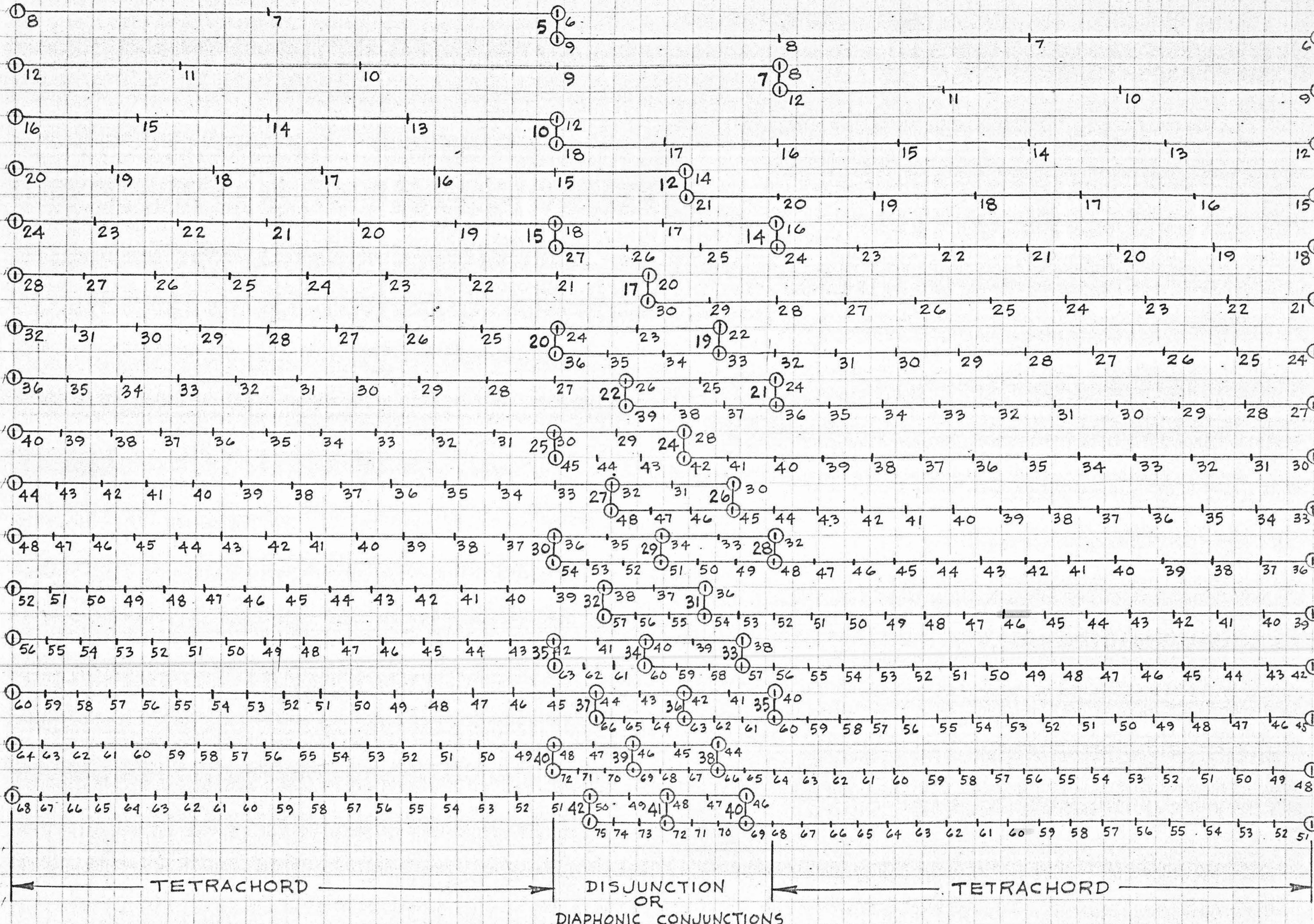
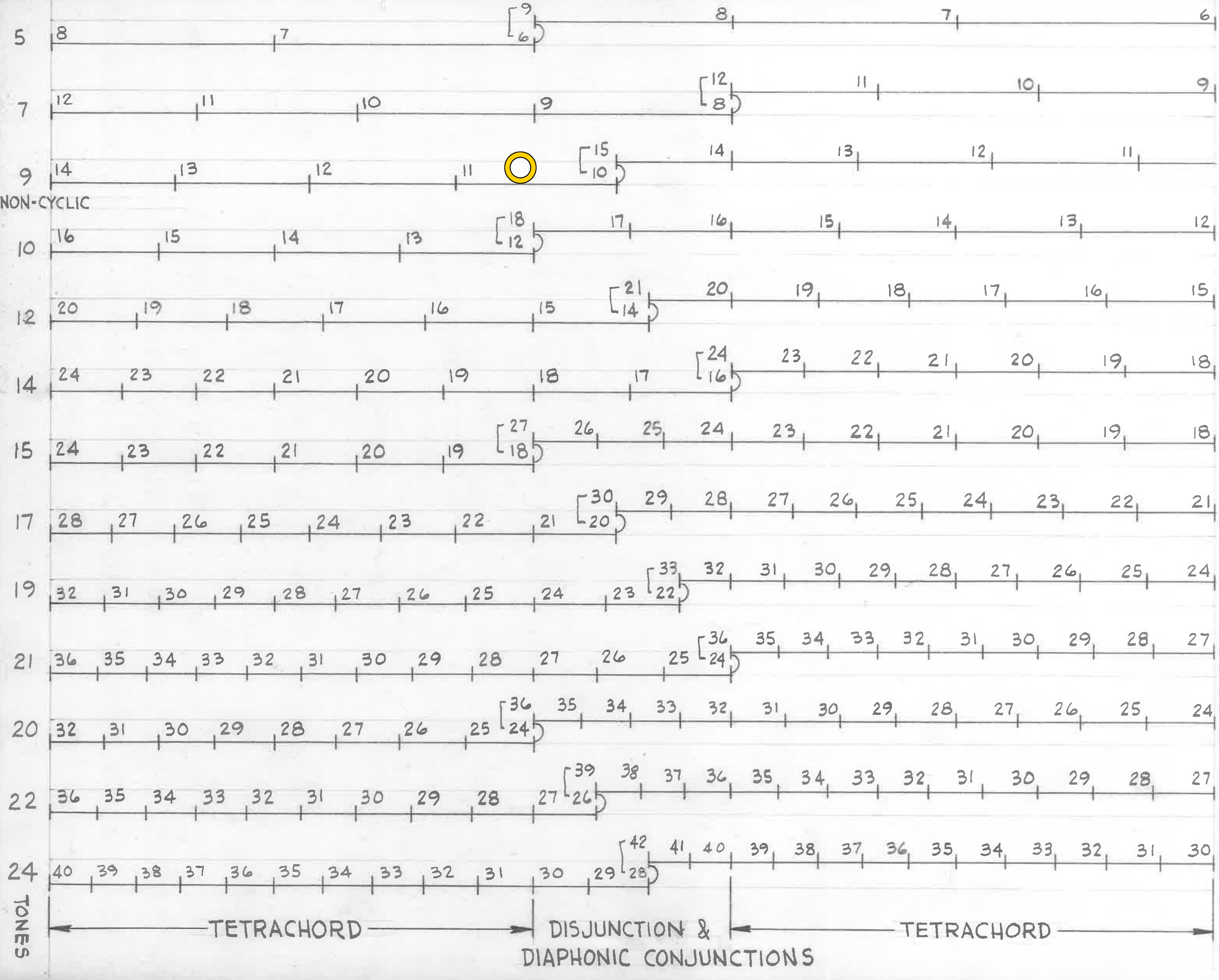
The Diaphonic Cycles are a set of scales originally conceived to be implemented on a string instrument with pairs of stings tuned a 3/2 apart and equally-spaced frets to play sections of the subharmonic series. Like the HelixSongs, the Diaphonic Cycles are conjoined at two nodal points, but unlike the former, tetrachordal or pentachordal segments are used instead of intertwined octave-spanning segments. While Wilson provides classic subset examples of scales derived from these sets, their use is still wide open and he encouraged larger subsets to be used. While the strings are tuned to a simple 3/2 or 4/3 away from each other, the nodal points are quite often at surprisingly unusual intervals which give each series its own unique flavour beyond the subharmonic sections combined.
The Diaphonic Cycles also appear to be Constant Structures.

