

OCT 25, 1963

LETTER TO IVOR DARREG AND JOHN CHALMERS FROM ERVIN WILSON

I KNOW ITS A DRAG, BABYS, TO BE BROUGHT DOWN BY PSEUDO-ERUDITE (LIKE, DOUBLE-WOW, YOU KNOW WHAT I MEAN) RANTINGS ON MANTISSI OF LOGS BASE 2 and all THAT JAZZ---WHEN ALL WE REALLY WANT TO DO IS MAKE WAY OUT SOUNDS. BUT THERE IS A LITTLE DIRTY WORK TO BE DONE BEFORE WE CAN ALL GET STONED ON HARMONICS, SO HERE WE GO---LIKE A HERD OF TURTLES, UGH!

Rough Note on Logarithmic Spiral, & Harmonic Series

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Remember that the Octave is the ratio $\frac{2}{1}$, and that the first two terms of the harmonic series are 1 and 2. Consider the circumstance of describing the Harmonic Series logarithmically; for computational clarity one may choose to take the 8ve as the measuring unit, and describe the series as decimal fractions of the Octave — which as it turns out are logarithms to the base 2 ($\log_2$). What are logarithms to the base 2? They are the powers to which 2 ($\frac{2}{1}$) must be raised to equal 1, 2, 3, 4, 5, 6, 7, 8, ... the terms of the harmonic series.

<u>Powers of 2</u>	<u>harmonic</u>	<u>$\times 360^\circ$ (angular position around circle)</u>
2^0	= 1	$0 \times 360^\circ = 0$
2^1	= 2	$1 \times 360^\circ = 360^\circ (= 1 \text{ octave})$
$2^{1.584962501}$	= 3	$1.585 \times 360^\circ = 360^\circ + .585 \dots$
2^2	= 4	$2 \times 360^\circ = \text{Twice around circle, to } 0^\circ$
$2^{2.321928095}$	= 5	$2.322 \times 360^\circ = 2 \text{ laps around circle, } +.322$
$2^{2.584962501}$	= 6	$2.585 \times 360^\circ = 2 \text{ laps } +.585$
$2^{2.807354922}$	= 7	$2.807 \times 360^\circ = 2 \text{ laps } +.807$
2^3	= 8	$3 \times 360^\circ = 3 \text{ laps, to } 0^\circ$
$2^{3.169925001}$	= 9	etc
$2^{3.321928095}$	= 10	
$2^{3.459431619}$	= 11	
$2^{3.584962501}$	= 12	
$2^{3.700439718}$	= 13	
$2^{3.807354922}$	= 14	
$2^{3.906890596}$	= 15	
2^4	= 16	

