The Genetic code: Section II

Simpler numeral series

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12. Simpler numeral series - Comparisons with the ES-series - some first notes -

A. Some simple quotients:

The simple quotients 7/24, 6/24, 5/24 times 10^3 approximate first three numbers of the ES-chain, since total sum of ams R is nearly 1500 (particularly if we count on Lys and the two Arg uncharged), Note the sum of the series 5 - 4 - 3 - 2 - 1 - 0 = 15.

However, the lower numbers in the ES-chain are not given through simple quotients.

Fig 12-1: *7,6, 5 parts of 24, decimals ~ ES-numbers:*

7/24 = 0,**292**., x 10^{+3}. x 2 = **584.** **292 + 250** = **G1 + C1 -2**
6/24 = 0,250 x 10^{+3} x 2 = **500** (2 x 252 -4) **+ 2 x 208** = **U1 + A1 -2**
5/24 = 0,**208**., x 10^{+3} x 2 = **416.** ....intervals in the steps 84
2/24 = 0,**083**., x 10^{+3} x 2 = **2 x 84** (-1).

Cf. numbers 7, 6, 5 with halved numbers of electrons in orbitals *f, s + d,* and *d*, see below and file 13 about the periodic system.

A division 10-8-6 of the total 24 ams times 1504 in agreement with number of ams, 10 (2 x 5) in G1 and C1, 8 in A1, 6 in U1, gives sums that through a displacement of **84** (~ 2/24 = 292 - 208 in the ES-chain) gives the G+C- and U+A-groups, figure 12-2 below..

Applying exponent 2/3 to these 10-8-6-parts of the total, gives abbreviated times 4 the appropriate numbers of the ES-chain.

Fig 12-2: *10, 8, 6 parts of 24, transformed to ES-numbers:*

10/24 **x 1504 = 627, – 84 = 544 - 1**. (G+C -1)
8/24 **x 1504 = 501.** **= 500 +1** (A1 +4), (292 + 208, +1)
6/24 **x 1504 = 376, + 84 = 460.** (U1 – 3), (252 + 208)

10/24 x 1504 = 627. →	$627^{2/3}$ = 73,26 →	**73 x 4 = 292.** = $5^{2/3}$ x 100
8/24 x 1504 = 501.	$501^{2/3}$ = 63,11	**63 x4 = 252.** = $4^{2/3}$ x 100
6/24 x 1504 = 376.	$376^{2/3}$ = 52,09	**52 x4 = 208.** = $3^{2/3}$ x 100
Sum 1504	Sum 188,43	Sum 1504/2

63 x 52 happen to give the whole sum of 24 ams R + B unbound = **3276**.

A note:
Numbers 7/24 and 5/24 above = 0,292 - 1/3 and 0.208 +2/3.
Orbital numbers with reference to file 13
14 – 2/3, /24 = 0,5555…
10 + 2/3, /24 = 0,4444…
8 , /24 = 0,3333…
2 + 2/3 , /24 = 0,1111...

B. Survey of different numeral series on x = 5 - 0:

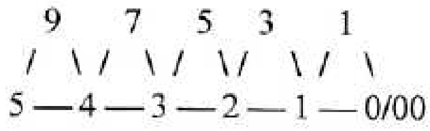
a) x^1: **5 - 4 - 3 - 2 - 1 - 0** read as triplets:

543 - 432 - 321 - 210

b) **$2x^2$: 50 - 32 - 18 - 8 - 2 - 0**: the chain behind the periodic system.
Intervals in the steps as orbitals in electronic shells.

c) Halved orbital numbers **½(18 - 14 - 10 - 6 - 2)** as a superposed chain:

Fig 12-3: *Halved orbitals as a superposed chain:*



d) **x^3:** 125 - 64 - **27 - 8** - 1 - 0.

e) **x^4: 625 - 256 - 81** - 16 - 1 - 0.

13. The $2x^2$-chain

1. **The $2x^2$-chain behind the periodic system:**

1. It is one rather natural hypothesis that the genetic code could originate from a similar number chain as for instance the $2x^2$-chain behind the Periodic system, figure 13-1 below. The ES-chain is the cubic roots out of numbers in this chain halved. Is there anything pointing to a more direct connection?

(In the figure is pointed to the fact that reading these numbers in decreasing number-base systems (nb-x) 10-8-6-4-2 and translating them to nb-10 gives the very simple chain 50 - 40 - 30 - 20 - 10.)

