

# The Parallel Murchanas of Kafi

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1/1 10/9 32/27 4/3 3/2 5/3 16/9 2/1

10/9	16/15	9/8	(9/8)	10/9	16/15	9/8	
S	R-	G	M	P	D-	N	S

Kafi

1/1 9/8 5/4 4/3 3/2 27/16 15/8 2/1

9/8	10/9	16/15	9/8	(9/8)	10/9	16/15	
S	R	G	M	P	D	N	S

BALANCE

1/1 16/15 6/5 4/3 64/45 8/5 9/5 2/1

16/15	9/8	10/9	16/15	9/8	(9/8)	10/9	
S	R+	G+	M	P+	D+	N+	S

SRUTIS  
 SM  $\frac{81}{80}$   
 MED  $\frac{25}{24}$   
 LG  $\frac{256}{243}$

1/1 10/9 32/27 4/3 40/27 128/81 16/9 2/1

10/9	16/15	9/8	10/9	16/15	9/8	(9/8)	
S	R-	G	M	P-	D	N	S

1/1 9/8 5/4 4/3 3/2 5/3 16/9 2/1

(9/8)	10/9	16/15	9/8	10/9	16/15	9/8	
S	R	G	M	P	D-	N	S

1/1 9/8 81/64 45/32 3/2 27/16 15/8 2/1

9/8	(9/8)	10/9	16/15	9/8	10/9	16/15	
S	R	G+	M	P	D	N	S

1/1 16/15 6/5 27/20 3/2 8/5 9/5 2/1

16/15	9/8	(9/8)	10/9	16/15	9/8	10/9	
S	R+	G+	M+	P	D+	N+	S

S  $\overbrace{R+ R}$   $\overbrace{G+ G+}$   $\overbrace{M+ M+}$  P  $\overbrace{D+ D}$   $\overbrace{N+ N+}$  S

