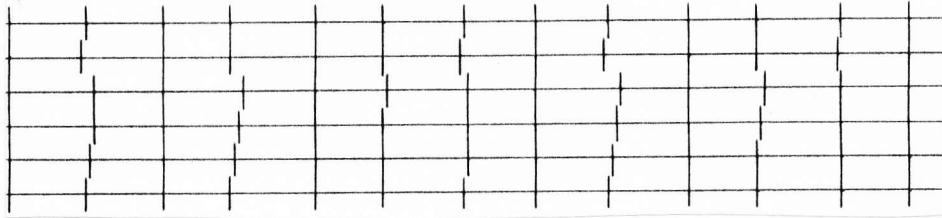
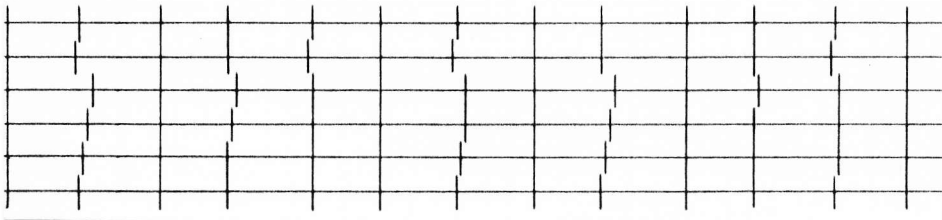


1/4 Comma 4 Places; 1/8 Skhisma 8 Places, Modes 1 thru 5; E, A, D, G, B, E Tuning
©1984 by Erv Wilson

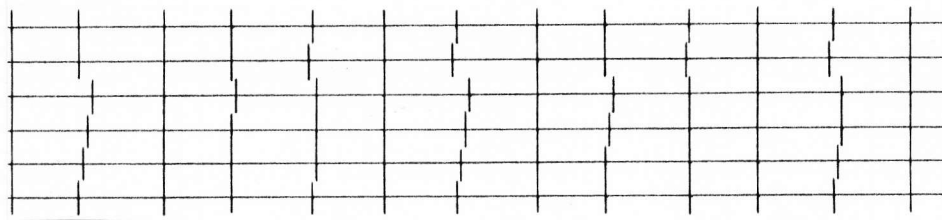
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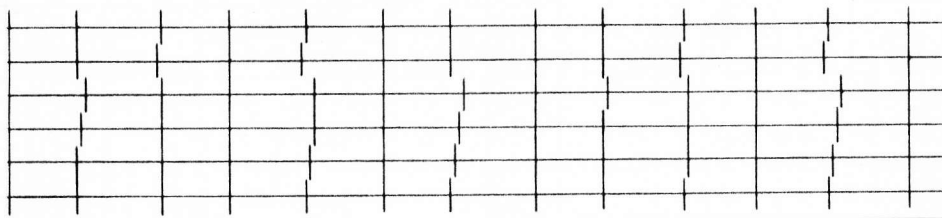
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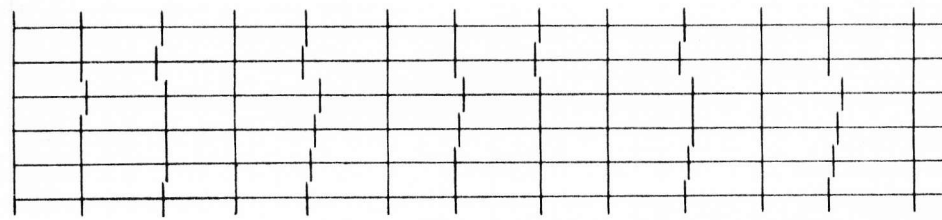
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4.

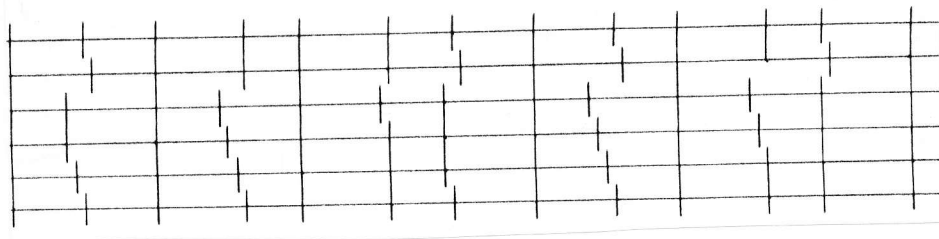


5.

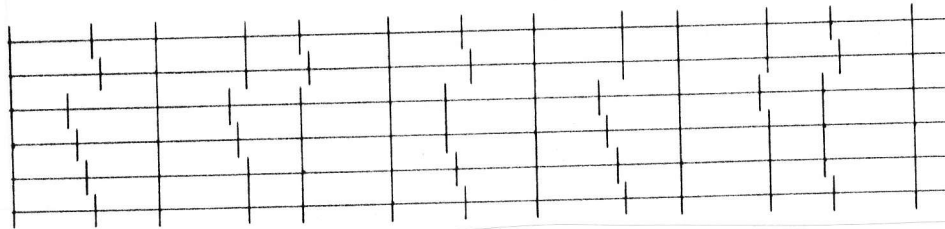


-1/4 Syn. Comma 8 Places ; +1/4 Pyth. Comma 4 Places , Modes 1 thru 5,
E,A,D,G,B,E Tuning. © 1984 by Erv Wilson

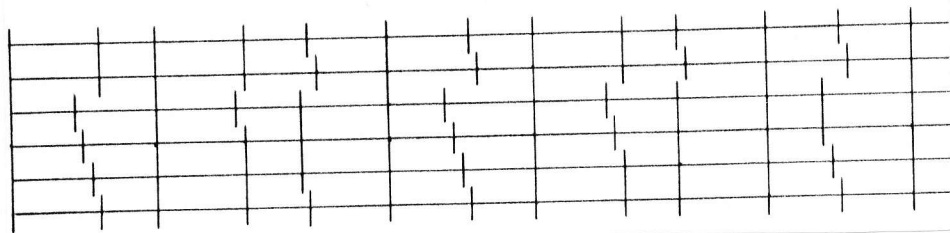
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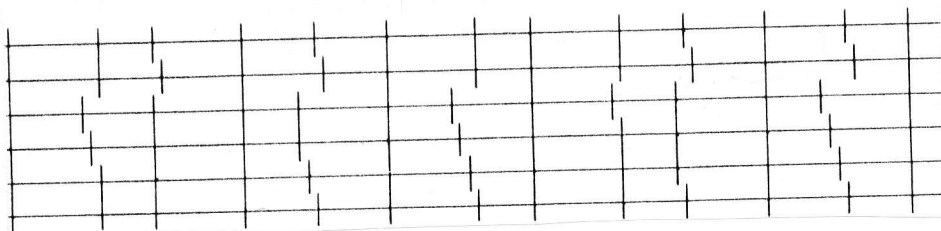
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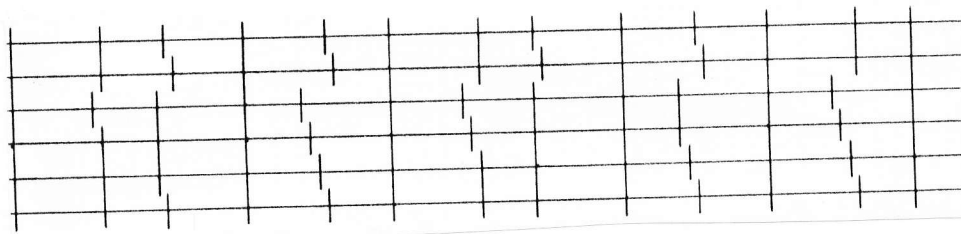
3.



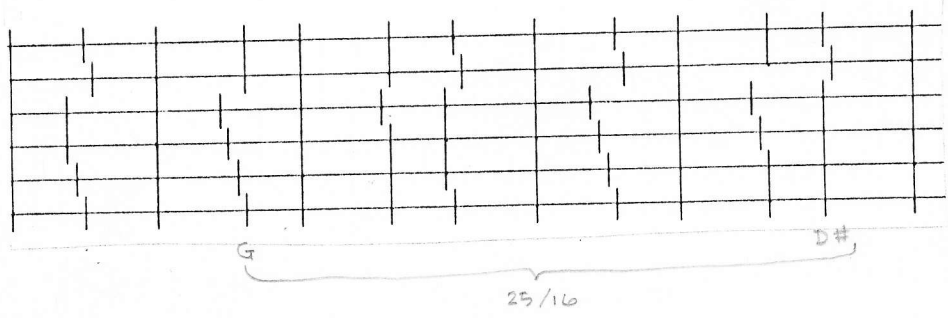
4.



5.

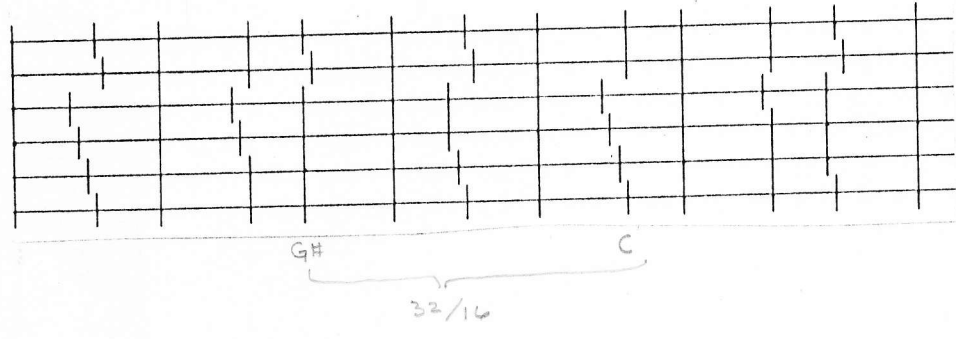


1.



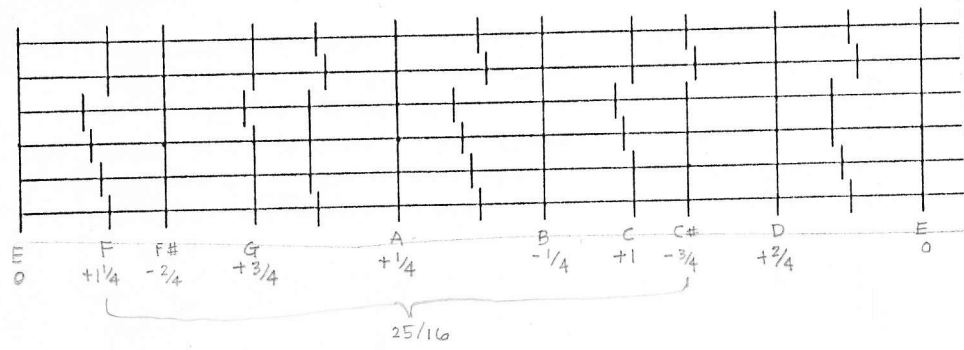
E, A, D Meantone

2.



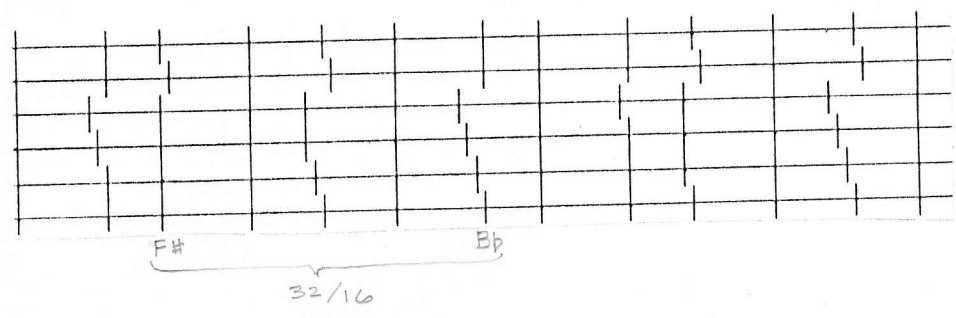
A, D, G meantone

3.



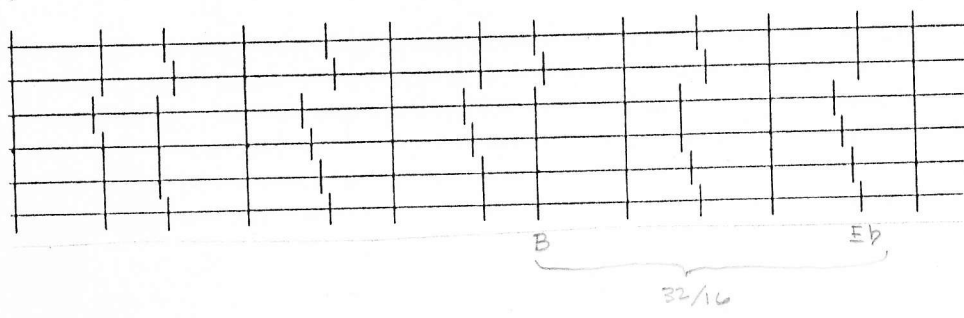
D, G, C meantone

4.

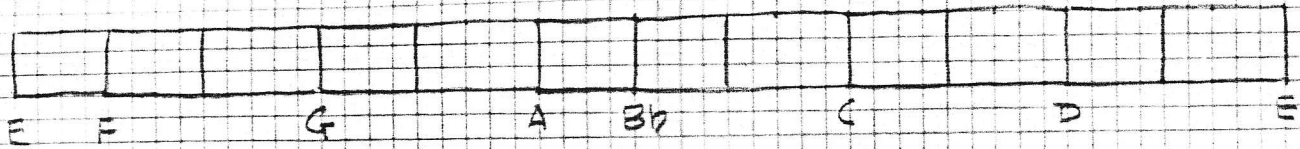


G, C, F meantone

5.



