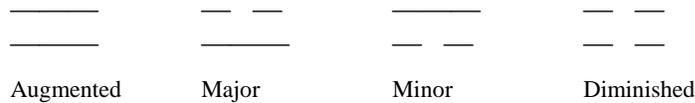
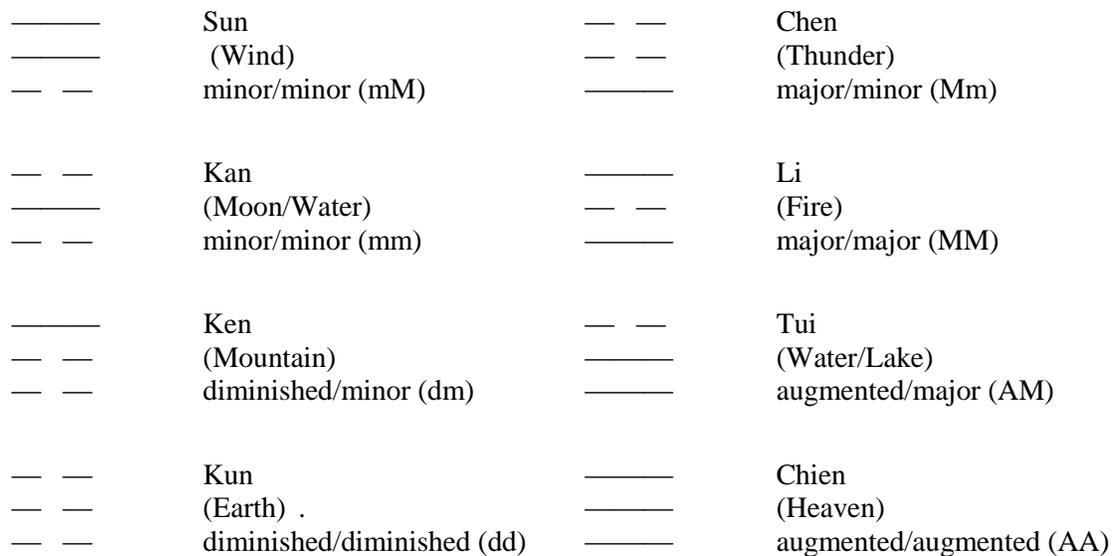


DNA, I CHING, AND CHAOS

As I contemplated the primal poles of yang (——) and yin (— —) it seemed logical to assume the interval of a major third to be the male principle, yang, and the interval of a minor third to be the female principle, yin, because it is always the third which determines the “sex” of the triad. Now things began to make sense: the two “I” are the major third and the minor third. From these two intervals are produced the four triad types, the four Hsiang:



These same two lines placed successively over the Hsiang produced the eight types of seventh chords, the eight Kua:



The trigrams, the order which Fu Hsi gave, corresponds to the binary code, with the top broken line read as “1,” the middle, “2,” and the bottom as “4.” Thus read in the following order, the code shows the minors on the left, the majors on the right, these two sides adding to 7: 3 + 4, 5 + 2, 6 + 1, and 7 + 0. The arrangement is based upon the pairing of opposites (AA opposes dd; Mm opposes mM, and so on). The numbers, which ascend in order from 0 (Chien) to 7 (Kun), total to 28.

mM	Sun	4		Chen	3	Mm
mm	Kan	5		Li	2	MM
dm	Ken	6		Tui	1	AM
dd	Kun	7		Chien	0	AA

According to Chinese history, in the mists of time Fu Hsi created the trigrams. Millennia passed. A great flood covered the earth, and was brought under control by Yu. As a reward, he was made emperor of the first ruling

house, the Shang dynasty. A thousand years later, war and revolution brought down the house of Shang. The new mandate passed to the house of Zhou, and its emperor King Wen, who changed the order of the trigrams. This changed order of the trigrams, attributed to King Wen, is shown below:

— — — — — —	Kun (Earth) diminished/diminished (dd)	———— ———— ————	Chien (Heaven) augmented/augmented (AA)
———— ———— — —	Sun (Wind) minor/minor (mM)	— — — — ————	Chen (Thunder) major/minor (Mm)
———— — — ————	Li (Fire) major/major (MM)	— — ———— — —	Kan (Moon/Water) minor/minor (mm)
— — ———— ————	Tui (Water/Lake) augmented/major (AM)	———— — — — —	Ken (Mountain) diminished/minor (dm)

The King Wen trigrams no longer depict minors solely on the left, the majors solely on the right (as did the old Fu Hsi arrangement), nor do the numbers remain in ascending linear order. However, as before, the complementary chords add to 7, and the four pairs of 7's total to 28.

