

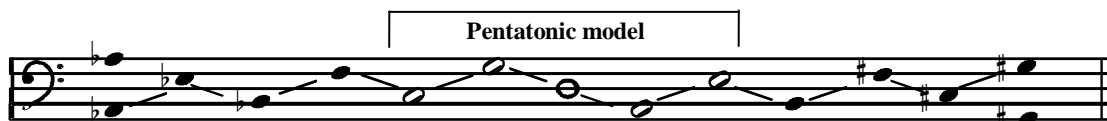
(This *adventure of ideas* is dedicated to Jewish musicologists who escaped the Holocaust to transform my life as part of their own labor of love).

## Children of Abraham

Ernest G. McClain

Thesis: The tension today between Muslim, Jew, and Christian who claim descent--and in that order--from Father Abraham can be traced in part to the effort of Bible authors to illuminate three very different aspects of Deity. This is the story I missed in the first edition of my book, and for which I now try to make amends writing from a musical perspective that has endured for more than 5000 years. Bible authors imagine Pharaoh as “a great serpent in the midst of the Nile” represented by a sequence of twelve rising/falling musical fifths and fourths that can be tuned accurately only by successive pairs. On the thirteenth tone (twelve intervals in either direction) a nearly perfect agreement between first and last (either at the unison or the octave) encourages a limitation to only twelve tones. A universally known pentatonic subset in the middle sets the pattern in both directions. Here is the 5-thousand year old Sumerian serpent as “lion of the ground.”<sup>1</sup>

**Figure 1. Deity as “Great Serpent,” required for aural accuracy.**



Pentatonic model

Modern names and numbering with pitch class D as center of symmetry.

A $\flat$	B $\flat$	B $\flat$	F	C	G	D	A	E	B	F $\sharp$	C $\sharp$	G $\sharp$
1	2	3	4	5	6	7	8	9	10	11	12	13

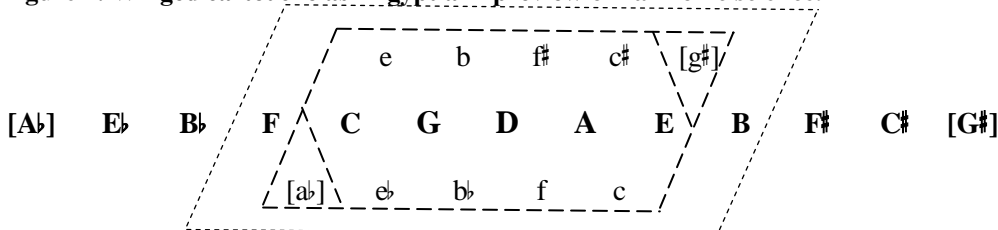
This system seems to have developed historically from the pentatonic subset in the middle (C G D A E) through extensions on each end to 7, 9, 11, and 13 pitch classes all tuned similarly (in successive pairs from their nearest neighbors). Ratios are quantified by an ancient Chinese algorithm: “Take 3 four times” (from any reference as  $1 \times 3 \times 3 \times 3 \times 3$  by which to find initial “reduced” values of 1-3-9-27-81 that can be doubled into linear scale order (C D E G A) in any permutation we please. The largest value required (in this case 81) determines both upper and lower limits of the defining octave 2:1. Five pentatonic solutions are developed in Table 1 in two different ways: either double each “reduced” number upwards as in the Middle East to “enthroned” any one as largest and “tonic reference,” or work backward from 81 by the more advanced Chinese algorithm, “add or subtract one-third.”<sup>2</sup>

Table 1. Pentatonic permutation.				
C	G	D	A	E
128	96	72	108	81
128	<b>96</b>	<b>72</b>	108	81
64	96	<b>144</b>	54	81
64	96	72	<b>108</b>	81
64	48	72	54	<b>81</b>
<b>1</b>	<b>3</b>	<b>9</b>	<b>27</b>	<b>81</b>

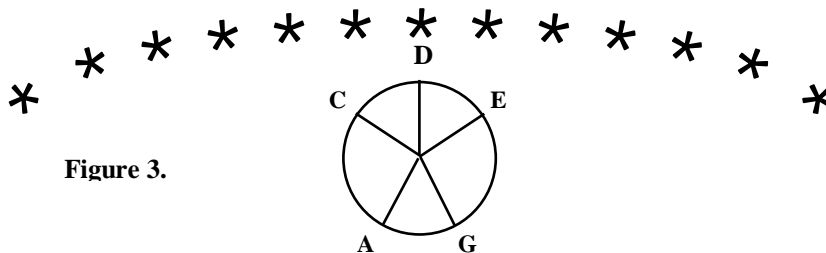
**Bible perspective on the “spiral” set of thirteen.**

Bible authors encourage a more abstract view of these systems in musical notation aligned here to imitate the ancient Egyptian symbol of a *winged cartouche*. Twelve Arab princes born to Ishmael represent the wings, and twelve tribal patriarchs born in the next generation to Jacob represent the body, sharing the pentatonic subset (and eventually the heptatonic set) in common. Slight conflicts known as *commas* arise in the tuning of C-c and of E-e, and both systems are troubled by similar conflicts between first and last tones (A-flat and G-sharp among the “Arabs,” and a-flat and g-sharp among the “Jews”). Thus trouble brews in the ancient Near East “from the Creation” and requires severe “civic discipline.”

**Figure 2. Winged cartouche as “Egyptian” preview of harmonic science.**



The pentatonic set in Figures 1 and 2 is projected into the “tone-circle” of Figure 3 as ancient Sumerian “mantles of radiance” functioning also as the Egyptian hieroglyph for the sky. (The body of the sky goddess arched on fingers and toes is ornamented with rows of these 5-pointed stars that suggest the “stick” figure of a joyous human.) This page can be rotated to display for the eye the unique pattern of each pentatonic mode at some hour of the day or night.



