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RESEARCH ARTICLE

Numerical 11-Factor in Half the Genetic Code – A Search for an Explanation in Number Series

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ABSTRACT

Half of 20 + 4 (double-coded) amino acids in the genetic code structure showed[1] an astonishing regularity in a 2D-table, including the 11-factor. The regularities have been dismissed by professionals, saying that no known physical-chemical laws can explain them.

Here a search for possible explanations or aspects is carried through by investigating the numeral series, as dimensions, of x = integers 5 → 0 with different exponents, treated in earlier papers: x^3, $2x^2$ behind the Periodic system, $x^{2/3} \times 10^2$ (the "ES"-series) and further the basic series with its superposed series (as coding for underlying steps) with features like quantum mechanics. The regularities are reproduced in first section.

It's shown how the paired amino acid side chains that give the 11-factor in the 2D-table are derivable in different ways through counter-directed reading of numbers in the different series (2-digit numbers that always give sums with factor 11). Introduced is the concept of step-numbers, related to numeral series, implying a vector character, with this also anti-vectors, a physical and biological reality, expressed e.g. as intervals. A main interval in the ES-series as a whole is the number 77, specially studied, the most obvious organizing principle in the 2D-table.

The fact that also sums of mirrored 2-*letter* codons code for amino acid groups with the 11-factor points to a deeper level of double-direction acting on both levels, here suggested as inherited from the higher dimension 4D.

Regarding the coding base pairs G-C and A-U as two coordinate axes, the regularities show up in amino acids with 2-letter codons that join these axes, called Mx-coded ones, the other half of the genetic code not. It seems connected with the two axes of the 2D-table and strengthens the hypothetical dimensional processes from higher to lower D-degree.

Finally, factor 9 as difference of numbers read bidirectionally are circa the inversion of 11, inversion existing in physical laws. An eventual relation to centriole structure with factor 9 (×2 or ×3) of microtubules are shortly studied.

This paper should be taken as material, inviting other researchers in applied physics and biochemistry to go on with the questions.

Keywords: genetic code structure, 11-factor, numeral series, arithmetical analysis, step-numbers, 2-way direction

Introduction

In an earlier article on the genetic code[1] an astonishing regularity was found in half the code with what was called mixed (Mx) codons: one of the first two bases from the G-C-pair, one from the A-U-pair. See table 1 below

The relevance of such an arithmetic regularity has been denied by some professionals with the argument that there are no chemical or physical laws that can explain this arrangement of the coded amino acids (aa). (The same could be said for instance about what biologists call a drive to survive as inherent in living organisms.)

I think the most scientific answer to such an opposition is a) that the facts are there (under given conditions), and b) that, thus, something remains to be discovered in those biochemical and physical "laws".

Many authors have studied the genetic code with arithmetical approaches, some of them[2-5] referred to in my earlier paper[6] in this journal. Another two articles[7,8] by Rakočević might be added. All or most of them and of others in this field have probably met the same opposition and problem to unite number regularities with hitherto known (or accepted) physical-biochemical "laws". This study does not pretend to have "solved" the problem but could hopefully add useful aspects.

Self-organization?

One concept used on higher levels of complexity is "*self- organization*". Unicellular bacteria for instance have been found to communicate with one another, arranging structures (as "films"), interpreted as out of *need* for collective defense against anti-bacteria and other attacks. They also exchange genetic material. Homo sapiens form groups, maintaining their connection through rituals, dancing patterns etcetera.

Such cooperation seems already prepared for on the molecular level with moving units, trends to polarize in charge as dipoles, and on the atomic level in the concept of valences (given numbers) - a "need" for atoms to obey the "law" of the "octet rule". (All structure-building atoms in the genetic code are of the not self-sufficient type.)

Yet, it's hitherto hard to find a "need" for side chains (R) of amino acids (aa) to adapt to what seems to be pure mathematical, geometrical regularities, this without further assumptions.

Numerical regularities?

The problem in accepting such *numerical* regularities as in the 2D-table 1 below as relevant seems to be - ? - precisely the numerical view? Mass here taken as the *number of nucleons (u) in side-chains (R) for most common isotopes*. This already implies a half-step down into the realm of numbers. (The property "mass" was accepted as a field with "Higgs" boson. Yet, it couldn't explain how individual particles got their masses defined.)

There *do* exist examples of elementary numeral formulas in physics - chemistry besides valences and the octet rule, e.g. the factors in Rydberg's formula for orbital levels of hydrogen. Also the orbital numbers s-p-d-f-g in the periodic system (illustrated in intervals of the $2x^2$-series. Further, such a thing as telomeres at end of chromosomes, seeming to decide possible number of cell divisions. Also frequencies are defined in numbers (lambda/time unit) on the level of EM-fields.

In a more generalized view numbers as such originate from divisions, have their roots in polarizations.
Quantum entanglement between polarized *complementary* units or quanta is an equally timeless relation as the concept *dimension*, immaterial as mathematics.

In the background model (*https://www.u5d.net*) to this research a dimension was defined as the relation between complementary "poles" or structures, lower degrees developed from next higher degree through polarizations: 5D → 4D → 3D etc. and in synthesizing direction the reverse.

Could such processes of dimensional steps constitute an underlying *level* behind the physical-chemical ones as earlier suggested by the author?

Codons <—> aa relations:

In Table 1 below the close relation between codons (1st and 2nd bases) and the aa groups are obvious, contradicting the hypothesis of a random distribution of codons.

A natural question is if codons might influence the grouping of aa or aa the choice of codons, i.e. direction of influence, if any?

Some close relations codons <—> aa have in earlier paper[1] been commented on: First, it's mostly aa that contribute to the synthesis of codons. Second, the parent numbers of the bases and their distribution on the ES-series (section 3) gives aa-sums for pyrimidine- and purine-coded aa. Third, that transformations of codon base mass numbers from number-base system (nb-x) 10 to 8 gives aa-groups (–/+1), a “TR”-relation.

Counting conditions here:

- 24 aa, including Ile AUA as the forth double-coded aa besides AU-U/C, only differing in 3^{rd} base *type*, (The other three = Arg, Ser and Leu.)
- Deviations in isotopes dismissed. (All atoms here Z–H = N.
- The basic aa, 2 Arg and Lys taken as *charged*, as in reference[9].

Ways of writing:

- Numbers in actual series is often shortened 5’, 4’, 3’ etc.
- Inversions signed /\.

Content:

Section 1: The found regularities and similarity with fusion in the sun. Section 2: Codon-guided factor 11? Sections 3: Correlations with whole x^3-series? Section 4: Some general considerations. Section 5-6: Correlations with $2x^2$- and the $x^{2/3}$-series? Section 7: Number 77. Section 8: Step-numbers in basic (BS) and superposed SP) series. Section 9: How about a relation to centrioles? Section 10: Two extras. Conclusions and some associations.

1. Regularities in the Mx-coded amino acids

In the astonishing regular “2D-table” 1 below on 12 amino acids (aa) side-chains (R) with mixed (Mx) codons (one of first 2 bases from the G-C-pair, the other from the A-U-pair) the 11-factor appeared in the rows and –/+1 in columns[1].

[The table is nearly a “3D-table” when including the N—Z-division: N = G1+A1-columns 352, –1, Z = C1+U1-columns 418, +1.]

Table 1. *The Mx-table on aa coded by mixed codons* [1]

GA	Glu	CA	His	UG	Trp	AG	Arg	→ 385
GA	Asp	CA	Gln	UG	Cys	AG	Ser2	→ 209
GU	Val	CU	Leu	UC	Ser1	AC	Thr	→ 176
175		210		208		177		
385				385				770

Figure from reference [1], *licence cc-by-nc-nd*

1.1.The most elementary scheme from the cubes 27 and 8:

It’s the cubes on 3 and 2, which appears in the middle steps 3’ and 2’* in the x^3-series (x = integers 5 → 0) = 27 and 8. However, the right way to think seems to be *27 +/–8*, which directly gives numbers 35 - 19 with interval 2 times 8, figure 1 It appears as the most middle of a “middle” that one can imagine!

