(2) When the Fourth subtends 3 scale steps we get this cycle of "tetrachords".

0 1 2 3 4 5 6 7 8 9 10 11 0/12 1 2 3 4 5 6 7 8 9 10 11 0/12 1 2 3 4 5 6 7 8 9 10 11 12
0 5 3 1 6 4 2 0 5 3 1 6 4 2 0 5 3 1 6 4 2 0

3-steps 3 3 3 3 3 3-steps

generating Fourths "disjunct" Fourth

And the final, unifying factor is that the disjunct Fourth is functiming melodi/rythmically in the same capacity as the generating Fourths, hence the cycle, the cyclic feedback which lifts this organization up into an autonomous state. The deletion or addition of a single linear member would disrupt the cyclic continuity.

A moment-of-symetry may be used as a matrix, as a rythmelodic cycle analogous to an acoustic cycle, for which sub-moments may be derived. A spectrum of 5-member sub-moments may be taken from the 7-member moment of symetry, thus:

~~0 5 3~~

~~0 5 3 1 6 4 2 7/0 5 3 1 6 4 2 7/0~~
0 1 2 3 4 5 6 7 8 9 10 11 12/0 1 2 3 4 5 6 7 8 9 10 11 12/0 1 2 3 4 5 6 7 8 9 10 11 14/0
7/0 5 3 1 6 4 2 7/0 5 3 1 6 4 2 7/0 5 3 1 6 4 2 7/0

0 3 1 4 2 5/0 3 1 4 2 5/0

0 3 1 4 2 5/0 3 1 4 2 5/0

0 3 1 4 2 5/0 3 1 4 2 5/0

0 3 1 4 2 5/0 3 1 4 2 5/0

0 3 1 4 2 5/0 3 1 4 2 5/0

0 3 1 4 2 5/0 3 1 4 2 5/0

0 3 1 4 2 5/0 3 1 4 2 5/0

← chain of "Trichords" → ↑ disjunct "Trichord"

And we may observe, with musical interest, the variations occurring to the chain of "Trichords" and disjunct "Trichord". The ~~chain of~~ Fourths of the chain have a "Tolerance" which characterizes them. The disjunct fourth has a different and distinctive tolerance. We have sort of a double-layered depth. Each Interval has 2 size categories, each of which is again divided into 2 sizes.

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26 April, 1975 (2) 7sh

Dear John

The basic structure of the "moments-of-symetry" is almost embarressingly simple. Unfortunately, what is simple is not always obvious, or visa-versa. And we use certain devices, repeatedly, without identifying them. Or we neglect to use them, when we might well have chosen to do so, had we only recognized them.

Let me give a number of examples, starting with the classic moments-of-symetry of 12, where the "generating interval" is the Fourth; (5 units) (and 12 is equal)