**Figure 3.**

Only in New Testament arithmetic is the sequence in Figure 1 (central axis in Figure 2) imagined as a “Leader followed by 12 disciples,” or viewed from the middle as Pharaoh ruling “in the midst of the Nile” (playing Satan), or as Peter (*Petros*) as leader of the Church. The naming of Arab princes suggests a very different a-symmetric pattern—confirmed in the names of both Abram and YHWH--that places the *sixth* tone in *seventh* place, thus effectively “dethroning” Pharaoh, Marduk, and the future Satan.

**Table 2: Ancient perspective is from the middle with tones numbered symmetrically in each direction: Bible names require realignment.**

7	6	5	4	3	2	1	2	3	4	5	6	7
A <sup>b</sup>	E <sup>b</sup>	B <sup>b</sup>	F	C	G	D	A	E	B	F <sup>#</sup>	C <sup>#</sup>	G <sup>#</sup>
13	1	2	3	4	5	6	7	8	9	10	11	12

When the resulting tuning is viewed from the middle its “mantles of radiance” fall naturally on or near the hours of a local clock as displayed in Figure 4. A glance at the near perfection of “boundary markers” reveals why YHWH takes Ishmael and his mother under divine protection when they are expelled from Abram’s tent to appease Sarai’s jealousy:<sup>3</sup> *aural* tuning, *iterative* algebra, and *geometric* projection are *discovered*—not invented—as gifts of nature to a mankind predisposed to *order*. A musical fifth of 2:3 “maps” as *seven hours* in either direction, and its complementary musical fourth of 3:4 as *five hours*. A ritual music, tuned aurally, needs neither algebra nor geometry for correlating music with clock hours or months of the year: *cycles* were not “computed” but assumed to be twelve. Arc segments are labelled here with modern values in *logarithmic cents*, computed as 1200 to the octave and thus 100 per equal tempered semitone, to betray a slight mathematical inequality of no importance to the ears in a music concerned only with melody, and within pentatonic or heptatonic limits.

In Jewish arithmetic Abram at eighty-six when fathering Ishmael on Hagar presumably means at  $8 \times 8 \times 8 \times 8 \times 8 \times 8 = 8^6 = 262,144$  (or  $2^{18}$ )—and thus effectively halts the spiral of fifths at  $3^{11} = 177,147$  and excludes the twelfth interval (thirteenth tone) at  $3^{12} = 531,441$ , lying a comma beyond the next octave limit ( $2^{19} = 524,288$ ). And because time can be counted forward or backward any new tone possesses a symmetric “Platonic twin” on the opposite side of an imaginary plumb line from heaven. Thus the tones can be plotted laterally in pairs (7-5, 2-10, 9-3, 4-8, 11-1, and *almost* 6 to 6—where the slight overlap of a comma reveals a trivial but cumulative excess in musical fifths, and similar defect in musical fourths. Thus, as Isaiah notices, “to God seated above the circle of the earth, men look like grasshoppers.”<sup>4</sup> And now we see the cleverness of this Bible re-numbering. We learn nearly everything about Bible arithmetic from examples—understood *only* in retrospect.

### The Chosen People

Every fifth tone in the spiral of fifths has a near neighbor in a related “Just” tuning at the trivial ratio of a comma, and this option displayed in Figure 2 encourages moving the first five tones of Spiral Fifths under the middle five, and moving the last five over them. When results are *offset* in this “brick” pattern every triangle of nearest neighbors is naturally “major” when upright  $\triangle$  and “minor” when inverted  $\nabla$ . The numerical evolution of Jacob’s musical family is displayed in the cartouche alignment of Figure 6, keyed to Figure 2.

Figure 4: “Serpentine” spiral fifths.

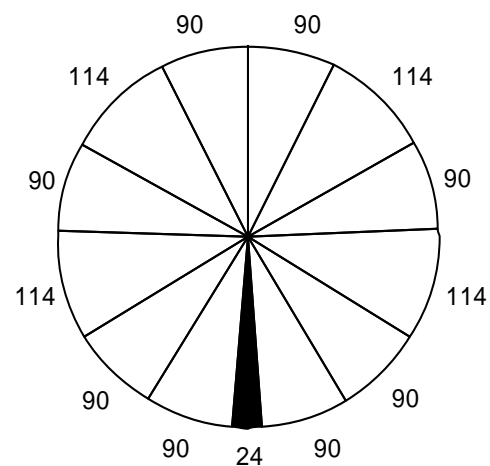
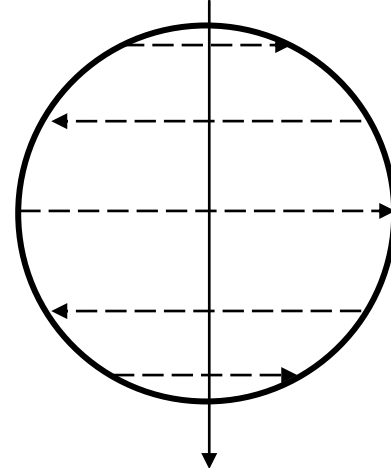
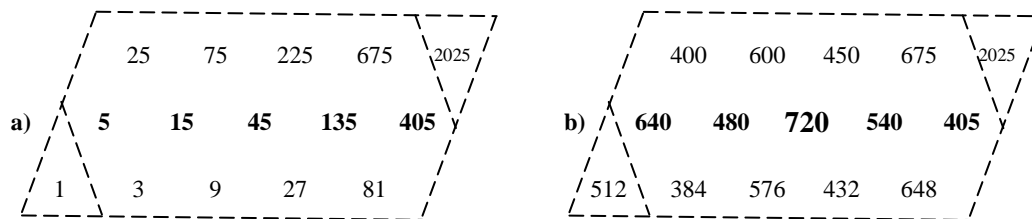


Figure 5. A view from the throne.