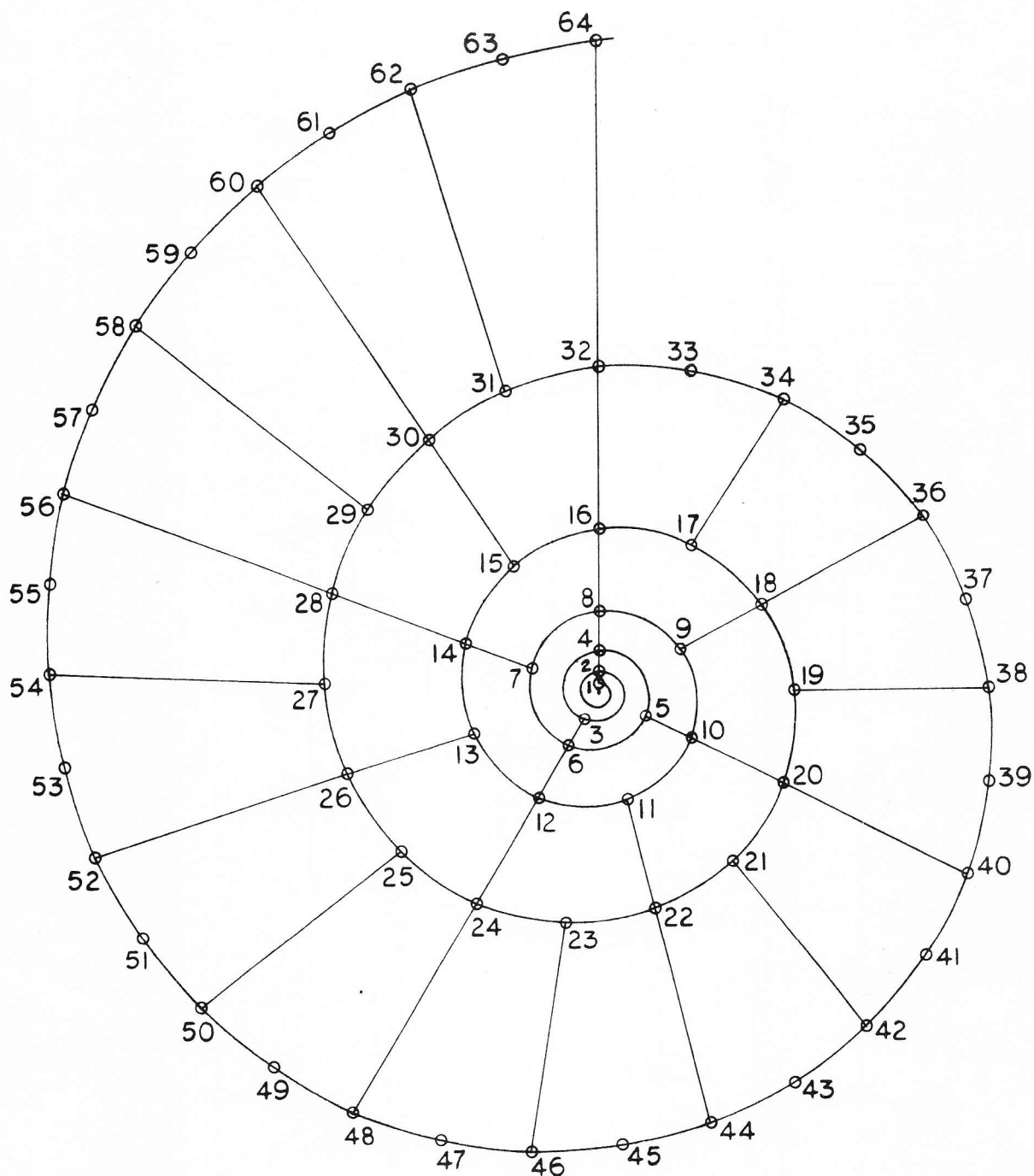
and so forth endlessly

$2^{.694241914} = 1.618033989$ the Golden Section ϕ

I use the hp 20s, hand-held calculator to do these calculations.