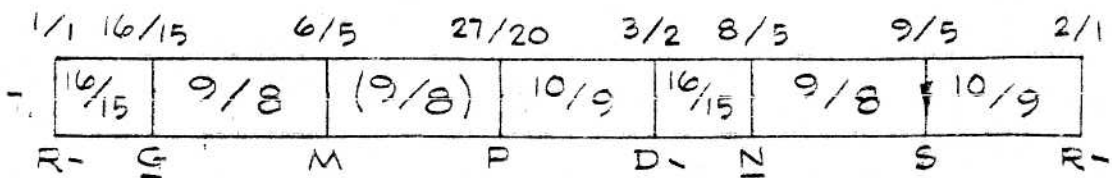
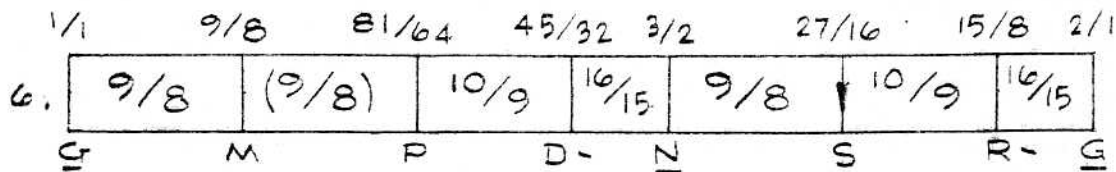
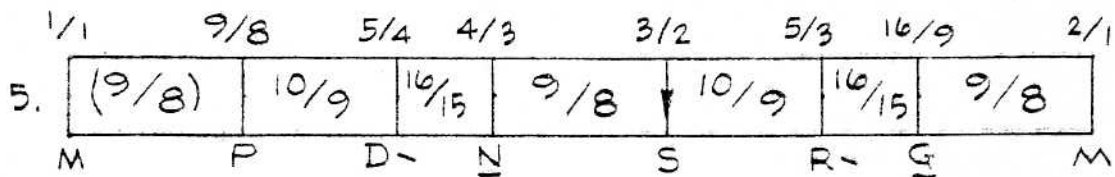
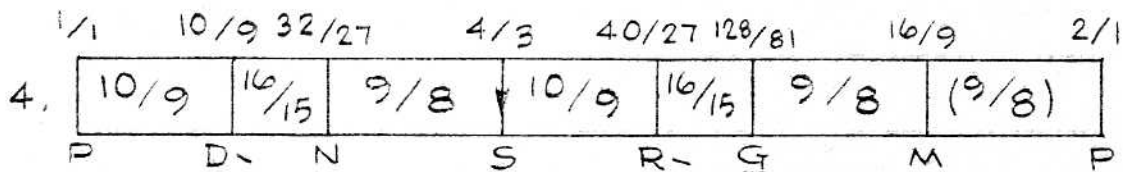
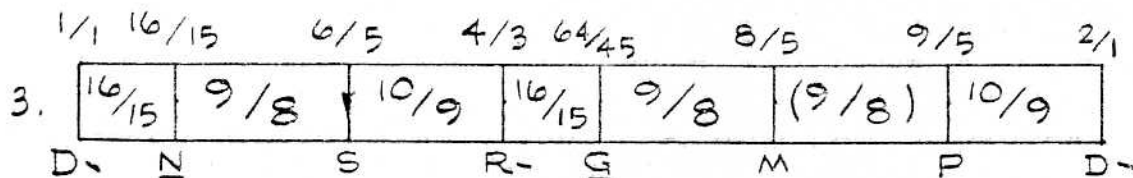
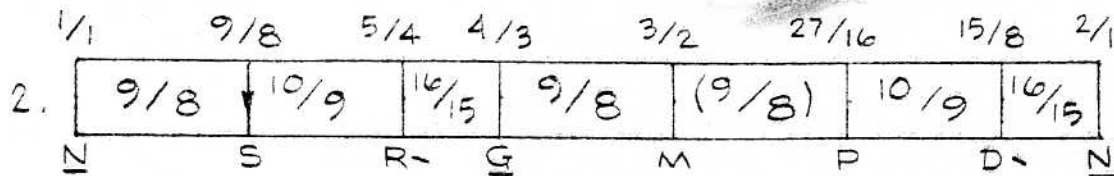
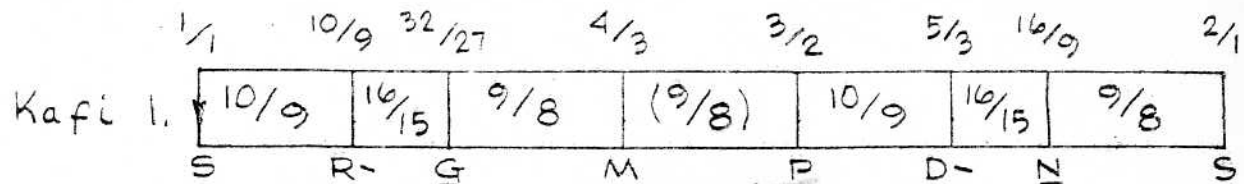
1/1 16/15 9/8 6/5 81/64 27/20 729/512 3/2 8/5 27/16 9/5 243/128 2/1

16/15	$\frac{135}{128}$	16/15	$\frac{135}{128}$	16/15	$\frac{135}{128}$	$\frac{256}{243}$	16/15	$\frac{135}{128}$	16/15	$\frac{135}{128}$	$\frac{256}{243}$	
$\frac{256}{243}$	S	$\frac{25}{24}$	S	$\frac{256}{243}$	S	$\frac{25}{24}$	S	$\frac{256}{243}$	S	$\frac{25}{24}$	S	$\frac{256}{243}$
$\frac{256}{243}$	$\frac{135}{128}$	16/15	$\frac{135}{128}$	16/15	$\frac{135}{128}$	16/15	$\frac{256}{243}$	$\frac{135}{128}$	16/15	$\frac{135}{128}$	16/15	

Upper inflection  
 Variable inflection of basic 12-tone scale = the 22-tone scale.  
 Lower inflection

1/1  $\frac{256}{243}$  10/9 32/27 5/4 4/3 45/32 3/2 128/81 5/3 16/9 15/8 2/1

S  $\overbrace{R R}$   $\overbrace{G G}$   $\overbrace{M M}$  P  $\overbrace{D D}$   $\overbrace{N N}$  S