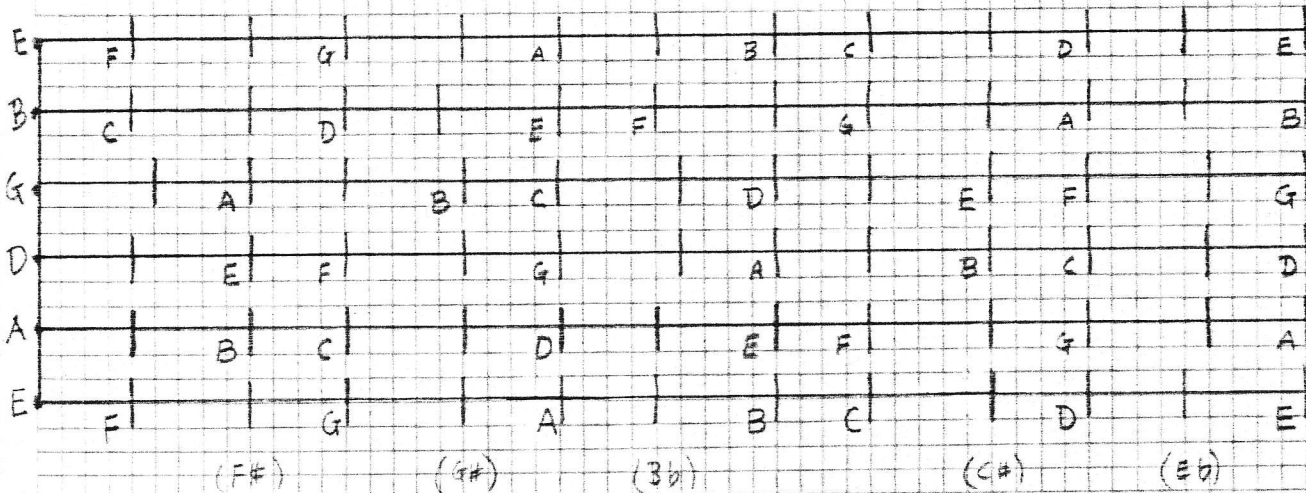
Bb, F, C meantone



10/9	9/8	10/5			
10/9	10/5	9/8			
$\frac{256}{243}$	9/8	9/8			

9/8	9/8	$\frac{256}{243}$			
9/8	$\frac{256}{243}$	9/8			
$\frac{256}{243}$	9/8	9/8			

Pythagorean Open String on E Just
Tetrachord / Tetra chord / Disjunction (Diatonic in E#)



Capo

E	F	G ^b	G	A ^b	A	B ^b	C ^b	C	D ^b	D	E ^b	F ^b	F				
C ^b =B	C	D ^b	D	E ^b	F ^b	F	G ^b	G	A ^b	A	B ^b	C ^b	C				
G	A ^b	A	B ^b	C ^b	C	D ^b	D	E ^b	F ^b	F	G ^b	G	A ^b				
D	E ^b	F ^b	F	G ^b	G	A ^b	A	B ^b	C ^b	C	D ^b	D	E ^b				
A	B ^b	C ^b	C	D ^b	D	E ^b	F ^b	F	G ^b	G	A ^b	A	B ^b				
F ^b =E	F	G ^b	G	A ^b	A	B ^b	C ^b	C	D ^b	D	E ^b	F ^b	F				

$\frac{1}{1}$	$\frac{16}{15}$	$\frac{9}{8}$	$\frac{6}{5}$	$\frac{81}{64}$	$\frac{4}{3}$	$\frac{64}{45}$	$\frac{3}{2}$	$\frac{8}{5}$	$\frac{27}{16}$	$\frac{16}{9}$	$\frac{256}{135}$	$\frac{2}{1}$
---------------	-----------------	---------------	---------------	-----------------	---------------	-----------------	---------------	---------------	-----------------	----------------	-------------------	---------------

Tetrachord

Tetrachord

disjunction

Pythagorean
5m M7

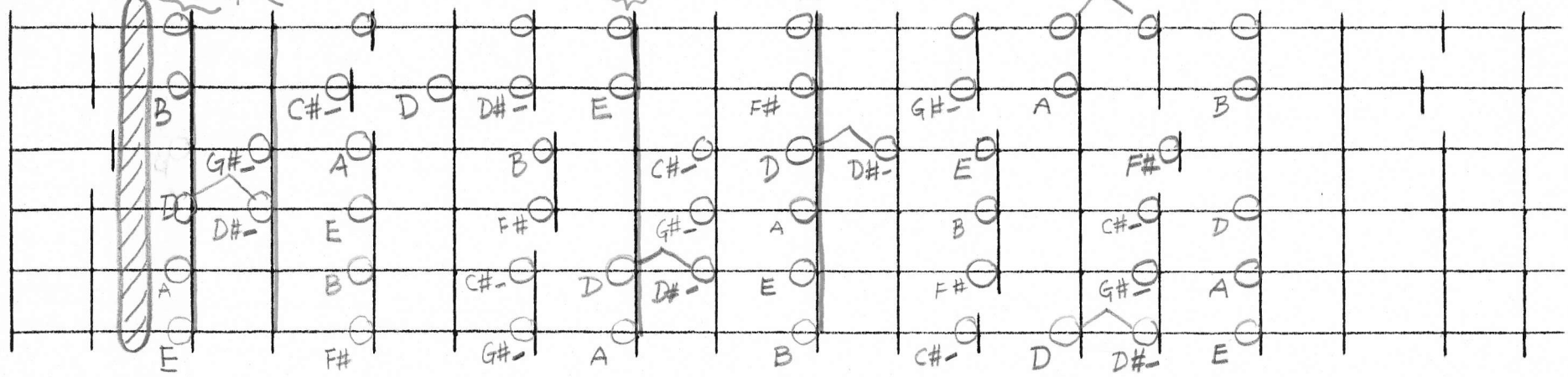
Capp

Just Major
Dulcimer
Rast
Some Indian, Lalit
Nawruz

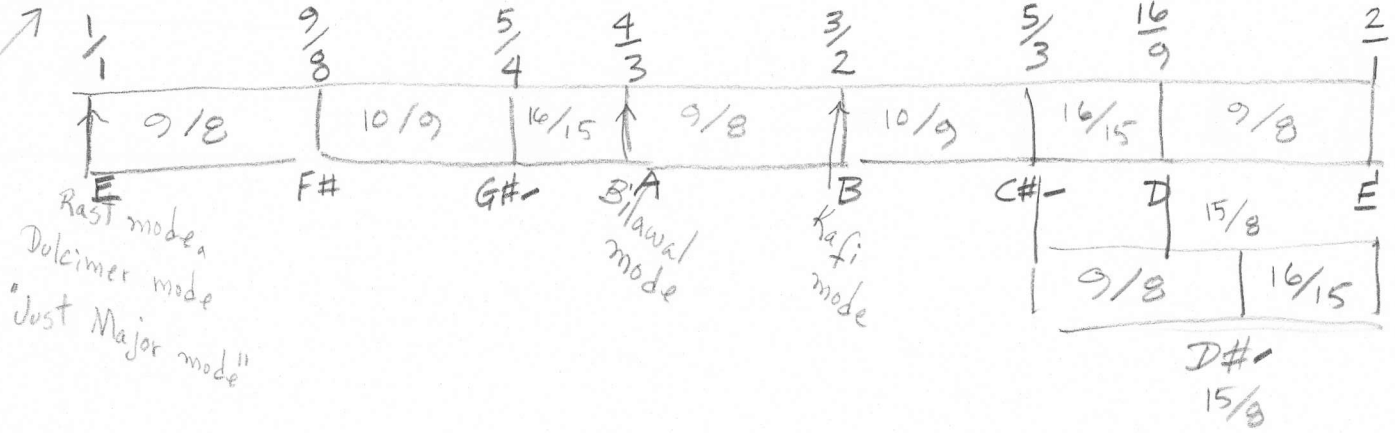
Pythagorean
Lg M7

Bilawal
Most Indian

Kafi mode



If this is open string



Rast mode
Dulcimer mode
"Just Major mode"

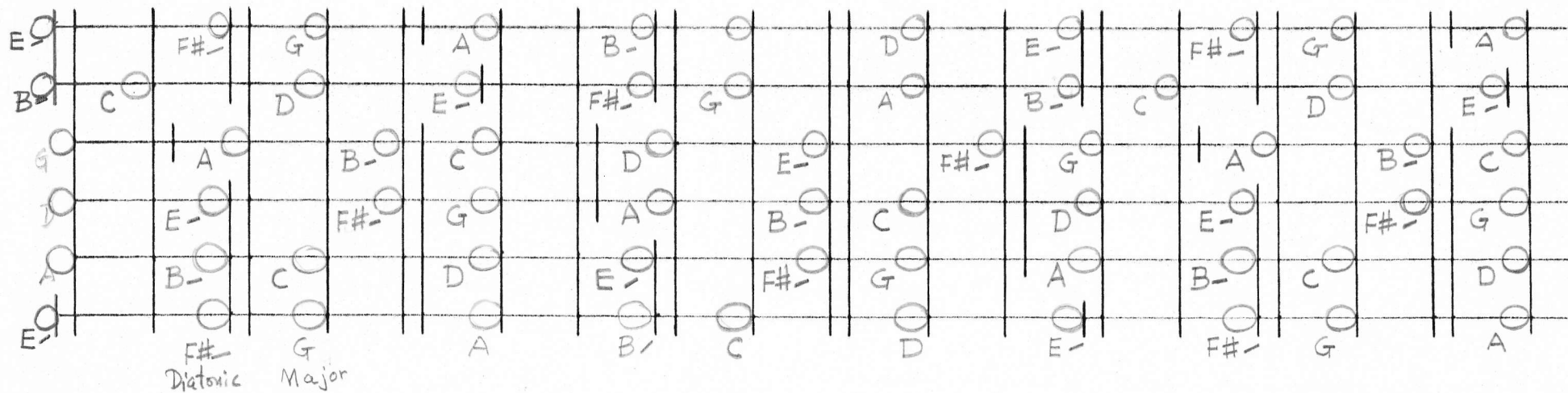
Rast

Dulcimer

D#
15/8

E
 B
 G
 D
 A
 E
 Pirāḡ
 Natural minor

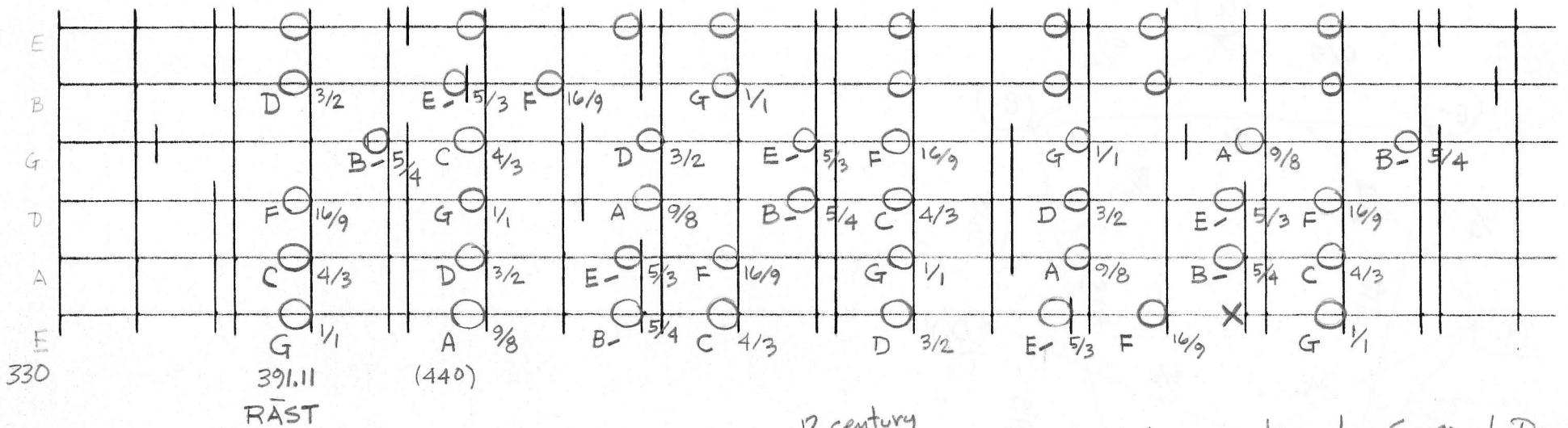
Keys of Pirāḡ ^{G#} C#, F#, B, E, A
 Keys of natural minor



Diatonic on open frets is in key F#-. Also occurs in C#-, G#-, D#-, A#-, E#-,
 Major " " " " " " G, " " D, A, E, B, F#,

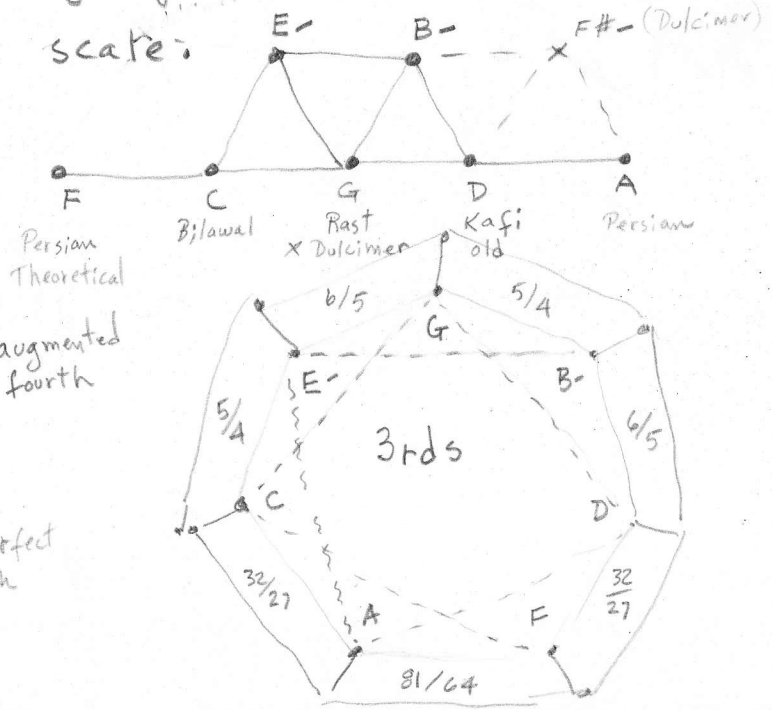
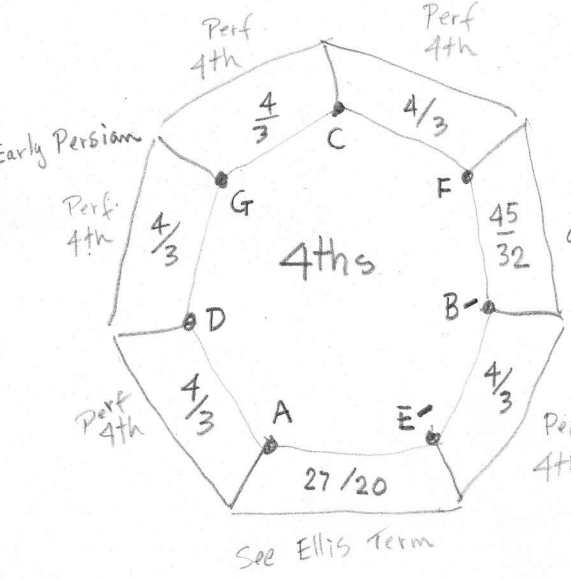
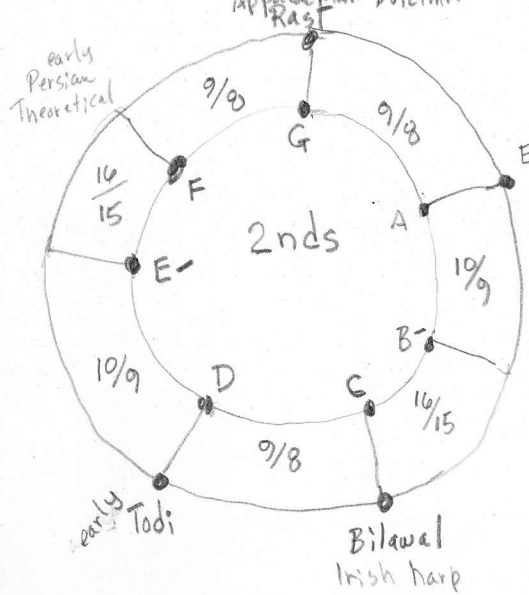
b - 4 + ≠ ##