Fig 13-1: *The $2x^2$-chain behind the periodic system:*

x:	5	4	3	2	1	0	
$2x^2$, (x = 5-0):	50 —	32 —	18 —	8 —	2 —	0	Addition steps to whole shells*
Intervals :		18	14	10	6	2	Orbital numbers
		(x)	f	d	p	s	

*Note adds 2 times 8 and 18.

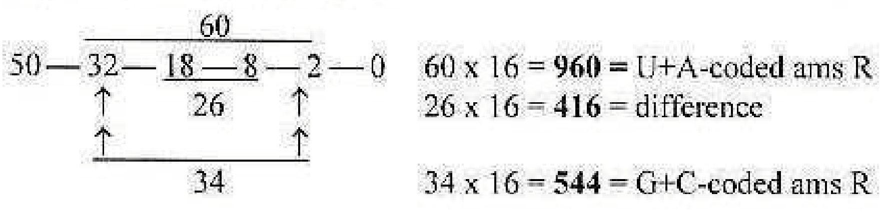
10 times elementary chain read in decreasing nb-systems:

	nb-10	nb-8	nb-6	nb-4	nb-2	
	50	40	30	20	10	
=	50	32	18	8	2	in nb-10

2. G+C and U+A-groups:

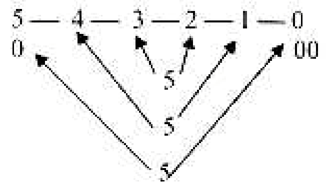
First observations is that numbers in the chain times a factor 16 gives mass of the main groups of G + C- and U + A (R), fig.13-2], total sum 94 x 16= 1504.
(Simultaneously we have that sum of the whole chain 110, times 16, = 1760, e. g the total sum of Z in the 24 ams unbound. About Z, see Para 6 below.)

Fig 13-2: *$2x^2$-chain, main codon groups 544, 960 through a factor 16:*



With reference to the dimension model behind this site (cf. the "loop model", figure 1-2) three polarizations of dimension degree 5 (the whole): 5 → 0 + 00, 5 → 4 + 1, 5 → 3 → 3 + 2

Fig 13-3

	The G+C-coded ams as a polarization of 5 to 4 + 1 (before 5 to 3 + 2) may be regarded as a deeper level when dimensional aspects are applied, as this group of ams comes first in the ES-chain.

However, number 544 appears also "linearly" as a sum:
(32 - 8) x 16 = **384**
(18 - 8) x 16 = **160**
Sum: 544

It may be noted that **first three numbers 50 - 32 - 18** in the $2x^2$-chain times a factor ~ 30 (2 times the elementary series 5-0) roughly approximate the sum and division on U+A and G+C groups: 1500 - 960 - 540.

3. Some general observations:

Both 208-numbers in the ES-chain and here **416** goes to the U+A-group of ams. Cf. perhaps that additions 8 and 18 are repeated two times to whole shells in the periodic system (through displacement of *d*-orbitals; *s*-orbitals of next shell first filled).

262 = 676, **the middle number 18 + 8 in this $2x^2$-chain squared, times 2 = 1352**, sum of all ams R without H-atoms; this factor 26 also something to remember. Total number of ams, R + B = 3276 = 26 x 126.

Number 94, 60 + 34; and Selenocysteine:
Number 94 (times 16 = 1504, total of ams R) is also the R-chain of the so-called 21st ams *Selenocysteine*, 34 Z, with isotope 79 of Selenium: A (R) = 94 = 2 x 47, the R-chain of Cys with its special role in protein folding. Se-Cys is encoded in a special way and could be an example of how Nature elaborates to fill arithmetical patterns?
About numbers 94, 47, 34 and the division of number 128, see Subpages II, file 04. para. 6

Total number of atoms in R + B-chains of the 24 ams without H-atoms = 224 =

= 14 x 16. (14 the interval in step 4" - 3").

4. All integers 1 - 110 = 6105:

Another curious connection is that the sum of all integers 1 - 110 of the whole chain = 111 x 55 = 6105, inverted = half the total sum 3276 of 24 unbound ams 1638 as a periodic number,

Fig 13-4: *6105, total sum of numbers 1-110:*

1-110 = 55 x 111 = **6105, Λ = 1638**,00-period. ½ x 3276

1/55 - 1/555 = 1638 00 1638 00...x10^x = ½ x 3276 as period

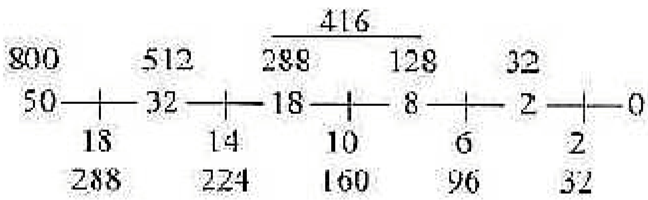
= 0.0181818... and 0.00180180180...