DIAPHONIC CYCLES IN TETRACHORDAL POSITION

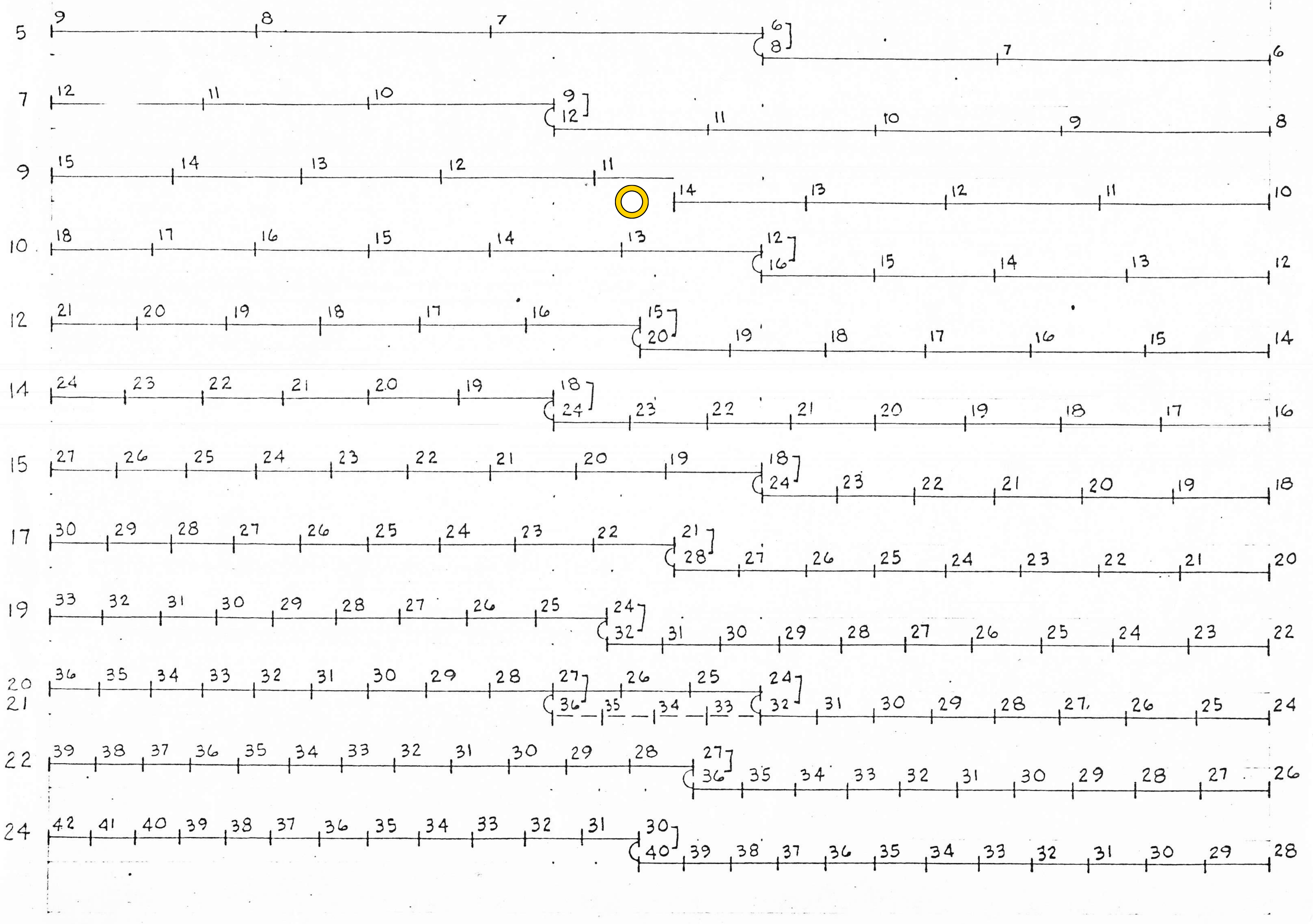


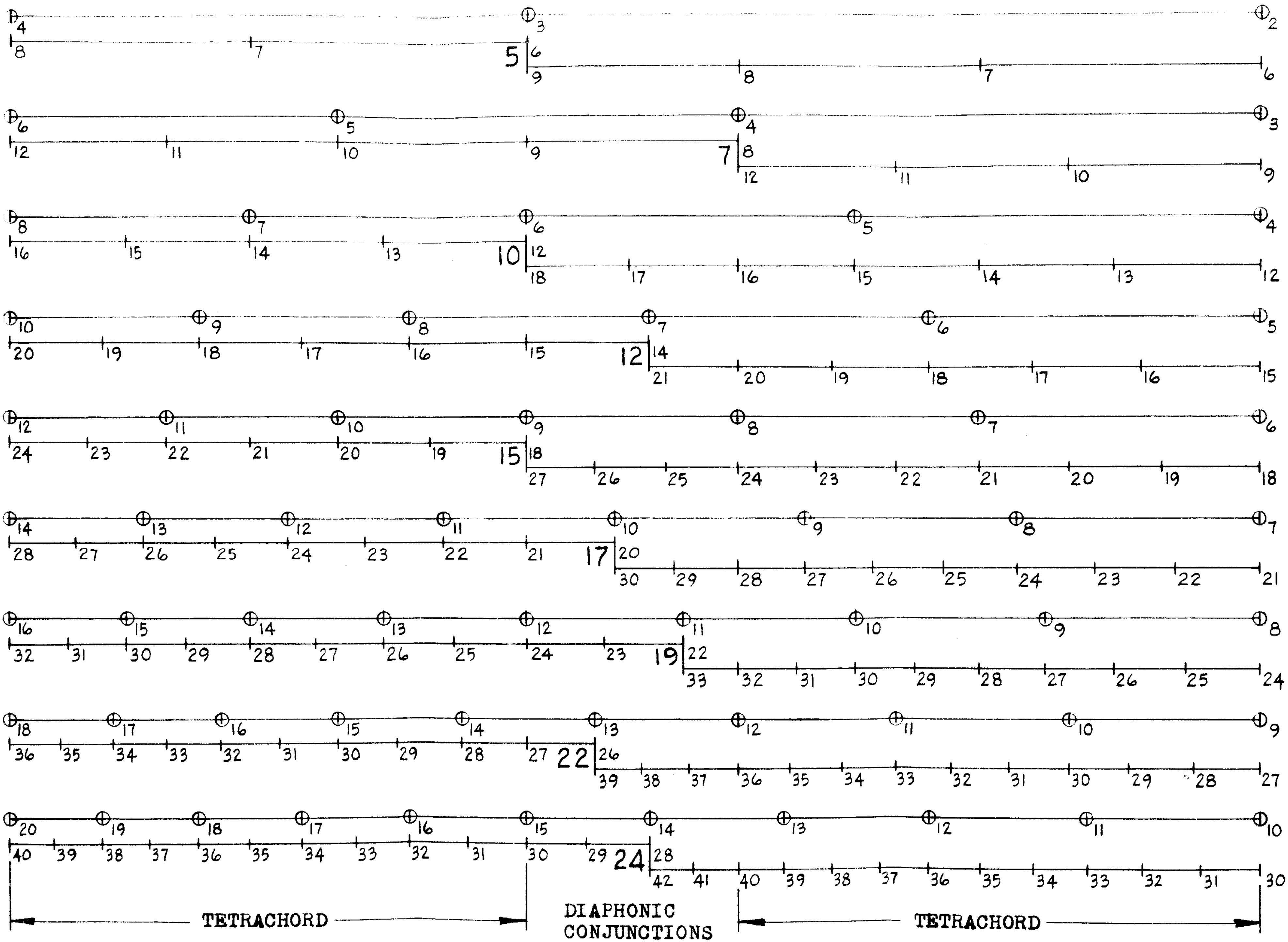
Issued by Erv Wilson Apr 1, 1963

DIAPHONIC CYCLES, (SUBHARMONIC GENUS) IN TETRACHORDAL POSITION
Issued by Ervin M. Wilson Apr 1, 1963 Reissued Jan 13, 1965



LETTER WILSON TO CHALMERS 13 SEP 1963 --- DIAPHONIC CYCLES, SUBHARMONIC SPECIES, CONJUNCTIVE POSITION.





SUBHARMONIC SPECIES, & DIAPHONIC CYCLES (CONSTRUCTED FROM 2 EQUALLY-DIVIDED STRINGS)
Issued 19 Jan 65 by Ervin M. Wilson 651 Huntley Dr., Los Angeles, California 90069

0 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5

42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7

CONJUNCTIONS 14 13 12 11 10 9 8 7 6 5 4 3

LETTER WILSON TO CHALMERS 13 SEP 1963

THE FAMILY OF DIAPHONIC CYCLES, SUBHARMONIC SPECIES
These can be constructed on 2 fretted strings using the aliquot divisions indicated, and tuned to each other as shown by the bracket. These integrate the Schlesinger species with the related, ancient tetrachordal species. 28 tones per 8ve required for entire group. see next 2 sheets for comparative plotting

8 7 6
9 8 7

12 11 10 9 8
12 11 10 9

14 13 12 11 10
15 14 13 12 11 10

16 15 14 13 12
18 17 16 15 14 13 12

20 19 18 17 16 15 14
21 20 19 18 17 16 15

24 23 22 21 20 19 18 17 16
24 23 22 21 20 19 18

24 23 22 21 20 19 18
27 26 25 24 23 22 21 20 19 18

28 27 26 25 24 23 22 21 20
30 29 28 27 26 25 24 23 22 21

32 31 30 29 28 27 26 25 24 23 22
33 32 31 30 29 28 27 26 25 24

32 31 30 29 28 27 26 25 24
36 35 34 33 32 31 30 29 28 27 26 25 24

36 35 34 33 32 31 30 29 28 27 26 25 24
36 35 34 33 32 31 30 29 28 27

36 35 34 33 32 31 30 29 28 27 26
39 38 37 36 35 34 33 32 31 30 29 28 27

40 39 38 37 36 35 34 33 32 31 30 29 28
42 41 40 39 38 37 36 35 34 33 32 31 30

Diaphonic - Symphonic

6 7 8 9
6 7 8

5-tone Major Diaphonic

$\overline{8}\ \overline{7}\ \overline{6}$
$\overline{9}\ \overline{8}\ \overline{7}\ \overline{6}$

5-tone minor Diaphonic

9 10 11 12
8 9 10 11 12

7-tone Major Diaphonic

$\overline{12}\ \overline{11}\ \overline{10}\ \overline{9}\ \overline{8}$
$\overline{12}\ \overline{11}\ \overline{10}\ \overline{9}$

7-tone minor Diaphonic

12 13 14 15 16 17 18
12 13 14 15 16

10-tone Major Diaphonic

$\overline{16}\ \overline{15}\ \overline{14}\ \overline{13}\ \overline{12}$
$\overline{18}\ \overline{17}\ \overline{16}\ \overline{15}\ \overline{14}\ \overline{13}\ \overline{12}$

10-tone minor Diaphonic

15 16 17 18 19 20 21
14 15 16 17 18 19 20

12-tone Major Diaphonic

14 15 16 17 18 19 20 21
15 16 17 18 19 20

12-tone Major Involute Diaphonic

$\overline{20}\ \overline{19}\ \overline{18}\ \overline{17}\ \overline{16}\ \overline{15}\ \overline{14}$
$\overline{21}\ \overline{20}\ \overline{19}\ \overline{18}\ \overline{17}\ \overline{16}\ \overline{15}$

12-tone minor Diaphonic

$\overline{20}\ \overline{19}\ \overline{18}\ \overline{17}\ \overline{16}\ \overline{15}$
$\overline{21}\ \overline{20}\ \overline{19}\ \overline{18}\ \overline{17}\ \overline{16}\ \overline{15}\ \overline{14}$

12-tone minor Involute Diaphonic

18 19 20 21 22 23 24
16 17 18 19 20 21 22 23 24

14-tone Major Diaphonic

$\overline{24}\ \overline{23}\ \overline{22}\ \overline{21}\ \overline{20}\ \overline{19}\ \overline{18}\ \overline{17}\ \overline{16}$
$\overline{24}\ \overline{23}\ \overline{22}\ \overline{21}\ \overline{20}\ \overline{19}\ \overline{18}$

14-tone minor Diaphonic

18 19 20 21 22 23 24 25 26 27
18 19 20 21 22 23 24

15-tone Major Diaphonic

$\overline{24}\ \overline{23}\ \overline{22}\ \overline{21}\ \overline{20}\ \overline{19}\ \overline{18}$
$\overline{27}\ \overline{26}\ \overline{25}\ \overline{24}\ \overline{23}\ \overline{22}\ \overline{21}\ \overline{20}\ \overline{19}\ \overline{18}$

15-tone minor Diaphonic

21 22 23 24 25 26 27 28 29 30
20 21 22 23 24 25 26 27 28

17-tone Major Diaphonic

21 22 23 24 25 26 27 28
20 21 22 23 24 25 26 27 28 29 30

17-tone Major Involute Diaphonic

$\overline{28}\ \overline{27}\ \overline{26}\ \overline{25}\ \overline{24}\ \overline{23}\ \overline{22}\ \overline{21}\ \overline{20}$
$\overline{30}\ \overline{29}\ \overline{28}\ \overline{27}\ \overline{26}\ \overline{25}\ \overline{24}\ \overline{23}\ \overline{22}\ \overline{21}$