* (3’, 2’ is here often used as an abridged way of referring to numbers in the actual series with different exponents.)

Fig.1. *Elementary numbers behind factor 11 in table 1.*

35 x 11 = **385**

/ ↑ \ ↑

27 +/- 8 |- 16 x 11 = **176, 2 x 88**

↓ ↓

19 x 11 = **209**

1.2. About "degenerated" codons:

In the Mx-table it's obvious and should perhaps be underlined that the division between rows 1+2 versus row 3 is what here is called aa with 3B-codons (with differentiated 3rd base) versus 2B-codons (with indifferent 3rd base):

3B = 11 × 54
2B = 11 × 16…Quotient 27/8, 3^3/ 2^3.

It indicates sooner a serial, numeral interpretation of this so called "degeneration".

3B-coded aa, 54 × 11:
GA = 132, CA =154 –1, UG = 176 +1, AG = 132.

1.3. The operation +/– 1 on cubes 27 and 8:

It's possible also to think of the division in figure 1 as all numbers, including 27 and 8, with the operation +/– 1, figure 2 below.

A suggestion from earlier papers is that such –/+1 operations represent a branching of one dimension to another, as an 1/x-curve, passing through +/–1 asymptotically join two coordinate axes.

Fig.2. *The numbers in figure 1 with operator +/–1.*

11-factor
27 +/-1 = ↑ 28, x 11 = **308**. → +1 = 309 (U1+A1, rows 1+2)
+/–1 > **594**
↓ 26, x 11 = **286**, → –1 = 285 (G1+C1, rows 1+2)

8 –/+ 1 = ↑ 7, x 11 = **77**. → –1 = 76 (U1+A1, row 3)
–/+1 > **176**
↓ 9, x 11 = **99**, → +1 = 100 (G1+C1, row 3)

1.4. Number 77 as an essential factor in the Mx-table[1]:

Number 385 = 5 × 77, divided in quotient 3/2 - 2/3, shown in table 2.

Table 2. *Factor 77, row 1 and rows 2+3.*

2 x 77 = 154		**3 x 77 = 231**		**→ 385**
3 x 77 = 231		**2 x 77 = 154**		**→ 385**
G1	**C1**	**U1**	**A1**	

More about factor 77 in section 7 below.

1.5. One single chemical aspect:

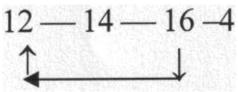
Dividing the aa in molecular groups according the atom types gives following pattern, with Gln included in the NHx-group, 2 times 385 +/–1:

CHx = 100 = GU+CU
CO/SHx= 286 = GA+UC+AC+AGY+UGY
Sum = *386*
CNHx = *384* = AGR+UGG+CA

1.6. Fusion C→N→O in the sun, a similarity:

After first elementary fusions in the sun the following repeated steps from carbon (3 alpha), to oxygen, 4 alpha, (a 3 → 4 step) is supposed to occur in the sun: ^{12}C get fused with 2 H to nitrogen ^{14}N, then another + 2 H to oxygen ^{16}O. There a helium atom, 1 alpha, gets released and the process returns to ^{12}C for a new cycle, figure 3. Thus, on the atomic level:

Fig.3. *Fusion of alpha (He) in the sun*



The divisions of columns in 3 + 1 in the Mx-table in rows 1+2 = sum 594, we had 11 times these atomic numbers as if it followed a similar process:

132 (GA) → 154 **–**1 (CA) → 176 +1 (UG)
← "back to" 132 (AG).

Sums of 3 columns G1+C1+U1:

Row 1: 286 **–**2
Row 2: 176 +2
<u>Row 3: 132 **–**1…Sum 594 **–**1</u>
Column 4 (A1):= 176 +1

It might be noted that AG are extra codons for the aa Arg and Ser. And AC, Thr, in this 4th column derives from homoserine, as earlier has been assumed for Serine's AG-codon.

[A different view on the three C-N-O-numbers, here with multiplications, an operator giving more of a volume:

12 → 14 → 16

12 × 14 = 168 ≈ sum of all ^{14}N in 24 aa R, valence 3.
<u>14 × 16 = 224, sum of all ^{16}O+^{32}S in 24 aa R, valence 2.</u>
Back: 16 × 12 = 192,
→ × 5 = sum of all ^{12}C-atoms, valence 4.]

2. Codon-guided 11-factor?

2.1. Factor 11 in aa sums with 2-letter Mx-codons:

Central to observe is that the factor 11 in the Mx- table here appeared[1] in all sums of aa with bidirectionally read 2-letter codons:

GA + AG = 132 +132 = **264** = 11 × 24
CA + AC = 153 + 45 = **198** = 11 × 18
Sum 42 × 11 = **462** = 6 × 77
GU + UG = 43 + 177 = **220** = 11 × 20
CU + UC = 57 + 31 = **88** = 11 × 8
Sum 28 × 11 = **308** = 4 × 77

Here the quotient 3/2 appear again into 42 — 28 times 11.

About these numbers 462 and 308, cf. divisions of aa from Glycolysis and Citrate cycle[1], see further section 7.3.2 below.

(The 11-factor here is hardly a sure support for the hypothesis of an early two-letter code.)

2.2. Codons as from opposite strands of DNA/RNA

With another pairing and layout, the 2-letter codons become complementary as from opposite strands of RNA, figure 4, giving the sums 209 and 176 times 2:

Fig. 4. *Polarities of codons as from opposite strands*

176+1		44–1			132		132		
→		→			→		→		
U G	→←	G U	= 220		G A	→←	A G	= 264	
| |		| |			| |		| |		
A C	→←	C A	= 198		C U	→←	U C	= 88	
←		←			←		←		
154-1		44+1			33–2		55+2		
	↓					↓			
	418					352			
	2 × <u>209</u>					2 × <u>176</u>			
	Row 2					Row 3			

Here there are three *polarizations*:
- the "reading direction" between 2-letter-codon pairs horizontally,
- the opposition of complementarities vertically, and
- the reading of the two strands in opposite directions.

How to interpret this relation codons — aa-groups with the 11-factor? Could it perhaps reveal some guiding principle behind the connection of nucleotides and aa sums in R. This central question remains to answer.

2.3. General about codons:

This research count on the 20 "classical" aa + 4 of them with 2 codons, thus 24 aa, They get grouped in 4 types, each with 6 aa: 4 are 3B-codons, 2 are 2B-codons in each type; here called:

Mx: Form codons: GA, AG, CU, UC = 352
Cross codons: GU, UG, CA, AC = 418…770
Nmx*: RNA codons: GC, CG, UA, AU = 412
Pair codons: GG, CC, AA, UU = 322…734
The 11-factor only in the 12-group Mx.
*Nmx = non-mixed codons.

3. Correlations with the whole x^3-series?

With 27 and 8 as fundamental numbers behind the Mx-table (figure 1 above) and the middle in the x^3-series, it's natural to ask if the whole series eventually is involved in some way.

3.1. Steps and intervals times 11:

Here, in figure 5, the same operation as in figure 1, sums and differences and their interval is applied to each step in the x^3-series:

Fig. 5. *Cubes of the basic series of integers 5 → 0, the x^3-series:*

189 91 35 9 1 → sums
/ \ / \ / \ / \ / \
125 –↓– 64 –↓– 27 –↓– 8 –↓– 1 –↓– 0
61 37 19 7 1 → intervals

<u>Step 5 → 4:</u>	<u>Step 4 → 3:</u>	<u>Step 3 → 2:</u>	Step 2 → 1:	<u>Step 1 → 0:</u>
189, x 11 = 2079	91 x 11 = 1001	35 x 11 = 385	9 x 11 = 99	1 x 11 = 11
|- **128**, x 11 = **1408**	|- **54** x 11 = **594**	|- **16** x 11 = **176**	|- **2** x 11 = **22**	|- **0**
61, x 11 = 671 ↑	37 x 11 = 407	19 x 11 = 209	7 x 11 = 77	1 x 11 = 11

The differences between sums and intervals in steps 4⟶ 3 ⟶ 2 times 11 give the sum of rows 1 + 2 and row 3 in the Mx-table, 594 and 176 = 770.

