D'ALESSANDRO, LIKE A HURRICANE

Erv Wilson
Los Angeles, California

I shall speak therefore in the following terms :

1 in 4 can be combined 4 times
2 in 4 can be combined 6 times
3 in 4 can be combined 4 times
4 in 4 can be combined 1 time.

Blaise Pascal - Treatise on the Arithmetical Triangle

In 1965 Paul Beaver asked me if I knew of any musical use for Pascal's triangle. (Figure 1).

I knew of none, whatsoever.

In 1966, while rummaging thru my lattices, and looking for a good set of Just Pitch Bases (for Just Pitch Tables that John Chalmers was about to calculate), I stumbled across an interesting set of six pitches --- whose factors were the 6 combinations of 2 in the 4 numbers: 3, 5, 7, 11. (Figure 2).

The musical resources of this set were of utmost interest to me. (Figure 3). So I explored its neighboring analog, the 20 combinations of 3 in the 6 numbers: 1, 3, 5, 7, 9, 11. (Figure 4). And it was comparably resourceful. I noticed that these combinations had been predicted by Pascal's Triangle. (Figure 5).

I told Paul Beaver.

By January 27, 1967 I had been able to map this (2,4) 3 5 7 11 Hexany to the outlines of the octohedron. (Figure 6). Projection showed corresponding tetrads mapped to the outlines of tetrahedra.

The full significance of this correspondence did not strike home until 1969. (Figures 6c & 6d).

On August 8, 1967 I issued "Double-linkage of the 3 5 7 11 Genus as a set of Pitch Bases". On October 27, 1970 John Chalmers calculated the monumental "Conversion Tables 10000-Tone Temperament", at Seattle, to these pitch bases. (Figure 6b).

On June 28, 1967 John Chalmers, at UC San Diego, calculated extensive Just Pitch Tables to the 20 pitches of the (3,6) 1 3 5 7 9 11 Eikosany. A thumbnail version was issued as "1 3 5 7 9 11 Diamond x Eikosany Pitches" in 1969. (Figure 15b).

I acquired 2 old Jenco vibes, one from Drum City, and the other from Mike

Craden. I had enough metal for a 22-tone instrument. I found 2 Eikosanies melodically compatible with modulus 22. I chose the (3,6) 1 3 7 9 11 15 Eikosany. (The other one is the (3,6) 1 5 7 9 11 15 Eikosany). In 1968 I handed the scale design to Paul Beaver, who tuned it up, enthusiastically.

The Tetrads, and the Hexanies of the (3,6) 1 3 7 9 11 15 Eikosany are shown in figures 8 and 9. The (2,4) 1 3 11 15 Hexany (indicated by →) caught my attention for its resemblance to Pélog.

I mounted the tuned bars according to figure 10. This was not an ideal pattern. In 1989, when Kraig Grady offered to remount the bars in a Bosanquet pattern, I recalled an excellent keyboard program from my files, and named it "Pascal". (Figures 11 and 12).

Figure 10b was my best Eikosany lattice in 1968.

By 1969 I had broken thru the lattice barrier, and produced 2 landmark lattices, (figures 13 & 14), of the Eikosany and the Diamond. These could be overlaid to show their points of intersection. (Figure 15). These are based upon, and geometrically generated from the "centered pentagon".

By 1970, in a letter to Adrian Fokker, I was using a variation of the lattice to describe aspects of the Eikosany. This variation is based upon the "pentagonal asterisk", as exemplified in figures 16 & 17.

Figure 17 was the specific lattice used to tune the tiling pattern figure 18.

By December 1969 I had acquired and honed the skills to lattice any of the possible combination-sets occurring thru Ogdoadic tone space. This gave rise to the spectacular spread of lattices in figure 19, representing every combination-set thru hexadic tone-space.

And set the stage for a keyboard program that could embody them all.

The bottom line is figure 20.

A keyboard program that embodies all of the Combination-Product Sets on the bottom row of figures 3 & 19 was accomplished in September 1974, from my adobe house in Pacheco, Chihuahua, and mailed by pony to John Chalmers for XH2. It is expressed in modulus 41, spans 43 linear positions on the Bosanquet Keyboard, and covers the whole page. It is titled "1 3 5 7 9 11 Combination Sets", and is juxtaposed over a second figure called "1 3 5 7 9 11 Diamondic Cross-Set". This is in the article "Bosanquet - A Bridge - A Doorway To Dialog" by yours truly. In all fairness to this program, Beth, it must be viewed on an upgraded keyboard (Figure 21), in order to compare it with D'alessandro.

It has been my experience that modulus 31 can sometimes do what modulus 41 is doing but without the implied commas. It was worth a try. So, in 1975, I mapped the (0,6) through (6,6) 1 3 5 7 9 11 series of combination-product sets to modulus 31 and its implicit linear series. It worked. I had one of the most densely packed, compact, and resourceful keyboard programs I could imagine. Plus it had all the convenient fingerings of 31. (41 can get a little awkward). I put it on paper, and to this day I can only marvel at its resourcefulness and efficiency. (Figure 22).

In 1980 it was embodied in a keyboard program dubbed "D'alessandro" like a hurricane in celebration of the 4th letter of the alphabet (and the Oak tree). (Figure 23).

I shipped it off to Paul Rapoport at McMaster University (where the last of the great Scalatrons was being installed) without very much explanation as to what I had in mind.

The 1989 version of D'alessandro (figure 24) has, importantly, an upgraded layout for the shape and placement of the keyboard digitals. This keyboard shape is derived directly from that of the 19-tone clavichord, which has proved itself performance-worthy. Also included with this version is a "template" wherein the master set 1-3-5-7-9-11 is mapped to the chain-of-fifths (linear series) as indicated by the numerals +1, +2, +3, etc.. It is further mapped to the melodic modulus 31 as indicated by the numerals 0/31, 5, 10, etc.. This information is a triple-key to what events may occur in the keyboard program. In short, it is a trinary master set, which, in a triplicate progression, in projected geometrically, in the combinations, 0-out-of-6 (0,6) thru 6-out-of-6 (6,6) across the surface of the keyboard. The final outcome is inevitable. This puts each of the 32 members of the sets, in its correct position in the chain-of-fifths, and in its correct position within a 31-modulus scale.

To illustrate, the combination $\overset{+4}{\underset{10.}{(\ 5\ )}}\overset{+10}{\underset{25.}{(\ 7\ )}}\overset{+18}{\underset{14.}{(\ 11\ )}} = (\ 5 \times 7 \times 11\ )$. The 5x7x11 member is +32 up the keyboard chain-of-fifths (+4 +10 +18 = +32), and degree 18. in the 31-tone scale (10. + 25. + 14. = 49. = 31. + 18.).

The problem presented by having duplicate pitches at scale degrees 0, 5, 10, 13, 18, 23, and 28, is automatically resolved when the duplicate pitch, in each case, falls at a different linear position on the keyboard. For example, "3" and "5x7x11" both are assigned to scale degree 18. in modulus 31. However, "3" maps to linear +1 and "5x7x11" to linear +32 on the keyboard chain-of-fifths, allowing both inflections of degree 18. to appear on the keyboard simultaneously.

As it so results, each of the 32 tones (members) of the (0,6)-(6,6) 1 3 5 7 9 11 set is mapped onto the linear series of fifths, without interference from any other member, in a chain of 36 linear positions, 0 thru +35. There are but 4 unoccupied linear positions, +8, +9, +26, +27.

The 2nd feature of "D'alessandro" is the intersection of two (3,6) 1 3 7 9 11 15 Eikosanies, each on 19 of its 20 members, with the (0,6) thru (6,6) 1 3 5 7 9 11 (grand slam). These 2 Eikosanies are in mirroring positions within the larger tuning. The lone member in each which does not intersect with the "grand slam", happily, does not interfere with any of its 32 members, either. The two are positioned, in accordance with the "D'alessandro" template, in the otherwise unoccupied linear positions +8 and +27. (See figures 24 & 25). That leaves 2 unoccupied linear positions, +9 and +26, on degrees 7. and 3. of modulus 31. These are not fixed pitches, but template rules likewise apply.

The linear disposition of the tuning is such that it begins, at +18, to repeat itself as taken from 0, and at +36 (11^2) a new repetition may commence, and so on. For the 1980 version of D'alessandro this repetition is actually shown on the surface of the keyboard with the result that the whole scale appears in 2, interlocking keys, pitched an 11/8 apart. On the McMaster instruments the required digitals to do this are present on the keyboard.

The <u>inverted D'alessandro</u> (figure 26) was designed <u>not</u> for a manual keyboard, but for Kraig Grady's marimba; the physical dimensions would otherwise have become unwieldy. The single, critical maneuver was, in the template, to move "11" from degree 14. and linear position +18, to degree 14. and linear position -13. (Figure 27). This resulted in deliberate interfences at the 5 locations shown, where 2 pitches get mapped to one piece of wood. 3 of these pitch-pairs, on scale degrees 5., 18. and 23., form the small interval 385/384, about 1/5 comma, between them (example: "5x7x11" and "3", both assigned to linear position +1 and scale degree 18.). In a rapid-decay instrument having non-harmonic timbres this difference is hardly resented. The remaining 2 pitch-pairs, on scale degrees 0/31. and 10. form the larger interval of 2079/2048, a hefty comma, and these were voiced in different octaves.

Figures 28 & 29 illustrate a newer lattice technique, for hexadic tone-space, with 6-fold symmetry.

Figures 30, 31, 32, & 33 illustrate the use of "3-D" lattices, based on the four legs of the centered tetrahedron, to describe pentadic tone-space. This technique was developed in 1969-70.

Figures 34, 35, 36, & 37 are four parallel lattices, each illustrating, from its own perspective, the geometries of the (0,6) thru (6,6) 1 3 5 7 9 11 combination-product sets (the substance of D'alessandro).

Figures 38 & 39 are the tetrads and hexanies of the (3,6) 1 3 5 7 9 11 Eikosany. Figure 40 is the dekanies of the same Eikosany.

Figure 41 is 4 tuned hexadic tile-bursts.

Figure 42 is 4 tuned ogdoadic tile-bursts.

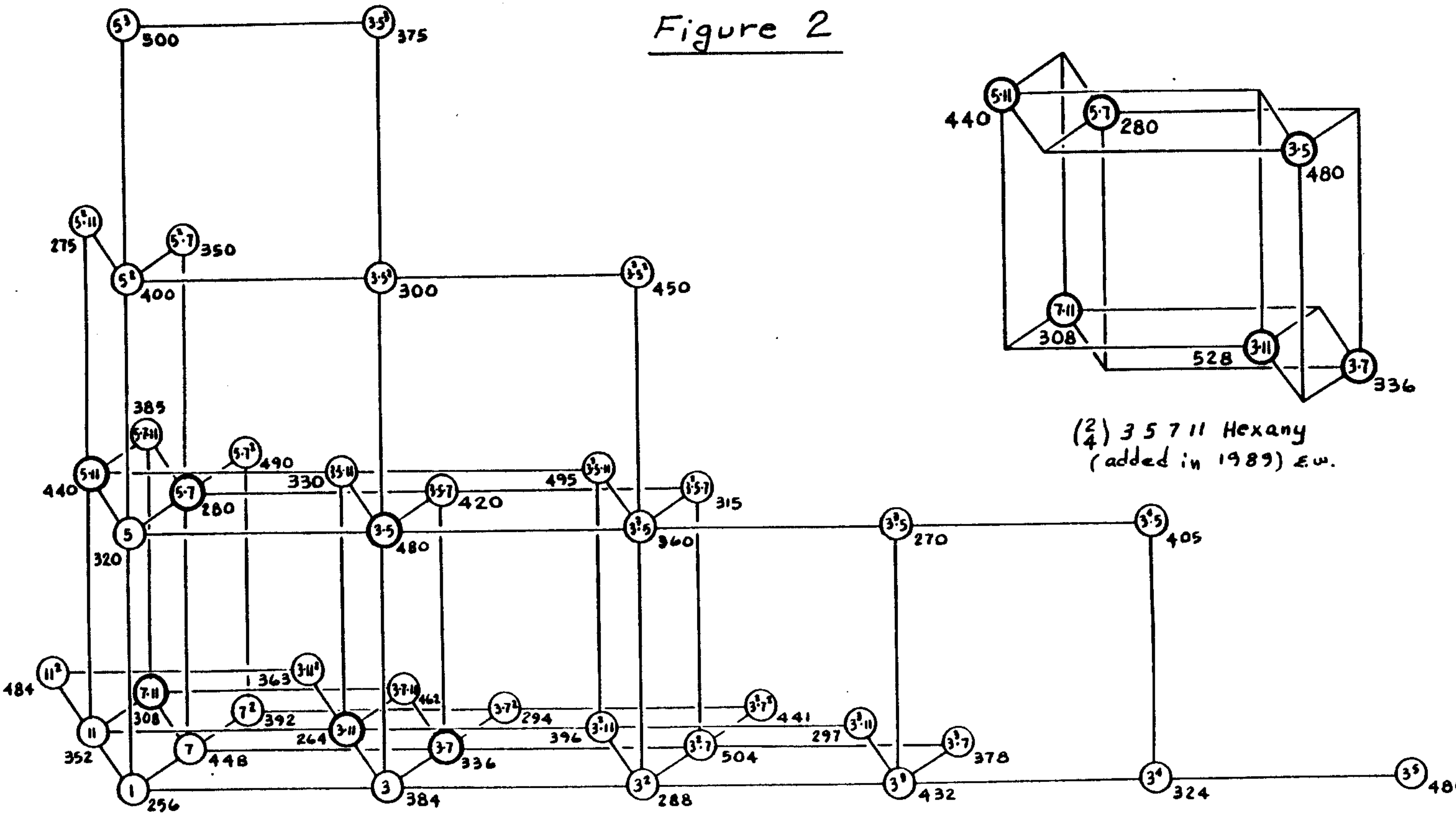
That's it.

PASCAL'S TRIANGLE

Figure 1

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
1 8 28 56 70 56 28 8 1
1 9 36 84 126 126 84 36 9 1
1 10 45 120 210 252 210 120 45 10 1
1 11 55 165 330 462 462 330 165 55 11 1
1 12 66 220 495 792 924 792 495 220 66 12 1
1 13 78 286 715 1287 1716 1716 1287 715 286 78 13 1
1 14 91 364 1001 2002 3003 3432 3003 2002 1001 364 91 14 1
1 15 105 455 1365 3003 5005 6435 6435 5005 3003 1365 455 105 15 1
1 16 120 560 1820 4368 8008 11440 12870 11440 8008 4368 1820 560 120 16 1

Figure 2



$\binom{2}{4}$ 3 5 7 11 Hexany
(added in 1989) E.W.

Exploratory Lattice for Possible Pitch Bases
(traced from a late 1966 or early 1967 print) Erv Wilson 1989

Figure 4

Intervals of the $(\frac{3}{6})$ 1 3 5 7 9 11 Eikosany

×	1·3·5	1·3·7	1·3·9	1·3·11	1·5·7	1·5·9	1·5·11	1·7·9	1·7·11	1·9·11	3·5·7	3·5·9	3·5·11	3·7·9	3·7·11	3·9·11	5·7·9	5·7·11	5·9·11	7·9·11
$\overline{1\cdot3\cdot5}$	(1)	7/5	9/5	11/5	7/3	9/3	11/3	7·9/3·5	7·11/3·5	9·11/3·5	7/1	9/1	11/1	7·9/1·5	7·11/1·5	9·11/1·5	7·9/1·3	7·11/1·3	9·11/1·3	7·9·11/1·3·5
$\overline{1\cdot3\cdot7}$	5/7	(1)	9/7	11/7	5/3	5·9/3·7	5·11/3·7	9/3	11/3	9·11/3·7	5/1	5·9/3·7	5·11/1·7	9/1	11/1	9·11/1·7	5·9/1·3	5·11/1·3	5·9·11/1·3·7	9·11/1·3
$\overline{1\cdot3\cdot9}$	5/9	7/9	(1)	11/9	5·7/3·9	5/3	5·11/3·9	7/3	7·11/3·9	11/3	5·7/1·9	5/1	5·11/1·9	7/1	7·11/1·9	11/1	5·7/1·3	5·7·11/1·3·9	5·11/1·3	7·11/1·3
$\overline{1\cdot3\cdot11}$	5/11	7/11	9/11	(1)	5·7/3·11	5·9/3·11	5/3	7·9/3·11	7/3	9/3	5·7/1·11	5·9/1·11	5/1	7·9/1·11	7/1	9/1	5·7·9/1·3·11	5·7/1·3	5·9/1·3	7·9/1·3
$\overline{1\cdot5\cdot7}$	3/7	3/5	3·9/5·7	3·11/5·7	(1)	9/7	11/7	9/5	11/5	9·11/5·7	3/1	3·9/1·7	3·11/1·7	3·9/1·5	3·11/1·5	3·9·11/1·5·7	9/1	11/1	9·11/1·7	9·11/1·5
$\overline{1\cdot5\cdot9}$	3/9	3·7/5·9	3/5	3·11/5·9	7/9	(1)	11/9	7/5	7·11/5·9	11/5	3·7/1·9	3/1	3·11/1·9	3·7/1·5	3·7·11/1·5·9	3·11/1·5	7/1	7·11/1·9	11/1	7·11/1·5
$\overline{1\cdot5\cdot11}$	3/11	3·7/5·11	3·9/5·11	3/5	7/11	9/11	(1)	7·9/5·11	7/5	9/5	3·7/1·11	3·9/1·11	3/1	3·7·9/1·5·11	3·7/1·5	3·9/1·5	7·9/1·11	7/1	9/1	7·9/1·5
$\overline{1\cdot7\cdot9}$	3·5/7·9	3/9	3/7	3·11/7·9	5/9	5/7	5·11/7·9	(1)	11/9	11/7	3·5/1·9	3·5/1·7	3·5·11/1·7·9	3/1	3·11/1·9	3·11/1·7	5/1	5·11/1·9	5·11/1·7	11/1
$\overline{1\cdot7\cdot11}$	3·5/7·11	3/11	3·9/7·11	3/7	5/11	5·9/7·11	5/7	9/11	(1)	9/7	3·5/1·11	3·5·9/1·7·11	3·5/1·7	3·9/1·11	3/1	3·9/1·7	5·9/1·11	5/1	5·9/1·7	9/1
$\overline{1\cdot9\cdot11}$	3·5/9·11	3·7/9·11	3/11	3/9	5·7/9·11	5/11	5/9	7/11	7/9	(1)	3·5·7/1·9·11	3·5/1·11	3·5/1·9	3·7/1·11	3·7/1·9	3/1	5·7/1·11	5·7/1·9	5/1	7/1
$\overline{3\cdot5\cdot7}$	1/7	1/5	1·9/5·7	1·11/5·7	1/3	1·9/3·7	1·11/3·7	1·9/3·5	1·11/3·5	1·9·11/3·5·7	(1)	9/7	11/7	9/5	11/5	9·11/5·7	9/3	11/3	9·11/3·7	9·11/3·5
$\overline{3\cdot5\cdot9}$	1/9	1·7/5·9	1/5	1·11/5·9	1·7/3·9	1/3	1·11/3·9	1·7/3·5	1·7·11/3·5·9	1·11/3·5	7/9	(1)	11/9	7/5	7·11/5·9	11/5	7/3	7·11/3·9	11/3	7·11/3·5
$\overline{3\cdot5\cdot11}$	1/11	1·7/5·11	1·9/5·11	1/5	1·7/3·11	1·9/3·11	1/3	1·7·9/3·5·11	1·7/3·5	1·9/3·5	7/11	9/11	(1)	7·9/5·11	7/5	9/5	7·9/3·11	7/3	9/3	7·9/3·5
$\overline{3\cdot7\cdot9}$	1·5/7·9	1/9	1/7	1·11/7·9	1·5/3·9	1·5/3·7	1·5·11/3·7·9	1/3	1·11/3·9	1·11/3·7	5/9	5/7	5·11/7·9	(1)	11/9	11/7	5/3	5·11/3·9	5·11/3·7	11/3
$\overline{3\cdot7\cdot11}$	1·5/7·11	1/11	1·9/7·11	1/7	1·5/3·11	1·5·9/3·7·11	1·5/3·7	1·9/3·11	1/3	1·9/3·7	5/11	5·9/7·11	5/7	9/11	(1)	9/7	5·9/3·11	5/3	5·9/3·7	9/3
$\overline{3\cdot9\cdot11}$	1·5/9·11	1·7/9·11	1/11	1/9	1·5·7/3·9·11	1·5/3·11	1·5/3·9	1·7/3·11	1·7/3·9	1/3	5·7/9·11	5/11	5/9	7/11	7/9	(1)	5·7/3·11	5·7/3·9	5/3	7/3
$\overline{5\cdot7\cdot9}$	1·3/7·9	1·3/5·9	1·3/5·7	1·3·11/5·7·9	1/9	1/7	1·11/7·9	1/5	1·11/5·9	1·11/5·7	3/9	3/7	3·11/7·9	3/5	3·11/5·9	3·11/5·7	(1)	11/9	11/7	11/5
$\overline{5\cdot7\cdot11}$	1·3/7·11	1·3/5·11	1·3·9/5·7·11	1·3/5·7	1/11	1·9/7·11	1/7	1·9/5·11	1/5	1·9/5·7	3/11	3·9/7·11	3/7	3·9/5·11	3/5	3·9/5·7	9/11	(1)	9/7	9/5
$\overline{5\cdot9\cdot11}$	1·3/9·11	1·3·7/5·9·11	1·3/5·11	1·3/5·9	1·7/9·11	1/11	1/9	1·7/5·11	1·7/5·9	1/5	3·7/9·11	3/11	3/9	3·7/5·11	3·7/5·9	3/5	7/11	7/9	(1)	7/5
$\overline{7\cdot9\cdot11}$	1·3·5/7·9·11	1·3/9·11	1·3/7·11	1·3/7·9	1·5/9·11	1·5/7·11	1·5/7·9	1/11	1/9	1/7	3·5/9·11	3·5/7·11	3·5/7·9	3/11	3/9	3/7	5/11	5/9	5/7	(1)