THE HARMONIC SERIES AS A LOGRITHMIC SPIRAL

Issued by Erv Wilson March 1, 1965

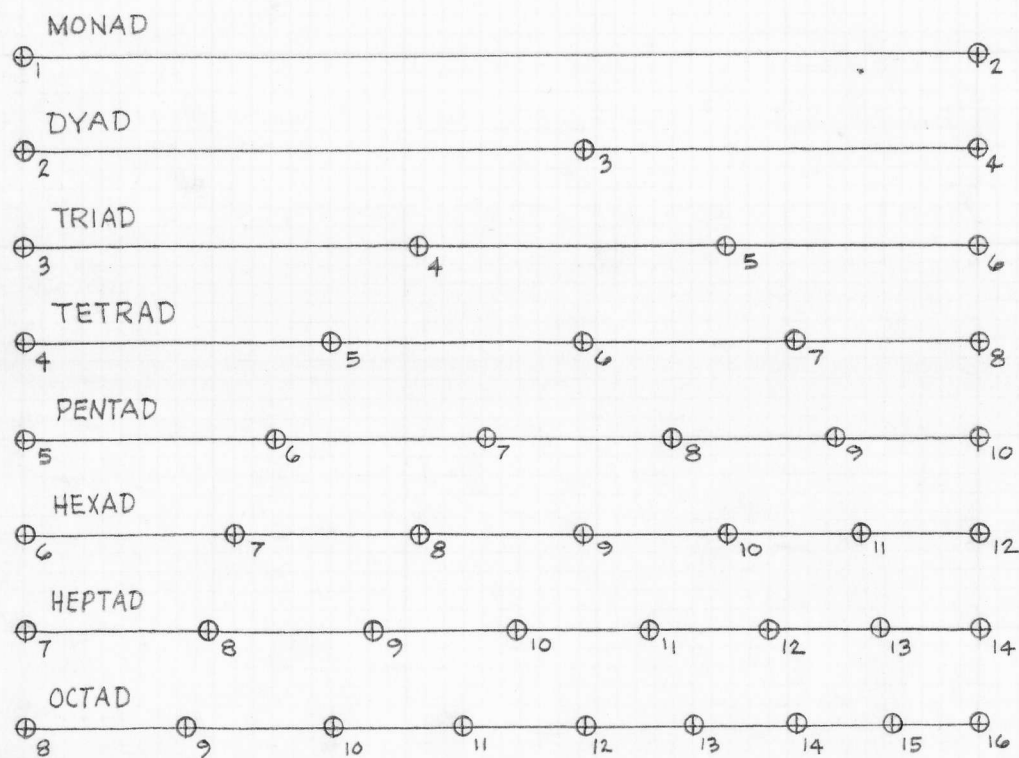
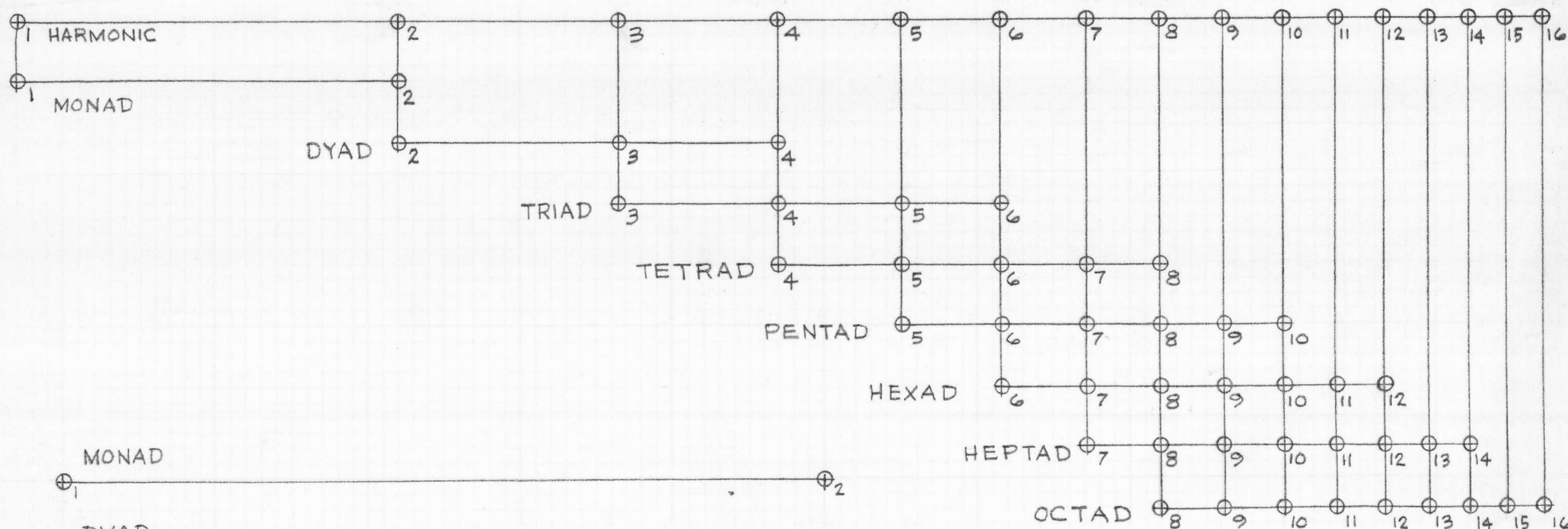


