short article for the newsletter!!

A Colour Code For Steel Guitar Fretboards in 31-Equal:

In my exploration of Non-twelve sounds, Ive been using the Steel guitar as a practical instrument for realizing on the physical plane those abstract numerical relations which have intriqued my intellect. Much is lost if one cannot actually hear the difference in pitch between a 6:5 and a 7:6. The traditional instrument for such exploration was the Monochord - a stretched string with a moveable bridge and a board for marking down Ratios. Well, what is a Steel Guitar in essence but a stretched string with a moveable bridge (the steel)? Since the Fret markings are just guides, we can use any fret system we want as a guide. Indeed, we can exchange Fretboards at will simply by making cardboard Fretboards and fastening them over the standard 12-Equal Fretboard.

For the last few years I have been doing an inventory of various forms of Equal-Tempered Tuning Systems; that is, working out the mathematics on my pocket calculator, finding the proper Fret positions, then making a Fretboard for my Steel Guitar. The problem with a "microtonal" fretboard, for me, has been trying to "find my way around" it and avoid "getting lost," among all those Fret markings. This problem is particularly accute with one of my favourite Tuning Systems - 31-Equal-Temperament.

Well, the answer to the problem lies in treating the Fret board as a grid pattern. The Fret markings are the vertical lines and the strings form the horizontal lines. Thus each fret position of each string is represented by a particular "box" which may be coloured to make it easier to locate. But what colours for what pitches?

What I'm presenting here is a fairly simple colour scheme that works for me. I won't pretend that it is

the only reasonable colour scheme, but it is consistent and may be modified to fit various Tuning Systems.

The colour code is based on the Monophonic (or Symmetrical) expansion of the Harmonic Series and the order of the Rainbow colours. It is thus a "Modal" approach - treating the various pitches as "distance" or relationship to a Reference pitch (1:1).
Here is the generalized colour code:
1:1 and 2:1 - uncoloured (white or black).
3:2 and 4:3 - Red
5:4 and 8:5 - Orange
6:5 and 5:3 - Yellow
9:8 and 16:9 - Green
16:15 and 15:8 - Blue
Tritones - violet

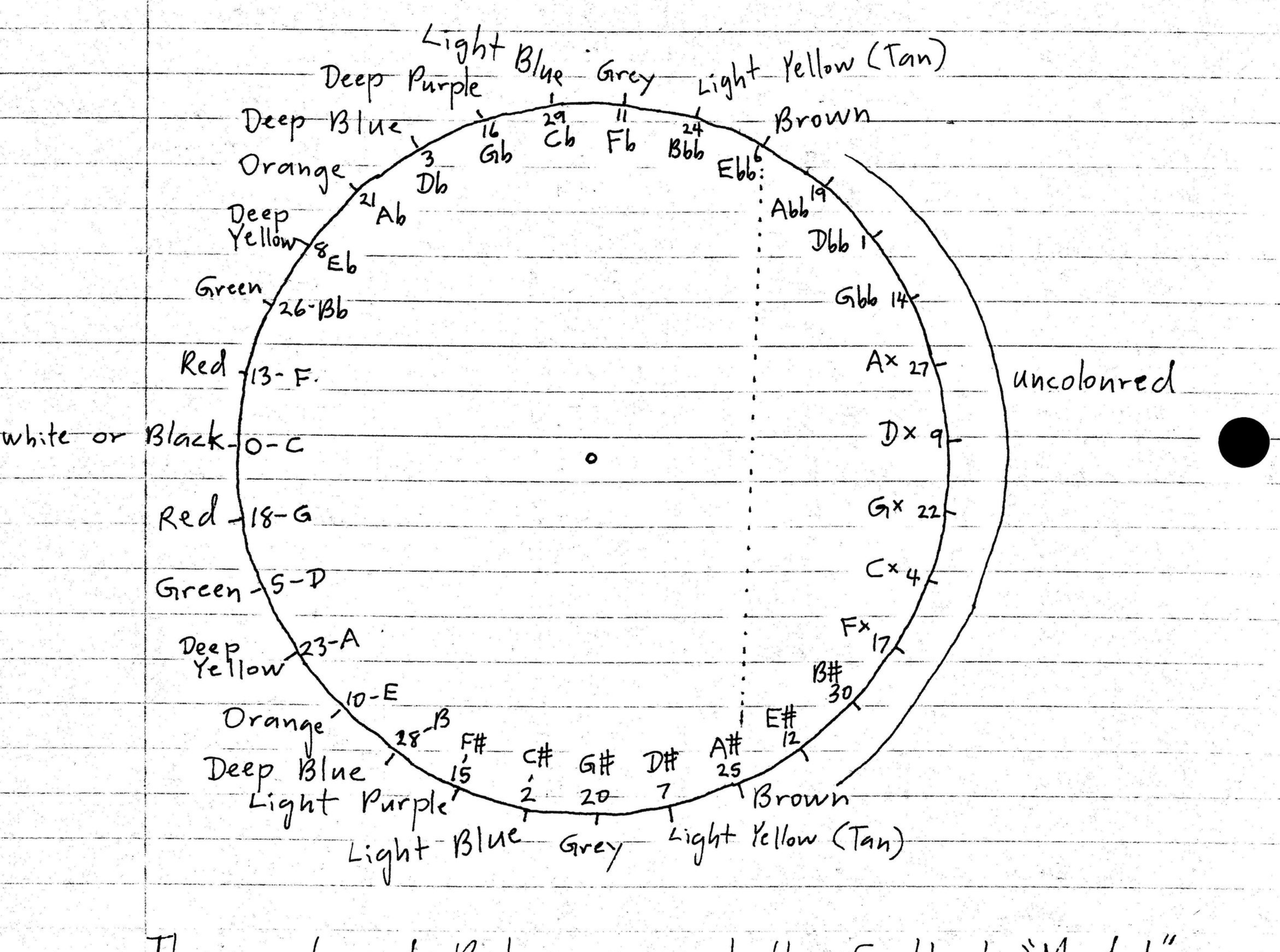
Well, you ask, what about the Ratio 7:6? Since it is a type of "minor third" interval it should be some shade of yellow. In other words, we use different shades of that colour for any Ratio which we would generally classify as a "minor third" eg. 6:5, 32:27, 7:6. Similarly, every size of "whole-step" (eg. 9:8 or 10:9) would be some shade of green. When using Rational Ratios, of course, the problem arises in deciding on a "border" Ratio; for example the ratio 8:7. Is it a large whole step or a small minor third. Really it is both. Shall we colour it Green-yellow?

