Partitioned Cross-Sets of the Hebdomekontany

Item 1. In the 4)8 Hebdomekontany the 1)2 dyany subset has 28 varieties, each of which occurs 20 times, in a 3)6 Eikosony partitioned cross-set.

Example; the $\binom{1}{2}$ 1 3 dyany × the $\binom{3}{6}$ 5 7 9 11 13 15 Eikosany, $\left\{\binom{1}{2} 1\ 3\right\} \times \left\{\binom{3}{6} 5\ 7\ 9\ 11\ 13\ 15\right\}$ =

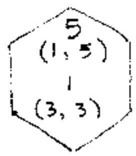
×	1	3
5·7·9	1·5·7·9	3·5·7·9
5·7·11	1·5·7·11	3·5·7·11
5·7·13	1·5·7·13	3·5·7·13
5·7·15	1·5·7·15	3·5·7·15
5·9·11	1·5·9·11	3·5·9·11
5·9·13	1·5·9·13	3·5·9·13
5·9·15	1·5·9·15	3·5·9·15
5·11·13	1·5·11·13	3·5·11·13
5·11·15	1·5·11·15	3·5·11·15
5·13·15	1·5·13·15	3·5·13·15
7·9·11	1·7·9·11	3·7·9·11
7·9·13	1·7·9·13	3·7·9·13
7·9·15	1·7·9·15	3·7·9·15
7·11·13	1·7·11·13	3·7·11·13
7·11·15	1·7·11·15	3·7·11·15
7·13·15	1·7·13·15	3·7·13·15
9·11·13	1·9·11·13	3·9·11·13
9·11·15	1·9·11·15	3·9·11·15
9·13·15	1·9·13·15	3·9·13·15
11·13·15	1·11·13·15	3·11·13·15

Item 2. The $\left\{\binom{4}{8}\ 1\ 3\ 5\ 7\ 9\ 11\ 13\ 15\right\}$ Hebdomekontany may be partitioned into the following 13 illustrative types of cross-sets;

	variations or permutations of Partition
$\left\{\binom{0}{0}\ \varnothing\right\}_{(1y)} \times \left\{\binom{4}{8}\ a\,b\,c\,d\,e\,f\,g\,h\right\}_{(70y)}$	1
$\left\{\binom{0}{1}\ a\right\}_{(1y)} \times \left\{\binom{4}{7}\ b\,c\,d\,e\,f\,g\,h\right\}_{(35y)}$	8
$\left\{\binom{1}{1}\ a\right\}_{(1y)} \times \left\{\binom{3}{7}\ b\,c\,d\,e\,f\,g\,h\right\}_{(35y)}$	8
$\left\{\binom{0}{2}\ a\,b\right\}_{(1y)} \times \left\{\binom{4}{6}\ c\,d\,e\,f\,g\,h\right\}_{(15y)}$	28
$\left\{\binom{1}{2}\ a\,b\right\}_{(2y)} \times \left\{\binom{3}{6}\ c\,d\,e\,f\,g\,h\right\}_{(20y)}$	28
$\left\{\binom{2}{2}\ a\,b\right\}_{(1y)} \times \left\{\binom{2}{6}\ c\,d\,e\,f\,g\,h\right\}_{(15y)}$	28
$\left\{\binom{0}{3}\ a\,b\,c\right\}_{(1y)} \times \left\{\binom{4}{5}\ d\,e\,f\,g\,h\right\}_{(5y)}$	56
$\left\{\binom{1}{3}\ a\,b\,c\right\}_{(3y)} \times \left\{\binom{3}{5}\ d\,e\,f\,g\,h\right\}_{(10ny)}$	56
$\left\{\binom{2}{3}\ a\,b\,c\right\}_{3ny} \times \left\{\binom{2}{5}\ d\,e\,f\,g\,h\right\}_{10ny}$	56
$\left\{\binom{3}{3}\ a\,b\,c\right\}_{1ny} \times \left\{\binom{1}{5}\ d\,e\,f\,g\,h\right\}_{5ny}$	56
$\left\{\binom{0}{4}\ a\,b\,c\,d\right\}_{1ny} \times \left\{\binom{4}{4}\ e\,f\,g\,h\right\}_{1ny}$	70
$\left\{\binom{1}{4}\ a\,b\,c\,d\right\}_{4ny} \times \left\{\binom{3}{4}\ e\,f\,g\,h\right\}_{4ny}$	70
$\left\{\binom{2}{4}\ a\,b\,c\,d\right\}_{6ny} \times \left\{\binom{2}{4}\ e\,f\,g\,h\right\}_{6ny}$	$\frac{70}{(2)} = (35)$

12 remaining cross-sets (total 25) are in effect a re-ordering of the first 12 cross-sets above,

<u>Item 3</u>; In the 4-out-of-8, (4,8) hebdomekontany matrix the (1,5) Pentany subset has 56 variations, each of which occurs once, in a (3,3) Monany partitioned complementary cross-set.

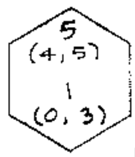


Example; the $\binom{1}{5}$ 1 3 5 7 9 Pentany partition/cross with $\binom{3}{3}$ 11 13 15 Monany can be expressed,

$$\left\{\binom{1}{5} 1\ 3\ 5\ 7\ 9\right\} \times \left\{\binom{3}{3} 11\ 13\ 15\right\} =$$

×	1	3	5	7	9
11·13·15	1·11·13·15	3·11·13·15	5·11·13·15	7·11·13·15	9·11·13·15

<u>Item 4</u>; In the (4,8) Hebdomekontany matrix the (4, 5) Pentany subset has 56 variations, each of which occurs once, in a cross-set with its partitioned complementary (0, 3) monany.



Note; because the (4, 5) Pentany conceals a subharmonic hexad, it is helpful to show that additional relationship, thus —

Example; $\left\{\binom{4}{5} 1\,3\,5\,7\,9\right\} \times \left\{\binom{0}{3} 11\ 13\ 15\right\}$,

added step	$\overline{1}$	$\overline{3}$	$\overline{5}$	$\overline{7}$	$\overline{9}$	(Subharmonic Pentad)
		× 1·3·5·7·9 =				
×	3·5·7·9	1·5·7·9	1·3·7·9	1·3·5·9	1·3·5·7	$\binom{4}{5}$ set
(empty) ∅	3·5·7·9	1·5·7·9	1·3·7·9	1·3·5·9	1·3·5·7	

The last step of this operation, (multiplication of of the (4 5) Pentany by the (0 3) Monany [an empty set, ~~indicated ∅~~]) is obviously academic.

Item 5; In the 4-out-of-8, (4,8) Hebdomekontany matrix the (1,4) Tetrany forms a partitioned cross-set with the (3,4) Tetrany. There are 70 combinations by which this partitioning may occur. Note; the (3,4) Tetrany carries a concealed sub-harmonic tetrad which is identified thus; <u>Example</u>

$$(\overline{1} \quad \overline{3} \quad \overline{5} \quad \overline{7}) \times 1\cdot3\cdot5\cdot7 =$$

← (3,4) Tetrany

(1,4) Tetrany ↓

×	3·5·7	1·5·7	1·3·7	1·3·5
9	3·5·7·9	1·5·7·9	1·3·7·9	1·3·5·9
11	3·5·7·11	1·5·7·11	1·3·7·11	1·3·5·11
13	3·5·7·13	1·5·7·13	1·3·7·13	1·3·5·13
15	3·5·7·15	1·5·7·15	1·3·7·15	1·3·5·15

Now, then — By adding a single tone, 1·3·5·7, to the 4 harmonic tetrads and to the 4 subharmonic tetrads, a set of 4 plus 4 Pentads will occur, each of which shares the 1·3·5·7 in common. A 17-tone quasi-diamond, providing 8 ways to harmonize the member 1·3·5·7.

If the entire set above is divided by 1·3·5·7 this simple relationship emerges;

$\overline{9}$, $\overline{11}$, $\overline{13}$, $\overline{15}$ ↓ add

$- \times \overline{1\cdot3\cdot5\cdot7} =$

×	$\overline{1}$	$\overline{3}$	$\overline{5}$	$\overline{7}$	
9	9/1	9/3	9/5	9/7	9/9
11	11/1	11/3	11/5	11/7	11/11
13	13/1	13/3	13/5	13/7	13/13
15	15/1	15/3	15/5	15/7	15/15
add → 1, 3, 5, 7	1/1	3/3	5/5	7/7	

One sees (by $\frac{1\cdot3\cdot5\cdot7}{1\cdot3\cdot5\cdot7} = 1/1$) the 8 harmonizing roles that 1·3·5·7 can play; 4 harmonic partitioned w. 4 subharmonic senses.

ITem 5 continued ;

Another way to show this is to simply add 1·3·5·7 to each of two tetrads thus

	$\overline{1}$	($\overline{3}$)	($\overline{5}$)	($\overline{7}$)	$\overline{9}$ $\overline{11}$ $\overline{13}$ $\overline{15}$ sequence
	3·5·7	1·5·7	1·3·7	1·3·5	add ↓
9	3·5·7·9	1·5·7·9	1·3·7·9	1·3·5·9	1·3·5·7
11	3·5·7·11	1·5·7·11	1·3·7·11	1·3·5·11	1·3·5·7
13	3·5·7·13	1·5·7·13	1·3·7·13	1·3·5·13	1·3·5·7
sequence 15	3·5·7·15	1·5·7·15	1·3·7·15	1·3·5·15	1·3·5·7
1 3 5 7 add ↗	1·3·5·7	1·3·5·7	1·3·5·7	1·3·5·7	

The horizontal lines may be seen as partitioned cross-sets {(4,5) a b c d e} x {(0,3) f g h} .

The vertical lines may be seen as partitioned cross-sets {(1,5) ab c de} x {(3,3) f g h} .

But that doesn't really tie it all together as well as I'd wish. —

What we have in this "quasi-diamond" is that set of (4,5) Pentanies horizontal / which share 1·3·5·7. This simultaneously gives us the material for that set of (1,5) Pentanies vertical / which, also share the 1·3·5·7. These are the 17 points that would be shared by the ogdoadic cross-set (1 3 5 7 9 11 13 15) x ($\overline{1}$ $\overline{3}$ $\overline{5}$ $\overline{7}$ $\overline{9}$ $\overline{11}$ $\overline{13}$ $\overline{15}$) with its 1/1 at key 1·3·5·7. [This kind of cross-set is usually called a "Diamond" after Partchs usage.] These 17 points (in their 70 partitioned permutations) are the 70 bonding-sites between centered and centerless modules in ogdoadic tone-space. They are the basis for modulating from Hebdomekontanies to 8adic Diamonds & visa/versa throughout the infinite realms of open 8adic tone-space.

Item 6;

within the (4,8) hebdomekontany the (2,5) Dekany forms a partitioned cross-set with the (2,3) Triany. There are 56 ways the 8 elements of the master set can be partitioned into 2 sets of 3 and 5 elements.