E.W. 1989

Figure 3

Intervals of the $(\frac{2}{4})$ 3 5 7 11 Hexany

×	3·5	3·7	3·11	5·7	5·11	7·11
$\overline{3\cdot5}$	(1)	7/5	11/5	7/3	11/3	7·11/3·5
$\overline{3\cdot7}$	5/7	(1)	11/7	5/3	5·11/3·7	11/3
$\overline{3\cdot11}$	5/11	7/11	(1)	5·7/3·11	5/3	7/3
$\overline{5\cdot7}$	3/7	3/5	3·11/5·7	(1)	11/7	11/5
$\overline{5\cdot11}$	3/11	3·7/5·11	3/5	7/11	(1)	7/5
$\overline{7\cdot11}$	3·5/7·11	3/11	3/7	5/11	5/7	(1)

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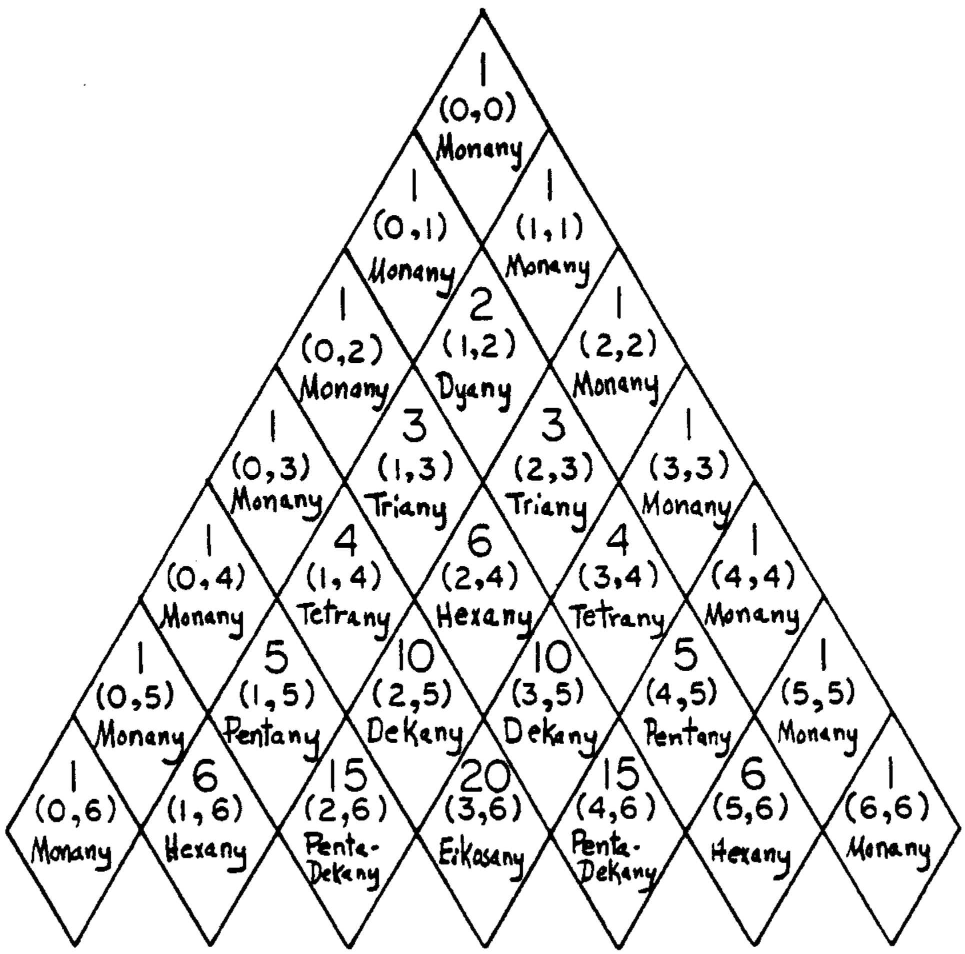
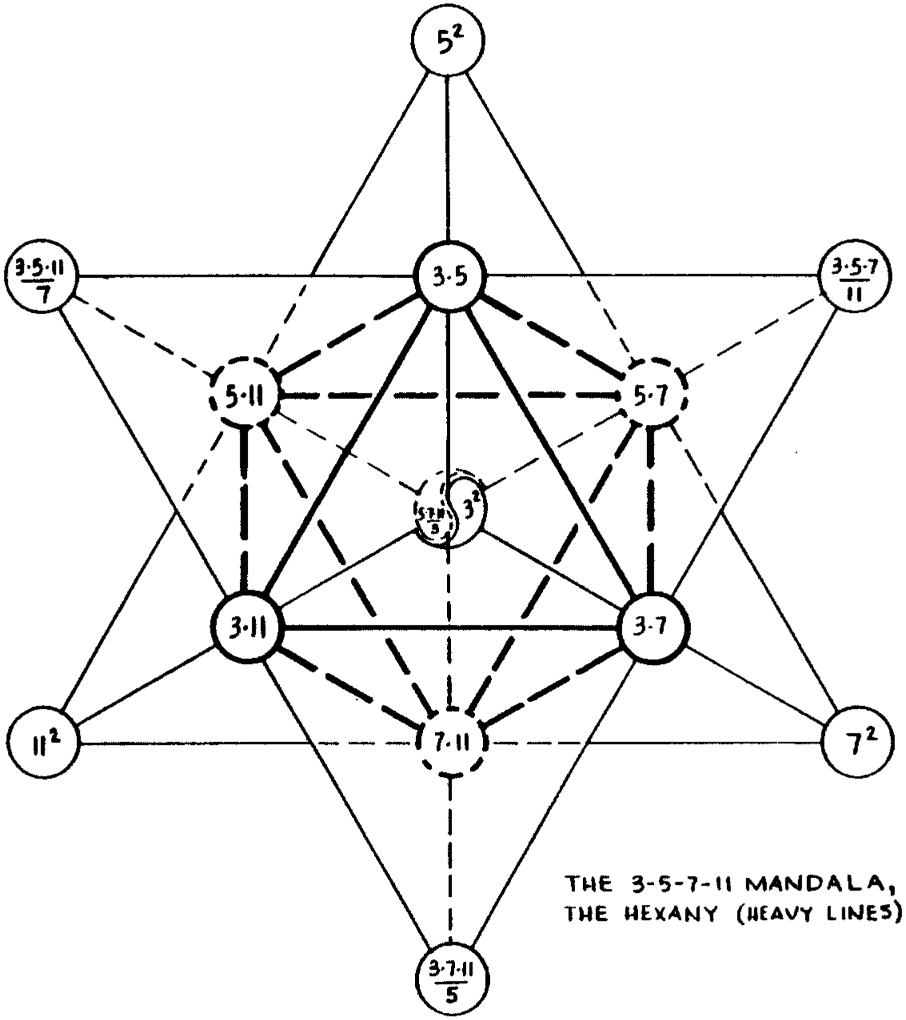
Figure 5

Pascal's Triangle
Showing Combination-Product Sets





THE 3-5-7-11 MANDALA,
THE HEXANY (HEAVY LINES)

ISSUED BY ERV WILSON
27 JAN 1967

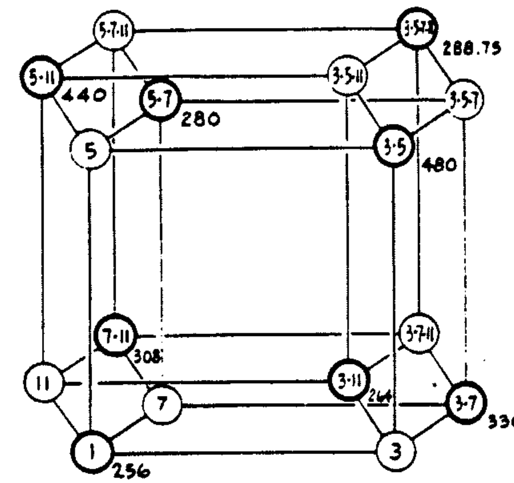
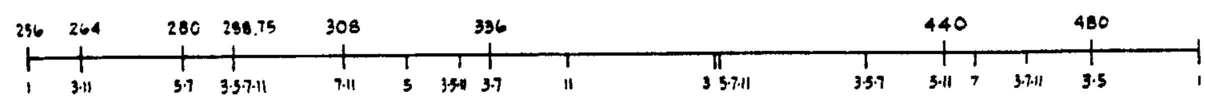


Figure 6b



Double-linkage of the 3·5·7·11 Genus
as a Set of Pitch Bases

Issued by Erv Wilson 8 Aug 67

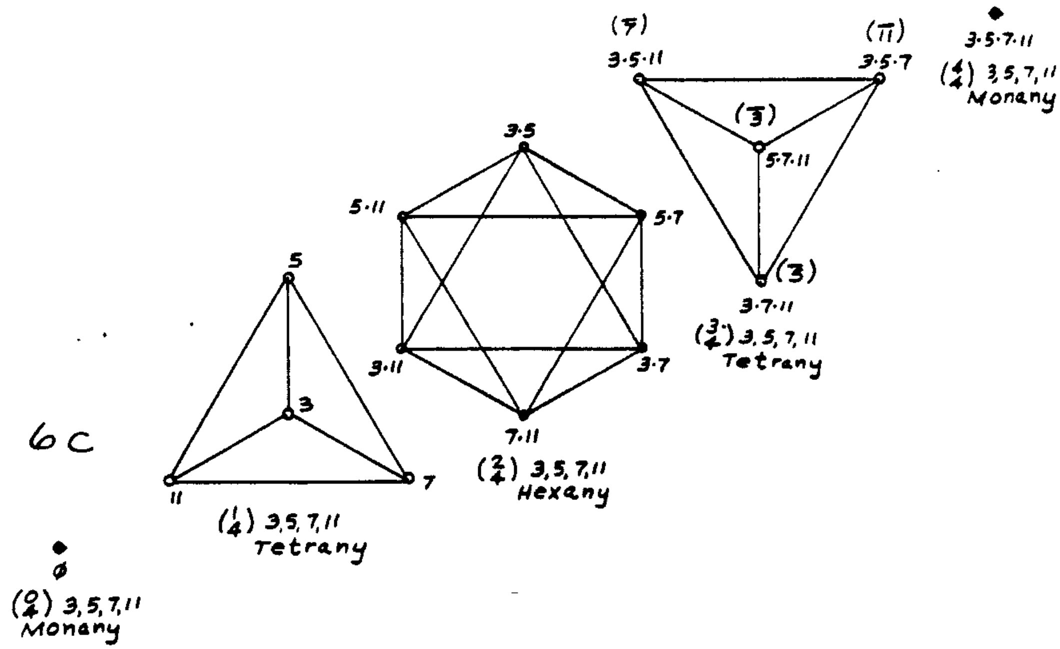


Figure 6c

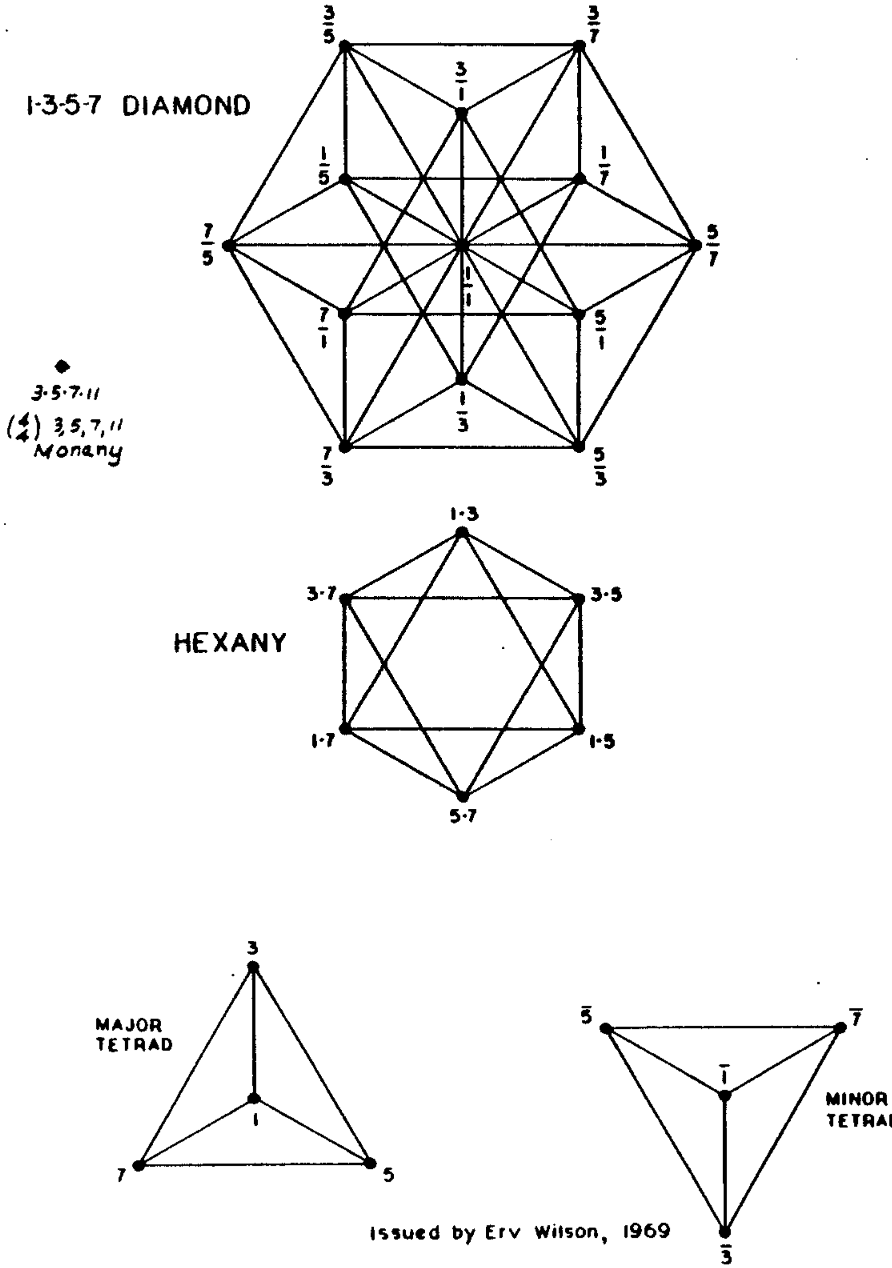
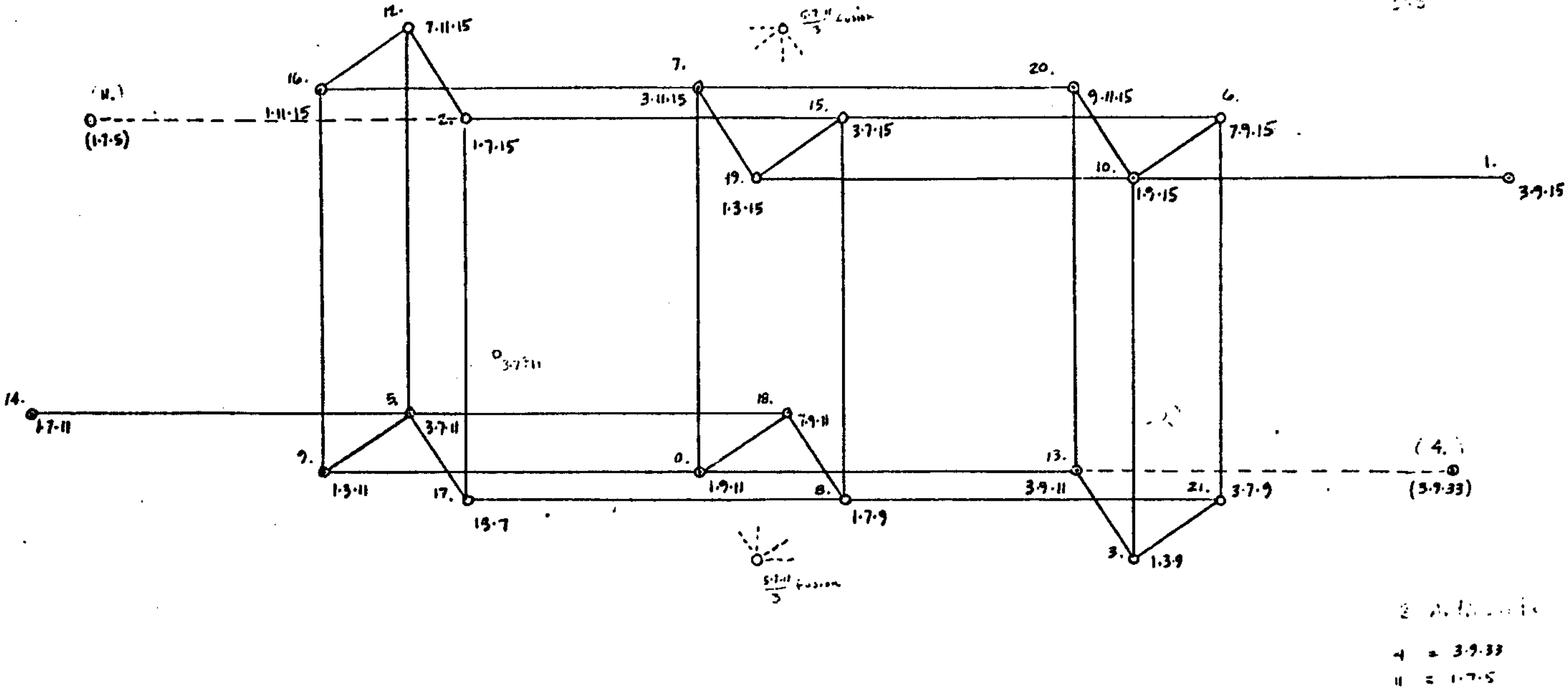


Figure 6d



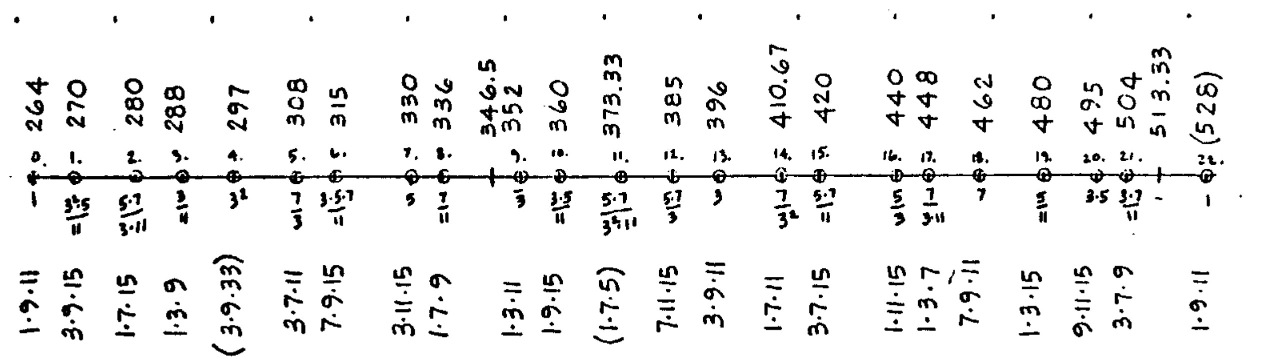
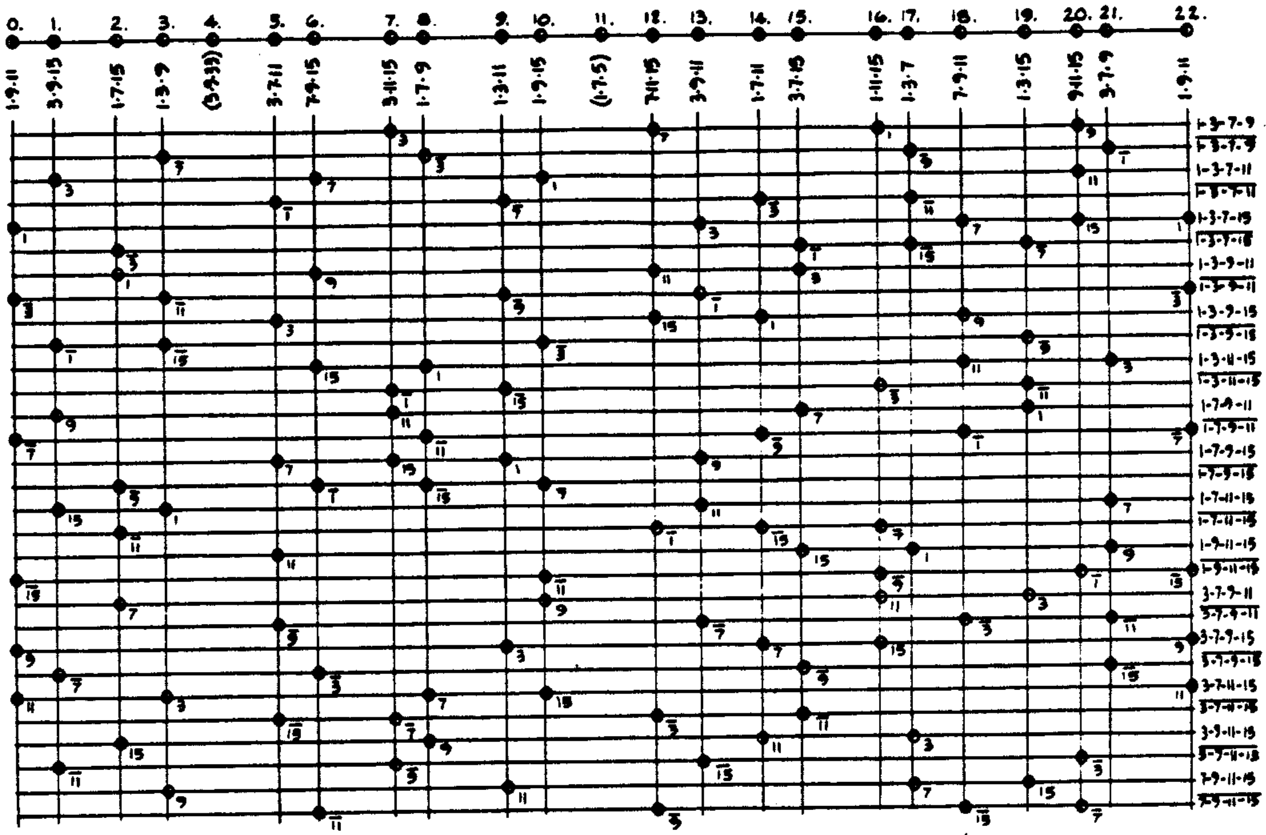