G#-, D#-, A#-, E#-, B#-, Fx-,

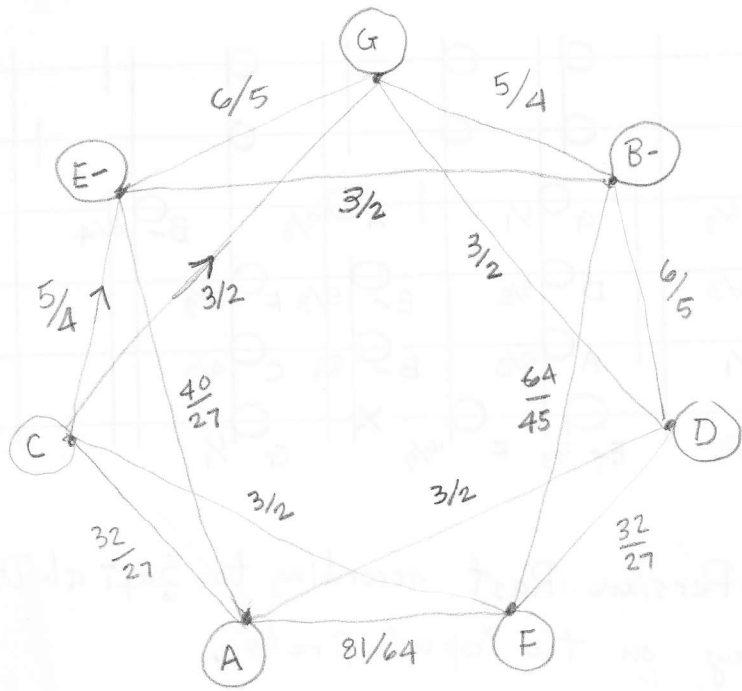


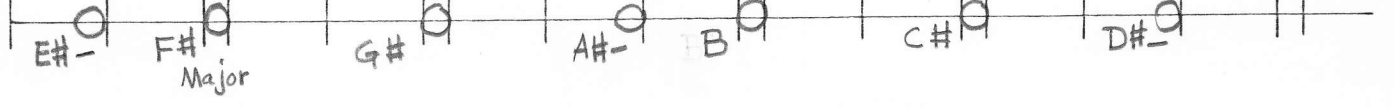
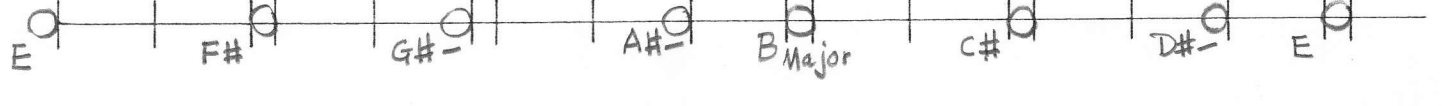
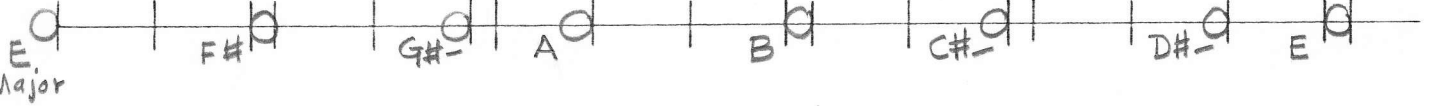
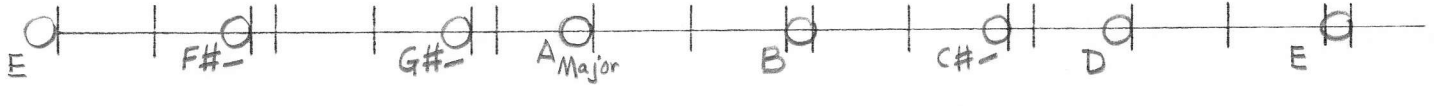
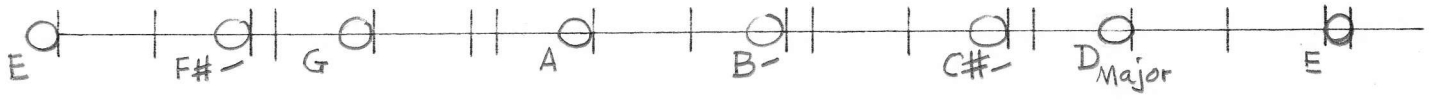
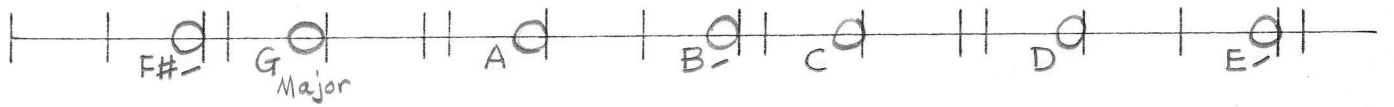
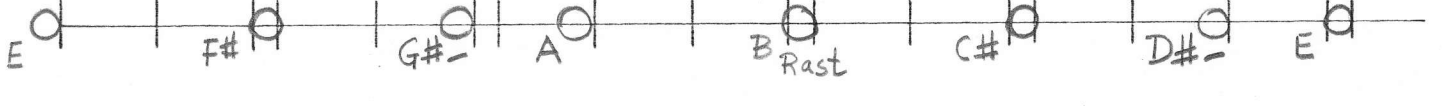
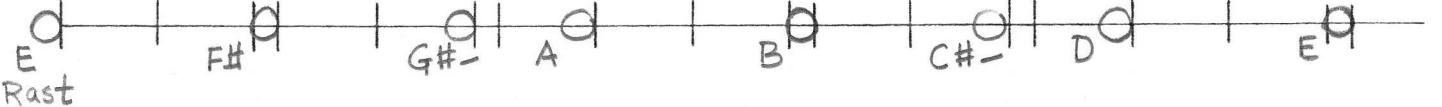
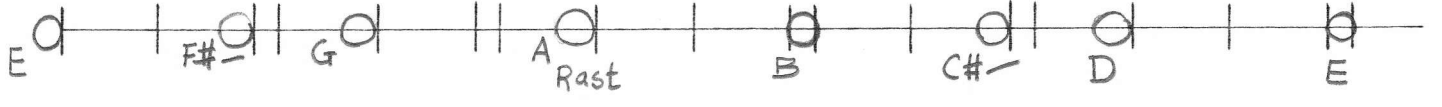
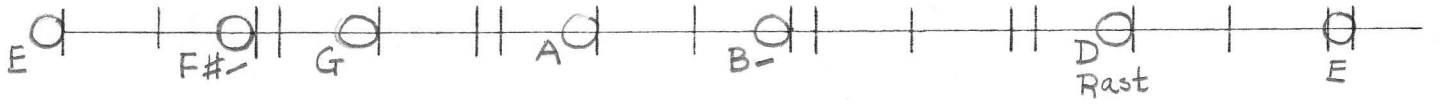
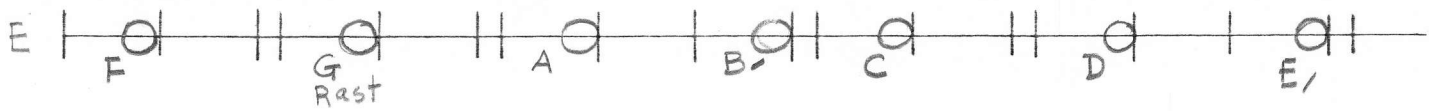
Rast is the dulcimer scale. This is the ^{12 century} early Persian Rast according to Safi al-Din. 6 keys for Rast F#, B, E, A, D, G. G is the easy key on the "open" frets.

X F# - 15/8 is commonly added to the dulcimer scale:



over





Handwritten musical notation on a staff with notes: F# (labeled 'irāq'), G, A (labeled 'irāq'), B (labeled 'natural minor'), C#, D, E.

Handwritten musical notation on a staff with notes: E (labeled 'irāq'), F# (labeled 'natural minor'), G#, A, B, C#, D, E.

Handwritten musical notation on a staff with notes: E, F#, G#, A, B (labeled 'iraq'), C#, D#, E.

Handwritten musical notation on a staff with notes: F# (labeled 'iraq'), G#, A#, B, C#, D#, E.

Handwritten musical notation on a staff with notes: d, b, d, a, b, C# (labeled 'iraq'), d.

Handwritten musical notation on a staff with notes: d, b, G#, d, a, b, d.

Handwritten musical notation on a staff with notes: x, d, G# (labeled 'Nawwāz'), d, a, d, a, d.

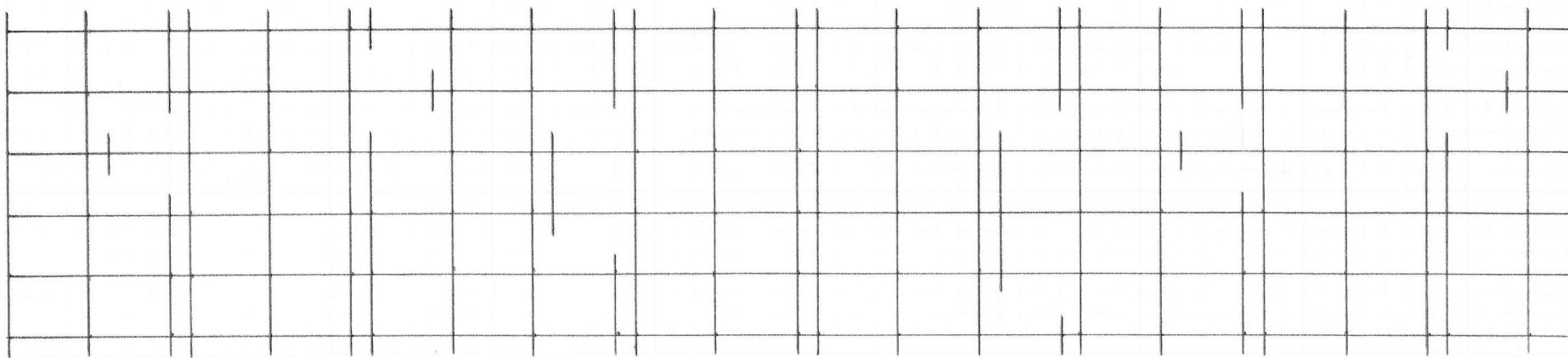
Handwritten musical notation on a staff with notes: E, d, d, d, a, d, d, D#.

Handwritten musical notation on a staff with notes: E, d, d, A#, b, d, d.

Handwritten musical notation on a staff with notes: E#, b, d, a, b, d, a.

Handwritten musical notation on a staff with notes: d, b, d, a, B#, b, d.

Handwritten musical notation on a staff with notes: d, Fx, b, d, a, b, d.