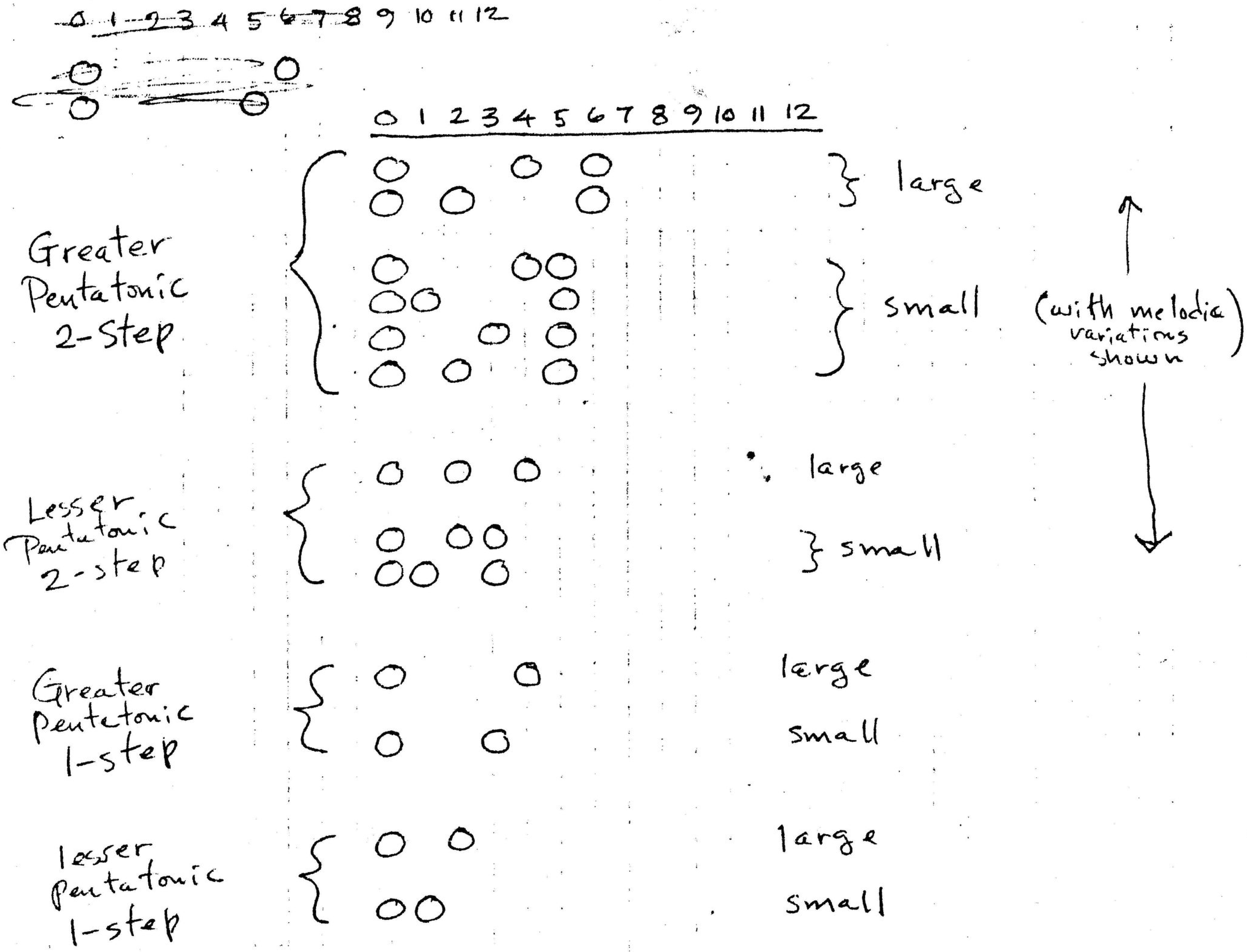
0	1	2	3	4	5	6	7	8	9	10	11	12	
												0	1 (2)
0													
0					1							0	2
0					1					2		0	3
0			3		1			4		2		0	5
0	5		3		1	6		4		2		0	7
0	5	10	3	8	1	6	11	4	9	2	7	0	12

These are all highly coherent patterns, and that is probably why we like them. But why do we stop exactly where we do, at 5 instead of 4 or 6, at 7 instead of 8 or 9 or — ? These structures are so rich in properties that one is hard put to isolate one, and say "this is the raison-dêtre".

I think that as part of the pattern making process we latch onto cycles. That anywhere a cycle has the potential of forming, it will tend to do so. Having asserted itself, its own inertia re-affirms it, and gives it remarkable durability. Now these are not acoustic cycles in the strict, scientific sense. These are functional cycles, or effective cycles, based on melody and rythm, rather than on harmony. That is to say that if an interval is "functioning" as a Fourth it effectively "is" a Fourth. Our perception of Fourth-ness is not just acoustic, i.e. 4/3 determined, it is melodic and/or rythmic influenced to a high degree. We may learn melodically/rythmically to expect the Fourth to subtend 2 scale-steps as it does in the pentatonic. We then experience the pentatonic above as a conjunct series of 2-step Fourths, with a "disjunct" and also 2-step Fourth completing the cycle of melody/rythmic Fourths.