Figure 7

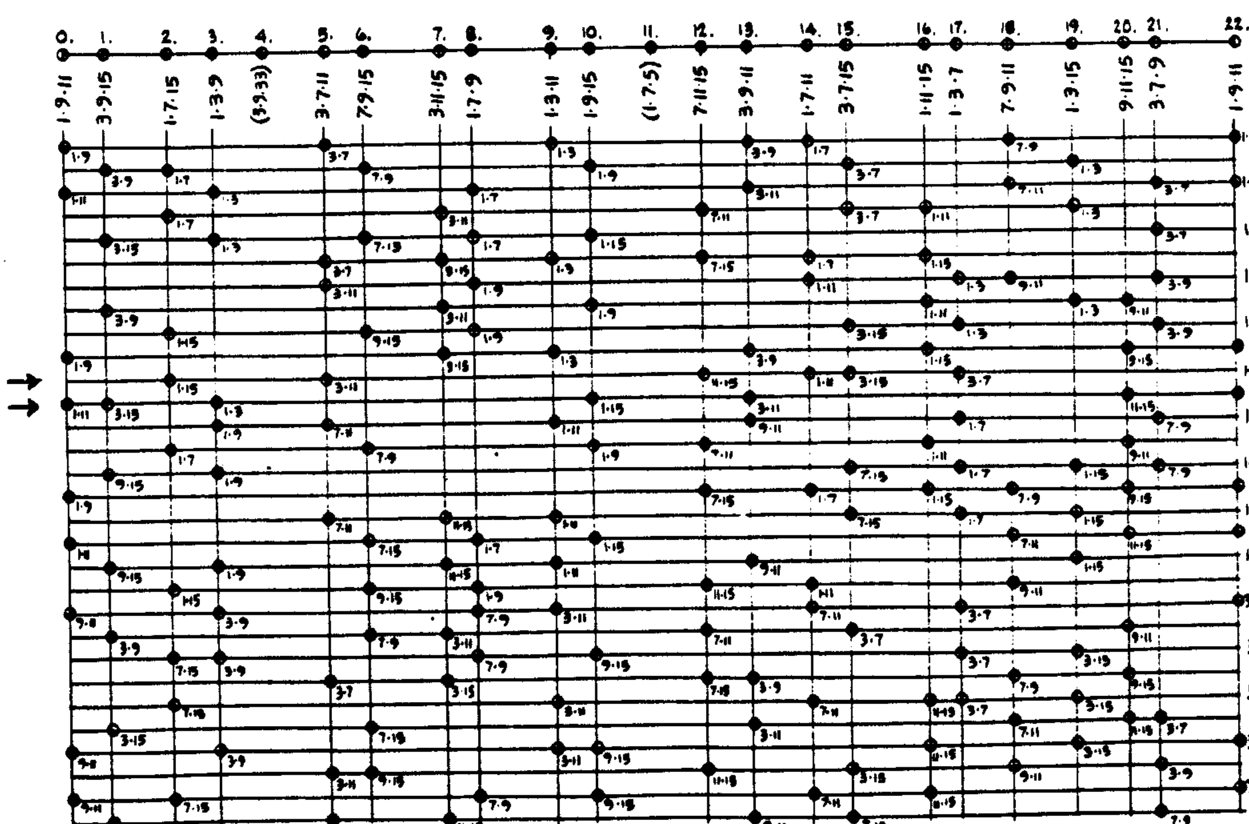
1 3 7 9 11 15
EIKOSANY



Tetrads of 1-3-7-9-11-15 Eikosany
Issued by Ervin M. Wilson 1968

Figure 8

Figure 9



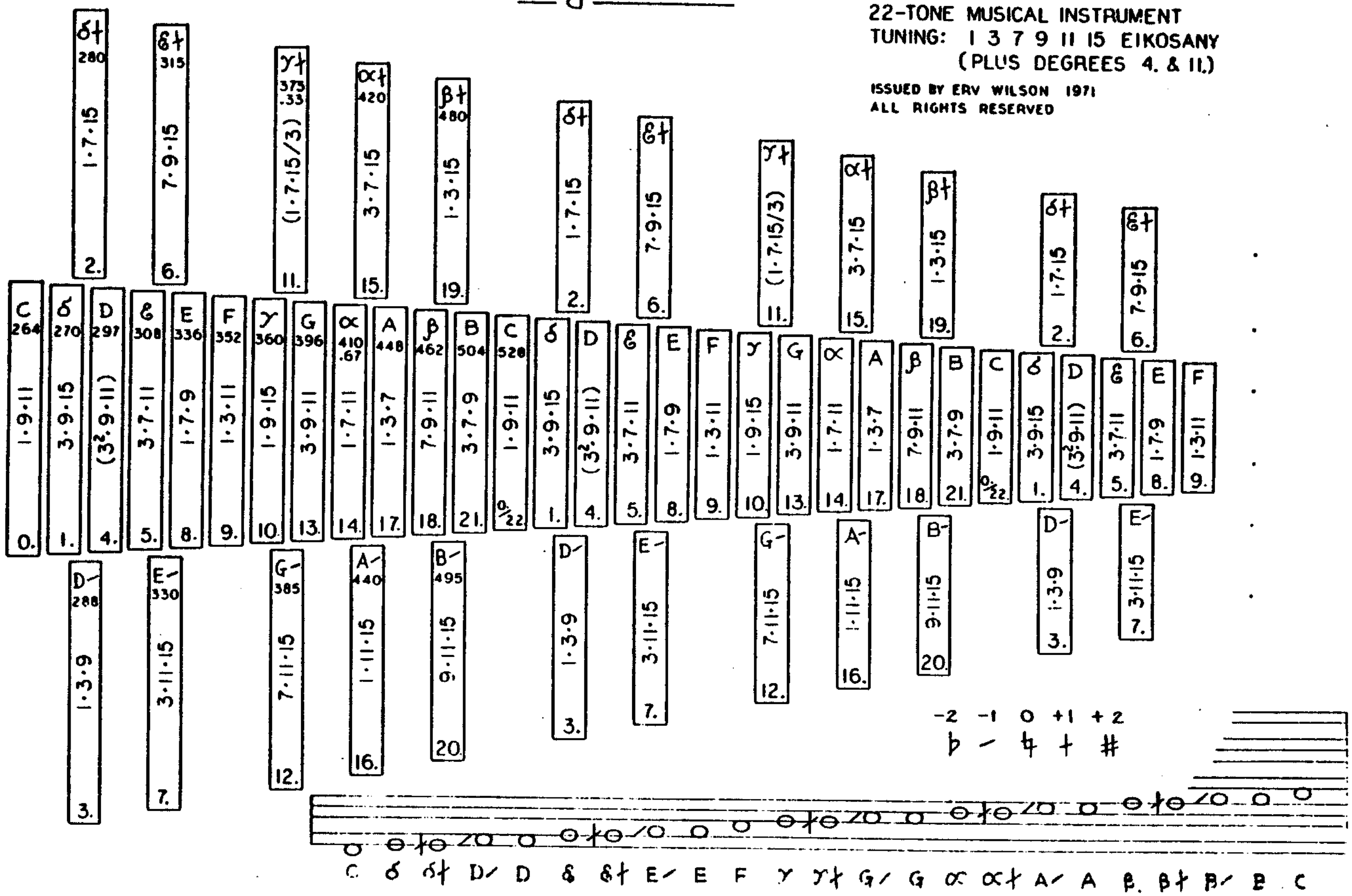
Hexanys of the 1-3-7-9-11-15 Eikosany

Please refer to fig. 11 for a better mounting

Figure 10

22-TONE MUSICAL INSTRUMENT
TUNING: 1 3 7 9 11 15 EIKOSANY
(PLUS DEGREES 4. & 11.)

ISSUED BY ERV WILSON 1971



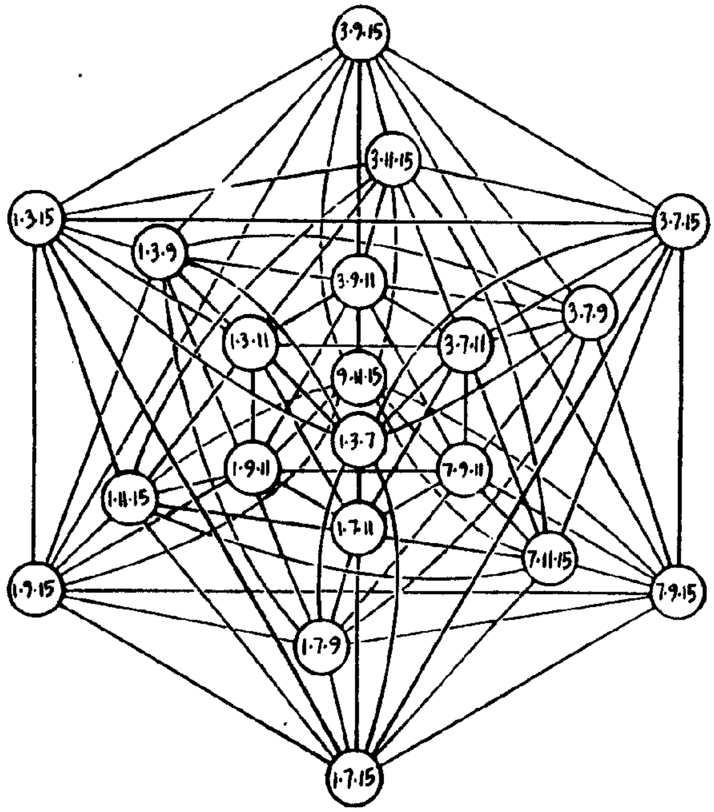


Figure 10 b

A Pre-Breakthru "Lattice"

E. Wilson 68

Pascal Vibes

Figure 11

1 3 7 9 11 15 Eikosany

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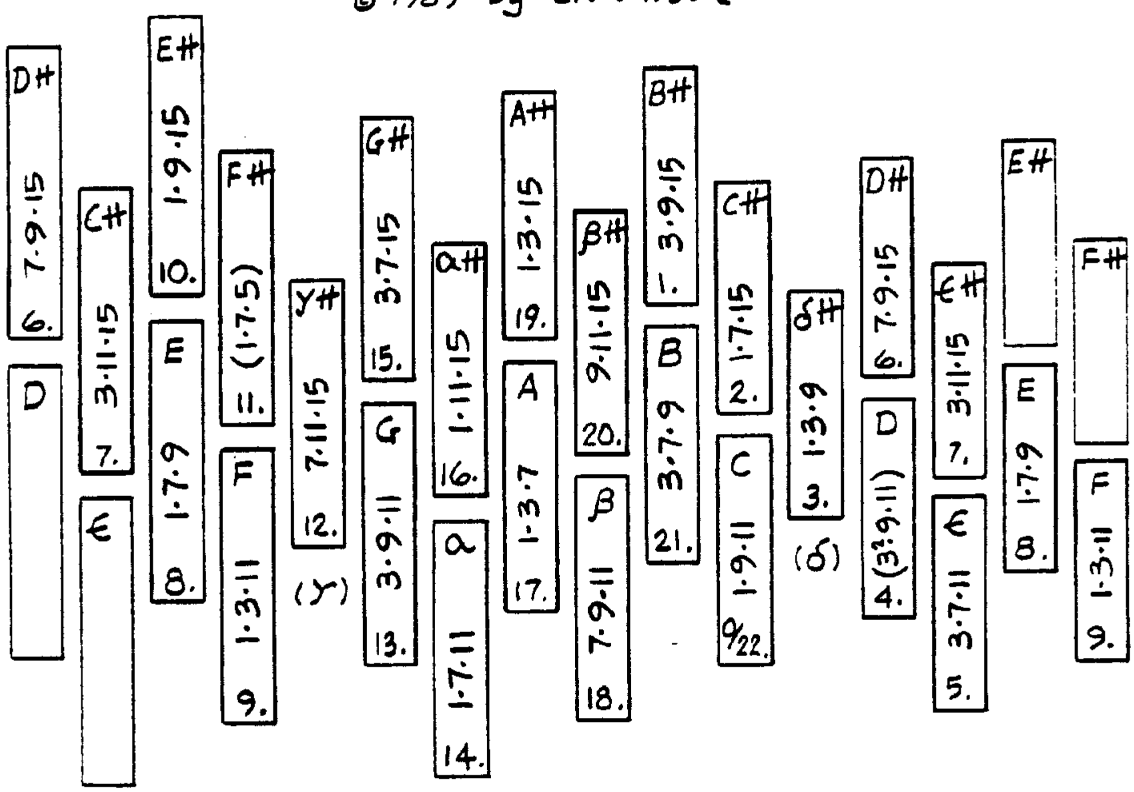
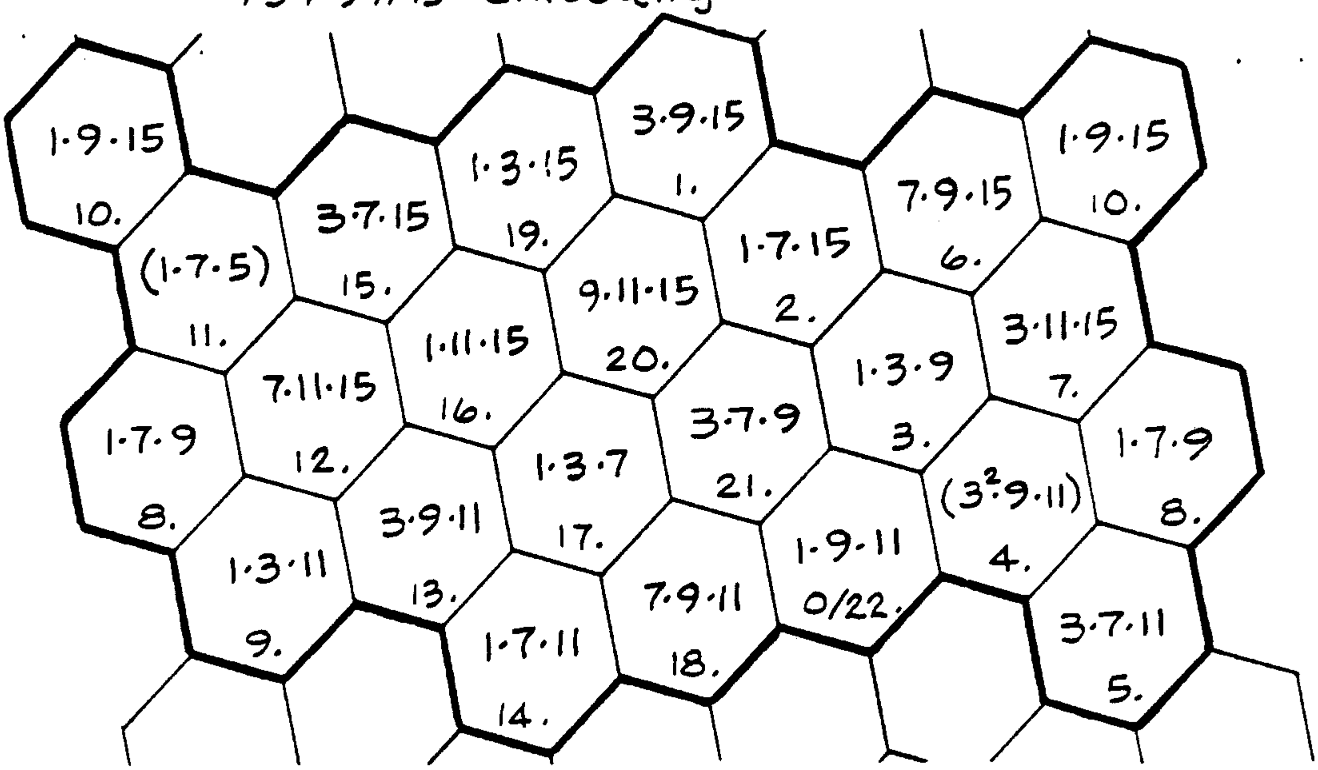


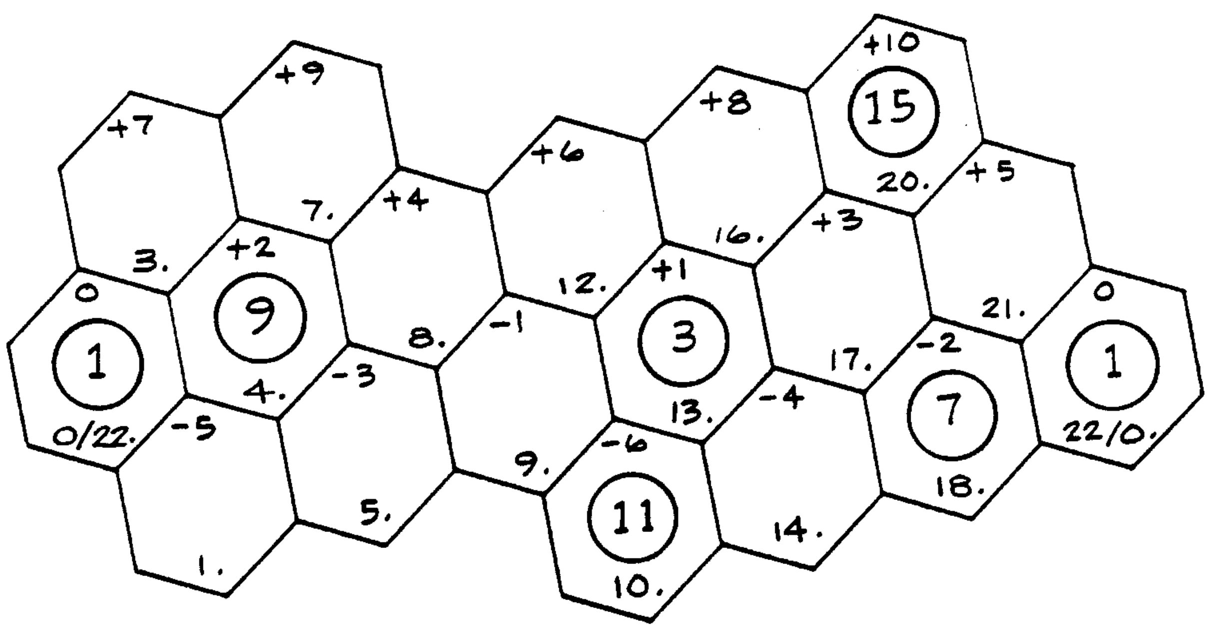
Figure 12

Pascal

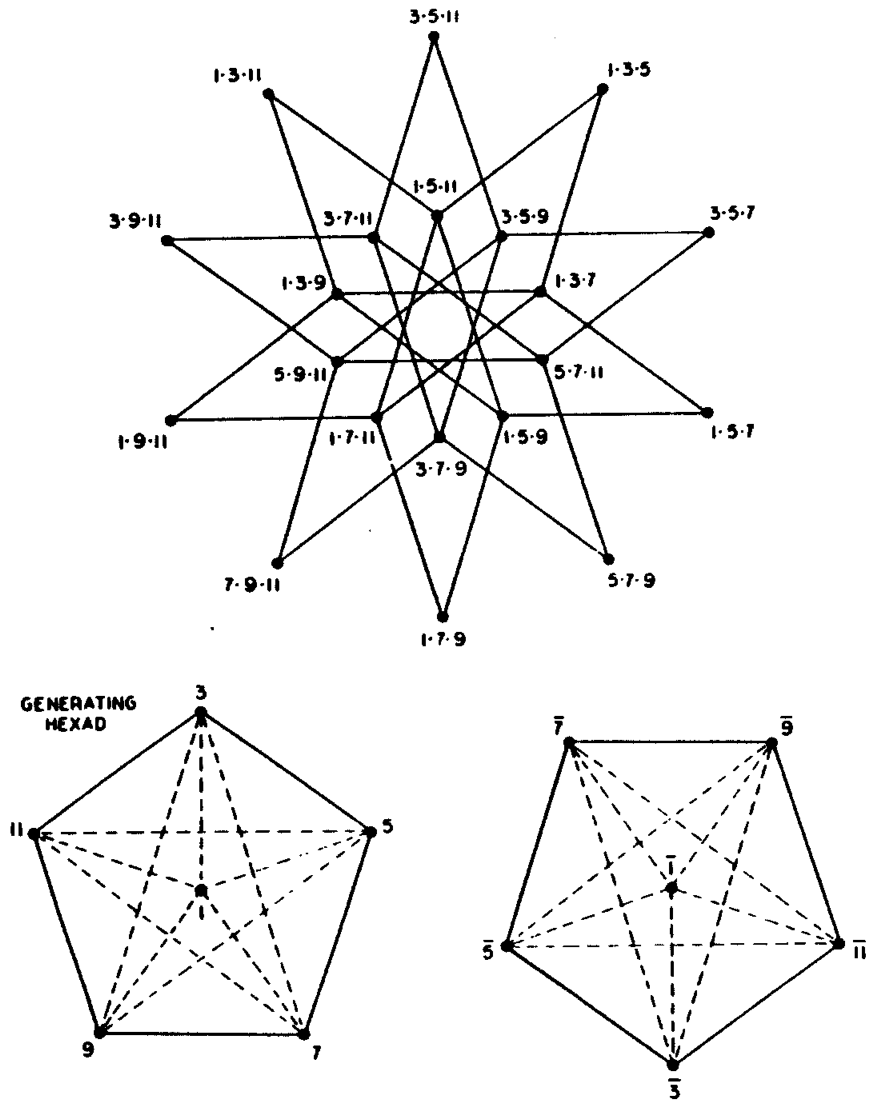
1 3 7 9 11 15 Eikosany



Template;



