several royal libraries soon after its publication. The Vijayanagara court was hastily moved south after the 1565 sack of the main city, and it thus seems likely that copies were disseminated in the 15 years following its composition. Manuscripts that have survived the centuries have been cataloged in Thanjavur, Chennai, Mysore, Varodara, and Bikaner (Ramaswami Aiyar 1932, v; Bhatkhande [ca. 1912] 2012). The first critical Sanskrit edition was printed in 1906 at Kumbakonam by S. Narayanasvami Aiyar. In 1910, V. N. Bhatkhande pseudonymously reprinted this edition with commentary in Marathi—now very rare, but available in Hindi translation (Bhatta 1963).[6] In 1932, M. S. Ramaswami Aiyar printed a widely read crit-

ical edition with a lengthy introduction and translation in English that, as noted earlier, is strongly biased toward his own practical concerns as a music reformer.

We therefore have produced our own original English translation of the first three chapters (largely the work of Srinivas Reddy), using Ramaswami Aiyar's Sanskrit critical edition as the source text.[7]

Śāstra

The *SMK* is written in the tradition of musical *śāstra*.[8] The term *śāstra* resists a handy English gloss, as it refers both to general bodies of knowledge (rather like the suffix "-ology") and to specific synoptic works that systematize this knowledge. The śāstric tradition consists of authoritative texts and commentaries on a vast range of scholastic disciplines, from phonetics to medicine to architecture, including prescriptive rules alongside descriptions of standard practices. The common twentieth-century term *śastriya saṅgīt* refers to music that (in principle, at least) is ratified by *śāstra*. Authors of śāstric literature, like modern academics, frequently refer to earlier, authoritative *śāstra*-s—but often without explicit citation and with a heightened respect for the authority of the canon they invoke.

A tradition so steeped in the legitimizing force of ancient masters, which "preserv[es] material from earlier sources long after it had ceased to relate directly to current performance practice" (Widdess 1995, 118), may well "strike an unsympathetic Western critic as self-fulfilling," as "an outright rejection of the principles of objective observation and scientific method" (Rowell 1992, 119), or as a "regressive re-appropriation of the past" (Pollock 1985, 499), but the *SMK* provides a fascinating example of how the citation of past texts can be a key strategy that accommodates the present. The scrupulous citation of canonical verses enables critical intertextuality: commentary, allusion, explication, reconstrual, and questioning. As a śāstric scholar, Rāmāmātya was adept at borrowing foundational terms and metaphors from these past sources even while adapting these terms to changing practices.

Since roughly the beginning of the Common Era, the production of Sanskrit *śāstra*-s was intertwined with the promotion of political, religious, and cultural power in South Asia,[9] and Vijayanagara in particular was a major crucible of music-theoretic scholarship. In addition to a large body of works of philosophy and poetry, at least seven other major Sanskrit *śāstra*-s on music were produced there in the two hundred years preceding the *SMK* (see Sathyanarayana 2001). But the *SMK* mentions none of these local writings.[10] In fact, only one *śāstra* is explicitly referenced in the *SMK*: the encyclopedic, synoptic, widely revered *Saṅgīta-ratnākara* (hereafter *SR*), written three

centuries earlier by a polymath named Śārṅgadeva at the Yādava court at Devagiri, hundreds of miles north, in what is now known as Maharashtra. Like most medieval music theorists (writing in Persian as well as Sanskrit), Rāmāmātya quotes the *SR* frequently and even reproduces extended sections of the *SR* verbatim and without citation.

However, the *SMK* was neither a dutiful reproduction of orthodoxy nor a sweeping modernist rebuke of received tradition. Rāmāmātya explicates his novel analytic approach within the discursive world of the *SR*. His own stance on the music-theoretic tradition he inherits is neither entirely skeptical nor entirely credulous. As we will demonstrate, the *SMK* is a document of both tradition and modernity, of both rationalism and empiricism, of scholarly revision, political duty, and pious devotion.

Chapter I: Invoking Divine, Scriptural, and Political Authority

A modern-day reader, having heard of Rāmāmātya's legendary rationality, might expect to open the *SMK* and find a table of tunings, a list of scale types, or a summary of theoretical statements. But the *SMK*, like all śāstric texts, begins by framing itself, suggesting how it should be read, and staking a claim to its own particular kind of authority. Rāmāmātya begins by invoking Śrīraṅga, the tutelary deity of the last legitimate Vijayanagara dynasty:[11]

> Śrīraṅga's form is both majestic and elegant, his love for Śrī his sole treasure. Endowed with devoted skill in matters of *svara* [melody], *śruti* [intonation] and *grāma* [scale] and eternally delighting in the creation of playful rhythms, his ornamented body is the universe of sound. May Lord Nārāyaṇa protect us. In the very beginning, venerable Brahma arose from the lotus that sprang from Viṣṇu's navel, just as the essence of music came from the *Sāma Veda*, and the knowledge of truth from the scriptures of Vedānta. (I.1–2)

This dazzling opening, in which music is presented as a natural outpouring of Śrīraṅga's celestial form, is well in line with the prevailing tendency, in Persian and Sanskrit music theory, to intertwine scholarly and divine authority.[12] Rāmāmātya then glorifies his royal patron, Rāmarāya, first ascribing to him a grand mythic lineage, and then specifically comparing him to Yudhiṣṭhira, the legendary king of the Pāṇḍavas from the epic *Mahābhārata*:

> Rāmarāya, supreme king of kings, was born due to the great *tapas* [sacrifice] of his parents. And when Kṛṣṇarāya [the last legitimate monarch] gave his daughter to him, her ancestors were glorified. He has two younger brothers, the famous kings Timmarāja and Śrīveṅkaṭādri, just as noble Yudhiṣṭhira had Bhīma and Arjuna as his powerful arms. (I.8–9)

Ramaswami Aiyar calls this "flattery" of Rāmarāya merely "fanciful" (1932, xiii), and of course he is correct that Rāmāmātya is not merely reciting a dis-

interested list of facts. But the praise of his patron nonetheless accomplishes something quite important. The *SMK* seems to have been intended in part, like many texts commissioned by kings, as a demonstration of Rāmarāya's royal authority. Rāmarāya was in particular need of such legitimacy. He was an outsider from the Aravīḍu clan, who had married into the ruling Tuluva family. He became the de facto ruler of Vijayanagara only after a prolonged conflict among successors (and thanks to the military support of the sultan of neighboring Bijapur) in which he took the nephew of the previous king into his custody in 1543 and commenced his rule of the empire as a regent. When the boy-king came of age, Rāmarāya placed him under house arrest; the rule of Rāmarāya thus began in name as well as fact only in 1550 (Eaton 2005, 92). The *SMK*, finished only months later, was likely commissioned soon after this dubious seizure of power. It casts the coup as an act of heroism (I.11), presents Rāmarāya's alien lineage as a mark of royal distinction, affirms his patron's familial connection (through marriage) with the previous dynasty, yet also asserts his uniqueness and superiority (I.8). Comparing Rāmarāya to the legendary kings Rāma (I.13) and Yudhiṣṭhira (I.9) claims more than strength—it puts him in the same breath with mythic exemplars of legitimate royal power.

After all, Rāmarāya would have known all too well that military might alone was not enough to legitimize a Vijayanagara king. Years earlier, at the peak of his career as commander of the Vijayanagara army, he had already tried and failed to seize the throne (Stein 1989, 113). His father-in-law, Kṛṣṇadevarāya, the last king of Vijayanagara with broad political support, had been known as *sāhitī-samarāṅgaṇa sārvabhauma*, a "universal monarch in the fields of literature and war," an appellation that celebrated his military conquests and intellectual sensitivities in equal measure. His cultured court witnessed the zenith of Vijayanagara power, and his reign set a high standard of enlightened kingship. Thus, Rāmāmātya specifically distinguishes Rāmarāya's refined sensibilities from the military victories that would have theretofore been his only claim to authority:

> His arms can conquer the King of Snakes, so there's no wonder he rules the earth, but it's amazing that his mind, subtle as an atom, could contain the Lord of Mount Śeṣa, who is the entire universe. . . . Rāmarāya spent his time in that palace, enjoying the presence of men whose minds were like embodiments of Śeṣa, masters of music, art and literature. (I.10, 19)

Again, this praise does more than simply flatter the king. It also serves to frame a text that will propose some significant revisions to the music-theoretic canon and thus was in need of a very similar kind of scholarly legitimacy. The distinctive encomium that Rāmāmātya places in the mouth

of Rāmarāya grants just this kind of authority. Unlike the authors of previous treatises, who were mostly known for their scholarly prowess alone (cf. *SR*, I.9–21), Rāmāmātya is specifically praised for his practical knowledge as well:

> In this world, some create theories, while others understand practice, but I've seen no one else like you who is knowledgeable in the essence of both. (I.26)

Rāmāmātya's authority is strengthened by his family tradition of scholarship:

> Kallapadeśika, a treasury of knowledge greater than the author of Dattilam, was your grandfather, and so the texts of divine music pulse through your lineage. (I.27)

This Kallapadeśika is most likely Kallinātha,[13] the celebrated author of the influential *Kalānidhi,* a commentary on Śārṅgadeva's *SR*, composed at Vijayanagara a century earlier (Ramaswami Aiyar 1932, xi–xii). By citing his own illustrious grandfather, Rāmāmātya was also proclaiming his genealogical legitimacy and scholastic authority—authority not only to review but also to revise the theory of music to fit current practice. He thus appears quite worthy when he receives the commission from Rāmarāya:

> In musical texts there are differences of opinion regarding meanings and usages. Harmonize theory and practice, and offer a treatise on music filled with beauty. As in the past, when Patañjali analyzed Pāṇini's grammar and developed rules for words, you must respect the views of Bharata and other [music theorists] as you produce a lucid model of *svara*-s.[14] (I.28–29)

The royal commission of a traditional Sanskrit text legitimates Rāmarāya; the patronage of such a king likewise ratifies the authority of the *SMK*.

Note that Rāmāmātya's charge is not to create something radically new to replace the past but rather to proceed by "respect[ing] the views" of canonical music theorists. His revisions are further grounded in tradition by citing a highly respected precedent for scholarly commentary: Patañjali's second-century BCE clarification of Pāṇini's canonical *sūtra* on Sanskrit grammar. These citations of venerable models establish an interpretive frame in which the appropriate revision of particular details (whether grammatical rules, tonal relations, or royal lineages) are sanctioned as a central part of maintaining the continuity of a centuries-old, authoritative tradition. The resonances with Rāmarāya's claims to kingship—starting a new dynasty in the interest of preserving a greater tradition of imperial glory—may or may not have been obvious or even intentional. But the very frame of the *SMK*, established in this first chapter, legitimizes change not as anarchic, modern, or progressive but as canonical, authoritative, and traditional.

