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## **A Way to Play Indian Songs by using mostly Suddha Notes**

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### **Abstract**

*There are ten main scales in North Indian Music. Bollywood and other songs are based upon these scales. The notes of these scales come from a chromatic scale which contains twelve notes (seven suddha\* notes “S R G m P D N,” four komal notes “r g d n” and one tivra note “M”). We find that there is a pattern in the formation of all these scales from Bilawal scale. This pattern offers an insight into the formation of the scales. Although these scales consist of different combinations of the twelve notes, all scales, except one, can be formed by rearranging and transposing† subsets of nine notes “S R G m M P D n N.” The remaining three notes of the chromatic scale “r g d” are not needed. Only one of the scales requires an additional note from the chromatic scale in its formation.*

*Since all scales, except one, can be formed from the nine notes, the songs based on the scales can also be played from this set of nine notes, which contains mostly suddha notes. This reduction in the number of notes involved from twelve to nine offers a significant simplification in developing fingering patterns that are required for playing the songs. However, this simplification comes at a cost – the song will get transposed (will shift in pitch). This happens because these notes have not gone through the transposition step in the formation of the scales. In case of electronic musical instruments with a transpose feature, one can easily eliminate this shift in pitch. For instruments without a transpose feature, if one develops fingering patterns for the nine notes, at three different transpose levels, then one can keep this shift in pitch within two semitones. The simplified approach presented is intended for those who want to play musical instruments for fun.*

**Keywords:** Formation of Indian Musical Scales, Foundation of Indian Thaats (Scales), Relationships between Indian Thaats (Scales), Playing Bollywood Songs, Playing Indian Songs.

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\* Suddha means natural, komal means flat, and tivra means sharp.

† Transpose means to move up or down all notes by the same amount (number of semitones).

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There are ten main scales in North Indian Music <sup>[1, 2]</sup>. Bollywood and other songs are based upon these scales. These scales are composed from a chromatic scale which contains twelve notes (seven suddha notes, “*S R G m P D N*,” four komal notes “*r g d n*” and one tivra note “*M*”). Each of the scales has its own combination of suddha, komal and tivra notes as their main notes. A variety of relationships between these scales have been reported in the literature <sup>[2-6]</sup>. These are useful in understanding the scales and are based on the notes that these scales contain. In other words, they show how the finished products are related to each other. In this paper, a pattern that exists in the *formation of all* scales from Bilawal scale is presented. This pattern offers an insight into the formation of the scales, shows their distinguishing features, and offers a practical advantage as indicated below.

To play songs based on these scales on a musical instrument requires one to learn a fingering pattern for each of the scale. These scales may need to be played at different transpose levels. Thus, several fingering patterns may need to be developed. Keeping track of the version (suddha versus komal/tivra) of the five notes to be used in each song, and ascending/descending through this maze of notes is not easy especially in case of the wind instruments. By examining the formation of these scales, this paper shows that the maze (zig-zag path) can be simplified. Since the scales can be formed by rearranging and transposing subsets of a set of mainly suddha notes, songs based on the scales can also be played by using those subsets and thus the playing of songs can be made easier. We show that if one has developed a fingering pattern to play the seven suddha notes, by adding only two notes, namely, *M* (tivra *Ma*) and *n* (komal *Ni*), to one’s fingering pattern, one can play songs from nine out of the ten scales. The remaining three komal notes of the scale “*r, g, d*” are not needed. This is possible of course, if one is okay with playing the songs that have shifted/changed in pitch. However, we feel that this simplification in the playing of the songs would be of interest to many who want to learn to play musical instruments for fun.