1-3-5-7-9-11 EIKOSANY



Issued by Erv Wilson, 1969

Figure 13

1-3-5-7-9-11 DIAMOND

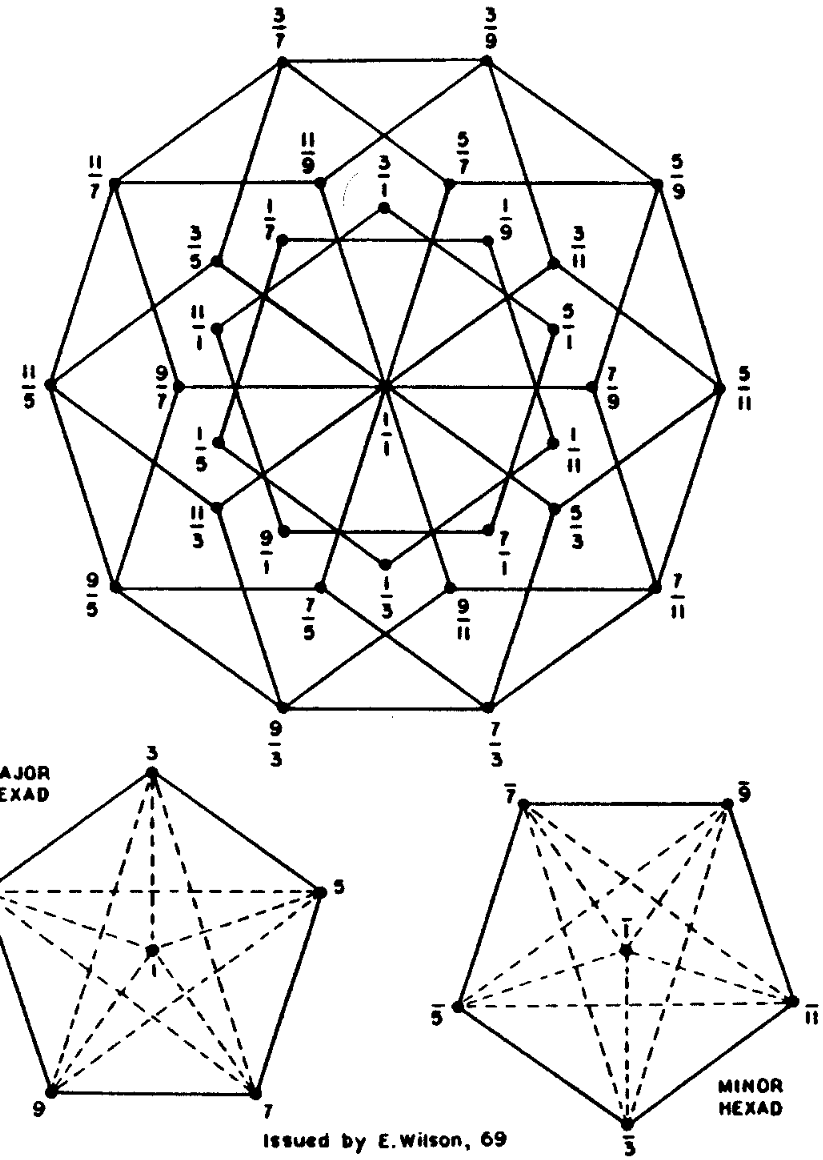


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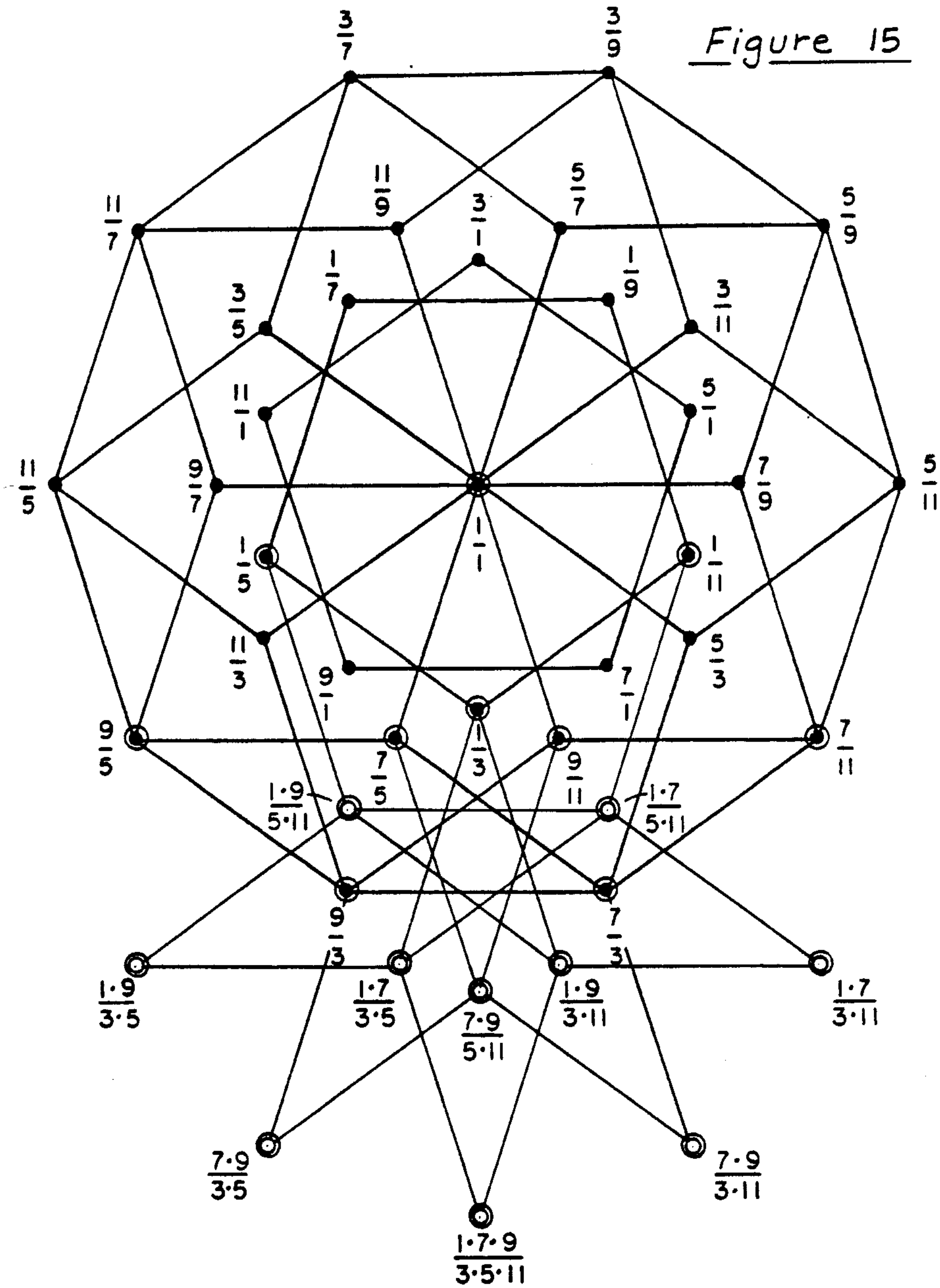
Figure 14

Intersection of Diamond & Eikosany (1 3 5 7 9 11)

Figure 15



Issued by Erv Wilson 1989

1-3-5-7-9-11 Diamond × Eikosany Pitches

PITCHES FROM JOHN CHALMERS' JUST TABLES BY PERMISSION
ISSUED BY ERV WILSON 1969

	1·3·9	1·9·11	3·5·11	1·5·9	3·5·7	1·7·9	3·7·11	5·7·11	1·3·11	1·5·11	1·3·5	1·5·7	1·3·7	1·7·11	3·9·11	5·9·11	3·5·9	5·7·9	3·7·9	7·9·11
1/1	432	396	330	360	420	252	462	385	264	440	480	280	336	308	297	495	270	315	378	346.5
5/1	540	495	412	450	525	315	577	481.25	330	550	600	350	420	385	371.25	618.75	337.5	393.75	472.5	433.12
5/3	720	660	550	600	700	420	770	641.67	440	733.33	800	466.67	560	513.33	495	825	450	525	630	577.5
1/5	691.2	633.6	528	576	672	403.2	739.2	616	422.4	704	768	448	537.6	492.8	475.2	792	432	504	604.8	554.4
3/5	518.4	475.2	396	432	504	302.4	554.4	462	316.8	528	576	336	403.2	369.6	356.4	594	324	378	453.6	415.8
7/1	756	693	577.5	630	735	441	808.5	673.75	462	770	840	490	588	539	519.75	866.25	472.5	551.25	661.5	606.38
7/3	504	462	385	420	490	294	539	449.17	308	513.33	560	326.67	392	359.33	346.5	577.5	315	367.5	441	404.25
7/5	604.8	554.4	462	504	588	352.8	646.8	539	369.6	616	672	392	470.4	431.2	415.8	693	378	441	529.2	485.1
1/7	493.71	452.57	377.14	411.43	480	288	528	440	301.71	502.86	548.57	320	384	352	339.43	565.71	308.57	360	432	396
3/7	74.57	678.86	565.71	617.14	720	432	792	660	452.57	754.28	822.86	480	576	528	509.14	848.57	462.86	540	648	594
5/7	617.14	565.71	471.43	514.28	600	360	660	550	377.14	628.57	685.71	400	480	440	424.28	707.14	385.71	450	540	495
9/1	486	445.5	371.25	405	472.5	283.5	519.75	433.12	297	495	540	315	378	346.5	334.12	556.88	303.75	354.38	425.25	389.81
3/1, 9/3	648	594	495	540	630	378	693	577.5	396	660	720	420	504	462	445.5	742.5	405	472.5	567	519.75
9/5	777.6	712.8	594	648	756	453.6	831.6	693	475.2	792	864	504	604.8	554.4	534.6	891	486	567	680.4	623.7
9/7	555.43	509.14	424.28	462.86	540	324	594	495	332.43	565.71	617.14	360	432	396	381.86	636.43	347.14	405	486	445.5
1/9	768	704	586.67	640	744.67	448	821.33	684.44	469.33	782.22	853.33	497.78	597.33	547.56	528	880	480	560	672	616
1/3, 3/9	576	528	440	480	560	336	616	513.33	352	586.67	640	373.33	448	410.67	396	660	360	420	504	462
5/9	480	440	366.67	400	466.67	280	513.33	427.78	293.33	488.89	533.33	311.11	373.33	342.22	330	550	300	350	420	385
7/9	672	616	513.33	560	653.33	392	718.67	598.89	410.67	684.44	746.66	435.56	522.67	479.11	462	770	420	490	588	539
11/1	594	544.5	453.75	495	577.5	346.5	635.25	529.38	363	605	660	385	462	423.5	408.38	680.62	371.25	433.12	519.75	476.44
11/3	792	726	605	660	770	462	847	705.83	484	806.67	880	513.33	616	564.67	544.5	907.5	495	577.5	693	635.25
11/5	475.2	435.6	363	396	462	277.2	508.2	423.5	290.4	484	528	308	369.6	338.8	326.7	544.5	297	346.5	415.8	381.15
11/7	678.86	622.28	518.57	565.71	660	396	726	605	414.86	691.43	754.28	440	528	484	466.71	777.86	424.28	495	594	544.5
11/9	528	484	403.33	440	513.33	308	564.67	470.56	322.67	537.78	586.67	342.22	410.67	376.44	363	605	330	385	462	423.5
1/11	628.36	576	480	523.64	610.91	366.54	672	560	384	640	698.18	407.27	488.73	448	432	720	392.73	458.18	549.82	504
3/11	471.27	432	360	392.73	458.18	274.91	504	420	288	480	523.64	305.45	366.54	336	324	540	294.54	343.64	412.36	378
5/11	785.45	720	600	654.54	763.64	458.18	840	700	480	800	872.73	509.09	610.91	560	540	900	490.91	572.73	687.27	630
7/11	549.82	504	420	458.18	534.54	320.73	588	490	336	560	610.91	356.36	427.64	392	378	630	343.64	400.91	481.09	441
9/11	706.91	648	540	589.09	687.27	412.36	756	630	432	720	785.45	458.18	549.82	504	486	810	441.82	515.45	618.54	567

Figure 15b

1·3·7·9·11·15 Eikosany
©1976 by Erv Wilson

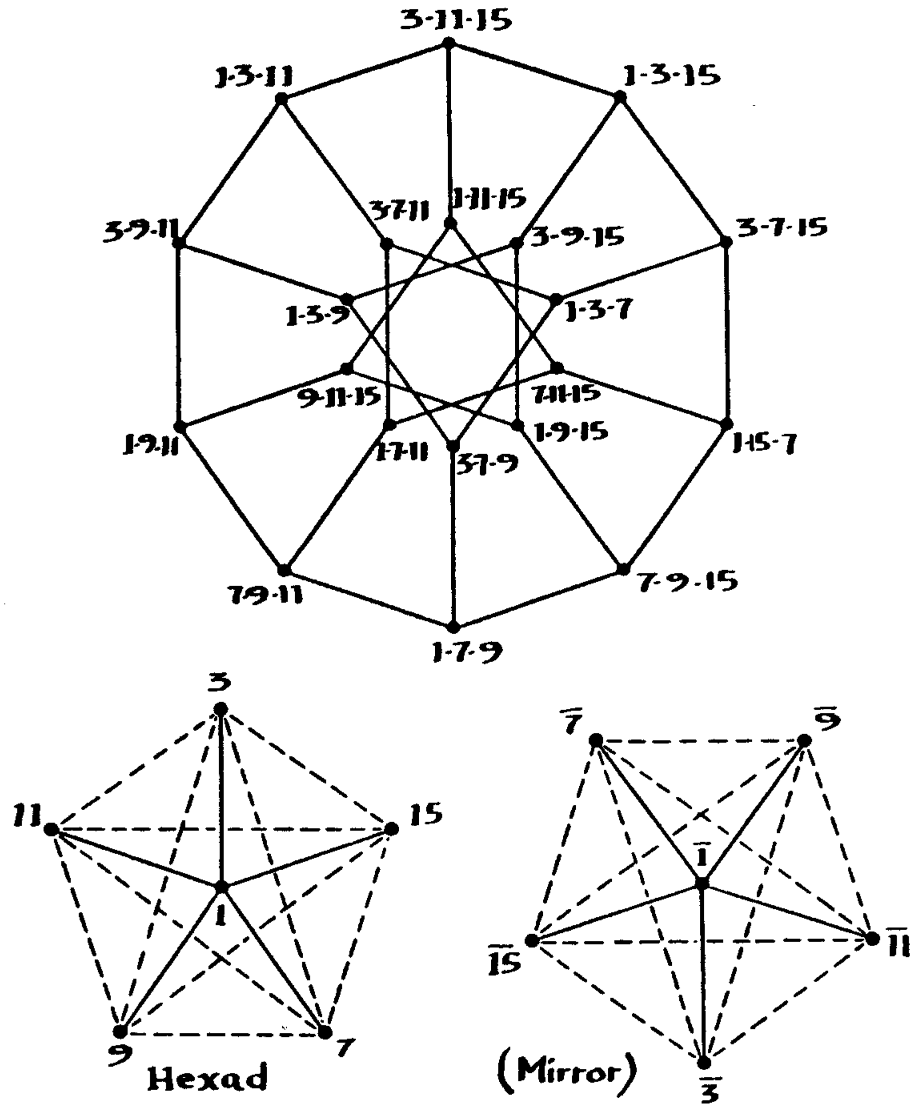


Figure 16

1·3·5·7·9·11 Eikosany
©1975 by Erv Wilson

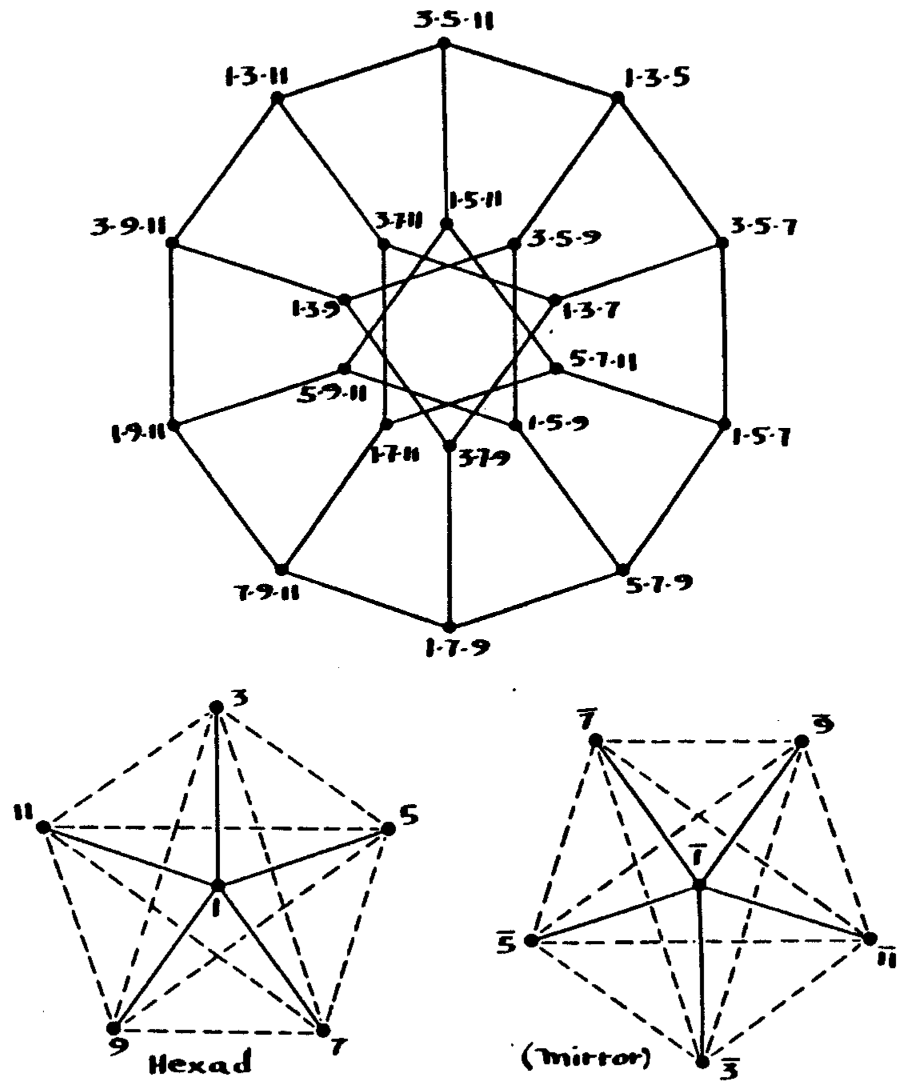
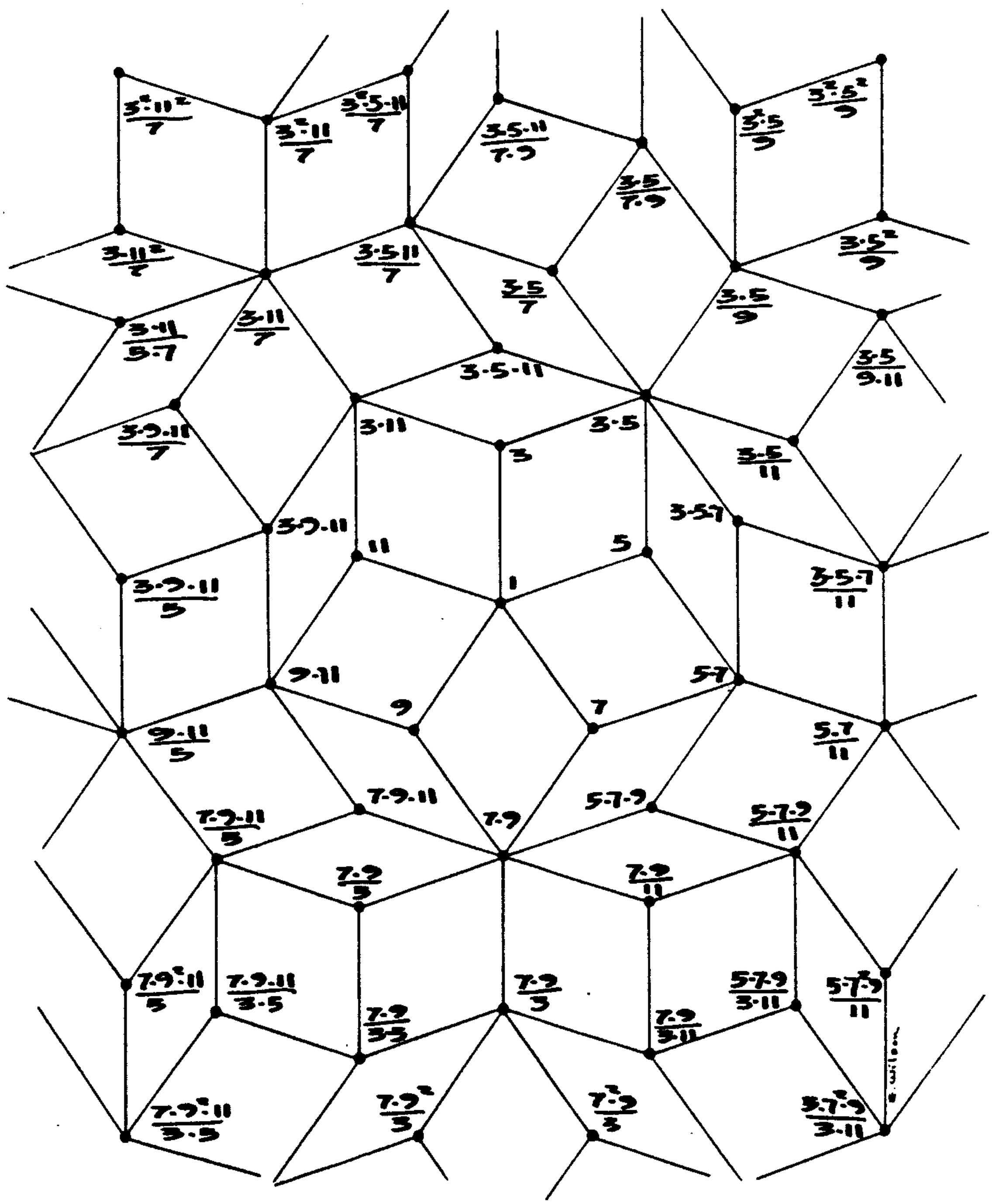