17-tone minor Diaphonic

17-tone minor Involute Diaphonic

$\overline{30}\ \overline{29}\ \overline{28}\ \overline{27}\ \overline{26}\ \overline{25}\ \overline{24}\ \overline{23}\ \overline{22}\ \overline{21}\ \overline{20}$

$\overline{28}\ \overline{27}\ \overline{26}\ \overline{25}\ \overline{24}\ \overline{23}\ \overline{22}\ \overline{21}$

19-tone Major Diaphonic

24 25 26 27 28 29 30 31 32 33

22 23 24 25 26 27 28 29 30 31 32

19-tone Major Involute Diaphonic

22 23 24 25 26 27 28 29 30 31 32 33

24 25 26 27 28 29 30 31 32

19-tone minor Diaphonic

$\overline{32}\ \overline{31}\ \overline{30}\ \overline{29}\ \overline{28}\ \overline{27}\ \overline{26}\ \overline{25}\ \overline{24}\ \overline{23}\ \overline{22}$

$\overline{33}\ \overline{32}\ \overline{31}\ \overline{30}\ \overline{29}\ \overline{28}\ \overline{27}\ \overline{26}\ \overline{25}\ \overline{24}$

19-tone minor Involute Diaphonic

$\overline{32}\ \overline{31}\ \overline{30}\ \overline{29}\ \overline{28}\ \overline{27}\ \overline{26}\ \overline{25}\ \overline{24}$

$\overline{33}\ \overline{32}\ \overline{31}\ \overline{30}\ \overline{29}\ \overline{28}\ \overline{27}\ \overline{26}\ \overline{25}\ \overline{24}\ \overline{23}\ \overline{22}$

Resume of Bi-Nodal Scales (Ascending Version)

Diaphonic

Scales with nodes a 4:3 apart:

6 - 9
6 - 8 = 5

8 - 12
9 - 12 = 7

12 - 18
12 - 16 = 10

14 - 21
15 - 20 = 12

16 - 24
18 - 24 = 14

18 - 27
18 - 24 = 15

20 - 30
21 - 28 = 17

22 - 33
24 - 32 = 19

24 - 36
24 - 32 = 20

24 - 36
27 - 36 = 21

26 - 39
27 - 36 = 22

28 - 42
30 - 40 = 24

30 - 45
30 - 40 = 25

30 - 45
33 - 44 = 26

32 - 48
36 - 48 = 28

32 - 48
33 - 44 = 27

34 - 51
36 - 48 = 29

36 - 54
36 - 48 = 30

36 - 54
39 - 52 = 31

38 - 57
39 - 52 = 32

38 - 57
42 - 56 = 33

40 - 60
42 - 56 = 34

40 - 60
45 - 60 = 35

42 - 63
42 - 56 = 35

42 - 63
45 - 60 = 36

Scales with nodes a 7:5 apart:

15 - 21
14 - 20 = 12

20 - 28
21 - 30 = 17

30 - 42
28 - 40 = 24

35 - 49
35 - 50 = 29 * unique

Scales with nodes a 11:8 apart:

24 - 33
22 - 32 = 19

32 - 44
33 - 48 = 27

Scales with nodes a 13:9 apart:

27 - 39
26 - 36 = 22

36 - 52
39 - 54 = 31

Scales with nodes a 15:11 apart

33 - 45
30 - 44 = 26

Scales with nodes a 17:12 apart

36 - 51
34 - 48 = 29

Scales with nodes a 9:7 apart (imperfect)

21 - 27
18 - 28 = 16

28 - 36
27 - 42 = 23

Scales with nodes a 13:10 apart (imperfect)

30 - 39
26 - 40 = 23

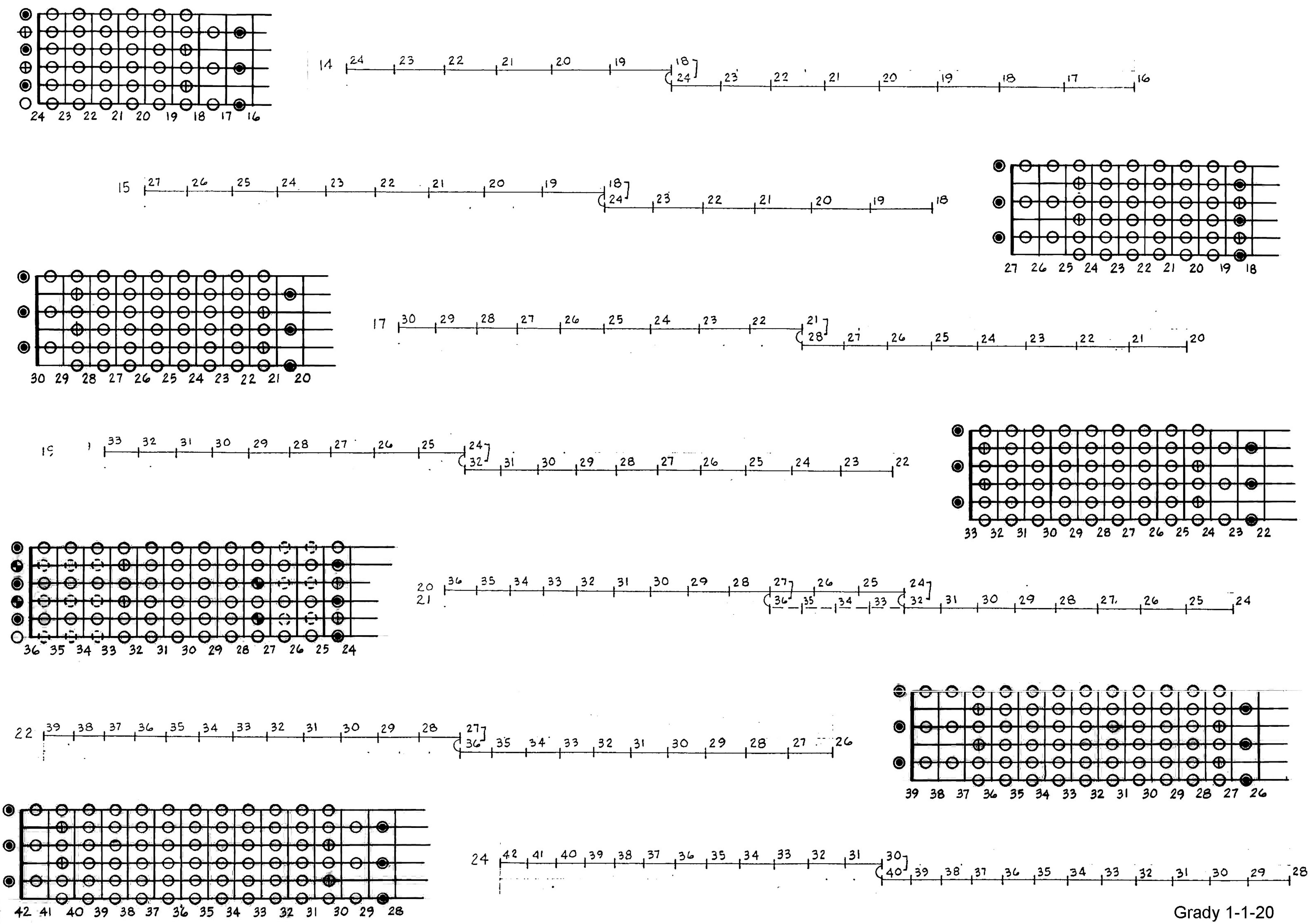
52 - 40
60 - 39 = 33

Scales with nodes a 14:11 apart (imperfect)

33 - 42
28 - 44 = 25

Issued by E. Wilson 1968

Addditional page compiled by Grady showing the guitar fretting to the corresponding Diaphonic Cycle



Grady 1-1-20

ERVIN M WILSON
651 HUNTLEY
LOS ANGELES, CALIF 90069
OCT 6, 1963

JOHN CHALMERS
UNIVERSITY OF CALIFORNIA, SAN DIEGO
LA JOLLA, CALIFORNIA, 92038

DEAR JOHN CHALMERS,

RECIEVED YOUR TRANSLATION OF THE KITAB AL-ABDWAR, FOR WHICH I EXPRESS MY APPRECIATION.

THE ARABS DID FORM 8VE SPECIES BY SUPERIMPOSING THE MOST 'CONSONANT FORMS' OF THESE TETRACHORDS, THE DISJUNCT INTERVAL 9/8 BEING AT THE TOP OR THE BOTTOM FOR 'ROOT' POSITION, DEPENDING ON THE THEORIST, BUT NOT IN THE CENTER. LET A B C AND C B A REPRESENT THE CONSECUTIVE INTERVALS OF THE CONSONANT TETRACHORDS; WHEN THESE ARE SUPERIMPOSED THE REMAINING DISSONANT FORMS APPEAR IN THE 8VE SPECIES:

```
A B C A B C          C B A C B A
  B C A                B A C
    C A B                A C B
```

THEY ENTERTAINED ALL 7 MODES OF THE RESULTANT SPECIES BUT I DONT THINK THEY REGARDED THEM ALL AS EQUALLY CONSONANT.

I WILL HAVE MORE TO SAY ABOUT MIXED TETRACHORDAL SPECIES, LATER.

THE PENTACHORD WAS COMPLETED BY A TETRACHORD OF SIMILAR CONSTRUCTION. (MY CAR WAS DESTROYED THE MORNING AFTER YOU WERE HERE, AND I WILL HAVE TO GET EXACT DETAILS LATER). IN THE SAME MANNER THAT THE TETRACHORDS WERE PERMUTED INTO 3X2X1= 6 varients, THE PENTACHORDS WERE PERMUTED INTO 4X3X2X1=24 variants. FOLLOWING THIS SAME LOGIC WE MIGHT PERMUTATE THE INTERVALS OF SCHLESINGER'S MIXOLYDIAN INTO 7X6X5X4X3X2X1=5040 VARIENTS. WHETHER OR NOT THESE WOULD REMAIN AESTHETICALLY VALID, OR EVEN COMPREHENSIBLE, IS SOMETHING THAT PAT MATHMATICAL LOGIC CANNOT TELL US.

"....THAT IS A HELL OF A LOT OF SCALES."
IT IS USEFULL TO POSIT A TRINARY SPECIES OF POLYCHORDS ON THE 3/2 TO DESCRIBE AND DELIMIT THE DIAPHONIC GENERA (SEE ENCLOSURE). THE FUNCTIONING, CONJUNCTIVE NODES ARE IDENTIFIED AS A,B,C,D, (A,B_2,C_2,D OR A, B_3,C_3, D). TO RESTATE THE FORMULAE:

B/D X A/C = 2/1 DIACYCLE, TETRACHORDAL POSITION
A/C X B/D = 2/1 DIACYCLE, CONJUNCTIVE POSITION

B/C X A/D = 2/1 INVOLUTE DIACYCLE, TETRACHORDAL POSITION
A/D X B/C = 2/1 INVOLUTE DIACYCLE, PENTACHORDAL POSITION

IT SHOULD BE OBSERVED THAT B/DXA/C and A/CXB/D ARE DIFFERENT MODES OF THE SAME, ACOUSTICALLY IDENTICAL CYCLE. LIKEWISE, THAT B/CXA/D AND A/DXB/C ARE MODES OF THE SAME CYCLE.