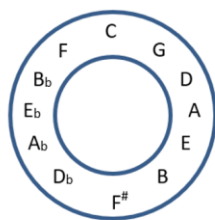
The songs are commonly played at transpose levels that are different from the original level of the song. Even professional singers sing their own songs at times at a different transpose level. In any case, for electronic musical instruments, an adjustment in transpose can be easily made by the transpose feature of the instrument. For other instruments, if one develops fingering patterns to play the above nine notes in three keys<sup>‡</sup>, five semitones apart, then the change/shift in transpose can be kept within two semitones of the desired level. For guitar, suggestions are made in the Comments Section of the paper for eliminating this change completely. For situations, where a change in the transpose is not acceptable, such as, playing in a group, one needs to develop a fingering pattern for the nine notes “7 suddha + *M* + *n*” at the desired transpose level.

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<sup>‡</sup> If one plays suddha notes starting from note *C* on a piano, one is playing in the key of *C* major.

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Let me first introduce “the Circle of 5ths” as it plays a crucial role in this paper. It may be noted that there are twelve major keys in the Western music, and they are all in the Bilawal scale. The twelve major keys are transposed versions of each other and the relationship between these keys are shown in Figure 1 below. Moving clockwise in the circle, *G* is fifth note of *C* major key, *D* is fifth note of *G* major key and so on. In this circle, any two keys adjacent to each other share the same notes except one note. E.g., the notes in the key of *C* are, *C, D, E, F, G, A,* and *B*. The adjacent key *G* (on right side) has note *F#* in stead of *F*. The adjacent key *F* (on left side) has note *Bb* in stead of *B*. It may be seen that any two adjacent keys contain eight ( $7 + 1$ ) different notes. Seven of these notes are suddha notes (with respect to one of the keys) and one note is vikrit<sup>§</sup> note (tivra or komal). And it may be seen that any three adjacent keys contain nine ( $7+1+1$ ) different notes, seven suddha and two vikrit. If we designate the key of *C* as the base key and use its first note as “*S*” (*Sa*), then it may be seen that the three adjacent keys, *F, C,* and *G* would contain the following nine notes: “*S R G m M P D n N.*” The seven suddha notes “*S R G m P D N*” are from the key of *C*. The note “*M*” comes from the key of *G* and the note “*n*” comes from the key of *F*.

Figure 1. The Circle of 5<sup>ths</sup>

The ten scales considered in this paper are: Bilawal, Kafi, Asavari, Bhairavi, Kalyan, Khamaj, Marva, Todi, Poorvi, and Bhairav. Bilawal Scale is the simplest of all the scales as all seven notes are suddha notes.

We find that all above scales can be formed from Bilawal scale by replacing, rearranging, and transposing its notes in the following manner:

Take any one of the keys in the circle (Bilawal scale) as the base key. Replace zero, one, two or three notes of the base key with the note(s) from the adjacent key(s). Rearrange the seven notes (change the mode of scale) and transpose them. An example of changing the mode of a scale is: Instead of “*S R G m P D N*” use “*R G m P D N Ś,*” which is

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<sup>§§</sup> Vikrit means altered.

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Dorian mode of the Bilawal scale. We will use the key of *C* as the base key in our examples.

1. Kafi, Asavari, Bhairavi, Kalyan and Khamaj scales are a special case of this pattern where none of the notes of the base key is replaced. These scales can be formed by rearranging the notes of the Bilawal scale and transposing them.
2. The Marva scale can be formed by replacing one note of the base key with a note from an adjacent key. E.g., by adding a note from the key of *G* or from the key of *F* and by deleting one note. By rearranging the seven notes and transposing them.
3. The Todi and the Poorvi scales can be formed by replacing two notes of the base key with a note from each side of the base key. E.g., by adding a note from key of *F* and a note from key of *G* and deleting two notes. By rearranging the seven notes and transposing them.
4. The Bhairav scale can be formed by replacing three notes of the base key with a note from one side and two notes from the other side of the base key. E.g., by adding a note from *F*, *G* and *D* keys (or from *B<sub>b</sub>*, *F*, and *G* keys) and deleting three notes. By rearranging the seven notes and transposing them.