Figure 17

Figure 18

Tonescape on a tiling pattern by Roger Penrose

©1989 by Erv Wilson



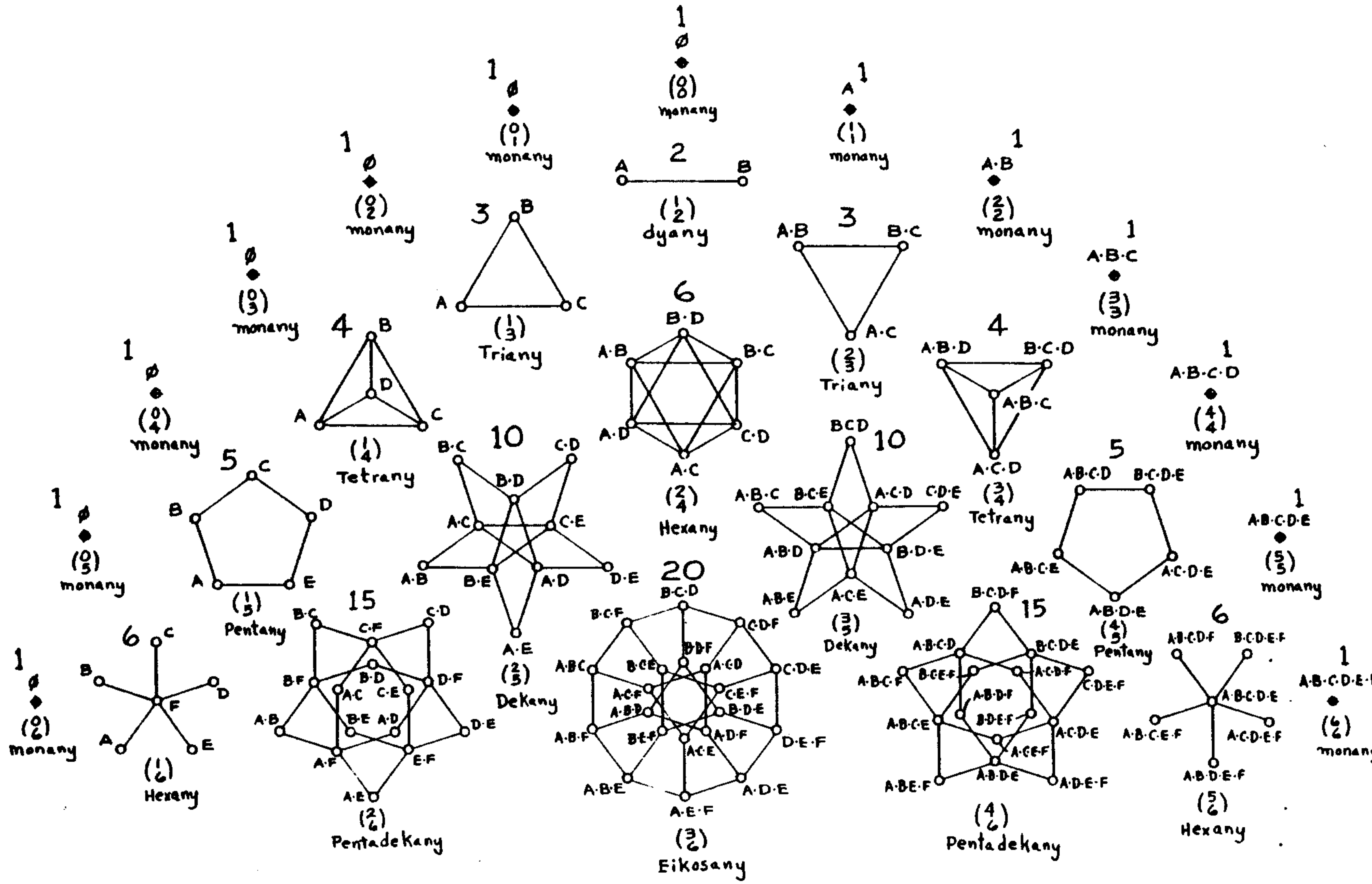
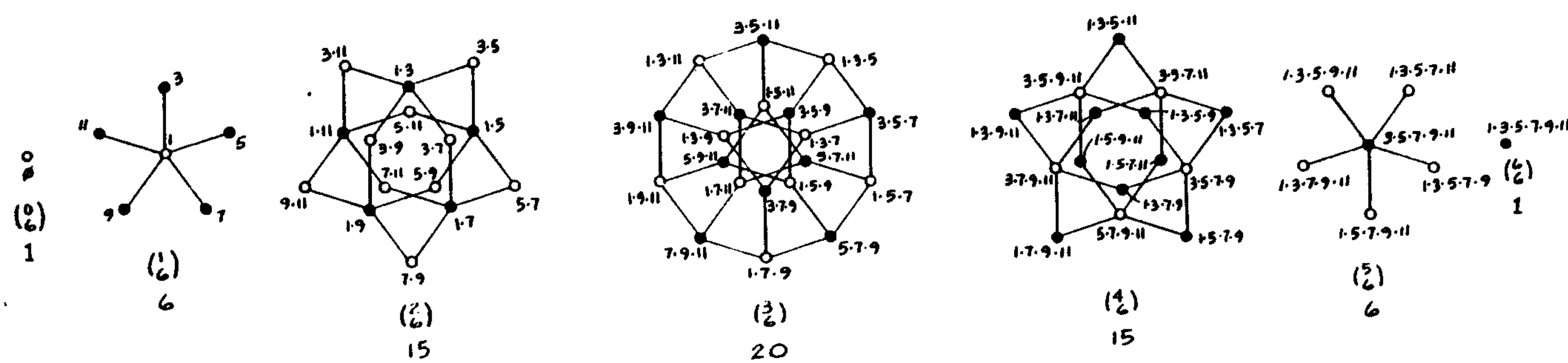


Figure 19   *A Pascal Triangle of Combination Set Lattices*

The Bottom Line

Figure 20

1. The bottom row of figure 3 & figure 19
2. consecutive, interlocking slices thru figure 20b
3. The substance of D'alessandro Keyboard Program



Combination-product Sets $\binom{0}{6}$ thru $\binom{6}{6}$ 1 3 5 7 9 11

(Latticed within a lenticular, rhombic Icosahedron)

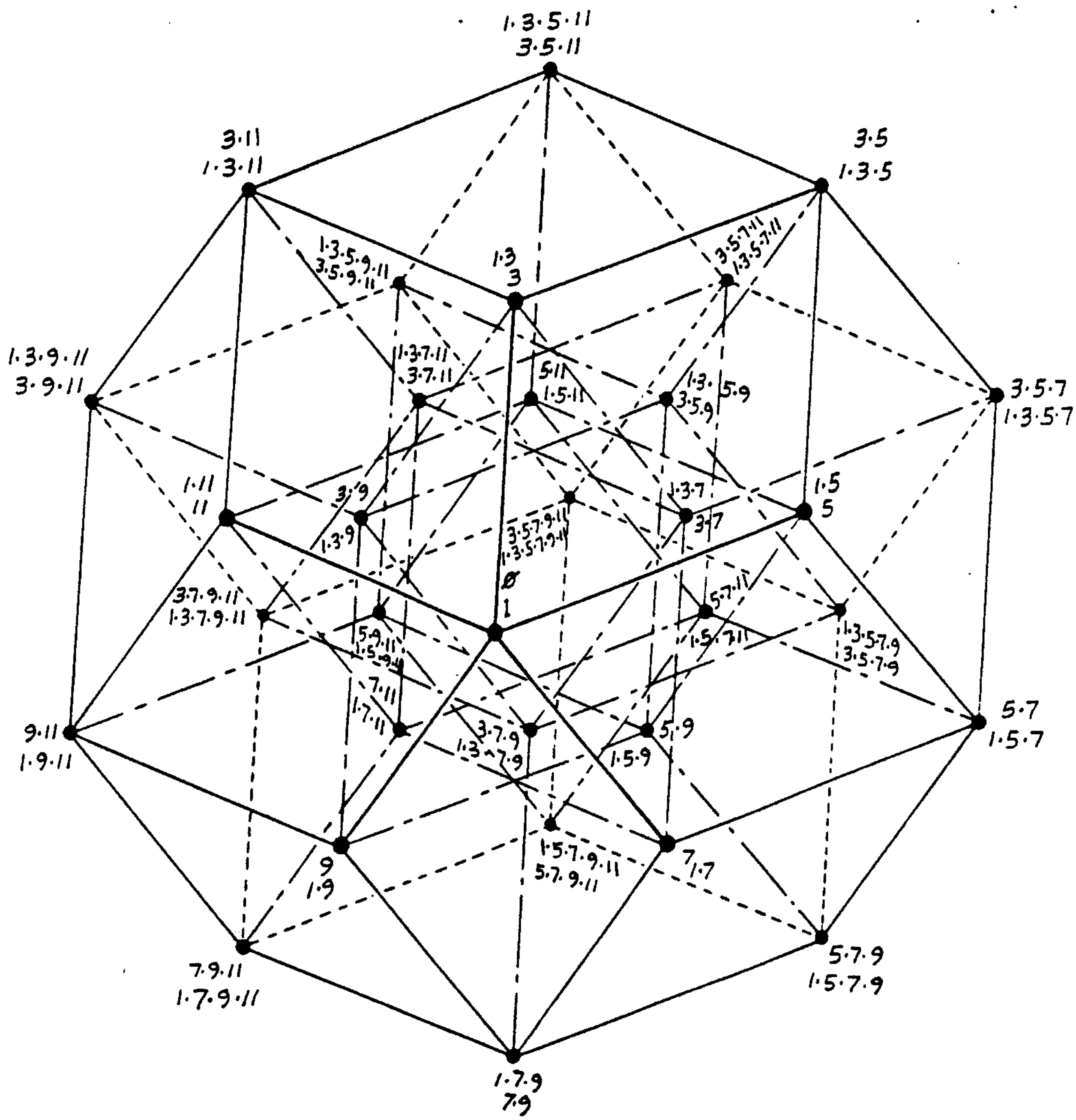


Figure 20b

1-3-5-7-9-11 Eikosany, Spatial Lattice
© 1989 by Erv Wilson

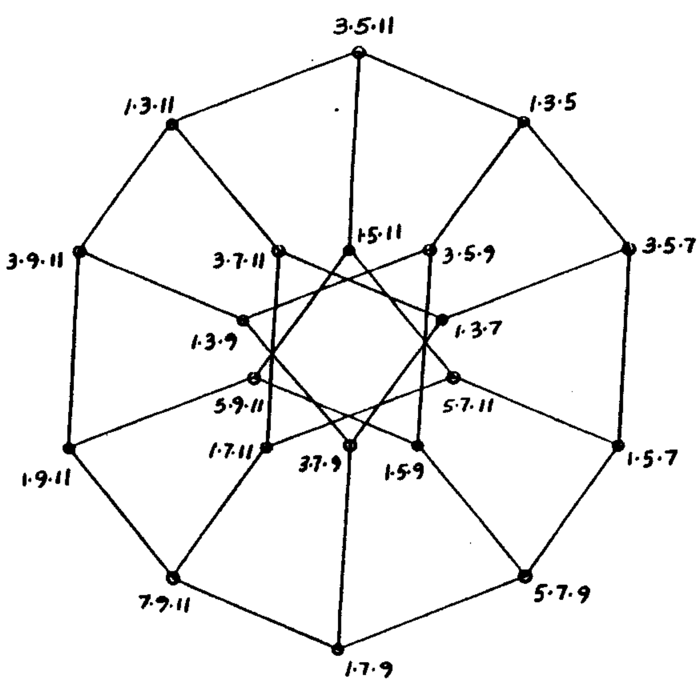


Figure 20c

1-3-5-7-9-11 Diamond, Spatial Lattice
© 1989 by Erv Wilson

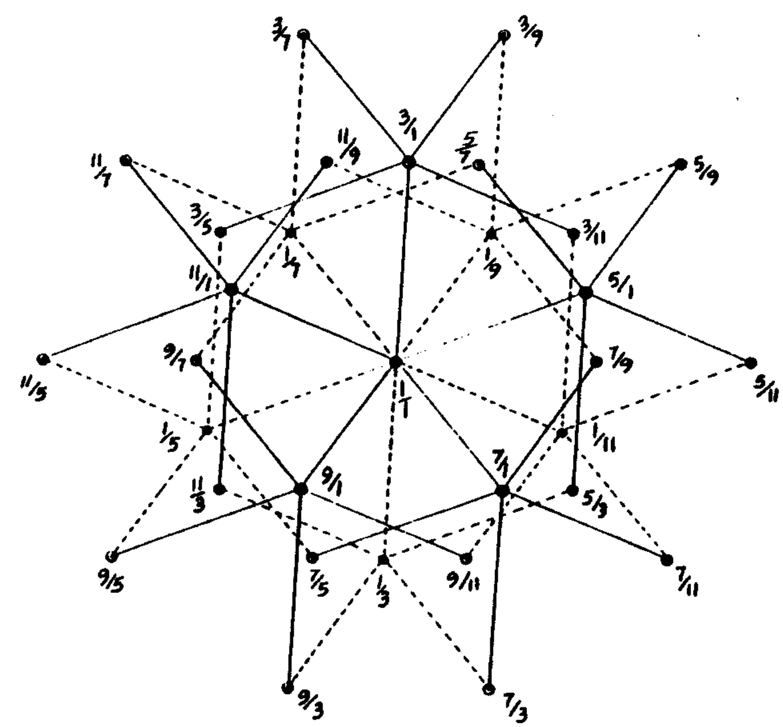
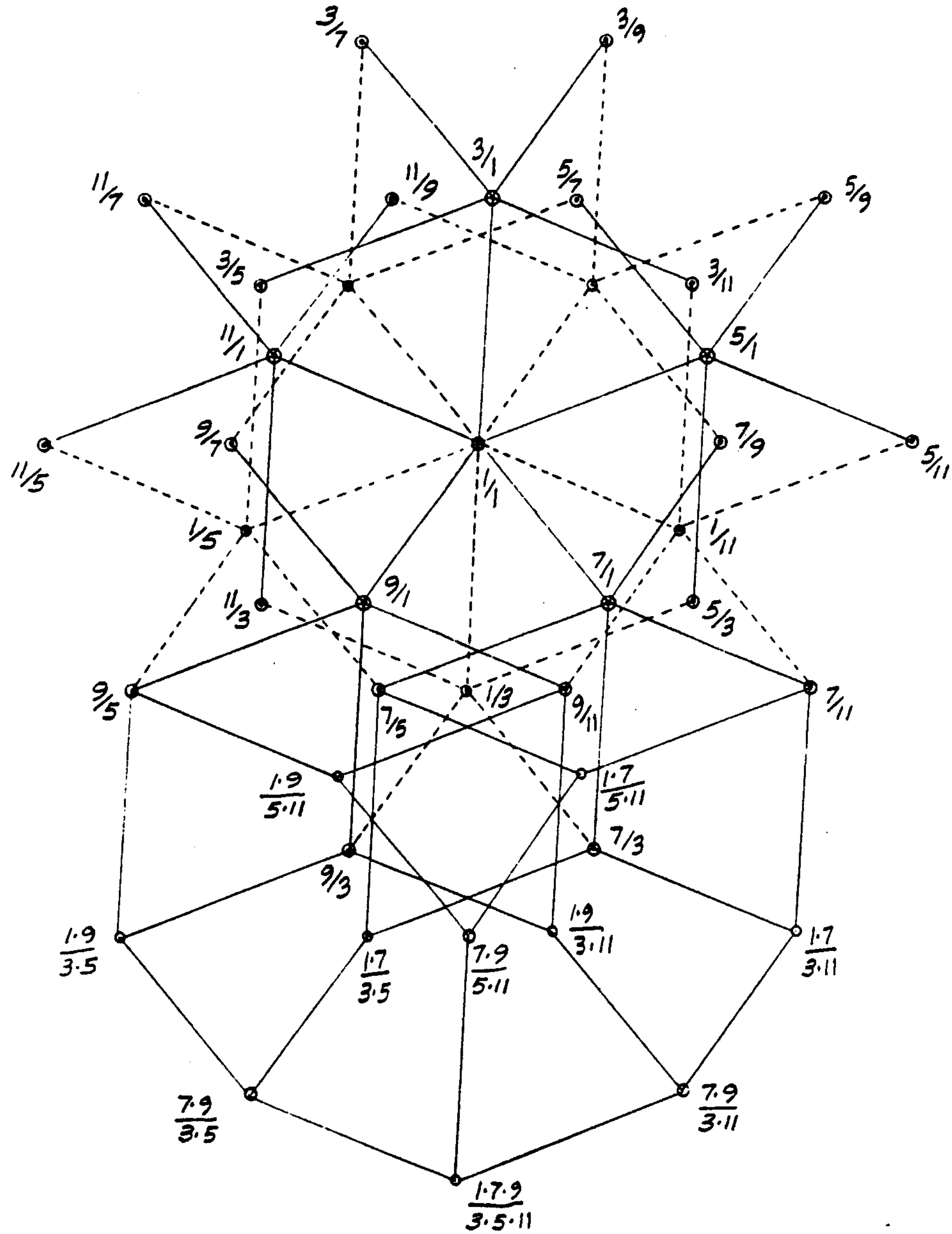


Figure 20d

25

Figure 20 e

Diamond & Eikosany Overlay, Spatial Lattice



Combination Sets $\binom{0}{6}$ thru $\binom{6}{6}$ 1·3·5·7·9·11
Mapped over Modulus 31 and the Bosanquet Keyboard Scheme
© 1975 by Ervin M. Wilson

$\binom{3}{6}$ 1·3·5·7·9·11 Eikosany shown in large numerals.

