Two gat Forms for the sit#r: A Case Study in the Rhythmic Analysis of North Indian Music

Martin Clayton

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Two *gat* forms for the *sitār:*
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Rhythmic analysis of two major composition types (the *vilambit* gat and *madhya lay gat*) as played by the Maihar *gharānā* sitārist Deepak Choudhury, illuminates several difficult issues. In particular this analysis clarifies the relationship between these *gats* and between their performance practices, and the relationships of both to their supposed models in vocal forms. This study suggests wide-ranging applications for rhythmic analysis, in studies of the relationships between the various forms and styles of North Indian classical music, and of the techniques and processes employed in performance. While dependent on an understanding of the rhythmic principles of the music tradition, such studies can go beyond areas traditionally considered to be the domain of rhythm.

I INTRODUCTION

All music is and must be organized in time, and yet despite this self-evident fact, musicology (ethno- or not) has rarely concentrated on music's temporal processes. The study of time, as the essential element within which all music is created and perceived, has largely been neglected. There have been, of course, a few exceptions: Sachs' *Rhythm and tempo* (1953) remains a classic, and in recent years writers in various fields have begun to develop valuable analytical frameworks for the study of musical time. The work of Lerdahl and Jackendoff (1983) on the metric structure of Western tonal music is particularly valuable in this respect. This area has remained largely ignored in Indian musicology however, and excepting the work of Widdess (1981a,b) and Rowell,[1] there has been little research into the rhythmic structure of Indian music, despite several substantial studies on the repertoire of the *tablā*.[2]

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[1]See Rowell (1992) and a number of his other papers listed in the bibliography of that work.

[2]See e.g. Stewart (1974), Gottlieb (1977, 1993) and Kippen (1985, 1988).

Rhythmic analysis, in the sense in which I use the term here, is the study of how music works—how it is structured, organized and generated in time. It is the study of some of the most fundamental aspects of music, and tells us not only about the music itself but also about the culture which produces it, about the importance of universal and culturally specific factors in its organization, and ultimately perhaps about how it may be used to represent our knowledge of the world. If we can begin to understand the processes by which music is conceived, performed, perceived and understood temporally, this must add greatly to our understanding of music both as an autonomous art form and as a product of culture in a wider sense.

This paper will introduce a few of the principles and analytical techniques developed in the course of research into the rhythmic organization of North Indian classical music,[3] and concentrates on their application to a particular case study. This study demonstrates the potential of rhythmic analysis in studies of areas such as performance process and formal structure, and the historical development of and the relationships between different forms and styles (especially those between vocal and instrumental music). After a brief introduction to the rhythmic concepts and terminology of North Indian music, the case study itself will be outlined.

North Indian rhythmic concepts: an introduction

North Indian (or Hindustānī) classical music may be either unmetered (as in the introductory *ālāp*), or else organized by the highly developed metrical system known as *tāl*.[4] The term *tāl* refers both to the system in general, and to any of the cyclically repeating patterns belonging to that system. *Tāls* are usually conceptualized as a combination of a *thekā* (basic drum pattern) and a clap pattern— a recurring sequence of *tālīs* (claps) and *khālīs* (waves) used to aid time-keeping.

The first, and structurally most important, beat of a *tāl* cycle is called *sam*. The basic time unit is the *mātrā;* the most common *tāl* cycles comprise between 6 and 16 *mātrās*. The cycle (*āvart*) is subdivided into groups of several *mātrās*, termed *vibhāg* (section), each of which is marked by either a *tālī* or a *khālī* gesture. Each *tāl* structure therefore determines the relationships between three levels of pulsation, or three units of time, from the *mātrā* (the smallest) through the *vibhāg* to the cycle or *āvart* (the largest).

Tempo, in both its senses as the rate of pulsation, and the rate of rhythmic events,[5] is regulated by the concept of *lay*. These qualities are described below as '(metric) tempo' and 'rhythmic density' respectively, since the term *lay* itself may refer to either, or even to the relationship between the two. In most genres of Hindustānī music, metric tempo and/or rhythmic density accelerate substantially

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[3]See my doctoral thesis (1993).

[4]Unmetered music is described as *anibaddh* (lit.: unbound), metered as *nibaddh* (lit.: bound).

[5]Although the former sense is that usually intended by the term 'tempo', a number of musicologists prefer the latter usage, largely because it provides a more objective measure for comparative studies (see e.g. Kolinski 1959).

over the course of a performance (deceleration, where it occurs, does so only at a local level and is usually reversed). In several styles of Hindustānī music the relationship between rhythmic density and metric tempo—described here as the '*lay ratio*'—is consciously manipulated as an aspect both of rhythmic variation and of the process of acceleration. Rhythmic variation, especially but not exclusively that involving manipulation of this kind, is termed *laykārī*.[6]

Although all metrically bound music in the Hindustānī tradition is organized by the same system, *tāl*, the ways in which it is organized are surprisingly diverse; it is fair to say that the apparent homogeneity of the system conceals much of this diversity from the casual observer. Both the historical reasons for this fact, and its implications, are too complex to discuss here in any detail, although it must be borne in mind that the detailed findings of this case study cannot be assumed to apply to the tradition as a whole, or to any other particular part of it. In some respects, the rhythmic concepts discussed here are specific to the particular musical lineage or *gharānā* in question, perhaps even personal to the one musician considered. However, what can be stated with confidence is that the same analytical methods could be usefully applied to much if not all Indian music, and probably (with appropriate modifications) to other music traditions as well.

II THE CASE STUDY

This study will concentrate on two important types of instrumental composition or *gat*, as performed by an eminent sitārist. The artist in question is Deepak Choudhury (hereafter referred to as 'DC'), a senior disciple of Pandit Ravi Shankar and hence a representative of the Maihar *gharānā*,[7] and this author's teacher since 1985.

The compositional forms under scrutiny are the *madhya lay gat* and the *vilambit gat*. In DC's repertoire *madhya lay* ('medium tempo') *gats* are set in irregular *tāls*, with structures which may be described as 'additive'.[8] They are performed immediately after a full *ālāp-joṛ*, the unmetered and unaccompanied introduction to the *rāg*. *Vilambit* ('slow') *gats* are set in the quadratic *tīntāl*, and performed without an extended *ālāp*. The performer's view, as expressed to the author, is essentially that the reasoning behind the performance of these two *gat* forms in the repertoire of Maihar *gharānā* artists, is that a complete concert performance should ideally comprise items derived from all three major *gāyakīs* or vocal styles, namely *dhrupad*, *khyāl* and *ṭhumrī*. Each of the *gats* under consideration is supposedly modelled on, or at least analogous to, important stages in vocal performances in the genres *dhrupad* and *khyāl*.

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[6]The suffix *kārī* denotes "performance of an act or a doer"; see Chaturvedi and Tiwari (1986:132).

[7]For more background information on Maihar *gharānā* sitār style, see Slawek (1987).

[8]Sachs distinguished rhythm in which time is divided into unequal parts, which he called 'additive' (or 'quantitative'), from 'divisive' rhythm in which time is divided into equal parts (also called 'qualitative') (1953:24-6, 93).

This three-part principle was established by Ustad Allauddin Khan (d. 1972), the founder of the Maihar *gharānā*, who built on earlier instrumental *gat* forms in so doing. The *vilambit gat* was developed using an extant form, the *masītkhānī gat*, which was based on a fixed stroke pattern in *tīntāl* (see below). The *masītkhānī gat* was originally (from the 18th or early 19th century) performed at a moderate tempo; it was subsequently slowed down, and elements of *khyāl gāyakī* incorporated, the result being known as the *vilambit* (slow) *gat*.[9] The type of *madhya lay gat* described here was created more recently, probably within this century; the inspiration for this was the perceived need to create a medium tempo form to complement the *ālāp-joṛ*, thus completing the '*dhrupad ang*' (*dhrupad* component).