IT SHOULD BE FURTHER OBSERVED (REF THE CHART OF 'POLY-PENTACHORDS') THAT IN EVERY 4TH SPECIES A AND B ARE IDENTICAL, AND THAT IN EVERY 3RD SPECIES C AND D (C_2,C_3 AND D) ARE IDENTICAL. WHEN EITHER OF THIS 2 CONDITIONS OCCUR THE RESULTANT INVOLUTE DIACYCLE IS ACOUSTICALLY IDENTICAL TO THE EQUIVALENT DIACYCLE. I.E. THE 12, 17, 19, and 22-TONE ARE, FOR EXAMPLE, THE FIRST 4 SPECIES WHERE THE INVOLUTE DIACYCLE IS ACOUSTICALLY DISTINCT FROM THE DIACYCLE.

THE SPECTRUM MEMBERS OF THE ORDINARY CYCLES, IN EACH CASE, (AND THIS IS ARBITRARY DELIMITATION ON MY PART) SPAN THE 3/2. IN TRIANGLES △ ARE IDENTIFIED TWO EXTRA*ORDINARY SPECIES WHOSE SPECTRUM MEMBERS SPAN THE 10/7: 50/35 X 49/35 AND 70/50 X 70/49 WITH 29 AND 41 TONES RESPECTIVELY.

THERE ARE, THEN, ONLY TWO 'FORMS' OF MANY OF THE DIACYCLES (WITH REDUN* DANT FORMULAE), FOUR FORMS OF THE REMAINING EXCEPT 29 and 41 WHICH HAVE SIX FORMS. TO WHAT DEGREE THE MODAL PERMUTATIONS ARE TONALLY VALID REMAINS TO BE EXPLORED. CERTAINLY SOME OF THE MOST UNEXPECTED TURN OUT VERY GOOD.

STILL A HELL OF A LOT OF SCALES FROM THE ANALYTIC APPROACH. WHICH, HOWEVER, FROM A SYNTHETIC VIEWPOINT ARE THE ARRESTED MOMENTS OF THE CHANGING SPECTRUM OF A SINGLE ORGANIZED SYSTEM. I CONCIEVE THE SCALE AS BEING INDEFINITELY VARIABLE, BOTH IN NUMBER AND POSITION OF TONES. THERE IS NO REASON WHY WE MAY NOT CONCIEVE A GAMUT OF, FOR EXAMPLE, (9-TONE SCALES AS ELABORATE AS THE GREEK TETRACHORDAL SYSTEM, IF THESE SATISFY OUR PRESENT MUSICAL NEEDS, STIMULATE OUR CREATIVE FANTASY.

YES! THATS VERY INTERESTING. I, TOO, HAVE FOUND I PREFER SCHLESINGER'S SUBHARMONIC MODES TO THE HARMONIC EQUIVALENTS. THERE IS MUCH MORE TO IT THO; FOR MELODY OR FOR HARMONY? I WILL HAVE MORE TO SAY ABOUT THE INTEGRATION OF THE 2 GENERA FOR MUSICAL PURPOSES. PARTCH'S DIAMOND CONCEPT IS PERTINENT, MOST PERTINENT, IN FACT. IN THE THOUSAND YEARS TO COME PARTCH'S DIAMOND CONCEPT (IN A MORE OR LESS AMPLIFIED FORM) WILL BE CONSIDERED THE MOST SIGNIFICANT CONTRIBUTION TO THE HARMONIC ART THAT THIS LULL-IN-BETWEEN-CREATIVE-PERIODS OFFERED.

THE TRI-CHROMATIC;

WELL, IF MODES:	11 12 13 14 15 16 17 18 19 20 21	ARE DIATONIC
AND MODES:	22 24 26 28 30 32 34 36 38 40 42	ARE 'CHROMATIC'
THEN MODES:	33 36 39 42 45 48 51 54 57 60 63	ARE TRI-CHROMATIC
AND MODES:	44 48 52 56 60 64 68 72 etc	ARE ENHARMONIC
AND MODES:	55 60 65 70 etc	are PENTA*ENHARMONIC

AND SO FORTH AD INFINITUM. ACTUALLY, THESE ANCIENT AND PSEUDO-ANCIENT DEFINITIONS ARE CLUMSY AND ARBITRARY. I PREFER TO THINK IN TERMS OF BINARY, TRINARY, QUATERNARY, PENTANARY, HEXANARY MODES OF ANY GIVEN BASE MODE. FOR EXAMPLE, MODE 60 IS THE BINARY MODE OF MODE 30, THE TRINARY MODE OF MODE 20, THE QUATERNARY MODE OF MODE 15, THE PENTANARY MODE OF MODE 12, THE HEXANARY MODE OF MODE 10. nevertheless, WITH RESPECT TO KATHLEEN SCHLESINGER AND HER GREEKS IVE DONE THIS PLOTTING OF MIXOLYDIAN (/14) IN ITS DIATONIC, CHROMATIC, TRI-CHROMATIC, AND ENHARMONIC FORMS. SOME OF THESE ARE QUITE EXCITING IN THERE ANGULAR, LOGRITHMIC ASYMETRY. IT IS REALLY THE EMPTY SPACES AS MUCH AS THE CONCENTRATIONS OF TONE THAT MAKE THESE SCALES.

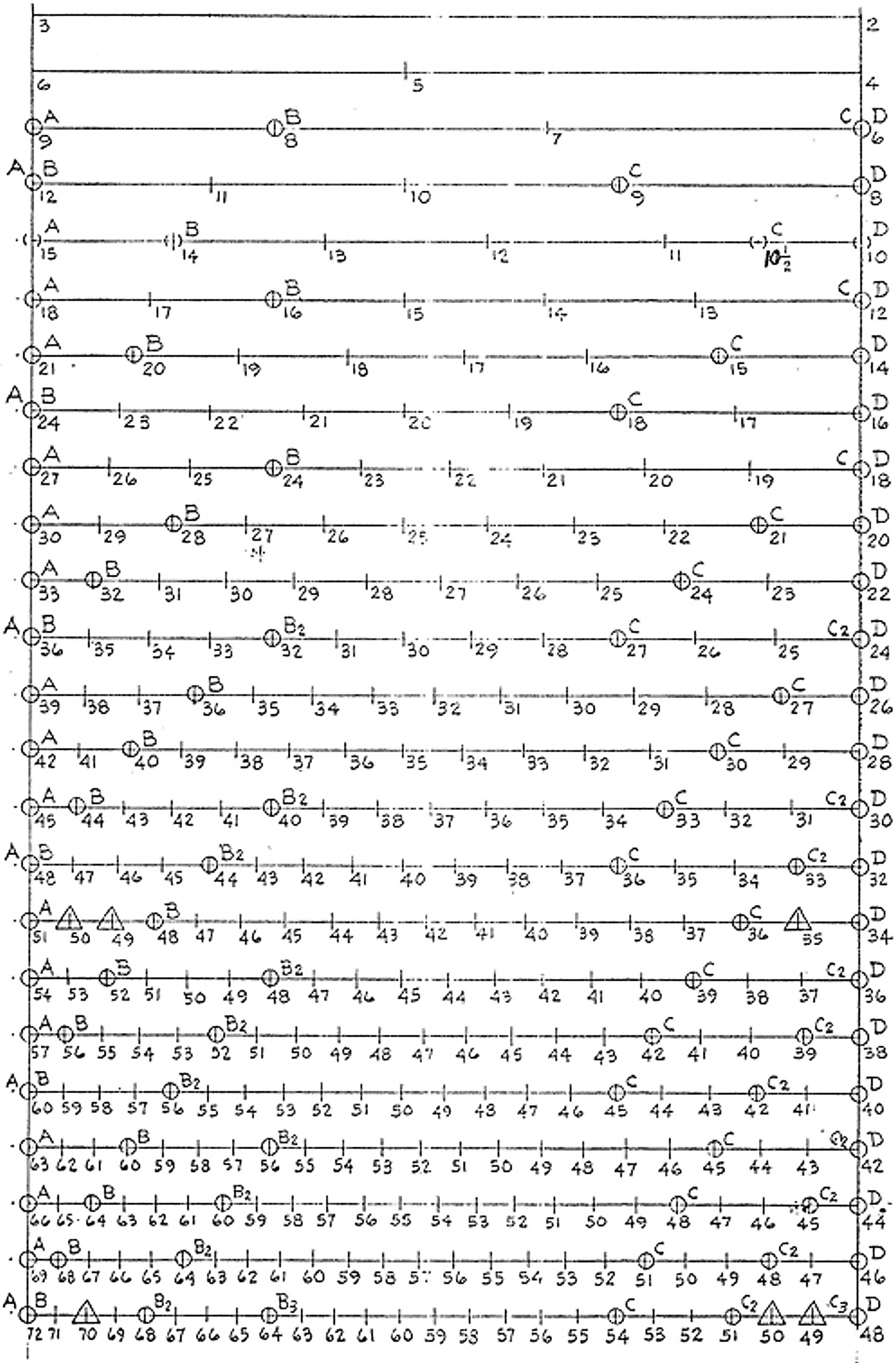
A THIRD CONCEPT WHICH MAY PROVE QUITE MEANINGFUL IS THAT WHICH (FOR LACK OF A TERM) I CALL UNIT-PROPORTION. THIS I HAVE DEMONSTRATED (& I HOPE) on A THIRD ENCLOSED SHEET IN CONJUNCTION WITH A VERY SPECIFIC TYPE OF VARIATION OF THE TETRACHORD 11 10 9 8, INSPIRED BY THE JAVANESE PELOG.

EXPANSION AND CONTRACTION. THE HARMONIC CHORD 8 10 12 16 MAY BY EXPANDED TO 7 9 11 15, OR CONTRACTED TO 9 11 13 17. THE UNIT-PROPORTION REMAINING IN EACH CASE 2-2-4. THIS TECHNIQUE HAS VAST UNEXPLOITED POSSIBILITIES; COMBINED WITH STANDARD COMMON-TONE TECHNIQUES WE GET A SERIES OF SUBTLY BEAUTIFUL CHORD PROGRESSIONS OR MODULATIONS. BUT HERE AGAIN WE ARE RUNNING ACROSS THE PARTCH DIAMOND. MORE ANOTHER TIME.