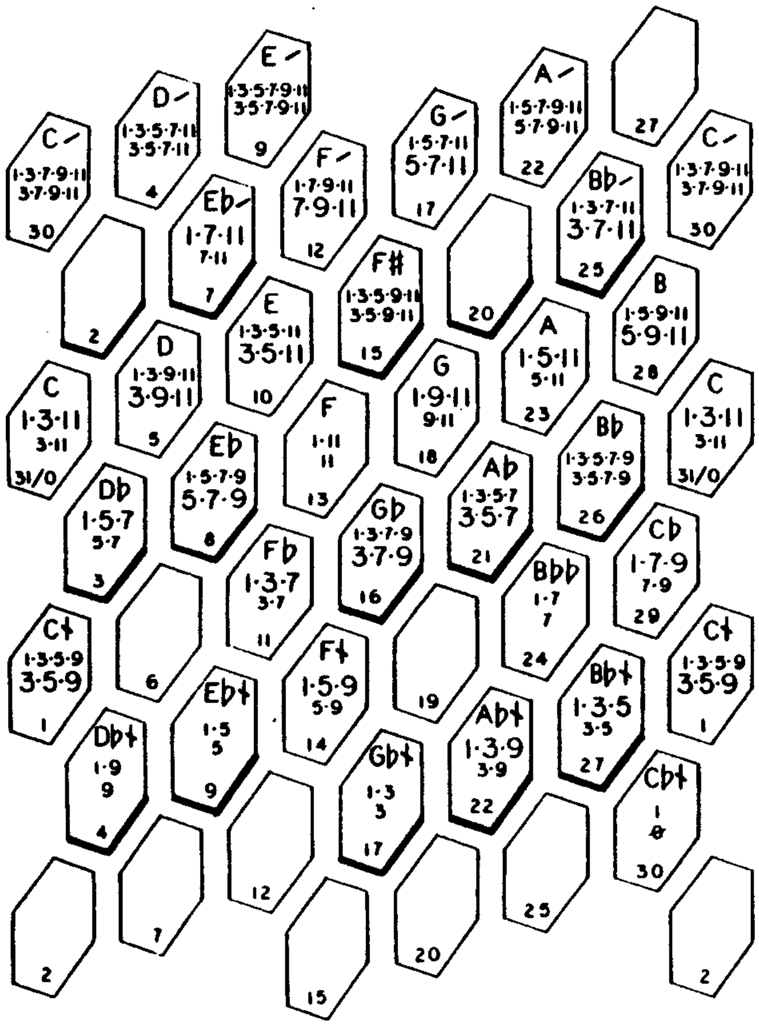


Figure 22

Genus $3^3\cdot5\cdot7\cdot11^2$ (& 8 pigtails)
Mapped to Bosanquet pattern using negative (31-like) template
©1980 by Erv Wilson

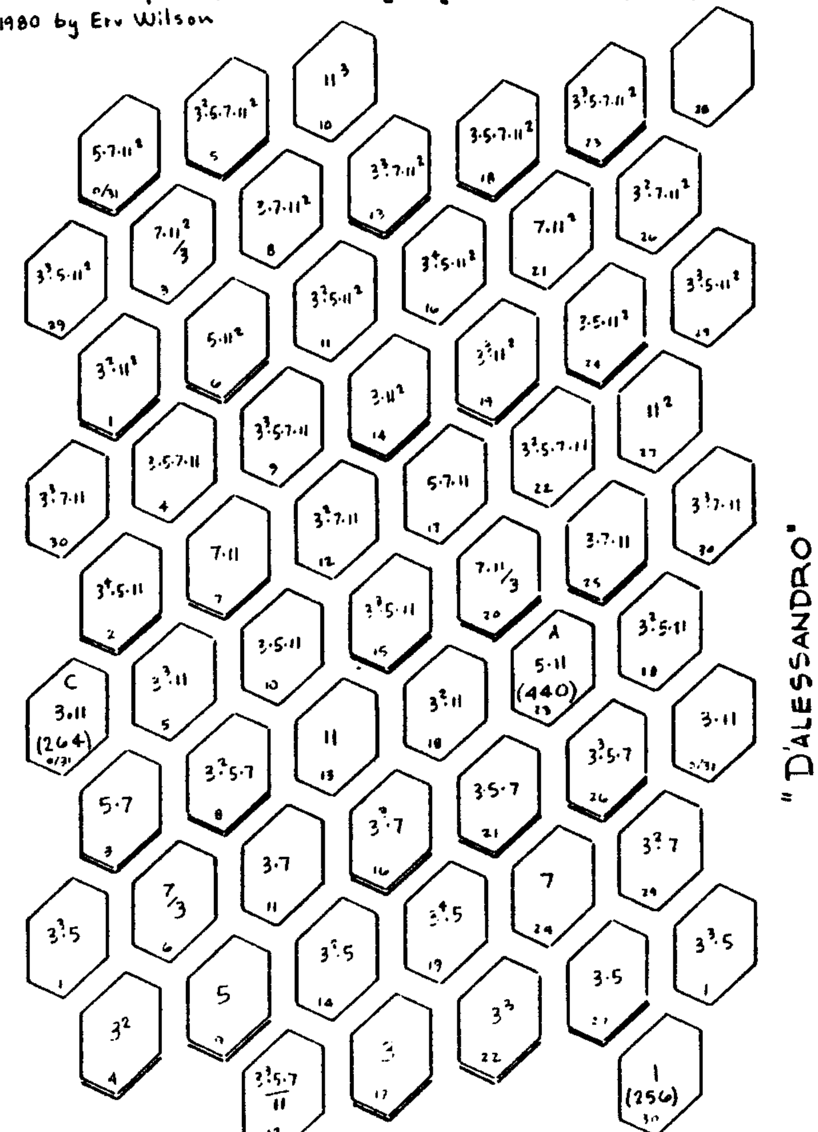
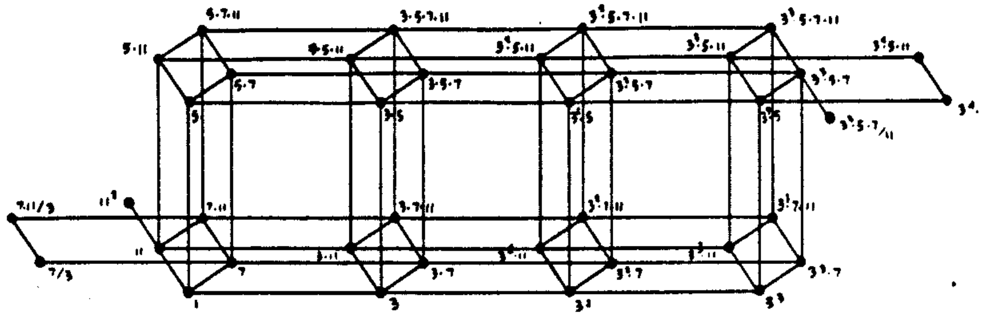
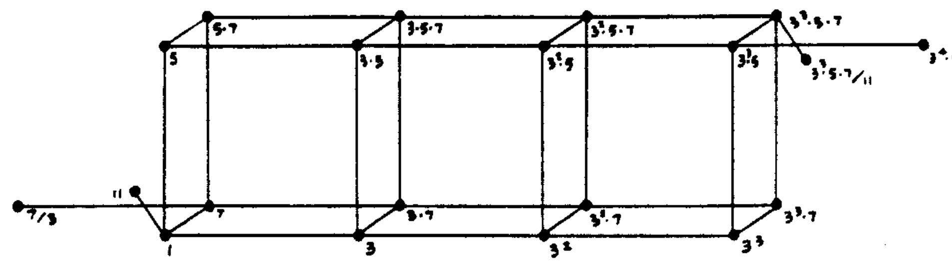


Figure 23

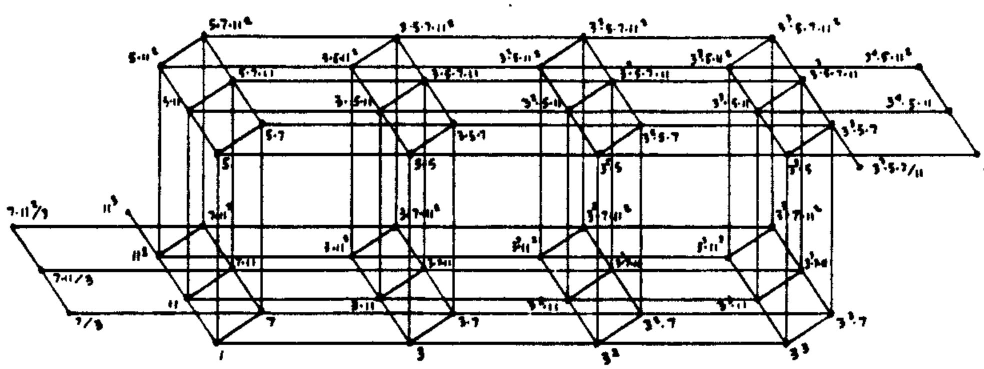
Lattice for Genus $3^3 5\cdot7\cdot11$ (plus 6 pigtails)



Lattice for Genus $3^3 5\cdot7$ (plus 4 pigtails)



Repeated Patterns in "Dalessandro"



Lattice for Genus $3^3 5\cdot7\cdot11^2$ (plus 8 pigtails)

"D'ALESSANDRO"

Fig. 23 continued

"Beth" Figure 21

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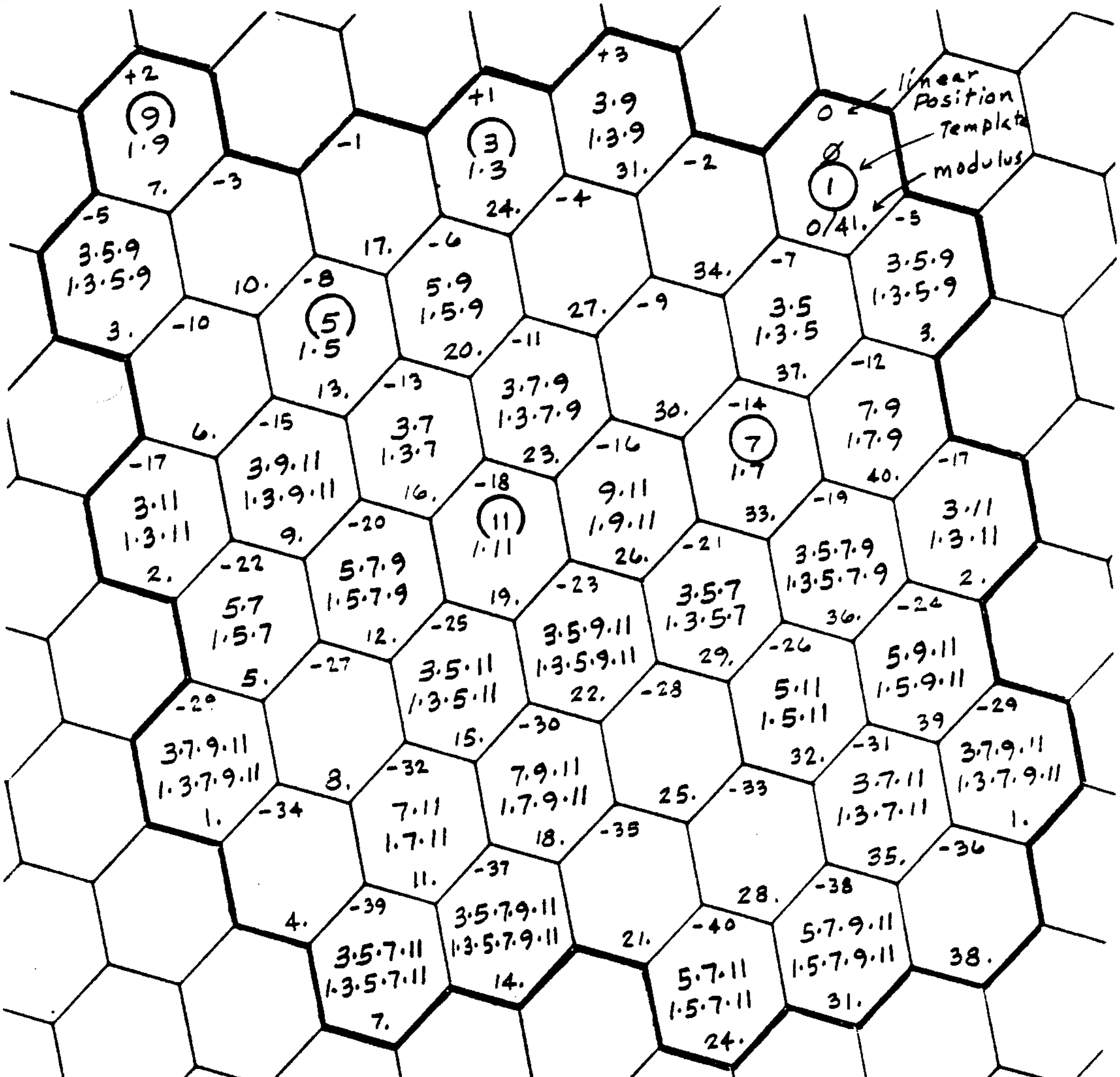
1·3·5·7·9·11 Combination Sets



Modified from a diagram in "Bosanquet – A Bridge – A Doorway to Dialog" by Ervin Wilson, Sept 1974, originally appeared in Xenharmonikon No. 2, 1974, Later incorporated into "Bea", 1980, by Erv Wilson

"Dálessandro"

Issued 1975, © 1989 by Erv Wilson

1·3·5·7·9·11 Combination-Product Set series mapped to modulus 31 & the Bosanquet Keyboard

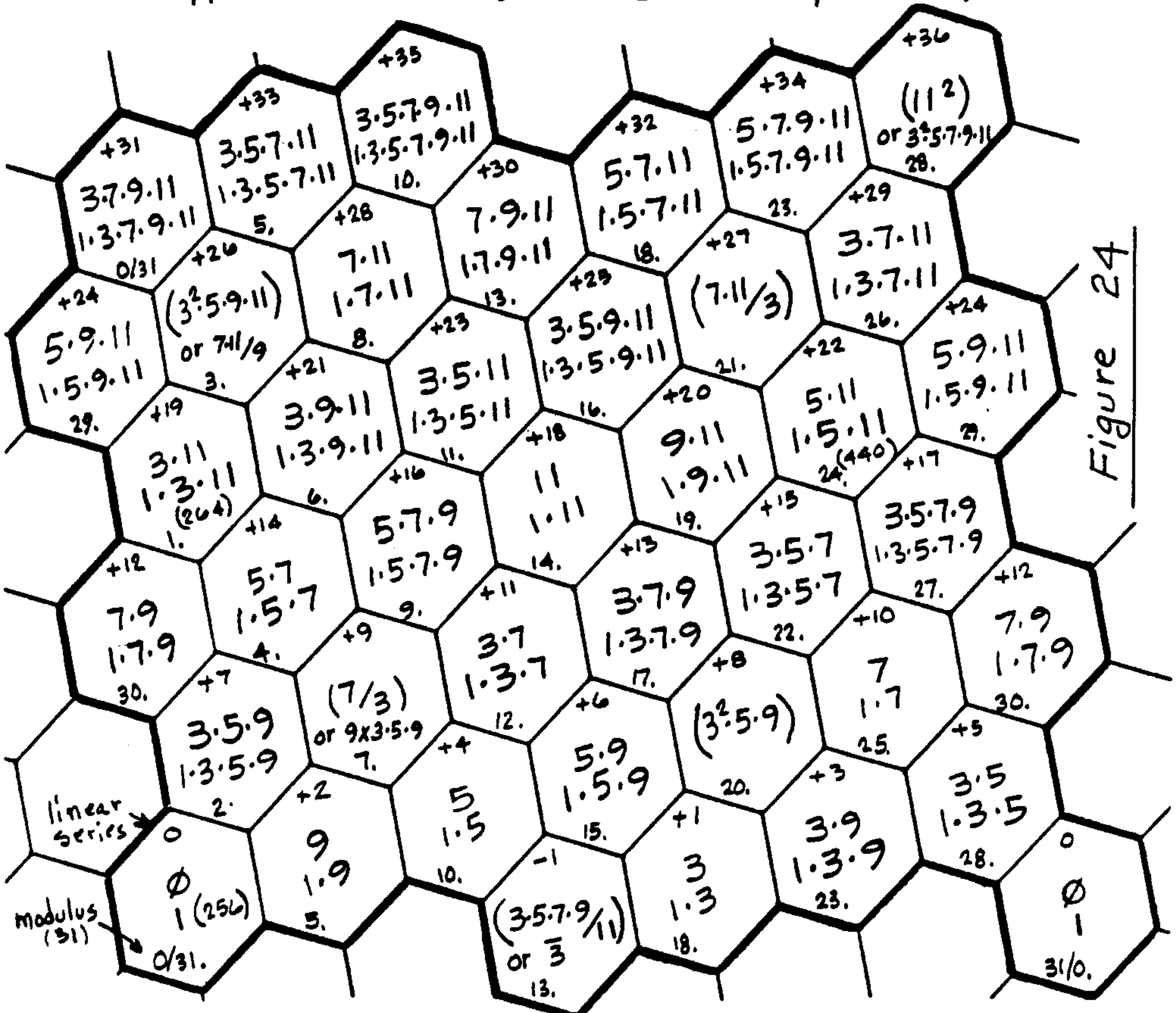
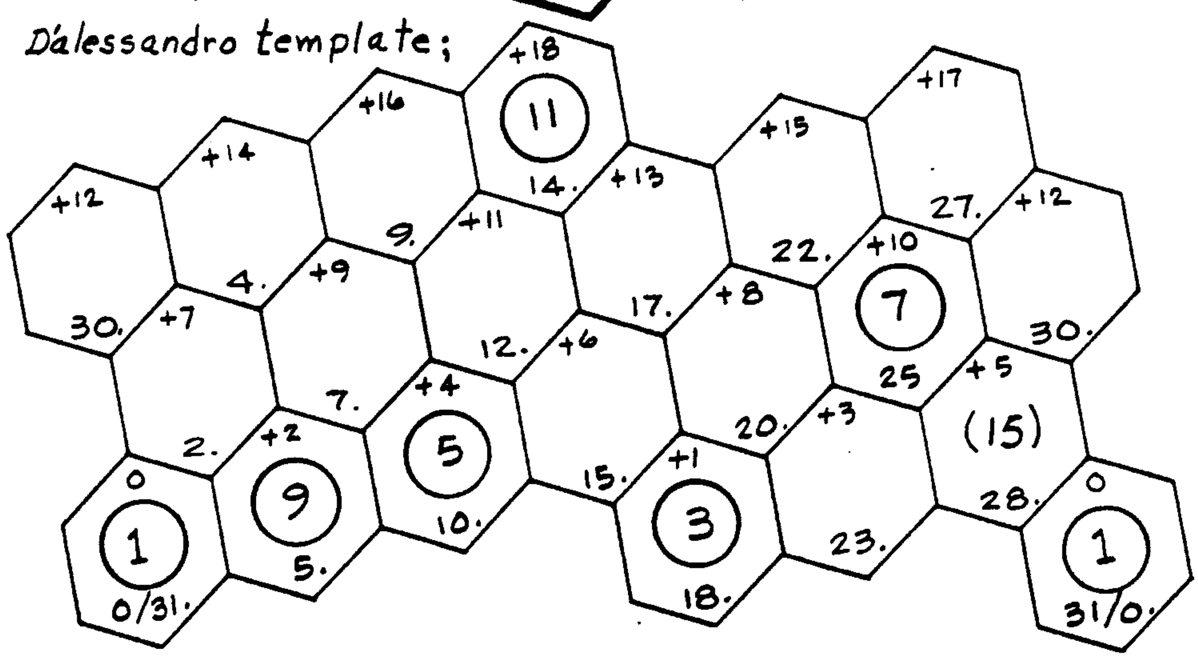
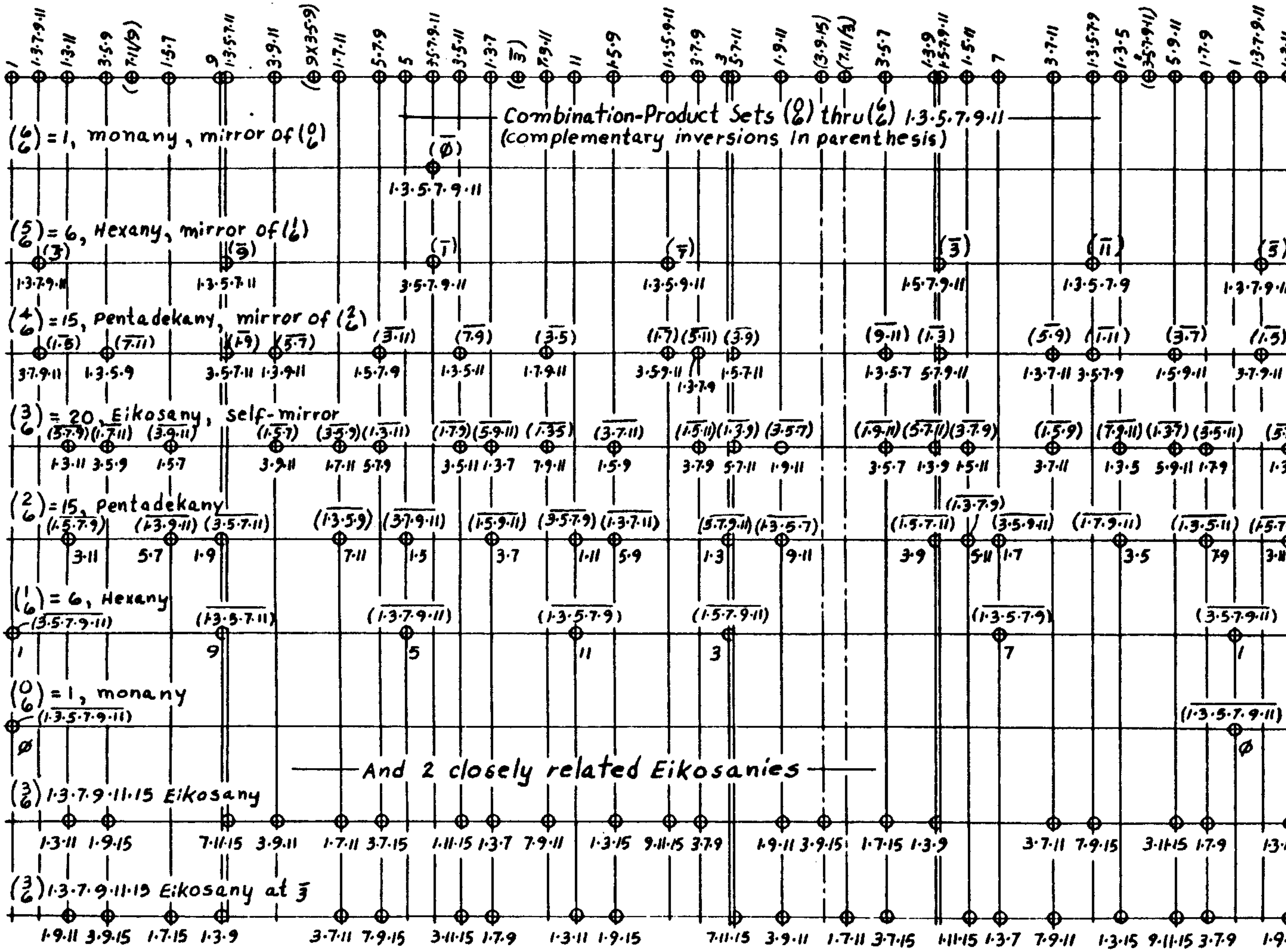


Figure 24

Dálessandro template;