| | || | || | | || | || | | || | | ||

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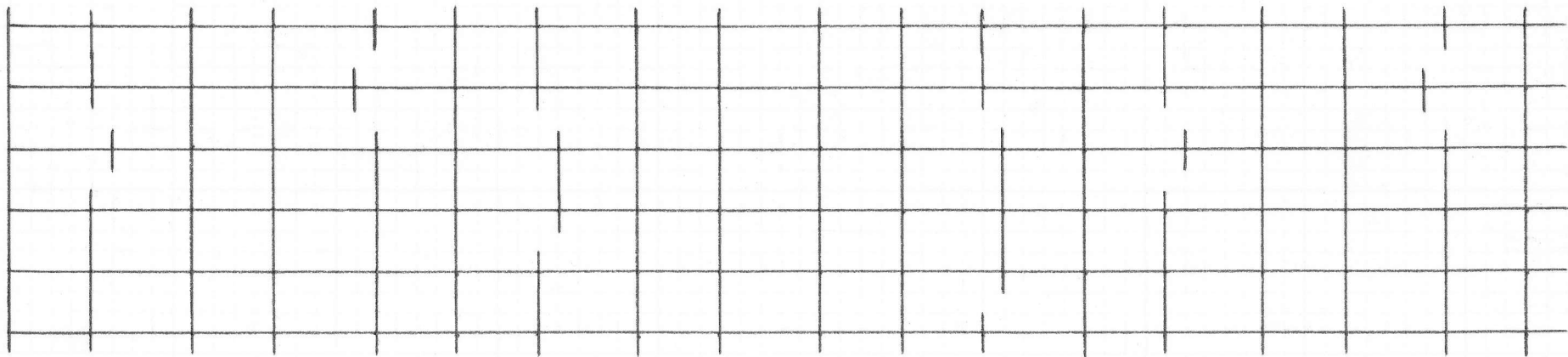
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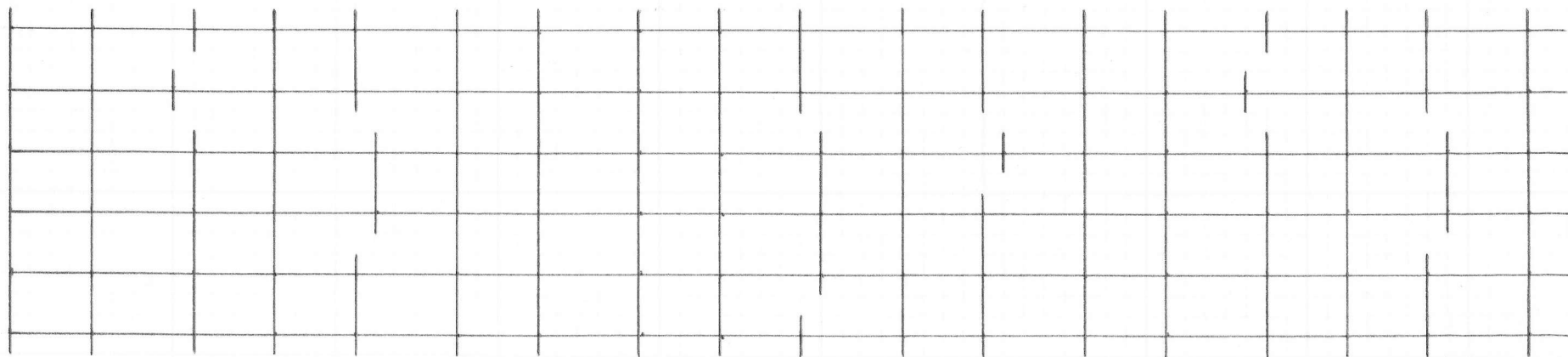
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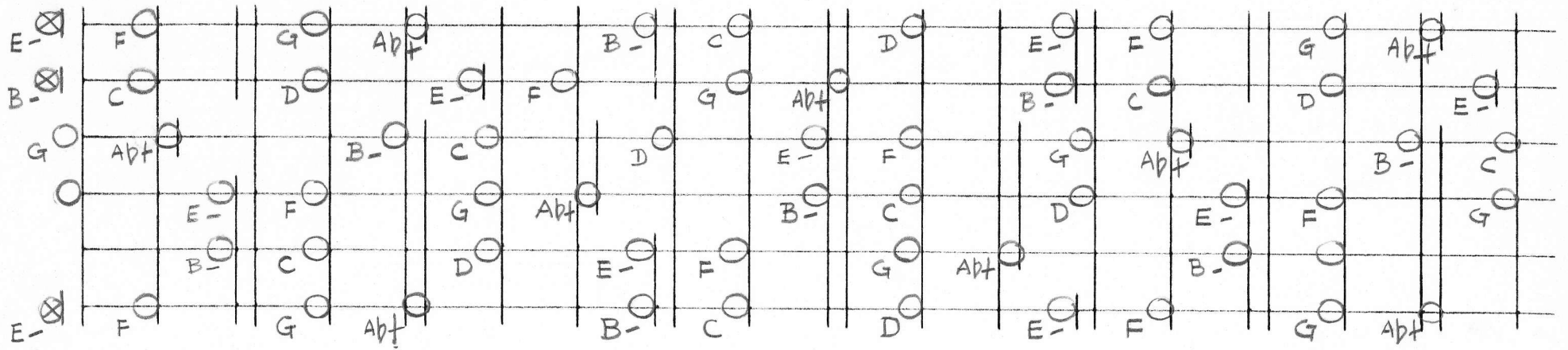
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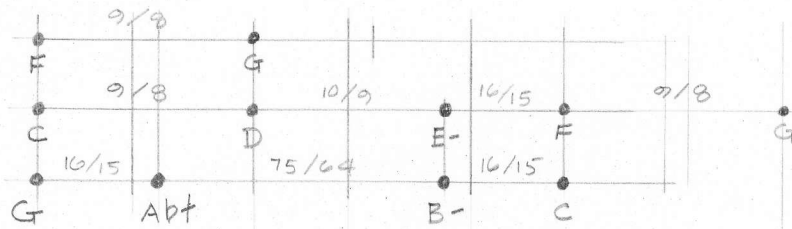
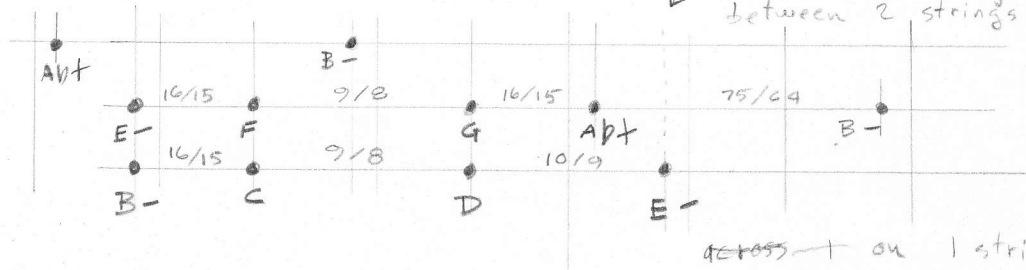
| | || | || | | || | || | | || | | ||







Safi al-Din's fret went straight across ^{systematically} eliminating the diminished 4th between 2 strings



across — on 1 string the dim. 4th is in the most awkward possible location; 1 fret short of the 8ve to 8 frets in the 2nd 8ve, CLLCLL

E	E	$\frac{10}{9}$	F#	$\frac{9}{8}$	G#	$\frac{16}{15}$	A	$\frac{9}{8}$	B	$\frac{10}{9}$	C#	$\frac{16}{15}$	D	$\frac{9}{8}$	E
B	B	$\frac{10}{9}$	C#	$\frac{16}{15}$	D	$\frac{9}{8}$	E	$\frac{10}{9}$	F#	$\frac{9}{8}$	G#	$\frac{16}{15}$	A	$\frac{9}{8}$	B
G X	G#	$\frac{16}{15}$	A	$\frac{9}{8}$	B	$\frac{10}{9}$	C#	$\frac{16}{15}$	D	$\frac{9}{8}$	E	$\frac{10}{9}$	F#	$\frac{9}{8}$	G#
D	D	$\frac{9}{8}$	E	$\frac{10}{9}$	F#	$\frac{9}{8}$	G#	$\frac{16}{15}$	A	$\frac{9}{8}$	B	$\frac{10}{9}$	C#	$\frac{16}{15}$	D
A	A	$\frac{9}{8}$	B	$\frac{10}{9}$	C#	$\frac{16}{15}$	D	$\frac{9}{8}$	E	$\frac{10}{9}$	F#	$\frac{9}{8}$	G#	$\frac{16}{15}$	A
E	E	$\frac{10}{9}$	F#	$\frac{9}{8}$	G#	$\frac{16}{15}$	A	$\frac{9}{8}$	B	$\frac{10}{9}$	C#	$\frac{16}{15}$	D	$\frac{9}{8}$	E

A Major guitar

E							
B	$\frac{10}{9}$	C#	D	$\frac{9}{8}$	E		
G	G#	A	$\frac{9}{8}$	B	$\frac{10}{9}$	C#	
D	$\frac{9}{8}$	E	$\frac{10}{9}$	F#	$\frac{9}{8}$	G#	
A	$\frac{9}{8}$	B	$\frac{10}{9}$	C#	$\frac{16}{15}$	D	
E	$\frac{10}{9}$	F#	$\frac{9}{8}$	G#	$\frac{16}{15}$	A	

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 $\frac{31}{0}$

G	$\frac{4}{3}$	$\frac{45}{32}$	$\frac{36}{25}$	$\frac{3}{2}$	$\frac{25}{16}$	$\frac{8}{5}$	$\frac{5}{3}$	$\frac{128}{75}$	$\frac{9}{5}$	$\frac{15}{8}$	$\frac{48}{25}$	$\frac{1}{1}$	$\frac{25}{24}$	$\frac{16}{15}$	$\frac{9}{8}$	$\frac{75}{64}$	$\frac{6}{5}$	$\frac{5}{4}$	$\frac{32}{25}$	$\frac{4}{3}$			
D	$\frac{1}{1}$	$\frac{25}{24}$	$\frac{16}{15}$	$\frac{9}{8}$	$\frac{75}{64}$	$\frac{6}{5}$	$\frac{5}{4}$	$\frac{32}{25}$	$\frac{4}{3}$	$\frac{45}{32}$	$\frac{36}{25}$	$\frac{3}{2}$	$\frac{25}{16}$	$\frac{8}{5}$	$\frac{5}{3}$	$\frac{128}{75}$	$\frac{9}{5}$	$\frac{15}{8}$	$\frac{48}{25}$	$\frac{1}{1}$			
A	$\frac{3}{2}$	$\frac{25}{16}$	$\frac{8}{5}$	$\frac{5}{3}$	$\frac{128}{75}$	$\frac{9}{5}$	$\frac{15}{8}$	$\frac{48}{25}$	$\frac{1}{1}$	$\frac{25}{24}$	$\frac{16}{15}$	$\frac{9}{8}$	$\frac{75}{64}$	$\frac{6}{5}$	$\frac{5}{4}$	$\frac{32}{25}$	$\frac{4}{3}$	$\frac{45}{32}$	$\frac{36}{25}$	$\frac{3}{2}$			
E	$\frac{9}{8}$	$\frac{75}{64}$	$\frac{6}{5}$	$\frac{5}{4}$	$\frac{32}{25}$	$\frac{4}{3}$	$\frac{45}{32}$	$\frac{36}{25}$	$\frac{3}{2}$	$\frac{25}{16}$	$\frac{8}{5}$	$\frac{3}{2}$	$\frac{25}{16}$	$\frac{8}{5}$	$\frac{5}{3}$	$\frac{128}{75}$	$\frac{9}{5}$	$\frac{15}{8}$	$\frac{48}{25}$	$\frac{1}{1}$	$\frac{25}{24}$	$\frac{16}{15}$	$\frac{9}{8}$
	5	7	8	16	11	13	15	16	18	20	21	23	24	25	26	28	28	31					

$\frac{128}{75} \frac{225}{128}$

29. Tone Guitar

Scale by Rod Poole
10 May 95

0 ✓
1/1
0/29.

+2 ✓
9/8
5.

+4 ✓
14/11
10.

-1 ✓
4/3
12.

+1 ✓
3/2,
17.

+3 ✓
27/16
22.

+5 ✓
21/11
27.

0
2/1
0/29.

-5
21/20
2.

-3 ✓
32/27
7.

-8
5/4
9.

-4
128/81
19.

-2 ✓
16/9
24.

-7
15/8
26.

-12
63/32
28.

-10
11/10
4.

-8
5/4
9.

-11
22/15
16.

-9
5/3
21.

-12
63/32
28.

-17 ✓
33/32
1.

-15
7/6
6.

-13
21/16
11.

-18 ✓
11/8
13.

-16 ✓
14/9
18.

-14
7/4
23.

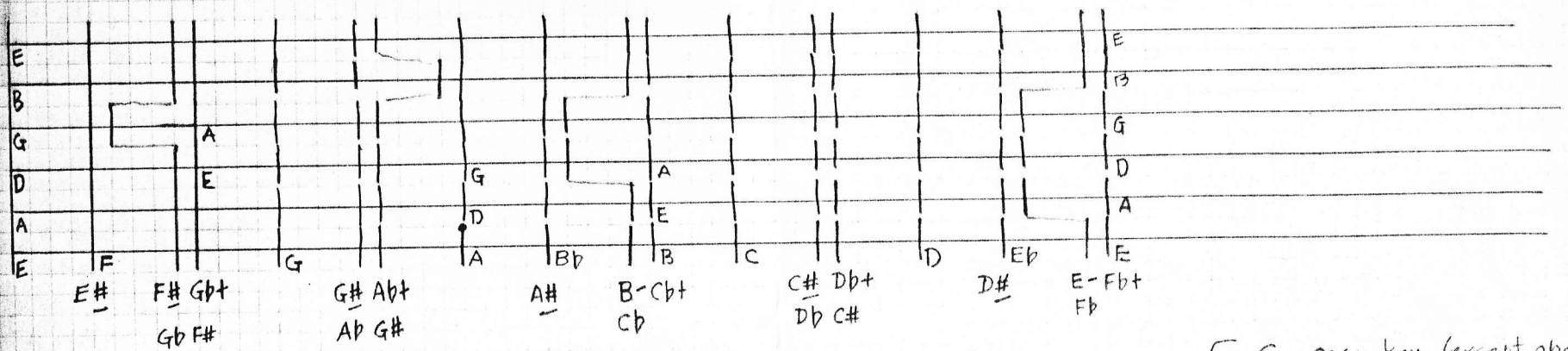
-22 ✓
13/12
3.

-20 ✓
11/9
8.

-23 ✓
13/9
15.

-21 ✓
44/27
20.

-19 ✓
11/6
25.



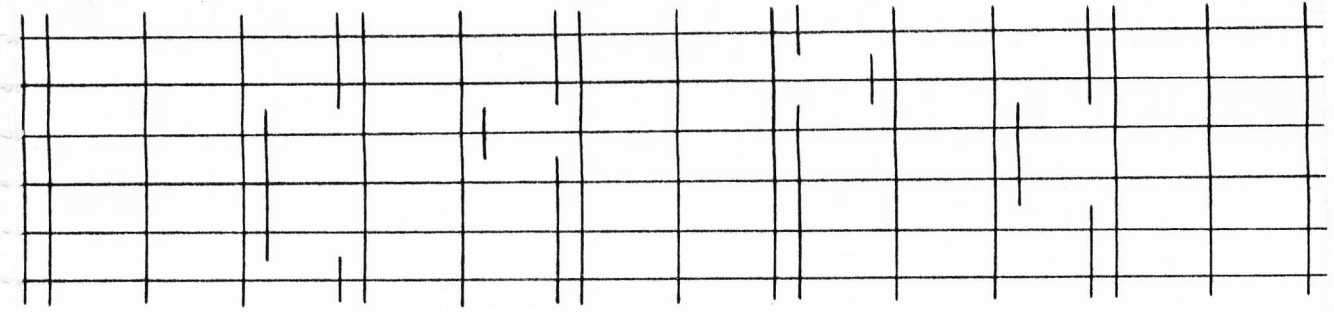
the 6 Keys
of "Just" major

- G easy key (except open E)
- D
- A
- E
- B
- F#

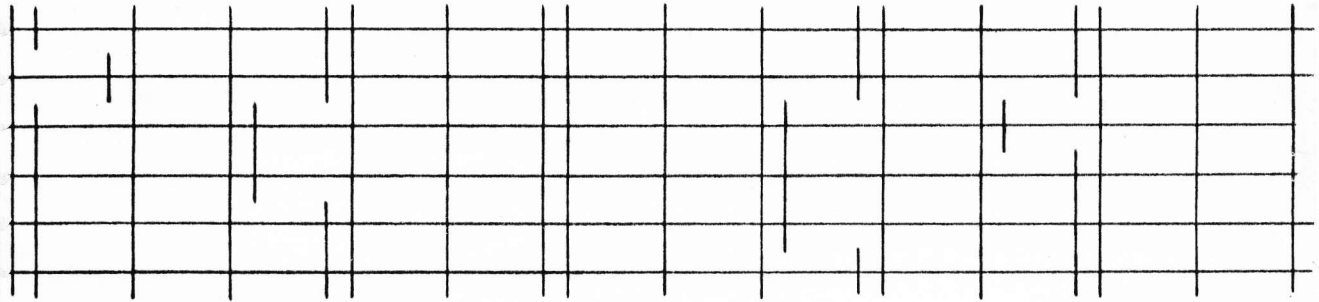
17-tone Guitar Design
© 1984 by Erv Willson
(After a 13th Century Persian Scale)