- Factor *77* appears already in first 3 sums: 2079 = 27 × 77, 1001 = 13 × 77, 385 = 5 × 77.
- 1408 = 4 × 352 (352 the sum of G1+A1 in the Mx-table). Minus 22 (as debranched degrees from steps 5⟶4⟶ 3) = 1386 = 6 times *231*; minus (594 + 176) = 616 = 4 × 154.
- In steps 3 ⟶2 ⟶ 1 a cross-adding of sums and intervals gives:
  385 + 77 = 462, 2 × 231, 6 × 77
  209 + 99 = 308, 2 × 154, 4 × 77

(- Sums in steps 4⟶ 0 = 1496, equal to the sum of 10 molecule stations in the citrate cycle; 770 – 22 = 748, equivalent to (~) C6-molecules in this circle.)

3.2 The x³-series times 6:

= 750 - <u>384</u> - <u>162 - 48</u> - 6 - 0
384 210 ⟶ Sum 594

Those numbers equal those in rows 1 and 2 in the Mx-table 1 above –/+1: 385 -1 and 209 +1.

3.3. Middle numbers 27 + 8 = 35 divided 3/2:

If taking factor 11 as a sum divided in 5 and 6 and number 35 (27 + 8) divided in quotient 3/2* (21 — 14) it gives:

5 × 21 = 105 + 6 × 21 = 126 ⟶ Sum <u>231, 3 × 77</u>.
5 × 14 = <u>70</u> + 6 × 14 = <u>84</u> ⟶ Sum <u>154, 2 × 77</u>
175 210

*Cf. the close to (~) 3/2-division dominating in the weight series of aa.[10]

It's vertically the Mx-division of 385 in 176 — 209, –/+1. (175 and 210 the division on columns G1 and C1). Horizontally it gives the division in table 2 on 3 and 2 × 77. (Vertically we get the same sums 175 and 210 when dividing 35 in quotient 4/3, 20 and 15.)

3.4. Mirrored numbers?

The *intervals* in the x³-series, adding their mirrored numbers happens to give the total sum 385; this sum, times 2, gets divided as in row 1+2 versus row 3 in the Mx-table at 2' (= 8), figure 6:

Fig. 6. "*Step-numbers" in x³ read bidirectionally?*

x³: 125 —|— 64 —|— 27 —|— 8 —|— 1 —|— 0

	61	37	19	07	01	⟶ Sum 125
Mirrored:	16	73	91	70	10	⟶ Sum 260
Sums:	77	110	110	77	11	
	297			88		⟶ **385**
x 2:	= **594**			= **176**		

The difference of sums of intervals and their mirrored numbers (as "the mirror"?) = 135, happens to be mass of the A-base.

Similar mirroring of elementary numbers in figure 1:
27 ⟶⟵ 72: sum 99 |
<u>08 ⟶⟵ 80: sum 88… 187 |</u>
35 ⟶⟵ 53: sum 88 |- 385
19 ⟶⟵ 91: sum 110…198 |

27 and difference 19 gives *209*, 08 and sum 35 gives *176*.

3.5. About factors in mirrored codon domains:

Cf. section 2.1.: 264 - 88, 198 - 220. Without factor 11, aa-domains +/– lower numbers in the x³-series?

- Factors *24* + *8*: *24* in GA + AG, *8* in CU + UC,
  the division purines (Pur) — pyrimidines (Pyr).

- Factors *18 + 20*: 18 in CA+AC, 20 in UG+GU.

24 — 8 = 16 +/– 8: → 8 = 2' in the x^3-series.
18 — 20 = 19 –/+ 1: → 1 = 1' in the x^3-series.

To sum up this section 3: In spite of all these connections there is hardly anything in the x^3-series itself that explains factor 11 — or the adding of mirrored numbers in it?

4. Some general considerations

- With 2-letter codons, letters as *symbols* for different molecules, reading them in opposite orders seems quite possible, but why does this give sums of their coded aa with factor 11 (times 24 - 20 - 18 - 8)?
  How from there come to opposite reading of Numbers? It seems as the *central question*.

- Or biologically expressed: What makes Mx-coded aa join in pairs to 11-factor numbers (–/+1)? There surely exist biochemical connections within these 6 aa pairs, more or less close, yet they hardly explain the 11-factor (*as in section 1.2. above*).

Two elementary mathematical facts:

- *Sums* of forward (Fw) + backward (Bw) reading of 2-digit numbers always have a factor 11. *Difference* a factor 9.
  (Not so in 3-digit numbers if not in themselves already including a factor 11.)

- *Differences* between 3-digit numbers read Fw – Bw give both factors 11 and 9 (if not 0).

- Directions of reading are vectors, and vectors – anti-vectors or counter-direction of vectors should surely be a part of *accepted physical realities*. As in biology; a single example the opposite directions of strands in DNA. But such vectors applied to reading of numbers?

- "Mass" here is taken as number of units (u), thus integers. It implies already a big step of abstraction, down into a deeper level of mathematics. It's *not* the same as the property mass measured from forces and acceleration. Number of units in an aa molecule is *only one of several biochemical properties* of it.

- However, reading numbers of some units (aa as units of certain number of units in R) backwards? It seems overwhelmingly senseless and mad! (Yet, doing so in this case in the Mx-table, it seems to give a sense, see "A note" below.)

- With the concept of "*step-numbers*", connected with (dimensional) *series*, in disintegration or synthesizing directions, there are numbers which represent directions, thus are vectors and might be expressed as the intervals between stations. (Cf. *section 3.4. above*.)

Another essential aspect:

- Regarding the base pairs G–C and U–A as *two coordinate axes* there is the important difference between Mx- and Nmx-coded aa: Mx-codons join the two axes, the Nmx-codons not as they are divided on single axes. Could the regularities in the Mx-table depend on this fact? Cf. the 2D-table of Mx-coded aa as a whole (vertically +/–1): two axes.

About vectors — anti-vectors:

- There are particles and anti-particles, quarks and anti-quarks; however, they don't seem opposite in mass, sooner in charge, a property of lower D-degree?

- There is *Space* with divergent acceleration (as from a 0-pole, a center) versus *Mass* (as from anti-center) with convergent acceleration. In next step combining to give "*Matter*" as aa; the Space factor of witch that seems dying in black holes. (Reappearing in surrounding galaxies?)

A note; Reading the unit numbers of each aa side-chain (R) in the Mx-table Fw *and* Bw happens to give the same sums in rows 2 and 3, and in row 1 it gives – 99 in both pair groups G1+C1 and U1+A1 = 770 – 198 = 2 × 286, (198 = difference of triplets in the basic series read Fw – Bw, as 543 – 345 etc.) Total sum in both base pair groups = 671. (61 is the number of codons without stop-codons.) Sums Fw + Bw in rows 2+3 gives 462 in G+C-columns, 308 in U-A-columns, the same as only Fw-reading times 2.

Fw + Bw, sums	= G1+C1	U1+A1:
Row 1: 572 = 2 × 286; –/+ 77	= 209	363.
Row 2: 418 = 2 × 209; +/– 44	= 253	165.
Row 3: 352 = 2 × 176; +/– 33	= 209	143

- For number 77: see section 7.

- Factor 26 in 572, row 1, = sums 35 *minus* 9, (27+8) – (8+1), in the x^3-series, and/or intervals in same steps 19 *plus* 7 (27–8) + (8–1), as if the following steps were included.

5. The $2x^2$-series?

5.1. Intervals times 11 in this series:

How about the $2x^2$-series (x = integers 5 →0) behind the Periodic system with intervals as number of electrons in the different orbitals?