The above pattern in the formation of the scales is shown in Figure 2, where one may see the basic distinguishing features of these scales. Five of the ten scales are transposed versions of the rearranged Bilawal scales. Other scales are transposed versions of modified Bilawal scales. Thus, five of the scales are much closer to the Bilawal scale than the other scales in their characteristics.

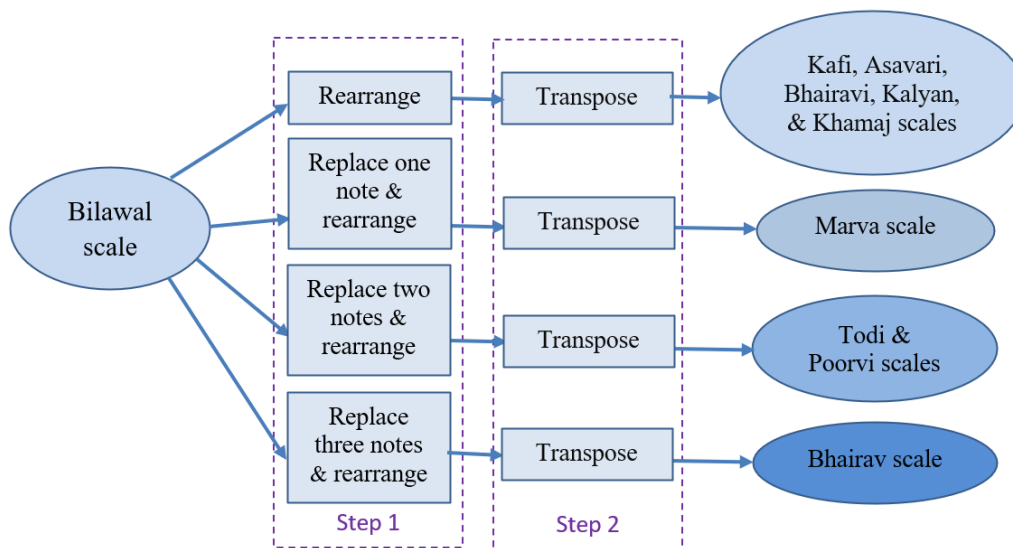


Figure 2. A Pattern in the Formation of the Scales.

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Apparently, this pattern is governing the formation of these scales. The information present in the pattern may be used for other purposes, such as, in the development of new scales. E.g., one may develop other scales by grouping the notes from different adjacent key(s) and/or by replacing different notes of the base key.

The pattern also shows the building blocks of the above scales. In other words, it shows the notes that are required in their formation and the process they go through. It may be seen in Figure 2, that just before Step 2, all these scales consists of mainly suddha notes. And we are suggesting in this paper that one may play these notes to simplify the fingering patterns that are otherwise required. Since these notes have not gone through the transposition involved in Step 2, the song will get transposed. This may be a fair price to pay for the benefit. It may also be noted from the above pattern that except for the Bhairav scale, all other scales can be formed from the notes contained in only three adjacent keys. And we pointed out earlier that those three adjacent keys contain only nine different notes “*S R G m M P D n N.*” This relationship is shown in Figure 3.

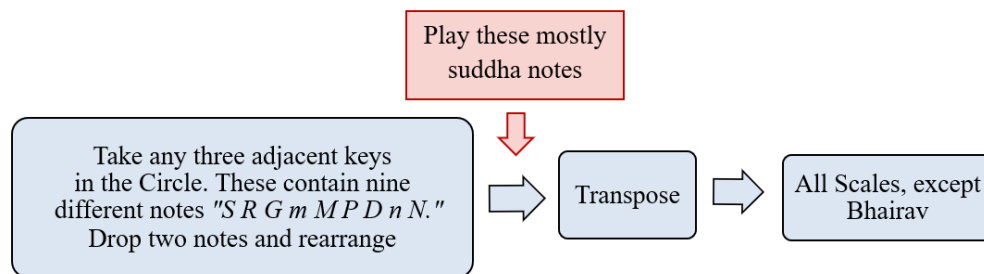


Figure 3. Formation of All Scales, except Bhairav.