Chapter II: *Svara*-s

Chapter II reconceives the tonal schema outlined in the *SR*. We pause here to consider two important terms for understanding Rāmāmātya's revisions: *svara* and *śruti*.[15] Either one might roughly be translated into English as "note," but this would obscure their crucial differences. *Svara*-s are sustained, pleasing, distinctive sounds (cf. *SMK*, II.26). There is an ordered sequence of seven *svara* names, roughly akin to movable do solfège, which is still in use today: *sa ri ga ma pa dha ni*. *Śruti*-s, on the other hand, traditionally numbered at 22 from *sa* to *sa*, are never individually sounded and almost never called by distinctive names. Instead, they form the silent matrix of possible locations for *svara*-s. Each *svara* is sounded at the upper limit of a range spanning the *śruti*-s just below it (cf. Rowell 1992, 151; Widdess 1995, 206). The *śruti* at which the *svara* is sounded is called the *ādhāra śruti*, or "anchor" *śruti*. But the remaining, unsounded, non-anchor *śruti*-s are not just empty units of measure. These silent, underlying *śruti*-s constitute the *svara* (cf. *SMK*, II.31b–32a) and are frequently described as belonging to the *svara*.[16] For example, the *svara* called *sa* ordinarily has four *śruti*-s, referring to the tonal region between it and the next lower *svara*, *ni*; *ni* in turn ordinarily has two *śruti*-s between it and the next lower svara, *dha*. This model is depicted in the top of figure 1 as oblong white shapes, with bulges at the anchor *śruti*-s. In the *SR*, each *svara* is measured by the number of *śruti*-s that belong to it: either two, three, or four.[17] As we will see, in Rāmāmātya's system, *svara*-s are defined by their pitch, not by their theoretical *śruti* content.

In the tonal schema of the *SR*, any tone could serve as a tonal center. In Rāmāmātya's new system, tones seem to be reckoned only in relation to *sa*. The new system is thus capable of accommodating a much wider range of scales, with intervals (such as those that we now would call augmented seconds and diminished thirds) that were impossible to render in the tonal schema of the *SR*. In chapter II, Rāmāmātya shifts from the theoretical 22-*śruti* gamut of the *SR*, in which tones were measured and named relative to one another and in which scales may be reckoned from various tonics, to a 12-fret gamut, likely measured relative to a constant system tonic (*sa*). Yet Rāmāmātya achieves these changes through incremental nomenclatural revisions, all the while periodically citing the authority of the *SR*.

Music in General

The first six verses of this chapter are a standard statement of music's greatness, copied verbatim from the introductory section of the *SR* (I.25b–29). Rāmāmātya omits the *tantra*-inflected section of the *SR* in which music is

presented as a means of gaining liberation (*mokṣa*) from the agony of bodily embodiment. Instead, he focuses on the worldly rationale for the study of music: simply that everyone, including divinities, humans, and even animals, is enchanted by music. Sensitive sixteenth-century readers of musical *śāstra* would have noticed another conspicuous omission here. The *SMK*, unlike most of its major precedents in the Sanskritic tradition, omits the generic discussion of ancient obsolete concepts such as *grāma* and *jāti* that were typically rehearsed before discussing melody (te Nijenhuis 1977, 20). These concepts have no function in Rāmāmātya's new schema.

In verses II.7–9, Rāmāmātya prepares the ground for his revisions of received intonational tradition by quoting the *SR* (IV.1b–3b) to assert that the concern of the *SMK* is not the celestial music (*gāndharva*) practiced by supernatural beings according to unchanging theory but human music (*gāna)* composed according to custom.[18] It sets the stage for a discussion of music focused on human pleasure and local convention rather than spiritual liberation. But Rāmāmātya goes further than the *SR*, taking this opportunity to drive home the primacy of practice over theory:

> *Gāndharva* music is practiced with an adherence to theory, but if there is no contradiction when a theory is dispensed with, then practice is paramount to theory. In *gāna* music, practice ought to be more important than theory, but this practice should be abandoned if it doesn't create something pleasant. So in this world, *gāna* music progresses in accordance with practice. (II.9b–12a)

He justifies this claim in reference to the *SR*. Its author, he says,

> who was versed in matters contained in all the musical *śāstra*-s, considered (in his chapter on instruments[19]) the primacy of practice in *gāna* music, or rather, that the *śāstra*-s themselves value the importance of practice. Therefore, a *śāstra* that contradicts practice should (not be followed). While the laws of *graha*, *amśa* and *nyāsa* [prescriptions for melodic action], and the arrangement of the other *svara*-s are the domain of the *śāstra*-s, they do not contradict the basis of practice. But wherever there are inconsistencies between theory and practice, this [theory] should be abandoned. Like Śārṅgadeva who resolved in regard to *deśī rāga*-s that theory ought to conform with what is expressed in *gāna* music. Establishing the primacy of practice substantiates theory. (II.12b–17)

Having already established (in chapter I) a frame that allows for canonical revision, Rāmāmātya further establishes the observed conventions of practice as the guiding principle for musical *śāstra*. Rāmāmātya is now well positioned to revise ancient theory according to contemporary practice. His rationale for this, we stress, is *not* cast in modernist, progressive terms. Rāmāmātya does not claim to start fresh, to reject a stifling tradition, or to move forward. On

the contrary, Rāmāmātya justifies his radical changes by reference to the very śāstric tradition he seeks to update.

The Tonal Schema of the Saṅgīta-ratnākara

In II.18–30, Rāmāmātya reviews the tonal theory laid out in the *SR*. He intersperses his own summaries with direct quotes from the *SR* that describe the production of *nāda*, or vibration, in the body of a singer.[20] Among other things, Rāmāmātya rehearses the conventional wisdom about the relationship between *śruti*-s and *svara*-s, so central to the ancient tonal system of the *SR* that Rāmāmātya is revising. As we will see, by the end of chapter III, Rāmāmātya replaces *śruti* measures with fret measures. But leading the reader gently along the way, for all the reasons outlined in chapter I, he must first pay tribute to the venerable śāstric tradition recorded in the *SR*, in which *śruti* and *svara* are closely intertwined.

Rāmāmātya leaves out the section in the *SR* about the cryptic two-*vīnā* proof of the 22 *śruti*-s found in the ancient *Nāṭya-śāstra* of Bharata (XXVIII.37). Instead, he asserts ambiguously, "The proof of this is clearly evidenced by the *vīnā*" (*SMK*, II.27a). Again, a śāstric dictum is radically reinterpreted in order to support Rāmāmātya's new approach to tuning the *vīnā*, measuring notes in relation to frets rather than *śruti*-s. He then, in II.27b–30a, briskly summarizes the canonical assignment of *śruti*-s to *svara*-s: *sa*, *ma*, and *pa* have four, *ri* and *dha* have three, and *ga* and *ni* have two.

Rāmāmātya then reproduces *SR* I.3.25b–27a, in which the author acknowledges the confusion about whether *śruti*-s are *locations* for *svara*-s or the *material* of *svara*-s. The problem seems to stem from the fact that each *svara* contains more than one *śruti*. If only one of these *śruti*-s (the *ādhāra śruti*—henceforth "anchor *śruti*"—the highest of each group) is sounded, what is the function of the others? "I state that the fourth *śruti* [the anchor *śruti* at which *sa* is sounded] absorbs the previous three *śruti*-s. And it is agreed that such a *śruti* is activated by its preceding *śruti*-s" (II.30b–32a). Thus ends the straightforward rehearsal of the canonical outlines of music. From here, Rāmāmātya gradually begins to insert his innovations.

Rāmāmātya's New Tonal Schema

The *SMK* lays out a new set of *svara* names, relationships, and melodic functions, which we are calling a new *tonal schema*.[21] Although it is difficult to precisely reconstruct how the tonal schemata of the *SR* and the *SMK* would have sounded in practice, circumstantial evidence suggests that the pitches of several of these nominally identical *svara*-s would have been rather

different—some suggestions of these differences are evident in the relative vertical position of *svara*-s in figure 2, though these are not measured along any absolute pitch scale. As the tonal schema in the *SMK* is notionally identical to the one used in modern Carnatic music, it certainly is tempting to assume that these *svara*-s sounded the same four and a half centuries ago. We will postpone the issue of acoustic reconstruction until later. For now, we maintain our focus on the conceptual changes wrought by the *SMK* in order to highlight the rhetorical means by which Rāmāmātya persuades the reader to accept his system as canonical.

The *SR* describes a system of 7 pure (*śuddha*) *svara*-s and 12 altered (*vikṛta*) *svara*-s. Rāmāmātya's first change is to reduce the number of altered *svara*-s from 12 to 7:

> Given that Śārṅgadeva spoke of twelve altered *svara*-s in the *SR*, why have only seven been described here? It is true that in theory, twelve distinct altered *svara*-s are acknowledged, but in practice there are seven altered *svara*-s distinct from the pure *svara*-s. If we leave out the anchor *śruti*, a difference in sound is evidenced [between the seven acceptable altered *svara*-s and the seven pure *svara*-s]. (II.32b–35b)

Rāmāmātya is here suggesting a criterion for the acceptability of the seven acceptable altered *svara*-s: their anchor (or sounding) *śruti* is different from those of the corresponding pure *svara*. However, the five remaining unacceptable altered *svara*-s do *not* change their anchor *śruti*. In these cases, they exchange their lower *śruti*-s with neighboring notes (and thus contain a different number of total *śruti*-s) but sound the same relative to a fixed pitch.