1/55 x 1/555 = 3276 00 3276 00 x10^x as period

* Numbers 18 and 180 as decimal periods are equivalent with masses of H2O and glucose, fructose, essential starts for ams!

5. Mass numbers, other groups:

Fig. 13-5. *16 times the $2x^2$-chain:*



a) The two 12-groups of ams, 770: and 734, -/+2 = 768 and 734:

12-group 770, ams with the mixed codons, -2 = 768, 2 x 384:

384 = **800 - 416** (or 512 - 128 or 416 - 32),
an interval here as in the ES-chain.

384 divided in numbers 208 and 176;
- **208** = 1/2 x 416, = 3' in the ES-chain.
- **176** = 1/2 interval 512 to 160 (128 + 32)

12-group 734, non-mixed codons, +2 = 736 (= 32 x 23)**:**

2 x 288 + 160 = 734 +2. (160 interval 288 - 128 or 128 +32)
G1 + C1 = 160, -1

U1 + A1 in this 2-group = **2 x 288 -1**= 416 + 160, = **576, -1**.
- U1 = **288 - 32** = 256, -1.
- A1 = **288 +32** = 320.

Note the similarity in derivations with the ES-chain: in these groups:
384 is an interval of the type 52/3 —— 22/3 (x10^2) in the ES-chain.,
and the other 12-group (734 + 2) appear in the middle step as in that chain,
both 288-nuumbers belonging to the 734-group.

Cf. numbers in paragraph xx below. Cf. below Pyramid numbers.

b) Purine - Pyrimidine pairs:

Fig. 13-6: *Sums of ams R in codon groups:*

```
        400  + 416  = 816 = C1 + U1  = (25 + 26) x 16
800 <           |- 128                  |     |       > (50 + 44) x 16
        400  + 288  = 688 = G1 + A1  = (25 + 18) x 16
```

c) B-chains:

B-chains bound = 1344:
Orbital numbers (18 - 14 -10), x 16 = 288 + 224 + 160 = 672, x 2 = 1344
= 6 x 224.

Why a factor 16?

Factor 16 happens to appear in all single base groups in 1 1st base order -/+1:
G1: 192 -1, C: 352 +1, U1 464 -1, A1 496 +1.
Why, however this factor 16 here, if pointing to a real connection between this $2x^{2-}$-chain behind the periodic system and codon-grouped mass in the genetic code?
- As 2^4, an expression for d-degree 4, four polarizations inwards?
(16 also the inversion of 5^4, x 10^4.)
- And / or the factor biochemically related to mass of oxygen ^{16}O, 4 alpha - or Z of ^{32}S in a first energy source?
- Or somehow connected with the unexplained "octet rule" with a doubled expression for mass in the atomic nucleus?
It must be left here as an open question.

6. Atomic mass expressed in the levels of electron orbitals and shells?

It is natural that the distances of electron orbitals and intervals between them around an atom are expressions for atomic mass, e.g. number of charged nucleons in the nucleus and thus circa half the atomic mass of ordinary isotopes of C, N, O and S in ams.

1760 was factor 16 times the sum of the $2x^2$-chain and the total Z of 24 unbound ams R+B, i. e. sum of all electrons.
The number of atoms C, N, O, S in these unbound ams R+B is 224.

Reducing 1760 with this number 224 in steps - as a kind of activation in electron shells, as suppressing of deeper orbital levels, with one electron in each step until those of C-atoms are zero, gives 6 "phases". It gives stepwise mass of bound ams R+B and disintegration of R-chains doubled.

Fig 13-7: *Reducing 1760 with 224 per step:*

1760 — 1536 — 1312 — 1088 — 864 — 640 — 416:
2848 **544** **432** **528** → 528 as 320 + 208,
x 2 x 2 x 2
= G+C U+A U+A → 1st base groups.
A → N → Z (-/+1 in 2nd base groups.)