Consequently the first segment of a *sitār* recital by DC, should consist of *ālāp*, *joṛ* and a medium tempo composition (the *madhya lay gat*). This sequence is derived from the vocal genre *dhrupad-dhamār*,[10] in which the major *rāg* development precedes the introduction of *tāl*. The second item comprises a combination of slow and fast tempo compositions, analogous to the *baṛā-* and *choṭā khyāl*, in which the main *rāg* development takes place within the context of the slow tempo *tāl;* finally a lighter item (*dhun*) is performed, usually based on folk melodies and preferably incorporating some influence from *ṭhumrī gāyakī*.[11]

DC refers to these three stages as the *dhrupad ang*, *khyāl ang* and *ṭhumrī ang* respectively; *ang* means 'part', literally 'limb', hence 'component of repertory'.[12] The *madhya lay gat* belongs to the *dhrupad ang* and is held to be analogous to the *dhrupad* (or *dhamār*) composition, while the *vilambit gat* belongs to the *khyāl ang* and is similarly comparable to the *baṛā* ('great', i.e. slow) *khyāl*. These relationships are set out in figure 1.

The clearest connection between the respective instrumental and vocal forms is that described above, and illustrated in figure 1; DC's *dhrupad ang* and *khyāl ang* imitate the large-scale organization of recitals in their respective 'parent' genres.[13] Thus the vocal models provide a rationale for the arrangement of different elements in DC's recitals, suggesting the appropriate performance order for the various instrumental forms.

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[9]According to Slawek, Ravi Shankar credits this development to both Allauddin Khan and the sitārist Rameshwar Pathak (1987:19). A similar development took place at roughly the same time (probably within the first half of this century) in the Imdadkhānī *sitār gharānā* (see Hamilton 1989: e.g. 74, 175).

[10]*Dhamār* is a vocal form related to *dhrupad*, and also sung by *dhrupad* singers; hence the compounded term sometimes employed for the genre, '*dhrupad-dhamār*'.

[11]The relationship between *dhun* and *ṭhumrī* is discussed by Slawek (1987:21-2).

[12]These terms are also mentioned by Slawek (1987:20).

[13]Although in practice a variety of sequences may be used, for *khyāl* recitals in particular, the best known archetype is arguably the one given in fig. 1. Like DC's *khyāl ang*, many *khyāl* performances begin with a brief *ālāp* (similar in style to that of *dhrupad*, but shorter and less thorough).

Fig.1 *The division of DC's* sitār *repertoire into three* angs

ang	instrumental forms	vocal 'models'
dhrupad ang	a. extended *ālāp-jor*	*dhrupad*-style *ālāp*
	b. *madhya lay gat* (medium tempo composition)	*dhrupad, dhamār*
	c. (optional *drut gat,*[14] fast tempo composition)	(optional fast *dhrupad)*
khyāl ang	a. brief *ālāp* (optional)	*khyāl*-style *ālāp* (optional)
	b. *vilambit gat* (slow tempo composition)	*barā khyāl* (slow tempo *khyāl)*
	c. *drut gat* (fast tempo composition)	*choṭā khyāl* (fast tempo *khyāl)*
thumrī ang	a. *dhun*	stylized folk tune; some *thumrī* influence
	b. (optional *drut gat*)[15]	

If the performer's view is confirmed by analysis, one would expect to find a clear distinction between the performance style of the *madhya lay* and *vilambit gats*, and indications that the differences are not derived simply from the different tempi, but determined in some way by analogies with *dhrupad* and *barā khyāl*. One would expect to observe distinctions in one or more of the following areas: the use of particular *tāls;* the rhythmic structure of the *gats;* the techniques used in the improvised development; the ranges and patterns of change of both tempo and rhythmic density; and the style of drum accompaniment. The approach of the study described here was to look at each of these areas in turn. The intention was to develop rhythmic profiles of each *gat* type, incorporating the most important rhythmic parameters, and then to compare these profiles, both with each other, and with those of vocal genres.

The analytical techniques employed in this study combined appraisal of the *sitār* performance—on the basis of a knowledge of Maihar *gharānā* technique and style, and wherever possible in terms of categories found within the music culture itself—with an objective and scientific analytical approach. The principal methods employed were therefore:

a) Analysis of the *tāl* structure, taking into account both *ṭhekā* and clap pattern (see below).

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[14]Although many *dhrupad* performances also feature a fast tempo composition (usually in the 10-*mātrā sūltāl*, or the 7-*mātrā tīvrā tāl)*, the *drut gats* performed here are very similar in performance style to those in both the *khyāl* and *thumrī angs.*

[15]See above, n.14.

b) Determination of the rhythmic structure of the *gat*, based on reconstructed *bol* (stroke) patterns,[16] and its relationship to *tāl* structure.

c) Analysis of the rhythmic structure of improvised passages (again, by means of reference to *bol* patterns), and correlation of these structures with those of the *gat* and/or of the *tāl* itself. This included recognition of idiomatic rhythmic techniques, such as various types of *tihāīs* (triple repetitions), and analysis of their application, as well as consideration of the preferred rhythmic style. Rhythmic style is characterized in terms of two archetypes; these are named 'syllabic' (in which a clear relationship exists between notes and *bols*, and between both and the *tāl* structure), and 'melismatic' (in which this relationship is broken down due to the use of extended melisma, i.e. more than one note is sung or played for each text syllable or stroke).[17]

d) Measurement of *lay*, in both its aspects as metric tempo and rhythmic density, with consideration for the relationship between the two. *Lay* charts were used to clarify patterns of acceleration, and these were correlated with formal schemes of the performances studied, to illustrate the relationship between changes in tempo and those in technique.[18]

e) Analysis of the style of percussion accompaniment.

A study was carried out on a representative selection of 6 *madhya lay gat* and 5 *vilambit gat* performances by DC, comprising both concert and commercial recordings (detailed in the discography). This study concentrated on each of the areas listed above in turn, and also correlated the different parameters in order to build up a clear picture of rhythmic styles.

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[16]*Bols* are (potentially) spoken syllables, which in this context represent the strokes played on the *sitār*. There is clearly a powerful relationship between the prominence of such representation, and the traditional preference for syllabic organization and style in Indian music.

[17]An important distinction may be made in Indian classical music betwen these two rhythmic styles. The former, 'syllabic' style is typical of South Indian music and of the older North Indian vocal styles such as *dhrupad*, while the latter, 'melismatic' style is associated with more recently developed vocal genres such as the *baṛā khyāl*. This issue is discussed in more detail in my thesis (1993:45ff). See the similar use of these terms independently arrived at and applied to Beijing Opera by Wichmann (1991:265).

[18]*Lay* measurements were made with a timer application , 'HyperTimer', developed by the author using the HyperCard programme on an Apple Macintosh computer; data was processed using a spreadsheet application (Excel), which also generated the *lay* charts below (figs. 8 to 11).

III RESULTS

The results of these investigations are many and complex; those relevant to the questions under consideration are summarized below in six sections (*tāl* structure; *gat* structure; development procedures; *lay;* accompaniment style; and the correlation of rhythmic parameters), together with observations on their significance.[19]

1 Tāl *structure*

There is a clear distinction between the types of *tāl* employed in the two *gat* types. In *madhya lay gats*, DC uses a variety of *tāls* which are composed of *vibhāgs* of different lengths (eg 2+3+2+3 or 4+4+3). The most important of these, according to DC himself, are the six shown in figure 2.[20]

In contrast, all *vilambit gats* are set in *tīntāl*, in which all sections are the same length (4+4+4+4) (fig. 3).

Thus we may observe distinctions here between many *tāls* (in the *madhya lay gat*) and one *tāl* (in the *vilambit gat*), and between additive and largely asymmetrical structures on the one hand, and a divisive and symmetrical pattern on the other. The six main *tāls* used in DC's *madhya lay gat* appear to have been selected to fulfil a requirement for rhythmic complexity and diversity; there is also a significant preference for a final *vibhāg* of 3 *mātrās*. Neither of these factors applies to the *vilambit gat*, which is always set in *tīntāl*.