Let us consider an example, shown in figure 1. In the *SR*, *pure sa* is so named because it contains the ordinary number of *śruti*-s (four), which are located above *pure ni*, which in turn contains two *śruti*-s. But these *śruti* measures can change, producing altered *svara*-s. In the *SR*, the dominant metaphor for these alterations involves one *svara* "taking" *śruti*-s from another. Thus, when *pure ni* "takes" two of the four *śruti*-s belonging to *pure sa* (so that *ni* now has four *sruti*-s and *sa* has only two left), its region of *śruti*-s expands, and it sounds higher. In this case, it is renamed *sweet* (*kākali*) *ni*. And since *sweet ni* sounds at a different pitch from *pure ni*, *sweet ni* is one of the altered *svara*-s that Rāmāmātya accepts. But what happens to *sa* as a result of this exchange? In the *SR*, *sa* then takes a different name (*acyuta sa*, or *unlowered sa*) because it has only two *śruti*-s left—even though it is sounded at the same pitch. Similarly, when *ri* "takes" one of the *śruti*-s of *sa*, its name changes to *altered ri*, even though its anchor *śruti* (and thus its pitch) remains the same (see III.44b–49a).[22] Though this may seem odd in contrast to modern Hindustani and Carnatic practice, it is no stranger than the convention of calling

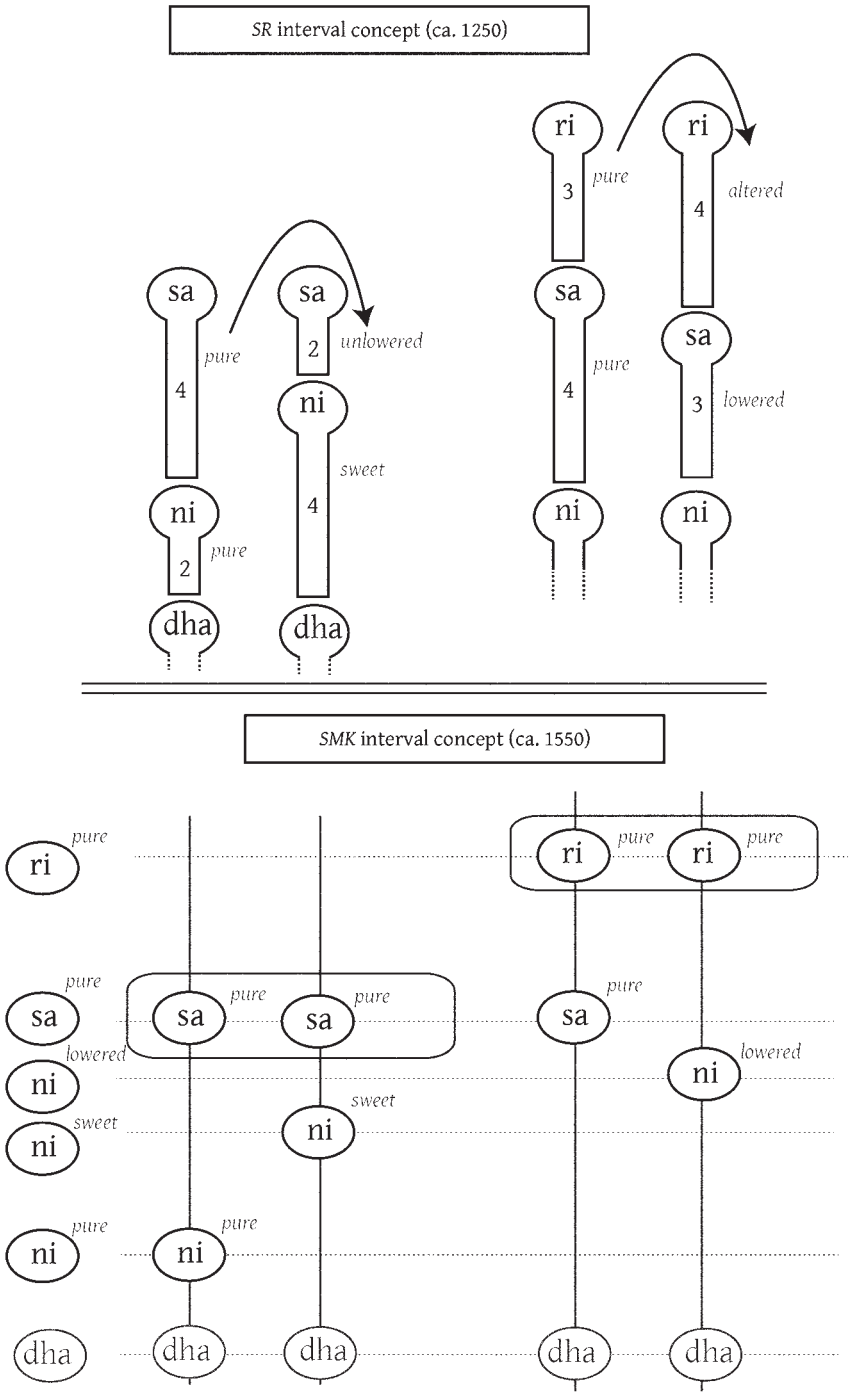

Figure 1. Interval concepts in the *SR* and the *SMK*.

C a "major second" in relation to B-flat, and a "minor second" in relation to B. In the system of the *SR*, the names and even the functions (Widdess 1995, 211) of *svara*-s depend on their relationship to their neighboring tones and how many *śruti*-s they contain.

Rāmāmātya acknowledges that this shuffling of *śruti*-s produces a theoretical difference in *śruti* content but no difference "in practice":

> In the remaining [redundant] five altered *svara*-s, by taking a *śruti* from the previous *svara*, and leaving out its own first *śruti*, the differences in the previously mentioned *svara*-s are theoretically very close. In practice, however, no difference is perceived because of the fixity of the anchor *śruti*. (II.36a–37b)

If the anchor *śruti* of a note doesn't change when it theoretically takes *svara*-s from its neighbors, it may sound different relative to its new lower neighbor, but it still sounds the same relative to *sa*, regardless of whether the preceding *svara* is relatively high or low (cf. Shringy and Sharma 2007, 143). Rāmāmātya seems to be describing a new tonal schema in which *svara*-s are heard in relation to a fixed system tonic, regardless of their interval with the note just below. But as always, Rāmāmātya does not simply claim that the old system was deficient, nor does he say that he is revising the tonal system in relation to *sa*. He describes this in terms of what is perceived, listing the five pairs of *svara*-s that were distinct in the *SR* but practically identical in a system with a fixed system tonic:

> Why there is no difference is explained by current practice: *unlowered sa* cannot be differentiated from *pure sa*. No difference should be accepted between *unlowered ma* and *pure ma*. There is no separation of *altered ri* and *pure ri*. *Altered dha* is not higher than *pure dha*. No difference is perceived between the *altered pa* of three *śruti*-s and the *altered pa* obtained from the *ma śruti*. Since these five [redundant *svara*-s] are [already] included in the fourteen previously mentioned, I make no distinction between them. (II.38a–42a)

The lack of (ap)perceived difference in these cases is by no means obvious—after all, these pairs of notes were evidently quite distinct in the system of the *SR*. Rāmāmātya's new system of names actively constitutes these observations. The conflation of these pitches already presumes—and, circularly, affirms—that they are no longer measured by inherent *śruti* content or heard relative to their lower neighbors. It seems to imply that they are heard relative to a fixed point of tonal reference. In any case, these five conflations (marked by gray rounded boxes in fig. 2) are the first step in Rāmāmātya's new tonal schema. The changes in tonal schema made in the following section are summarized in the first two columns of figure 2. We suggest keeping this figure handy throughout the next section.

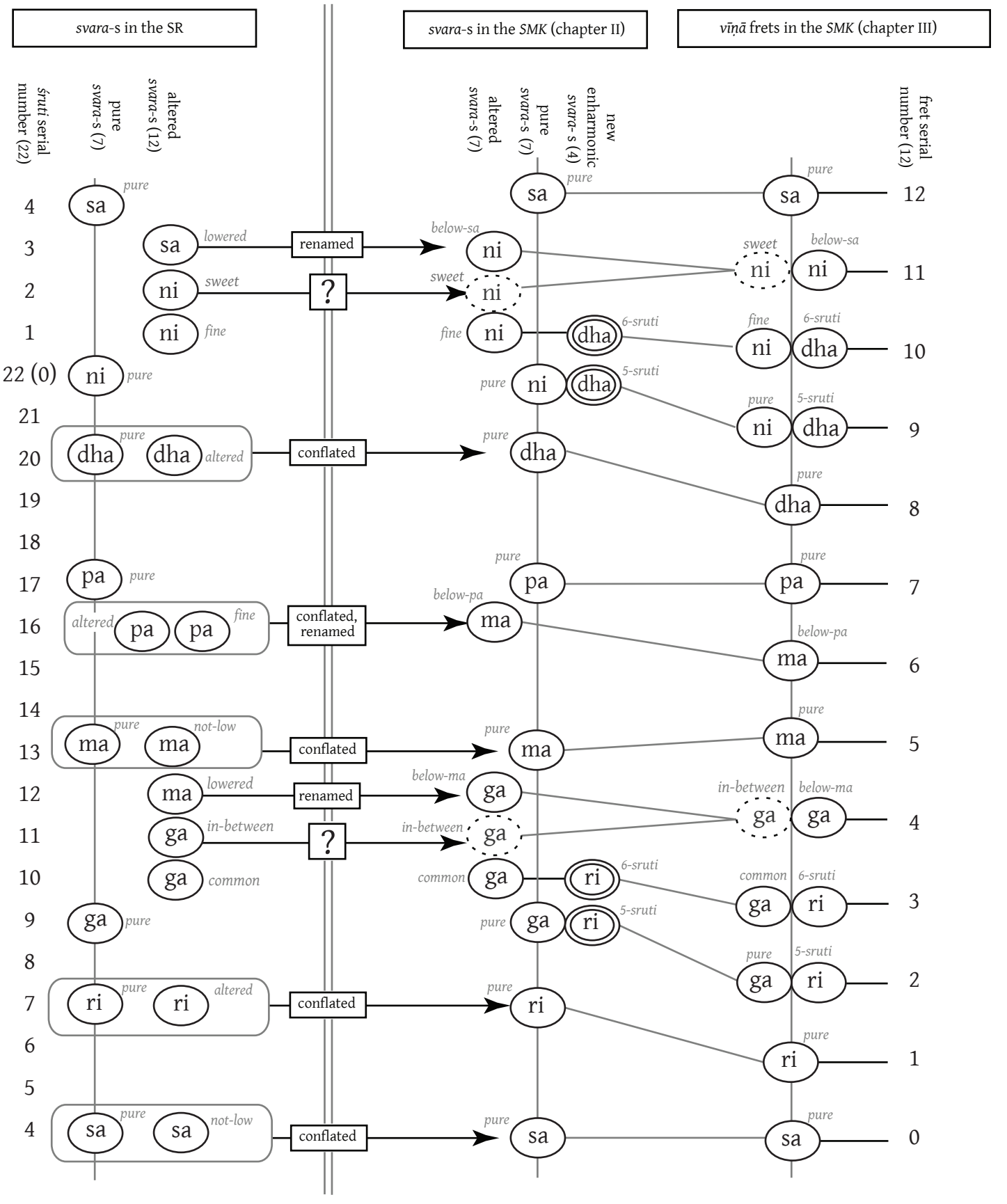

Figure 2. Tonal schemata in the *SR* and the *SMK*.