**Figure 6. Winged cartouche as “Egyptian” preview of the *Chosen*.** Twelve sons of Ishmael symbolize the basic material, and twelve tribes fathered by Jacob’s sons emerge from fifteen candidates in a “Just” system as the “body” in the calendar octave 720:360 (12 months of 30 days).



“Reduced” integers here form the multiplication table for 3 x 5. Perfect symmetry on the diagonals now “enthrones” the middle value of 45 as doubled four times to the limit of 720 *if the thirteenth and last value in the third row (2025) is cut off* as superfluous. The entire matrix can be rotated half-a-turn (180 degrees) to symbolize arithmetical reciprocation so that, as in Ishmael’s family, the *first* also functions as *last*. Otherwise 720 must be doubled through 1440 to 2880 (deeper into the “wilderness” of ratio theory) to gain a thirteenth tone that we desire never to encounter *with its “cornerstone” competitor on the long diameter of the rhombus. The Chosen thus reduce the essential arithmetic from six digits to only three digits.* Here indeed is possible inspiration for a “people dwelling alone, and not numbering themselves among the nations.”<sup>5</sup>

The “mantles of radiance” for Jacob’s family are displayed in Figure 7 where the cartouche arithmetic that correlates ratios of 4:5 along the right diagonals // of Figure 6 now map “pure” major thirds as a comma *less than four semitone hours*. It is obvious to the eye that the *Chosen*—who produce the “perfect triads” preferred by some musicians today—are geometrically inferior to “Arab Princes” in dividing the octave into twelve nearly equal semitones. (“Semitones” here vary almost 2:1 between a minimum of 70 cents and a maximum of 134.)

But Arab and Jewish descendants of Abram/Abraham in Figures 4 and 7 interweave naturally in Figure 8 below, like the symmetrically opposite fingers of our clasped hands. This inverse symmetry between harmonic systems offers itself “naturally” as a simple, manipulative model *for all cycles*, computed forwards or backwards. It was the destiny of this early musicology to serve as a convenient handmaiden for many other arts. Ironically, “Arab” and “Jew” are presented in the Bible in conflict essential to displaying the *subtlety* of creation and the *ingenuity* of the Creator in “Intelligent Design.” Differences between the two systems (Spiral Fifths for the Arabs and Just for the Jews) are always a *comma* of 22 cents that embrace “Equal Temperament” somewhere between them. They close in on six-o clock to reduce commas to 24 and 20 cents in ratios that “cross over” from the “Pythagorean comma” of excess or deficiency of 12 cents to a reduced “Just” comma of only 10. This crossover near-coincidence of less than 2 cents—acceptable today in Equal Temperament theory—is no greater than the error in the first pair (A vs G, Plato’s harmonic and arithmetic *means* shared by both systems). Arab and Jew thus prove essential to defining each other. But in the middle of the octave only a *super-sensitivity* could distinguish the difference between systems! Design could hardly be more *intelligent* in wedding thought and feeling, for without the commas of *aural insensitivity* that make us congenial to each other we could not tolerate singing or playing with our own friends. And the mental *cross-over* at 6:00 is unthinkable without modern logarithms (it is less than half a degree).

**Figure 7. Jacob’s family.**

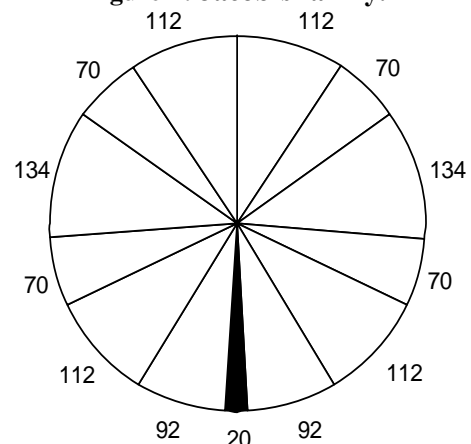
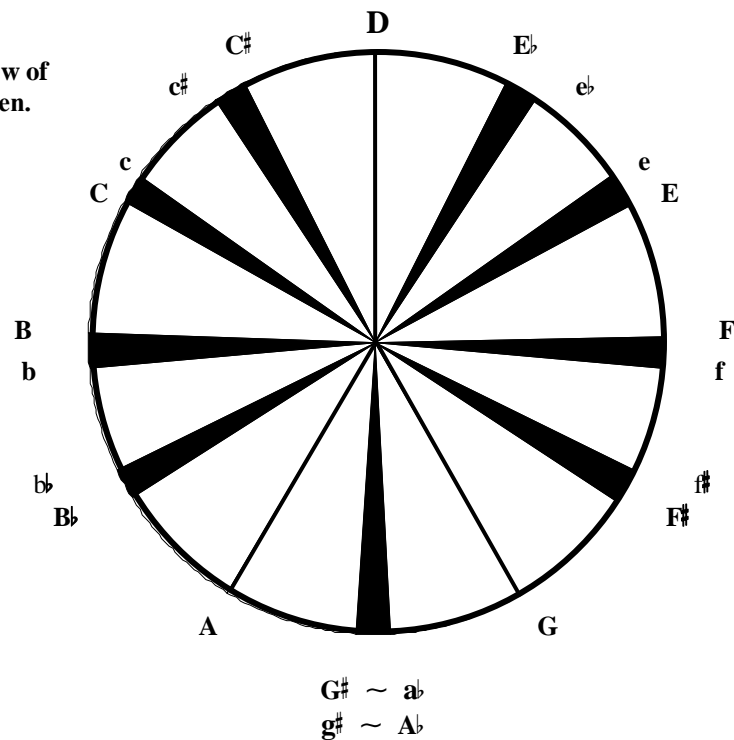


Figure 8. Overview of Abraham's children.