Since all scales except Bhairav can be formed by rearranging and transposing subsets of only nine notes, one can play a transposed version of the songs based on these scales by using those subsets. In other words, one can play the above scales by using subsets of seven suddha and two vikrit notes “*M* and *n.*” The following three komal notes of the base key are not required: “*r g d.*” This is a significant simplification in the playing of the songs. In this paper we demonstrate how this may be done.

As shown in Figures 2 and 3, all scales go through a transposition step in their formation. If one plays these scales using the notes before the transposition step, one will encounter a transposition shift in the song. Since a large shift in transposition would not be desirable, one may develop fingering patterns to play the nine notes (seven suddha + *M* + *n*) for any three adjacent keys in the circle. E.g., one may develop fingering patterns for the keys of C major, F major (5 semitones above C major), and G major (5 semitones below C major). Then, any key in the circle is a maximum of two semitones away from one of these three keys. (E.g., *D* is two semitones above *C*. *E<sub>b</sub>* is two semitones below *F*. *A* is two semitones above *G*. *B<sub>b</sub>* is two semitones below *C*). Therefore, by

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developing one's fingering patterns for only three adjacent keys in the circle would allow one to play the songs within two semitones of any of the twelve keys.

Now we will consider one scale at a time. We will show the replacement of the notes of the Bilawal scale (if needed), their rearrangement and transposition to form each scale. Then, we will show how transposed versions of the songs based on all scales (except Bhairav scale) can be played by using subsets of the following nine notes: "S R G m M P D n N." We will refer to this set of nine notes as "the nine notes." Then we will consider the Bhairav scale which requires the playing of one additional note.

Let me first introduce the format of the tables used in this paper by placing notes in Table 1. This Table shows the Chromatic Scale and the Bilawal scale starting from any key on a piano. As one moves in the table from left to right, the pitch increases by one semitone.

Table 1.

Key →	1	2	3	4	5	6	7	8	9	10	11	12	13
Chromatic	S	r	R	g	G	m	M	P	d	D	n	N	Ś
Bilawal	S		R		G	m		P		D		N	Ś

1. Playing of Bilawal Scale Notes (these notes are same as in C major scale in Ionian mode):

All seven notes of the Bilawal scale are suddha notes, so no change is needed in playing this scale.

2. Playing of Kafi Scale Notes (these notes are same as in B<sub>b</sub> major scale in Dorian mode):

The main notes of this scale are shown in Row 1 of Table 2. These contain the following two komal notes: *g* and *n*. The other five notes are suddha notes. As mentioned earlier, for this scale (and next four scales), none of the notes of the base key is replaced. The Dorian mode of Bilawal scale is shown in Row 3. The alignment of notes in Rows 1 and 3 shows that Kafi scale can be formed by transposing Row 3 notes. Now for playing, replace the notes on the music sheet by the notes in Row 3. E.g., replace *S* by *R*, replace *R* by *G*, replace *g* by *m*. It will be seen that the music sheet that contained two komal and five suddha notes, now has seven suddha notes "S R G m P D N." Please note that by playing the new notes on the music sheet, the song will get transposed up in pitch by two semitones.

Table 2.

Row	Key →	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Kafi scale	S		R	g		m		P		D	n		Ś
2	+ 2 semitones	↓		↓	↓		↓		↓		↓	↓		↓
3	Suddha Notes	R		G	m		P		D		N	Ś		Ṛ

**UGC-CARE enlisted & Indexed in the EBSCO International Database of Journals**3. Playing of Asavari Scale Notes (these notes are same as in  $E_b$  major scale in Aeolian mode):