$2x^2$: 50 — 32 — 18 — 8 — 2 — 0:

Sum 110 of this series, divided in step 4'— 3', gives 82 — 28, mirror numbers with interval 54. The interval numbers times 11 can give codon groups of aa in the Mx-table, figure 7:

Fig.7. *The $2x^2$-series with intervals × 11*

```
        18      14      10     6      2
x 11:  198 — 154 — 110 — 66 — 22.
          352 ________ 176 ________.
                 264            88
```

Mx-table, aa-numbers, sum 770 as 440 + 330:
440 = 352 + 88 or 264 + 176;
330 = 154 (CA+1) + 110 + 66 = + 176 (UG –1).
CA+AC = 198.
GA+AG = 264…Sum 462, 6 × 77.
UG+GU = 220 = 198 + 22 or 154 + 66
CU+UC = 88…Sum 308, 4 × 77
(Numbers 352 - 264 - 176 - 88 = 8-6-4-2 times factor 44 = 4' →3' in ES-series, section 6.)

5.2. Intervals in the $2x^2$-series mirrored:

Intervals as step-numbers in the $2x^2$-series read bidirectionally?

```
   18   14   10   06   02 →Sum   50
+  81   41   01   60   20 → Sum 203 …Total 253
   99   55   11   66   22
     154        77          Sum 231 (3 × 77)
          66          88    Sum 154(2 × 77)
```

Sum 385, divided as in Table 2.

385 = 2(55+11+66) + 1(99+22).
Fw + Bw reading = 253, cf. table 3 below.

154 + 66 = 220, × 2 = 440
77 + 88 = 165, × 2 = 330
154+66 + 77 = 297, + 88 = 385, times 2, = the division 11(27 + 8) in the Mx-table, (fig. 1).

Thus, sums of codon groups in the Mx-table are possible to derive from these series. It shouldn't perhaps be astonishing if both the x^3- and the $2x^2$-series had relevance, with regard to the exponent 2/3 in the ES-series (*section 6 below*)?

The backward reading of these later "step-numbers" having sense?

6. Correlations with the ES-series?

6.1. The "ES-series", first facts:

In the ES-series[1] x = integers 5 → 0 with exponent 2/3 times100, (numbers abbreviated): Figure 8 below shows on the several correlations with codon domains of aa R in both the 12-groups, Mx end Nmx (aa with non-mixed codons):

Fig.8. *ES-series: The two 12-groups of 24 aa, sums R:*

367 → 2 x 367 = 734 = Nmx
/ \
<u>292 — 252</u> — 208 — 159 — 100 — 0
544 <——|——>|
385 → 2 x 385 = 770 = Mx

Partly from reference[1], licence cc.by-nc-nd.

Domains of aa in 2nd base order[1]:
2(544 – 259) = C2 + U2)
2(208 + 259) = G2 + A2).

6.2. Divisions of interval number 385 in ES:

The number 385 in figure 8 might be seen as divided in two numbers in the Mx-table:

544 – 367= **177** = sum of column A1 in Mx
+ **208** = sum of column U1 in Mx

These numbers –/+1 = 176 and 209, the division of 385 in the Mx-table.
Interval between these numbers = 31, equal to mass of aa *Ser*, included with both its codons in U1- and A1-columns of the Mx-table. Sum 177 in A1 divided, figure 9:

Fig.9. *Some intervals in ES, 177 as 133 + 44*:

|<—— **133** ——>|
| 44 |
<u>292 — **252**</u> —↑— <u>**208** ——</u> 159 —100 — 0
544 <——↓——>367
177

6.3. The alternative division 133 — 252 of 385:

Number 252 = 4' in the ES-series, + interval 133 = 385, table 3:

Table 3. *Division of 385 in 133 + 252, –/+1 in the Mx-table:*

<table>
<tr><td>GA</td><td>C1</td><td>U1</td><td>AG</td><td>Mx</td></tr>
<tr><td rowspan="2">132</td><td rowspan="2">153</td><td rowspan="2">177</td><td rowspan="2">132</td><td>Row 1</td></tr>
<tr><td>Row 2</td></tr>
<tr><td>GU 43</td><td>CU 57</td><td>UC 31</td><td>AC 45</td><td rowspan="2">CA+UG
+ Row3</td></tr>
<tr><td colspan="2">253</td><td colspan="2">253</td></tr>
</table>

Noteworthy perhaps is that here, with operator –/+1, there is the 11-factor times first two inward step-numbers 12 and 23 with sum 35 in the basic series of integers 5 —> 0:

Basic series: 5 ← 4 ← 3 ← 2 ← 1 ← 0:
Step-numbers: 23 12 → Sum 35

6.4. More in ES joining Mx- with Nmx-groups:

Some other features seem to closely join the two 12-groups of aa, Mx and Nmx, to the ES-series, even if the factor 11 and factors 27 and 8 from figure 1 not are shown in any obvious way. They follow from –/+ lower intervals in the series.

6.4.1. C-atoms (Cs) and rest atoms (Re):

Through operations of –/+ last intervals in ES (100 and 59) the division in Cs and Re might be given: Sum 960 is equal to sum of whole A-+U1-domains:

544 – 100 = 444 = Cs in Mx
416 + 100 = 516 = Cs in Nmx

The division of Re, equal to whole mass Re (544) of aa in G+C-domains, is given through operation –/+ 59, the interval 2' → 1' in the ES-series (Re quotient circa 3/2.):

385 – 59 = 326 = Re in whole Mx.
159 + 59 = 218 = Re in whole Nmx.

Nmx: 2 × 3' = 416; 2 × 2' = 318 in ES:

416	318
+ 100	–100
516	218 → ≈ Cs and Re in Nmx.

6.4.2. Operator –/+ 100 in Mx-coded aa, table 4:

Table 4: *Rows 1+2 in G1+C1- and U1+A1-columns:*

285 = **385** – 100 4 aa	309 = **209** + 100 4 aa	→ 594 = rows 1+2
+ 100	176 – 100 = 76	→176

285 = GA + CA: (Glu, Asp + His, Gln)
309 = UG:+AG: (Trp, Cys + Arg^+. Ser).

In 2nd base order:

A2: GA+CA: **285** — G2: UG+AG: **309**, sum = 594
U2: GU+CU: **100** — C2: UC+AC: **76**, sum = 176

6.4.3. Two other proofs of the joined Mx-Nmx-tables:

The A+U-domains of aa 960, equal to sum of Cs in the whole of 24 aa, is divided 385 in Ms and 575 in Nmx. These numbers –/+1 equals the two-peak numbers of Cs in the C-skeleton with quotient 3/2, built as a number pyramid on the basic series of integers 5 → 0.[6]

There was also the fact that Re in the A+U-domains is equal with Cs in G+C-domains in the total sum, table 5. The same correlation +/–1 appeared[10] in divisions of aa in the "weight series", divided on aa lighter (L) and heavier (H) than the mean value of aa R.

Table 5: *Re in U+A-groups = Cs in G+C-groups +/–1*

aa-domains	L-chain		H-chain		Σ
	Cs	Re	Cs	Re	
G1+C1	**156**	61	**168**	159	544
U1+A1	228	**155**	408	**169**	960

6.5. Nmx + 2 × 18 (as 2 H2O)?

The Nmx-group *734* of aa differs from the Mx-group *770* with 36, which could be suspected to represent two H2O à 18. Adding 18 to Nmx-groups in different ways gives groups in Mx.

a) 3B-coded aa: *575*, + 18 = 594 **–** 1.
   2B-coded aa: 159, + 18 = 176 **+** 1

Hence, it gives numbers of rows 1+2 and 3 respectively in Mx, **–**/+1.
  It's said that Lys AA (3B) and Pro CC (2B) often gets an OHx-group added after the translational process. Possible reflected here?

b) Codon division Purines — Pyrimidines in Nmx:
 A1 + G1: 320 + 16 (GG + GC)= 336;
   336 **+** 18 = *354* = 2 × <u>*177*</u>
 U1 + C1: 255 + 143 (CG + CC)= 398;
   398 **+** 18 = *416* = 2 × <u>208</u>. Cf.6.2. above.

c) In Nmx: the U-contenting 2-letter codons guide aa-sums 444 (UU+UA+AU). The rest: (AA+G1+C1-domains) = 290.
  444 + 18 = *462.*→ 6 × *77*
  290 + 18 =*308.* → *4* ×*77*
Cf. table 2. Without + 18:
  444 = *367* **+** *77*,
  290 = *367* **–** *77*. *See section 7*.