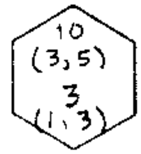
Example;

$$\{(2,5)\ 1\ 3\ 5\ 7\ 9\} \times \{(2,3)\ 11\ 13\ 15\} =$$

(2,5) Dekany ↓ ; (2,3) triany →

×	$(\overline{15})$ 11·13	$(\overline{13})$ 11·15	$(\overline{11})$ 13·15
1·3	1·3·11·13	1·3·11·15	1·3·13·15
1·5	1·5·11·13	1·5·11·15	1·5·13·15
1·7	1·7·11·13	1·7·11·15	1·7·13·15
1·9	1·9·11·13	1·9·11·15	1·9·13·15
3·5	3·5·11·13	3·5·11·15	3·5·13·15
3·7	3·7·11·13	3·7·11·15	3·7·13·15
3·9	3·9·11·13	3·9·11·15	3·9·13·15
5·7	5·7·11·13	5·7·11·15	5·7·13·15
5·9	5·9·11·13	5·9·11·15	5·9·13·15
7·9	7·9·11·13	7·9·11·15	7·9·13·15

Item 7;

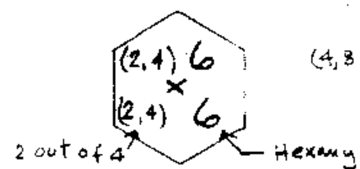


In the (4,8) Hebdomekontany [70ny] matrix the (3,5) Dekany [10ny] forms a partitioned cross-set with the (1,3) Triany [3ny]. The are 56 ways a set of 8 elements may partitioned into 2 sets, of 5 and 3 elements ~~each~~. /Hence 56 cross-sets)

Example; {(3,5) 1 3 5 7 9} × {(1,3) 11 13 15}

×	11	13	15
1·3·5	1·3·5·11	1·3·5·13	1·3·5·15
1·3·7	1·3·7·11	1·3·7·13	1·3·7·15
1·3·9	1·3·9·11	1·3·9·13	1·3·9·15
1·5·7	1·5·7·11	1·5·7·13	1·5·7·15
1·5·9	1·5·9·11	1·5·9·13	1·5·9·15
1·7·9	1·7·9·11	1·7·9·13	1·7·9·15
3·5·7	3·5·7·11	3·5·7·13	3·5·7·15
3·5·9	3·5·9·11	3·5·9·13	3·5·9·15
3·7·9	3·7·9·11	3·7·9·13	3·7·9·15
5·7·9	5·7·9·11	5·7·9·13	5·7·9·15

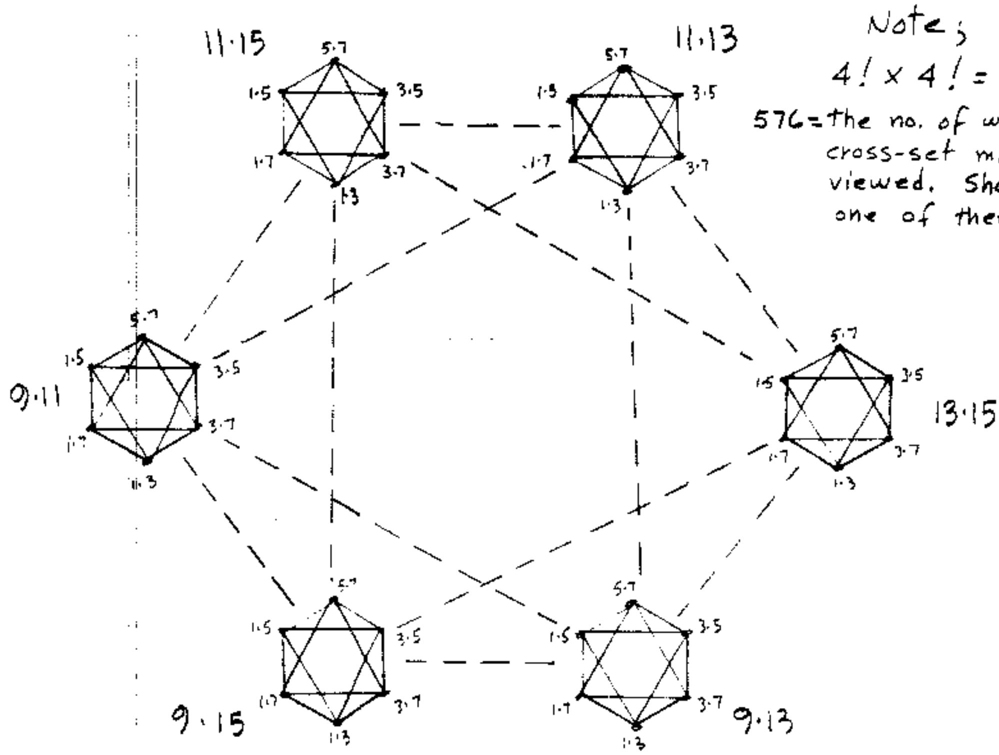
Item 8:



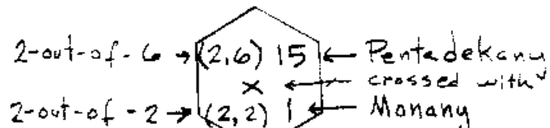
In the (4,8) Hebdomekontany matrix the (2,4) Hexany forms a partitioned cross-set with the (2,4) Hexany. The master-set of 8 elements may be partitioned into 2 sets, of 4 and 4 elements ~~each~~, in 35 ways only (70 ÷ 2 = 35), because of the mirroring nature of the entire theoretical group of 70 ways.

Example; {(2,4) 1 3 5 7} × {(2,4) 9 11 13 15}

×	1·3	1·5	1·7	3·5	3·7	5·7
9·11	1·3·9·11	1·5·9·11	1·7·9·11	3·5·9·11	3·7·9·11	5·7·9·11
9·13	1·3·9·13	1·5·9·13	1·7·9·13	3·5·9·13	3·7·9·13	5·7·9·13
9·15	1·3·9·15	1·5·9·15	1·7·9·15	3·5·9·15	3·7·9·15	5·7·9·15
11·13	1·3·11·13	1·5·11·13	1·7·11·13	3·5·11·13	3·7·11·13	5·7·11·13
11·15	1·3·11·15	1·5·11·15	1·7·11·15	3·5·11·15	3·7·11·15	5·7·11·15
13·15	1·3·13·15	1·5·13·15	1·7·13·15	3·5·13·15	3·7·13·15	5·7·13·15



Note;
4! × 4! = 576
576 = the no. of ways this cross-set might be viewed. Shown, is but one of them.



Item 9;

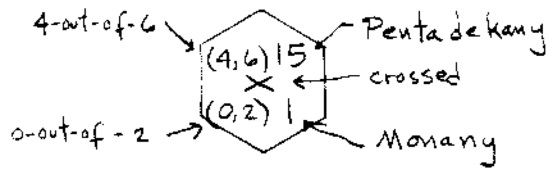
Contained In the hebdomekontany matrix, the (2,6) Pentadekany forms a partitioned cross-set with the (2,2) Monany. The ogdoad (8ad) partitions into 2 sets, of 6 and 2 elements, in 28 different ways. (Hence 28 different forms of this cross-set.)

$\{(2,6)\ 1\ 2\ 5\ 7\ 9\ 11\} \times \{(2,2)\ 13\ 15\}$

Example;

×	13·15
1·3	1·3·13·15
1·5	1·5·13·15
1·7	1·7·13·15
1·9	1·9·13·15
1·11	1·11·13·15
3·5	3·5·13·15
3·7	3·7·13·15
3·9	3·9·13·15
3·11	3·11·13·15
5·7	5·7·13·15
5·9	5·9·13·15
5·11	5·11·13·15
7·9	7·9·13·15
7·11	7·11·13·15
9·11	9·11·13·15

Item 10;



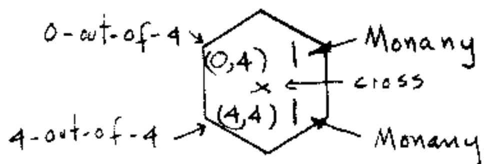
In the (4,8) Hebdomekontany [70ny] the (4,6) Pentadekany forms a partition cross-set with the (0,2) Monany. There are 28 expressions of this cross-set, based on the 28 ways 6 and 2 elements may be partitioned out of 8 elements.

Example; {(4,6) 1 3 5 7 9 11} × {(0,2) 13 15}

×	∅ (= empty set)
1·3·5·7	1·3·5·7
1·3·5·9	1·3·5·9
1·3·5·11	1·3·5·11
1·3·7·9	1·3·7·9
1·3·7·11	1·3·7·11
1·3·9·11	1·3·9·11
1·5·7·9	1·5·7·9
1·5·7·11	1·5·7·11
1·5·9·11	1·5·9·11
1·7·9·11	1·7·9·11
3·5·7·9	3·5·7·9
3·5·7·11	3·5·7·11
3·5·9·11	3·5·9·11
3·7·9·11	3·7·9·11
5·7·9·11	5·7·9·11

Note; Caution – the "empty set" (∅) is not equivalent to zero (0). This notwithstanding, the cross is academic, and done to maintain a useful format.

Item 11;



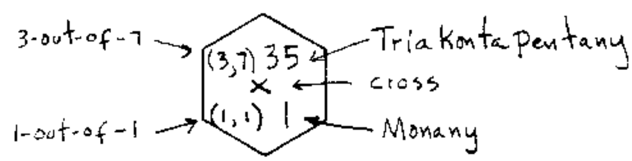
In the (4,8) Hebdomekontany [70ny] the (0,4) Monany forms a partitioned cross-set with the (4,4) Monany. There are 70 expressions of this cross-set, according to the number of ways 4 and 4 elements may be partitioned from 8 elements.

Example; {(0,4) 1 3 5 7} × {(4,4) 9 11 13 15}

×	9·11·13·15
∅	9·11·13·15

Note; obviously, going thru all 70 expressions of this cross-set would be a futile exercise. Dont do it.

ITem 12;



In the (4,8) Hebdomekonty the (3,7) TriaKontapentany forms a partitioned cross-set with the (1,1) Monany. There are 8 expressions of this cross-set, according to the number of ways 7 and 1 elements may be partitioned from 8 elements.

Example; {(3,7) 1 3 5 7 9 11 13} × {(1,1) 15}

×	15
1·3·5	1·3·5·15
1·3·7	1·3·7·15
1·3·9	1·3·9·15
etc	etc

Item 13;

(4,7) 35
×
(0,1) 1

In the (4,8) 70ny the (4,7) 35ny forms a partitioned cross-set with the (0,1) 1ny. There are 8 expressions of this cross-set, as there are 8 ways in which a set of 8 elements may be partitioned into 2 sets, of 7 and 1 elements.

Example; {(4,7) 1 3 5 7 9 11 13} × {(0,1) 15}

	∅ = (empty)
1·3·5·7	1·3·5·7
1·3·5·9	1·3·5·9
1·3·5·11	1·3·5·11
etc	etc

Item 14;

(4,8) 70
×
(0,0) 1

And finally, in the (4,8) 70ny, the (4,8) 70ny itself, forms a partitioned cross-set with the (0,0) 1ny. There is only 1 expression of this cross-set. This corresponds to the 1 way a set of 8 elements may be partitioned into 2 sets, of 8 and 1 elements.

Example: {(4,8) 1 3 5 7 9 11 13 15} × {(0,0) ∅ (= empty)}

	∅ (= empty)
1·3·5·7	1·3·5·7
1·3·5·9	1·3·5·9
1·3·5·11	1·3·5·11
etc	

Part II
Partitioned Cross-sets of the Hexany

Pascal's Triangle;

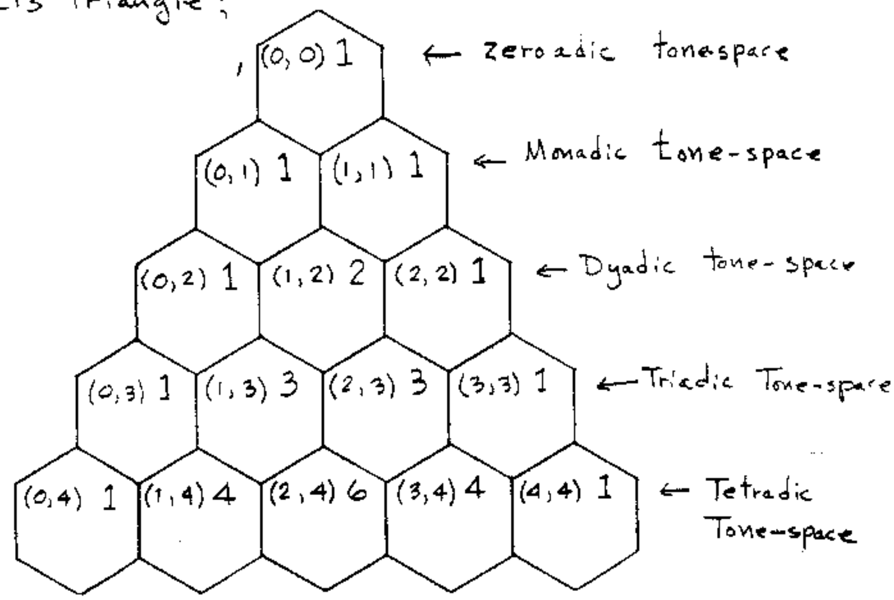
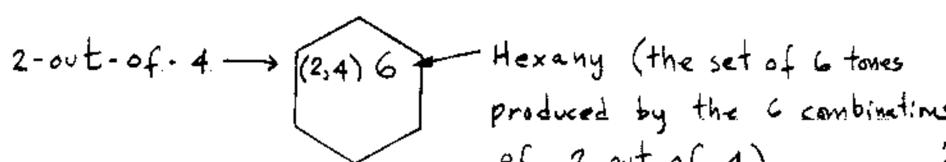


Fig 1.