dd	Kun	7	Chien	0	AA
mM	Sun	4	Chen	3	Mm
MM	Li	2	Kan	5	mm
AM	Tui	1	Ken	6	dm

By altering the relationship, King Wen was able to blend the trigrams together. He stacked two trigrams, one on top of the other and from this “forming twos” created the sixty-four hexagram structure of the *I Ching*, which, literally translated, means “Canon of Change.”<sup>1</sup> Hexagrams in hand, I followed suit with the musical intervals. Whereas before, the trigrams defined only triadic constructions, the merging together of two trigrams created a lambdoma arrangement whose structural form made possible the creation of seven-note “scales.” Scales are composed of intervals of seconds, and seconds are the way we tell time. The scale at hexagram 0 contains the most sharps. The scale at hexagram 63 contains the most flats. The scale with no sharps or flats is at hexagram 22. (Solid lines are read as 0; the top broken line is 1, second line 2, third line 4, fourth line 8, fifth line 16, and sixth line 32. [See diagram #1: “The 64 Scales”].

<sup>1</sup> The words “forming twos” are now seen to refer to a Movement of the same name, brought by Mr. Gurdjieff. Who in the Work today (even and perhaps especially the Movement teachers themselves) is aware of the underlying meaning—or cares?

For those who say that ideas are “dry,” let me say unequivocally that they are not. Vividly I remember very wet tears streaming down my face as I penned these words to Forman: “My knowledge of the I Ching is rudimentary, but in the fog of my non-comprehension I discern the seeds of the new science which have lain fallow for millennia. My great excitement comes from knowing I am seeing something really new which is really very old. At the risk of sounding pompous and pretentious, I want to quote a paragraph from an old book, *The Source of Measures*, because I feel it so strongly:”

The ancient knowledge will again abound, and overflow, as water, upon the earth. The remains of this knowledge are everywhere about us, in every-day use, and perfect. Its revival will point to the restoration of the period prior to the confusion of lip. The prophet saw a valley filled with a confusion of dry bones; but the bones were perfect and all there: so with us are the vestiges of this knowledge. At the word, bone came to its bone; the perfect framework of the man. “And he said, son of man, can these bones live? . . . and behold a shaking, and the bones came together, bone to his bone: . . . Then, thus saith the Lord God: come from the four winds, O breath, and breathe upon these slain, that they may live.” This is coming to pass. Then shall the people know.

Even now, the words continue to vibrate their message over Time, causing that welling up of wetness that still electrifies my feelings. Even now, there is a tremendous urgency to help put the bones of this ancient knowledge back together. Somehow the fate of the planet depends upon a higher knowledge which will put to rest the confusion and alarms of the present age.

When all notes within the 64 seven-note scales were tallied, the following order appeared:

C								1
Eb	E							2
Gb	G	G#						3
Bbb	Bb	B	B#					4
Dbb	Db	D	D#	Dx				5
Fbb	Fb	F	F#	Fx	Fx#			6
Abbb	Abb	Ab	A	A#	Ax	Ax#		7
								28 notes

I began to wonder: are these 28 notes which arrange themselves into seven groupings the “seven gravity center sounds” that Gurdjieff mentions? Things became even more interesting when I noticed that the binary code hexagrams, when arranged in a certain order, produce seven sets with the same numbers of hexagrams within each set as the above sets of notes. Beginning with all solid lines, the broken lines began to move, like *static*, through the solid lines, at first singly, then in pairs, threes, fours, fives, and then became all broken lines. I was sure this “static” had to do with the new theories of Chaos. I recalled James Gleick’s book, *Chaos*, in which he spoke of

regions of chaos in a bifurcation diagram. “First the bifurcations produce periods of 2, 4, 8, 16. . . . Then chaos begins, with no regular periods. But then, as the system is driven harder, windows appear with odd periods. A stable period 3 appears and then the period-doubling begins again: 6, 12, 24, and so on.” [See diagram #2: The 22 Hexagrams and Chaos Theory]]

Seeing how the groups of notes naturally clumped into sets of numbers had a startling effect on me, an ardent pupil of Gurdjieff’s ideas. Immediately I recognized in them the expression of the two separate parts of the enneagram figure. One set contained the “inner circulation” numbers, familiar as the “canon” (1 4 2 8 5 7); the other set was composed of the lower triangle points, (3 and 6). Standing alone, at the bottom of the chart, was the number 9, the number found at the apex of the enneagram, the letter C. Also of interest was the group containing the most notes, the group composed of A’s. For a pianist, the two letters, C and A, are the boundary values of the piano keyboard: C is the highest note, A is the lowest. Coming in between are the seven octaves of notes.