The selection of *tāls* does not however present a clear picture of influence from vocal genres. The greater emphasis on rhythm in DC's *madhya lay gat* is clearly evident in the greater variety and complexity of the *tāls* used, and this reflects a greater emphasis on rhythm in *dhrupad* than in *khyāl* (although, in the case of the vocal genres this emphasis is not similarly reflected in a greater variety of *tāls* used for *dhrupad*). Of DC's *madhya lay gat tāls jhaptāl, dhamār tāl,* occasionally *matta tāl* and even *rūpak tāl* may be used for *dhrupad*, and the two *savārī tāls* for the associated genre of solo *pakhāvaj* (barrel drum) performance: however, the main *dhrupad tāl,* the 12-*mātrā cautāl,* is conspicuous by its absence from this list. On the other hand although *tīntāl* is employed for *khyāls*, so too are other *tāls* (e.g. *jhūmrā tāl, ektāl*) which are not used for *vilambit gats*. Moreover, clear distinctions between the types of *tāl* structures employed, such as those noted above, are not observed between *dhrupad* and *khyāl.* Overall therefore, evidence for the influence of vocal genres on instrumental forms in *tāl* use is limited.

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[19]More detailed discussion, including transcribed music examples, is to be found in my thesis (1993:179ff).

[20]DC also occasionally performs *madhya lay gats* in a *tāl* of 13 *mātrās (jay tāl),* and in ½-*mātrā tāls* (e.g. 9½, split 4+4+1½).

Fig. 2 Tāls *used in DC's* 'dhrupad aṅg' madhya lay gat.[21]

jhaptāl: 10 *mātrās*, 2+3+2+3

X(1)	2	0	3	X
dhin nā	dhin dhin nā	tin nā	dhin dhin nā	dhin
1 2	3 4 5	6 7	8 9 10	1

rūpak tāl: 7 *mātrās*, 3+2+2

X(0)	1	2	X
tin tā tirakita	dhin nā	dhin nā	tin
1 2 3	4 5	6 7	1

matta tāl*: 9 *mātrās*, 4+2+3

X(1)	2	3	X
dhin tirakita dhin nā	tū nā	dhindhin nā,dhin dhinnā	dhin
1 2 3 4	5 6	7 8 9	1

cārtāl kī savārī (savārī tāl): 11 *mātrās*, 4+4+3

X(1)	2	3	X
dhī tirakita dhin nā	tū nā kat tā	dhīdhī nā,dhī dhīnā	dhī
1 2 3 4	5 6 7 8	9 10 11	1

pañcam savārī tāl: 15 *mātrās*, 4+4+4+3

X(1)	2	3	4	X
dhin tirakita dhin nā	tū nā kat tā	tirakita dhinnā tūnā kattā	dhindhin nā,dhin dhinnā	dhin
1 2 3 4	5 6 7 8	9 10 11 12	13 14 15	1

dhamār tāl: 14 *mātrās*, 5+5+4

X(1)	2	3	X
ka dhi ta dhi ta	dhā — ge ti ta	ti ṭa tā —	ka
1 2 3 4 5	6 7 8 9 10	11 12 13 14	1

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[21]In each *tāl* the top line illustrates the clap pattern, the bottom line the *tablā ṭhekā*. Top line symbols used are 'X' for *sam* (1st *mātrā*), numerals for *tālīs* (claps), and 0 for *khālī* (wave); vertical lines separate *vibhāgs* (sections). The repetition of X (*sam*) indicates the repeating nature of the pattern. On the bottom line, syllables represent *tablā bols* (mnemonic syllables); each *mātrā* is either filled with one stroke, or divided equally between a number of syllables grouped together in the notation. The sign — indicates a rest (absence of drum stroke), and the comma indicates a stress on the stroke following, where this stroke occurs in mid-*mātrā*; i.e. dhin = ♩, tirakita = ♫♫, — = 𝄽, dhindhin nā,dhin dhin nā = ♫♫♫ .

*The *ṭhekās* given here for *matta, savārī* and *pañcam savārī tāls* are from *tablā* player Arup Chattopadhyay (pers. comm.). The *bols* '*dhī*' and '*dhin*' are equivalent; I have reproduced them here as they were recited to me.

Fig. 3

tīntāl: 16 mātrās, 4+4+4+4

X(1)				2				0				3				X
dhā	dhin	dhin	dhā	dhā	dhin	dhin	dhā	dhā	tin	tin	tā	tā	dhin	dhin	dhā	dhā
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1

2 Gat *structure*

In both *gat* types, the fixed compositions appear to be based on idiomatic *sitār* patterns; however they are organized according to slightly different rhythmic principles. *Vilambit gat*s are almost invariably based on modified versions of the *masītkhānī gat* form (fig. 4); the *masītkhānī gat* has a stereotypical *bol* pattern, which features a 5-*mātrā mukhṛā* (anacrusis) leading up to *sam* (the first beat), and hence overlaps the *tāl* structure. This pattern was apparently created by the sitārist Masit Khan in the 18th century,[22] and therefore predates the influence of *baṛā khyāl* on instrumental *gats,* which took place largely in the 20th century.[23]

Most of DC's *madhya lay gats* are based on the *tāl* structure itself, employing relatively simple *bol* patterns and with no overlap or syncopation across the *vibhāg* divisions[24] (although with a preference for hemiola in the final *vibhāg* of 3 *mātrās*). DC has however developed a new type of *gat* in recent years which incorporates a 2½-*mātrā mukhṛā*; thus apparently transferring a feature of the *vilambit gat* to the *madhya lay gat.* Examples of these *gat* structures, in *jhaptāl*, are given in figure 5.

All the *gat* types illustrated in figures 4 and 5 are clearly idiomatic instrumental forms; in the absence of text syllables, it is the patterns of strokes (*bols*) which form the basis of their rhythmic organization. The basic pattern of the *vilambit gat* has been retained over some two centuries, and the decrease in performance tempo over this period has been compensated for by an elaboration of the basic pattern, which is particularly prominent in the *mukhṛā* (see figure 4b). Patterns for *madhya lay gats* are of more recent origin, and are clearly based in the first instance on the structure of the *tāls.* These have tended to crystallize into archetypal patterns, such as those cited above (figure 5).

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[22]See Dick (1984:394), Miner (1990:34-5).

[23]Indeed the *masītkhānī gat* dates from a period before the fashion for very slow *khyāl* performance had been established. There may have been a connection between *khyāl* and the *masītkhānī gat* at this stage (see Slawek 1987:17), but it is not directly relevant to this discussion.

[24]Except in some *gats* in *rūpak tāl;* see Clayton (1993:201)

Fig. 4 *Examples of* bol *sequences for simple and elaborated* masītkhānī gats[25]

(a) *masītkhānī gat*—the basic pattern

	3	X	2	0
// diri	da diri da ra	da da ra, diri	da diri da ra	da da ra //

(b) *masītkhānī gat*—an example of an elaborated pattern by DC[26]

	3	X	2	0
// diri	da diri da-diri dara	da da ra, diri	da diri da ra	da da diri //

Fig. 5 *Two* bol *patterns for* sitār gats *in* jhaptāl *(10* mātrās*); symbols as fig. 4*

(a) *madhya lay gat*—a typical pattern, *sam-to-sam*

X	2	0	3	X
da diri	da ra da	da diri	da- ra,da -ra	da

(b) *madhya lay gat*—a *mukhṛā* type pattern

3	X	2	0	3
// -da ra,da -ra	da diri	da ra da	da ra,da	//

If the influence of vocal genres were to be felt, certain features of the '*dhrupad aṅg*' gats might be expected to provide a connection with the typical *dhrupad* practice, of setting *cautāl* compositions with a textual/melodic grouping of 3+3+3+3 against a *tāl* structure of 4+4+2+2 (see Widdess 1981a:137). This is not the case: evidently, the influence of *dhrupad* does not extend into this type of contra-metrical composition structure—indeed, DC does not use *cautāl* at all for *madhya lay gats*. In *baṛā khyāl* compositions, the most prominent aspect of the rhythmic structure is the *mukhṛā*, which is a feature also observed in the *vilambit gat*. However, since almost all fast tempo *khyāls*, and many *dhrupads* and *ṭhumrīs*, also feature *mukhṛās*, we must be careful not to read too much into this feature. The use of the *mukhṛā*

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[25] da = inward stroke, ra = outward stroke, diri = da+ra, in the time previously occupied by a single stroke. The *mukhṛā* is italicized; the signs //.....// denote the beginning and end of the sequence (ie. repeat marks).