2848 is the mass sum of the 24 bound ams, R+B, here from phases representing suppression of electrons in the K-shell.
- **1536** is the sum of all 128 C-atoms, **1312** sum of all other atoms.

Whole interval 1760 — 416 = 1344, sum of 24 bound B-chains, 4 x 56 in each step.

544 is also the mass sum of all other atoms N, O, S, H in R-chains,
960 = 432 + 528, the mass sum of the 80 C-atoms in R-chains.
432 = 36 C-atoms in C2 + U2, 528 = 44 C-atoms in G2 + A2.

Sum of whole chain = **14 x 544.**

Series of phases for R- and B-chains taken separately:
R-chains: 104 atoms C, N, O, S gives minus 104 per step. (H = 152)
B-chains: 120 atoms C, N, O gives minus 120 per step. (H = 92)
Z -sum R-chains 828.
Z-sum B-chains 932.... Difference 104.

B: 932 - 812 - 692 - 572 - 452 - 332 - 212
1504

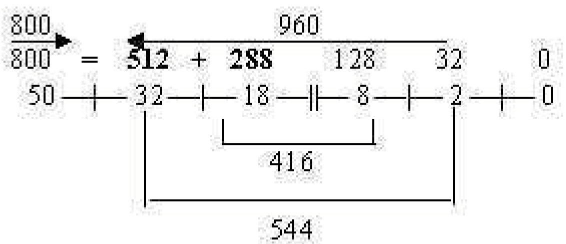
R: 828 - 724 - 620 - 516 - 412 - 308 - 204
1344

Thus, the B-chains give in first numbers the atomic mass sum of the 24 R-chains, the R-chains in first numbers the sum of the atomic mass sum of 24 B-chains bound.

7. Z-numbers, the total and its divisions:

Fig 13-8: *Division of total Z 1760 in the $2x^2$-chain times 16:*

The total 1760 divided 800 and 960: 800 = 512 + 288, numbers from 4 and 3.



Sum of whole chain = 110, times 16 = **1760** = total Z-sum of 24 ams (R + B) unbound.
960 = 24 x 40, Z-sum for B-chain of Gly with only 1 H as "R-chain".

Displacements of H-atoms between R- and B-chains:
If in B-chains one H is added as replacement for R-chains, and the 4 H, reduced in B-chains of Arg 1, 2, Lys and Pro, are filled from R-chains, all B-chains become NH_2-CH_2-COOH = 40 Z: It gives a division of the chain in step 5 - 4:

R-chains: **800 Z** = 50 x 16
B-chains: **960 Z** = (32 + 18 + 8 + 2) x 16 = 24 x 40 Z
(32 + 18) x 16 = 20 B-chains. The 4 extra B-chains = (8 + 2) x 16.

R-chains, number 800 Z get divided:

A1+U1: **512** = 32 x 16. (528 Z - 14 H - 2H in Arg AG and Lys AA)
G1+C1: **288** = 18 x 16. (300 Z - 10 H - 2H (in Arg CG and Pro*)
* (Has sooner to be added + H in Pro, compensated with - 2H in Glu and Asp?)

These resulting numbers 512 and 288 could give more support for a hypothesis that the $2x^2$-chain influenced the code on one level and for the thought that the B-chains may have "come first" in the evolution, followed by a stepwise construction of the side chains R as substitution of H.

L-T-waves:
The backbone chains (B) of proteins may be regarded as a kind of **L-waves**, (assumed in fields of gravity), when unbound expressed as dipoles in terms of the electromagnetic force. Perhaps they preceded the evolution of the side chains (R), these implying a dimensional step to **T-waves,** characterizing electromagnetic waves.
(Cf. perhaps a hypothesis by Copley et al (2005) that ams may have been constructed at the inner OH-group of ribose between nucleotide pairs.)

(Total number of atoms R + B without H = 512 - 288 = 224.)

Note that interval 800 - 512, also 288, may be connected with G1 + C1 too.

7b. Z-division on atom kinds when 24 + 4 H are moved to the B-chains:

Z - B-chains as 960:

C: = **288**
N + H (120) = **288**...Sum 576, 3 x 192
O = **384** = 2 x 192

Z - R-chains as 800:

C = **480** = **512 - 32**,
N + O + H (124) + 2 S = **288 + 32 = 320**
A division 3/2 between C-skeleton and " substituents".