Something else was startling. There were a total of exactly 22 hexagrams. The deletion of the C and the A reduced that number to 20. The numbers immediately called to mind the number of amino acids in the genetic code. For some, the fact that these hexagrams shared numbers with the DNA might appear as mere coincidence. To my way of thinking, the analogies were seen as the numerical manifestations revealing the underlying phenomenal structure of the universe. If nothing else, the musical chart revealed, in the simplest possible way, exactly how the 64 codons of the genetic code *were reduced* into the 20 amino acids, a question that had long puzzled biochemists.

That puzzling question arose because the 20 (or 21 or 22) naturally occurring amino acids had four bases; and scientists recognized that combining two bases ( $4 \times 4$ ) gave 16 codons, not enough. Three bases ( $4 \times 4 \times 4$ ) produced 64 codons, too many. Today, those same scientists hold that there are many “redundancies,” or that there are “degeneracies” in the triplet codons, or that some amino acids may be coded by more than one codon. Therefore, they are able to convince themselves that they know why there are 64 codons, but only 22 amino acids with four bases. Their justifications cannot come close to the absolutely objective, musical, reason. In fact, the DNA code *is* a musical code, just like every other universal code. To comprehend it requires musical knowledge. [See diagram #3: I Ching and DNA Codons].

As I wrote to Mr. Forman that February long ago:

Each hexagram contains three out of a possible four pairs of letters/lines corresponding to the four triad types in music: major, minor, augmented, or diminished. Two triads are “male” and correspond to the purine bases in chemistry. Two triads are “female” and are related to the pyrimidine bases. I believe that the two unstable pairs are adenine and thymine (which becomes uracil) and the two stable pairs are cytosine and guanine. (A – T has just two pairs of hydrogen bonds. The C – G pair has three forces

linking it together. In biochemistry books, it is said that the higher the content of the C O G pair in the DNA, the more stable the structure and the more thermal energy is required to disrupt it).

Musically unstable triads are, of course, the augmented and diminished. The two stable triads are the major and minor.

<u>Augmented</u>	<u>Diminished</u>	<u>Major</u>	<u>Minor</u>
_____	— —	— —	_____
_____	— —	_____	— —
Adenine	thymine	cytosine	guanine
Male	female	male	female
	Unstable		stable

In biochemical language, a musical twelfth is 1½ storeys. There are four codons in 1½ storeys, eight codons in 3 storeys, and thirty-two codons in 12 storeys (or Gurdjieff’s three octaves of radiations). For there to be 32 codons along the plus strand, there must also be the complementary 32 anticodons along the minus strand. The 64 codons work as a computer with 64 switching functions or 4096 possibilities.

In Gurdjieff’s Table of Hydrogens, beginning with H12 as we are instructed, and counting each carbon, oxygen, and nitrogen as one codon, it can be seen that there are 32 codons in the Third Scale of 11 Hydrogens. When the 32 codons along the plus strand are doubled to form the 32 complementary anticodons, we see 64 codons of carbon, oxygen, and nitrogen in 22 Hydrogens—the number of amino acids essential for man. Twelve twelfths produce all the 20 (21, 22) notes, the Universe,” in the three octaves of radiation:

(Fb)	Cb	Gb	Db	Ab	Eb	Bb	
F	C	G	D	A	E	B	
F#	C#	G#	D#	A#	E#	B#	(Fx)

Omitting the Fb and Fx, there are a total of 20 octaves of C’s in twelve twelfths. And there are 20 semitones in each interval of a twelfth. Twelve twelfths each with 20 semitones equals 2880 semitones in three octaves of radiation. Evidently the Mayans knew about the two numbers, 20 and 28800, for they set them on their Wheel of Time. As scholars report, the Mayans (a people by all accounts obsessed with Time) counted all things in units of 20 (building from ones to twenties to four hundreds to eight thousands, and so on—i.e., by powers of 2 multiplied by 10. The Mayan long count of time began with the *tun*, the year reckoned as  $18 \times 20 = 360$  days. The next highest unit was the *katun*,  $18 \times 20 \times 20 = 7200$ ; the next, the *baktun*  $18 \times 20 \times 20 \times 20 = 144,000$ , and then  $18 \times 20 \times 20 \times 20 \times 20 = 2,880,000$ . In the Mayan Wheel, the inner circle of One produces the numbers 8 (notes in a perfect fifth), 13 (notes in a perfect octave), and 20 (notes in a twelfth, the combined octave plus fifth). [See Drawing The Mayan Wheel of Time