6.6. Connections codons — amino acids

Some arithmetic relations between codons and aa domains could be mentioned in this ES-context:
- Interval 5' → 1' = 192 is the sum of a codon *base pair* rings including only C and N,divided in 9 C = *108* and 6 N = *84*, numbers equal to intervals 3' → 1' and 5' → 3' in the ES-series. Total C-atoms in 24 aa R = 5 × 192 = 960.
- The codons are mostly synthesized by aa.
- There was also the close relation between mass of codon bases transformed to number- base system 8 (nb-8) and the aa-domains[1]:
   2(G1 + C1) = 2(227 **+** 157) in nb-8 = 384 × 2.
   2(A1 + U1) = 2(207 **+** 160) in nb-8 = *367* × 2.

To sum up section 5:
In spite of all correlations that join the Mx-group with Nmx through the ES-series, this series cannot in itself explain the 11-factor times 35-19-16 in figure 1.

7. Number *77*

7.1. Some general notes:

Table 2 in section 1 above shows the Mx-table on aa divided in 5 × *77* on both base-pair codons G1+C1 and U1+A1, in opposite order, 5 divided 3 - 2. It's a striking regularity.
  Factor 35 in 385 = *7* × 5 is the first to note. Both these factors times 11 show up, yet most clearly *7* × 11; however, also **–**/+ *55* in this operation:

  209 **–** *55* = <u>154</u>, 2 × *77*
  176 + *55* = <u>231</u>, 3 × *77*

(It reminds of *number* of aa: *5* + *5* in G1- and C1-domains, *7* + *7* in U2- and A2-domains.)
  Factor *7* appeared also[6] in the total sum of aa, R+B = 3276 = *7* × 468; this number 468 also the total number of atoms in 24 aa. Mean value (Mv) of an atom becomes exactly *7*.
  Notable is that the whole *ES-series* (section 6) is divided in the step 4→3 in sums with the difference *77*: (5'+ 4') **–** (3'+2'+1') = *544* **–** *467* = *77*.

7.2. Factor 77 as 44 + 33 ?

In figure 10 below the main divisions of sums in the Mx-table are given through steps +/– 44 and 33:

Fig.10. *Rows 2 and 3 in Mx-table (+/–1), +/– 44 and 33:*

```
            253
             |      \
            + 44      = 209 + 253 = 462 = 2 x 3 x 77
             |      /
C1:210 —— 209 ———————————— 208:U1
   /         |                    \     /+ 33 = 418 = U1 + C1
385          |- 33                 385
   \         |                    /     \– 33 = 352 = G1 + A1
G1:175 —— 176 ———————————— 177:A1
             |      \
           – 44       = 176 + 132 = 308 = 2 x 2 x 77
             |      /
            132
```

Columns in Mx-table, vertical sums: 175→ 210 → 208 → 177.
Numbers 253 and 132: cf. table 3 in 6.3. above.

Factor 44 is the interval 4' — 3' (252 – 208) in the ES-series and also the mass of **CO_2**, a building stone of life. This factor is closely expressed in several aa sums in the Mx-table:
The 3B-coded aa:
GA = 132 = 3 × 44 = AG. UG = 177 = 4 × 44 +1.
GU + UG = 220 = 5 × 44. GA + AG = 264 = 6 × 44.
The 2B-coded aa: GU+AC = 2 × 44, CU+UC = 2 × 44
Factor + 33 (× n), starting from 99 gives also several codon groups of aa in Mx, e.g.
198, (CA+AC), 231 (3×77), 264 (GA+AG), 297 (half 594), 330 (CA+UG) etc.

7.3. Factor 77 as 43 + 34?

7.3.1. The factors × 3 in aa-sums 231 in Mx:

The factors 43 - 34 times 3 = 129 — 102 appear approximately in the 231-sums in Mx.
Trp = 129 +1, = 3 × 43 +1. Row 1, U1
<u>Arg$^+$ = 102 –1, = 3 × 34 –1. Row 1, A1…Sum 231</u>
Asp + Val = 102 = 3 × 34, Rows 2+3, G1
Gln + Leu = 129 = 3 × 43, Rows 2+3, C1…Sum <u>231</u>

7.3.2. Division of aa from Glycolysis and Citrate cycle:

In another context[1] there was the division of aa from stations in glycolysis (Glyc.) versus those from the citrate cycle (Citr.) according to earlier calculations, figure 11. Conditions there: Ala GC + Ser AG taken as derived from oxaloacetate (Ser AG via homoserine) and Gly GG taken as derived from Ser AG. All aa with U-base in their codons (1st and/or 2nd base) derive from stations in glycolysis. 12-groups of aa: Mx = 2 × 385, Nmx = 2 × 367:

Fig.11. *The equal division of aa from Glyc. and Citr.*

```
385 +/– 77 = 462 —— 308 = 770
              |-172   |-136
367–/+ 77 = 290 —— 444 = 734
            752      752
            Citr.    Glyc.
```

308 + 444 = U-contenting codons from Glyc.
462 + 290 = the rest.

Vertical intervals in figure 11 sum up to 308 and divides in factors 43 — 34:

172 = 4 × 43
136 = 4 × 34.

Diagonally differences = 18 (~ H_2O), × 2 separating the two 12-groups of aa as if it was part of the process to reduce water. (Signs "~" for "equivalent with" or "corresponding to".)
Cf. codon types in Nmx +18:
RNA: 412, +18 = *430*. PAIR:322, + 18 = *340*.

7.4. Connections with the background model?

Number 7 is in the background model (*http://www.u5d.net*) the sum of the "outer poles" or "complementary structures" of D4, a or b, and D3, a or b, where the polarization of one D-degree into complementary structures defines next lower D-degree (with a redefinition of the concept dimension); figure 12 here, with some notes:

Fig.12. *D4 → D3 polarized to D3 → D2*

D3: 4b → **3** ← 4a
7 < > 7
D2: 3b → **2** ← 3a

7.4.1. The simplistic number 3344 = 11× 304:

3344 = 19 × 176, (176 = row 3 in Mx)
3344 = 16 × 209, (209 = row 2 in Mx)
35 385

304 = 16 × 19 was the difference between light and heavy chains in the weight series[10]
600 — 904.
Cf. Mx-factor 35 divided 3/2 = 21—14:
21 × 43 = 904 –1
14 × 43 = 600 +2…Sum total R 1504, +1.
(304 also the difference between aa domains of U2 and C2, 437 — 133).

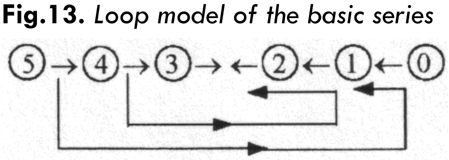
7.4.2. Total domains of aa R:

U1+C1-domains = 816 = 24 × 34
A1+G1-domains = 688 = 16 × 43

A 3/2-relation in factors and opposed directions in step 4 <—> 3.

7.4.3. Step- numbers and the "loop model":
Factor 43 as a step number 4→3 in the basic chain of integers 5 → 0 is in the "loop model" here connected with step 2 ← 1. Debranched d-degrees in higher steps 5 → 4 → 3 meeting the other way around in synthesizing direction, figure 13:

Fig.13. *Loop model of the basic series*



Adding these opposite steps gives number 55, times 7 = 385.
7 × 43 = 301
7 × 12 = 84... Sum 385.

How find such a division in the Mx-table? Factor 7 divided 4 — 3, figure 14:

Fig.14. *Factor 7 divided 4-3 times 43 and 12*

```
4 x 43 = 172 <-------
3 x 43 = 129        |
            > 177   |-> 208
4 x 12 =  48        |
3 x 12 =  36<-------
```

Sum 177 = whole A1-column in the Mx-table. (Also = UG.)
Sum 208 = whole U1-column. (Cf. ES-series, section 6.)