Pascal's Triangle (Fig 1) may be used to codify the combination-product sets.



A. Each base combination-product set contains all the subsequent combination-product sets obliquely above it in the triangular heirarchy.

B. Further, each "subsequent" combination-product set occurs a predictable number of times in the "base" combination-product set. The pattern of this multiple occurence is (interestingly enough) also a combination-product set. A cross-set is produced. The second set is labeled "consequent"-set.

C. The partitioned nature of the cross-set is seen in the numerical terms of combination as well as in the elements of the set. To illustrate;

	"Terms" (1st … 2nd)	"Elements"	
"Subsequent set"	(1 out of 3)	1 3 5	The partitioned cross-sets
"Consequent set"	(1 out of 1)	7	
"Base set"	(2 out of 4)	1 3 5 7	

Partitioned into 1 & 1 (the 2)
Partitioned into 3 & 1 (the 4)
Partitioned into (1 3 5) & (7) (the elements 1 3 5 7)

D. Finally, the partitioned cross-set, itself, has a predictable number of "expressions" (permutations) based on the no. of ways the elements of the "base set" can be partitioned into the appropriate no. of elements in the partitioned sets. For example; when the "base" set has the 4 elements (1 3 5 7), and is being partitioned into sets of 3 and 1 elements, the "expressions" or permutations are (135)(7), (1 3 7)(5), (1 5 7)(3), and (3 5 7)(1); 4 permutations.

E. When the various "consequent" sets of a "base" set are assigned to their proper niches in the Triangle they produce, among them, the 180° rotation of the Triangle (see Fig 2). The apex has now become the nadir, which is juxtaposed upon the "base" set, (see Fig 3).

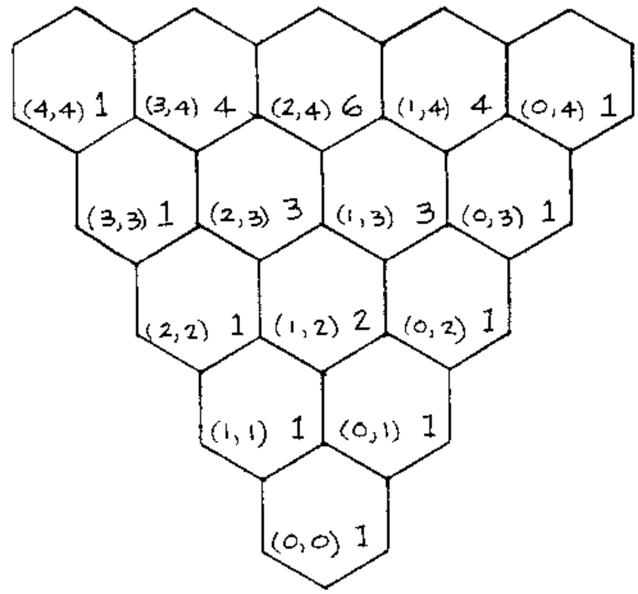


Figure 2

Pascal's Triangle rotated 180°

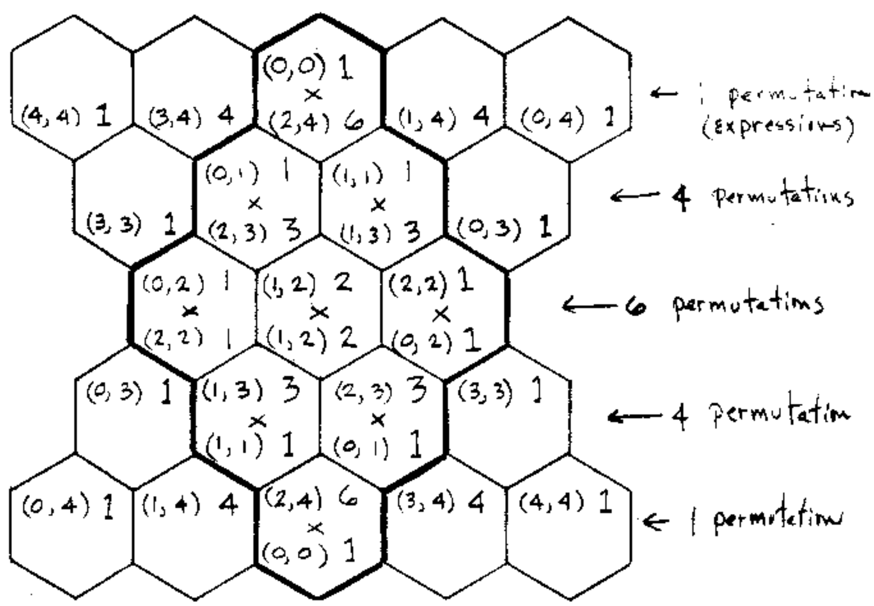


Figure 3

180° rotation of Pascal's Triangle rising from the (2,4) hexany.
Note: this is the key for all the partitioned cross-sets of the 2-out-of-4, (2,4) Hexany. Within the outlined rhombus the cross-sets are cross-indexed, as well.

Notes on Terminology

1.

No. of Tones	Name of Combination-product Set	abbrev.	Name of Primary Module
0	—		Zeroad
1	Monany	1ny	Monad
2	Dyany	2ny	Dyad
3	Triany	3ny	Triad
4	Tetrany	4ny	Tetrad
5	Pentany	5ny	Pentad
6	Hexany	6ny	Hexad
7	Heptany	7ny	Heptad
8	Oktany	8ny	Ogdoad
9	Enneany	9ny	Ennead
10	Dekany	10ny	Dekad
15	Pentadekany	15ny	
20	Eikosany	20ny	
21	Eikosimonany	21ny	
28	Eikosioktany	28ny	
35	TriaKontapentany	35ny	
70	HebdomeKontany	70ny	

2. The suffix "-ny" or "-any" is reserved for combination-product sets.
3. The "Primary Module" is a master set; that set from which the combination-product set is derived.
4. Combination-product Set; a set of combinations taken from the elements of a master set, & where the elements of each combination are multiplied. Example; the 2-out-of-4 combination-product set of the master set, 1 3 5 7, is 1·3, 1·5, 1·7, 3·5, 3·7, 5·7.

Notes on Terminology (continued)

5. $\binom{3}{6}$ or $(3,6)$ = 3 out of 6

6. (4,8) hebdomekontany = a combination-product set of 70 members, derived by taking/ combinations of 4-out-of-8 elements (usually the harmonics 1 3 5 7 9 11 13 15, but they could be any appropriate set of 8) and multiplying together the 4 elements of each combination, thus; $1\cdot3\cdot5\cdot7$, $1\cdot3\cdot5\cdot9$, $1\cdot3\cdot5\cdot11$, etc., to $9\cdot11\cdot13\cdot15$.

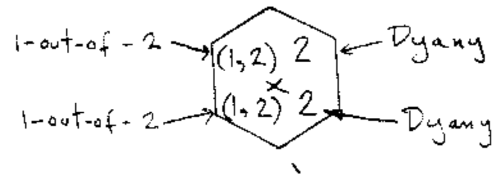
Partitioned Cross-sets of the Hexany
(cont.)

Refering to Figure 3 the outlined rhombus shows the following Partitioned Cross-sets:

		Permutations
	$\{(0,0)\ \emptyset\} \times \{(2,4)\ a\,b\,c\,d\}$	1
	$\{(0,1)\ a\} \times \{(2,3)\ b\,c\,d\}$	4
	$\{(1,1)\ a\} \times \{(1,3)\ b\,c\,d\}$	4
	$\{(0,2)\ a\,b\} \times \{(2,2)\ c\,d\}$	6
*	$\{(1,2)\ a\,b\} \times \{(1,2)\ c\,d\}$	6
	$\{(2,2)\ a\,b\} \times \{(0,2)\ c\,d\}$	6
*	$\{(1,3)\ a\,b\,c\} \times \{(1,1)\ d\}$	4
*	$\{(2,3)\ a\,b\,c\} \times \{(0,1)\ d\}$	4
	$\{(2,4)\ a\,b\,c\,d\} \times \{(0,0)\ \emptyset\}$	1

In effect (in the body of permutations) the 1st half of the series merely cross-indexes the 2nd half. Further, the sets on the 4 corners of the rhombus are academic. The 3 cross-sets indicated (*) will be discussed below.

Item 15,

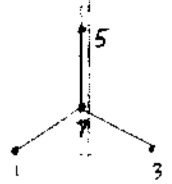


In the (2,4) Hexany matrix the (1,2) Dyany forms a partitioned cross-set with the (1,2) Dyany. This cross-set is a rare mirror of itself. Therefore, altho normally there would be 6 permutations of the ways 2 can be taken from 4, in this partitioned circumstance 3 of the cross-sets thus derived are merely a re-ordering of the remaining 3.

Example: of re-ordered sets

1. {(1,2) 1 3} × {(1,2) 5 7}
2. {(1,2) 1 5} × {(1,2) 3 7}
3. {(1,2) 1 7} × {(1,2) 3 5}
4. {(1,2) 3 5} × {(1,2) 1 7}
5. {(1,2) 3 7} × {(1,2) 1 5}
6. {(1,2) 5 7} × {(1,2) 1 3}

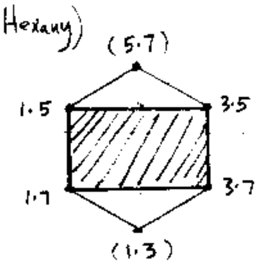
Examples of cross-sets; (within the (2,4) 1 3 5 7 Hexany)



(master set)

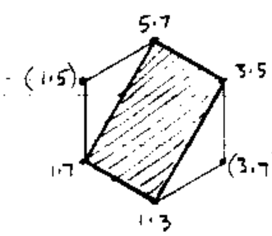
(1.)

×	1	3
5	1·5	3·5
7	1·7	3·7



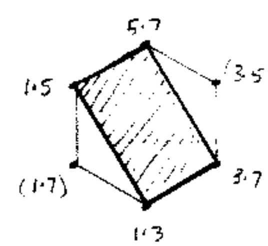
(2.)

×	1	5
3	1·3	5·3
7	1·7	5·7



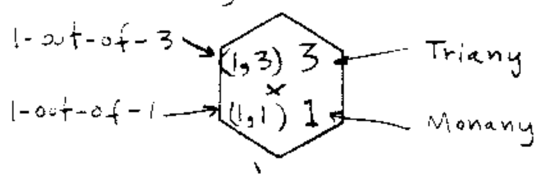
(3.)

×	1	7
3	1·3	7·3
5	1·5	7·5



Hexany (cont)

Item 16:



In the (2,4) Hexany matrix the (1,3) Triany forms a partitioned cross-set with the (1,1) Monany. There are 4 permutations of this cross-set, according to the combinations of 3 and/or 1 out of 4.

4 Permutations

Example; (1.) {(1,3) 1 3 5} × {(1,1) 7}
(2.) {(1,3) 1 3 7} × {(1,1) 5}
(3.) {(1,3) 1 5 7} × {(1,1) 3}
(4.) {(1,3) 3 5 7} × {(1,1) 1}

(1.)