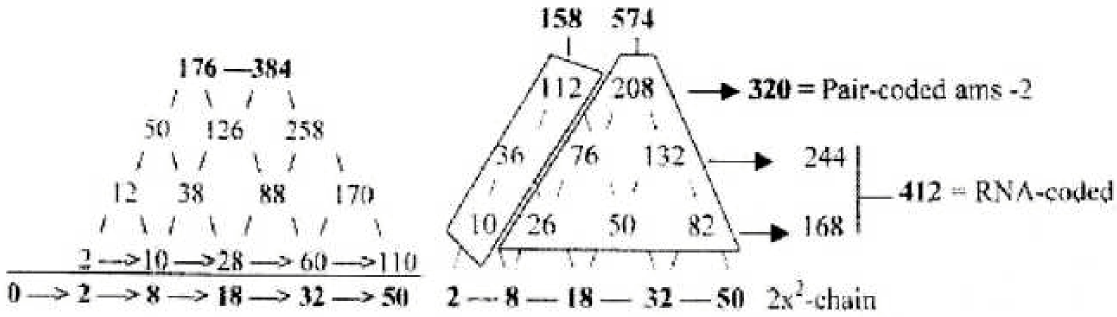
Z - total. R+B 1760:

C = 2 x 384 = **800 - 32**
S = **32**
N + O + H (244) = **960**

8. Pyramids on the $2x^2$-chain:

Building figure pyramids (as Pascal's triangles) on the $2x^2$-chain leads of unknown reasons to numbers from the ES-chain (-1 in some of them). A couple of examples are shown in Fig. 40.

Fig 13-9: *Pyramids on $2x^2$-chain, 176, 384 and 158, 574:*



The left pyramid is built on the cumulative sum of the chain and gives on level 3 the top numbers 176 and 385-1, **interval 208**, to compare with the **770**-group of ams as intervals in the ES-chain.

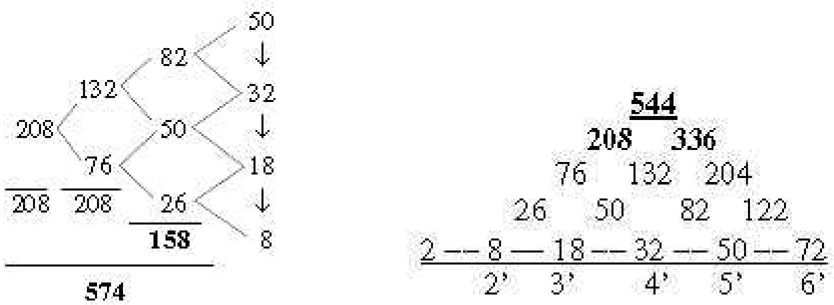
The right pyramid is built directly on the $2x^2$-chain and shows the **734-**group and its codon divisions when figures are added in orthogonal directions, -1 in the G+C- and U+A-sums. 574 - 158, interval 416.

Note e. g. A1 = 497 = 176+1 in group 770 plus 320 in group 734 = 496 +1.

"2-base-coded" ams = 336-1 is the sum of **176** in the 12-group 770 (GU+CU+UC+AC) and **158 + 1** in 12-group 734 (GG+GC+CC+CG). These numbers appear to the left, built from lowest "dimension degrees" in the $2x^2$-.chain. (160 in figure 13-8 below).

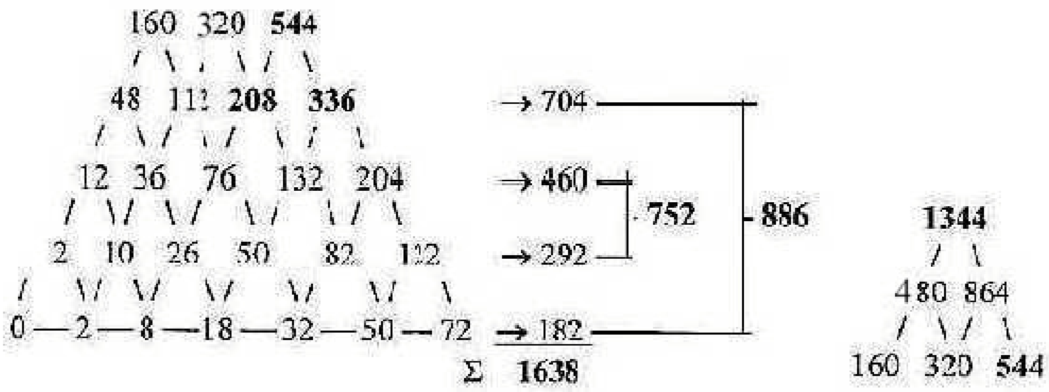
Another way to see the right 574-pyramid above , 2 x 208 = 416, + 158 in accordance with the ES-chain. To the left the isolated 544-pyramid below.