[26] This example is transcribed from a *vilambit gat* by DC in *rāg jaunpurī* (see Clayton 1993:227); there are many other possibilities.

does not necessarily imply the influence of *baṛā khyāl*, especially as the *masītkhānī gat* pattern appears to predate that influence.[27]

The structures of the *gats* themselves confirm their histories: the *vilambit gat* developed through adaptation of an earlier form, while the *madhya lay gat* was composed relatively recently on the basis of the *tāl* structure, and is at an earlier stage in its development. Once again therefore, evidence for the influence of vocal genres is less than overwhelming, although the analysis has been productive in other ways.

3 Development procedures

In both *gat* types, a rough distinction may be drawn between development techniques and procedures that are suited to a low rhythmic density and immediately follow the statement of the *gat sthāyī* (first section of the gat), and those that are suited to higher rhythmic densities and are therefore employed towards the end of the performance—although in practice no clear division is made. Since in the *khyāl aṅg, rāg* development occurs within the metered form, the melismatic *vistār* (the 'spreading out' of the *rāg*)[28] has an important place in the early stages of DC's *vilambit gat* development. At a comparable stage in the *madhya lay gat,* the technique employed by DC, loosely termed '*toḍā*', involves the generation of new rhythmic and melodic combinations based on material already introduced.[29] The *vilambit gat vistār* is comparable to the *vistār* in some styles of *baṛā khyāl*; the *toḍā* of medium tempo compositions is, arguably, similarly analogous to the *bol bā̃ṭ* ('text division') procedures typical of *dhrupad* performance.

At a later stage and at faster tempi, however, *ekhārā tāns* (fast runs with one note per stroke) are performed in both *gats*. In *vilambit gats* the normal '*lay* ratio' (maximum rhythmic density ÷ metric tempo) for *tāns* is 8:1, with occasional bursts of up to 12:1.[30] In *madhya lay gats* the normal *lay* ratio for *tāns* is 4:1, with some extra-fast passages of 6:1 or even 8:1. This reflects the preference for fast *tāns* in *sitār* performances of all *gat* types; in vocal music they occur principally in *khyāl*.

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[27]Another difference between *baṛā khyāl* and the *vilambit gat* is in the adjustment of the *mukhṛā* to slow tempi; in *baṛā khyāl* as a general rule, the slower the tempo the fewer *mātrās* the *mukhṛā* takes up—in this way the variability of both the rhythmic pattern and density are limited. In the *vilambit gat* the *mukhṛā* always takes up 5 *mātrās*; the slower the tempo, the more elaborated the pattern becomes.

[28]*Vistār* is used in both a general sense, meaning 'expansion' or 'development' and—as here—in a more specific sense to refer to *rāg* exposition in melismatic style. Some musicians prefer the term *baṛhat* (lit.: increase, expansion) in both these senses, or either *ālāp* or *ālapti* in the latter, more limited sense only.

[29]*Toḍā*, like *vistār*, has a range of senses. Specifically it refers to development based on stereotypical *bol* patterns which combine single and double strokes; more generally to any development in a syllabic style (as here). In DC's *madhya lay gat, toḍā* refers to the generation of new rhythmic combinations, using melodic material already introduced in the foregoing *ālāp*. There is a considerable degree of overlap between the usage of the terms *toḍā, vistār* and *baṛhat*.

[30]I.e. a maximum of 8 or 12 *bols* per *mātrā*. I have avoided introducing terminology for these *lay* ratios here for the sake of brevity; see my thesis (1993:147-9), or Gottlieb (1977:42-5, or 1993:37-41).

The transition from *vistār* or *toḍā* through to *tāns* is smoothly effected in both cases, by means of a progression through various intermediate *lay* ratios—this progression is a notable feature of Maihar *gharānā* style. In *vilambit gats* the progression from the point at which this ratio becomes clear (as it is not in the early stages of *vistār*) may be 4:1–(5:1)–6:1–(7:1)–8:1;[31] in *madhya lay gats* it would be 2:1–3:1–(7:2)–4:1 (against a metric tempo twice as high as that of the *vilambit gat*). In both cases these levels are used in a more systematic way than in either *khyāl* or *dhrupad* performance, and in fact such use is largely the result of influence from solo percussion repertoires and from South Indian music (on Ravi Shankar in particular). The process of stepwise acceleration is an important feature of DC's performance style, usually described as an aspect of *laykārī.*

Other aspects of development technique may be considered, in addition to the preference for *toḍā* (emphasis on rhythm and stroke patterns, syllabic in style) or *vistār* (emphasis on melody and fluid continuity, melismatic in style), or the common use of *tāns* and of South Indian-influenced '*laykārī*' (stepwise acceleration).[32] In any *gat* form, following the initial statement of the *gat* itself (usually in fact following the *sthāyī* or first section only), the improvised development is organized into 'episodes' separated by refrains consisting of repeated statements of the first line of the *gat sthāyī*.[33] The way in which development processes are integrated with this episodic performance structure is clearly important.

Episodes of development may start from any point and in many different ways; a pattern is more discernible in the way in which improvised episodes end, and link back to the *gat* refrain. In all cases this transition from improvisation episode to fixed refrain is effected as smoothly as possible. In the *vilambit gat*, both *vistār* and *tāns* link back either to the *sam* or to the start of the *mukhṛā*. In a large proportion of cases this link involves a *tihāī* (a phrase repeated three times), calculated to end on *sam* or before the *mukhṛā*, or to elide with the start of the *mukhṛā*. *Tihāīs* are also common in the *madhya lay gat*. In the case of simple *gats* which run *sam-to-sam* (see fig. 5a), they generally end on *sam* itself; where the *gat* includes a *mukhṛā* (see fig. 5b) they more often conclude just before the *mukhṛā* begins.[34]

The use of potentially complex rhythmic techniques such as *tihāīs* may suggest *dhrupad* influence, since there is generally more emphasis on rhythmic virtuosity in *dhrupad* than in *khyāl* performance. However a comparison with *dhrupad* performance reveals that, as with the technique of stepwise acceleration ('*laykārī*'), the *tihāī* is employed far more in both *gat* styles than it is in *dhrupad*. This suggests that the main inspiration for this high usage of *tihāīs* in *sitār gats* also lies elsewhere.

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[31]*Lay* ratios in parentheses are optional.

[32]South Indian terms for changes in subdivision of the *tāl* pulse (ie. *lay* ratio) include *gati (bheda)* and *naḍai (svara)*. See Sambamoorthy (1964:100), Shankar (1974:90 or Frishman (1985:2).

[33]Or in some circumstances the first line of the final section, the *antarā*.

[34]*Tablā* player Bikram Ghosh describes this style of improvisation—ending just before the *mukhṛā* begins—as the '*muqām*' style (pers. comm.). *Muqām* means literally 'halting place' (Chaturvedi and Tiwari 1983:606).

The most probable sources are the repertoires of the drums *pakhāvaj* and *tablā,* of the *kathak* dance and even possibly of South Indian music; in all these cases *tihāīs* are used extensively.[35]

Therefore study of development procedures in these two types of *gat* provides evidence for the influence of the vocal models (in the distinction between techniques and styles of *toḍā* and *vistār*); for mutual influence (in the use of *tāns,* a *khyāl* feature, in the *madhya lay gat*); and for influence from other sources (the use of *laykārī,* and of *tihāīs*). Although the evidence for the modelling on vocal forms is modest, the analysis highlights a number of other interesting issues.