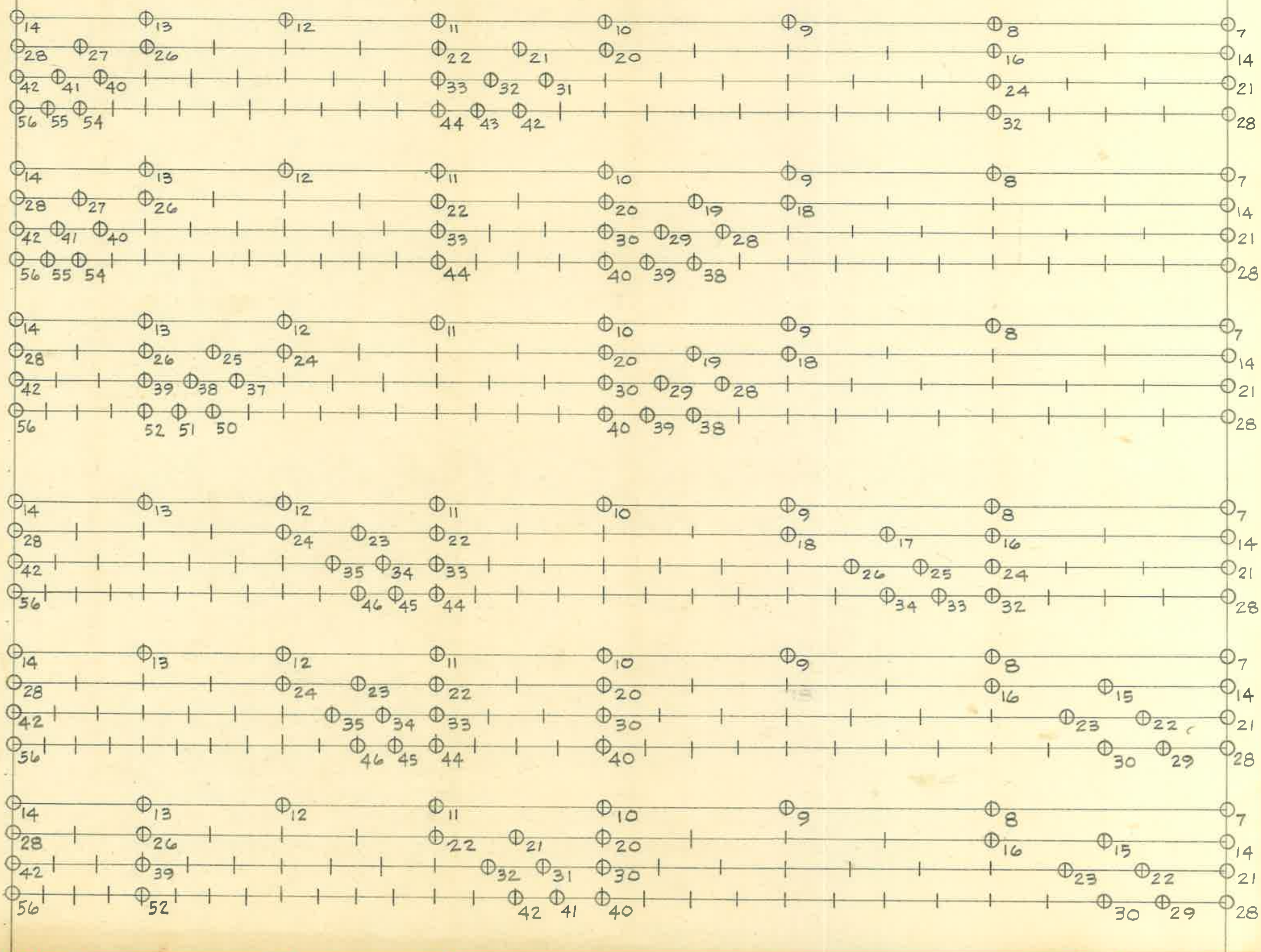
MOST SINCERELY YOURS,

EW

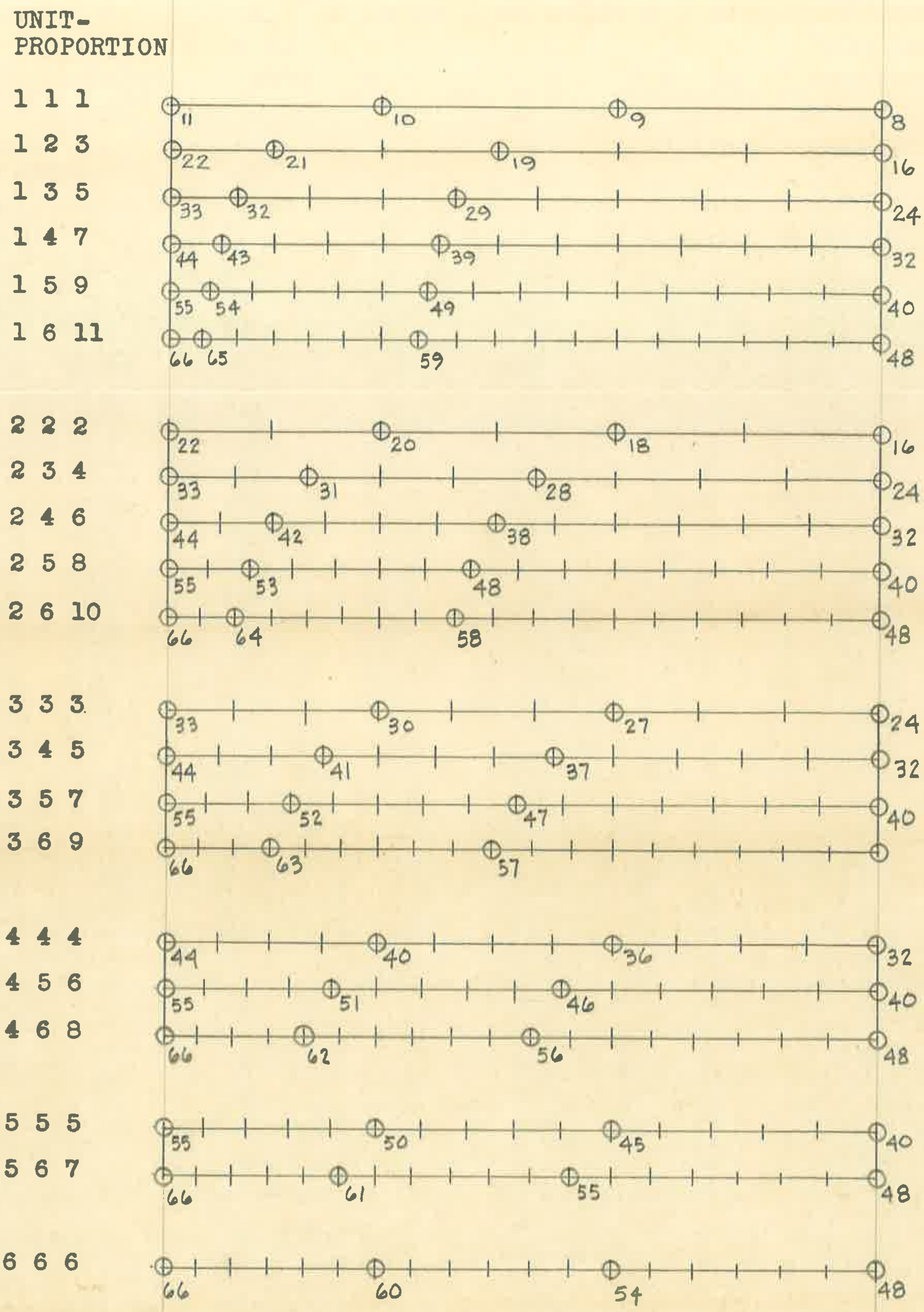
LETTER E WILSON TO JOHN CHALMERS OCT 6, 1963
SUBHARMONIC POLYCHORDS ON THE 3/2
△,○ = CONJUNCTIVE NODES FOR THE 8VE SPECIES
(INVERT SHEET AND FORMULAE ACCORDINGLY FOR THE HARMONIC GENERA)



DIATONIC, CHROMATIC, TRI-CHROMATIC, AND ENHARMONIC FORMS OF MIXOLYDIAN (MODE /14)



A MANNER OF VARIATION ON THE TETRACHORD /11 10 9 8
WITH RESPECT TO THE JAVANESE PELOG



John

13/9 13/9

$\frac{1}{1}\quad \frac{27}{26}\quad \frac{9}{8}\quad \frac{4}{3}\quad \frac{18}{13}\quad \frac{3}{2}\quad \frac{27}{16}\quad \frac{2}{1}$

$\frac{27}{26}\quad \frac{13}{12}\quad \frac{32}{27}\quad \frac{27}{26}\quad \frac{13}{12}\quad \frac{9}{8}\quad \frac{32}{27}$

B C A B C D A

Tetrachord Tetrachord dis-junction

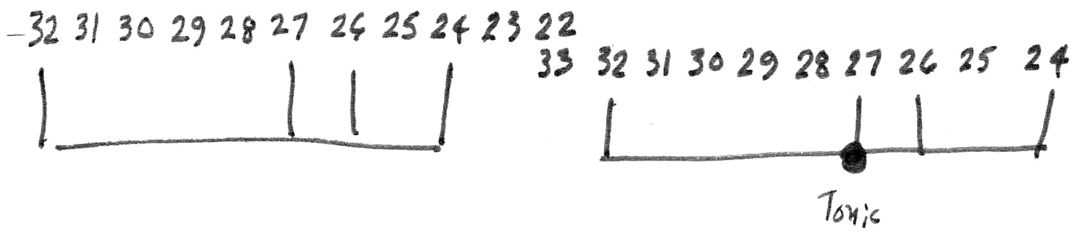
This tetrachordal species in this permutation & inversion is most delightful. It is notable for the appearance twice of the 13/9 which makes some nice turns against the 3/2's they are associated with.