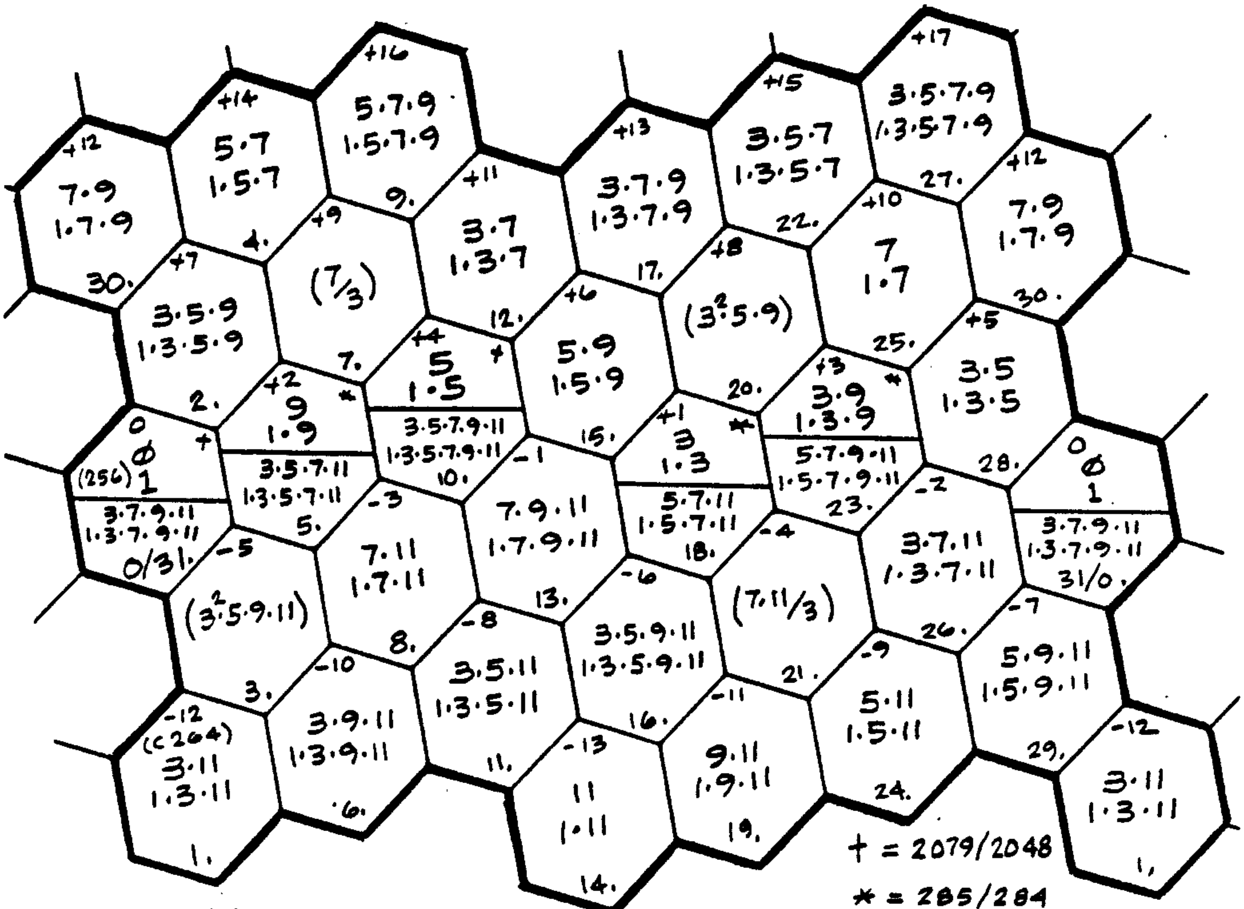


The Dalessandro Tuning

FIG 25

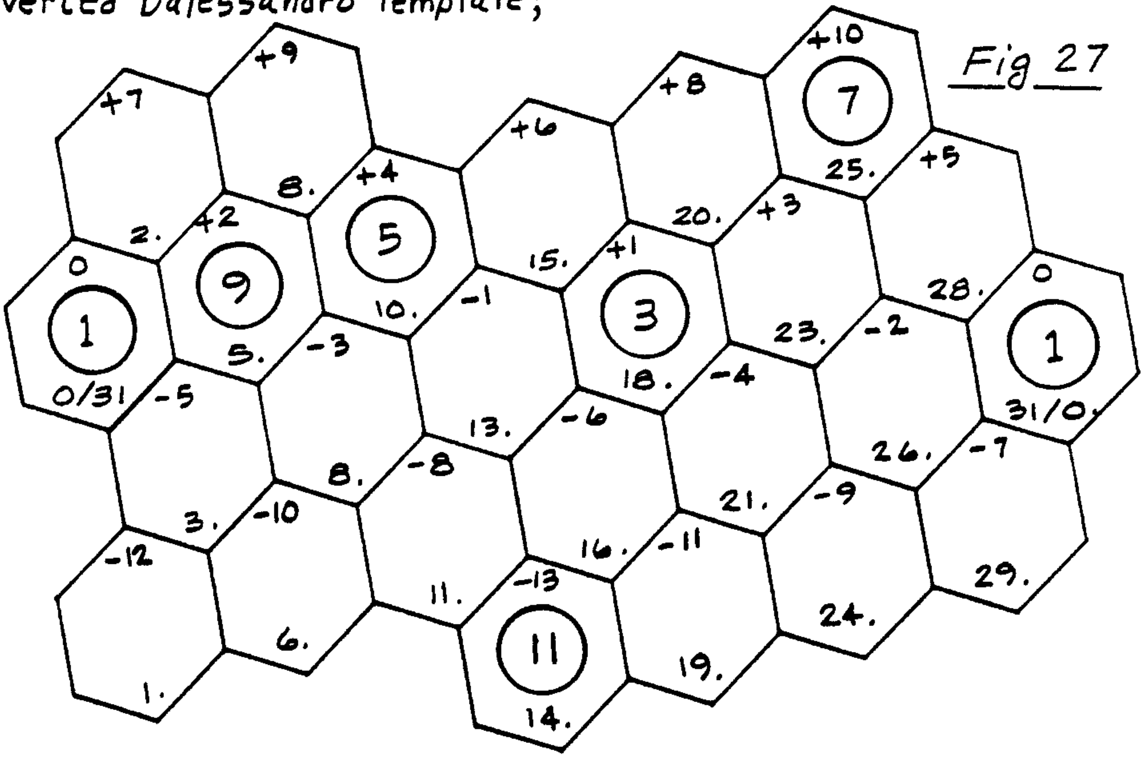
inverted "D'alessandro"
© 1989 by Erv Wilson

Figure 26



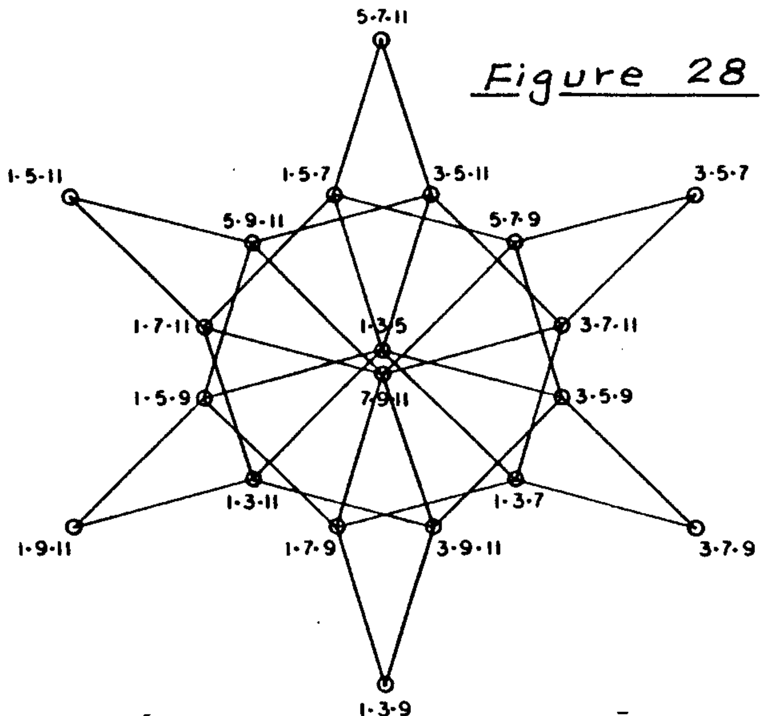
Inverted D'alessandro template;

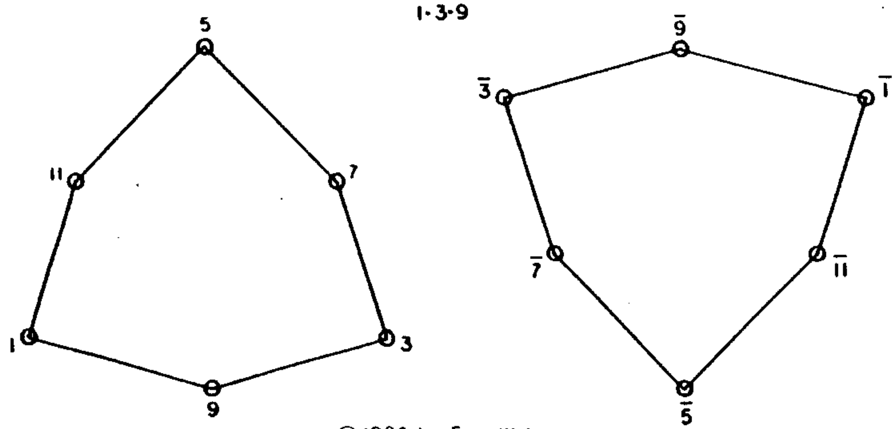
Fig 27



1-3-5-7-9-11 EIKOSANY

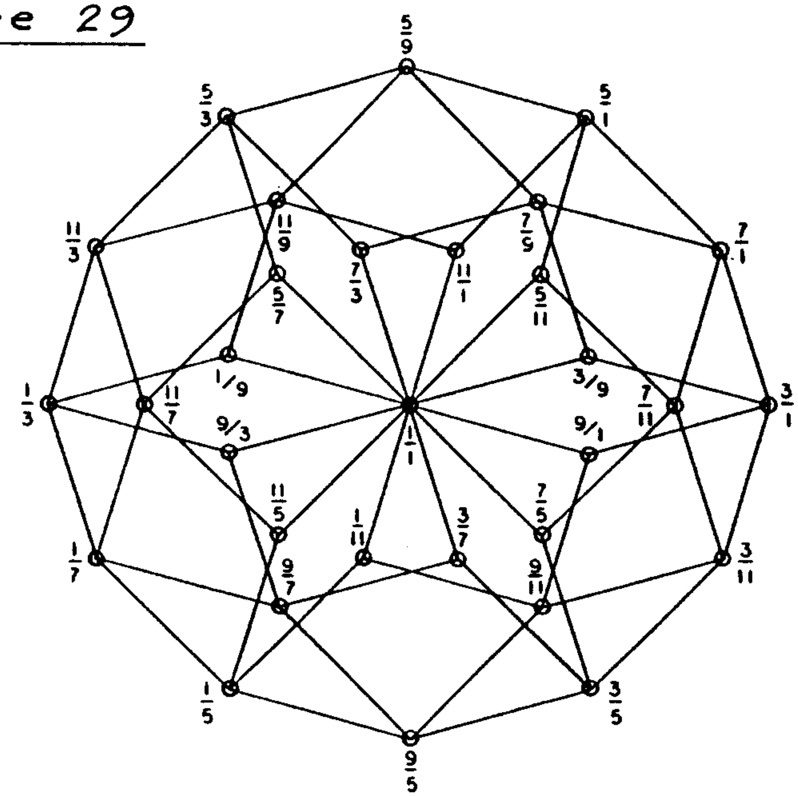
Figure 28

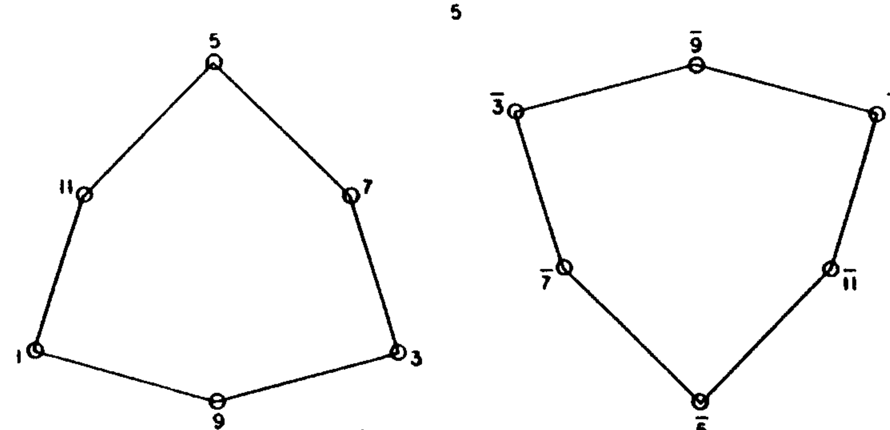




1-3-5-7-9-11 DIAMOND

Figure 29





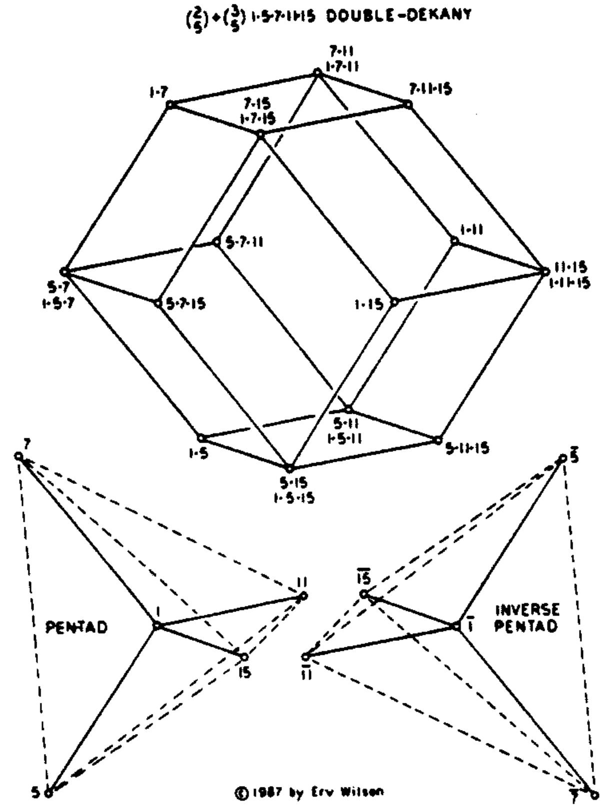


Figure 30

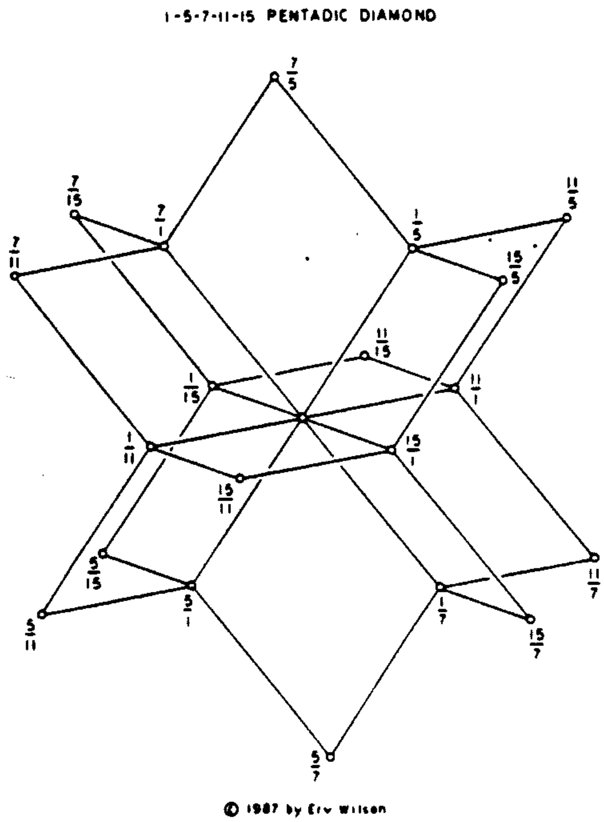


Figure 31

Figure 32

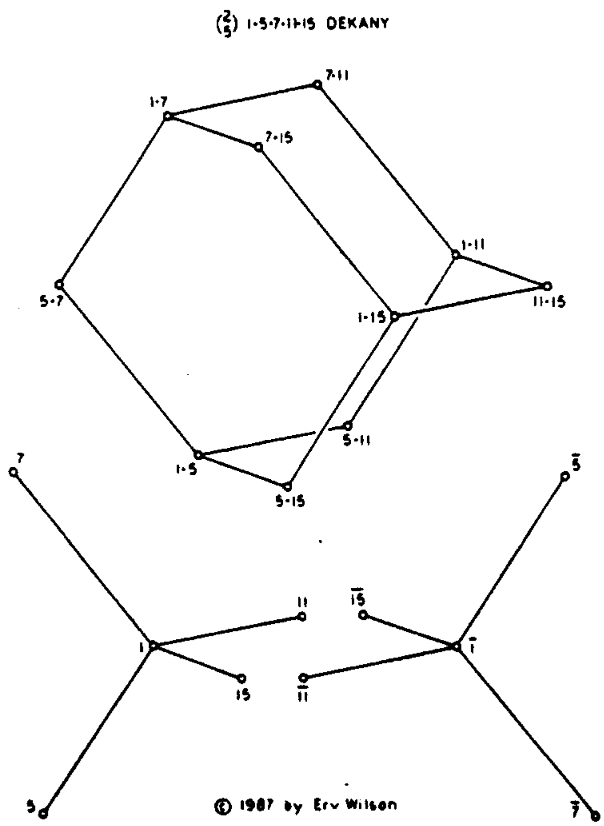


Figure 33

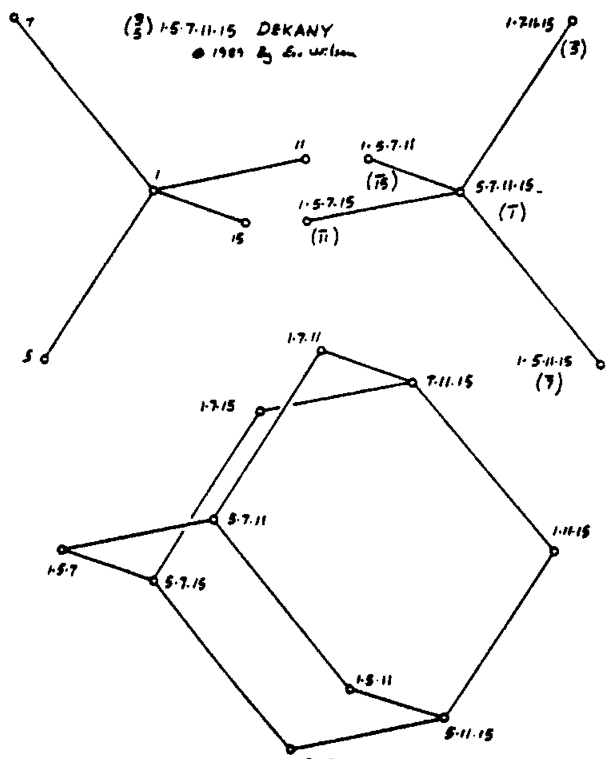
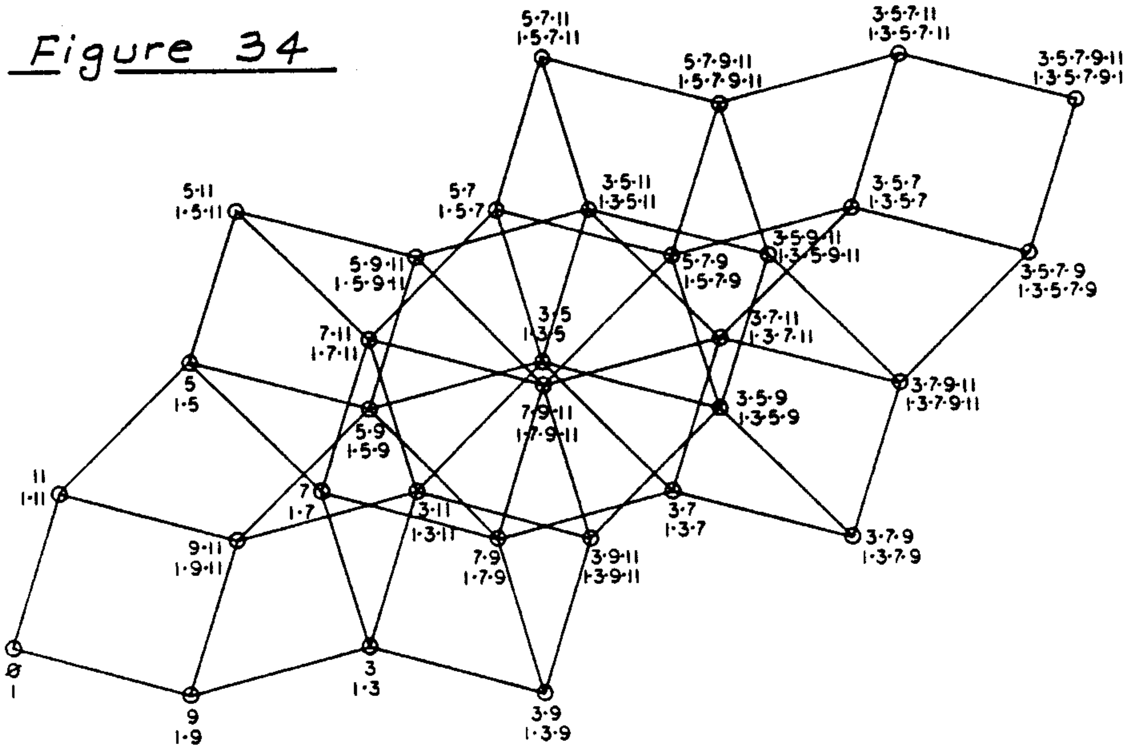