Fig 13-10a, 10b::



Extending the $2x^2$-chain with x = 6 - 0 in Fig. 41,(top of pyramid to the right), and with an orbital 22 gives e. g. the sums **292** for level 1, **460** on level 2, first sums in the ES-chain, and sum **1638** on levels 0 to 4. half the total of 24 unbound ams.

Fig 13-11: *Pyramid 1638, the top of it to the right:*



- **752** = ½ x R-chains, **886** = ½ x B-chains of ams.

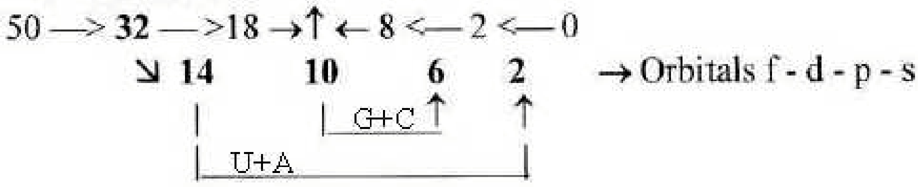
- On level 3 and 4 we get the numbers 336 - 208, sum **544.**
- Top number becomes **1344**, sum of 24 *bound* B-chains.

Do we have to count on a 6th dimension or rather rely on Einstein that the relation between two bodies is 6-dimensional?! Only for a total 544. Note: G+C 544 = 384 in left figure 13-7, the cumulative pyramid, +1, + 160 - 1 in figure 13-8.

9. About 3rd-base groups of ams:

Number of ams in the G+C- and U+A-groups are possible to associate to orbital numbers, as in figure 13-6 below. U+A: 14 ams, 2 with indifferent 3rd base; G+C: 10 ams, 6 with indifferent 3rd base.

Fig 13-12: *Codon groups after 3rd base compared with orbital numbers:*



A note:
Ams with 3rd base A/G (+ A or G) = 638
638 = 352 + 286 = **11 x 32 + 11 (18 + 8)**, **orbital numbers**

Together with all "debranched " 2-base-coded ams 335 we get the sum = **973.**
973 = figures 1/2 x (18 + 14 + 10), -2.
3rd base U/C = 531
531 = **1/2 x figures 10 - 6 - 2**.

10. Two more special annotations:

a) Numbers 110 and 26:

Two numbers in the 2x2-chain, 110 as the sum of the whole chain and 26 as the sum of middle two numbers 18 + 8, give associations to the displacements between single base groups of as from 1st to 2nd base order: +/- 2 x 110 in the G- and C-groups and -/+ 26 in the U- and A-groups. An eventual connection?

It should imply a two-way direction aspect on the G+C-groups versus one-way direction in the U+A-groups.

Compare the numbers in these differences:

To purine - pyrimidine group:

U+A = 960, – 26 = 934 = G2 + A2; from U + A, ~ U → G
G+C = 544, + 26 = 570 = C2 +´U2; from C + G, ~ G → U
To keto- / amino groups:
U+A = 960, – 110 = 850 = C1 + A1; from U + A, ~ U → C
G+C = 544, + 110 = 654 = G1 + U1; from G + C, ~ C → U

b) Some numbers of the $2x^2$-chain, orbitals, cumulative ones as 28 etc. read in opposite directions:

28 + 82 = 110, x 2 = 220 = UG + GU
26 + 62 = 88, x 2 = 176
18 + 81 = 99, x 2 = 198 = CA + AC
14 + 41 = 55, x 2 = 110
10 + 01 = 11, x 2 = 22
08 + 80 = 88, x 2 = 176 = CU + UC + GU + AC
06 + 60 = 66, x 2 = 132 = GA, AG
02 + 20 = 22, x 2 = 44 (CO_2)

14. Halved orbitals as a superposed chain

1. Sum of triplets read in the halved orbital chain:
Intervals in the 2x2-chain in preceding file 13 give the orbital numbers in the periodic system. Halved these numbers, 9 - 7 - 5 - 3 - 1, may be regarded as a superposed chain to steps in the most elementary chain 5-0: 5-4, 4-3, 3-2, 2-1, 1-0:

Fig 14-1: *Halved orbital numbers 9-7-5-3-1 as superposed level:*

```
  9     7     5    3     1
 / \ /  \ /  \/   \ /  \
5 — 4 — 3 — 2 — 1 — 0/00
```

975 + 531 = **1506** = mass of 24 ams R, +2.