17-TONE LINEAR, MODES 4-16,
FOR E,A,D,G,B,E TUNING
© 1984 by ER Wilson

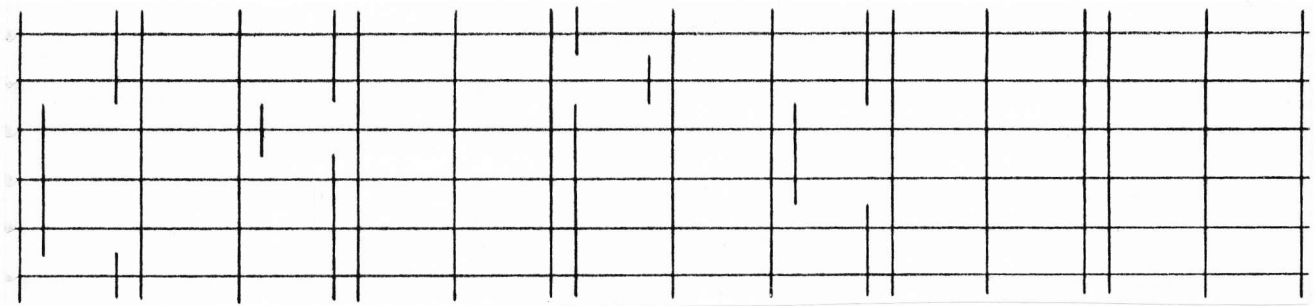
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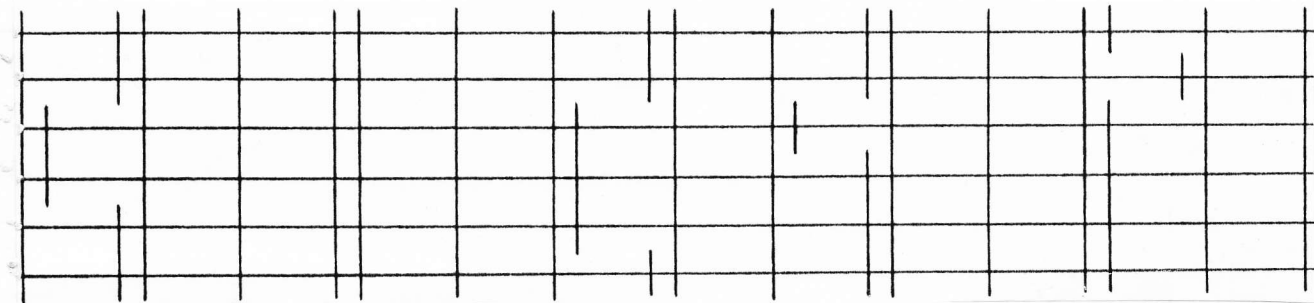
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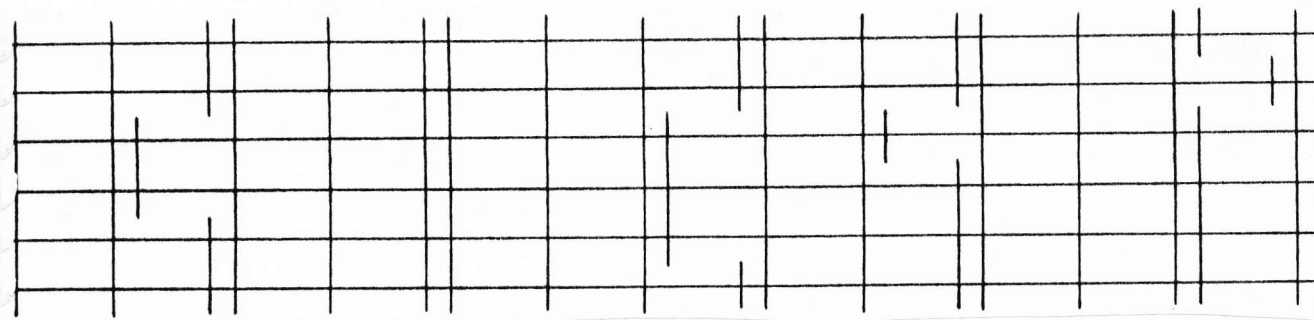
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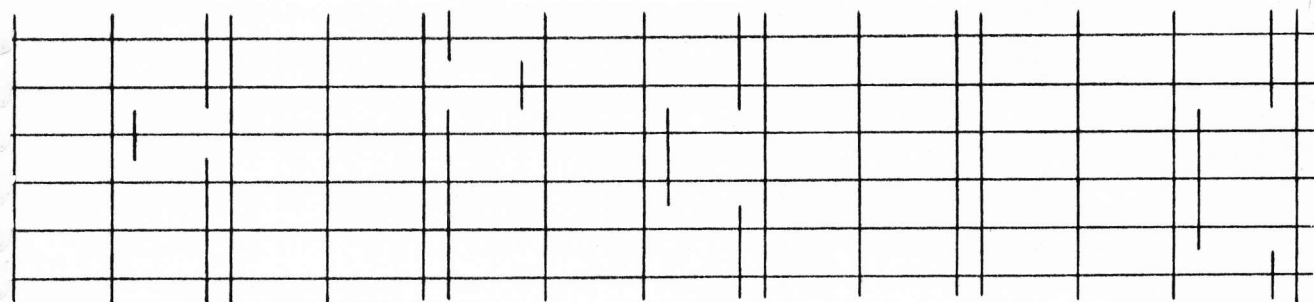
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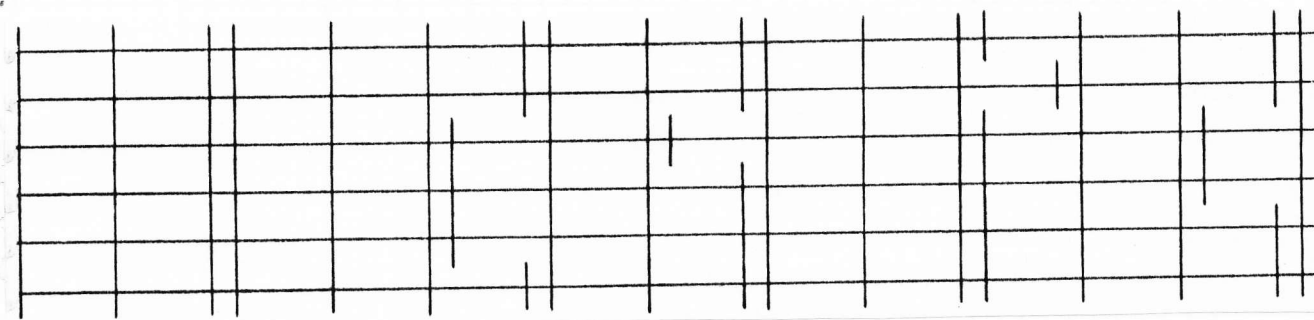
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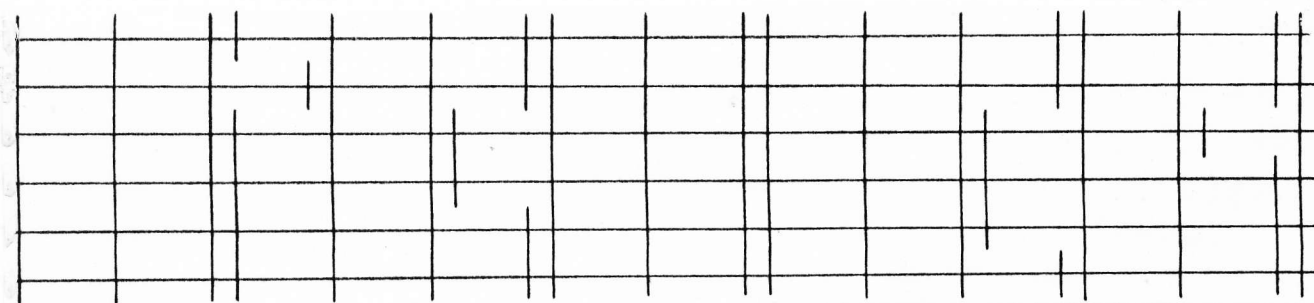
13.



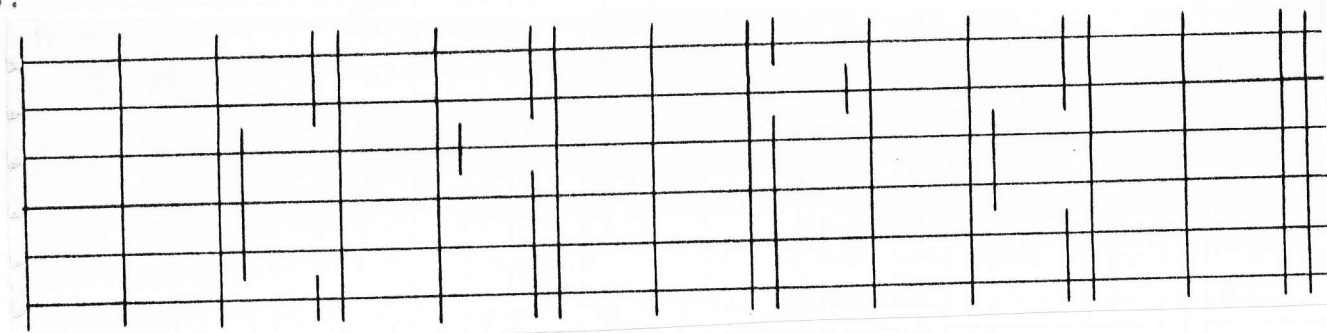
14.



15.



16.



$\frac{4}{3}$ $\frac{7}{5}$ $\frac{13}{11}$ $\frac{3}{2}$ $\frac{4}{3}$ $\frac{44}{27}$ $\frac{5}{3}$ $\frac{7}{4}$ $\frac{11}{6}$ $\frac{15}{8}$ $\frac{21}{11}$ $\frac{1}{1}$ $\frac{21}{20}$ $\frac{13}{12}$ $\frac{9}{8}$ $\frac{7}{6}$ $\frac{11}{9}$ $\frac{5}{4}$ $\frac{14}{11}$ $\frac{4}{3}$
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
 $\frac{1}{1}$ $\frac{21}{20}$ $\frac{13}{12}$ $\frac{9}{8}$ $\frac{7}{6}$ $\frac{11}{9}$ $\frac{5}{4}$ $\frac{21}{16}$ $\frac{11}{8}$ $\frac{45}{32}$ $\frac{63}{44}$ $\frac{3}{2}$ $\frac{63}{40}$ $\frac{13}{8}$ $\frac{27}{16}$ $\frac{7}{4}$ $\frac{11}{6}$ $\frac{15}{8}$ $\frac{21}{11}$ $\frac{2}{1}$

$\frac{22}{21}$ $\frac{13}{11}$ $\frac{14}{13}$ $(\frac{9}{8})$ $\frac{22}{21}$ $\frac{27}{22}$ $\frac{28}{27}$
 $\frac{12}{11}$ $\frac{22}{21}$ $\frac{13}{12}$ $\frac{14}{13}$ $(\frac{9}{8})$

8		9		10		11		12		13		14		15		16
8				10		11				13		7				8
16				20	21	22				26	27	28		Disj.		
16				20	21	22				26	Disj.	14		15		16
8		9		10		11		12		13		14				16
	$\frac{13}{12}$	$\frac{14}{13}$		$\frac{9}{8}$		$\frac{8}{7}$		$\frac{13}{12}$		$\frac{14}{13}$		$\frac{8}{7}$				
	$\frac{7}{6}$			$\frac{9}{8}$		$\frac{8}{7}$		$\frac{7}{6}$				$\frac{8}{7}$				
	$\frac{7}{6}$			$\frac{9}{8}$		$\frac{15}{14}$	$\frac{16}{15}$	$\frac{7}{6}$		$\frac{15}{14}$		$\frac{16}{15}$				
	$\frac{13}{12}$	$\frac{14}{13}$		$\frac{9}{8}$		$\frac{15}{14}$	$\frac{16}{15}$	$\frac{13}{12}$	$\frac{14}{13}$	$\frac{15}{14}$		$\frac{16}{15}$				
				$\frac{9}{8}$												
12	13	14		15		11		12		13		14		15		16
8		9		10		11		12		13				15		16
12	13			10		11		12		13				15		16
12	13			15												16
	$\frac{13}{12}$	$\frac{15}{13}$		Disj.		$\frac{16}{15}$		$\frac{13}{12}$		$\frac{15}{13}$		$\frac{16}{15}$				
8		9		10		11		12				14		15		16
	$\frac{5}{4}$			$\frac{11}{10}$				$\frac{14}{11}$				$\frac{15}{14}$		$\frac{16}{15}$		
8				10		11				14		15				16

Preliminary Notes for Guitar Tuning
 by Eric Williams 1993

← cycle of 3rds (skip every other note)

0/9 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19/0.