In II.44b–49a, Rāmāmātya returns, albeit briefly, to the canonical *śruti* model of the *SR* to affirm the relative placement of the remaining seven (acceptable) altered *svara*-s, which are summarized in the middle column of figure 2. He reckons them, for now, just as they are in the *SR*: in *śruti*-s. As we will see in chapter III, however, their precise *śruti* measures are made not only irrelevant but also impossible in Rāmāmātya's system of tuning the *vīnā*.

Lower-Neighbor Ni, Ma, *and* Ga

Rāmāmātya begins the next revisions innocuously enough:

> In accordance with what is seen in popular usage, I will delineate alternate names for some of the fourteen *svara*-s. (II.49b–50a)

On the surface, the following is merely a question of names. But Rāmāmātya is about to reassign the melodic functions of three altered *svara*-s that, in the *SR*, were lowered versions of *sa*, *pa*, and *ma*. He now calls *lowered sa* a kind of *ni*, *lowered pa* a kind of *ma*,[23] and *lowered ma* a kind of *ga*. This is rather akin to calling C "B-sharp" when it functions as a lower neighbor to C-sharp. Since Rāmāmātya is adjusting the tonal system so that it is measured only relative to *sa* (never relative to any other note), the note just below *sa* functions melodically as a lower neighbor (just as B-sharp is heard as a leading tone, and not a lowered tonic, in the key of C-sharp). This is what Rāmāmātya means by *niṣādatvam*, or "*ni*-ness"—its melodic function between *dha* and *sa*.

> Due to its known *niṣāda*-ness [*niṣādatvam*] in this world, lowered-*sa* is referred to by the name *lowered-sa ni*. Due to the usage of *lowered-ma* as a *ga*, I employ the term *lowered-ma ga*. Because the world identifies *lowered-pa* with *ma*, it is called *lowered-pa ma*. (II.50b–53a)

Were one to adhere strictly to the *śruti* measures of these notes (which Rāmāmātya does not), these new tones would all allow one-*śruti* diatonic melodic motion, which was unheard of in older treatises.

Ma now has two possible positions (*pure ma* and *lowered-pa ma*). But significantly, by removing these lowered versions of *sa* and *pa*, and eliminating their redundant *śruti*-based names, Rāmāmātya has left us with only one theoretical position for each of these two *svara*-s. To this day, in both North and South India, these remain the only two notes with only one (pure) version.

New Enharmonic Svara-*s: Higher Versions of* Ri *and* Dha

Next, Rāmāmātya introduces four enharmonic *svara*-s—that is, *svara*-s that sound the same pitch as others but are named differently for their scalar function. These *svara* positions—high and very high versions of *ri* and *dha* that overlap with the two lowest positions of *ga* and *ni*, respectively—endure to this day in Carnatic music theory. These are indicated on figure 2 in the column "new enharmonic *svara*-s (4)," enclosed in double ovals.

This may seem to be a strange move after dismissing five redundant *svara* names on the grounds that there is no difference perceived between them. Why introduce four new duplicate names for identical-sounding tones? It is a necessary step in order for Rāmāmātya to organize contemporary practice

into pitch-sets that have precisely one type of each *svara*. For example, in the tonal system described in the *SR*, a tonal path from C to D-sharp to E to F could only be described as motion proceeding through two separate varieties of *ga*—rather like calling the middle two notes E-flat and E. But Rāmāmātya is working toward a system of classifying *rāga*-s into distinctive pitch-sets along five dimensions: each must have precisely one type each of *ri*, *ga*, *ma*, *dha*, and *ni*. This allows him to account for melodic action between, for example, D-sharp and E (*6-śruti ri* and lowered-*ma ga*), as in modern Carnatic *Rasikapriya* or in the sixteenth-century practice of *Deśākṣī* (IV.30b–31, V.30).

> In some instances when it is observed that a *ri* falls in the range of *pure ga* [E𝄫], it is known by the name *5-śruti ri* [D] and if it falls in the range of *common ga* [E♭], then in accordance with what is observed, it is called *6-śruti ri* [D♯]. Similarly, when a *dha* stands in the range of *pure ni* [B𝄫] it is called *5-śruti dha* [A] in accordance with what is observed, and in some instances, if it stands in the range of fine *ni* [B♭] it is called *6-śruti dha* [A♯]. (II.53b–57a)

Recall that the *SR* permitted only 2-, 3-, and 4-*śruti* intervals; in addition to the *śruti* intervals noted in II.50b–53a, Rāmāmātya here explicitly includes *5-* and *6-śruti* intervals as well. *Ri* and *dha* are specially suited for these names, as they are located above *sa* and *pa*, *svara*-s that, in Rāmāmātya's system, never shift position.

By the end of chapter II, Rāmāmātya has established 18 *svara* names: 7 pure *svara*-s, 7 altered *svara*-s, and 4 enharmonic *svara* names. But he counts only 14 distinct positions used for all of the *rāga*-s in practice: "These fourteen *svara*-s definitely exist in *rāga* after *rāga*" (II.65b). In the *SR*, 19 *svara*-s are each counted separately, on the basis of both the position of their anchor *śruti* and their *śruti* content (I.3.45b–46a.) Thus, the fact that two *svara*-s would sound at the same pitch doesn't negate their distinctive identities and melodic functions. In the *SMK*, the absolute *śruti* count of a *svara*, in a fixed tonal reference frame, is the key determinant of its identity. *Svara*-s sounding the same pitch, even with variant *śruti*-measures and variant names (e.g., *6-śruti ri* and *common ga*), are conflated in his final tally of 14. Though he claims that his changes are simple accommodations of what is obvious and conventional, he is also leading us toward a certain kind of hearing. By conflating some pairs of *svara*-s, invoking new distinctions between others, and renaming obsolete melodic functions, he directs us to hear tonal relations in a certain way that would have been impossible to express in the system of the *SR*.

Rāmāmātya has thus far presented these changes in the nominal shell of the ancient system that reckons the identity of a *svara* by its *śruti* content. But in chapter III, Rāmāmātya goes further, settling on only 12 distinctive values

articulated on frets. These frets eventually take the place of *śruti*-s as the generative origin of the intonation of *svara*-s.

Chapter III: The *Vīnā*

In this chapter, Rāmāmātya describes the method of setting frets on a *vīnā*. This is by no means the first mention of frets in a South Asian music treatise (see *SR*, VI.262 or Gḥuniyat *al-Munya* [ca. 1375]). But these frets, properly set, come to replace *śruti*-s as the key measure of *svara*-s in Rāmāmātya's tonal system. In fact, the very structure of parallel frets creates difficulties for *śruti*-s. Though Rāmāmātya doesn't mention it explicitly, the canonical system of *śruti*-s described in the *SR* is impossible to render on a *vīnā* tuned as he prescribes. As Ramanathan (1992, 80) points out, the layout of this fretted *vīnā* requires a departure from the prescribed numbers of *śruti*-s (see fig. 3). Rāmāmātya may well have been aware of this fact; it would certainly explain why he remains silent on the matter of *śruti*-s when presenting his tuning method. This silence elegantly fulfills two conflicting desiderata: to perform continuity with a śāstric tradition *and* to present a new way of thinking about intonation that could apply to fretted *vīnā*-s.

The Structure of Rāmāmātya's Vīnā

Rāmāmātya mentions three kinds of *vīnā* in common use: *Madhya-melā*, *Acyutarājendra-melakā*, and *Śuddha-melā*. The bulk of this section describes the tuning of the *Śuddha-melā vīnā*, which is tuned as follows:

String I—(very-low-octave) *sa*
String II—(very-low-octave) *pa*
String III—(low-octave) *sa*
String IV—(low-octave) *ma*

He also describes the tuning of the three side strings, very much like the unfretted strings called *cikāri* on a modern sitar, and *tālam* on a modern Sarasvatī *vīnā*. They are tuned to *sa*, *pa*, and (low-octave) *sa*. These unfretted strings would almost certainly have served to reinforce a steady reference pitch, regardless of *rāga*, just as they do on modern sitars and *vīnā*-s. They further are called *śruti* strings—apparently, as in one modern usage of this term, in reference to the fixed anchor *śruti* of *sa*, rather than any specific microtones that constitute *svara*-s. In any case, the presence of these strings strengthens the case that Rāmāmātya was describing a single tonal system measured relative to an unchanging *sa*.

Next, Rāmāmātya describes the layout of *svara*-s on the frets, which is summarized in figure 4. Interspersed in this description are the assertions

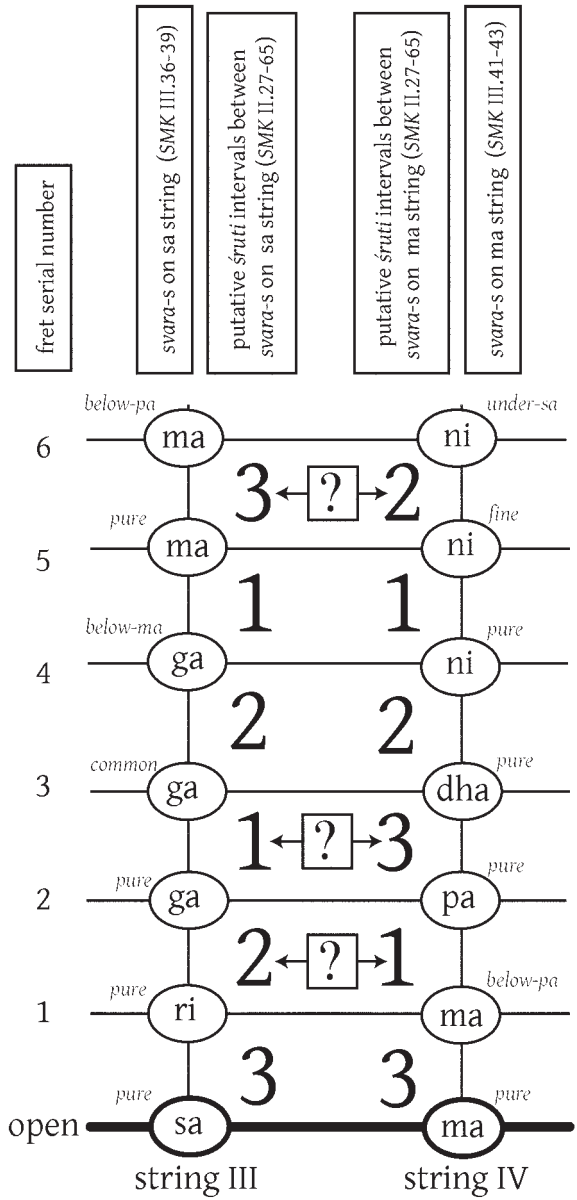

Figure 3. *Śruti* discrepancies on fretted *vīnā*-s.