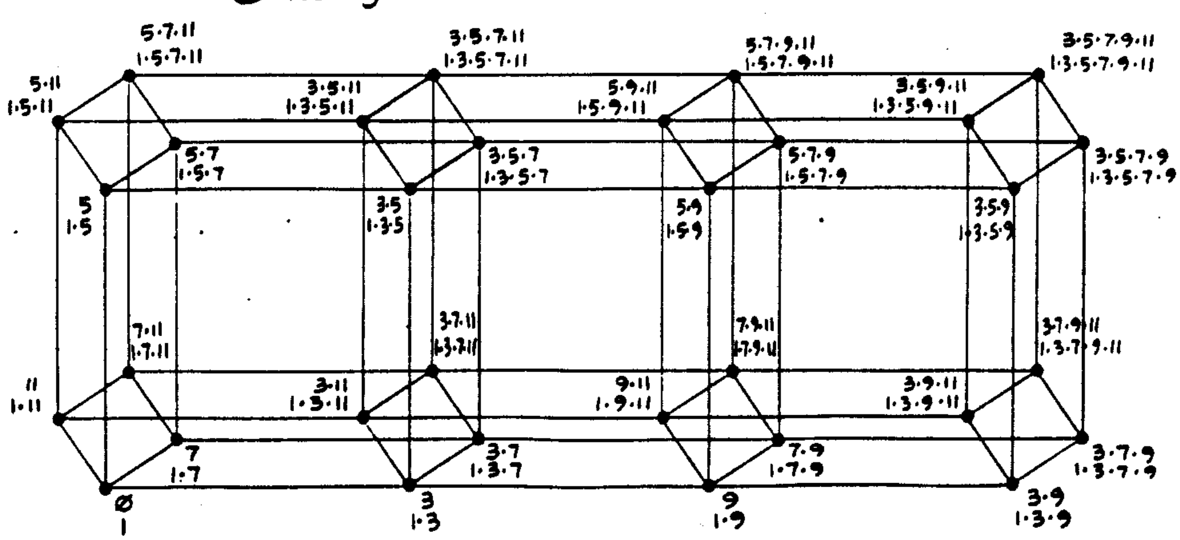
Figure 34



COMBINATION PRODUCT SETS $\binom{0}{6}$ THRU $\binom{6}{6}$ 1·3·5·7·9·11

Figure 35

Combination Product Sets $\binom{0}{6}, \binom{1}{6}, \binom{2}{6}, \binom{3}{6}, \binom{4}{6}, \binom{5}{6}, \binom{6}{6}$ 1·3·5·7·9·11
(in simultaneous lattice)



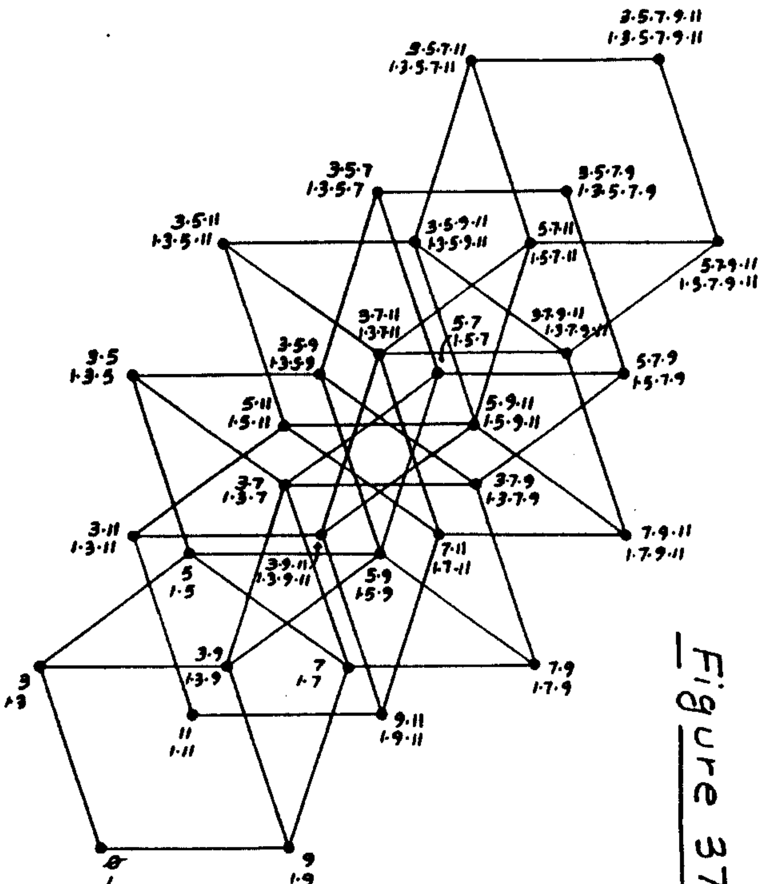


Figure 37

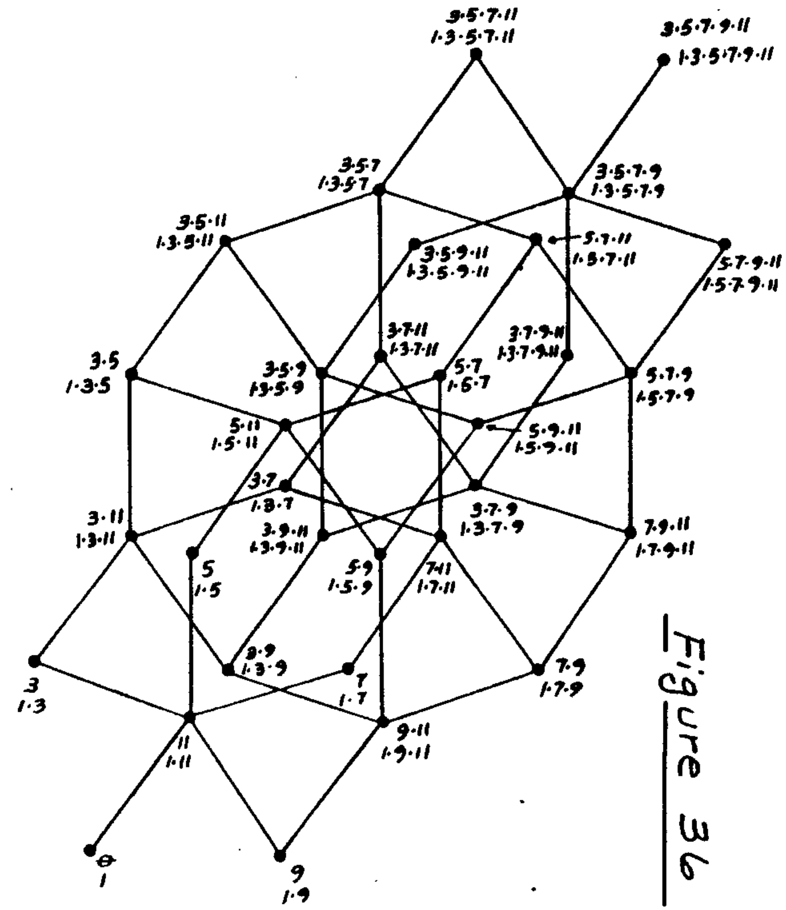


Figure 36

ISSUED BY ERV WILSON
JUNE 1969

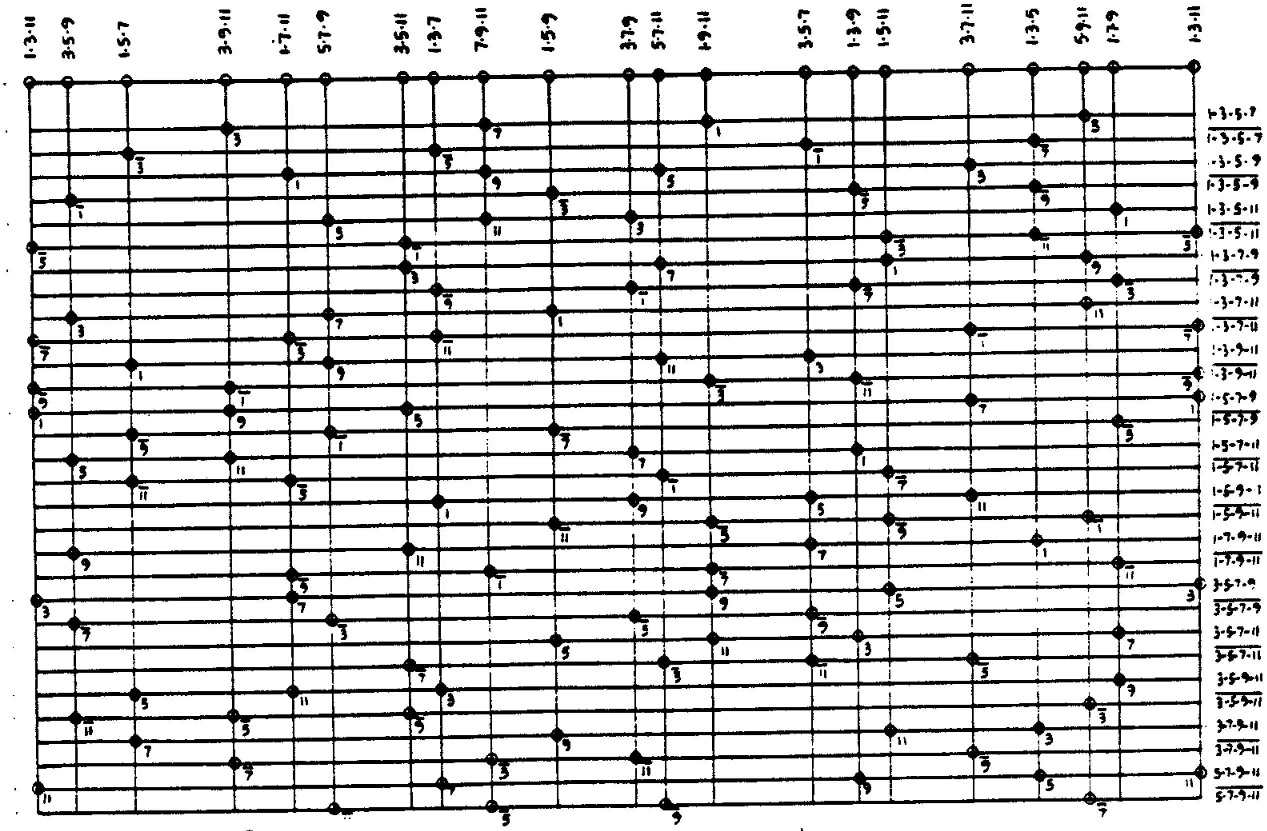
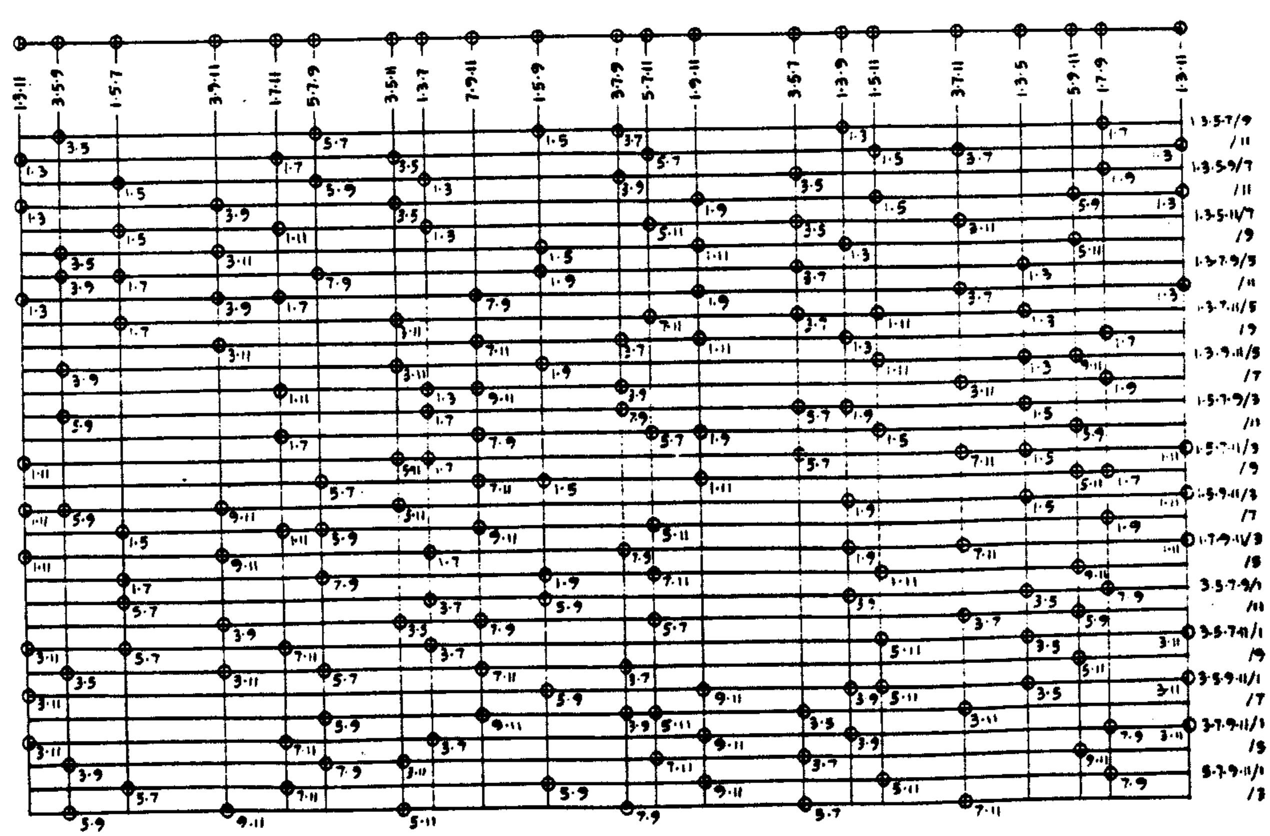


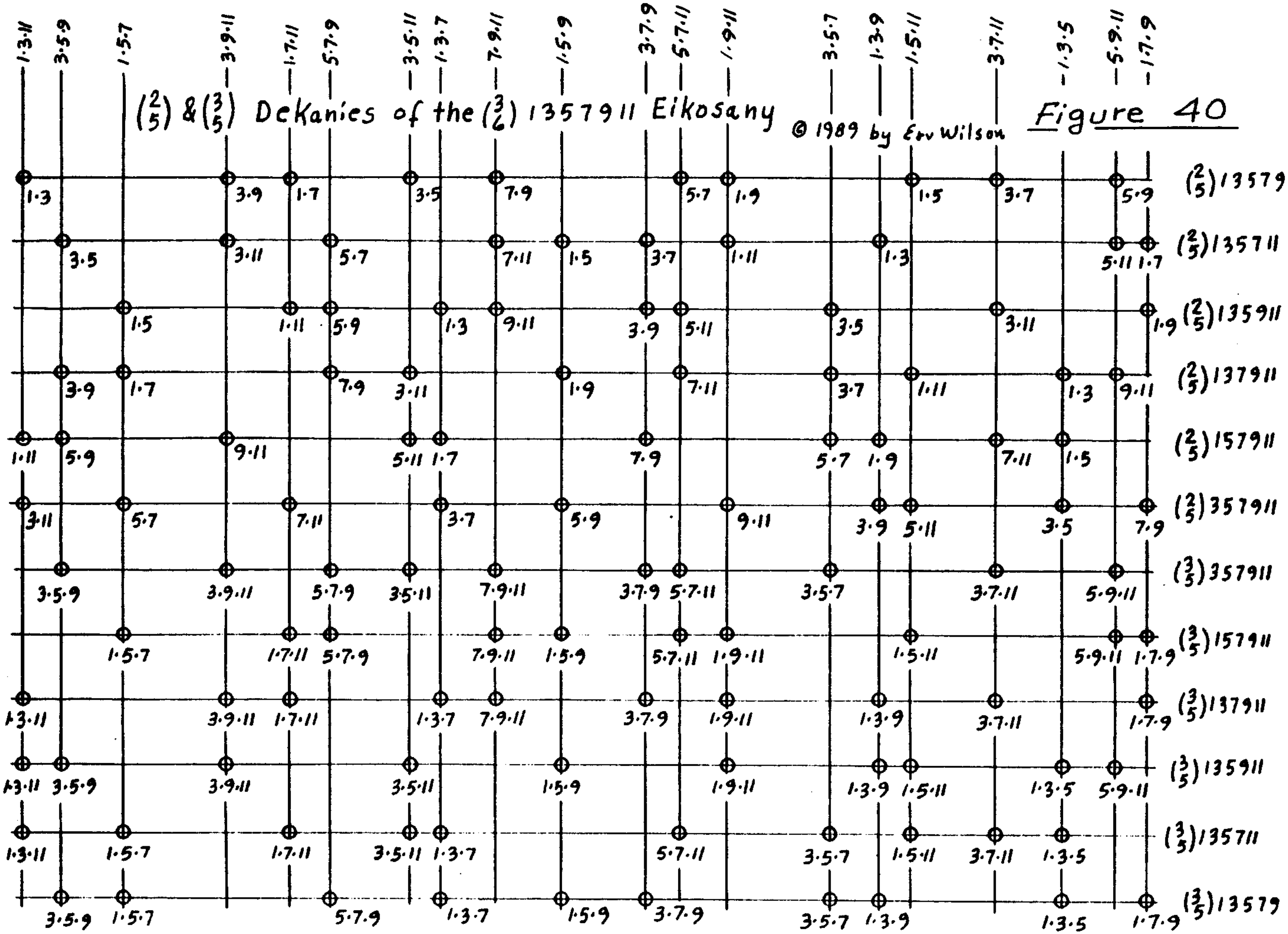
Figure 38 Tetrads of the 1-3-5-7-9-11 Eikosany

ISSUE BY ERV WILSON
JULY 1969

Figure 39



Hexanies of the 1-3-5-7-9-11 Eikosany



$\binom{2}{5}$ & $\binom{3}{5}$ Dekanies of the $\binom{3}{6}$ 1 3 5 7 9 11 Eikosany

Figure 40

Four Hexadic Tilebursts

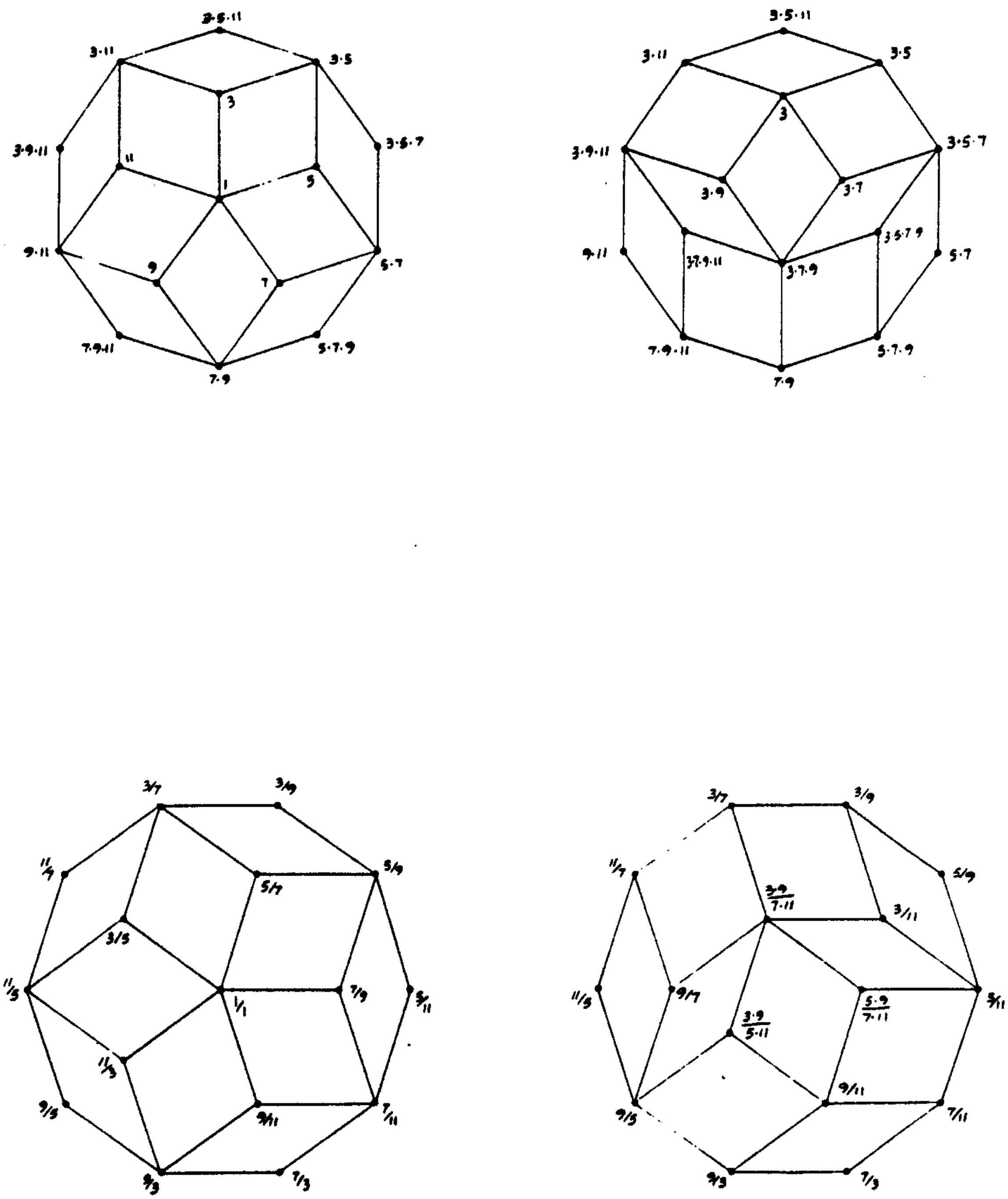


Figure 41

Four Ogdoadic Tilebursts

©1989 by Erv Wilson

Figure 42