# The Murchanas of Basic 12 (Skhisma neglected)

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	$\frac{1}{1}$	$\frac{256}{243}$	$\frac{10}{9}$	$\frac{32}{27}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{45}{32}$	$\frac{40}{27}$	$\frac{128}{81}$	$\frac{5}{3}$	$\frac{16}{9}$	$\frac{15}{8}$	$\frac{2}{1}$
1.	D		Z	S		R		G	M		P		D
2.	R		G	M		P		D		Z	S		R
3.	P		D		Z	S		R		G	M		P
4.	S		R		G	M		P		D		Z	S
5.	M		P		D		Z	S		R		G	M
6.		Z	S		R		G	M		P		D	
7.		G	M		P		D		Z	S		R	
8.		D		Z	S		R		G	M		P	
9.		R		G	M		P		D		Z	S	
10.		P		D		Z	S		R		G	M	
11.	Z	S		R		G	M		P		D		Z
12.	G	M		P		D		Z	S		R		G
	$\frac{1}{1}$	$\frac{16}{15}$	$\frac{9}{8}$	$\frac{6}{5}$	$\frac{81}{64}$	$\frac{27}{20}$	$\frac{729}{512}$	$\frac{3}{2}$	$\frac{8}{5}$	$\frac{27}{16}$	$\frac{9}{5}$	$\frac{243}{128}$	$\frac{2}{1}$

# The Murchanas of Basic 12 (Skhisma neglected)

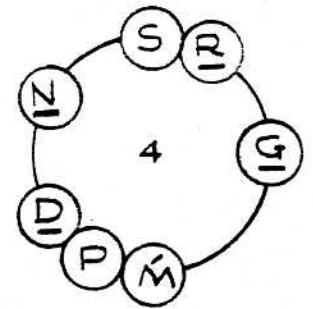
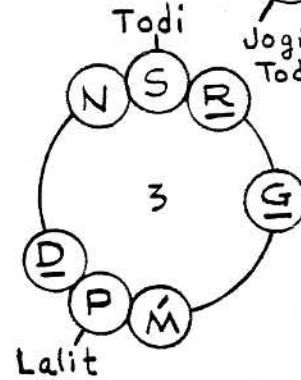
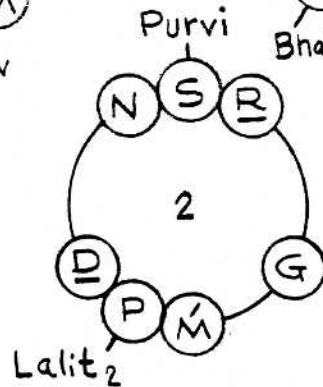
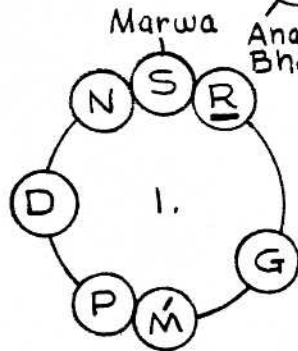
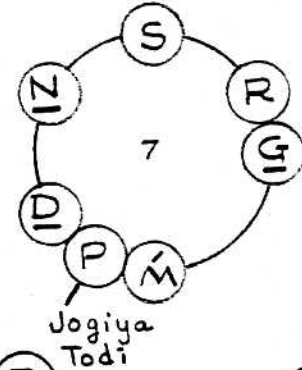
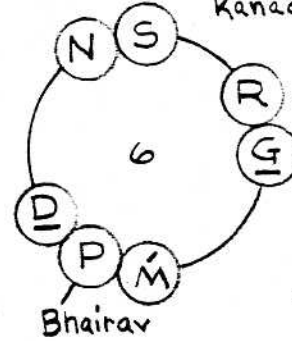
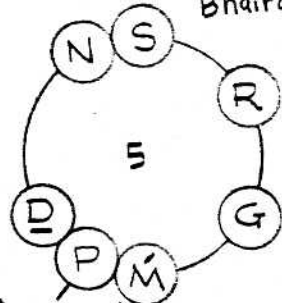
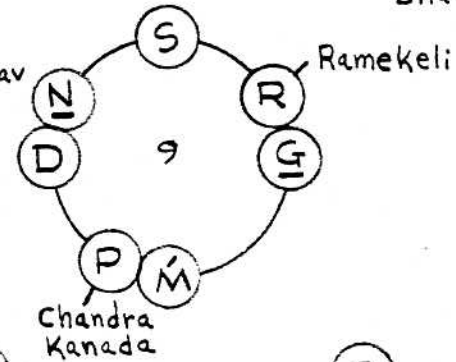
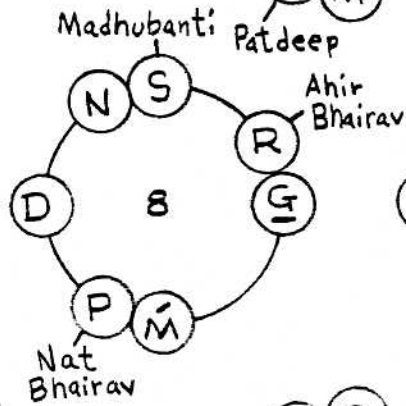
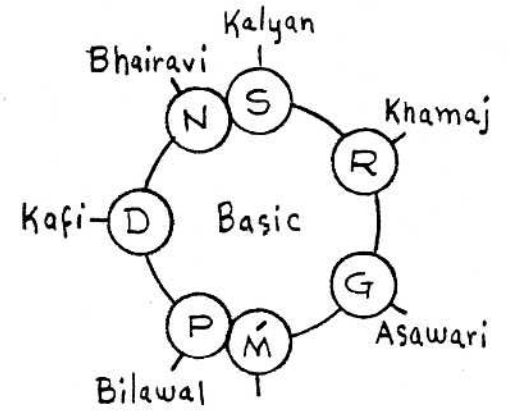
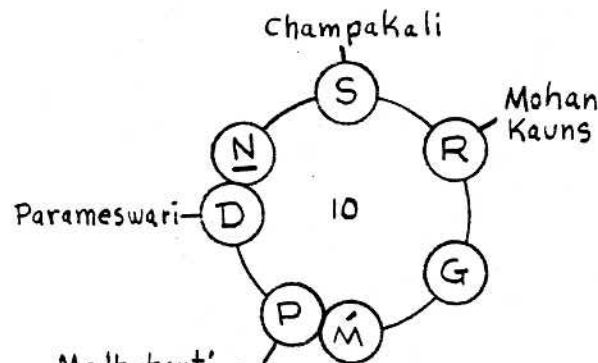
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S	$\underline{R}_1$	$R_3$	$\underline{G}_1$	$G_3$	$M_1$	$\acute{M}_3$	*	$\underline{D}_1$	$D_3$	$\underline{N}_1$	$N_3$	S
$\frac{1}{1}$	$\frac{256}{243}$	$\frac{10}{9}$	$\frac{32}{27}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{45}{32}$	$\frac{40}{27}$	$\frac{128}{81}$	$\frac{5}{3}$	$\frac{16}{9}$	$\frac{15}{8}$	$\frac{2}{1}$