Cf. 975/531 x 10^3 = 1836,158 ~ mass quotient proton/electron (p/e)

2. Classes of tRNA synthetases:
We may note here that the triplets 975 and 531 approximate sums of ams in the two classes I and II of tRNAs - if the different codons for Arg, Leu, Ile and Ser with two codons don't split their affiliation:
Class I: Leu, Ile, Met, Cys, Val,
Glu, Gln Arg, Tyr, Trp: Sum **975 +2** (with 2 sets of Leu, Ile, Arg)
Class II: Pro, Ala, Gly, Ser, Thr,
His, Lys, Asp, Asn, Phe. Sum **531 -4** with two Ser

3. Wavy, horizontal reading:
The two-level chain in figure 14-1 above may be regarded as a kind of "wave function". and a first observation is that the square root out of 6-figure numbers, from lower 5 to upper 5 in the middle, outwards and inwards, gives the sums of ams in the 12-groups 770 and 734, -/+1, total 1504 of 24 ams:

Fig 14-2: *Square roots out of 6-figure numbers:*

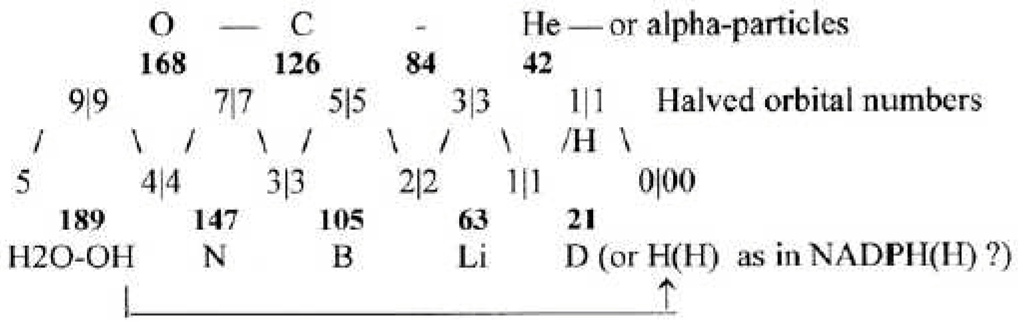
5-9-4-7-3-5: → √ = 771.2. . ≈Cross-plus Form-coded ams +1.
5-3-7-4-9-5 → √ = 733,1. . ≈RNA- plus Pair-coded ams -1

Note that 734 -1 is derived from the middle of the chain where we had this 734-group of ams in the ES-chain 2(208 + 159).

Next step from lower 4 to upper 3 gives the sum of 20 ams (R) = 1258 without the four double-coded ones and these divided in Z and N -/+1 outwards - inwards **688** and **570**, also numbers for G1 + A1 and C2 + U2 among the 24 ams.

4. Vertical readings in halved orbitals. - An illustration of fusion processes:
Another way of reading in the chain is downwards, adding numbers 95+94, 94 + 74, 74 + 73 etc. as in figure 14-3 below. This gives sums that may be called **"A-Z"--**numbers of first elements in K- and L-shells, ^{16}O, ^{14}N, ^{12}C etc.

Fig 14-3: *"A-Z"-numbers of elements - an illustration to fusion processes:*



The figure could illustrate fusion:
- the right part first elementary steps from H and Deuterium via Tritium and ^{3}He2 to ^{4}He2, then e. g. to ^{6}Li3 to 2 alpha 8-4;
- the left part illustrating **the carbon-nitrogen cycle** in the sun, O 16-8, N 14-7 C, 12-6, intermediate steps neglected here. (10Boron, 5 Z, in the middle.) Interpretation of first and last step, see the figure.

The close, inner relations C-N-O in the fusion of the sun could be regarded as "outsourced" to a planet and translated to external relations on the higher molecular level, forming the bases and amino acids and the situation when their B-chains bind to each other in the protein synthesis;.[- O=CO- → ← +H2NH -].

Comparison with numbers in the ES-chain:

Sums of numbers from 168:

168 147 126 105	84 63 42 21
544 + 2	**208 +2**

The role of boron?