×	1	3	5
7	1·7	3·7	5·7

(2.)

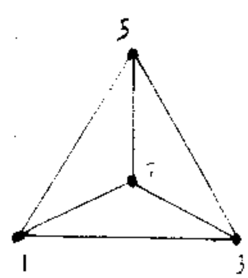
	1	3	7
5	1·5	3·5	7·5

(3.)

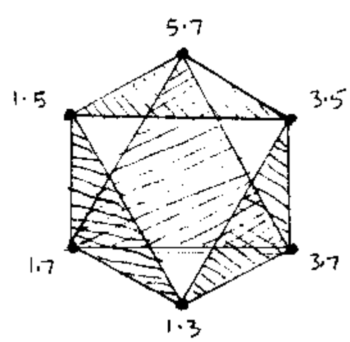
	1	5	7
3	1·3	5·3	7·3

(4.)

	3	5	7
1	1·3	1·5	1·7

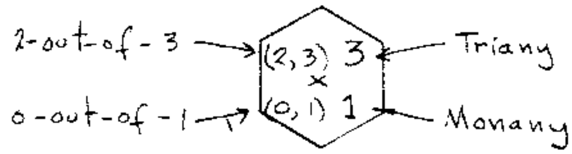


master set



The 4 (1,3) × (1,1) cross-sets are shown as shaded triangles

Item 17;



In the (2,4) Hexany matrix the (2,3) triany forms a partitioned cross-set with the (0,1) Monany. There are 4 permutations of this cross-set, resulting from the 4 combinations of 3 and/or 1 out of 4.

The 4 permutations; Example

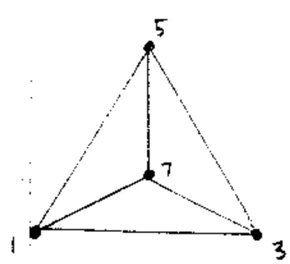
1. {(2,3) 1 3 5} × {(0,1) 7}
2. {(2,3) 1 3 7} × {(0,1) 5}
3. {(2,3) 1 5 7} × {(0,1) 3}
4. {(2,3) 3 5 7} × {(0,1) 1}

(1.) $\times$ 1·3 1·5 3·5 $\rightarrow (\times \overline{1\cdot3\cdot5} = \bar{5}\ \bar{3}\ \bar{1})$
$\varnothing$ | 1·3 1·5 3·5

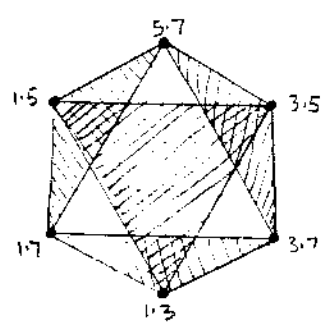
(2.) $\times$ 1·3 1·7 3·7 $\rightarrow (\times \overline{1\cdot3\cdot7} = \bar{7}\ \bar{3}\ \bar{1})$
$\varnothing$ | 1·3 1·7 3·7

(3.) $\times$ 1·5 1·7 5·7 $\rightarrow (\times \overline{1\cdot5\cdot7} = \bar{7}\ \bar{5}\ \bar{1})$
$\varnothing$ | 1·5 1·7 5·7

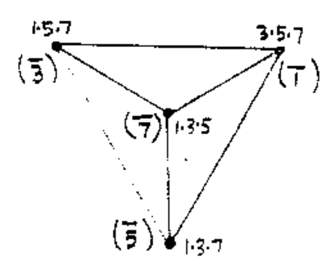
(4.) $\times$ 3·5 3·7 5·7 $\rightarrow (\times \overline{3\cdot5\cdot7} = \bar{7}\ \bar{5}\ \bar{3})$
$\varnothing$ | 3·5 3·7 5·7



(1,4) Tetrany
also Master Set
(Ref



The 4 (2,3) × (0,1) cross-sets are shown as shaded Triangles



(3,4) Tetrany
(Ref.)

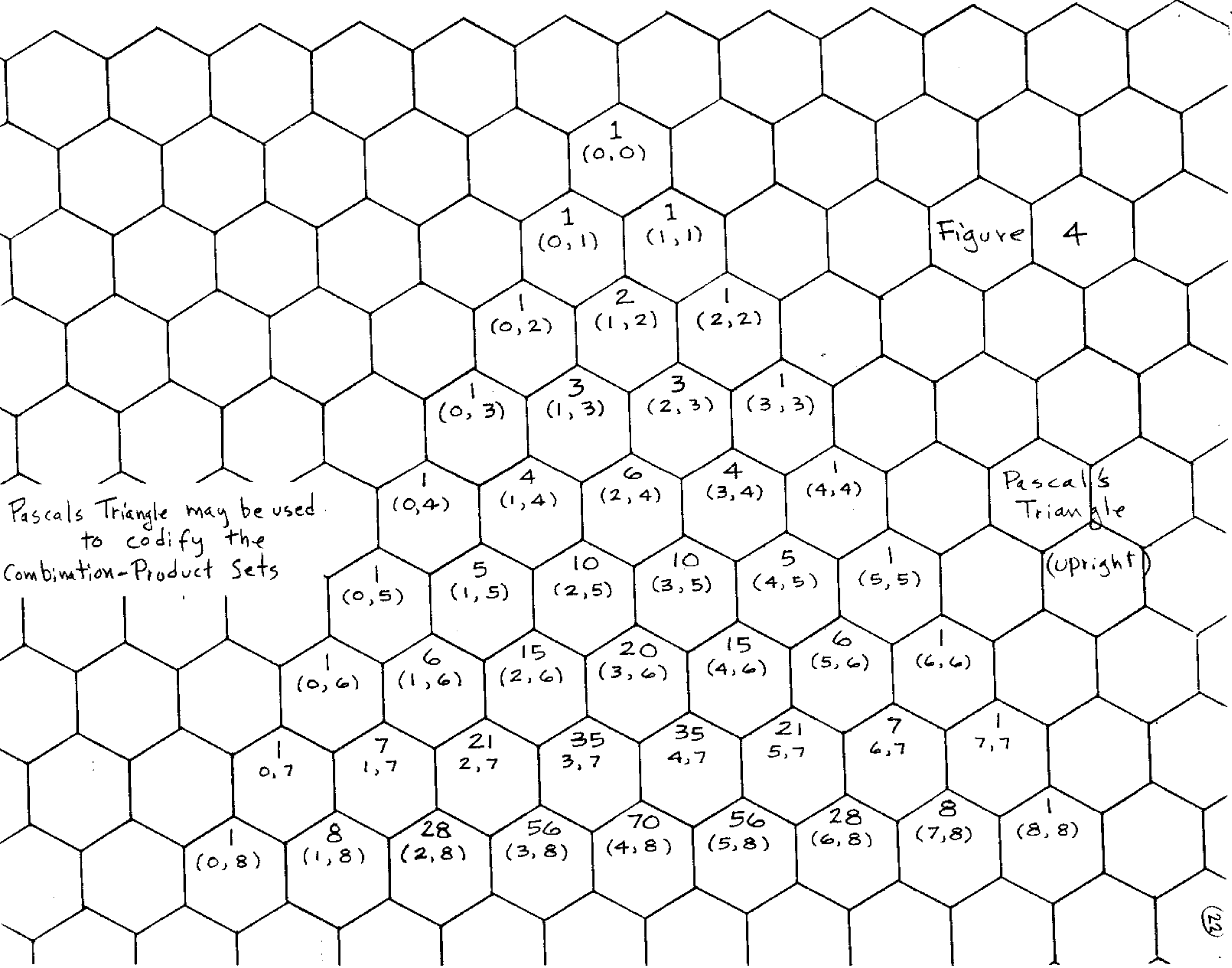


Figure 4
Pascal's Triangle (upright)
Pascals Triangle may be used to codify the Combination-Product Sets
1 (0,0)
1 (0,1) 1 (1,1)
1 (0,2) 2 (1,2) 1 (2,2)
1 (0,3) 3 (1,3) 3 (2,3) 1 (3,3)
1 (0,4) 4 (1,4) 6 (2,4) 4 (3,4) 1 (4,4)
1 (0,5) 5 (1,5) 10 (2,5) 10 (3,5) 5 (4,5) 1 (5,5)
1 (0,6) 6 (1,6) 15 (2,6) 20 (3,6) 15 (4,6) 6 (5,6) 1 (6,6)
1 0,7 7 1,7 21 2,7 35 3,7 35 4,7 21 5,7 7 6,7 1 7,7
1 (0,8) 8 (1,8) 28 (2,8) 56 (3,8) 70 (4,8) 56 (5,8) 28 (6,8) 8 (7,8) 1 (8,8)

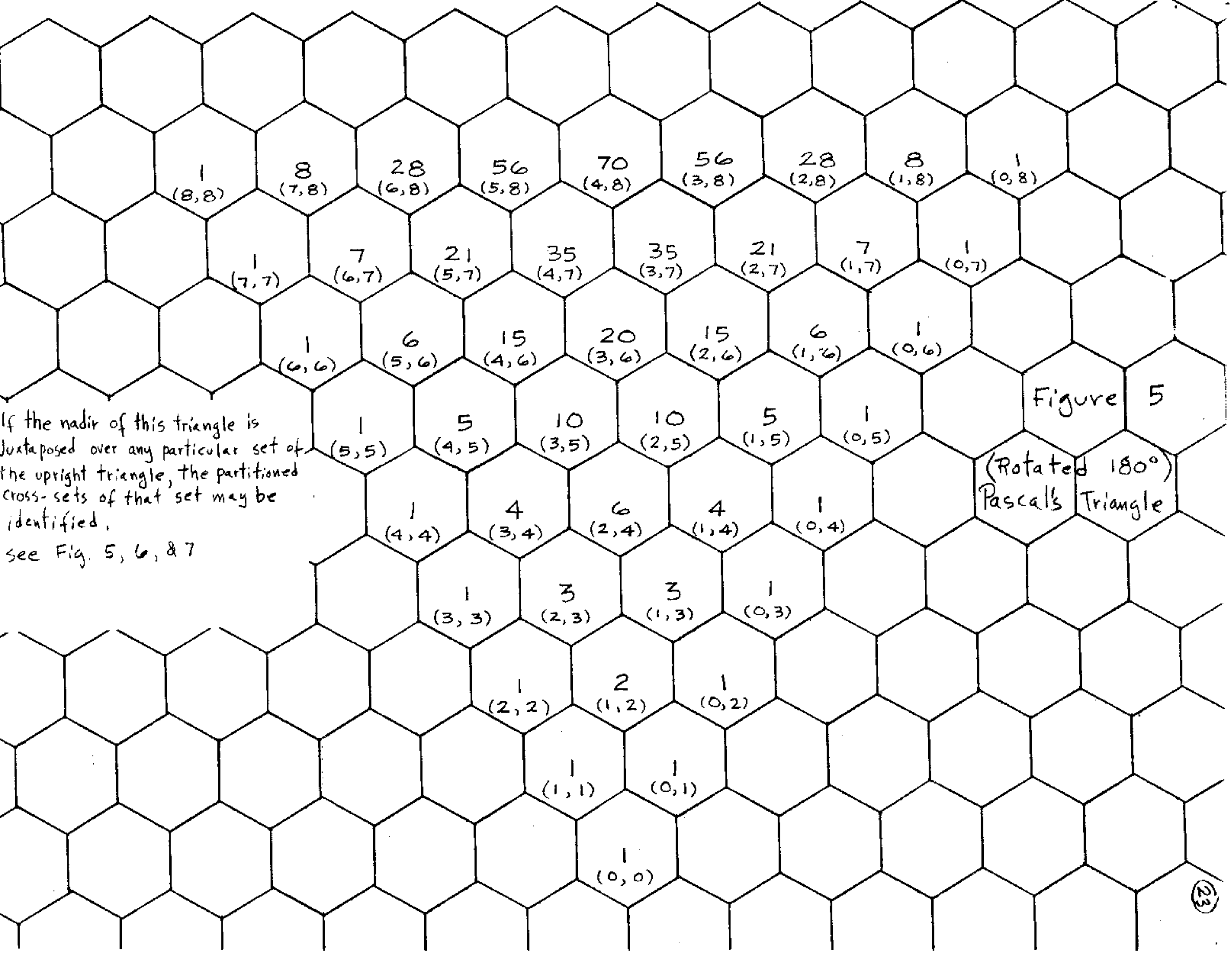


Figure 5

(Rotated 180°) Pascal's Triangle

If the nadir of this triangle is juxtaposed over any particular set of the upright triangle, the partitioned cross-sets of that set may be identified.