4 Lay

Analysis of *lay* includes measurement of tempo (and recognition of patterns of variation), calculation of rhythmic density, and recognition of the relationship between the two. Firstly, tempo ranges of *madhya lay gats* are considerably higher than those of *vilambit gats,* with maxima approximately double, as figure 6 shows. This evidence serves to confirm the information given in the names of the *gat* types—the *vilambit gat* is slow, the *madhya lay gat* performed at medium tempo. Measurements for rhythmic density are perhaps more interesting however. In the early stages of the improvised development (immediately following the statement of the *gat sthāyī*), a calculation based on the number of *bols* (strokes) in each cycle[36] reveals that the average *bol* density is much lower in *vilambit* than in *madhya lay gats* (in fact, it is approximately half). This confirms that the rhythmic style of the former is more melismatic, as described above: one would expect that a more melismatic style would use fewer strokes per minute, and this is precisely what the figures show.

Fig. 6   Tempo ranges for vilambit *and* madhya lay gats, *as performed by DC* [37]

composition type	range of tempo (MM)
vilambit gat	32-92 [38]
madhya lay gat	85-180 [39]

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[35]In South Indian music they are known as *mora.*

[36]I.e. number of *bols* in cycle ÷ length of cycle (in secs) x 60 = average *bol* density.

[37]The ranges given are from the lowest initial tempo to the highest final tempo.

[38]Based on a sample of 5 performances; see discography.

[39]Based on a sample of 6 performances; see discography.

By the second half of the performance however, rhythmic density levels are almost identical.[40] The reason for this is that while the technique and rhythmic style of the performance are quite different in the early stages of the development, in the latter stages they are basically the same; fast *tāns* are performed. Figures taken from one example of each *gat* type are given in figure 7.

Fig. 7 Lay *measurements for two* gat *performances by DC*

	rāg Bhaṭiyār vilambit gat tīntāl	rāg Pūriyā madhya lay gat jhaptāl
tempo:	43-82 MM	89-160 MM
average rhythmic density (initial development):	67-90 *bols/*min	110-185 *bols/*min
maximum rhythmic density (tāns):	290-656 *bols/*min	294-640 *bols/*min

This pattern is not found in the vocal genres, since *tāns* are exclusive to *khyāl*. In the later stages of a performance, rhythmic densities are higher in most *khyāl* performances than in *dhrupad*, whereas they are very similar in the two *gat* forms.

Acceleration patterns for the two *gat* types are remarkably similar; in the earlier part of the performance rhythmic density increases over a more or less constant tempo, in the later the tempo increases by a number of significant, and clearly deliberate, increments. Patterns of tempo change are illustrated in figures 8 and 9 with respect to two typical performances, one for each *gat* type. The patterns for *vilambit* and *madhya lay gats* are very similar to each other; they are derived from neither *dhrupad* nor *khyāl*, although they are certainly more similar to those of *khyāl* performances. Analysis of sample performances suggests that tempo in *dhrupad* performances does generally accelerate significantly, although never by clear and deliberate increments (the acceleration is a gradual and possibly unconscious process). *Khyāl* performances often retain very steady metric tempi for long periods, but do often include stepped increases in tempo as well.[41] This indicator gives useful corroborating evidence of the similarities in performance practice between the two *gat* types. Overall the results of the analysis of *lay* corroborate the earlier findings—that is, that while there are some indications of the influence of vocal forms, a number of other factors are equally important.

[40]At this stage maximum rhythmic densities were calculated by multiplying the metric tempo by the *lay* ratio (e.g. if *tāns* were performed with a *lay* ratio of 8:1 at a tempo of 60MM, the maximum rhythmic density would be calculated as 60x8 = 480 *bols/*min).

[41]See Clayton 1993:97ff.

Fig. 8 Lay *(metric tempo) chart for a* vilambit gat *performance of* rāg Bhaṭiyār *in* tīntāl, *by DC*
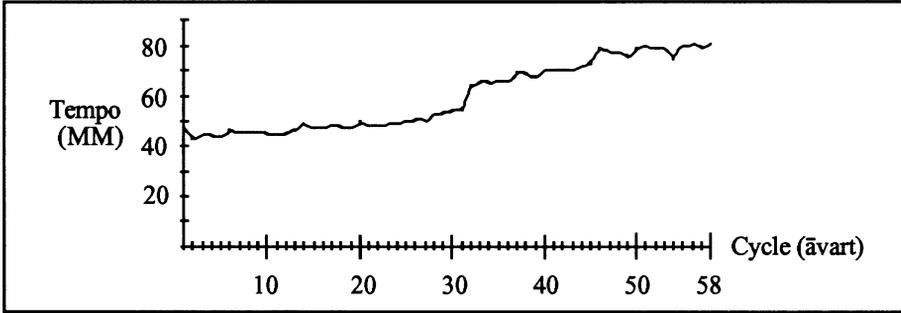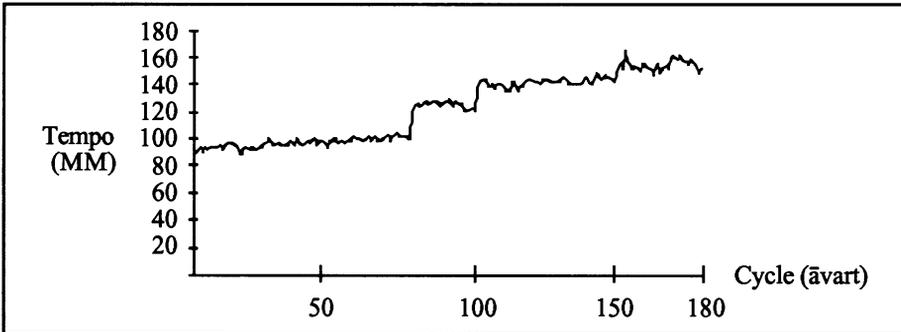

Fig. 9 Lay *(metric tempo) chart for a* madhya lay gat *performance of* rāg Pūriyā *in* jhaptāl, *by DC* [42]

5 Accompaniment style

The style of *tablā* accompaniment is almost identical in DC's *madhya lay* and *vilambit gats*. The *tablā* plays the *ṭhekā* in an elaborated form throughout, except when playing solos to the accompaniment of the *gat sthāyī* played as a refrain. This accompaniment style is similar to that of *khyāl*, in which the *ṭhekā* is used for a very high proportion of the performance, but with a greater allowance for *tablā* solos. The only concession to *dhrupad* style accompaniment (as played on the *pakhāvaj*) is in a brief episode of *sāth saṅgat* ('synchronized accompaniment'[43]) with which

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[42]NB: the greater fluctuation in this chart (compared to fig. 8) is caused by the greater sampling rate, since the error in timings is proportionally higher for the shorter and faster *tāl* cycles of the *madhya lay gat.*

[43]Also referred to as *laṛant* ('fighting') accompaniment. See Kippen 1988:102.

DC's *madhya lay gat* performances are usually concluded. This is a feature included no doubt as the result of a conscious attempt to imitate *dhrupad* practice.[44]

6 Correlation of rhythmic parameters

So far this discussion has focussed on five distinct areas; *tāl* use and structure; *gat* structure; development technique and style; *lay* (tempo and rhythmic density) and the style of percussion accompaniment. Although it is convenient and effective to divide the analysis according to rhythmic parameters in this way, it must be emphasized that all these factors must necessarily be interdependent; each is dependent on the others, and a change in one would have inevitable knock-on effects.

Connections between the parameters are many. The simplest way for some of these to be illustrated is graphically, as in figures 10 and 11. Using tempo charts as the base line, a second trace has been added, using the calculations of rhythmic density described above. Aligned with these charts are lines illustrating the alternation of *gat*, improvised development and refrain in the *sitār* part, the stage of performance and techniques employed including *tihāīs*, and the *lay* ratio. In this way, both the overall progression and acceleration process, and the episodic performance structure are made clear; so too are changes in technique and *laykārī* correlated with the measured changes in *lay*. Two charts are given here, one from a *madhya lay gat* (fig. 10) and the other a *vilambit gat* (fig. 11).