### Identifying Abram/Abraham and Sarai/Sarah.

In the “cosmic circle” of Figure 8 Abram is married to half-sister Sarai ten years younger, and who remains childless until 90 when he is 100—after God himself changes their names a year earlier and requires father to circumcise himself at 99 to bring about this miracle.<sup>6</sup> Abraham’s fabled indifference to right and left and to up and down (when dividing the Holy Land with nephew Lot) means that 100:90 (= 10:9) is found either between “D” and “e” to the right or “c” to the left. Son Isaac fathers twins Esau and Jacob with Rebekah when he reaches 60, and its first odd male divisor is 3, meaning that “twins” are necessarily the *first pair* (A and G at  $2/3 \times 60 = 40$  as symbolic firstborn Esau, so that younger twin Jacob is  $3/2 \times 30 = 45$  (a larger integer and thus “born later”). Now the smallest integer that can divide a year of 360 days by *halving* (which retains tonal identity at the octave) identifies Isaac’s lifetime of 180 years *and* Sarah’s age of 90 when bearing him, so that Jacob’s 45 is essential to grounding the Hebrew symbolic calendar. This means that Esau (40) must be cheated out of his deserved “doubled inheritance” as firstborn, and this deception is neatly arranged for “trickster” Jacob by mother Rebekah.<sup>7</sup> In Figure 8 the “enthroned” D as reference tone ensures that A and G lie at 7:00 and 5:00 in the reduced octave 30:40::45:60 but at 480 and 540 in the 12-tone octave 720-360 (coincidentally twelve times greater). Thus the first three tones (A-D-G) are the same for Arab and Jew, and successive additions always compete at the interval of a comma that reduces mutual impatience.

But the Hebrew letter values of Abram sum to 243 (as 1+200+40) meaning to  $3^5$  defining the sixth tone in Spiral Fifths, as displayed in Table 2. When names are changed Abram becomes Abraham and sums to 248 (read these digits as 2x2x2) to earn him the throne (“1” is tonally invariant under doubling), while Sarai (510) becomes 505 (read the digits as 5-0-5) to vacate the center for him as sixth when mapped 5-1-5. (He gains the 5 units his wife loses.) But Jacob is not the only trickster; YHWH has many more games to play. He is fond of describing himself *tribally*

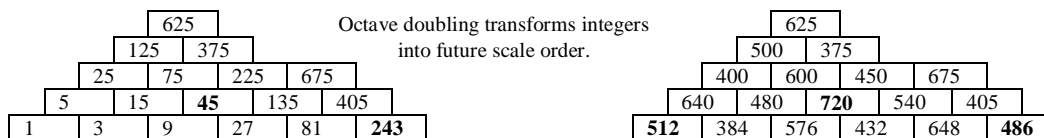
as “the God of Abraham, Isaac, and Jacob,” justified so far by Platonic analysis, now let’s play a similar game with his own “Great Name” of four letters (YHWH in German and English) that notate 10.5.6.5 for every Kabbalist. Here, I suggest, we meet *El Shaddai* as “God on the mountain,” and whose Hebrew letters sum to  $31 + 314 = 345$  making him both tribal and universal (as “days” in the Egyptian year). Only the High Priest is permitted to pronounce YHWH, and only once a year in the privacy of the sanctuary, and for very good reason.

### YHWH (10.5.6.5) as the “One” God of monotheism.

The highest gods of ancient Mesopotamia enjoyed numerical nicknames, suppressed here, and that YHWH’s numbers dethrone, to concentrate instead on Marduk, the Bible’s hated Baal. He reorganized the universe presented in Appendix I (pp. 125-161) as the “Holy Mountain” that functions in the Bible as “Noah’s flood” measuring 15 units in depth.<sup>8</sup> When YHWH’s 10.5.6.5 is read *exponentially* as  $10^5 \times 6^5$  meaning  $60^5 = 777,600,000$ —i.e., only *nine percent* of Marduk’s 8,640,000,000—he defines a similar “Holy Mountain” (Figure 10 below) only thirteen levels high but with a more powerful “army” of ambidextrous fighters that belong both to the mountain matrix and to its rotation by 180 degrees that *maps* arithmetical and tonal *reciprocals*, and whose *sixth row* displays the 11 symmetries studied above, plus an asymmetric *twelfth* that becomes *first* under reciprocation. Abraham’s arithmetic makes YHWH understandable in Platonic analysis. Figure 9 displays the evolution of the symmetry patterns within 777,600,000 in Figure 10 in the factorial analysis modeled on the Holy Mountain of Appendix 1 and with minimal commentary on Bible metaphors. This construction is not conceivable, I believe, before Semitic Babylon “regularized” the ancient *base 60* arithmetic of Sumer (c. 2000 BC) to give *sixty* as the “Big ONE” what we call “floating place value.” Because Hammurabi declared Marduk the god of Babylon in the 18<sup>th</sup> century BC, establishing, a *heptatonic* musicology, the invention of YHWH as the “ONE God” with an invariant *eleven-tone* set (count 5-1-5) appears as a blunt parody of Marduk, for the 777 in 777,600,000 is a “translation jest” irrelevant to 600,000 brick makers. Genesis narrative slips this name to us ahead of time, anticipating many Bible stories that follow.<sup>9</sup> Thus the Bible is a monumental exercise in *Intelligent Design* perfected in successive stages over the preceding 3000 years—not by inventing patterns but rather by *discovering* them within the severely iterative processes of “Egyptian” arithmetic that anybody would be eager to escape. “Musicology” needs no more digits than 600,000, and their “brick makers” needn’t be supplied with straw. Bricks of any size whatever were counted and manipulated in units of 720 belonging to both music and the calendar.