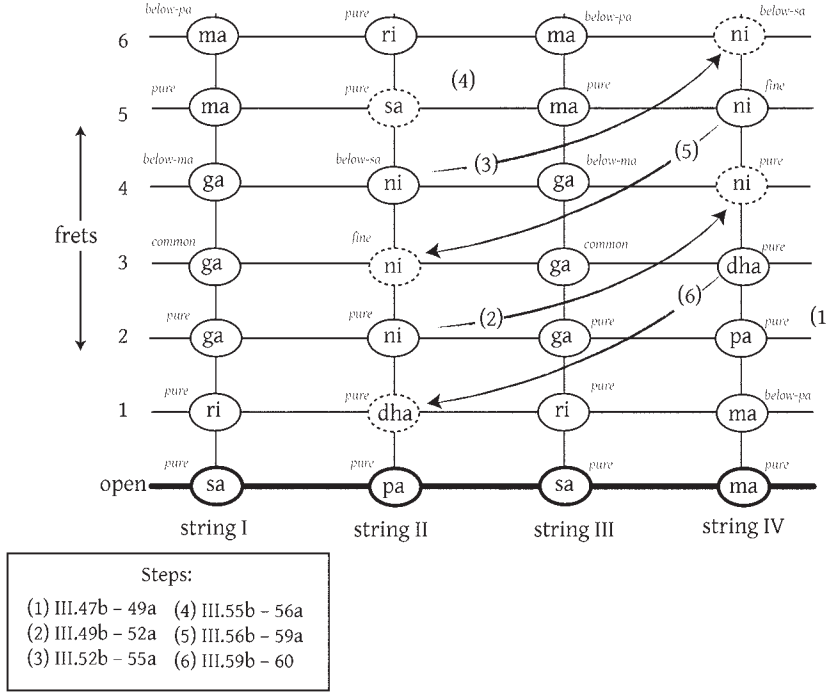

Figure 4. Rāmāmātya's tuning method.

that the fifth and sixth frets (and presumably higher frets, too) on strings II and III are useless (III.35–36a, 39b–40), because the *svara*-s are reproduced on strings III and IV.[24]

The next line of the manuscript reads, cryptically: "This is the method of a *mela*."[25] This seems to imply that the method of generating *mela*-s (pitch-sets) is derived from the setting of frets on a *vīnā*. Note that the frets set thus far yield only 12, not 14 notes. This accords with the later North Indian system of pitch-sets called *ṭhāṭ*-s, which also refers to specific arrangements of frets (Brown 2003–4).

The Theoretical Basis of Rāmāmātya's Tuning System: Svayambhu Svara-*s*

Before he begins describing his method for setting frets on the *vīnā*, Rāmāmātya must explain the theoretical basis for his method and distinguish it from the canonical *sruti*-based descriptions of intonation. Rāmāmātya's method proceeds by tuning according to what he calls *svayambhu svara*-s, which he defines as follows: "The *svayambhu svara*-s are those not determined by one's own judgment" (III.44b).

Svayambhu svara-s are central to understanding Rāmāmātya's tuning method. He seems to have coined the term, and it furthermore seems to have later fallen out of use in the precise sense that he used it. Its literal meaning is "self-existent" or "self-born," sometimes used to refer to things not contrived by humans—for example, natural rock formations that resemble *śiva-liṅgam*-s.[26] Modern commentators have often taken this term to refer to string harmonics (especially those sounding a fifth above a given note) or *samvādi*-s (consonant intervals a fourth or fifth apart) (e.g., Ramaswami Aiyar 1932, liii; te Nijenhuis 1976, 4; Grieg 1987, 359). The confusion about this term is exacerbated by the word's ambiguous etymology, its varied usages by later theorists, and a typographical error in Ramaswami Aiyar's widely known English translation.[27]

However, the Sanskrit text of the *SMK* would seem to support a rather different understanding of *svayambhu svara*-s, a concept that is quite distinct in principle from fourths, fifths, octaves, *śruti*-s, or ratios. The word appears seven times in the text. All but one of these (47b–48a, discussed following) is unambiguous: *svayambhu*-s are simply the *svara*-s that one finds available along a properly fixed fret. For example, if we fix the second fret to produce *pa* (G) on the *ma* (F) string, then *pure ga* (E♭) becomes available as a *svayambhu* on the *sa* (C) string, and *pure ni* (B♭) becomes available as a *svayambhu* on the *pa* (G) string. As Rāmāmātya says, these *svayambhu*-s are those *svara*-s not determined by *sva-buddhyā*, literally "from one's own discriminating judgement." That is, these *svayambhu*-s are there, ready to be played on the fret, without any judgment required.

It should be noted that this is not a purely algorithmic method of tuning. In addition to all of the physical imperfections inherent in tuning real three-dimensional strings (i.e., of non-infinitesimal width), discriminating judgment is also implicitly required in adjusting the angle of each fret—each presumably is to be placed perpendicular to the neck of the *vīnā*.[28] More important, Rāmāmātya's method still implicitly requires "discriminating judgment" in order to tune the open strings of the *vīnā* in the first place to *sa*, *pa*, *sa*, and *ma*. Rāmāmātya evidently assumes that any competent *vīnā* player would be capable of doing this by ear and makes no effort to fix their values using ratios, *śruti*-s, *svayambhu-s*, or any other method. This, together with the vague wording of steps (1) and (4), suggests that Rāmāmātya may assume that *sa*, *pa*, and *ma* are especially easy to discern by ear.

But *svayambhu*-s are never identified as intervals. In fact, Rāmāmātya clearly distinguishes his practical method of tuning by *svayambhu*-s from the canonical understanding of consonances (*samvādi*-s) as 8- and 12-*śruti* intervals (which probably sounded like perfect fourths and fifths, respectively), described in the earliest extant Sanskrit sources on music (e.g.,

Nāṭya-śāstra, XXVIII.24 and *Dattilam*, I.19).[29] He precedes his description with this statement:

> Two *svara*-s separated by a distance of eight or twelve *śruti*-s should always be understood as mutual *samvādi*-s. This principle is well explained by statements in the *SR*.
>
> Now another method [*mārga-antara*] of determining the values of *svara*-s is explained. (III.45b–47a)

This is the last we hear of *samvādi*-s or *śruti*-s. Rāmāmātya's method of properly setting the frets in place requires tuning only pairs of *svara*-s with the same value (for example, *pure dha* on both strings II and IV). Rāmāmātya makes no distinction between octaves for the purposes of tuning: either one of a pair of notes with the same name has the same *pramāṇa*, or "value," regardless of its octave. As Rāmāmātya says in II.65b–c, nominally identical *svara*-s at various octaves simply "repeat." They are not *samvādi*-s, or *svayambhu*-s, or even notionally separated by intervals at all.

Setting the Frets of the Vīnā

The tuning system proposed by Rāmāmātya begins with the *svara*-s already available on the open strings (*sa*, *pa*, and *ma*) and proceeds to set each of the frets by tuning other notes to octaves or unisons of already-available *svayambhu*-s. Each time a fret is set, new *svayambhu*-s become available on the other strings, and the process continues until he has frets for 12 *svara*-s. Step 1, step 2, and so forth given in the following method are indicated in figure 4 by numbers in parentheses.[30]

Step 1: Set Fret 2.

> The low *pure pa* produced on fret 2 of string IV is known to be *svayambhu*. (III.47b–48a)

Pa is already available as a *svayambhu* on the open string II.[31] We adjust fret 2 of string IV so that it produces a *pa*, which is an octave above (to be precise, in Rāmāmātyā's terms, *equal to*) the open sounding of string II.

> Therefore all *svara*-s produced on fret 2 are *svayambhu*-s, and their values can be determined without discrepancy. (III.48b–49a)

Once the fret is set in place, the *svara*-s it articulates on each of the four strings are all fixed and accurate, given by the placement of the fret.

Step 2: Set Fret 4. Among the *svayambhu svara*-s now available on fret 2 is the *pure ni* (B𝄫) produced on string II. We adjust fret 4 until the *pure ni* produced on fret 4 of string IV is identical with this *svayambhu svara*.

> The very low *pure ni* produced on fret 2 of string II has the same value as the low *pure ni* found on fret 4 of string IV. (III.49b–51a)

Once fret 4 is set in place, the *svara*-s it affords on each of the four strings, like those on fret 2, are available as *svayambhu*-s (III.51b–52a).

Step 3: Set Fret 6. We use the same technique to fix fret 6, tuning the (low) *lowered-sa ni* (~B) on fret 6 of string IV to the *svayambhu* (very low) *lowered-sa ni* on fret 4 of string II. The fixing of fret 6 in turn produces four more *svayambhu*-s (see III.52b–55a).

Step 4: Set Fret 5. Rāmāmātya seems to find the method of fixing this fret so obvious as to not require explication; thus we can only speculate about how it might be done.[32] At any rate, once it is fixed,

> Fret 5 produces *sa* and *ma*, so all *svara*-s generated from this position are *svayambhu*-s. (III.55b–56a)

There is also a new *svayambhu svara* produced on string IV: fine *ni* (III.56b–57a).

Step 5: Set Fret 3. We then fix fret 3, by tuning the very low fine *ni* on fret 3 of string II to the *svayambhu* low fine *ni* now available on fret 5 of string IV (see III.57b–58a).

Step 6: Set Fret 1. Finally, we fix fret 1, following the same method: the low *pure dha* on fret 3 of string IV is equal to the very low *pure dha* generated by fret 1 of string II (see III.59b–60).