In root position (with disj. on 4/3 & 3/2) the scale ~~is~~, or loses its reason for being -

I'm sure you've got this in your tables, but its one probably of many I've slighted because I evaluated them only in root position -

Yours Erv

This occurs in 19 tone diphonic cycle:



A derivative pentatonic:

$$\frac{1}{1} \quad \frac{27}{26} \quad \frac{4}{3} \quad \frac{18}{13} \quad \frac{27}{16} \quad \frac{2}{1}$$

$$\frac{27}{26} \quad \frac{104}{81} \quad \frac{27}{26} \quad \frac{39}{32} \quad \frac{32}{27}$$

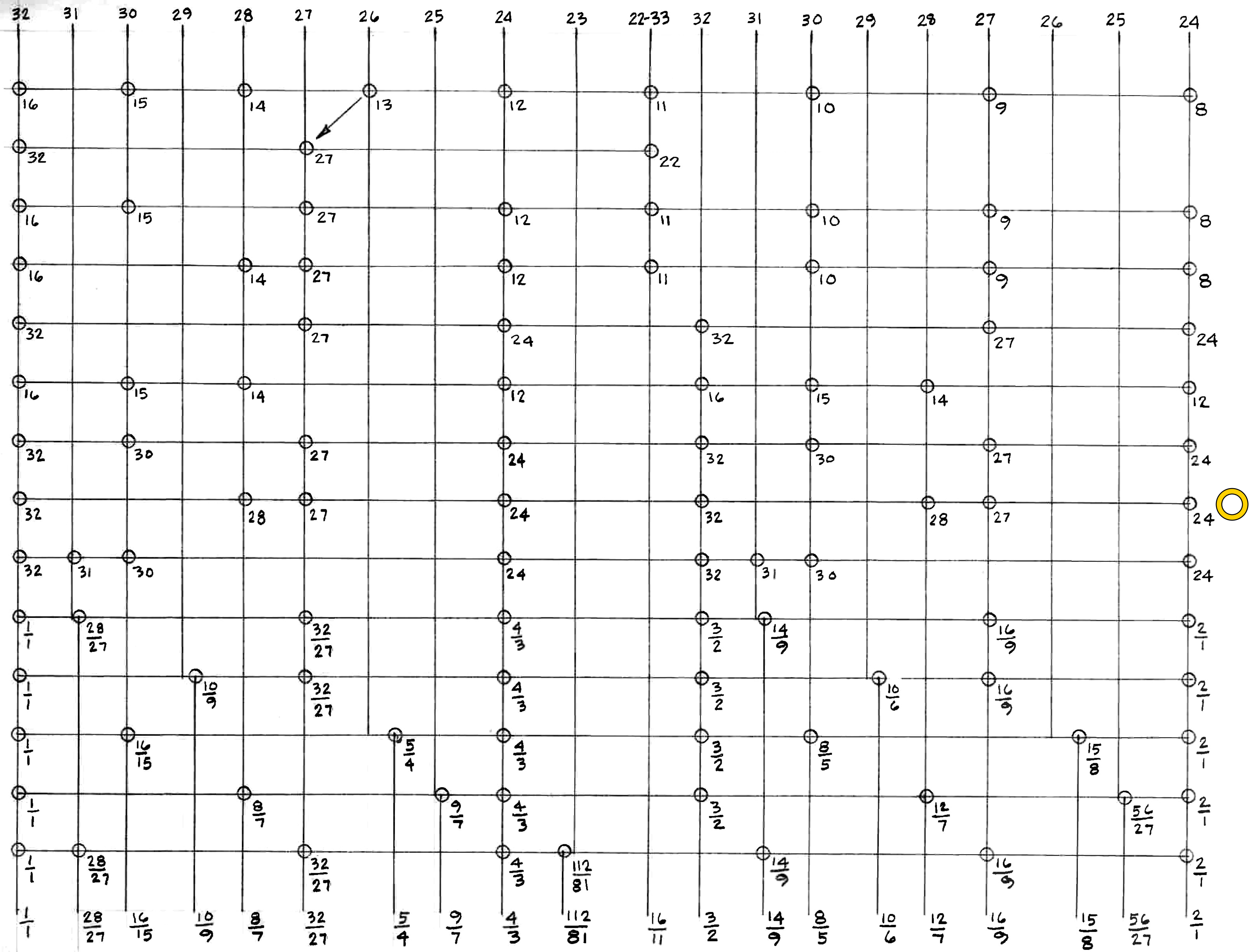
but- by employing the $\frac{22}{33}$ conjunction we could have.

$$\frac{1}{1} \quad \frac{27}{26} \quad \frac{4}{3} \quad \frac{18}{13} \quad \frac{18}{11} \quad \frac{2}{1}$$

$$\frac{27}{26} \quad \frac{104}{81} \quad \frac{27}{26} \quad \frac{13}{11} \quad \frac{11}{9}$$

which is quite a bit more credible. But not classic theory covers it. In this case the top 3 tones are the $\overline{13}\ \overline{11}\ \overline{9}$ triad. To avoid 104/81 would be to avoid the obvious!

ε.


32 31 30 29 28 27 26 25 24 23 22-33 32 31 30 29 28 27 26 25 24
1/1 28/27 16/15 10/9 8/7 32/27 5/4 9/7 4/3 112/81 16/11 3/2 14/9 8/5 10/6 12/7 16/9 15/8 56/27 2/1

Cont

$\frac{1}{1}$ $\frac{27}{26}$ $\frac{4}{3}$ $\frac{18}{13}$ $\frac{3}{2}$ $\frac{2}{1}$

$\frac{27}{26}$ $\frac{104}{81}$ $\frac{27}{26}$ $\frac{13}{12}$ $\frac{4}{3}$

A B A D- B+

$\leftarrow$

another derivative pentatonic. Here we have a situation which works (To my ear) in spite of the fact the 4/3 appears once as a unit and twice as a "binit". That is to say, it is not the situation the "constant structure" is made of. It works because the ear by melodic means is persuaded the 4/3 is an altered B function (B+) and not an A+B function. And D absorbs the difference (D-). This is characteristic, again of a whole category of non-classical constructions my ear will accept.

over

The cycle of binits for this pentatonic is:

$\frac{1}{1} \quad \frac{4}{3} \quad \frac{3}{2} \; / \; \frac{27}{26} \quad \frac{18}{13} \quad \frac{2}{1}$

$\frac{4}{3} \quad \frac{9}{8} \quad \frac{18}{13} \quad \frac{4}{3} \quad \frac{13}{9} \quad \leftarrow$

This reveals the situation where both $13/9$ and its recip $18/13$ are used as binits. Again, of course, its a matter of function.

Mar 28, 73

John,

There are, of course, also, mixed Trichordal Pentatonics. One of my favorite pentatonics can only be explained as an altered pentatonic;

0.		5.		12.	13.		18.		22.
$\frac{1}{1}$	A	$\frac{7}{6}$	B+	$\frac{35}{24}$	$\frac{3}{2}$	A	$\frac{7}{4}$	B	$\frac{2}{1}$
				Disj.					

Here B+ is altered, in the lower Trichord, from $8/7$ to $5/4$. The disjunction absorbs the consequence. B+ = $6/5$ is another well integrated possibility.

Another melodically equivalent scale is:

0,	5.	12.	13.	18.	22.
$\frac{1}{1}$	$\frac{32}{27}$	$\frac{16}{11}$	$\frac{3}{2}$	$\frac{16}{9}$	$\frac{2}{1}$

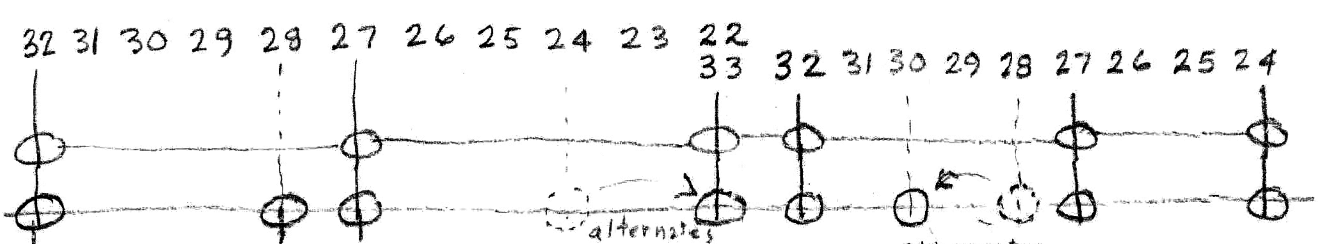
you can do this in 24T on: 0. 6. 13. 14, 20, 24.

The lower triplet of this scale has the proportional sequence;

$\frac{1}{32}$ $\xleftrightarrow{5}$ $\frac{1}{27}$ $\xleftrightarrow{5}$ $\frac{1}{22}$

5 aliquot units   5 aliquot units

which gives it a simple triadic flow, in spite of its higher numbers. This scale occurs in the 19 Tone diaphonic cycle:

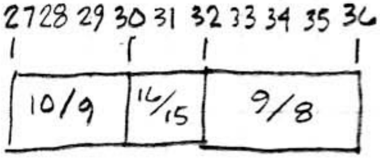


as does this beautiful 7-tone scale illustrating mix and/or altered tetrachords.

[illegible], Serv

On the 22-tone Diaphonic Cycle

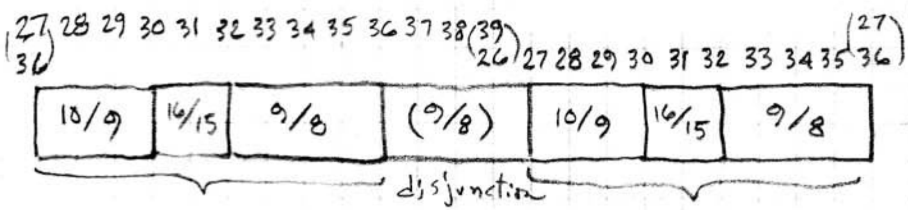
when the tetrachord 10/9, 16/15, 9/8 is put in the simplest harmonic context the following situation occurs:



The 10/9 is divided in 3 parts; the 16/15 is divided in 2 parts; and the 9/8 is divided in 4 parts. (This incidentally corresponds to the Śruti requirements of old Kafi)

When the tetrachord is duplicated with the disjunction in the center the 7 tone scale is $\underbrace{10/9 \;\; 16/15 \;\; 9/8}\;\; \underset{\text{disjunction}}{9/8}\;\; \underbrace{10/9 \;\; 16/15 \;\; 9/8}$.

Placing both tetrachords in their simplest harmonic context gives this result:



old Kafi

The 2 harmonic series intersect at tonic & octave $\binom{27}{36}$. Also if the series are extended into the area of the disjunction they intersect again at $\binom{39}{26}$. This forms a cycle of superparticulars having 22 tones.