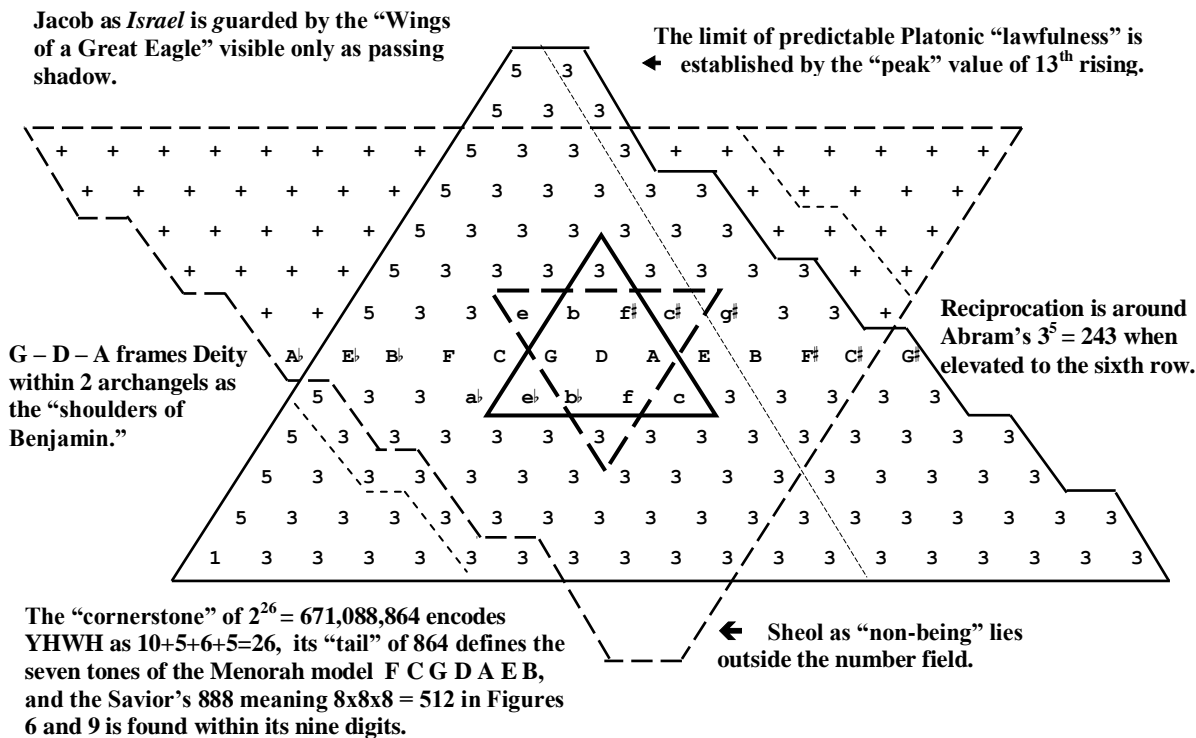
The basic *tree of life* is presented here as the multiplication for “male” odd integers 3x5 to some limit of special interest. Then all integers are doubled as necessary to lie within its half. In this example 45 is doubled four times into 720, and the others are doubled to lie within 360.

Figure 9. The matrix arithmetic developed for “bricks” in the “calendar octave” 720:360.



All larger limits are studied in this way (as anticipated in Charts 11 and 12 on pages 146 and 149). The YHWH matrix that follows in Figure 10 is notated here only in exponents of 5 and 3, replaced by tone names in the few places relevant musically around the throne. There is no evidence that more than a few of its 9-digit numbers ever were computed, but limits to the right in each row had to be tested empirically. Inverting the matrix outline automatically identifies reciprocal pairs within common borders. Multiplying 720 by 1,080,000 into YHWH’s playful 777,600,000 merely moves the model to a new locus among “ambidextrous fighters.”

**Figure 10. YHWH as a “Man of War” meaning  $10.5.6.5$  read as  $10^5 \times 6^5 = 60^6 = 777,600,000$ .**



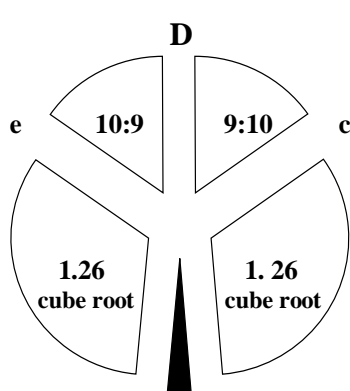
The YHWH universe is displayed here with factors of 5 along the left ascent and with factors of 3 to the right in each row. The twelve smallest values framed within the dashed lines in the lower left corner are Jacob’s twelve sons born within his lifetime of 147, and under reciprocation they illuminate from “ABOVE” in the upper right corner. The last seven diagonals in the lower right corner // // // // // // // could symbolize the tribes named for an extermination never carried out; they were “enslaved” instead as a continuing risk to Jewish fidelity. Beyond the equilateral triangle of predictable Platonic “lawfulness” (limited here to 91 elements in “triangular 13”), extension to the right in each row must be determined empirically.