1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												
9.												
10.												
11.												
12.												
$\frac{1}{1}$	$\frac{16}{15}$	$\frac{9}{8}$	$\frac{6}{5}$	$\frac{81}{64}$	$\frac{27}{20}$	$\frac{729}{512}$	$\frac{3}{2}$	$\frac{8}{5}$	$\frac{27}{16}$	$\frac{9}{5}$	$\frac{243}{128}$	$\frac{2}{1}$
S	$\underline{R}_2$	$R_4$	$\underline{G}_2$	$G_4$	$M_2$	$\acute{M}_4$	P	$D_2$	$D_4$	$\underline{N}_2$	$N_4$	S

\*  $\frac{40}{27}$  is not in the scale of 22.

Basic	S	P	R	D	G	Z	M'
1.	S	P	<b>R</b>	D	G	Z	M'
2.	S	P	<b>R</b>	<b>D</b>	G	Z	M'
3.	S	P	<b>R</b>	<b>D</b>	<b>G</b>	Z	M'
4.	S	P	<b>R</b>	<b>D</b>	<b>G</b>	<b>Z</b>	M'
5.	S	P	R	<b>D</b>	G	Z	M'
6.	S	P	R	<b>D</b>	<b>G</b>	Z	M'
7.	S	P	R	<b>D</b>	<b>G</b>	<b>Z</b>	M'
8.	S	P	R	D	<b>G</b>	Z	M'
9.	S	P	R	D	<b>G</b>	<b>Z</b>	M'
10.	S	P	R	D	G	<b>Z</b>	M'



KEY TO RAGA SCALES  
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11 June 2003, Wednesday

Kraig,

This juxta poses a Bosanquet generalized keyboard over an 8x8 lambda Grid, And shows the confluence of 22, 41, (and 46, which has 5 243/242 epimoria).

Obviously this multiplies the applications of the lambda keyboard - if the ratios are retuneable at will by the user?