1/1 2/20 13/2 9/8 7/6 11/9 5/4 2/16 11/8 45/32 63/44 3/2 63/40 13/8 27/16 7/4 11/4 15/8 21/11 2/1

$\frac{11}{8}$	$\frac{11}{9}$	$\frac{9}{8}$	$\frac{12}{11}$	$\frac{11}{9}$	$\frac{12}{11}$	$\frac{11}{12}$
$\frac{9}{8}$	$\frac{11}{9}$	$\frac{12}{11}$	$\frac{11}{9}$	$\frac{12}{11}$	$\frac{12}{11}$	$\frac{11}{12}$
$\frac{9}{8}$	$\frac{88}{81}$	$\frac{9}{8}$ Disj.	$\frac{12}{11}$	$\frac{9}{8}$	$\frac{88}{81}$	$\frac{12}{11}$
$\frac{5}{4}$	$\frac{11}{10}$	$\frac{12}{11}$	$\frac{11}{9}$	$\frac{12}{11}$		
$\frac{5}{4}$	$\frac{11}{10}$	$\frac{12}{11}$	$\frac{11}{9}$	$\frac{12}{11}$		
0	⋮				⋮	
$\frac{50}{20}$	$\frac{25}{21}$	$\frac{18}{20}$	$\frac{8}{7}$	$\frac{9}{8}$	$\frac{28}{27}$	$\frac{8}{7}$
				$\frac{10}{9}$		
$\frac{21}{20}$	$\frac{10}{9}$	$\frac{9}{8}$ Disj.	$\frac{8}{7}$	$\frac{21}{20}$	$\frac{10}{9}$	$\frac{8}{7}$

← bagpipe-like

(Thirds)

Suggestion

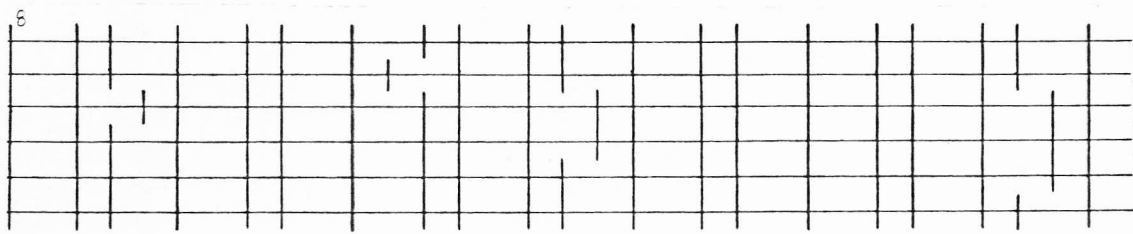
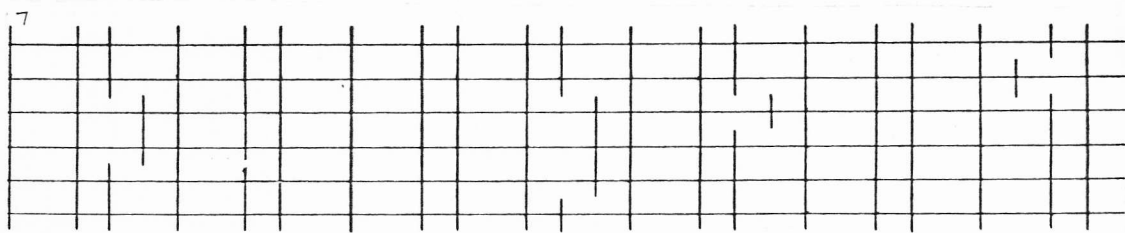
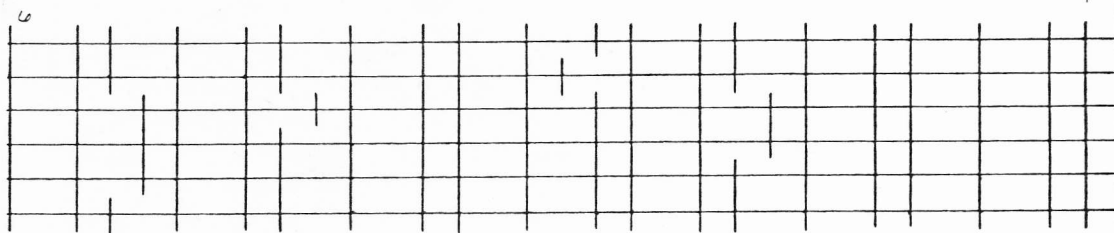
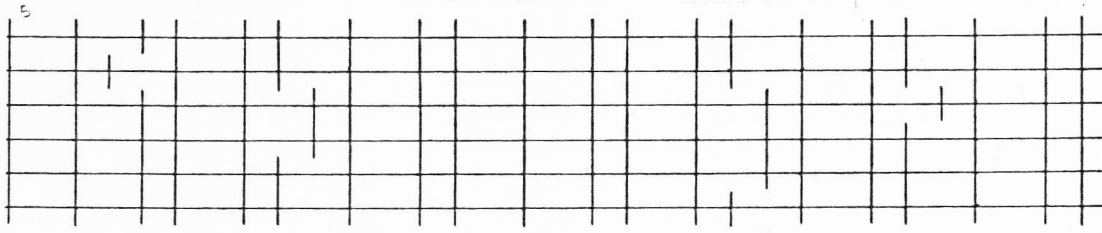
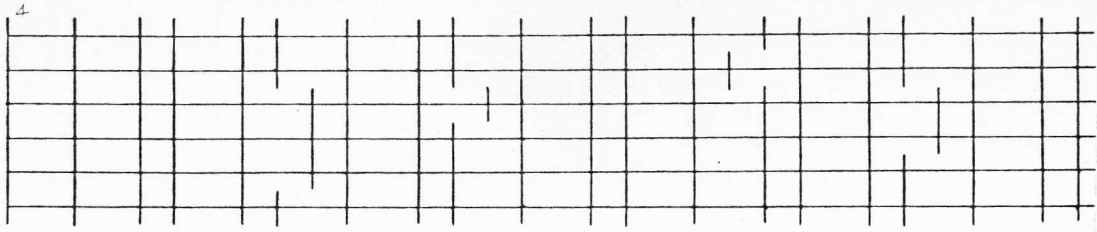
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 1/1 2 1/20 13/12 9/8 7/6 11/9 5/4 21/16 11/8 45/32 63/44 3/2 63/40 13/8 27/16 7/4 11/6 5/8 21/11 2/1

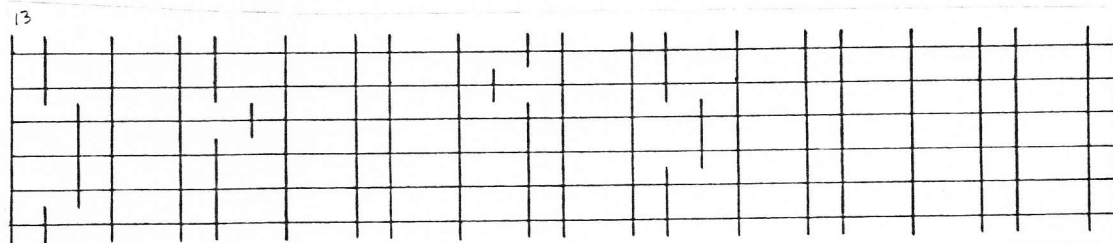
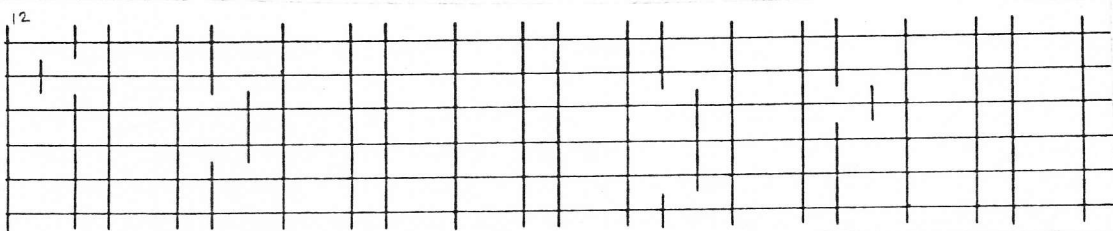
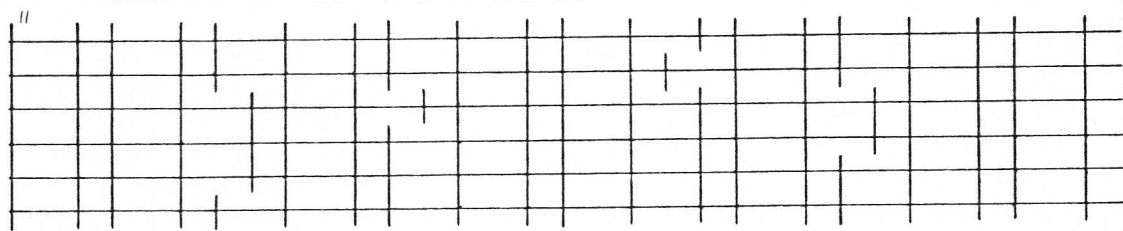
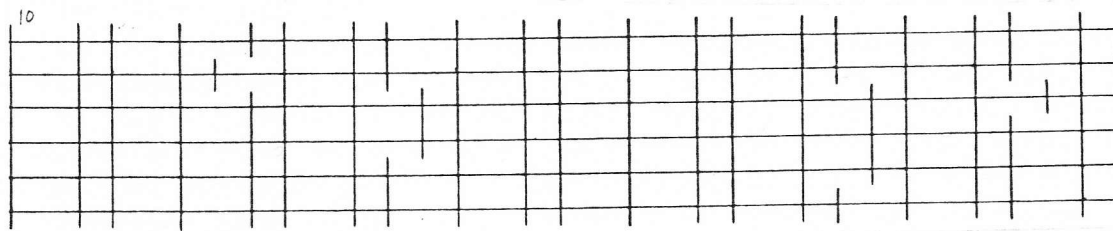
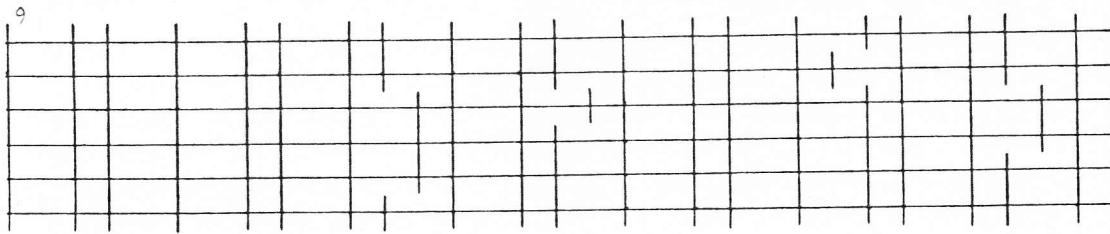
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		15/14	11/10		14/11				14/11
		9/8		$\frac{22}{21}$	14/11				14/11
7/6		15/14	11/10	12/11		7/6	$\frac{22}{21}$	12/11	
7/6		$\frac{22}{21}$	9/8	12/11		7/6	$\frac{22}{21}$	12/11	
7/6		9/8		$\frac{22}{21}$	12/11	7/6	$\frac{22}{21}$	12/11	
9/8		7/6		$\frac{22}{21}$	12/11	7/6	$\frac{22}{21}$	12/11	
¹² 13/12	¹³ 14/13	¹⁴ 15/14	¹⁵ 11/10		12/11	¹³ 12	¹⁴ 1314/13	$\frac{22}{21}$	¹¹ 12/11
	14/13		9/8	$\frac{22}{21}$	13/11		14/13	$\frac{22}{21}$	13/11
	14/13	$\frac{22}{21}$	9/8		13/11		14/13	$\frac{22}{21}$	13/11
	14/13	15/14	11/10		13/11		14/13	$\frac{22}{21}$	13/11

9-tone

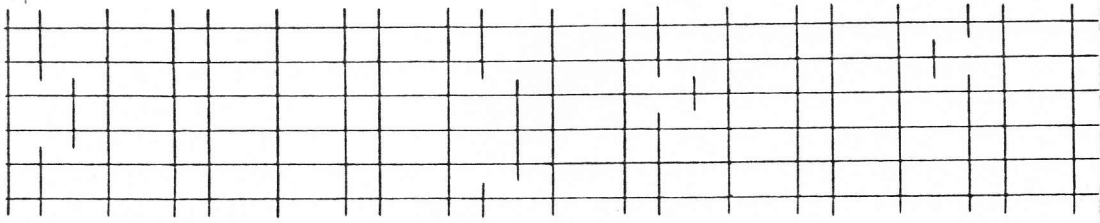
19-TONE LINEAR, MODES 4-18, FOR E, A, D, G, B, E TUNING