The matrix presents YHWH as a “man of war” with longer “arms” than Pharaoh or Marduk (of eleven values from E-flat to C-sharp on the central axis instead of seven from F to C) and with more “ambidextrous fighters” (42 pairs of reciprocal twins here within the limit as against only 36 in the Marduk flood of 8,640,000,000)--and *within only NINE percent of Marduk’s limit* (inspired by a square root in its fifteenth row far too complicated to use). Thus the YHWH matrix can be read as a gigantic jest at the traditional enemy’s superior “military” power. The first 13 tones along the base need only 600,000 “Jewish brick-makers,” and the Magen David in the middle reduces the Chosen to eleven tones plus its “forgotten cornerstone” (a-flat as 512 meaning 8x8x8). We are viewing the superior power of a model that is “more of a unity” than Pharaoh’s and Marduk’s, and impregnable except “from within.” *This is the YHWH model I missed in my three earlier books.*

Here also is the Greek model for Apollo (“not many”) symbolized by the “E” at Delphi meaning “5” in Greek as exponent of 60 as “the big ONE.” This serves as Homer’s model for the tower at Troy whose defenders number “less than a tenth” of the marauding Greeks, penetrable only by the “Trojan horse.” But those stories must be told elsewhere. The Qur’an is concerned only with *meaning*, and suppresses nearly all mythology except a passing allusion to “Nineteen Guardians of the Fire.”<sup>10</sup> This holy fire is specifically anticipated in Isaiah and Ezekiel<sup>11</sup> but New Testament authors transform it into the Crucifixion of the Savior. Jesus describes himself as “forgotten cornerstone,” meaning the “small unit” (1) in the lower left corner of *any* matrix, and inherited from “a-flat” in the Magen David arithmetic developed in Figures 2, 6, and 9, and the heptatonic A-flat in Figures 1, 2, and 8. He “saves” the 13-tone symmetry of the system.

## Christian Transformation in the New Testament

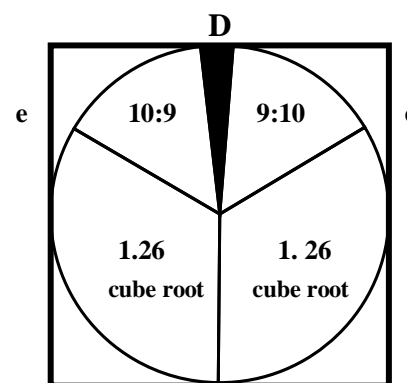
How “children of Abraham” become Christian requires a close study of YHWH’s “first explorer,” for the throne identified by “head” digits of 7776 in Figure 10 is anticipated by Abram’s initial value of  $3^5=243$ , now doubled five times (i.e., multiplied by five “virgins” as  $2 \times 2 \times 2 \times 2 = 32$ ). Marriage to half-sister Sarai ten years younger—and who remains childless until she is 90 and he is 100—means that this marriage is “fruitful” only at the ratio of 9:10 that identifies tones *e* and *c* as “small” Just wholetones either above or below the enthroned “D” displayed in Figures 6, 7, 8, and 10. But Abram’s birth as a triplet son of Terah at 70 together with his self-circumcision at 99 produce a square root of 2 approximation (presumably in his “soul”) of  $99/70 = 1.4142\dots$ , correct to one place in ten thousand, more precise than humans ever need for music and for most other purposes in life. Abraham, from birth, enjoys a factor of 7 that only God can use in the ratio 35:49::50:70 anticipated by father Terah. And because Abraham is indifferent to right and left, between Sarah at *c* or *e* and either 49 or 50 in the “Intelligent Design” of Figure 11, waiting there to be discovered lies a cube root of 2 of 1.26, correct through the fourth decimal place (1.2599... is more accurate). This 49:50 ratio of the Jubilee comma, now perfectly centered in the octave, presumably is the *fiery furnace in which souls are tested and metals fused* since Cain’s family was exiled to the East and Zeus threw Hephaetus out of heaven to become “metal workers” for both Jew and Greek. New Testament authors, however, convert these ancient fables into the new “crucifixion of the Savior between two robbers”; 49 and 50 are still wrong (“robbing truth”), and only Jesus as 888 meaning  $8 \times 8 \times 8 = 512$  in either Spiral Fifths heptatonicism (F C G D A E B) or Just chromaticism (Figure 9) lies between them within the *septimal* comma of “holy fire” as imagined by Ezekiel. For him these “instruments of Jewish warfare” feed the fires of Jerusalem for seven years (meaning  $7 \times 720$  days and nights = 5040, for us “factorial seven”).<sup>12</sup> Figure 11 displays the location of these ratios in the cycle, *naturally* fractured on the left, and reassembled ideally on the right to reconcile square and cube roots by a different disposition within the octave.<sup>13</sup>



49:50  
G# ~ a<sup>b</sup>  
g# ~ A<sup>b</sup>

Figure 11a.  
(existent)

“Intelligent design”



$\sqrt{2}$

Figure 11b.  
(imagined)

**God “Most Gracious, Most Merciful,” takes “the sins of the world “upon Himself.**

Perfection requires the destruction of Babylon and the silencing of “harpers and minstrels, of flute players and trumpeters” (Rev. 18:21-24) and a New Jerusalem. But after a thousand years “the dragon, that ancient serpent, who is the Devil and Satan ... must be loosed for a little while” (20:2-3). The distinction between “rational” and “real” numbers is a treasure that need not be feared.