The main notes of this scale are shown in Row 1 of Table 3. In this scale, the following three komal notes are used:  $g$ ,  $d$ , and  $n$ . The other four notes are suddha notes. The Aeolian mode of Bilawal scale is shown in Row 3. Again, the alignment of notes in Rows 1 and 3 shows that Asavari scale can be formed as indicated above. Now for playing, replace the notes on the music sheet by the notes in Row 3. E.g., replace  $S$  by  $D$ , replace  $R$  by  $N$ , replace  $g$  by  $S$ . It will be seen that the music sheet now has seven suddha notes. In this case, by playing the new notes on the music sheet, the song will get transposed down in pitch by three semitones. If this is not desirable, one may shift to the key five semitones up (e.g., from  $C$  to  $F$ ) and then play the new notes, in which case the song will get transposed up in pitch by two semitones.

Table 3.

Row	Key $\rightarrow$	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Asavari scale	S		R	g		m		P	d		n		$\dot{S}$
2	- 3 semitones	$\downarrow$		$\downarrow$	$\downarrow$		$\downarrow$		$\downarrow$	$\downarrow$		$\downarrow$		$\downarrow$
3	Suddha Notes	D		N	S		R		G	m		P		D

4. Playing of Bhairavi Scale Notes (these notes are same as in  $A_b$  major scale in Phrygian mode):

The main notes of this scale are shown in Row 1 of Table 4. In this scale, the following four komal notes are used:  $r$ ,  $g$ ,  $d$ , and  $n$ . The other three notes are suddha notes. By using the Phrygian mode of Bilawal scale, shown in Row 3, we can obtain the desired alignment. Now for playing, replace the notes on the music sheet by the notes in Row 3. It will be seen that the music sheet now has seven suddha notes. Since in this case, by playing the new notes on the music sheet, the song will get transposed up in pitch by four semitones, it would be better to shift to a key five semitones down (e.g., from  $C$  to  $G$ ) and then play the new notes. The song will then get transposed down in pitch by one semitone.

Table 4.

Row	Key # $\rightarrow$	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Bhairavi scale	S	r		g		m		P	d		n		$\dot{S}$
2	+ 4 semitones	$\downarrow$	$\downarrow$		$\downarrow$		$\downarrow$		$\downarrow$	$\downarrow$		$\downarrow$		$\downarrow$
3	Suddha Notes	G	m		P		D		N	$\dot{S}$		$\dot{R}$		$\dot{G}$

5. Playing of Kalyan Scale Notes (these notes are same as in  $G$  major scale in Lydian mode):

The main notes of this scale are shown in Row 1 of Table 5. In this scale, only one tivra note is used:  $M$ . The other six notes are suddha notes. By using the Lydian mode of Bilawal scale, shown in Row 3, we can obtain the desired alignment for formation of Kalyan scale. The notes



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of Kalyan scale are already within “the nine notes,” so, no change is needed to play this scale. However, this scale may be transposed to suddha notes if desired. To do so, replace the notes on the music sheet by the notes in Row 3. In this case, by playing the new notes on the music sheet, the song will get transposed up in pitch by five semitones, which could be corrected by shifting to a key five semitones down (e.g., from *C* to *G*).

Table 5.

Row	Key # →	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Kalyan scale	S		R		G		M	P		D		N	Ś
2	+ 5 semitones	↓		↓		↓		↓	↓		↓		↓	↓
3	Suddha Notes	m		P		D		N	Ś		Ṛ		Ḡ	ṁ

6. Playing of Khamaj Scale Notes (these notes are same as in *F* major scale in Mixolydian mode):

The main notes of this scale are shown in Row 1 of Table 6. In this scale, only one komal note is used: *n*. The other six notes are suddha notes. By using the Mixolydian mode of Bilawal scale, shown in Row 3, we can obtain the desired alignment for formation of Khamaj scale. The notes of Khamaj scale are already within “the nine notes,” so, no change is needed to play this scale. However, this scale may be transposed to suddha notes if desired. To do so, replace the notes on the music sheet by the notes in Row 3. In this case, by playing the new notes on the music sheet, the song will get transposed down in pitch by five semitones. which could be corrected by shifting to a key five semitones up (e.g., from *C* to *F*).