Justifying a 12-Svara *System*

Had he continued up the neck of the *vīnā* with his method of tuning, he could have generated any number of new tones with distinctive pitches: 14, 17, 22, or more. Why does Rāmāmātya stop here? He simply states,

> This method of aligning six frets generates all the measurable *svara*-s, and Rāmāmātya has demonstrated the determination of these values. (III.61–62a)

He had also asserted this earlier after listing the *svara*-s produced on each fret (III.43b–44a). But the set of "measureable *svara*-s" amounts to only 12. The two dubious *svara*-s (*sweet ni* and *in-between ga*) have been left out, since separate frets for *in-between ga* and *sweet ni* would "cause a muddle" (*saṅkīrṇa-bhāvena*):

> Earlier I spoke of a total of fourteen *svara*-s, but now I provide a thorough explanation of the twelve *svara*-s. Why are two (extra) frets not described for the

> production of *sweet ni* and *in-between ga*? If frets were separately fitted for *sweet ni* and *in-between ga*, playing them would be unpleasing because it would cause a muddle. Therefore separate frets are not described. (III.64b–67b)

It is unclear whether this means a tonal muddle or an ergonomic muddle. In fact, Rāmāmātya's new system depends so thoroughly on the material frame of frets that it is hard to distinguish them. He also claims that it is possible to produce these *svara*-s, if necessary, from nearby frets:[33] "Learned musicians maintain that the *sweet [ni] śruti* can be produced from the *lowered-ma ga* fret" (III.68) and that some musicians accept the higher versions of *ga* and *ni* as acceptable substitutes: "Due to their minute difference in pitch, other practicing musicians understand *lowered-ma ga* and *lowered-sa ni* to be substitutes in lieu of *sweet ni* and *in-between ga*" (III.70–71a). He then, in a by-now familiar rhetorical move, justifies his break from the tonal schema of the *SR* by returning to the *SR* itself for justification: "This is like the statement expressed by [Śārṅgadeva] that in all cases, the *sweet ni* and *in-between ga svara*-s are used sparingly" (III.71b–72a).[34]

But there is another remarkable shift here, which Rāmāmātyā passes over in silence. All of the measureable *svara*-s have been produced without any mention of *śruti*-s. The six fret positions have now replaced the 22 *śruti*-s as the means by which *svara*-s are both measured and generated. In the *SR,* 19 *svara*-s were separately enumerated, many of which have the same anchor *śruti*-s, and therefore would sound at the same pitch relative to a fixed tone. The *SR* accorded each of these *svara*-s a distinct identity by virtue of how many *śruti*-s it contained (either two, three, or four). In the *SMK*, however, despite the 18 *svara* names listed in chapter II (ranging widely in *śruti* content from one to six) there are only 12 distinctive *pramāṇa*-s measured on frets. Each *svara* has a distinctive designation in a closed system of functions and names, yet its identity depends on its having one of 12 distinctive values articulated on a properly fixed fret.

Twelve or Fourteen Svara-*s, Fifteen or Twenty* Mela-*s?*

Rāmāmātya admits that both a 12-*svara* and a 14-*svara* system were possible, without making any attempt to reconcile them. At the end of the section on *mela*, Rāmāmātya cites an unresolved difference of opinion among *vīnā* players. Rāmāmātya maintains this ambiguity even when it leads to ambiguities in his *mela* system. He says that the five *mela*-s distinguished by *in-between ga* and/or *sweet ni* may actually be considered to be interchangeable to those with the near-equivalent *lowered-ma ga* and/or *lowered-sa ni*, respectively, reducing the total number of *mela*-s to 15.[35] He further marks these notes as

odd by placing the five dubious *mela*-s that apparently are distinguished by their use at the end.

> The characteristics of the twenty *mela*-s have been considered in the main text. But two viewpoints will be discussed based on *vīnā* practice. In the case of treating both *in-between ga* and *sweet ni* separately, the first view is that there are definitely twenty *mela*-s. But in substituting *in-between ga* and *sweet ni* with *lowered-ma ga* and *lowered-sa ni* respectively, the second view deems there to be fifteen *mela*-s. The remaining five *mela*-s are said to be absorbed into the fifteen *mela*-s. (IV.63–66b)

These pitch-sets (either 20 or 15, depending on whether one distinguishes the two odd notes or not) are laid out in chapter IV. In principle, these *mela*-s account for every *rāga* known to Rāmāmātya. Chapter V describes the modal attributes of these *rāga*-s.

Does the SMK *Prescribe a System Tonic?*

The circumstantial evidence for a fixed-*sa* system tonic in the *SMK* is quite strong: the disappearance of the *ma-grāma* (already reported in the *Kalānidhi*), the side strings tuned to *sa* and *pa*, the dismissal of altered *svara*-s that sound identical relative to *sa*, and the exclusion of *sa* and *lowered pa* as varieties of *ni* and *ma*. But Rāmāmātya never explicitly mentions a drone or tonicity.

The tidy picture of a single tonal center in Rāmāmātya's system is further complicated by the descriptions of *rāga*-s in chapter V. In addition to their scalar patterns, *rāga*-s are described according to their *aṃśa, graha,* and *nyāsa svara*-s: the *svara*-s on which melodies begin, end, and come to rest. In every case, Rāmāmātya gives the same *svara* for all three, suggesting that this svara bears a great deal of tonal weight. Often this weighty *svara* is *sa*, but not always. This is a strong hint that many *rāga*-s in practice may have had functional tonal centers other than *sa*, even within a *sa*-centric tonal schema.[36] N. Ramanathan (1992) suggests one solution: these *graha svara*-s may have referred to a process of transposition whereby *ri* was temporarily renamed *sa*, *ga* was temporarily renamed *ri*, and so on. Further speculation about functional tonics would require more scholarly work on modal practice in sixteenth-century Vijayanagara.

Tonal Translation, Pythagoreanism, and the Question of West Asian Influence

The tuning system described in chapter III seems to invite translation into modern terms. V. N. Bhatkhande, for example, translated the *svara*-s of the

SMK into those that would have been familiar to Hindustani musicians in the early twentieth century, rendering, for example, Rāmāmātya's *pure ga* (E𝄫) as a Hindustani *pure re* (D) (1972, 25).[37] While Bhatkhande himself was not terribly concerned with measuring precise pitch-values, others have attempted to translate Rāmāmātya's *svara*-s into cents (equal-tempered twelve-hundredths of an octave.) Despite the wide margin of error that acoustic reconstructions must allow,[38] it is clear that Rāmāmātya's pure *svara*-s would have sounded quite different from those described in the *SR*.[39] His *pure ri, ga*, *dha,* and *ni* were almost certainly lower than the *svara*-s called by those names in the *SR*, sometimes by as much as a semitone (see Forster 2010, 545, 550, 573; te Nijenhuis 1976, 4.)

Several latter-day commentators on the *SMK* have gone beyond acoustic reconstruction and translated Rāmāmātya's tuning system into a series of ideal ratios (e.g., 9:8 for *pure ga* and $[9:8]^2 = 81:64$ for *below-ma ga*). This interpretive tradition is so strong in the secondary literature that one author of the present essay mistakenly replicated these erroneous claims in an earlier article (Rahaim 2011, 666.) Some have gone even further, claiming that Rāmāmātya's tuning was "Pythagorean" all along (e.g., te Nijenhuis 1974, 26). In light of the many well-documented Islamicate features of Vijayanagara court life,[40] some have even speculated that this putative Pythagorean intonation was inherited from West Asian theorists of *nisbat*, or string-length ratios (Ramaswami Aiyar 1932, lii; Brhaspati 1969, 41; Grieg 1987, 354; te Nijenhuis 1974, 25; 2010, 37). To be sure, there were older Arabic and Persian texts in circulation in sixteenth-century India (e.g., the *Kitāb al-Adwar*) that reckoned scale degrees by ratios. And several Indian theorists writing after Rāmāmātya (e.g., Kāmilḵhānī, Hṛdayanārāyaṇa, Qāsim Dost ʿAli al-Bukhārī, Ahobala) did indeed describe their tuning system in terms of string lengths (Brown 2003, 199; Storey 1977, 414).

It is important to note, however, that the *SMK* itself never mentions ratios. Like his Arab and Persian contemporaries (Grieg 1987, 366; Mohammadi 2006, 43–44), Rāmāmātya seems to have been largely unconcerned with arithmetic accounts of consonance. His tuning system requires no ratios, no intervals, no consonance—only *svayambhu* (the unmeasured notes found ready for use once a fret is set) and tonal identity (i.e., unisons and octaves.) The only mention of consonance in the whole treatise (*samvādi*, in 45b–47a) is unconnected with the actual tuning process. Numerical measure is conspicuously absent precisely where a Pythagorean would find it most obvious: in measuring the placement of frets. This false ascription of Pythagorean influence in retrospect would be a mere detail were it not for the fact that the *SMK* has been widely understood by historians as a catalyst for a radical shift in musical epistemology, not just as a practical tuning manual. From the

point of view of intellectual history, the difference between hearing a tone as self-evident and hearing it as an expression of a ratio is as crucial as the difference between imagining the earth as the unmoving center of the universe and imagining it orbiting the sun—even when the practical measurements yielded by these various models happen to coincide. Pythagoreanism, after all, is more than a handy method for setting frets—it is a totalizing view of a rational, harmonious cosmos, organized by number (Godwin 1988, 11–13; Brown 2003, 191). Rāmāmātya, in contrast, seems to consider independence from rational discrimination to be a special virtue of his method (44b–45a).

Sounding Sāstric, Reading *Sāstra*-s

The very presence of Sanskrit—its sound, its appearance in writing, the elite audience it interpellates—not only bears but *serves as* "the stamp of orthodoxy" (Sawhney 2009, 9). The production of Sanskrit texts was a crucial part of legitimizing kingship at the Vijayanagara court, and the need for orthodox textual production would have been particularly acute as Rāmarāya claimed the throne. But this śāstric orthodoxy does not simply amount to a mechanical repetition of past assertions; it accommodates a great deal of creative revision. Rāmāmātya ends up with a very different tonal schema, free from enumeration, measured relative to *sa*, and capable of accommodating a wide range of intervals and scale types. Yet he never claims to replace or improve the system of the *SR*, never claims to make it new. Though the tuning system in chapter III eliminates the need to measure *svara*-s numerically by *śruti*-s, Rāmāmātya never explicitly claims that his system has made *śruti*-s obsolete. As with the question of the system tonic, he simply remains silent on the matter.

This selective silence is part of the orthodox sound of the *SMK*—and its sound certainly does matter. The life of a text like the *SMK* would almost certainly have been both oral and literate, including verbal citation from memory as well as silent study. Even when Rāmāmātya's system is logically incommensurable with that of the *SR*, it rings out in familiar terms, smoothly blended with what would have been familiar couplets. Since both the *SMK* and the *SR* were composed in the standard *śloka* meter of four octo-syllabic units (*pāda*-s), it was not hard for Rāmāmātya to seamlessly interweave verbatim passages of the *SR* with his own work. Though these citations often take on fresh meanings in their new contexts, there is no clear sonic cue that marks the end of a quotation and the beginning of an original claim. Surely, in light of Rāmāmātya's rather different tonal schema, the sense of continuity between the *SR* and the *SMK* is an "illusion" (Powers and Widdess 2001, 173). But the feeling of continuity is also quite concrete, quite palpable;

Rāmāmātya smoothly merges his revisions into the rhythmic flow of śāstric discourse without any audible rupture.