The difference 43 – 12 = 31 = Ser, UC-coded in one column, AG-coded in the other.

Difference in step numbers in the *"loop model"* (figure 13):

5→ 4 <—> 1 ← 0 = 53
4 → 3 <—> 2 ← 1 = 31. Cf. SP-series, section 8.

8. Step-numbers in basic and superposed series

8.1. Basic series of integers 5 → 0 (BS)

The basic series of integers 5 → 0 is in the background model of this research taken as dimensions developed out of one another. Each step, read as a *2-digit* number, implies *minus or plus 11* outwards or inwards., 54 → 43 → 32…etc. or 01 → 12 → 23…; the *difference* between opposite reading directions is 9, 54 - 45 etc. Cf. about centrioles and cilia, section 9 below.

Codon groups of paired aa in the Mx-table can follow from adding bidirectional steps in the basic series. (Note the special derivation needed for the CA-coded aa, 154 –1.) Total sum 440:

```
54 — 43 — 32 — 21 — 10
45 — 34 — 23 — 12 — 01
99   77   55   33   11
 176        88
       132        44
```

Sum *440* = 2 (77+55+33) + 1(99 + 11)
330 (2 × 165)

(A note: 165 ~ Phe, R+B, N =77, Z = 88.)

8.2. The superposed series (SP): 9 - 7 - 5 - 3 - 1

This SP-series 9-7-5-3-1 in figure 15 below was earlier introduced[1] (*section 5.3.1*), there seen as connected with "half orbital sums", orbitals as the intervals in the $2x^2$-series. ("Superposed" – or perhaps *underlying* the basic series?) It's dividable at station 3 into 16 — 9 ≈ 4^2 — 3^2.

Fig.15. *SP-series with basic chain combined*

```
  9    7    5    3    1
 /   V   \/   \/   \/   \
5 — 4 — 3 — 2 — 1 — 0
```

[Could the SP-series eventually be regarded as a future expansion of principles in quantum mechanics, number 1 as referring to either 1 or 0 , number 5 as 3D-particles or "2D"-waves etc.?]

- The SP-series could perhaps be regarded as a kind of "code" for more elementary (dimensional) steps, i.e. 97 as referring to 2 steps 5 → 4 → 3.

- As said in section 4, *step-numbers*, having directions, should be quite possible to have counter-directions in biochemical processes.
- Combining the BS- and SP-series gives 3-*digit* numbers with the 11-factor times each individual step:

  594 — 473 — 352 — 231 — 110

- Sum of this series, 1760, happens to be the total Z of *R+B* in the 20 + 4 aa.[1]

8.3. Two other operations connected with figure 15

a) It may be remembered from reference[1] that the square roots of 6-digit numbers from lower 5 to upper 5 and the reverse (–/+1) gave the division of the 12-groups of aa in Mx versus Nmx, indicating a counter-direction in some aspect:

$\sqrt{594735} \sim 771.$, – 1 = *770* = Mx.
$\sqrt{537495} \sim 733.$, + 1 = *734* = Nmx.

b) An operator as multiplication could be mentioned of half-steps forwards and backwards in the combined series Bs-SP, starting from number 9 on SP:

$94\times47 + 73\times35 + 52\times23 + 31\times11 = 851 \times10$
$49\times74 + 37\times53 + 25\times32 + 13\times11 = 653 \times10$

Sum *1504* (×10) = total R of 24 aa × 10. C1+A1: aa-domains = 850, G1+U1 domains = 654, the amino/keto polarity –/+1 (×10).

Cf. the well-known 3×3 square, where digits 1→9 are distributed for giving sum 15 in all directions, figure 16.

Fig.16. *The 3×3-square for digits 1→9*

6	7	2
1	5	9
8	3	4

Diagonally: the numbers 852 - 654. Sum of aa R = 2 × *753*, –2. Sum of triplets 543 + 210 and 432 + 321 = 2 × *753* (from the basic series[1]). In ES-series: *5' + 4' + 3'* = *752; 2'* = *159.*

8.4. Bidirectional reading of half-step or whole steps?

- A new view on operator –/+ 1 ?

Each half-step 2-way-directed, figure 17:

Fig.17. *Addition of counter-direction in each half step*

```
   9    7    5    3    1
 // \\ // \\ // \\ // \\ // \\
5 — 4 — 3 — 2 — 1 — 0
```

- First half-steps: 59+95, 47+74 etc. gives sum *440.*
  Second half-steps: 94 + 49, 73+37etc. gives sum *385.*
  Total sum =15 × 55.
- *385* divided at 3' in the basic series, at *7-5* in SP. 143 (94+49) + 110 (73+37) = *253*, *77+44+11* = *132. Cf. table 3 in section 6.3.*

- The operator –/+1, (as vertically in the Mx-table) were earlier[1] suggested as indicating a step to a new coordinate axis, appears here in another way: Adding whole versus 2 half step-numbers gives differences 9 versus 11. One example:

- Whole step, sum 297:
  Fw. 59 **+** 94 = 153, Bw. 49 **+** 95 = 144; diff. 9.
- Two half steps, sum 297, give same sums +/–1:
  Fw. + Bw.: 59 **+** 95 = 154, 94 + 49 = 143; diff 11.

There is also the upwards - downwards directions combined or separated, and the complexity might give associations to the different measuring of spins in entangled quanta.

8.5. Some 3-digit Mx-numbers in figure 15:

- 594 = rows 1 + 2 in Mx,
- 352 = columns G1 + A1, (2 × 176)
- 231 = U1+A1, row 1, = G1 + C1, rows 2+3.

Interval in the3-digit steps = 121 = 11^2:
Operating with this factor gives relations of aa-groups in the Mx-table; a few examples:

- 297 **+** 121 = 418, 2 × 209, columns C1+U1
- 209 **–** 121 = 88 = GU+AC = CU+UC
- 385 **–** 121 = 264 = GA + AG, rows 1+2

8.6. Coded aa-domains, 1st + 2nd base order, in Mx-table:

G1: 175 + G2: 309 = 484, **–**11 = 473*
A1: 177 + A2:285 = 462, **+**11 = 473
C1: 210 + C2: 76 = 286, **+**11 = 297
U1: 208 + U2:100 = 308, **–**11 = 297.
G+C: 484 + 286 = 2 × 385, +/**–** 99.
A+U: 462 + 308 = 2 × 385, +/**–** 77

* A note: 473 happens to be a factor (times 6) in insulin, the kind with 51 aa.[9]

8.7. The 3-digit series (BS + SP) read backwards:

Steps 01→ 3-4 give sums 2 × 385, ≈ the Mx-table. In figure 18 there are the numbers 132 and 253 from table 3 (section 6.3.) Steps 1→2 + 2→3 = 35.)

Fig.18. *Inward reading of the series in fig. 15*

011 — 132 — 253 — 374 — 495
↓ 385 ↓
↓ 385 ↓

AG = 132. Column U1 = 208, + AC 45 = 253.
GA = 132, Column C1 = 210, + GU 43 = 253

There was in the ES-series 5' → 2' = 133, 4' = 252; **–**/+1 giving these numbers..
Interval 121 in the 3-digit series as 44 + 77; cf. figure 10 (section 7).
253 **–** 44 = 209,
132 + 44 = 176 → the division of 385 in Mx
253 **–** 77 = 176
132 + 77 = 209

8.8. Step-numbers alone in SP-series, bidirectional:

It gives shorter the same 11-factor numbers as from the basic series (8.1.), pairs of aa-numbers apart from CA-sum 154 **–**1 besides UG-sum 176 +1:

97 — 75 — 53 — 31
+79 — 57 — 35 — 13
= 176   132   88   44 → Sum 440.