see Fig. 5, 6, & 7

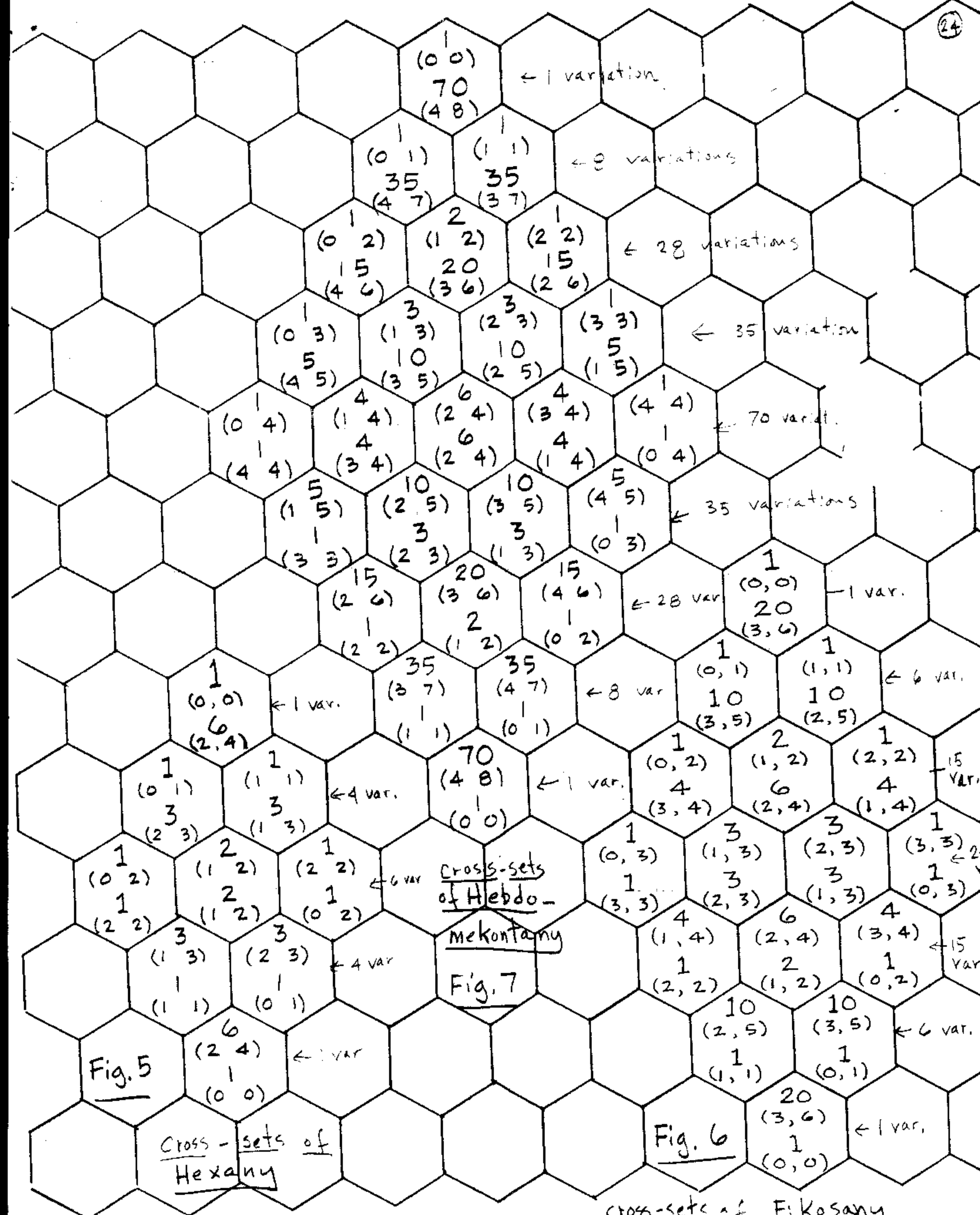


Fig. 5 Cross-sets of Hexany

Fig. 6 Cross-sets of Eikosany

Fig. 7 Cross-sets of Hebdomekontany

Letter to John Chalmers

844 N. Ave 65
Los Angeles, CA 90042
April 27, 1992

Copy to Kraig Grady

Dear John Chalmers,

Harmonic 8ad →	1	3	5	7	9	11	13	15	
Convert to 72 →	0/72	42	23	58	12	33	50	65	(x1, modulus 72)
Transform to → chain position Template	±0	+6	+5	+22	+12	(+51) use → −21	+14	+11	(x19, modulus 72)

Using the above code the Hebdomekontany can be transferred to Hanson's generalized keyboard with rather nice results. The keyboard position is derived by summing the 4-out-of-8 combinations of the chain position (template). These 70 combinations all fall within a 72-tone chain of (unequal) minor thirds (19/72). There are duplicate entries at positions +42 and +7, respectively, which require special handling. 16 "empties" are left, which can be filled (as shown in parentheses) to construct a formal 72-tone scale. This can be notated and fingered/malletted in an orderly and predictable (homogeneous) way. Article follows.

References; Sistema Natural base del Natural-Aproximado, Augusto Novaro, Mexico D.F. 1927 (Library of Congress call number ML 3805 .N69 1927)
Development of a 53-Tone Keyboard Layout Larry Hanson 1989, Xenharmonikon XII (Frog Peak Music Box A36, Hanover NH 03755)

yours,

Ervin M. Wilson

Novaro's use of the number 72 to measure the harmonic ogdoad makes the placement of the Hebdomekontany on the Hanson generalized keyboard possible. This is a significant step. Its amazing what else he was doing (in 1927!).

Notation; (□) ♭ \ ♮ / #
72-Scale −3 −6 −1 0 +1 +6

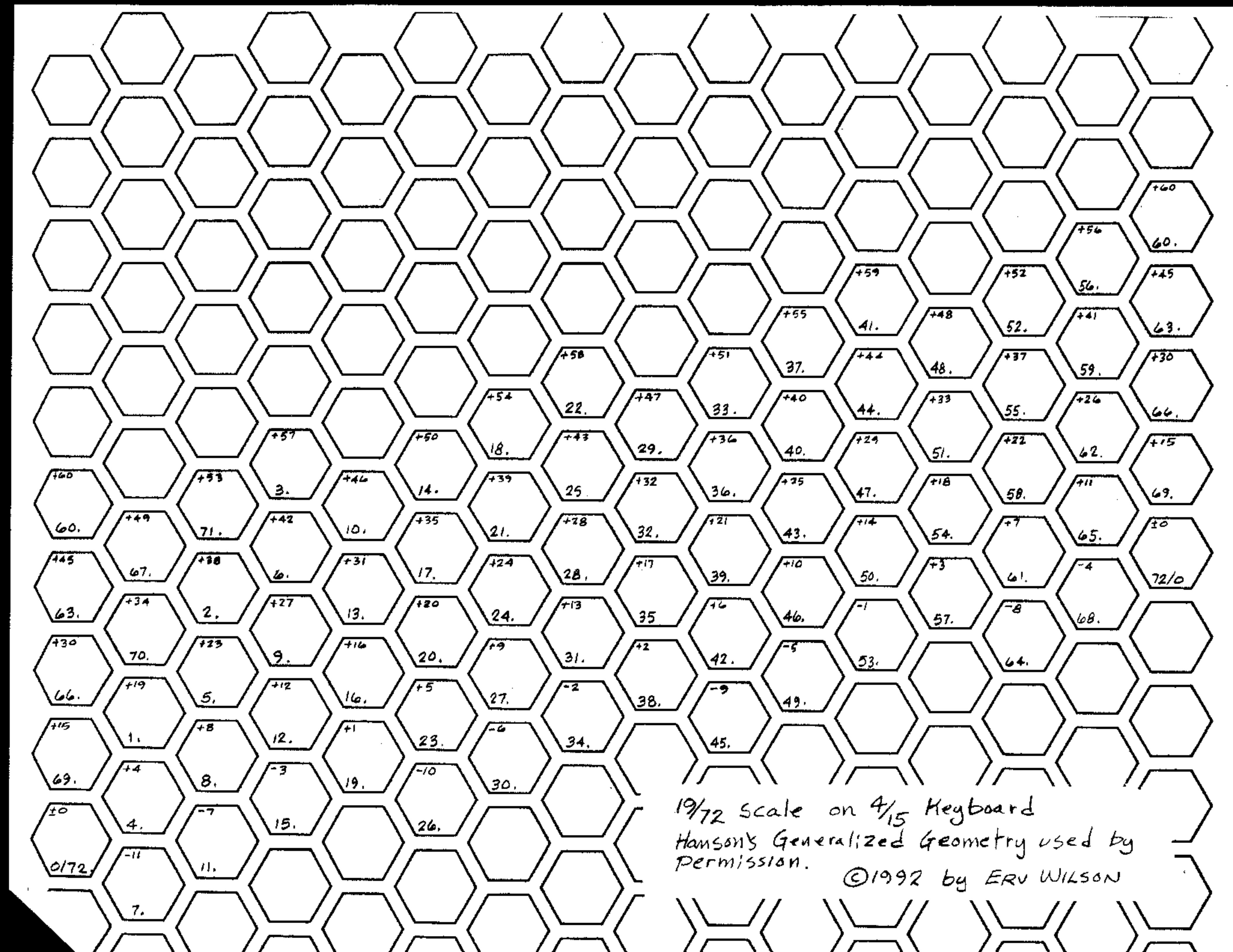
Letter to Kraig Grady / John Chalmers
April 27, 1992
from Erv Wilson