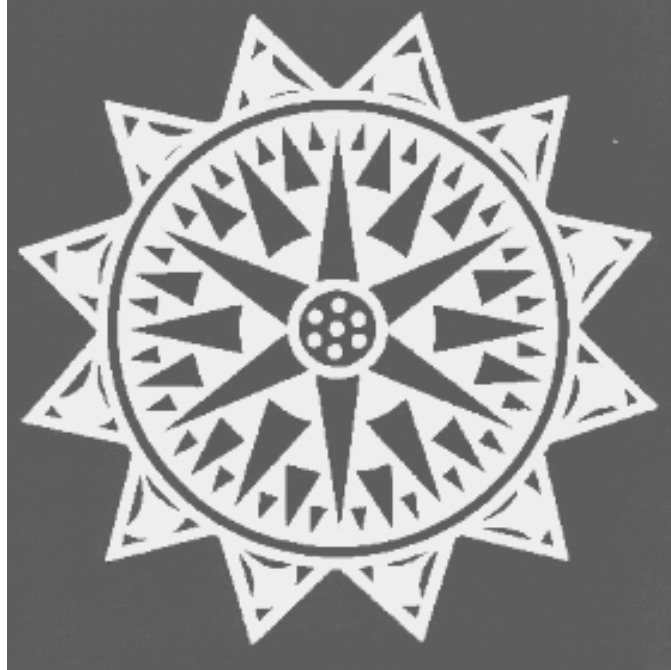
The Qur'an preserves a memory of Ezekiel's and Plato's earlier versions of this story in its allusions to "Nineteen guardians of the fire" (Sura 74:26-31). They are computed in Table 2 with Plato's arithmetic. For his new "magnet city" of *THE LAWS* Plato assumes "18 guardians from the parent city" of the *REPUBLIC*, meaning the 18 products of 2, 3, and 5 within the limit of 720 in Table 9, and he postulates 19 more "new arrivals" from factors of 7 as computed here in Table 2. The first 18 in column I must be multiplied by 7 in column II to permit further multiplication in integers by 7/5 or 7/10 in column III. (Both 675 and 625 eliminate themselves by inability to be halved.) Ten pairs of reciprocals are computed in columns III and IV by the formula: "the product of the means equals the product of the extremes," as in  $5040 \times 2520 = 1,260,000$ . This limit is "led" coincidentally by the cube root of 126 that surfaces in the Sumerian King List two millennia earlier as "the years of the reign of Gilgamesh" (or alternately his father). The Qur'an's allusions to Plato's nineteen presumably could be derived from his "ten-man wrestling teams" in columns III and IV when the first pair (3528 and 3600 = 49:50) are "fused in the fire" to leave only 19 (only Plato is known to have computed them) and thus "perfect" the circle of Figure 11b. But square and cube root formulas are likely to prove more ancient than Abraham.

	I	II	III	IV
1	720	5040	<b>3528</b>	<b>3600</b>
<b>2</b>	<b>675</b>	<b>4725</b>	<b>6615</b>	
3	648	4536		
4	640	4480	3136	4050
<b>5</b>	<b>625</b>	<b>4375</b>	<b>6125</b>	
6	600	4200	2940	4116
7	576	4032		
8	540	3780	2646	4800
9	512	3584		
10	500	3500	4900	2592
11	486	3402		
12	480	3360	4704	2700
13	450	3150	4410	2880
14	432	3024		
15	405	2835	3969	3200
16	400	2800	3920	3240
17	384	2688		
18	375	2625	3675	3456

### **The moving wheel of time.**

An appropriate image for the *moving wheel of time* displayed in Figures 4, 5, 7, 8, and 10 was photographed on the order of Seyyed Hossein Nasr in Sultaniyyah, the ruins of a Persian city built by a descendant of Genghis Khan c. 1300 AD, and displayed on the cover of his own *SUFI ESSAYS*, (1985). In the hexagonal array of six small circles surrounding a seventh in the middle of Figure 12 below is an early Sumerian glyph for "Seven" that has dominated harmonic theory since about 2000 BC when Marduk's heptatonic Babylon replaced an earlier pentatonic model. They are surrounded by six large and sharply-pointed triangles that function in modern musical imagination as precise Platonic "boundary markers" for six "equal tempered wholetones." Six smaller triangles interleaved between them locate twelve semitones in the octave cycle (never computed in ancient models except as "left-overs"). But another set of twelve still smaller triangles are interleaved to suggest 24 quarter-tones. And a last set of twenty-four smallest triangles can be imagined as 48 "commas" to the octave (the exact number being indeterminable and of no importance because the ear loses the ability to discriminate between them). But each of the twelve very large "toothed gears" that ominously surround the whole paradoxically contains what appears to be a lotus blossom, all turned the same direction except for one straddling the square root of 2 at six o'clock. It would be hard to find a more felicitous symbol for a God with not only a sense of perfect justice but also disposed to be both merciful and gracious to mankind. He never intends his own level of accuracy to be imposed on us. His wheel of time brings both blessings and curses, for all power is his, "there is no other." Without the Bible's rigorous examples of quantitative numerical science a Deity who creates the universe "by measure, number, and weight" could be mistaken as careless or ignorant rather than "Most Gracious, Most Merciful." Nasr's image, rescued from the desert, can help us understand why Judaism, Christianity, and Islam are three essential faces of monotheism. We need each other to "be" ourselves. Nasr reports that today nineteen gates open onto the Ka'ba in Mecca.

Figure 12.



### Conclusion

It seems doubtful that anyone ever understood the *meaning* of the Bible any better than the allegedly illiterate Prophet of Islam who counted himself as no more than a “Warner.” I can think of no more gracious ending to my own efforts to understand the Qur’an than to cite here Nasr’s poem, “Welcome Adam.” Whatever he may have had in mind as a Persian exile, he offers a startling clue to the very foundations of Bible numerology.<sup>14</sup>

### Welcome Adam

Welcome Adam, God’s fairest creature,  
Purity personified, yet thrown into a world  
Where darkness with light does mix.  
The angels do hover over thee,  
Thy sleep is a return to the celestial abode  
Where thou didst wander before thy descent below.  
May thou rememberest not only the names taught thee  
But His Name Who also alone abides and always is.  
Welcome O Adam generated here below,  
By the sun which is the sun of faith  
And generosity pervading all thy life.  
Welcome O Adam as the remembering Adam,  
Here to heal the wounds of mother nature  
Created by a humanity blind to its Edenic birth.  
May thou remain here below on earth,  
The Adam who saw the Face of the Beautiful  
Reflected upon the mirrors of paradise.