Table 6.

Row	Key # →	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Khamaj scale	S		R		G	m		P		D	n		Ś
2	- 5 semitones	↓		↓		↓	↓		↓		↓	↓		↓
3	Suddha Notes	P		D		N	S		R		G	m		P

7. Playing of Marva Scale Notes:

As used earlier, for simplicity, we will use the key of *C* as our base key to which note(s) from adjacent key(s) would be added. The first note of this key would be designated as “*S*” (*Sa*). This designation will also be used in considering the remaining scales.

This scale can be formed by adding a note from an adjacent key to the base key. We will use the key of *G* as the adjacent key. The note added would be *M* as being the only new note in this key. Now if we delete *P* from our set, our new group of seven notes will be as shown in Row 4 of Table 7. If we shift these notes five columns towards left (change their mode), we get the



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result as shown in Row 3. The notes of Marva scale are shown in Row 1. The alignment of notes in Rows 1 and 3 shows that this scale can be formed by transposing the notes in Row 3. Now for playing, by replacing Row 1 notes on the music sheet by Row 3 notes, we will have six suddha notes and *M*. These notes are within “the nine notes” and can be played. In this case, by playing these new notes, the song will get transposed up in pitch by five semitones, which could be corrected by shifting to a key five semitones down (e.g., from *C* to *G*)

Table 7.

Row	Key →	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Marva scale	S	r			G		M	P		D		N	Ś
2	+ 5 semitones	↓	↓			↓		↓	↓		↓		↓	↓
3	Notes played	m	M			D		N	Ś		R		G	m
4	C & G Notes	S		R		G	m	M			D		N	Ś

**8. Playing of Todi Scale Notes:**

This scale can be formed by adding a note from each side of the base key to the base key. Therefore, the notes from the keys of *F*, *C*, and *G* would be grouped. In this case, we would add *M* from key of *G*, and would add *n* from the key of *F*. Now if we delete *G* and *D* from our set, our new group of seven notes will be as shown in Row 4 of Table 8. If we shift these notes one column towards right, we get the result as shown in Row 3.

The notes of Todi scale are shown in Row 1 of Table 8. The alignment of notes in Rows 1 and 3 shows that this scale can be formed as indicated above. Now for playing, by replacing Row 1 notes on the music sheet by Row 3 notes, we will have five suddha notes plus *M* and *n*. These notes are within “the nine notes” and can be played. In this case, by playing these new notes, the song will get transposed down in pitch by one semitone.

Table 8.

Row	Key →	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Todi scale	S	r		g			M	P	d			N	Ś
2	- 1 semitones	↓	↓		↓			↓	↓	↓			↓	↓
3	Notes played	N	S		R			m	M	P			n	N
4	F, C & G	S		R			m	M	P			n	N	Ś

**9. Playing of Poorvi Scale Notes:**

This scale can be formed by adding a note from each side of the base key to the base key. Therefore, the notes from the keys of *F*, *C*, and *G* would be grouped. As in the case of Todi scale, we would add *M* from key of *G*, and would add *n* from the key of *F*. Now if we delete *S*

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and  $P$  from our set, our new group of seven notes will be as shown in Row 4 of Table 9. If we shift these notes two columns towards right, we get the result as shown in Row 3 of this Table.

The notes of Poorvi scale are shown in Row 1 of Table 9. The alignment of notes in Rows 1 and 3 shows that this scale can be formed as indicated above. Now for playing, by replacing Row 1 notes on the music sheet by Row 3 notes, we will have five suddha notes plus  $M$  and  $n$ . These notes are within “the nine notes” and can be played. In this case, by playing these new notes, the song will get transposed down in pitch by two semitones.

Table 9.