These charts not only allow different rhythmic parameters to be correlated, they also graphically illustrate the similarities and differences between performance styles. Not only are patterns of tempo and rhythmic density increase rather similar (except that the rhythmic density in the *vilambit gat* starts lower, yet reaches the same maximum); so too is the episodic structure of the performance, in which *tablā* solos intersperse development episodes.[45] In both cases the *sthāyī* only is stated at the beginning, and the *antarā* introduced after two episodes of development. Both performances start with one or two strokes per *mātrā* (a similar *lay* ratio), and both end with very similar rhythmic densities (but with different *lay* ratios). Both feature at least two significant accelerations by the soloist (and the *vilambit gat* performance has several others due to the *tablā* player accelerating for his solo interludes). Both also last approximately the same time, although this is slightly misleading since *vilambit gat* performances tend on the whole to be longer.

The differences are the more melismatic style of the *vilambit gat* (illustrated here through the lower rhythmic densities in the early part of the performance), and the greater number of *lay* ratios employed there (due to the need to shift from a lower rhythmic density than the *madhya lay gat* to the same maximum). Surprisingly, given the otherwise greater emphasis on rhythm in the *madhya lay gat*, of these two examples the *vilambit gat* actually employs more *tihāīs* than the *madhya lay gat*. One

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[44]Some musicians believe that the selection of *tablā bols* in *madhya lay gat* accompaniment is, or should be, limited to those derived from the *pakhāvaj*, but this lies beyond the scope of this paper.

[45]This episodic structure is also described, in slightly different terms, by Wade (1984:41).

possible explanation for this is that the cycle of *jhaptāl* in the latter performance is so short (c. 4–6.5 sec.) that *tihāīs* must either be very short, or they must cover more than one cycle, as does the ending *nauhār tihāī*. In the cycle of *vilambit tīntāl* (12–22 sec.) on the other hand, there is enough time for a substantial *tihāī* leading to either the *mukhṛā* or *sam,* and this partly explains the high number counted. Therefore the comparison between the charts points to considerable similarity between the performance styles, besides confirming the significant difference in approach at the early stages of the development.

A number of features are illustrated clearly in both charts. These include the association of the first significant increase in tempo with the switch to *tāns* (in the case of the *vilambit gat* in figure 11, the acceleration actually follows the first burst of 8:1 *tāns*), the use of a stepwise increase in *lay* ratio to raise the rhythmic density to a suitable level for fast *tāns*, and the episodic structure common to both performances. Useful as these charts are however, they cannot illustrate all the important rhythmic parameters, nor can they illustrate connections with vocal genres. In order to compare a wider range of rhythmic parameters—not only *madhya lay* versus *vilambit gat,* but also each of these versus its vocal 'model', the most important parameters are set out in figure 12.

In this chart the comparison may be made between the four columns, and it is clear that in several respects the *gat* forms do appear to correlate with their vocal 'models' (see rows 2,3,5,14 and possibly 10,15 and 16). However, in other cases the *gats* compare more closely with each other (see rows 7,8,12,13 and possibly 15), or demonstrate the influence of some other source (such as South Indian music), or in some cases present a situation too complicated to be summarized simply (rows 4,11). In this way the search for correlations with vocal music not only provides evidence of exactly that, but also of mutual influence between the *gat* forms, of the independent development of instrumental music, and of the influence from other sources on both *gats.*

IV CONCLUSIONS

The aim of the rhythmic analysis summarized above was to look for evidence to support the view that these two *gat* forms were in some sense modelled on two analogous vocal forms. Differences in performance practice were recognized and analysed, with a view to determining whether they may be associated with the influence of vocal genres (and not simply due to, say, the differences in performance tempo). Evidence to support DC's contention on vocal influence included the difference in metric tempo, the presence of melismatic *vistār* in the *vilambit gat* and the relatively syllabic style of the *madhya lay gat,* and the *bol* density calculations which confirm the more melismatic style of the slow *gat.* The use of the *mukhṛā* in the *vilambit gat,* and the limited use of *sāth saṅgat* in the *madhya lay gat* accompaniment, may also be cited as possible evidence for the influence of vocal genres. However, the areas in which the vocal genres most clearly exert influence are in the large scale organization (particularly in the fact that, as in *khyāl, rāg* development in the *khyāl aṅg* is concentrated in the metered

section); and in a greater emphasis on rhythm in the *dhrupad ang* (although in several respects its realization is different from that in *dhrupad*).

Fig. 10 *A correlation of rhythmic features of a performance of a* madhya lay gat *in* rāg Pūriyā *by DC, in* jhaptāl[46]

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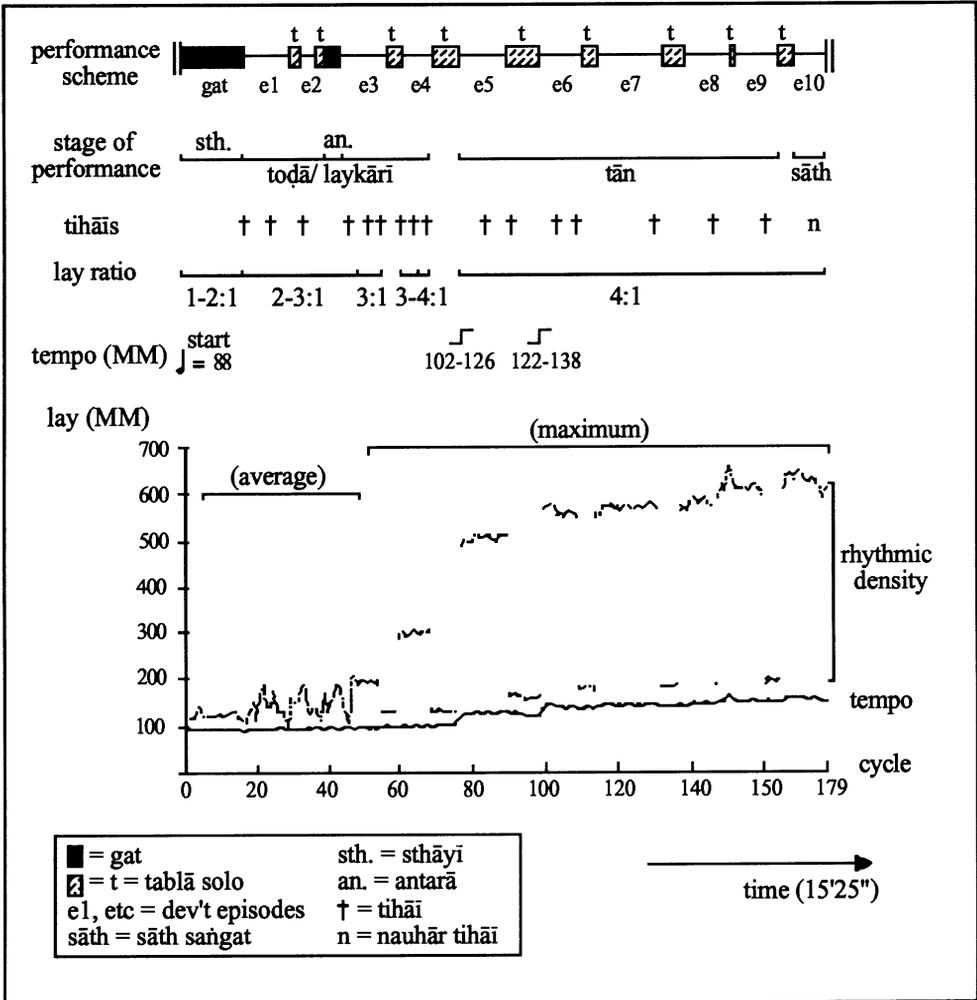
[46]The *nauhār tihāī* is a variety in which each phrase (ie. each third) of the *tihāī* itself consists of a shorter *tihāī*. The *nauhār* therefore concludes on the ninth repetition (*nau* = nine). This is closely related to another variety called the *cakkardār* (lit.: with a spin, spiral), in which each phrase of the *tihāī* consists of a short phrase plus a *tihāī*.