This may be posted on Anaphoria if you choose. Erv Wilson

# The 22-Tone Scale of India\*, Shown on 8x8 Lambdoma Grid, Modulo 41

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22-Tone Scale

Ref. \* South Indian Music, Book IV p95-97, P. Sambamurthy, University of Madras 1954

$\frac{81}{52}$ 26. <sup>+25</sup>	$\frac{81}{11}$ 29. <sup>+25</sup>	$\frac{12}{17}$ 32. <sup>+15</sup>	$\frac{0}{15}$ 35. <sup>+10</sup>	$\frac{243}{128}$ 38. <sup>+5</sup>	$\frac{1}{4}$ 41. <sup>+0</sup>	$\frac{256}{243}$ 40. <sup>+5</sup>	$\frac{0}{9}$ 6. <sup>+10</sup>
$\frac{243}{176}$ 19. <sup>+23</sup>	$\frac{81}{156}$ 22. <sup>+18</sup>	$\frac{32}{21}$ 25. <sup>+13</sup>	$\frac{00}{10}$ 28. <sup>+8</sup>	$\frac{27}{16}$ 31. <sup>+3</sup>	$\frac{9}{9}$ 34. <sup>+2</sup>	$\frac{5}{9}$ 37. <sup>+1</sup>	$\frac{3}{2}$ 40. <sup>-12</sup>
$\frac{27}{22}$ 12. <sup>+21</sup>	$\frac{9}{17}$ 15. <sup>+16</sup>	$\frac{27}{20}$ 18. <sup>+11</sup>	$\frac{22}{5}$ 21. <sup>+6</sup>	$\frac{3}{2}$ 24. <sup>+1</sup>	$\frac{128}{81}$ 27. <sup>+4</sup>	$\frac{5}{3}$ 30. <sup>+9</sup>	$\frac{7}{4}$ 33. <sup>-14</sup>
$\frac{27}{11}$ 5. <sup>+19</sup>	$\frac{00}{17}$ 8. <sup>+14</sup>	$\frac{9}{15}$ 11. <sup>+9</sup>	$\frac{81}{64}$ 14. <sup>+4</sup>	$\frac{4}{3}$ 17. <sup>-1</sup>	$\frac{5}{32}$ 20. <sup>-6</sup>	$\frac{189}{128}$ 23. <sup>-11</sup>	$\frac{14}{9}$ 26. <sup>-16</sup>
$\frac{27}{4}$ 39. <sup>+17</sup>	$\frac{64}{9}$ 1. <sup>+12</sup>	$\frac{16}{15}$ 4. <sup>+7</sup>	$\frac{9}{80}$ 7. <sup>+2</sup>	$\frac{32}{27}$ 10. <sup>-3</sup>	$\frac{5}{4}$ 13. <sup>-8</sup>	$\frac{2}{16}$ 16. <sup>-13</sup>	$\frac{100}{19}$ 19. <sup>-18</sup>
$\frac{12}{7}$ 32. <sup>+15</sup>	$\frac{0}{15}$ 35. <sup>+10</sup>	$\frac{243}{128}$ 38. <sup>+5</sup>	$\frac{1}{0}$ 41. <sup>+0</sup>	$\frac{256}{243}$ 39. <sup>-5</sup>	$\frac{10}{9}$ 6. <sup>-10</sup>	$\frac{1}{6}$ 9. <sup>-15</sup>	$\frac{1}{12}$ 12. <sup>-20</sup>
$\frac{32}{21}$ 25. <sup>+13</sup>	$\frac{00}{10}$ 28. <sup>+8</sup>	$\frac{27}{16}$ 31. <sup>+3</sup>	$\frac{15}{9}$ 34. <sup>-2</sup>	$\frac{5}{30}$ 37. <sup>-11</sup>	$\frac{63}{32}$ 40. <sup>-12</sup>	$\frac{80}{2}$ 2. <sup>-17</sup>	$\frac{80}{5}$ 5. <sup>-22</sup>
$\frac{27}{20}$ 18. <sup>+11</sup>	$\frac{729}{512}$ 21. <sup>+6</sup>	$\frac{3}{2}$ 24. <sup>+1</sup>	$\frac{128}{81}$ 27. <sup>-4</sup>	$\frac{5}{3}$ 30. <sup>-9</sup>	$\frac{7}{4}$ 33. <sup>-14</sup>	$\frac{1}{6}$ 36. <sup>-19</sup>	$\frac{52}{27}$ 39. <sup>-24</sup>

X

11Jun03.EW

41-tone 0/41  
22-Tone 0

Ratio

1. 64/28 256/16 12/11 10/9 8/7 32/27 6/5 27/4 81/9 21/16 4/3 27/20 11/8 45/32 729/512 81/56 189/128 3/2

continued

continue → 24. 27. 31. 34. 38. 41/0. ← 41-Tone Scale  
 332/21 14/9 128/81 8/5 18/11 5/3 27/16 7/4 16/9 11/5 15/8 243/128 27/14 63/32 2/1 ← 22-Tone Scale

Note:

The epimore  $\frac{243}{242}$  results 5 times with the alternate ratios in ( ) →  $(\frac{44}{27})$  X  $(\frac{81}{44})$  ← alternate ratios, 5 places.