						Tree Notes;	a ailm	b beth	c coll	d duir	e eadha	f fearn	g gort	
						Normal Notes; d	A	B	C	D	E	F	G	
		+52 52.	+56 (3·5·7·9·15) 56. A#	+60 (3^2·7·9·13) 60. b/										
	+37 55.	+41 59. b	+45 1·7·9·15 3·5·7·9 63. B/	+49 (3^2·9·13·15) 67. B\#	+53 3·7·13·15 5·7·9·13 71. [illegible]#	+57 (3^2·7·9·15) 3. C/#	Spare 5·9·13·15 *							
+22 58.	+26 62 B	+30 1·5·13·15 66. c/	+34 3·5·9·15 70. c\#	+38 1·5·7·15 2. C#	+42 1·3·7·13 5·9·13·15 6. *d/	+46 (1·3^2·7·9) 10. d\#	+50 5·7·9·15 14. D#	+54 3·7·9·13 18. e/	+58 (3·5·7·13·15) 22. e\#					
+11 65. c	+15 1·7·11·13 69. C/	+19 3·7·9·11 1. C\#	+23 1·3·5·9 5. d	+27 7·9·11·13 9. D/	+31 1·3·13·15 1·5·9·13 13. D\#	+35 (1·3^2·9·15) 17. e	+39 1·3·7·15 1·5·7·9 21. E/	+43 3·9·13·15 25. E\#	+47 1·7·13·15 3·5·7·13 29. f#	+51 3·7·9·15 33. F/#	+55 (3^3·9·13·15) 37. F\※	+59 7·9·13·15 41. g#		
(1) ±0 (5·7·11/3) 0/72. d/b	+4 1·11·13·15 3·5·11·13 4. d\	+8 3·9·11·15 8. D	(9) +12 1·7·11·15 3·5·7·11 12. e/b	+16 9·11·13·15 16. e\	+20 5·7·11·13 20. E	+24 7·9·11·15 24. f/	+28 1·5·9·15 28. f\#	+32 1·3·9·13 32. F#	+36 3·5·13·15 36. g/	+40 1·3·7·9 40. g\#	+44 3·5·7·15 44. G#	+48 1·7·9·13 48. a/	+52 5·7·13·15 52. a\#	A# 5.
−11 (5·11·15/3) 7. D\	−7 (1·11·13) 11. eb	−3 1·3·9·11 15. E/b	+1 3·5·11·15 19. E\	(5) +5 1·9·11·13 23. f	+9 5·11·13·15 27. F/	+13 1·7·9·11 31. F\#	+17 5·7·11·15 35. g	+21 3·7·11·13 39. G/	+25 1·3·5·13 43. G\#	+29 1·3·9·15 [illegible] a	+33 1·3·5·7 51. A/	+37 1·9·13·15 3·5·9·13 55. A\#	+41 1·5·7·13 59. b	6:
Basic octoad in red (x)			−10 1·3·5·11 26. F	−6 (5·7·11/3^2) 30. g/b	−2 1·5·11·13 34. g\#	+2 1·9·11·15 3·5·9·11 38. G	(3) +6 1·5·7·11 42. a/b	+10 3·11·13·15 5·9·11·13 46. a\	(13) +14 (5·7·11·13/3) 50 A	+18 3·7·11·15 5·7·9·11 54. b/b	(7) +22 1·3·5·15 58. b\	+26 7·11·13·15 62. B	+30 1·5·13·15 66. c/	70
			(11) −21 33.			−9 (1·9·11) 45. A/b	−5 1·5·11·15 49. A\	−1 1·3·11·13 53. bb	+3 (5·11·13·15/3) 57. B/b	† +7 1·3·7·11 5·9·11·15 61. B\	(15) +11 3·9·11·13 65. c	+15 1·7·11·13 69. C/	+19 1.	
								Spare 1·3·7·11 †	−8 (5·11·13/3) 64. c\	−4 1·3·11·15 1·5·9·11 68. C	(1) ±0 (5·7·11/3) 72/0 d/b	+4 4.	+8 8.	
											−11			

except for the placement of the 2 "spares" all fingering/malletting is homogeneous,

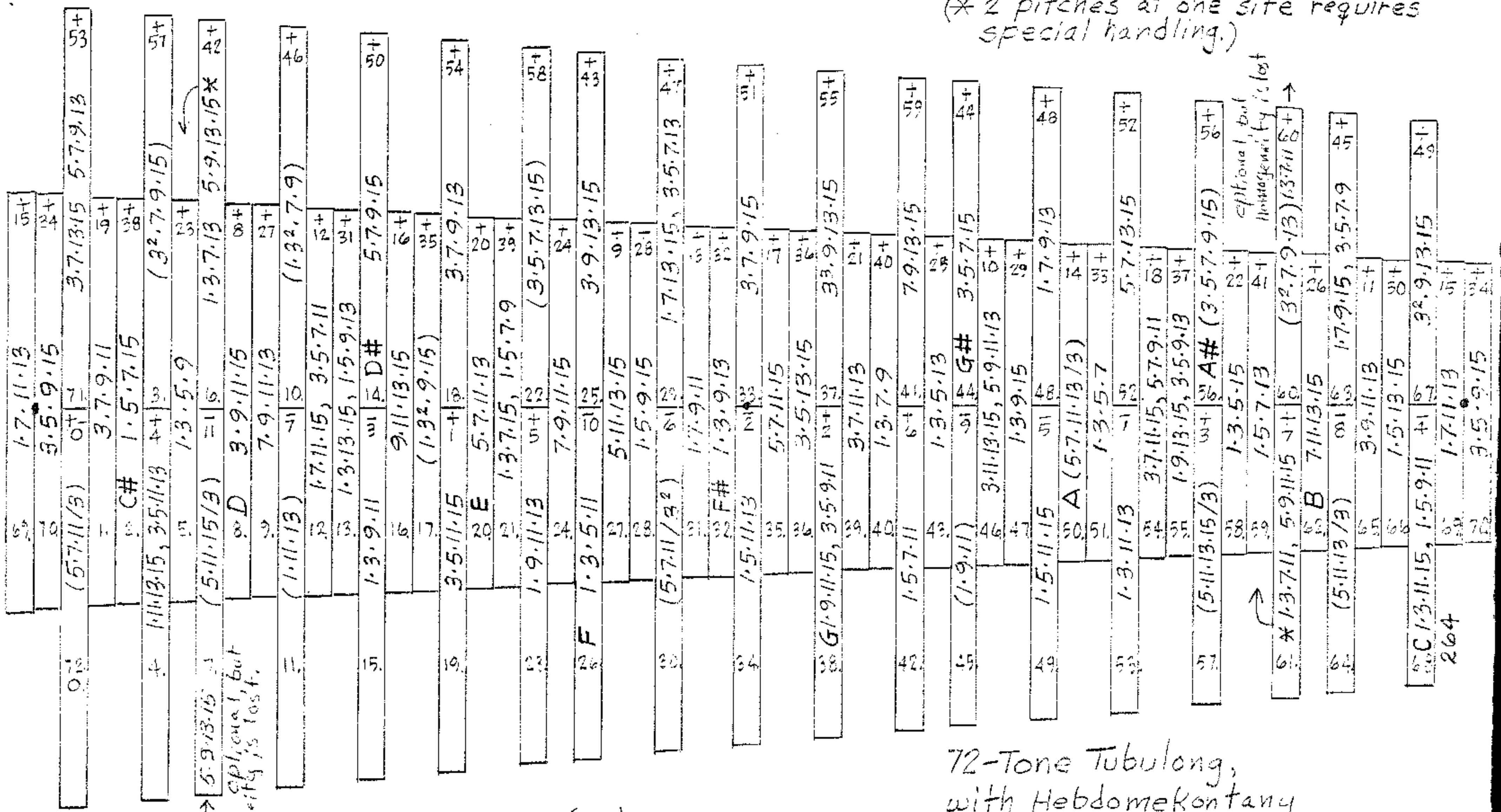
$\binom{4}{8}$ 1,3,5,7,9,11,13,15 Hebdomekontany,
19/72 scale, 3/11 keyboard

(Hanson Keyboard geometry used by permission)



19/72 Scale on 4/15 Keyboard
Hanson's Generalized Geometry used by permission.

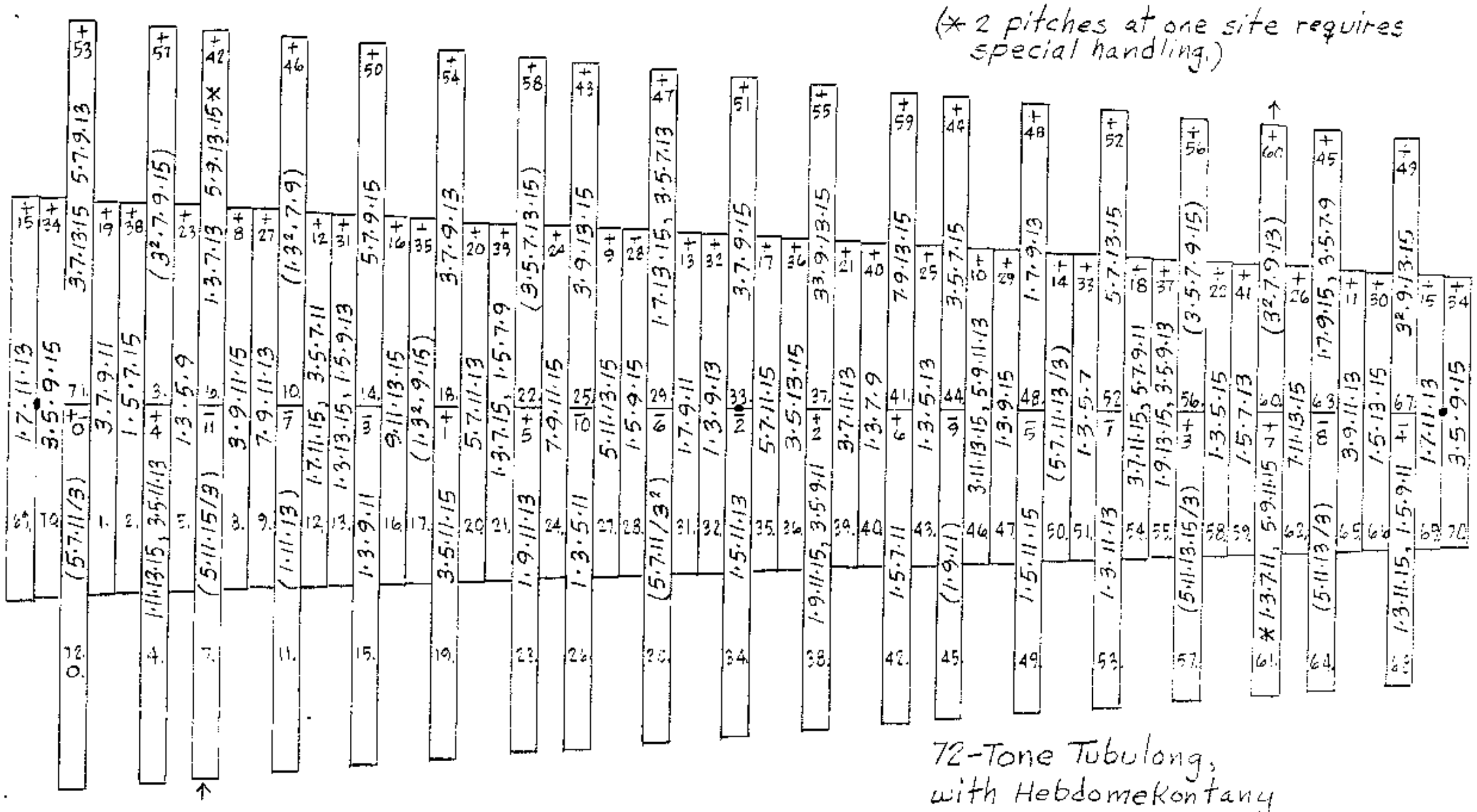
(* 2 pitches at one site requires special handling.)