Row	Key →	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Poorvi scale	S	r			G		M	P	d			N	Ś
2	- 2 semitones	↓	↓			↓		↓	↓	↓			↓	↓
3	Notes played	ṅ	Ṇ			R		G	m	M			D	n
4	F, C & G			R		G	m	M			D	n	N	

It may appear strange that we are not using the note  $S$  ( $Sa$ ) from “the nine notes.” But the name of these notes are just labels. The effect that note  $S$  of the Poorvi scale had on the song will now be conveyed by note  $n$  from “the nine notes.”

### 10. Playing of Bhairav Scale Notes:

This scale can be formed by adding a note from one side and two notes from the other side to the base key. So, we will need to add one more vikrit note to “the nine notes.” We show the grouping of the notes from the keys of  $F$ ,  $C$ ,  $G$  and  $D$ . In this case, we would add the following three notes:  $n$  (from the key of  $F$ ),  $M$  (from the key of  $G$ ), and  $r$  (from the key of  $D$ ). Please note that  $M$  of key of  $G$  is  $r$  with respect to key of  $C$ . Another way to see this is that the key of  $D$  adds a new note  $D_b$  which is  $r$ . Now, if we delete  $R$ ,  $P$  and  $N$  from our set, our new group of seven notes will be as shown in Row 4 of Table 10. If we shift these notes five columns towards left, we get the result as shown in Row 3 of this Table.

The notes of Bhairav scale are shown in Row 1 of Table 10. The alignment of notes in Rows 1 and 3 shows that this scale can be formed as indicated above. Now, by replacing Row 1 notes on the music sheet by Row 3 notes, we will have four suddha notes plus  $r$ ,  $M$ , and  $n$ . In terms of playing this scale, an extra note  $r$  needs to be played. In this case, by playing these new notes, the song will get transposed up in pitch by five semitones, which could be corrected by shifting to a key five semitones down (e.g., from  $C$  to  $G$ ). If we group the notes from the keys of  $B_b$ ,  $F$ ,  $C$ , and  $G$ , then it turns out that instead of note  $r$  we would need to play note  $g$ .

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Table 10.

Row	Key →	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Bhairav scale	S	r			G	m		P	d			N	Ṣ
2	+ 5 semitones	↓	↓			↓	↓		↓	↓			↓	↓
3	Notes played	m	M			D	n		Ṣ	ṛ			Ḡ	ṁ
4	F, C, G & D	S	r			G	m	M			D	n		Ṣ

**Comments:**

1. In case of a guitar, one may develop fingering patterns for any three adjacent keys in the circle (say, *F*, *C* and *G*). Tune all strings two semitones down and then use a capo at the second fret for normal playing. Now by obtaining additional plus/minus adjustment up to two semitones by moving the capo, one can quickly play in any of the twelve keys. (Added benefit: Less tension on the neck of the guitar).
2. In my playing of the old Bollywood songs, it has been observed that hundreds of these songs can be played from “the nine notes” in one of the following three ways:
  - a) By using only suddha notes
  - b) By using seven suddha notes + *M* (if the song shifts clockwise).
  - c) By using seven suddha notes + *n* (if the song shifts anti-clockwise).

**Results/Conclusions:**

1. A pattern in the formation of *all* scales from Bilawal scale is presented. Five of the ten scales are transposed versions of rearranged Bilawal scales. Other scales are transposed versions of modified Bilawal scales. The knowledge gained from the pattern could be utilized for different purposes.
2. By using the information in the above pattern, the playing of songs on musical instruments may be made simpler. By including only *M* (tivra *Ma*) and *n* (komal *Ni*) in one’s fingering pattern for the Bilawal scale, transposed versions of songs based upon nine out of the ten scales can be played. The transpositions needed in the notes of the scales, are shown in the paper.
3. By developing one’s fingering patterns for only three adjacent keys in “the circle of 5<sup>ths</sup>,” one can play the songs within two semitones of any of the twelve keys.

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