8.9. SP-series bidirectional with 11- and 9-steps

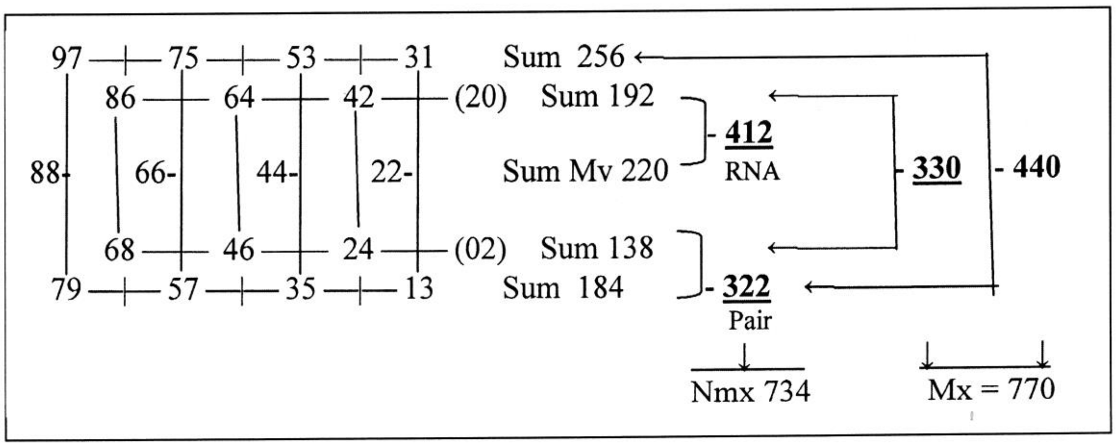
In figure 19 below the SP step-numbers counter-directed are supplemented with intermediate 11-steps and with 9-steps that represent mean value between mirrored SP-numbers.

There is reason to keep in mind that the SP step-series 97 - 75 - 53 - 31, as a kind of "code", refer to 2 steps and also triplet numbers of the basic chain: 5-4-3 — 4-3-2 — 3-2-1 — 2-1-0, the sum of which is 1506 = total R of 24 aa +2.

A hypothesis behind the figure 19 is that the differences between the very regular codon domains in Mx and the less regular in Nmx could depend on a bidirectional property in Mx, branched into one-directional codon domains in Nmx. This connected with the view on the G-C- and A-U-pair of bases as two coordinate axes, Mx-codons joining them, Nmx-codons not.

Domains of aa are here grouped according to codon *types* (section 2.3):

Fig.19. *The SP-series bidirectional, with intermediate 11- and 9-steps*



440 – 22 = 418 = Cross-coded aa. (440 = 256 + 184).
330 + 22 = 352 = Form-coded aa

- Four 9-steps from sum 256 → 220 equals the *–36 (~ 2H2O)* in Nmx: *97→88, 75→66* etc.
  The middle numbers with sum 220 seems here to represent the very "mirror" itself, and give part of aa with RNA-codons with the factor of complementarity A—U, G—C.

- Group 330 gives *vertically 154 (86 + 68) = CA +1* and 176 (110 + 66) = UG –1 in Mx.

- Group 440 gives vertically 176 (97 + 79) = whole row 3 in Mx, and following additions in these series = 2 × 132 (75 + 57) + 88 + 44 (53 + 35 and 31 + 13) = GA +AG, rows 1+2 in Mx.*

*330 + 55 = 385; 440 – 55 = 385. (55 between 66 and 44.)

[There is, however, not so easy to find other closer connections *within* codon type groups of aa with pairs of their individual numbers in the figure above. A couple of vertical additions:
- Pair-codons: 68 + 79 = *147* = UU –1, rest numbers in these series *175* = AA+CC+GG +1.

- RNA-codons: 88+86 + 66 + 64 = *304*, – 100 = AU + GC-coded aa.
  Rest numbers = *108*, +100 = UA + CG-coded aa.]

A difficult question:
How argument for writing a step-number 9 → 7 as 97, the vector replaced by a change in one position in our decimal system, start of the vector getting 10 times more "worth"?

9. How about a relation to factor 9 in centrioles and cilia?

To repeat from section 4:

- Sums of differing 2-digit numbers mirrored give factor 11
- Differences between these mirrored numbers give factor 9.
- 3-digit numbers mirrored give both factors 9 and 11 as *difference (if not 0)*..

("Mirrored" = counter-directed, reflected, bidirectional numbers.)

11 and 9 might be seen as *inverted* (/\) numbers: 11 /\ 909090… × 10^x, 9 /\ 11111…× 10^x.

It gives associations to the 9-factor (or 9 + 2) in centrioles, centrosomes and cilia. In centriole structure there are the 9 tubule, anti-centric arranged around a center, each consisting of 3 or 2 microtubules = 27 or 18, a 3/2-relation.

(This change in numbers, 3→2, seems related to d-degrees: *inside the cell* as basal bodies 9 × 3 = 27, as equivalent with volumes ~ 3D; *outside,* in cilia, 3 × 2 = 18, related to a surface ~ 2D. A simplified description; there seems to be exceptions.)

Number **27** = 3' in the x^3-series, number **18** = 3' in the $2x^2$-series. An association goes to the exponent 2/3 in the ES-series (section 6). Two a bit curious relations:

2 × 3' (208) in the ES-series = 416:

416/18 = <u>23,1</u> 1111… 416/27 = <u>15,4</u> 074074...

These quotients give times10 (and abbreviated) the division 3 and 2 × 77 in the Mx-table, 231 and 154. Observe also the *decimals* in the quotients above:

23,1 <u>111111</u>… – 23.1 = 0,0111111…
15,4 <u>074074</u>… – 15.4 = 0.00740740…

2/3 × 0.0111111 = 0.00740740, /\ ≈ 135.
74 = atomic mass of B-chains of aa unbound.
135 = atomic mass of A-base.

Could the ES-series be thought of as a midst between the x^3- (with 3' = 27) and the $2x^2$-series with 3' = 18?

Cf. also middle number 3-5-2 in figure 15: differences between Fw. – Bw. read half steps:
53 – 35 = <u>18</u>; 52 – 25 = <u>27</u>. (18 the first number outwards.)

The quotient 2/3 might be seen connected with the *<u>l</u>oop version* (figure 13, section 7) of the mentioned background model, where in the series of dimensions 5 → 4 → 3 etc. debranched degrees outwards might meet the other way around inwards, a kind of inversion of *directions.*

In the ES-serie<u>s</u> with 5' + 4' – 2' = 385 there is an approximate inversion 1' + 2' ≈ <u>259, /\ ~ 386.</u> × 10^x. (Cf. close to Z-numbers of ATP versus NADP, partly charged[1].) It's close also to the quotient between the basic series as two triplets, 543/210: <u>2.586</u>. /\ <u>3.867</u>. (×10^x), circa 6 × 43 — 9 × 43 (×10^x).

A similar quotient appears at ends of two B-chain parts of aa that leads to condensation (– 18, H2O): 44/17 (COO^-/$NH3^+$), interval 27, ~ 259 /\ 386 (×10^x).

The difference 11 — 9 = 2, eventually appearing as the 2 microtubules in the center of motile cilia (and some other centrioles). Could it be seen as an expression for the operation of inversion itself in the number relations?

There was also the relation between number-base systems (nb-x): 9 in nb-10 = 11 in nb-8; eventually part of some internal reference system Cf. how atomic mass of coding bases in nb-10 gives aa-sums in nb-8[1].

It has been said too that the fibers in *prokaryotes*, corresponding to later developed microtubules, are 11.

To this comes the polarity between *motile cilia*, 9 × 2 + 2 microtubules, and *non-motile, sensory cilia*, 9 × 2 + 0: here possible to interpret in terms of the background model: *motions* released in outward direction of a dimension chain 5 → 0 as from a center; sensory cilia as from anti-center in direction inwards.

Motions are said to start from the top ends of cilia as they are last step in the background model outwards. Last step-number in the basic series 5→0 is 1→0, with **–/+**1 = 9 and 11. (10 mirrored = 01: sum 11, difference 9).