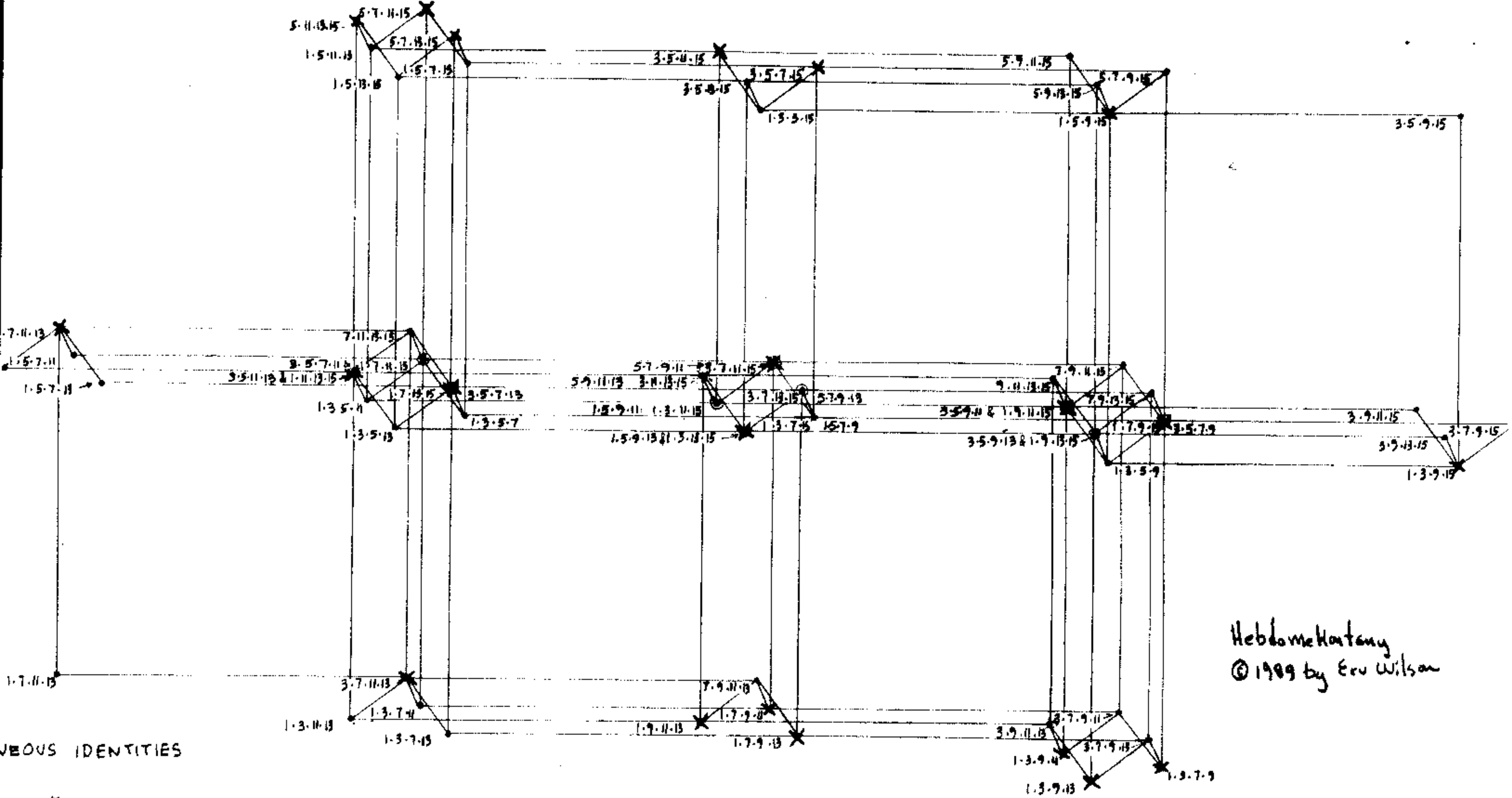
72-Tone Tubulong, with Hebdomekontany on 19-34-19 Keyboard

To Kraig Grady April 27, 1992 from Erv Wilson

(* 2 pitches at one site requires special handling.)



72-Tone Tubulong,
with HebdomeKontany
on 19-34-19 Keyboard
©1992 by Erv Wilson



Hebdomekontany
© 1989 by Erv Wilson

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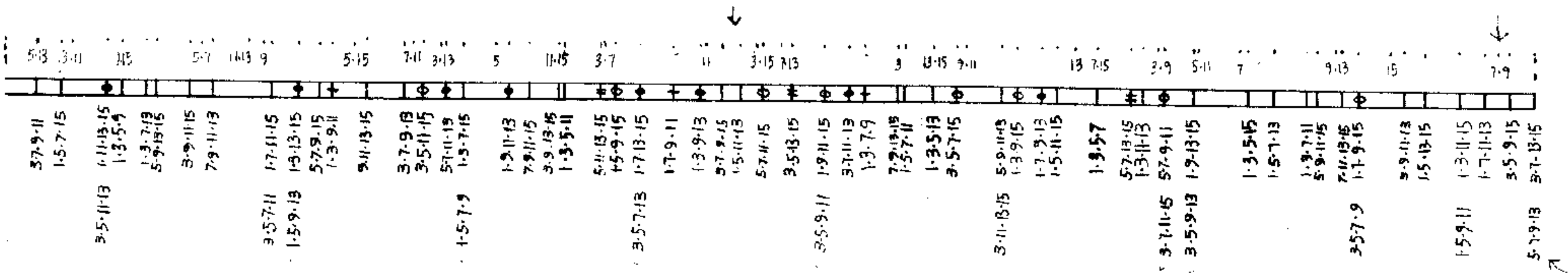
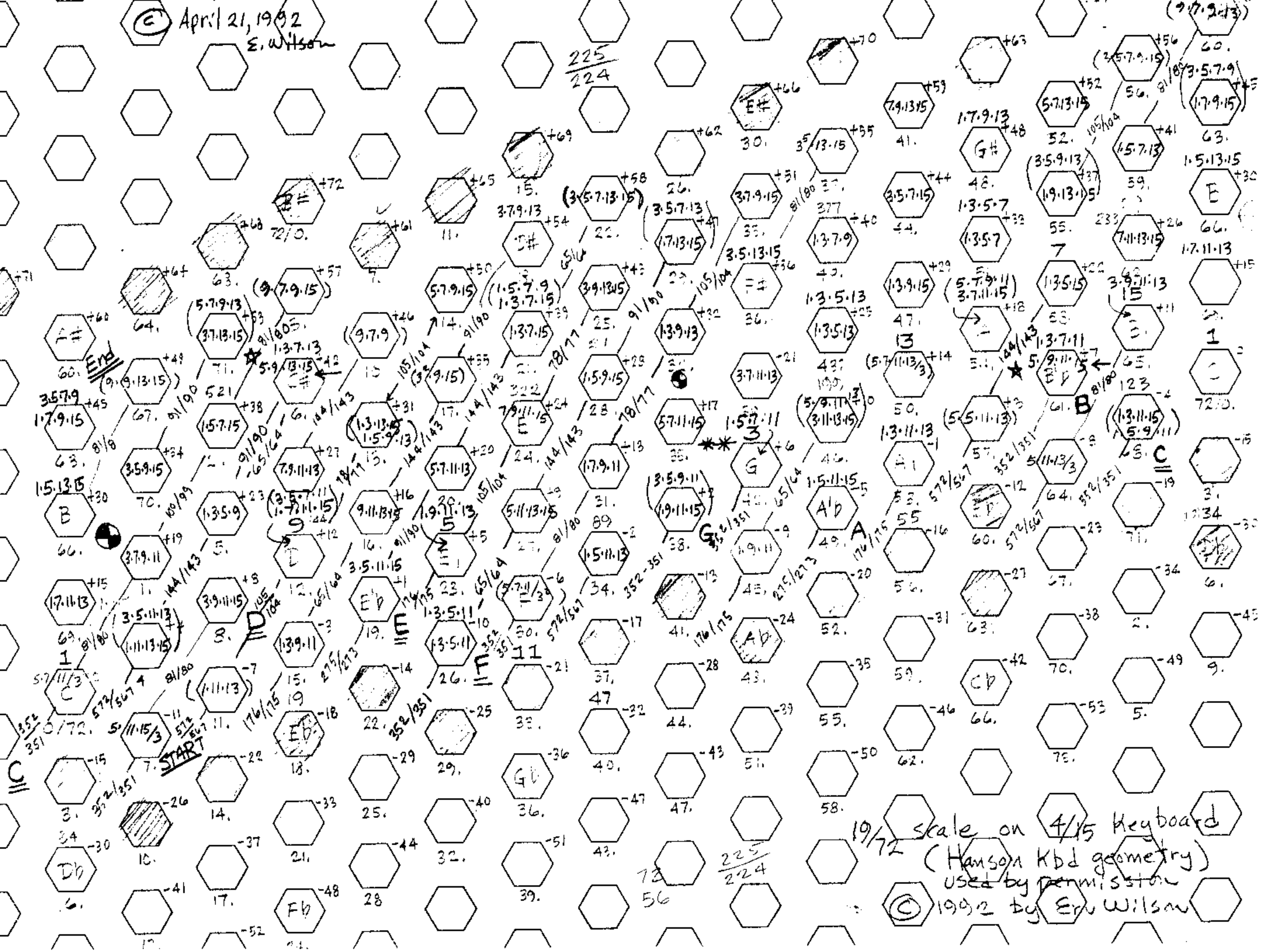
1 ×