©1984 by Eric Wilson

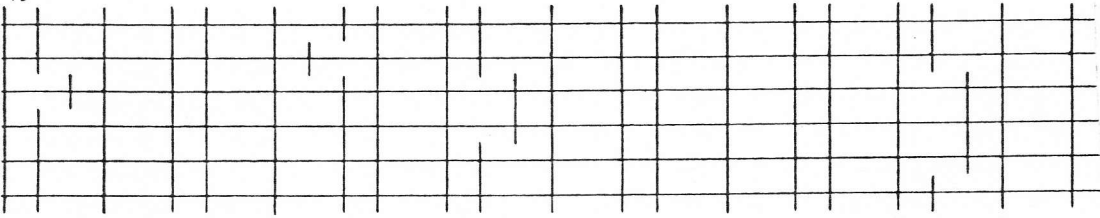




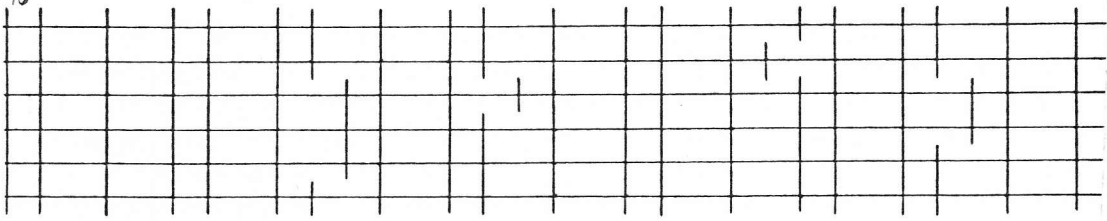
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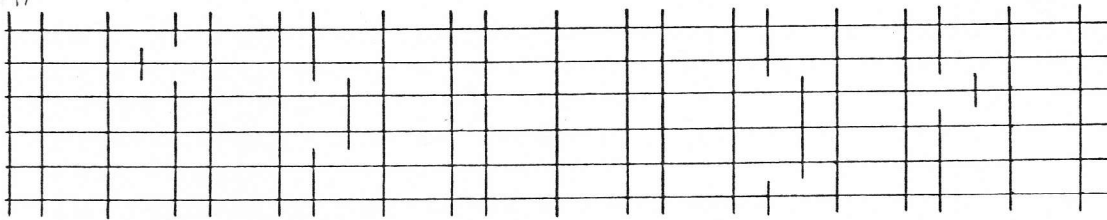
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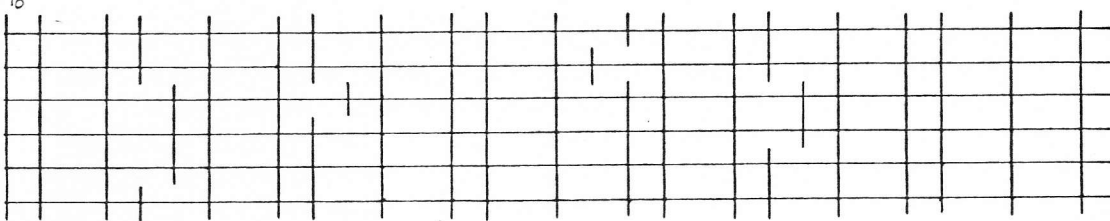
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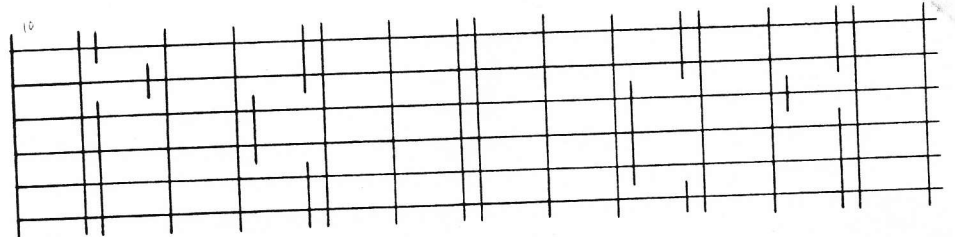
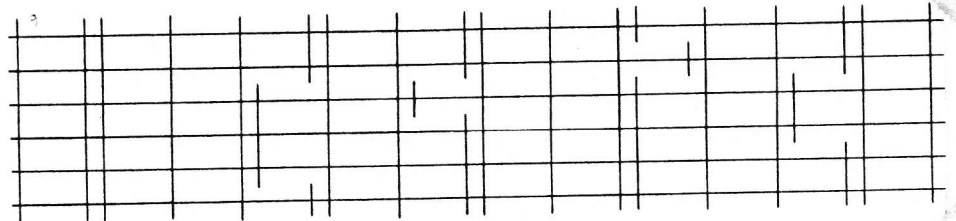
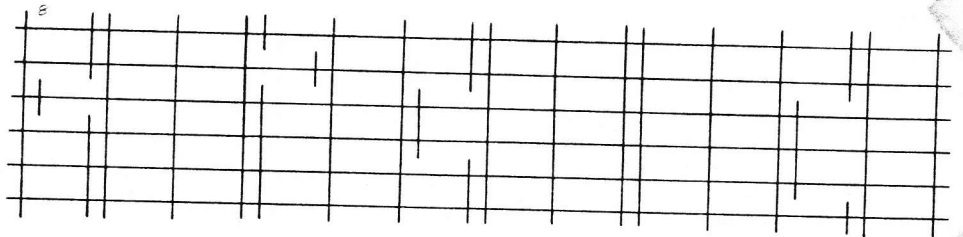
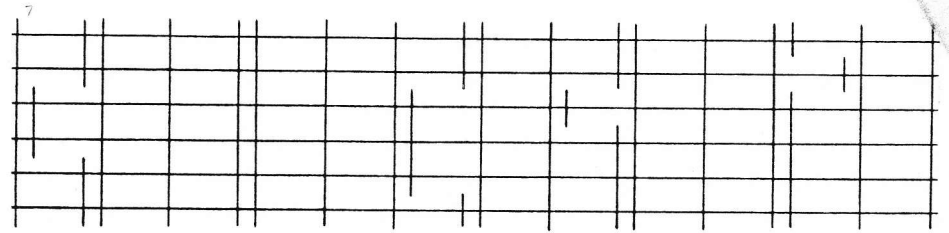
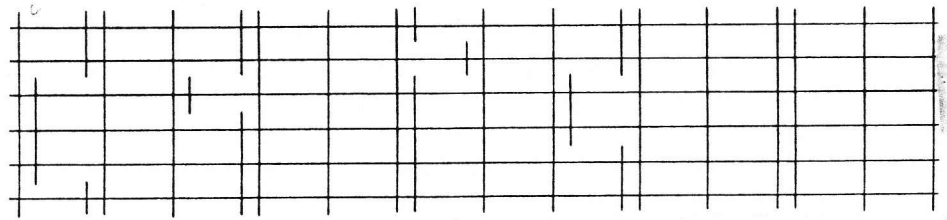
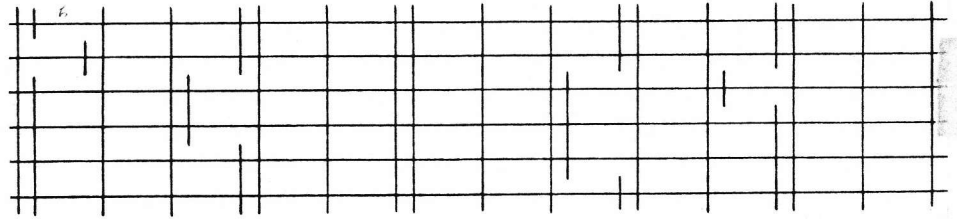
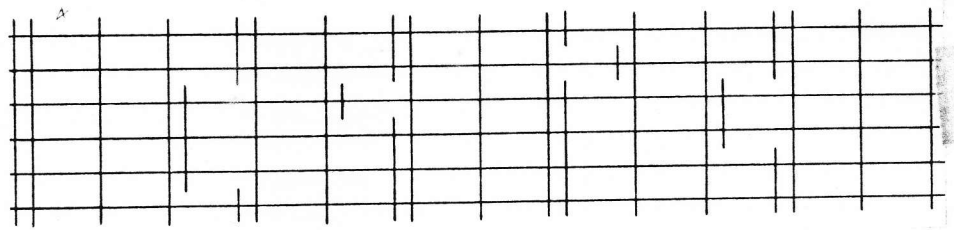


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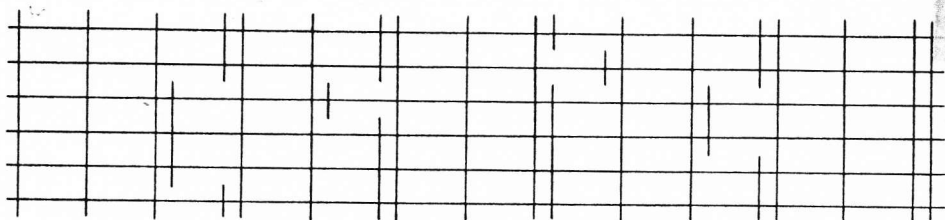
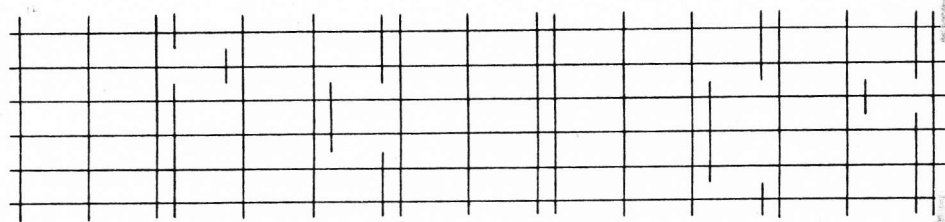
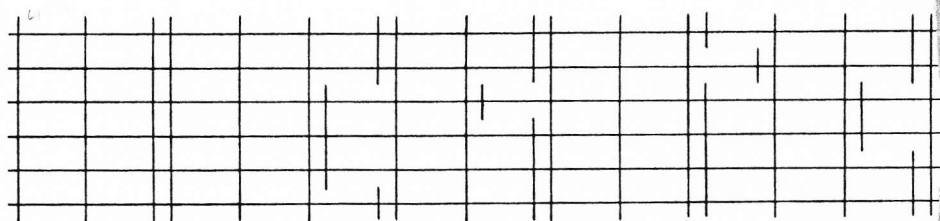
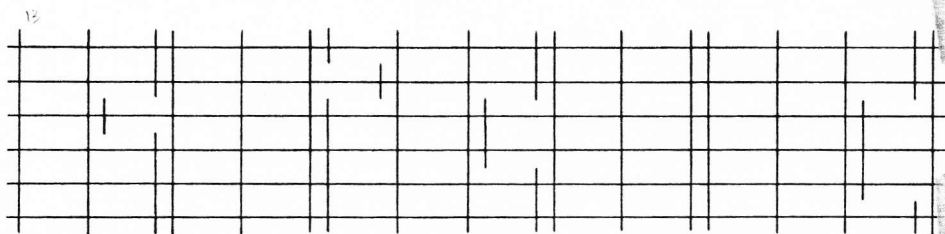
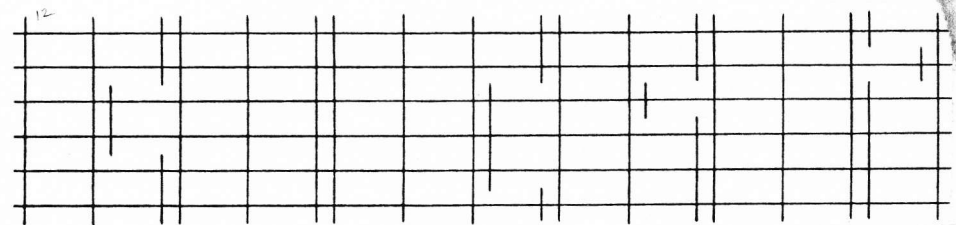
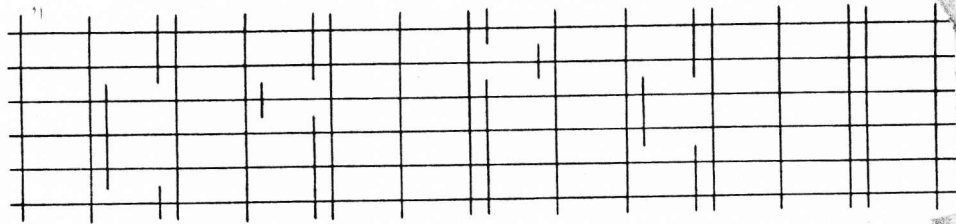


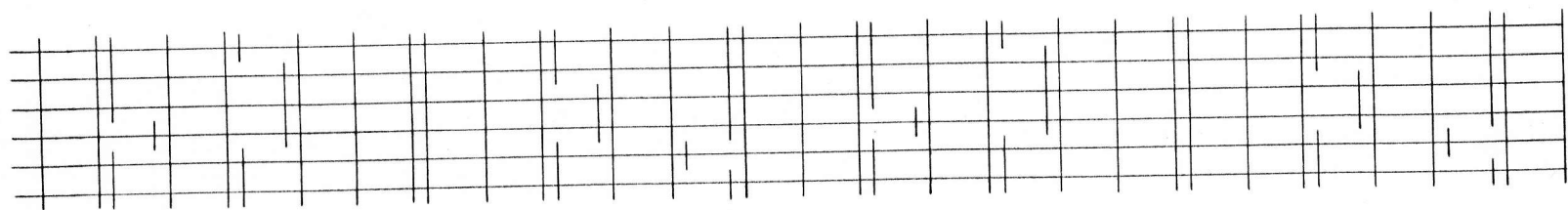
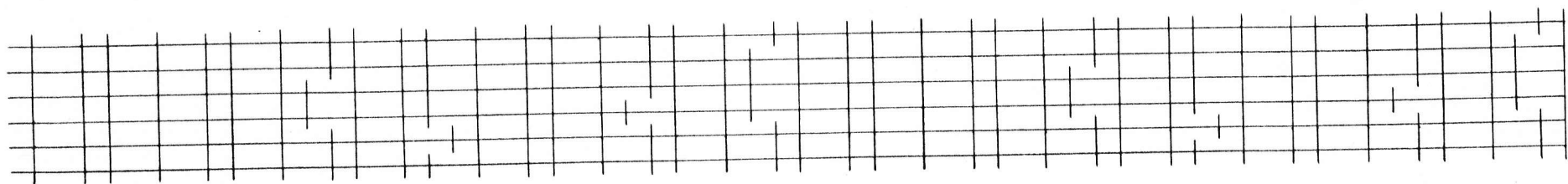
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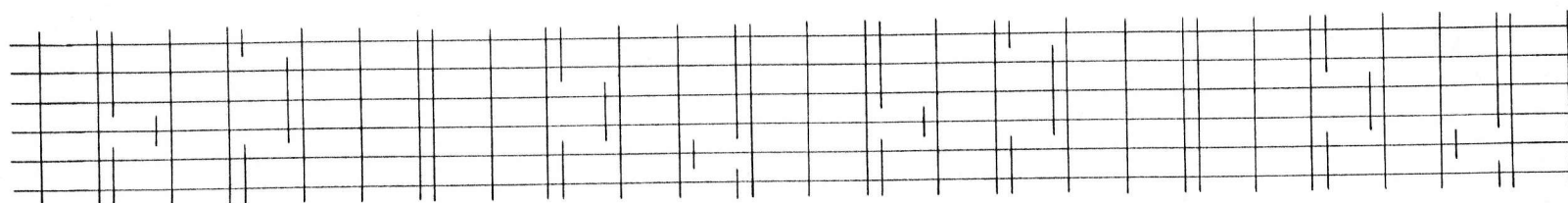
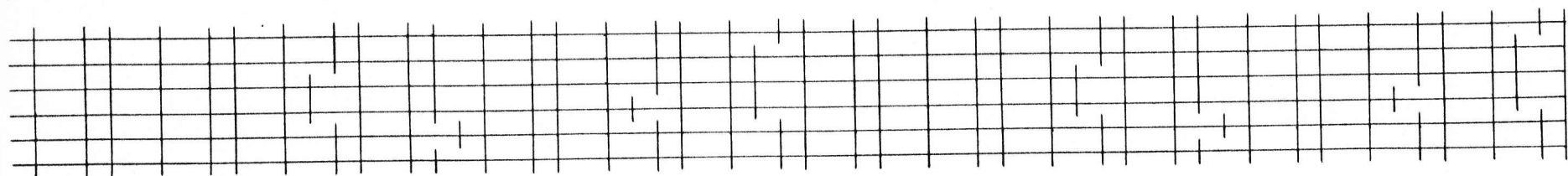




M
E







3 6 9 11 14 17 20 22 25 28 31 34 36 39 42 45 48 50 53
 D E F G A B

Guitar, C major, normal open-string tuning, Hanson 19-tone scale

Diagram of a guitar fretboard showing notes for the first six strings (E, B, G, D, A, E) across frets 1 to 15. The notes are as follows:

Fret	E	B	G	D	A	E
1	F	C	A	E	B	F
2	G	D	B	F	C	G
3	A	E	C	G	D	A
4	B	F	D	A	E	B
5	C	G	E	B	F	C
6	D	A	F	C	G	D
7	E	B	G	D	A	E
8	F	C	A	E	B	F
9	G	D	B	F	C	G
10	A	E	C	G	D	A
11	B	F	D	A	E	B
12	C	G	E	B	F	C
13	D	A	F	C	G	D
14	E	B	G	D	A	E
15	F	C	A	E	B	F

Diagram of a guitar fretboard showing notes for the first six strings (E, B, G, D, A, E) across frets 16 to 24. The notes are as follows:

Fret	E	B	G	D	A	E
16	F#	C#	A#	F	C#	G#
17	G#	D#	B#	G	D#	A#
18	A#	E	C#	A#	F	C#
19	B	F	D#	B	G	D#
20	C	G	E	C	G	D#
21	D	A	F	C	A	E
22	E	B	G	D	A	E
23	F	C	A	E	B	F
24	G	D	B	F	C	G

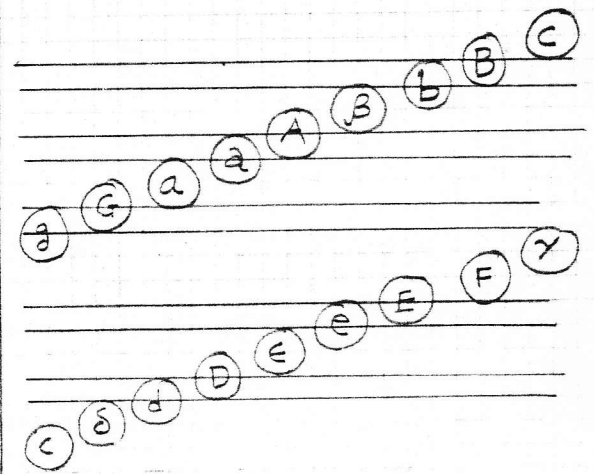
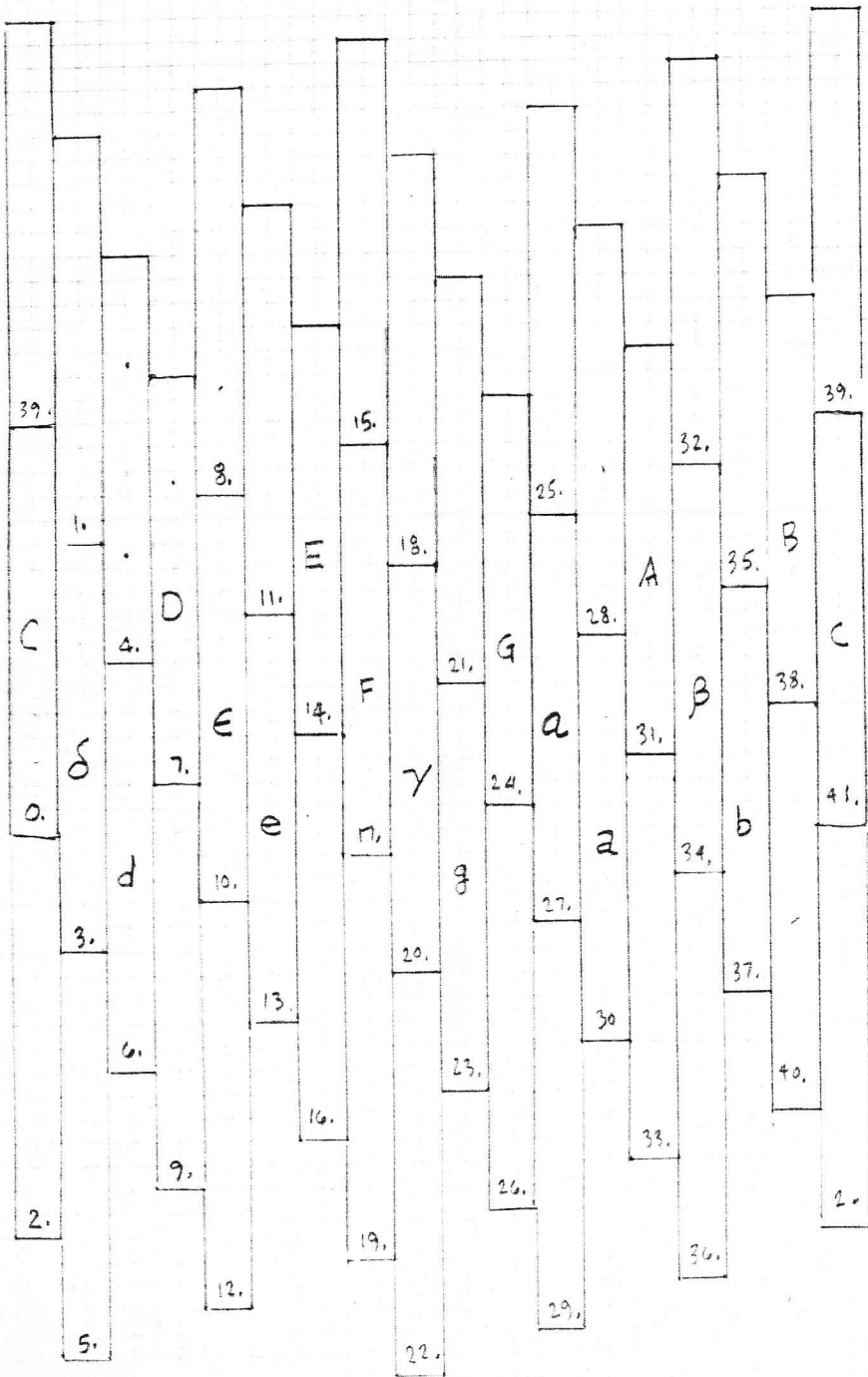
Diagram of a guitar fretboard showing the 19-tone scale across frets 1 to 25. The notes are:

Fret	Note
1	C#
2	D
3	D#
4	E
5	E#
6	F
7	F#
8	G
9	G#
10	A
11	A#
12	B
13	B#
14	C
15	C#
16	D
17	D#
18	E
19	E#
20	F
21	F#
22	G
23	G#
24	A
25	A#

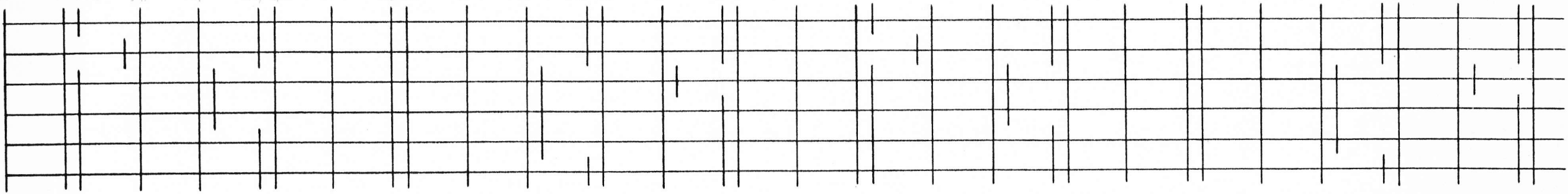
Diagram showing fret positions for natural harmonics on the first six strings (E, B, G, D, A, E) from fret 5 to 25. The fret numbers and corresponding notes are:

Fret	Note
5	G
7	D
9	A
11	E
12	B
14	F
17	C
18	G
19	D
21	A
22	E
23	B
24	F
25	C

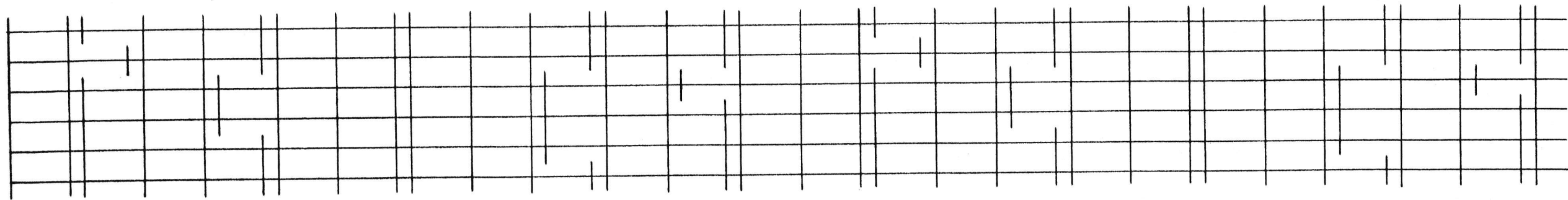
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17



10 5 ^x 17
 ↓
 E F E H 12 7 2 14 9 4 16 11 6 1 13 8 3 15 (10)
 F# G A B C D F# D#



↑
Persian
mode



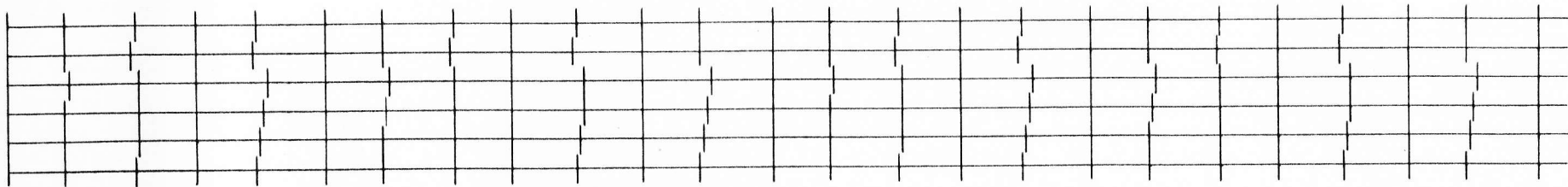
5

2

4

1

3



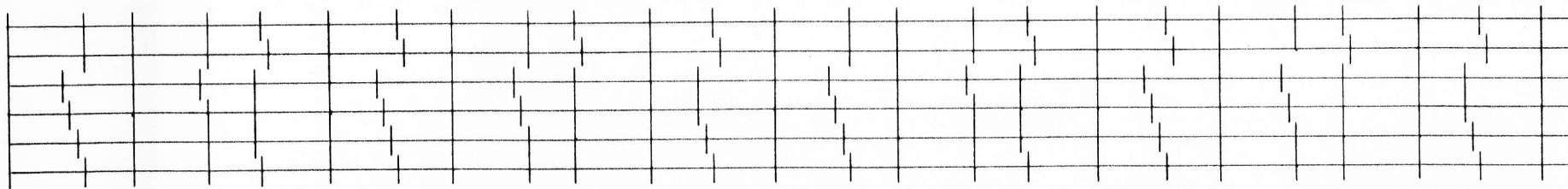
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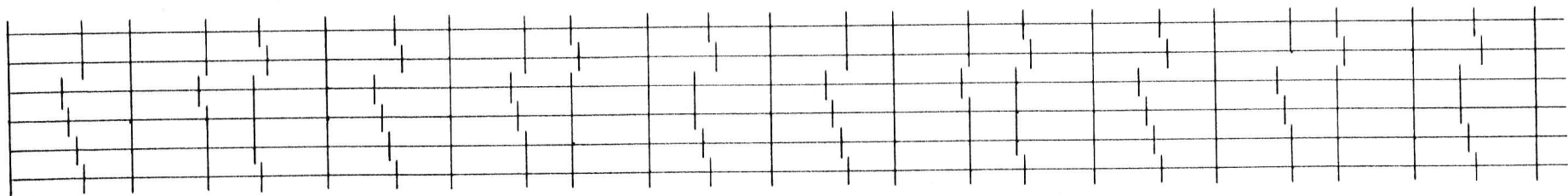
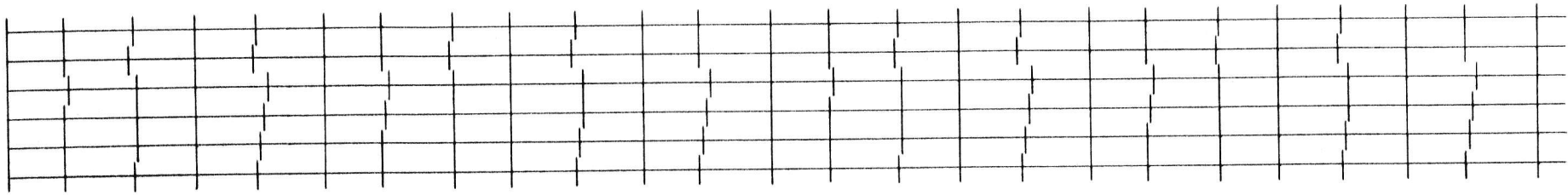
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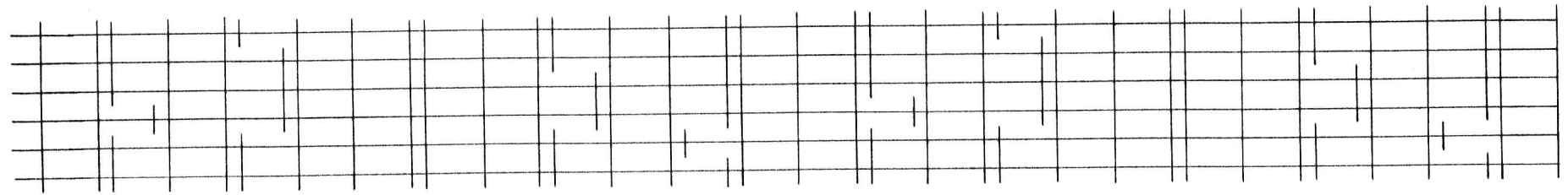
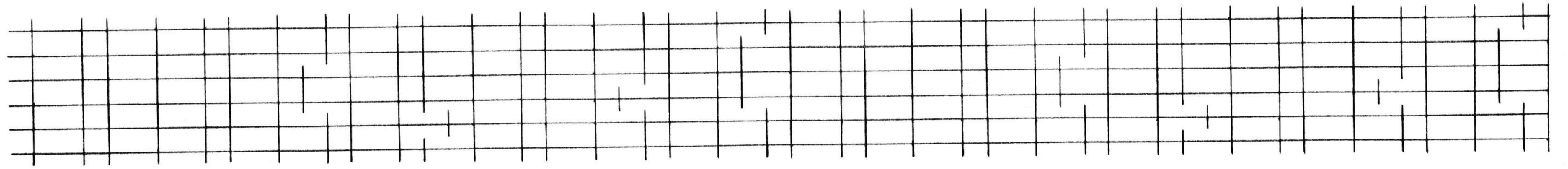
2

4

1







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