There are other tetrachords in the same harmonic context. This suggest one organizing vehicle for combining tetrachords. (There are others but, but that is another story)

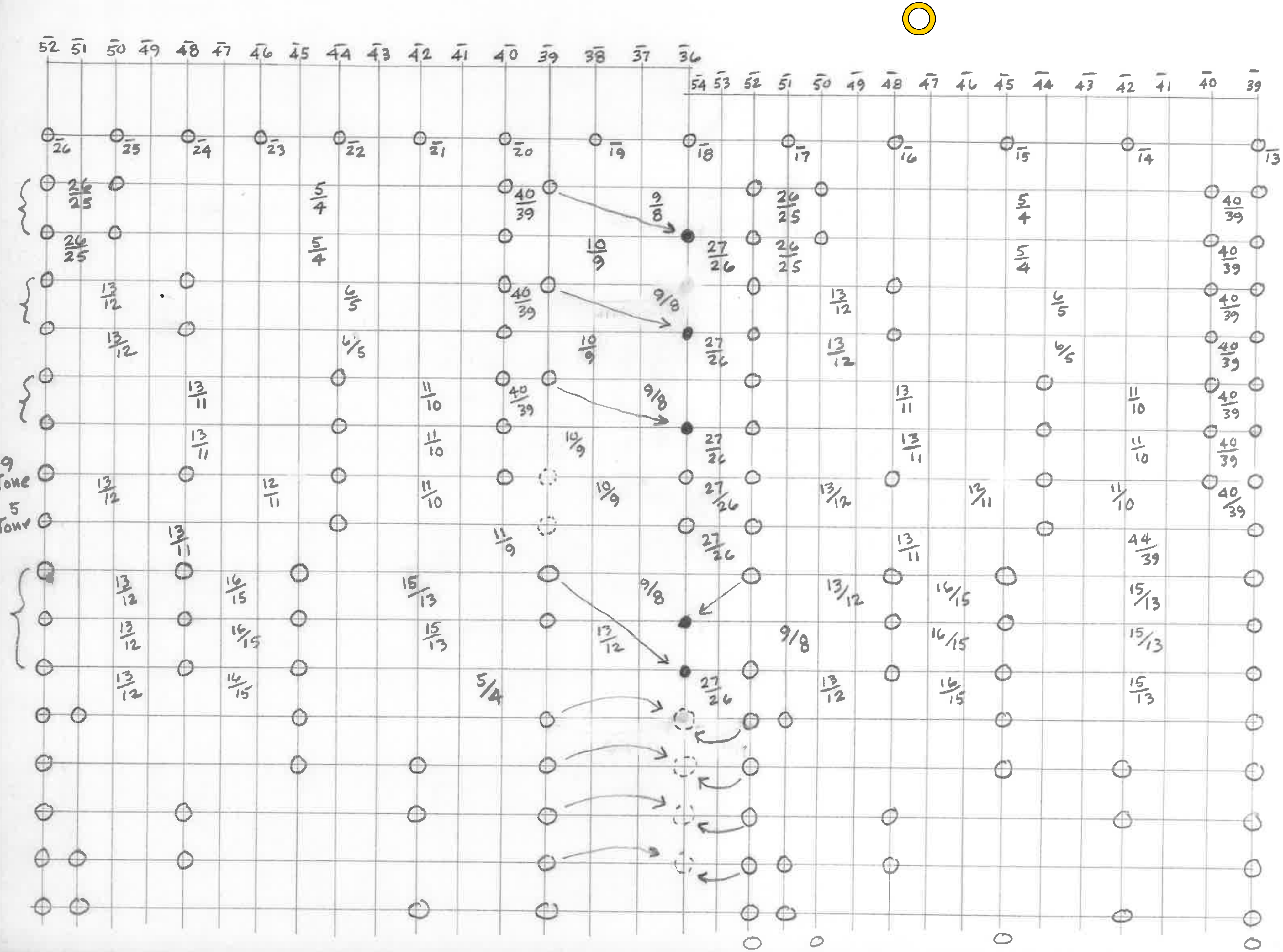
27 28 29 30 31 32 33 34 35 36 37 38 (39/26) 27 28 29 30 31 32 33 34 35 (27/36)

$\frac{28}{27}$	$\frac{15}{14}$	$\frac{6}{5}$	$(\frac{9}{8})$	$\frac{28}{27}$	$\frac{15}{14}$	$\frac{6}{5}$
$\frac{28}{27}$	$\frac{8}{7}$	$\frac{9}{8}$	$(\frac{9}{8})$	$\frac{28}{27}$	$\frac{8}{7}$	$\frac{9}{8}$
$\frac{28}{27}$	$\frac{5}{4}$	$\frac{36}{35}$	$(\frac{9}{8})$	$\frac{28}{27}$	$\frac{5}{4}$	$\frac{36}{35}$
$\frac{10}{9}$	$\frac{16}{15}$	$\frac{9}{8}$	$(\frac{9}{8})$	$\frac{10}{9}$	$\frac{16}{15}$	$\frac{9}{8}$
$\frac{10}{9}$	$\frac{11}{10}$	$\frac{12}{11}$	$(\frac{9}{8})$	$\frac{10}{9}$	$\frac{11}{10}$	$\frac{12}{11}$
$\frac{10}{9}$	$\frac{7}{6}$	$\frac{28}{27}$	$(\frac{9}{8})$	$\frac{10}{9}$	$\frac{7}{6}$	$\frac{28}{27}$

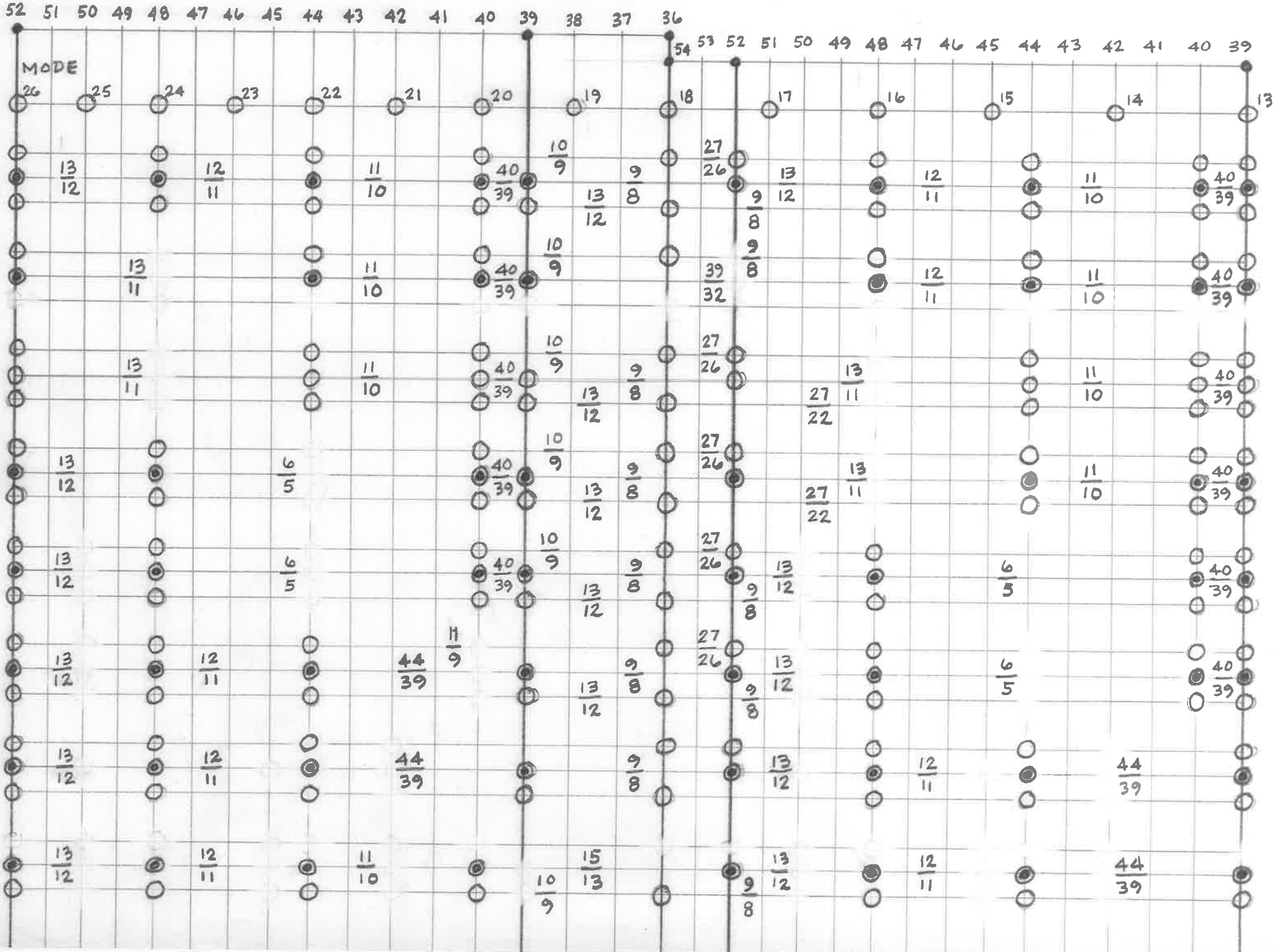
27 28 29 30 31 32 33 34 35 36 37 38 (39/26) 27 28 29 30 31 32 33 34 35 (27/36)

9 10 11 12 13 14 15 16 17 18 Harmonic series 9 thru 18

$\frac{28}{27}$	$\frac{15}{14}$	$\frac{13}{10}$	$\frac{27}{26}$	$\frac{28}{27}$	$\frac{15}{14}$	$\frac{6}{5}$	raised 4th
$\frac{28}{27}$	$\frac{15}{14}$	$\frac{6}{5}$	$(\frac{9}{8})$	$\frac{28}{27}$	$\frac{15}{14}$	$\frac{6}{5}$	Natural form
$\frac{28}{27}$	$\frac{15}{14}$	$\frac{6}{5}$	$\frac{13}{12}$	$\frac{14}{13}$	$\frac{15}{14}$	$\frac{6}{5}$	lowered 5th


52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36
54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39
26 25 24 23 22 21 20 19 18 17 16 15 14 13
9 Tone
5 Tone
26/25
5/4
40/39
9/8
10/9
27/26
13/12
6/5
13/11
11/10
12/11
11/9
44/39
16/15
15/13
5/4