Fig. 11 *A correlation of rhythmic features of a performance of a* vilambit gat *in* rāg Bhaṭiyār *by DC, in* tīntāl
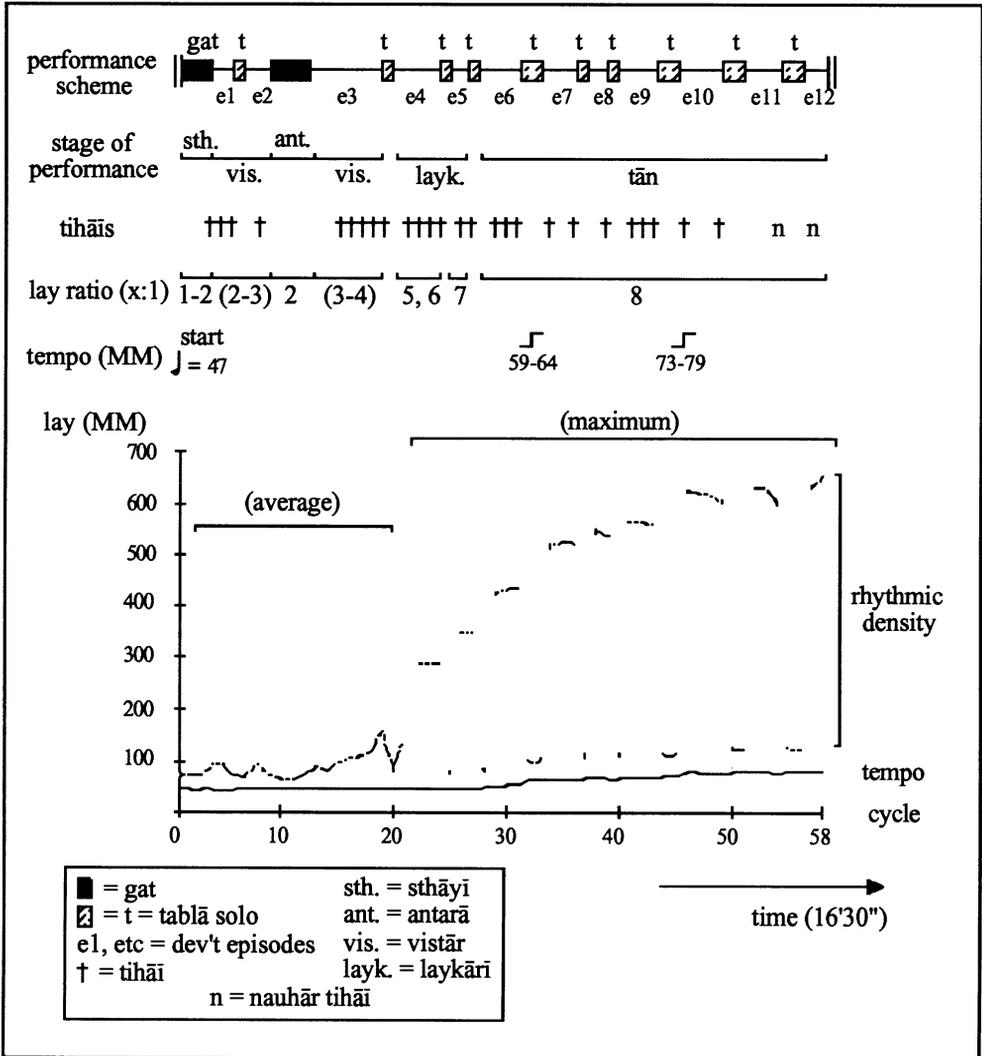
Fig. 12 *A comparison of rhythmic parameters between dhrupad, baṛā khyāl, and DC's madhya lay gat and vilambit gat*

1	dhrupad (dhamār)	madhya lay gat (dhrupad aṅg)	vilambit gat (khyāl aṅg)	baṛā khyāl
2 vocal influence	n/a	said to be analogous to *dhrupad*	said to be analogous to *baṛā khyāl*	n/a
3 performance context	follows full *ālāp* sometimes precedes fast *dhrupad*	follows full *ālāp-joṛ* sometimes precedes *drut gat*	follows *aochār* (brief *ālāp*); precedes *drut gat*	begins recital or follows brief *ālāp* precedes *choṭā khyāl*
4 principal *tāls*	*cautāl* (4422), *jhaptāl* (2323), *dhamār tāl* (554)	*jhaptāl* (2323), *rūpak tāl* (322), *cārtāl ki savārī* (443), *pañcam savārī tāl* (4443), *matta tāl* (423), *dhamār tāl* (554)	*tīntāl* (4444)	*ektāl* (4422), *jhūmrā tāl* (3434), *tīntāl/tilvāḍā tāl* (4444)
5 *lay* (tempo)[1]	47-128 MM	85-180 MM	32-92 MM	10.7-60 MM
6 *lay* (average rhythmic density)[2]	n/a	110-185 *bols*/min	67-90 *bols*/min	n/a
7 *lay* (maximum rhythmic density)	up to 256 *bols*/min	294-640 *bols*/min	290-656 *bols*/min	up to 378 *bols*/min
8 *lay* (acceleration pattern)	most common: gradual acceleration. in some passages, tempo constant or with wide fluctuation.	starts stable, stepped acceleration around change to *tān* phase and one or more further increases.	(as *madhya lay gat*)	most common: constant, or gradual acceleration. stepped acceleration to *tāns* in some styles.
9 *lay* ratios used (those in parentheses optional)	most common: 2:1, (3:1), 4:1	2:1, 3:1, 4:1 (and 4:3, 5:2, 7:2, 6:1, 8:1 occasionally)	3:1, 4:1, (5:1), 6:1, (7:1), 8:1, (12:1)	most common: 4:1, (6:1) and 8:1 against perceived pulse (up to 32:1 against *mātrā*)

10 *bandiś* or *gat* structure	syllabic, cover whole cycle	syllabic, cover whole cycle	syllabic, cover whole cycle (with some melisma interpolated)	melismatic, except more syllabic *mukhṛā*.
11	either *sam-to-sam* or with *mukhṛā*. *cautāl bandiśes* often with contra-metric setting.	either *sam-to-sam*, or with 2½ *mātrā mukhṛā*. most *tāl*-based, some syncopated.	most based on modified *masītkhānī gat* (with 5 *mātrā mukhṛā*).	many styles use *bandiśes* with the only recognisable 'structure' in the *mukhṛā*, the remainder improvised.
12 formal scheme of performance (development techniques)	1. *Bandiś* (composition) statement.	1. *Gat (sthāyī)* statement	1. *Gat (sthāyī)* statement	1. *Bandiś* statement (usually *sthāyī* only).
13	2. Development (*upaj*): episodic.	2. Development: episodic, with *tablā* solos accompanied by *sitār gat*.	2. Development: episodic, with *tablā* solos accompanied by *sitār gat*.	2. Development: episodic, with the *bandiś mukhṛā* as refrain.
14	consists of *bol bāṭ*; syllabic, text-based rhythmic development.	starts with syllabic rhythmic development (*toḍā, laykārī*). *gat antarā* follows.	starts with *rāg* development (*vistār*). *gat antarā* follows.	starts with melismatic *vistār* (*baṛhat, ālāp*). *bandiś antarā* usually follows once upper Sa reached.
15	rhythmic density increases, but no *tāns*.	*tāns* in 4:1 in latter part of performance.	*tāns* in 8:1 in latter part of performance.	fast *tāns* in latter part of performance.
16	accompanied by combination of *thekā*, *pakhāvaj* solo , and *sāth saṅgat*.	ends with episode of *sāth saṅgat*.	no *sāth saṅgat*.	