These "border" problems may or may not arise depending on what tuning system we are using. When we consider 31-Equal-Temperament, the colour code applies beautifully, with some slight modification which I will explain.

Here is the colour pattern:

Im interested in feedback on this colour scheme For 31-Equal and in alternative or improved colour schemes. Also, I have Steel Guitar colour schemes worked out For many other Tuning systems, including 5, 6, 7, 10, 12, 17, 19, 22, 24, 31, 36, and 53 Equal-Temperament. For that information, you may write me (Jonathan has my address) or maybe we could distribute the information through the newsletter. Happy exploring!

Certain Ratios (and thus Pitches) are left uncoloured because too many colours would make the Fretboard harder to read. The reason that those particular Ratios are left uncoloured can be seen by looking at the cycle of Fifths-Fourths For 31-Equal-Temperament:



The uncoloured Ratios represent the Furthest "Modal" distance From the generator tone ("C"). Also, the 6-step (or 7:6) was coloured brown but could have been coloured Green-yellow. Brown stands out more, but either one is fine.

I have found that this colour scheme makes a beautiful looking Fretboard and also a Fretboard on which it is easy to Find one's reference points.

Step Number	Pitch Name	Ratio Approximated	Colour
0	C	1:1 – 2:1	White or Black
1	Dbb	45:44	—
2	C#	22:21	Light Blue
3	Db	16:15	Deep Blue
4	Cx	12:11	—
5	D	9:8 – 10:9	Green
6	Ebb	8:7	Brown
7	D#	7:6	Pale Yellow (Tan)
8	Eb	6:5	Deep Yellow
9	~~D#~~ Dx	11:9	—
10	E	5:4	Deep Orange
11	Fb	32:25	Grey
12	E#	17:13	—
13	F	4:3	Red
14	Gbb	15:11	—
15	F#	7:5	Light Purple (viole
16	Gb	10:7	Deep Purple
17	Fx	19:13	—
18	G	3:2	Red
19	Abb	23:15	—
20	G#	11:7	Grey
21	Ab	8:5	Deep Orange
22	Gx	18:11	—
23	A	5:3	Deep Yellow
24	Bbb	12:7	Pale Yellow (Tan)
25	A#	7:4	Brown
26	Bb	9:5 – 16:9	Green
27	Ax	11:6	—
28	B	15:8	Deep Blue
29	Cb	21:11	Light Blue
30	B#	88:45	—
31(0)	C	1:1 – 2:1	White or Black