0	1	2	3	4	5	6	7	8	9	10	11	0/12	1	2	3	4	5	6	7	8	9	10	11	12
0			3		1			4		2		0			3		1			4		2		0

2 steps — 2 — 2 — 2 — 2 (disjunct Fourth)



We have "Binary Depth". And, perhaps a kind of perceptual analog to binocular vision; I dont know. But it does seem to me that these "Japanese Pentatonics" carry more information, not less, than the simple, geometric pentatonic. We may observe that the Greater 1-Step does not "interfere" with the Greater 2-Step. Nor does the Lesser 1-Step interfere with the Lesser 2-step. There is a correspondence between the sizes of the Greater 1-steps and the Lesser 2-step, but the psyche experiences no ~~co~~ confusio Indeed, The large Greater 1-step overlaps the small lesser 2-step But I cannot, for the life of me, experience a so-called "contradiction". It seems to me that the organizing principl must override absolute acoustic value of the intervals, in this case, insofar as the perceptual apparatus is concerned.

Let me tabulate some moments of symetry in 17, for example;

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

by 8 units

complements

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

Generated by intervals of 7 units

complements

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

by 6 units

complements

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

by 5 units

complements

By 4 units

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

complements

By 3 units

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

complements

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

complements

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

complements

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 31 32 33 34 35 36 37 38 39 40 41

17-tone moment of Sym by 17 units of 41 (equal)

7 tone moments of Symetry by 5 units of above 17 tone moment

6

0	5	10-2	3	8-4	1	6	11-1	4	9-3	2	7	12 0
0		4		1		5	2		6		3	0/7
	6	3		0/7		4	1		5		2	
	5	2		6		3	0/7		4		1	
	4	1		5		2		6	3		0/7	
	3	0/7		4		1		5	2			6
	2		6	3		0/7		4	1			5
	1		5	2			6	3	0/7			4
	0/7		4	1			5	2		6		3
		6	3	0/7			4	1		5		2
		5	2		6		3	0/7		4		1
		4	1		5		2		6	3		0/7
6		3	0/7		4		1		5	2		6
5		2		6	3		0/7		4	1		5
4		1		5	2		6		3	0/7		4
3		0/7		4	1		5		2		6	3
2		6		3	0/7		4		1		5	2
1		5		2		6	3		0/7		4	1

return to beginning of Cycle

Here 41 is shown as master set for convenient frame of reference. However the 17 tone moment could well be Helmholtz' 1/8 skhisma temperament to 17 places. When that is done, these scales correspond to attached sheet.

A Beautiful Cycle of 7 tone scales derived from Helmholtz' 1/8 skhisma temperament to 17 places

9/8	10/9	9/8	16/15	9/8	10/9	16/15
16/15	10/9	9/8	16/15	9/8	10/9	9/8
16/15	9/8	10/9	16/15	9/8	10/9	9/8
16/15	9/8	10/9	9/8	16/15	10/9	9/8
16/15	9/8	10/9	9/8	16/15	75/64	16/15
9/8	16/15	10/9	9/8	16/15	75/64	16/15
9/8	16/15	75/64	16/15	16/15	75/64	16/15
9/8	16/15	75/64	16/15	9/8	10/9	16/15
9/8	16/15	16/15	75/64	16/15	9/8	10/9
9/8	16/15	9/8	10/9	16/15	9/8	10/9
9/8	16/15	9/8	10/9	9/8	16/15	10/9
10/9	16/15	9/8	10/9	9/8	16/15	9/8
10/9	9/8	16/15	10/9	9/8	16/15	9/8
10/9	9/8	16/15	9/8	10/9	16/15	9/8
10/9	9/8	16/15	9/8	10/9	9/8	16/15
9/8	10/9	16/15	9/8	10/9	9/8	16/15
9/8	10/9	9/8	16/15	10/9	9/8	16/15

Return to Beginning

C Db Ebb D Eb Fb E F Gb G Ab Bbb A Bb Cb C

(C#) (D) (D#) (E) (F#) (G#) (A) (B)