[1]Figures refer to the sample of performances cited in the discography, unless otherwise stated.

[2]Average and maximum rhythmic densities are taken from the two *gat* performances illustrated in figure 7 above; those for vocal genres are based on the performances cited in the discography.

Against this evidence, however, must be set the use of *tāns* in both genres (reflected in the near-identical maximum rhythmic densities), extensive use of *tihāīs* and of South Indian-influenced *laykārī* techniques, and a common accompaniment style. These factors, and others such as DC's recent introduction of *mukhṛās* into his *madhya lay gats*, suggest both the diversity of influences brought to bear on the *gat* forms, and a powerful tendency to mutual influence, illustrating the difficulty for a creative artist in limiting cross-fertilization between theoretically distinct forms.

It is clearly not the case that the *gats* are intended as literal imitations of the vocal genres. This is inevitable, since a number of factors would render imitations of vocal forms on *sitār* less than satisfying. The loss of the text and its meaning might be felt to diminish the music, unless it were compensated for—as it is here by a greater rhythmic complexity in both *gat* forms. Moreover, and perhaps more importantly, the severe lack of sustain of the *sitār* relative to the voice means that this must be balanced by a higher rhythmic density; consequently, differences in rhythmic style between vocal and instrumental music are inevitable.

The development of the *vilambit* and *madhya lay gats* as part of the *khyāl* and *dhrupad aṅgs* respectively has succeeded in generating diversity and rhythmic interest in the Maihar *gharānā sitār* repertoire. However, each of the *gat* forms has continued to develop, and various forces are felt which continue to influence that development, of which three are particularly important: (1) the retention of certain elements which suggest the influence of the vocal forms (as perhaps initially envisaged); (2) the inevitable cross-fertilization of techniques and structural elements between *gats*; and (3) the adoption of elements from sources other than the two stated vocal genres. The later historical development of these *gats* may be understood to a great extent as the result of the interaction of these factors.

This study shows how investigation of the information available within the oral tradition led to a productive analysis. Although the main thrust of that tradition (at least in DC's interpretation)—that the difference in performance styles between the *gats* was due principally to their different origins in vocal forms—could be only partially confirmed, this undoubtedly remains an important factor. The investigation also brought to light other factors contributing to the complicated pattern of historical development of these *gats*, such as mutual influence between the different forms, and influence from other quarters such as the percussion repertoire and South Indian music. As had been hoped, rhythmic analysis proved to be a powerful tool in this investigation.

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INTERVIEWS AND PERSONAL COMMUNICATIONS

Chattopadhyay, Arup (*tablā* player); pers. comm. (ix/91)
Choudhury, Deepak (sitārist); pers. comm.
Choudhury, Swapan (*tablā* player); pers. comm. (xii/90)
Ghosh, Bikram (*tablā* player); pers. comm. (xi/92)

SELECT DISCOGRAPHY

1. Deepak Choudhury (sitār); *madhya lay gats*
* Arup Chattopadhyay (tablā); Rāg Pūriyā *jhaptāl* London concert 7/9/91
Arup Chattopadhyay (tablā); Rāg Bhīmpalāsī *rūpak tāl* London concert 6/10/91
Arup Chattopadhyay (tablā); Rāg Jog *cārtāl kī savārī* Middlesborough concert 22/9/91
Arup Chattopadhyay (tablā); Rāg Rāgeśrī *matta tāl* London concert 20/9/91
Arup Chattopadhyay (tablā); Rāg Tilak Kāmod *rūpak tāl* Birmingham concert 17/9/91
Kumar Bose (tablā); Rāg Bāgeśrī *jhaptāl* Concord 05-011 [cass., 1989]

2. Deepak Choudhury (sitār); *vilambit gats*
* Swapan Choudhury (tablā); Rāg Bhaṭiyār *tīntāl* Concord 05-021 [cass., 1991]
Arup Chattopadhyay (tablā); Rāg Kedārā *tīntāl* London concert 20/9/91
Arup Chattopadhyay (tablā); Rāg Tilak Kāmod *tīntāl* London concert 27/11/90
Kumar Bose (tablā); Rāg Bhairavī *tīntāl* Concord 05-011 [cass., 1989]
Sabir Khan (tablā); Rāg Basant Pañcam *tīntāl* Durgapur concert 19/1/91

3. *Dhrupad* performances (used for *lay* measurements)

Dagar Brothers [Aminuddin and Moinuddin Dagar] (vocal); S.V.Patwardhan (pakhāvaj) Rāg Aḍānā *cautāl;* Rāg Darbārī Kanaḍā *dhamār tāl* EMI EALP1291 [disc, 1965]

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Ginde, K G (vocal); Arjun Shejwal (pakh.) Rāg Hiṇḍol *dhamār tāl* EMI PSLP 1365 [disc, 1985]

Ginde, K G & S C R Bhatt (vocal); Arjun Shejwal (pakh.); Anant Kunte (sāraṅgī); Baban Manjrekar (harm.) Rāg Darbārī Kanaḍā *cautāl* Swarashree GB001 [cass., 1983]

Malik, Bidur [Vidur] (vocal); Ram Kumar Malik, Prem Kumar Malik (vocal); Ramji Upadhyay (pakh.) Rāg Jayant Malhār *cautāl* and *dhamār tal* [unpub. cass., Vrindaban concert 1982 (coll. R. Widdess)] Rāg Yaman *dhamār tāl* [unpub. cass., London concert 11/5/93]

Sanyal, Ritvik (vocal); Ashok Tagore (pakh.) Rāg Bāgeśrī *dhamār tāl* [unpub. cass., London concert 1987]

4. *Baṛā khyāl* performances (used for *lay* measurements)

Ameer [Amir] Khan (vocal); ? (tablā) Rāg Mārvā *jhūmrā tāl* EMI EALP1253 [disc, n.d.]

Amonkar, Kishori (vocal); Narayanrao Indorekar (tablā); Masit Khan (sāraṅgī) Rāg Jaunpurī *tīntāl (vilambit)* EMI ECLP 2326 [disc, 1967]

Bade Ghulam Ali Khan (vocal); Munawar Ali Khan (vocal); Nizamuddin (tablā); Shakoor Khan (sāraṅgī) Rāg Rāgeśrī *jhūmrā tāl* EMI ECLP 41562 [disc, 1984]

Joshi, Bhimsen (vocal); Vasant Achrekar (tablā) Rāg Puriyā *ektāl (vilambit)* EMI EASD 1513 [disc, 1973]

Kashalkar, Ulhas (vocal); Suresh Talwalkar (tablā), Govind Patwardhan (harmonium) Rāg Basant Bahār *tīntāl (vilambit)* HMV STCS04B 7449 [cass., 1990]

Mansur, Malikarjun (vocal); Rajshekhar Mansur (vocal), Balkrishna Iyer (tablā), Baban Manjrekar (harmonium) Rāg Yemenī Bilāval *tīntāl (vilambit)* EMI PSLP 1312 [disc, 1986]

Pandit Jasraj (vocal); ? (tablā), ? (harmonium) Rāg Miyān-kī-Toḍī *ektāl (vilambit)* Swarashree PJ0001 [disc, 1988]

Sahasrabuddhe, Veena (vocal); Vinayak Phatak (tablā); Vishwanath Kanhere (harmonium) Rāg Basant *vilambit ektāl* Rhythm House 240 401 [cass., 1990]

Talwalkar, Padma (vocal); Suresh Talwalkar (tablā); Anant Kunte (sāraṅgī); Babanrao Manjrekar (harmonium) Rāg Basant *jhūmrā tāl* Swarashree XPT00001 [cass., 1989]

Vyas, C R (vocal); Trimbak Jadhav (tablā), Purushottam Walavalkar (harmonium) Rāg Maluha Kedār *tilvāḍā tāl* Swarashree CV001 [cass., n.d.]