LOGARITHMS TO THE BASE 2 OF THE NUMBERS 1 TO 64

Issued Oct. 21, 1964 by Erv Wilson

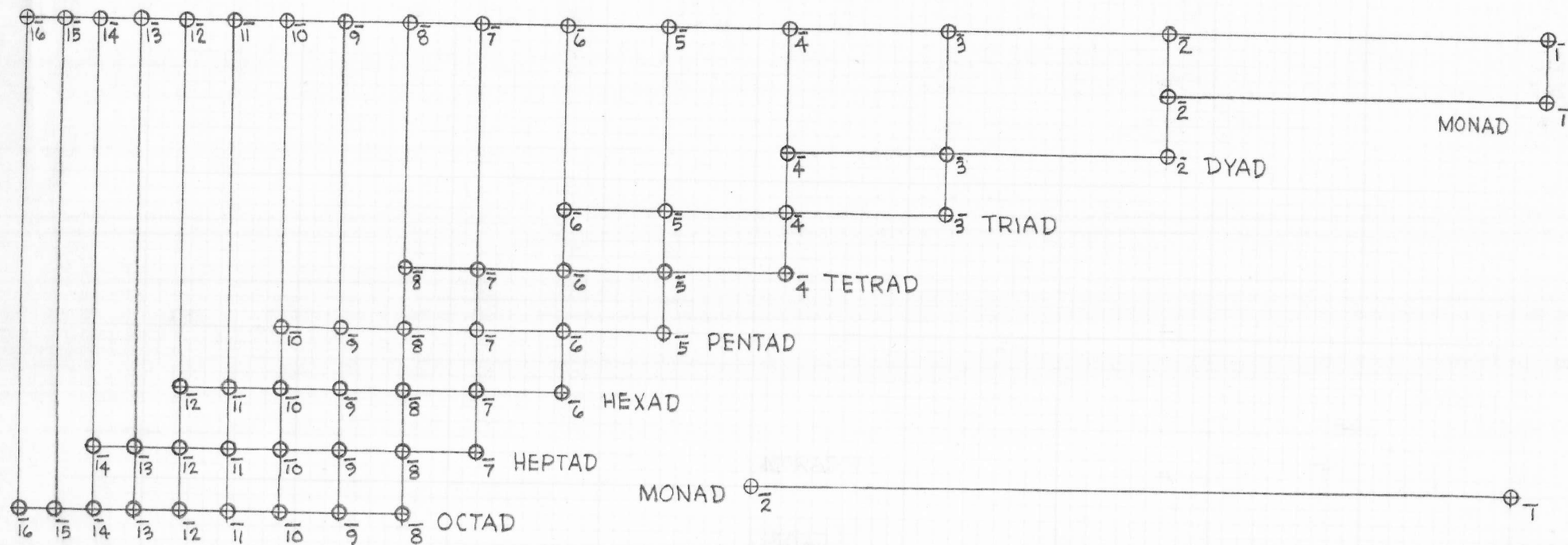
1.	0.0000	0000	33.	5.0443	9412
2.	1.0000	0000	34.	5.0874	6284
3.	1.5849	6250	35.	5.1292	8301
4.	2.0000	0000	36.	5.1699	2500
5.	2.3219	2809	37.	5.2094	5336
6.	2.5849	6250	38.	5.2479	2751
7.	2.8073	5492	39.	5.2854	0221
8.	3.0000	0000	40.	5.3219	2809
9.	3.1699	2500	41.	5.3575	4868
10.	3.3219	2809	42.	5.3923	1742
11.	3.4594	3162	43.	5.4262	6475
12.	3.5849	6250	44.	5.4594	3162
13.	3.7004	3971	45.	5.4918	5309
14.	3.8073	5492	46.	5.5235	6195
15.	3.9068	9059	47.	5.5545	8885
16.	4.0000	0000	48.	5.5849	6250
17.	4.0874	6284	49.	5.6147	0984
18.	4.1699	2500	50.	5.6438	5618
19.	4.2479	2751	51.	5.6724	2534
20.	4.3219	2809	52.	5.7004	3971
21.	4.3923	1742	53.	5.7279	2045
22.	4.4594	3162	54.	5.7548	8750
23.	4.5235	6195	55.	5.7813	5971
24.	4.5849	6250	56.	5.8073	5492
25.	4.6438	5618	57.	5.8328	9001
26.	4.7004	3971	58.	5.8579	4777
27.	4.7548	8750	59.	5.8823	1085
28.	4.8073	5492	60.	5.9068	9059
29.	4.8579	4777	61.	5.9307	3733
30.	4.9068	9059	62.	5.9541	9639
31.	4.9541	9639	63.	5.9772	7992
32.	5.0000	0000	64.	6.0000	0000

I originally calculated these around 1950-1951
at BYU. Erv Wilson



HARMONIC SERIES &
OCTAVE SPECIES





SUBHARMONIC SERIES & OCTAVE SPECIES