© April 21, 1992
E. Wilson
START
End
225/224
19/72 scale on 4/15 Keyboard
(Hanson Kbd geometry)
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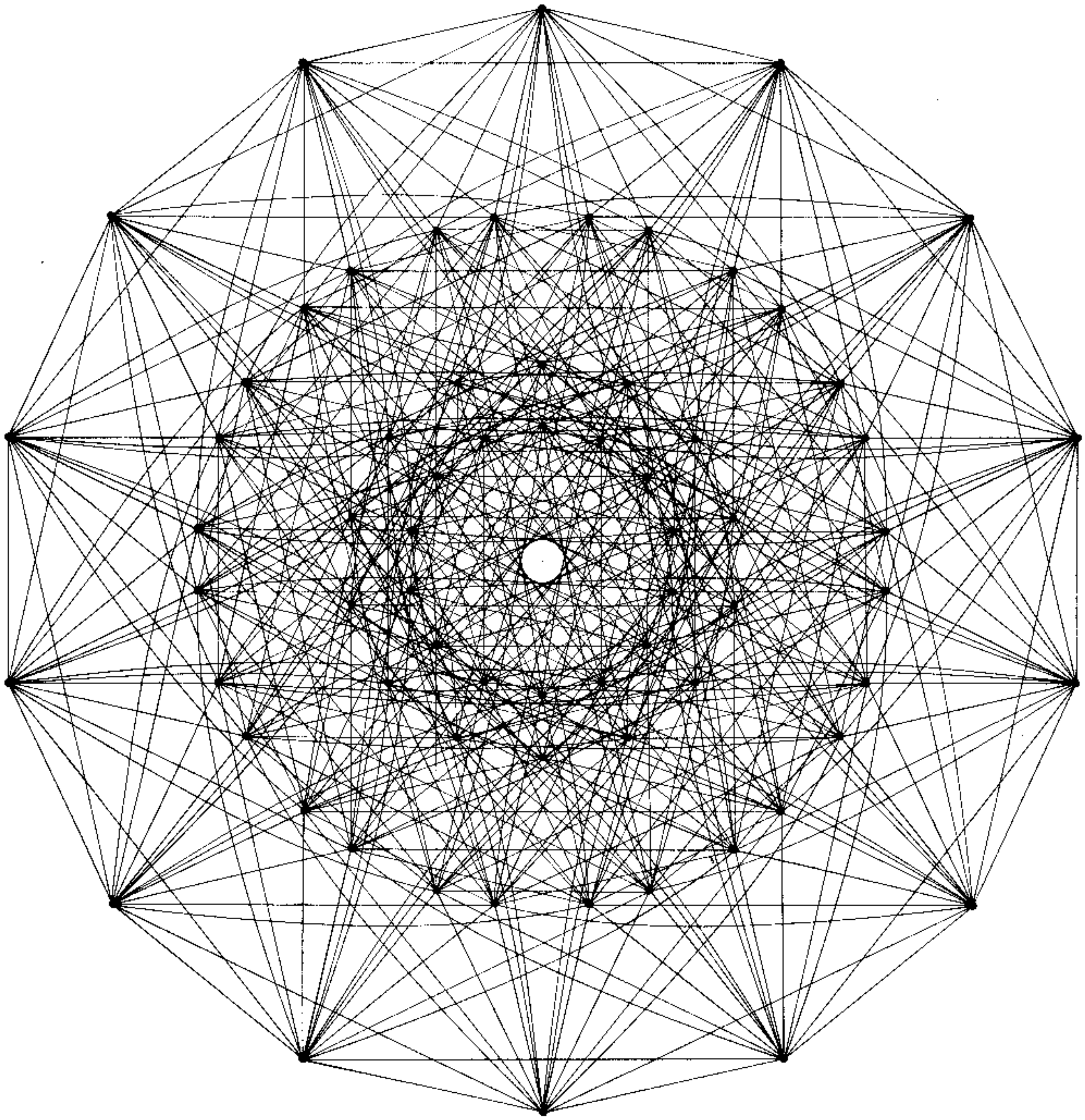
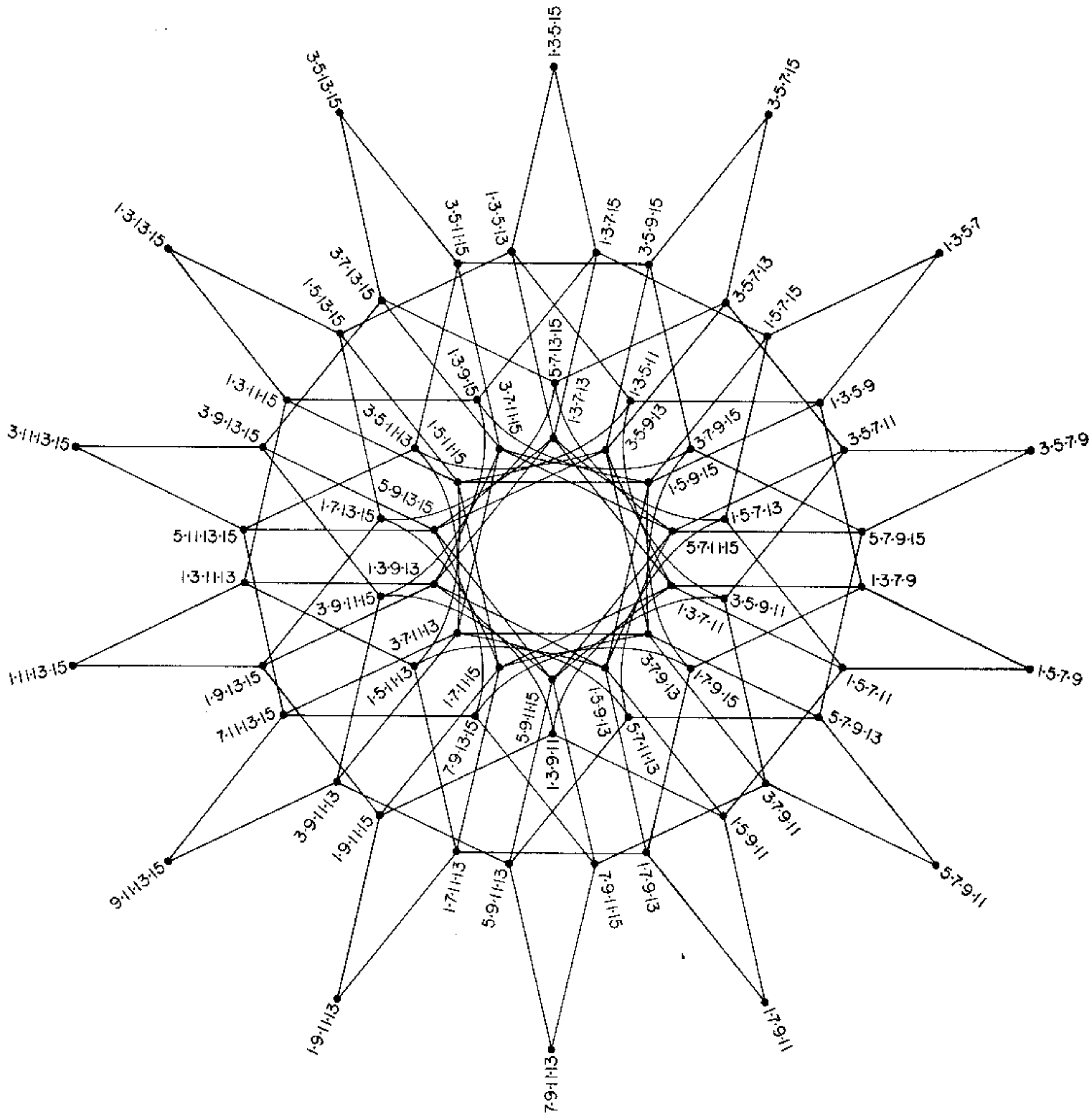
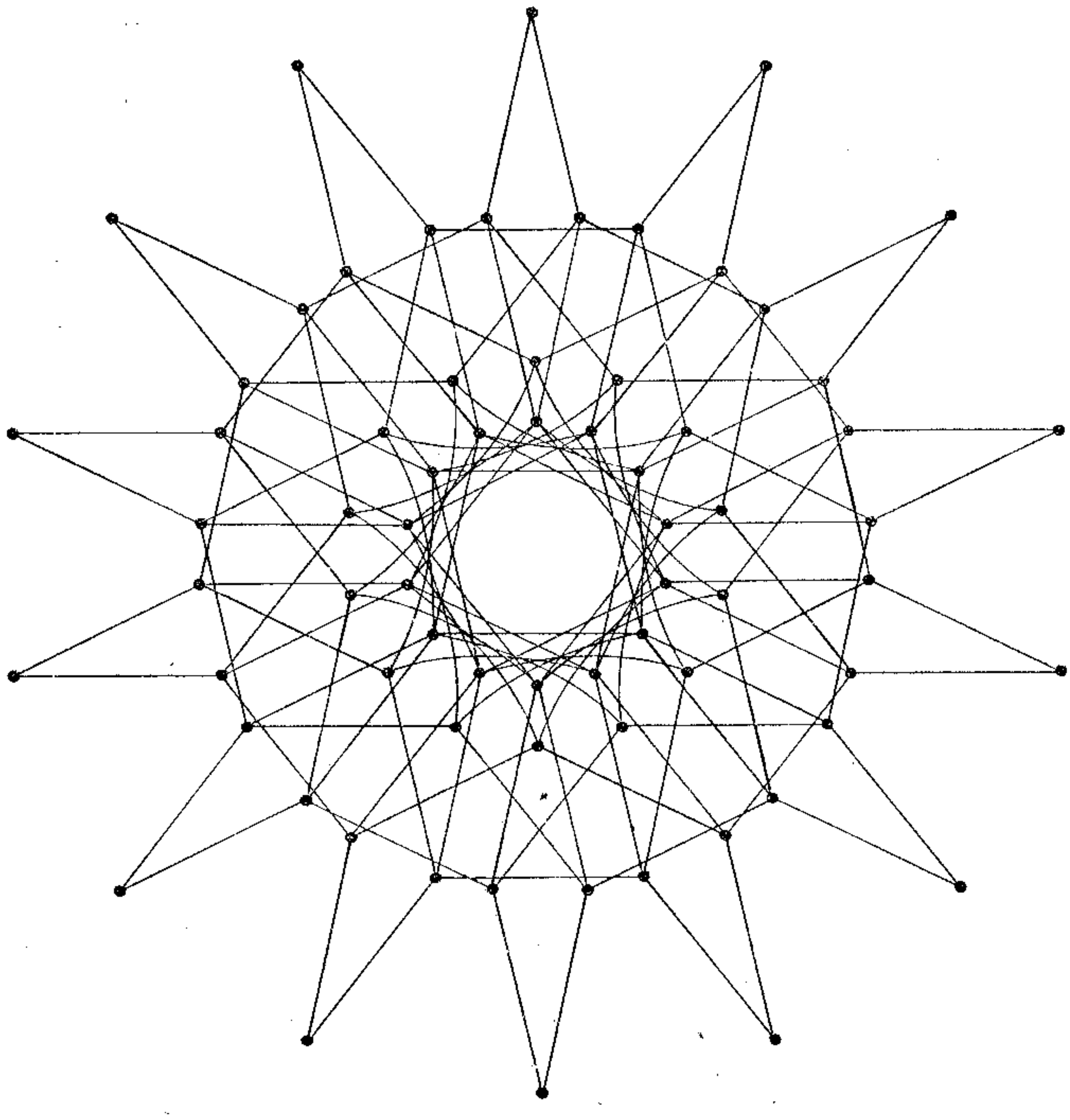
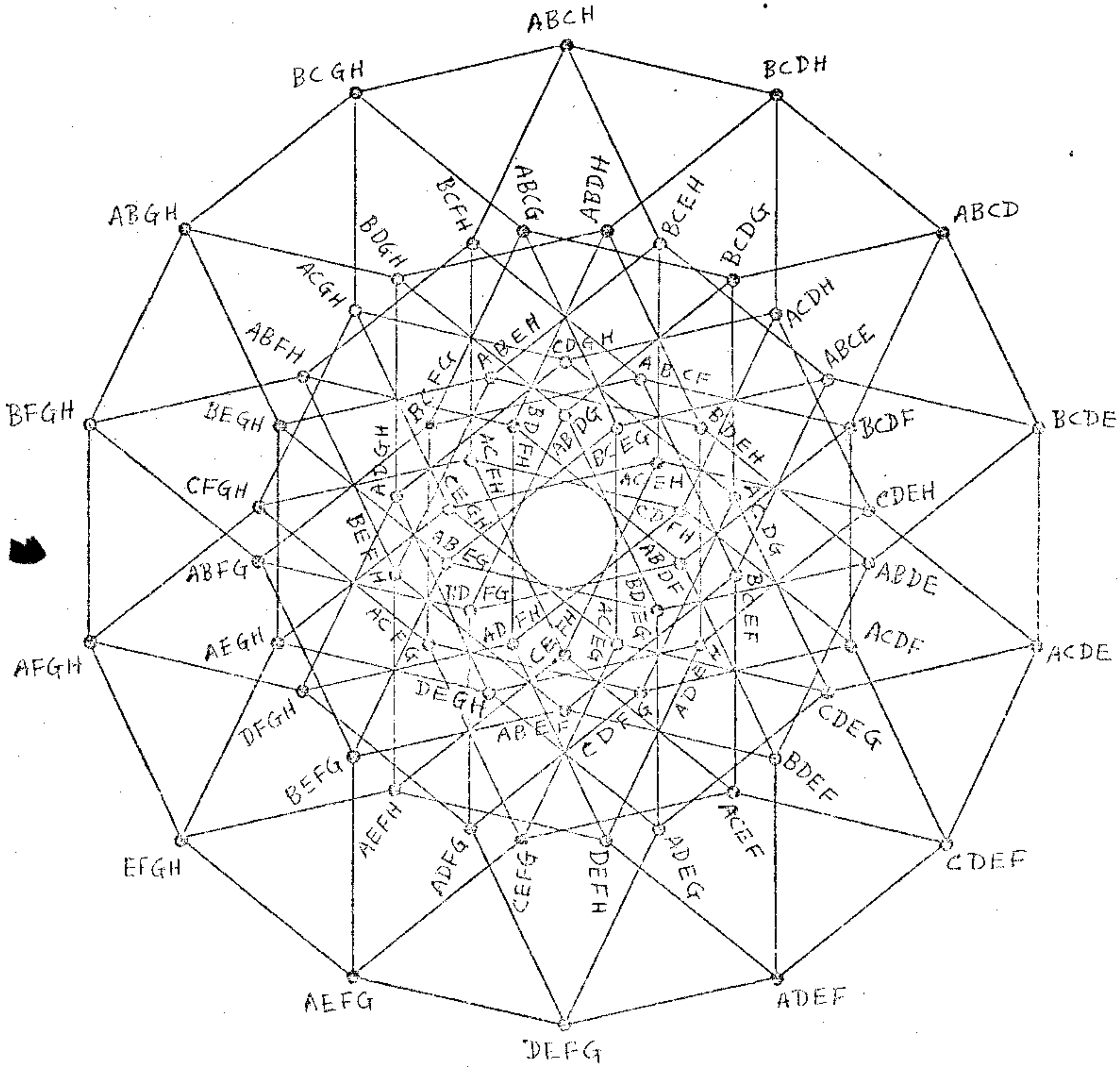




1-3-5-7-9-11-13-15 HEBDOMEKONTANY

ISSUED BY ERV WILSON, 1969




ABCH
BCDH
ABCD
BCDE
ACDE
CDEF
ADEF
DEFG
AEFG
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AFGH
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ABGH
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BCEH
BCDG
ACDH
ABCE
BCDF
CDEH
ABDE
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ACEF
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AEFH
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ABFG
CFGH
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ABFH
ACGH
BDGH
BCFH
ABEH
CDGH
ABCF
BDEH
ACEH
DEGH
ABEF
CDFG