# Khiasmos, and the 22-tone Scale of India

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Ref. South Indian Music, Book IV, pages 95-96, P. Sambamoorthy 1954

chain of Fifths

Khiasmos

Degree	Scale	Ratio
22	10	2/1
256/243		
81/80	21	243/128
25/24	20	15/8
81/80	19	9/5
256/243	18	16/9
81/80	17	27/16
25/24	16	5/3
81/80	15	8/5
256/243	14	128/81
256/243	13	3/2
256/243		
81/80	12	729/512
25/24	11	45/32
81/80	10	27/20
256/243	9	4/3
81/80	8	81/64
25/24	7	5/4
81/80	6	6/5
256/243	5	32/27
81/80	4	9/8
25/24	3	10/9
81/80	2	16/15
256/243	1	243/128
0/22		1/1

31/53 Scale, 4/7 Kbd, Pythagorean Series (3/2)  
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 Ref. Nazari, Ameli, Turk Musikisi, Dr. Suphi Ezgi

etc.

+12  $3^{12}$  1.

+14  $3^{14}$  10.

+16  $3^{16}$  19.

+11  $3^{11}$  23.

+13  $3^{13}$  32.

+15  $3^{15}$  41.

+17  $3^{17}$  50.

+12  $3^{12}$  1.

+7  $3^7$  5.

+9  $3^9$  14.

+11  $3^{11}$  23.

+8  $3^8$  36.

+10  $3^{10}$  45.

+12  $3^{12}$  1.

+2  $3^2$  9.

+4  $3^4$  18.

+6  $3^6$  27.

+8  $3^8$  36.

+10  $3^{10}$  45.

+5  $3^5$  49.

+3  $3^3$  27.

+1  $3^1$  31.

+2  $3^2$  9.

+4  $3^4$  18.

+6  $3^6$  27.

+8  $3^8$  36.

+10  $3^{10}$  45.

+5  $3^5$  49.

0  $3^0$  53/0.

-1  $3^{-1}$  22.

-3  $3^{-3}$  13.

-4  $3^{-4}$  44.

-5  $3^{-5}$  4.

-6  $3^{-6}$  26.

-7  $3^{-7}$  48.

-8  $3^{-8}$  35.

-9  $3^{-9}$  39.

-10  $3^{-10}$  48.

-11  $3^{-11}$  30.

-12  $3^{-12}$  52.

-13  $3^{-13}$  21.

-14  $3^{-14}$  43.

-15  $3^{-15}$  12.

-16  $3^{-16}$  34.

-17  $3^{-17}$  3.

-18  $3^{-18}$  25.

-19  $3^{-19}$  47.

-20  $3^{-20}$  16.

-21  $3^{-21}$  38.

-22  $3^{-22}$  7.

-23  $3^{-23}$  29.

-24  $3^{-24}$  51.

-25  $3^{-25}$  20.

-26  $3^{-26}$  42.

-27  $3^{-27}$  11.

-28  $3^{-28}$  33.

-29  $3^{-29}$  2.

-30  $3^{-30}$  24.

-31  $3^{-31}$  46.

-32  $3^{-32}$  15.

-33  $3^{-33}$  37.

-34  $3^{-34}$  6.

-35  $3^{-35}$  28.

-36  $3^{-36}$  50.

-37  $3^{-37}$  19.

-38  $3^{-38}$  41.

-39  $3^{-39}$  10.

-40  $3^{-40}$  32.

-41  $3^{-41}$  1.

-42  $3^{-42}$  23.

-43  $3^{-43}$  45.

-44  $3^{-44}$  14.

-45  $3^{-45}$  36.

-46  $3^{-46}$  5.

-47  $3^{-47}$  27.

-48  $3^{-48}$  49.

-49  $3^{-49}$  18.

-50  $3^{-50}$  40.

-51  $3^{-51}$  9.

-52  $3^{-52}$  31.

-53  $3^{-53}$  0/53.

etc.

16JUL01  
SW