The dialectical flow of this revision-in-continuity is obscured if we approach *sāstra*-s as either religious texts authored by infallible Hindu sages *or* secular texts authored by disinterested secular scholars. The *SMK* is not exactly one or the other. Though clearly not a work of secular humanism, the blanket term "Hindu" would also, among other things, obscure its omissions of the *SR*'s tantric content in favor of Vaiśnava imagery (see Eaton 2005, 83, on Vijayanagar's shift from Śaivite to Sufi, Jain, and Vaiśnava institutional patronage). Though Rāmāmātya was writing at a court marked by cosmopolitan Islamicate conventions, served by Persian soldiers, Jain merchants, Portuguese diplomats, and Turkish cannoneers, in the middle of a vernacular literary efflorescence, he did not have to look beyond the Sanskrit canon to justify his revisions. His authority to adapt theory to practice is bolstered by references to Patañjali, Śārṅgadeva, and even his own patron, Rāmarāya. Even at its most radical, the *SMK* maintains continuity with a canonical past and establishes its orthodox credentials in a narrative frame inflected by myth, just as the *SR* did in its own time.

The *SMK* is by no means unique in this regard. As recent scholarship has shown, even ostensibly secular twentieth-century music reform projects were undergirded by mythic visions: ancient origins, grand civilizational struggle, a dawning new age (Neuman 2004, 17, 92–93; Bakhle 2005, 4, 117; Weidman 2006, 6). This in itself should not surprise us or lead us to either celebrate or denigrate such projects. Nor does it make them particularly glorious, irrational, or contradictory. Whether secular reason is understood to be inextricably entangled with religious and ethical commitments (Mahmood 2009, 861) or transcendent-inclusive of a mythic infrastructure (Wilber 1995, 51), there is a high analytic price in categorizing music-theoretic work as simply religious or secular, traditional or modern, irrational or rational. We have worked instead toward an integral view of musical *sāstra* that reads even the strictest taxonomy, deduction, and logic as processes intertwined with narrative, authority, and rhetoric.

In this light, even the twentieth-century Pythagorean reconstruals of the *SMK* can be read as a kind of śāstric process. The same might be said of the work of "Indo-Occidentalists" (Jairazbhoy 2008) who creatively invoke links between ancient *śruti* measures and modern music, or music reformers like V. N. Bhatkhande (who, for example, reads *SMK* II.9–14 to mean that celestial *gāndharva* music is not the concern of humans [1972, 18]). Surely, these scholars project their own concerns onto the past, as do we all. In so doing, they are not so far off from sāstric authors like Rāmāmātya, Kallinātha, Śārṅgadeva, and Mataṅga, whose job has always been to "harmonize the-

ory and practice" (*SMK*, I.28). Improvising within well-established discursive spaces, they reconstrue the canonical models of their forebears in order to suit their own times and their own purposes. And though the present essay is oriented toward textual criticism and intellectual history rather than śāstric prescription, we cannot claim that our own reading of the *SMK* is simply and unproblematically descriptive. In carving out a space for musical *śāstra* independent from religious scripture and secular science, we foreground the creative, poetic, rhetorical work of music theorists: the work of actively constituting and projecting—rather than simply describing—a world of music.

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Notes

[1] We stress that these two stances, while quite distinct from each other, are not essential characteristics of writers but rather contingent attitudes that constitute the text at hand (see Berger 2009 for more on stance). Various stances on reading the Gospel of Thomas, for example, might constitute it as a tedious homework assignment, an exotic transgression from canonical norms, or a normative source of sacred instruction. Many writers can comfortably take either of the stances suggested here, at different times, without contradiction—compare Daniélou (1954, 11) with Daniélou ([1943] 1995, 84).

[2] The effects of this colonial encounter, of course, are difficult to assess without a solid understanding of the musical knowledge systems of the sixteenth and seventeenth centuries (cf. Pollock 2011, 1; Brown [Schofield] 2008, 336 ; Slawek 2007, 509). This need is part of what motivates the current study.

[3] As we will see, the epistemology of the *SMK* is neither exclusively empirical-inductive nor exclusively rational-deductive.

[4] We have used Roman numerals for chapters throughout per the canonical traditions of citing *śāstra*.

[5] South Indian court scholars and poets were often given special names that referred to their patrons. For example, the great poet Bhaṭṭu Mūrti was called Rāmā-rāja-bhūṣana, "an ornament for Rāmarāya," thereby foregrounding the poet's relationship to his esteemed patron and glorifying both the king and his cultured court. Rāmāmātya's appellation seems to follow a similar pattern, as the titles *-āmātya/-mantrī* both refer to a minister. Thus, our author's actual name remains anonymous while his nom de plume comes to us only as a reference to his royal sponsor. K. C. D. Brhaspati's (1969) claim that Rāmāmātya (the author of the *SMK*) and Rāmarāya are actually the same person is difficult to maintain in light of the section of the *SMK* in which Rāmarāya and Rāmāmātya have a conversation (I.25–29).

[6] In Bhatta's 1963 translation into Hindi of what purports to be V. N. Bhatkhande's, the text omits chapter III. The relation of this volume to the earlier Marathi edition

and the reason for the omission remain unclear to us. However, Bhatkhande certainly appears to have known the material that was included in that chapter, since he mentioned in a lecture both the *vīnā* and the system proposed by Rāmāmātya for fixing its frets (Bhatkhande 1972, 23).

[7] Our translation is available at http://www.srinivasreddy.org/docs/smk_translation.pdf.

[8] For an overview of the śāstric tradition, with special reference to s*aṅgīta-śāstra*, see Rowell (1992, chap. 6).

[9] As Sheldon Pollock puts it, "The work Sanskrit did do was beyond the quotidian and the instrumental; it was directed above all toward articulating a form of political consciousness and culture, politics . . . as celebration of aesthetic power" (2006, 14). After roughly 1100 CE, however, this already-polyvalent relationship was further complicated by the adoption of Persian as a court language of prestige in the North and the advent of emergent vernacular literary traditions particularly in the South. In languages like Telugu and Kannada, skilled poets now composed expressive literary works and gave new voice to budding regional polities. But as much as these texts offered something fresh and different, they also represented a regionalized articulation of the age-old Sanskrit paradigms of literary aesthetics, poetic tropes, religious beliefs, and sociopolitical ideologies. It is important to note that this process of literary vernacularization occurred primarily in the realm of expressive genres like *kāvya*, whereas the scientific language of *śāstra* remained almost exclusively bound to the refined, precise idiom of Sanskrit. Scientific literature, including several musical treatises, were indeed composed in Persian during this period in South Asia, and this fertile area of study is in need of deeper investigation.

[10] It is possible, however, to discern the implicit influence of other treatises. For example, Rāmāmātya's grandfather Kallinātha's *Saṅgīta-kalānidhi* set an important precedent for Rāmāmātya's break with the *SR*, by asserting, for example, that only the *sa-grāma* was in use in fifteenth-century Vijayanagara. Also, the (no longer extant) *Saṅgīta-sāra* of Vidyāraṇya (an earlier treatise often linked to the founding of Vijayanagara) is mentioned in the *Saṅgīta-sudhā* (a seventeenth-century Tanjore treatise) as the first treatise to propose *mela*-s as a method of *rāga* taxonomy, though this may well have been a mistaken attribution. In any case, it is not possible to be certain that the idea of *mela* was first proposed in the *SMK* (cf. Ramanathan 1992, 83).

[11] Śrīraṅga is the local form of Viṣṇu worshipped in Śrīraṅgam, a vital hub for the Śrīvaiṣṇava tradition that gained significant support and patronage from the Tuluva kings of Vijayanagara—most famously, the celebrated emperor Kṛṣṇadevarāya (r. 1509–29), who was an ardent proponent of this particular brand of Vaiṣṇava devotion. The mythic metaphors associated with the great god Viṣṇu resonated with the model of divine rule that South Indian kings had embraced and promoted for centuries.

[12] See, for example, the opening of the *Jawāhir al-Mūsīqāt-i Muḥammadī* of Shayḵh ʻAbd al-Karīm Ibn-i Shayḵh Farīd-i Anṣārī al-Qādirī-yi Jawnpūrī (ca. 1650), which

describes "the beginning of *Āwāz* [sound] which came into existence from the entity of God, the highest glory to Him, the presence of the world of heavens" (Mohammadi 2006, 46).

[13] Kallinātha was not merely a "treasury" of fixed knowledge but also identified ways in which ancient theory seemed to contradict the contemporary practices he observed at Vijayanagara (see Brhaspati 1969, 20; Shringy and Sharma 2007, xix–xx; also cf. note 10 in this article on Vidyāraṇya's nonextant *Saṅgīta-sāra* on *mela*-s).

[14] Bharata is the legendary author of the musical treatise *Nāṭya-śāstra*.

[15] When defining both these terms, Rāmāmātya quotes directly from Śāraṅgadeva: cf. *SMK*, II.24b–26b/*SR*, I.3.23a–25a (*svara*) and *SMK*, I.22a/*SR*, I.3.8a (*śruti*).

[16] We have described here the dominant conception of the relationship of *śruti* to *svara* that obtained in describing the tonal schema of the *SR*. At other times, as in discussions of consonance, this relationship was quite ambiguous and even explicitly controversial (as in the *Brhaddeśī* of Mataṅga). There are certainly moments when ancient theorists would treat *sruti*-s as empty intervals (cf. Lath 1978, 203–5.) For a detailed analysis of the relevant verses in *SR*, see Shringy and Sharma (2007, 134–36; cf. Ramaswami Aiyar 1932, 48).

[17] For more about the system outlined in the *SR*, see Powers and Widdess (2001).

[18] This quote, unlike the others, is taken from the fourth book of the *SR*, a relatively pragmatic description of song forms (*prabandha*).

[19] This refers to *SR*'s sixth chapter on instruments (*vādyam-adhyāya*), not translated in the current Shringy editions.

[20] Rāmāmātya conspicuously omits *SR* I.3.6, which suggests an esoteric, and ostensibly Tantric, etymology for the word *nāda*.

[21] The literature on tone perception generally treats tonal schemata as implicit perceptual processes rather than explicit nominal differences, like the systems in the *SR* and *SMK*. But this term, by highlighting the mutual dependence of percepts and concepts, actually fits our purposes well. Rāmāmātya's key basis for renaming these *svara*-s rests on perceived distinctions and conflations of pitch and function and likewise directs the reader toward a new way of hearing tonal relations.