The arithmetical operations *addition* — *subtraction* (as + or **–**) might perhaps be seen as *one* type of expression for the assumed double-direction in 4D and in d-degree "0/00" (~ pure kinetic energy) in the background model? ("Pole 1b" as "motions from each other", ~ "outwards", creating a new anti-center, "pole 1a" as "motions towards each other", ~ "inwards", defining a new center.)

There is also the earlier suggestion that **–**/+1 in several different contexts between similar sums of numbers might imply and express a change to a new coordinate axis. One such example shows up in the Mx-table: *horizontally*, row 2 = 209; +/**–**1 = 210 — 208, *vertical* sums in columns C1 and U1, and row 3 = 176; **–**/+1 = 175 and 177, the *vertical* sums of columns G1 and A1. (A 1/x-curve joins asymptotically two perpendicular axes in a coordinate system and passes through number y, x = +1 or **–**1.)

Could the views and facts above imply a biological connection between the aa divisions on codons Mx and Nmx and the centriole structures? Perhaps more of one type of aa from Mx in centriole proteins or their active sites? In the transport proteins* (as *kinesin* — *dynein*) building up and down cilia respectively**?** Note the opposite, anti-parallel *directions*. *(In positions inner — *outer* they seem to correspond to xylem (↑) and floem (↓) in plants.) It's here a totally open question if such relations to proteins and their aa content and codons exist.

With dimensions thought to develop out of one another through polarizations, there is + or **–** one (1) degree in *every step* in directions of disintegration or synthesizing processes. In the basic series of integers 5 ←→ 0, five steps squared:

11111^2 = 123454321.(9 digits). (The square relation?)

There are 6 "stations" including d-degree "0/00" for pure kinetic energy or motions. If assuming number 1 for each station it gives:

111111^2 = 12345654321. (11 digits = +2)

111111 × 2/3 = 74.074. Cf. *decimal* numbers we had above, 416/18 and 416/27.

Another hesitant operation: 111111 = 11 × **10101**:

10101 → × 1/6 → /\= **594** 000 594… × 10^{-6}
594 the sum of rows 1**+**2 in the Mx-table.

10101 → × 2 → /\ = **495** 000 495… × 10^{-7}.

10. Two numeral extras about number 385 in the Mx-table

10.1. The number 11 as such, divided:

Number 11 stepwise divided as 1st and 2nd digit with the difference as 3rd digit:
11 = 1 + 10, Diff. 9 → Σ = 2→0←9* = 11 × 19
11 = 2 + 9, Diff. 7 → Σ = 2→9←7 = 11 × 27
11 = 3 + 8, Diff. 5 → Σ = 3→8←5 = 11 × 35
11 = 4 + 7, Diff. 3 → Σ = 4→7←3 = 11 × 43
11 = <u>5</u> + <u>6,</u> Diff. <u>1</u> → Σ = 5→6←1 = <u>11 × 51</u>
Σ 15 40 25**

*Reading 1-10, difference 9 becomes 209 here.
** Cf. sums 15 - 25 - 40 = 80, three first rows in Cs-pyramid,[6] *figure 2.1*.
- **3**85 becomes the middle number in this series and first 3 numbers are directly connected with the Mx-table. Steps in 3-digit numbers = 88.
- First two numbers = 2 × 253, **–**/+ 44. Cf. table 3, section 6.

10.2. The "factor chain" 385:

In the 5D-background model it could perhaps be assumed that numbers 55 - 44 - 33 etc. as energy numbers represent outer a+b-poles in polarized D-degrees 4-3-2 etc.? With an operator as the basic series inwards (why?) it gives the sum 385 The sum divided odds — evens give the Mx-division of 385 :

1 × 55 =	55	
2 × 44 =		88
3 × 33 =	99	
4 × 22 =		88
5 × 11 =	55	
Σ	209	176 = Sum 385

Conclusions and some associations

Many different Mx-coded aa-groups (R) with factor 11, including 385, were shown to be derivable through bidirectional reading of 2-digit numbers in the studied series in different ways, so also 3-digit numbers from the combined basic and superposed series, the latter illustrating some principles in quantum mechanics. It strengthens the view on a serial background and fundamental double directions, here seen inherited from higher D-degree 4.

Numbers as such are naturally the result of or expression for the same "quantification principle" as in quantum mechanics, so why not on higher levels? On a macroscopic level it corresponds to general processes of polarizations and unifications, mathematically appearing e.g. as differences and additions.

Much indicates that the code itself, e.g. the four 2-letter Mx-codons of 3B-type guide the bidirectional features, with this the arithmetical 11-factor, while the differentiation through the third base implies a secondary polarization (purines <—> pyrimidines), these complementary in type of synthesis and in bonds within DNA. (There are 5 bonds in the 12-group with 2-letter Mx-codons (12 aa), −/+1 gives 4 bonds in U-A-codons of Nmx, (8 aa), 6 bonds in the G-C-codons of Nmx, (4 aa); thus showing on a serial (5 - 4 - 3x2) property of steps (of – 4 aa) in the ES-series.)

More than one regulating factor of complementarity are obviously operating in the genetic code on different levels, i.e. several polarities where opposite directions is one, the complementarity in DNA-bonds another, and also inversions around 1 might be seen as one.

The *mirror* relation, not only in bidirectional read numbers but also in the 2-letter Mx-codons, leads to the question: What is the mirror? The very projection of a center to anti-center as Big Bang → Universe, (infinity redefined as anti-center in the background model here)? An inherited feature from the whole "Entirety", proposed as 5-dimensional in an optional analysis that join both poles center and anti-center? As with "Consciousness": when we wake up and gets defined as a center, an I, in relation to the environment as anti-center, and a double-direction gets established of "seeking" and "getting". And simultaneously we are a little piece of anti-center for others. Summation of particles and anti-particles? A mirror factor in entangled quanta, in at least one aspect complementary? A dimension is in the background model defined as the polar relation between complementary structures, equal timeless as entangled quanta in quantum mechanics.

There *are* of course arithmetical laws in physics as in the periodic system and as the factors in Rydberg's formula for hydrogen orbits, in Balmer series differences 5,4,3 — 2, (squared and inverted), a similarity with intervals in the ES-series.

There *are* several anti-parallel biological vectors, as in DNA-strands, as in β-sheets on 2nd level of protein foldings, as in up- and down transporting proteins; also stepping proteins as in muscles and most steps in biochemical metabolism are reversible, however hardly numerical if not in a still closer study of quantum biology.

The problem to translate a bidirectional reading of numbers as such into something that can be expressed in physical or biological terms remains however, unsolved. Mass-numbers as number of units read backwards seems without sense. Here the concept of *step-numbers* was introduced, related to series, with the property of vectors, with those anti-vectors, surely a physical reality. Steps as in the carbon-nitrogen cycle in the sun: 12→14→16, back to mass number 12, like the 3B-coded aa-pairs in the Mx-table, but without factor 11.

Some associations

About factors 27 — 8 in the Mx-table and in the midst of x^3-series, there was[1] an association to *group theory*,[11] with 1/√27 and 1/√8 (times 10^3) giving close to sums of aa R in G1- and C1-domains. An 11-factor derived from Pauli or Gell-Mann's *3×3-matrices*?

There was further an association to the *string theory* and its 11 dimensions, 4 + 7, 7 said_"undeveloped" (!) dimensions. (Numbers *77* and 44 (~ CO2) seems both well-developed here. Cooperation with *water*? Auto-dissociation to H_3O^+ and OH^- (Wikipedia, simplified.) gives a curious proof of the polarization principle. Mass H_3O^+ = 19, <—> OH^- = 17; differences Mx- to Nmx-coded aa: 3B-coded: Mx 594 to Nmx *575* = *19*, 2B-coded aa: Mx 176 to Nmx 159 = *17*. Z = 11<—> 9.

The only more general hypothesis here is that there exist a world of dimensional processes of disintegration and synthesis expressed in numbers, below the known physical laws.

This paper should be regarded as just a contribution of material, inviting others more professional in the concerned areas, to go on with the problem.

Competing interests:

The author declares no competing interests.

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