Diphonic Cycle



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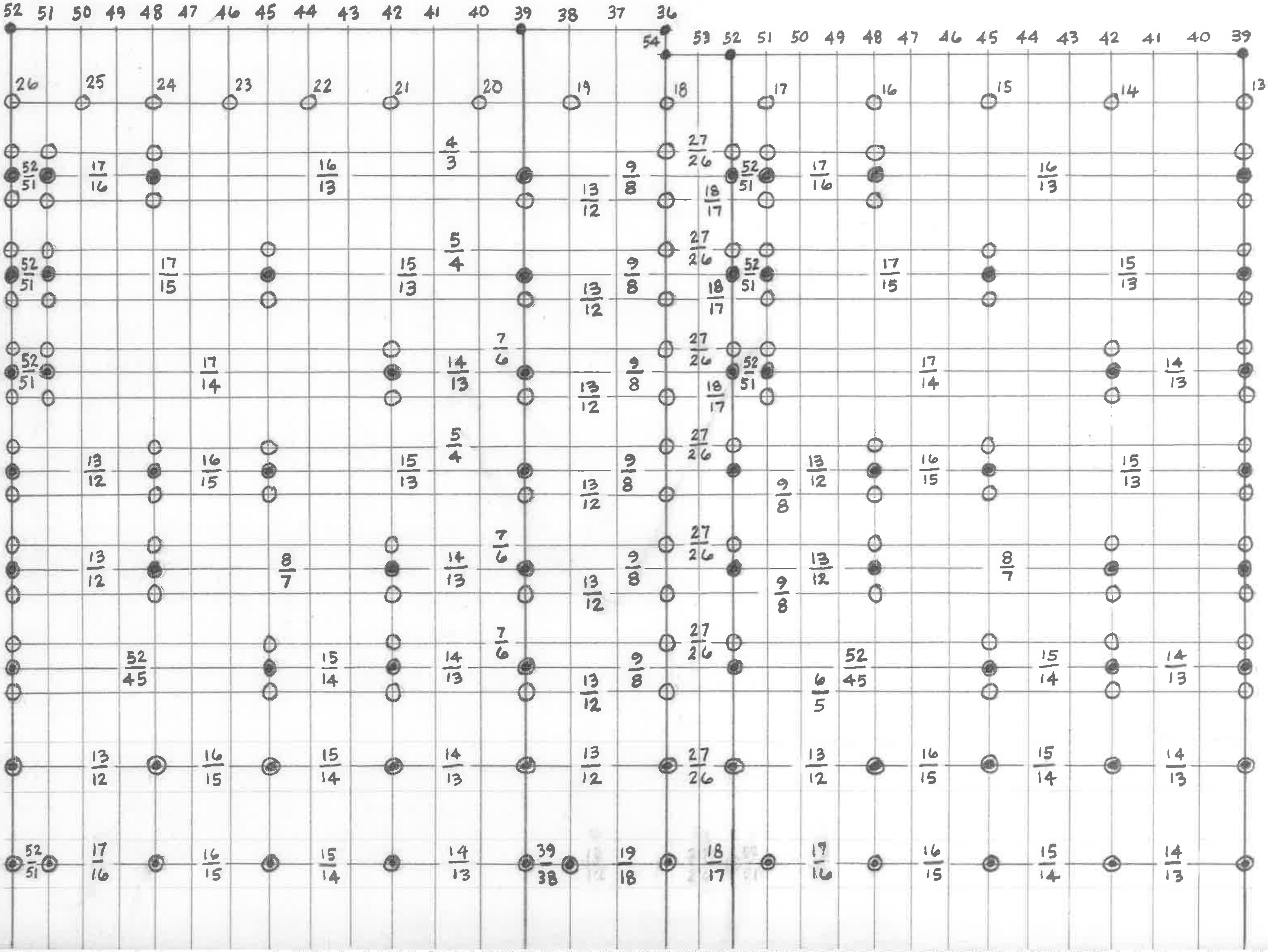
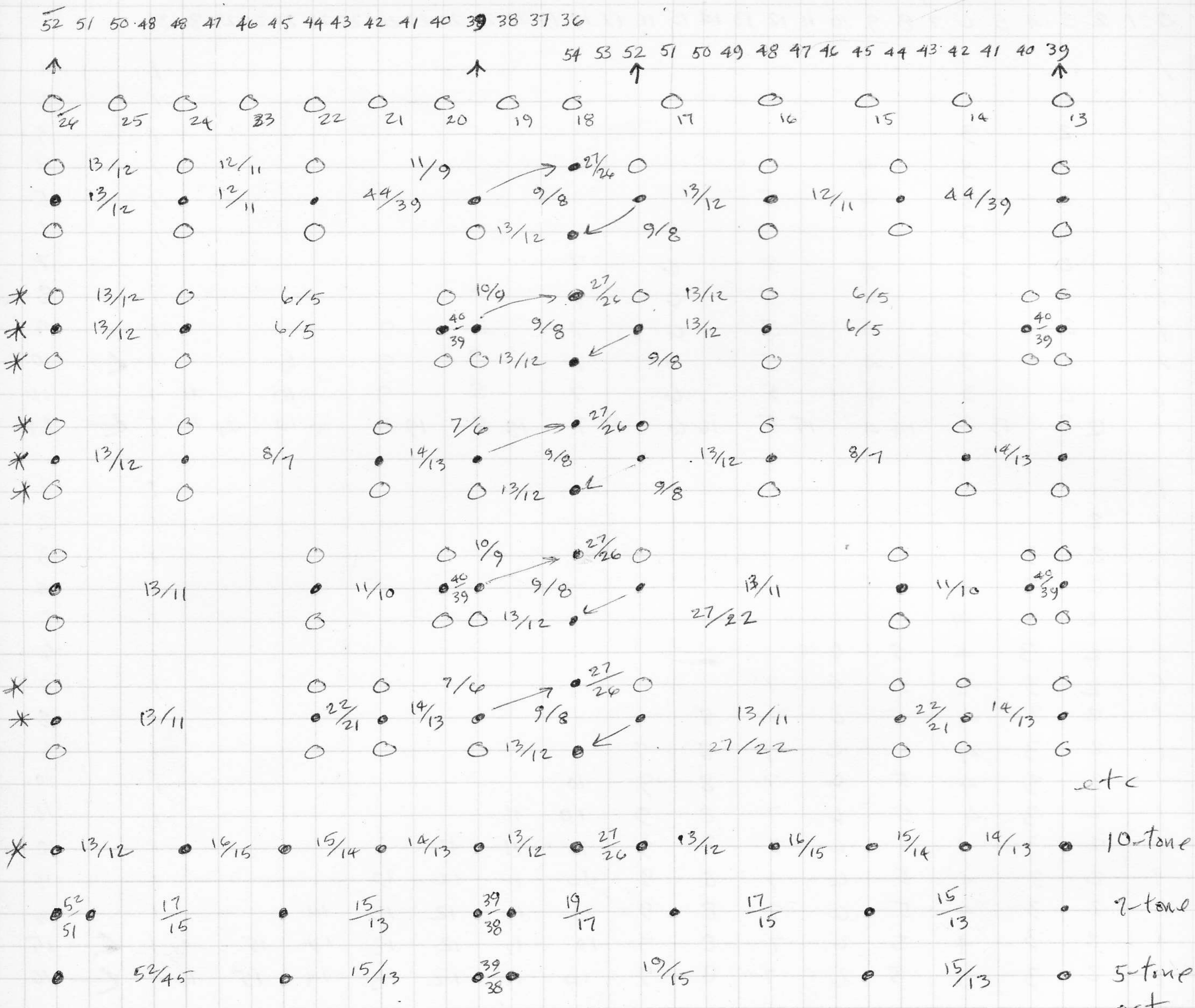
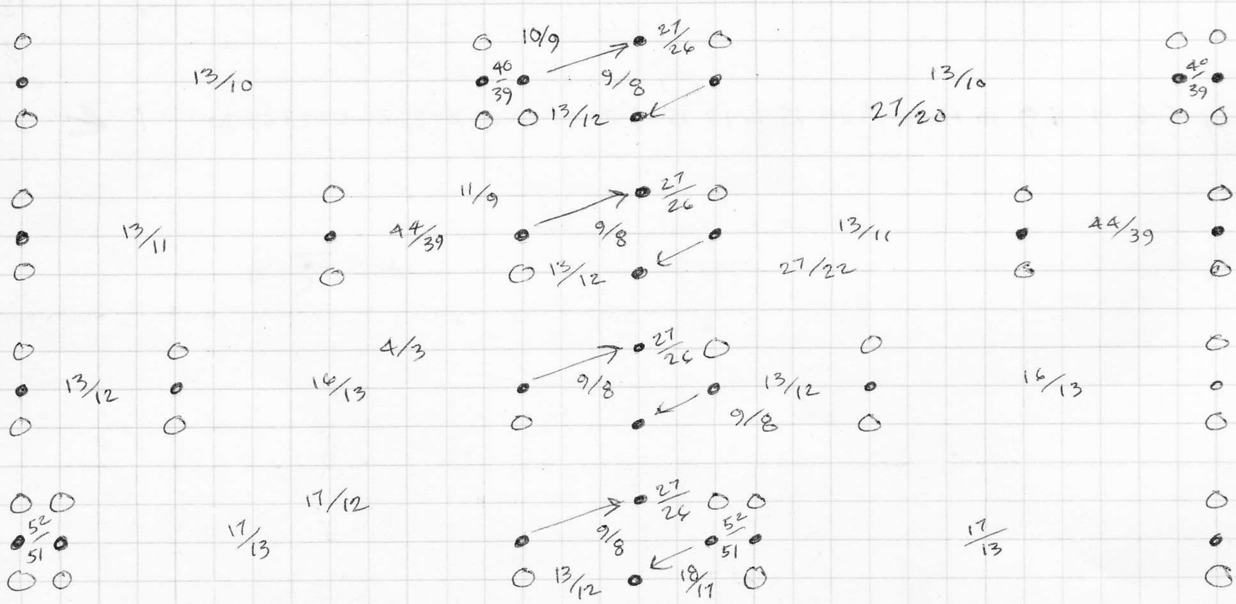

52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36
54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39
26 25 24 23 22 21 20 19 18 17 16 15 14 13
52/51 17/16 16/13 4/3 13/12 9/8 27/26 18/17 52/51 17/16 16/13
52/51 17/15 15/13 5/4 13/12 9/8 27/26 18/17 52/51 17/15 15/13
52/51 17/14 14/13 7/6 13/12 9/8 27/26 18/17 52/51 17/14 14/13
13/12 16/15 15/13 5/4 13/12 9/8 27/26 9/8 13/12 16/15 15/13
13/12 8/7 14/13 7/6 13/12 9/8 27/26 9/8 13/12 8/7
52/45 15/14 14/13 7/6 13/12 9/8 27/26 6/5 52/45 15/14 14/13
13/12 16/15 15/14 14/13 13/12 27/26 13/12 16/15 15/14 14/13
52/51 17/16 16/15 15/14 14/13 39/38 19/18 18/17 17/16 16/15 15/14 14/13



Pentatonic alterations




52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36
54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39
26 25 24 23 22 21 20 19 18 17 16 15 14 13
Mode 13
1/1 4/3 4/3 9/8 3/2 4/3 2/1
26 25 24 23 22 21 20 19 18=27 26 25 24 23 22 21 20 8ve
16-Tone
13/12 12/11 11/10 10/9 27/26 13/12 12/11 11/10 40/39
9-tone
13/11 11/9 27/26 13/11 44/39
5-tone
8ve 17 16 15 14 13 12=18 17 16 15 14 13
11-tone
52/51 17/15 15/13 13/12 18/17 17/15 15/13
7-tone
52/51 17/13 13/12 18/17 17/13
5-tone
52/45 15/13 13/12 6/5 15/13
5-Tone
13/12 8/7 14/13 13/12 9/8 8/7 14/13
7-tone
etc -
Tetrachords & Altered Tetrachords
52/51 17/15 5/4 15/13 27/26 9/8 52/51 17/15 15/13 13/12 18/17
4/3 52/51 17/16 16/13 27/26 9/8 52/51 17/16 16/13 13/12 18/17
7/6 52/51 17/14 14/13 27/26 9/8 52/51 17/14 14/13 13/12 18/17
5/4 26/25 10/9 15/13 27/26 9/8 26/25 10/9 15/13 13/12 27/25
10/9 26/25 5/4 40/39 27/26 9/8 26/25 5/4 40/39 13/12 27/25
5/4 13/12 16/15 15/13 27/26 9/8 13/12 16/15 15/13 13/12 9/8