The Bible's Adam notates 1.4.40 in Hebrew but the digits also can be read simply as 1440 defining a *double octave* of the calendrical 720 in Figure 6 (meaning two years of 720 "days plus nights"). And the digits sum to 45 as the *reduced expression* of Jewish calendar values (1440-720-360-180-90-45). All doubles coincide in *pitch class*, so that we can read the result *abstracted* as "mantles of radiance" in Figures 6 through 10.) This limit of 1440 is Adam's own 45 doubled five times (i.e., by  $2 \times 2 \times 2 \times 2 \times 2$ ) as the high priest's "32 virgins." But how this Biblical Adam "is thrown into a world where darkness with light does mix" merits numerical attention.

The twelve tones symbolizing Arab princes are assumed "cut off" from a thirteenth at 531,441 by Abram's age of 86 in fathering Ishmael, read here exponentially as  $8 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6 = 262,144$ , whose "head" digits of 26 are the sum of YHWH's 10.5.6.5, and whose "tail" of 144 "seals" the self-symmetric pentatonic octave on "D" in Table 1. This limits the necessary twelfth tone to  $3^{11} = 177,147$  where the "tail" of 147 becomes the lifetime of Jacob in fathering 12 sons. (Benjamin is twelfth and last at 135 in Figures 6 and 9.). I am inclined to read the "leading" 177 as "first born Cain," sent to the East to generate musicians and metal workers in the seventh generation, protected by God's promise of "seventy-sevenfold vengeance" on anyone who kills this first "murderer."<sup>15</sup> The thirteenth tone lies just a comma beyond  $2^{19} = 524,288$ , teasing us with 19 as exponent, and the "tail" of 288 grounds Bible musicology in its pentatonic origins as "leaders" of the temple's music. Whenever we find an interesting musical meaning in a Bible number we can expect to find another somewhere else. In Isaiah's powerful metaphors these purely coincidental "heads and tails" may contrast "the prophet who teaches lies is the tail" as opposed to "the elder and honored man as the head").<sup>16</sup> Authors mock *every human conceit*, and the depth of their irony remains elusive.

Any new birth is a new "1" (male/female, like the original Adam and Eve) and becomes *center of its own new universe*. The "tail" of the 13<sup>th</sup> tone in spiral fifths (53-1441) must drop its last and most insignificant unit to produce Adam as both 1440 and 45, and this "least of all" symbolic people is quite sufficient from which to generate anew. The "head" digits of 53 correlate with 53 commas in the octave. We are watching God make good his promise to make the least of the faithful "the head and not the tail."<sup>17</sup> ("Fivers" are Plato's *second caste citizens*, and products of "7" rank even lower.) Our poet's "remembering Adam" who "alone abides and always is" agrees with Plato's idea of intuitive knowledge as "remembrance." The "One Itself" must be conceived as *a union of opposites* that "heals the wounds of mother nature" for a "humanity blind to its Edenic birth" for whatever *intuition* discovers seemed appropriate to attribute to prior experience. In the playful "mathology" of the Bible the "forgotten cornerstone" is the "beginning, middle and end" that He claims to be—with no offense intended to anyone's notion of *Oneness*. But the Qur'an is clearly Islam's link to a far more distant past than Plato and Christianity, and that we are only now beginning to understand from the cuneiform record.

The assumption that all cycles are meant to be *twelve*--probably encouraged by study of the sun and moon--means that "equal temperament *mantles of radiance*" always were a convenient visible model for numerical approximation, always in tension with the "perfect harmony" of *smallest integers*. The Bible's arithmetical puns and jests and ironic cultural insults flow naturally from this "self-healing" model itself with piety never in doubt. But symbolic meaning lies partly in the observer, and remains more provocative than certain. All that music can do for Islam, Judaism, and Christianity is demonstrate how they flow from a common source.

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<sup>1</sup> Stephanie Dalley, p. 119, *MYTHS FROM MESOPOTAMIA* (1989), Chapter 11 of Gilgamesh Epic..

<sup>2</sup> Isaiah 19:18 refers to "five cities in the land of Egypt which speak the language of Canaan," and it is easy to image that this self-symmetric D mode defined by 144:72 is called "The City of the Sun."

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<sup>3</sup> Genesis 21:8-21. "I will make a nation of the son of the slave woman also, because he is your offspring" verse 13). This most prestigious ancient tuning is *not* YHWH's first choice."

<sup>4</sup> Isaiah 40:22, and with several other allusions. All translations are from the Revised Standard Version of 1952.

<sup>5</sup> Numbers 23:9

<sup>6</sup> Genesis 17.

<sup>7</sup> Genesis 27.

<sup>8</sup> Genesis 17:20.

<sup>9</sup> Genesis 2:4, where LORD appears in small capitals.

<sup>10</sup> Sura 74:26-31.

<sup>11</sup> Isaiah employs the metaphor of a "holy fire" some three dozen times, but Ezekiel (39:9) predicts that the cities of Israel will burn the instruments of warfare "for seven years." Only Plato is known to have analyzed  $7 \times 720 = 5,040$  (Jewish "days plus nights") to discover the Nineteen Guardians. I assume that the Qur'an holds fast to the Old Testament preference for "fire" as opposed to the New Testament "crucifixion" that the Prophet denies (Sura 4:157-158).

<sup>12</sup> Ezekiel 39:9.

<sup>13</sup> The very slight excess in cube roots of 1.26 now is offset by a slight defect in the union of  $10/9 \times 50/49 \times 10/9 = 5000/3969 = 1.2597\dots$  as a vision for the future.

<sup>14</sup> Professor Nasr is University Professor of Islamic Studies at George Washington University in Washington D.C. This was composed in 1989 and published in *POEMS OF THE WAY*, The Foundation for Traditional Studies, 1999.

<sup>15</sup> Isaiah 4:24.

<sup>16</sup> Isaiah 9:18.

<sup>17</sup> Deuteronomy 28:13.