[22] In modern terms, we might understand this process of notes "absorbing" each others' *śruti*-s as dealing in mutual tonal relationships between *svara*-s rather than an absolute relationship with *sa*, though neither Śārṅgadeva nor Rāmāmātya puts it quite this way. Even Sārṅgadeva's system already was showing signs of accommodating a system tonic (see Ramanathan 1992, 78). It's unclear to what extent the awkwardness of the *śruti* system for fretted instruments was a consequence of it being specially suited for arched harps (Jairazbhoy 1995, 90–91). Rāmāmātya's new system, however, was adapted for a *vīnā* much like the modern instruments that bear the same name, fretted lutes (Powers 1970, 13). Here, open strings provide absolute pitch references, with side strings, sounding a constant reference pitch (*sa*) against which pitches are always measured. However, it would be an exaggeration to say that a fretted instrument *requires* a fixed system tonic (modulation is common on guitars, for example).

[23] The term "lowered *pa*" (*cyuta pa*) does not appear in the *SR* but rather "altered *pa*" (*vikṛt pa*). Rāmāmātya calls it *lowered pa*, presumably for consistency with *lowered sa* and *lowered ma*.

[24] Rāmāmātya makes a similar assertion at III.62b–64a: "the actual *svara*-s produced on the frets in these registers are useful only on string IV, but not the other three strings." This suggests first of all that sixteenth-century Vijayanagara *śuddha-mela vīnā* players (like twenty-first-century sitarists, *vīnā* players, and *bīnkar*-s) tended to play melodies only on the highest string, when possible. For example, it would seem that one would play the phrase ([*below-pa*] *ma* [*shuddh*] *dha* [*below-ṣa*] *ni* [*shuddh*] *ri sa*) entirely on string IV (as one might do on a modern sitar) rather than play (*ma dha*) on string III and (*ni ri sa*) on string IV (as one might do on a modern oud). Second, it suggests that Rāmāmātya may not have tested the tuning of these "useless" frets. Cris Forster points out that, when tuning according to Rāmāmātya's method, the *lowered-pañcama ma* fret on string III typically yields a somewhat different pitch from the *lowered-pañcama ma* fret on string IV; likewise, the *pure ri* fret on string II will be different from the *pure ri* fret on string III (2010, 570–71).

[25] This, along with the other summary statements at the end of sections, may well have been the addition of a later copyist. It may also have been an error; the next chapter is about *mela*-s.

[26] *Svayambhu* has several other related meanings as well. The twelfth-century *Panditaradhya Charitra* mentions a *svayambhu vīnā*, which according to P. Sambamurthy was sounded by the wind instead of by human hands. This latter fact would account for the name, though Sambamurthy himself seems to have been influenced by Ramaswami Aiyar's reading of *svayambhu* as string harmonics (Sambamurthy 1982, 206–8). *Svayambhu* is also an epithet of several divinities, such as Brahma, the first manifested being (Stutley 2006, 141). The epithet originally applied to Prajāpati, but as he became identified with Brahma in the *Purāṇa*-s, the epithet was also transferred (Basu 1986, 38). Less often, *svayambhu* identifies *Puruṣa*, the Cosmic Being whose dismemberment created the universe; thus *svayambhu* can indicate both the first-born (Brahma) and the self-manifested (*Puruṣa*) (ibid., 58). *Svayambhu* is also an epithet applied to Buddha, Śambhu (an aspect of Śiva), and the Sun (119, 164, 255).

[27] Ramaswami Aiyar mistakenly gives "another method of determining the values of *svayambhu*-s" (1932, 53) rather than *svara*-s, implying that the *śruti* measures rehearsed in the previous section were the *first* method of determining the values of *svayambhu*-s. But the Sanskrit text in Ramaswami Aiyar's own edition makes clear that Rāmāmātya is actually distinguishing between tuning by consonances measured in *śruti*-s and "another method"—his *svayambhu*-based method (cf. *SMK*, III.47a: *svara-pramāṇatām kartum mārga+antaram atha ucyate*).

[28] To do so with precision is no trivial task in practice (cf. Euclid [ca. 300 BCE] 2007, I.12).

[29] These *śruti* measures are sometimes (as in the *Nāṭya-śāstra* and the *Dattilam*) also given as 9 or 13, apparently including the measured *svara* on both ends. Rāmāmātya's count of 8 or 12 seems instead to measure a distance in *śruti*-s between

the *svara*-s at issue. This discrepancy further highlights the ambiguous relationship of *śruti* to *svara*.

[30] The first three steps must be done in sequence. Setting the sixth fret in step 3 relies on setting the fourth fret in step 2, which relies on setting the second fret in step 1. The next three steps, however, do not rely on any of the even-numbered frets having been set, though they do rely on each other in turn. Thus, the steps could conceivably be carried out in the following order: 4, 5, 6, 1, 2, 3.

[31] The method is ambiguous here. In Ramaswami Aiyar's Sanskrit edition, Rāmāmātya definitely refers to the *pa* on string IV as *svayambhu*, not the *pa* on open string II. A Pythagorean hermeneutic might construe this as a hint that *pa* is *svayambhu* by virtue of being a harmonic overtone of *sa* (cf. te Nijenhuis 1976, 4). It seems to us, however, that it is far more parsimonious to assume that Rāmāmātya intends us to tune *pa* to *pa* (*svara*-s that have the same *pramāna*), as with the rest of the *svayambhu* tunings, especially in light of the fact that he has already distinguished his method from tuning by *samvādi*-s. An argument in favor of Pythagorean temperament in the *SMK* would need to demonstrate that this *svayambhu pa*—unlike every other instance of *svayambhu*—is *svayambhu* precisely by virtue of being a *samvādi* of *sa*, and definitely not by having the same *pramāna* as the given *pa* on string II. Another possible route in for a committed Pythagorean would be the unspecified method of setting the fifth fret in step 4.

[32] Two ways that would fit with the pattern in steps 2, 3, 5, and 6 would be to tune the fifth-fret s*a* (from the *pa* given by open string II) to either of the open *sa*-s (strings I or III), or to tune the fifth-fret *ma* (from string III) to the open *ma* (string IV). It seems unlikely that (as a Pythagorean reading would have it) he would have been implying that *ma* should be tuned a fourth above *sa* when either of these two unisons was available.

[33] This is a rather unusual claim: Rāmāmātya says that these notes can be produced from the fret just *above* where their fret would be. Modern-day *sitār* and *vīnā* players can produce notes *higher* than that produced by a fret by increasing the tension of the string on a *lower* fret with the left hand: deflecting the string horizontally or applying more pressure vertically. However, it is hard to imagine how the tension of the string could be reduced even more than it is when straight in order to produce a *lower* note on a *higher* fret. We wonder, then, whether Rāmāmātya actually observed musicians rendering these *svara*-s on these frets, or whether this was simply a way out of a theoretical pickle. It may also have been a scribal error; the claim would certainly make sense in reference to the *common ga* and *fine ni* frets.

[34] Cf. *SR*, I.5.6b, quoted verbatim in the SMK. In the *SR*, *sweet ni* and *in-between ga* are not only to be used sparingly but are assigned the lowest status of all the notes, even explicitly designated as belonging to the lowest caste (*śūdra*). In Shringy's translation of the *SR*, he suggests that the reason is that they are "degraded from the position of full-fledged *svaratva* (i.e., the capacity to be an independent musical note)" (Shringy and Sharma 2007, 154).

[35] However, even if we do accept the equivalencies between these odd *svara*-s, he seems to make some mistakes in the citing *mela* equivalencies: Samavarali and

Shuddh Varali, said to be equivalent apart from the odd *svara*-s, have different *ma*-s; Vasantabhairavi and Hejjuji likewise have different *ni*-s, Samant and Kannada Gowla have different *ri*-s and different *ni*-s, and Kambhoji and Sarang Nat have entirely different pitch-sets. There may indeed be a pattern here, but we have not found it.

[36] Perhaps similar to the function of *dha* in the modern Hindustani *rāga* Mārwā, or *ma* in modern Hindustani Lalit.

[37] Bhatkhande translates the enharmonic *svara*-s into Hindustani terms (so that *shuddh ga*, for example, is rendered as *shuddh ri*) even though this leads to cases of *mela*-s with two *ri*-s, two *ga*-s, two *dha*-s, or two *ni*-s. He also renders the "extra" notes *antara ga* and *kākali ni* in 12-note terms. *Antara ga* is consistently translated into modern *pure ga* (E). He seems more ambivalent about *kākalī ni*; though *Sāmanta mela* and *Kāmbhojī mela* are both assigned this note in the *SMK*, Bhatkhande assigns a lower (*komal*) *ni* (B♭) to the former and a higher (*shuddh*) *ni* (B) to the latter. This difference in nomenclature evidently leads to at least one typo as well—he translates the *shuddh ni* of Rāmāmātya's Revagupti *mela* (A) as a twentieth-century Hindustani *shuddh ni* (B).

[38] One problem with this assumption about the link between string length and perceived consonance is that there is more to hearing in-tuneness than just frequency. Timbre, for example, profoundly informs perceptions of consonance (Sethares 2004). Furthermore, linear fret distances on a *vīnā* are distorted by the tensing of the string; every *svara* articulation produces a triangle between the finger, the nut, and the bridge. Te Nijenhuis herself provides the most eloquent caution against putting too much stock in acoustic reconstructions: "[T]he pitch of the basic notes used in the various ragas depends solely on the instrumentalist's individual interpretation" (1974, 29).

[39] These all assume that the 9- and 13-*śruti* consonances in the *SR* correspond to the *sa-ma* and *sa-pa* consonances of Rāmāmātya and that both are roughly the same as perfect fourths and fifths, respectively.

[40] Vijayanagara's outdated construal as a "Hindu" holdout against "Muslim" invaders is hard to maintain in light of recent scholarship (Stein 1989; Wagoner 1996; Eaton 2005) that depicts a cosmopolitan medieval Deccan in which courtiers of various religions and ethnicities moved quite fluidly between courts with little regard for official religion. Rāmarāya's own grand political ambitions led him to make close strategic alliances with the rulers of the Deccan sultanates, who were mutual political rivals. Powers and Widdess speculate that augmented seconds described in the *SMK* may have been an influence from West Asian musicians (2001, 174), who may even have been in residence at Vijayanagara. The mention of *raga*-s such as *hejjuji* indicate that *maqam*-s were already being accommodated by the *rāga* system, just as previous Indo-Persian treatises had long given equivalences between *rāga*-s and *maqam*-s. For now, however, we must remain agnostic about these matters until more evidence about musical practice at Vijayanagar comes to light.

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