2 times numbers 147 - 126 - 105 gives sums near the first three numbers in the ES-chain:

2 x 189 = 378 (½ x 752 + 2, 2 x 168 = 336 = 544 - 208 or here 546 - 210.

2 x 147 = **294 ~ 5’** +2, 2 x 126 = **252 ~ 4’**; 2 x 105 = **210 ~ 3’ +2**.

189 –1 = 1/4 x (292 + 252 + 208) = **1/4 x 752**
168 = **1/2** x **336** (544 – 208)
147 –1 = **1/2** x **292**
126 = **1/2** x **252** - steps 4-3-2 here ~ 5 – 4 - 3 in the exponent series
105 - 1 = **1/2** x **208**
84 = 292 – 208, etc.

Nitrogen - Carbon:
"A-Z"-numbers of C and N, characterizing both codon bases and ams, gives the sum

273, the mean value of two ams unbound.
12 x 273 = 3276, total sum R + B

3276 is also "A-Z"-number of C, 126, x 26 (= 18 + 8 in the 2x^{2-}chain).
First six "A-Z"-numbers, including 84, give the sum 819, times 4 = 3276.

Sum of left part: 189 + 168 + 147 + 126 = **630**, to compare with mean value of side chains of an ams, nearly 63.

There is the relation too that four last numbers, 84-63-42-21, regarded as debranched from higher steps and representing 4, 3, 2, 1 steps à 21, raised with **exponent 3/2** give the sum = 1638, 2 x 819 and half of total sum of unbound ams.

$84^{3/2} \approx \underline{770}$; $63^{3/2} \approx \underline{500}$; $42^{3/2} \approx \underline{272}$; $21^{3/2} \approx \underline{96}$. **Sum = 1638.**

5. The p/e-quotient, π-mesons and μ-leptons:

In figure 42 above we had the halved orbital numbers 9-7-5-3-1 as a superposed chain to the elementary one. Quotient between this chain as two triplets gives the p/e-relation, inverted about the same 544-number as above:

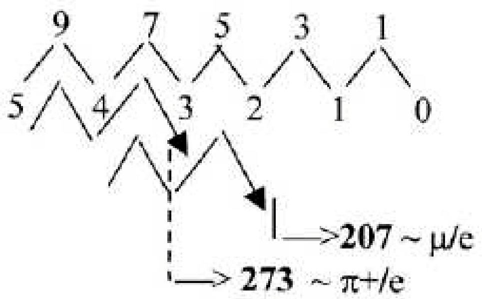
975 / 531 x 10^3 = 1836,158 ≈ mass quotient p/e . *
531 / 975 x 10^3 = **544**,6. x 10^{-3}; [~ $(2/3)^{3/2}$ = 544.33.]

*(About middle figure 5 as last and first number in the two triplets we should perhaps remember that the inner electron is said to sometimes exist inside the nucleus of an atom.)

Wavy reading of 2-figure numbers in figure 14-4 below, 59 + 94 + 47 + 73 in two steps, gives sum **273**, ~ the quotient π^+-meson / electron as parts of the proton. π-mesons appear at disintegration of protons in *p*-anti-*p*-annihilations. Next two steps 47 + 73 + 35 + 52 give **207**, ~ the μ-lepton in *e*-units, released in the further disintegration of π-mesons.

2 times these numbers = 544 + 2, 416 - 2, with reference to the ES-series.

Fig 14-4: *273 and 207 from addition of 2-figure-numbers in the two-level chain:*



2 x 273 = 546 = G + C, +2
2(273 + 207) = 960 = U + A

It was noted before that 273 is the mean value of two unbound ams (and sum of what here was called "A-Z"-numbers of N- and C-atoms 14-7 and 12-6).

The correspondence with numbers for charged π-mesons and μ-leptons, the same quotients on levels of different units (e- versus u), invites the not unreasonable view on amino acids and proteins as having a corresponding role in the very superposed unit of a cell as these elementary quanta in the nucleus of an atom.

6. Reading 2-figure numbers in the superposed chain:

A two-way directed reading of such numbers can give the 4 codon type groups of ams, Cross- and Form-coded, Pair- and RNA-coded, as shown in Genetic code II: “17 short files”, number 17.

15. x^1 - The triplet series
The x^4 series

I. The triplet series, x^1:

a) Reading triplet numbers in the elementary chain 5 - 0:
(Most of this file from "17 short files", 05.*)*

The most elementary chain 5-4-3-2-1-0 read as triplets approximates the sum of R-chains of ams read as two triplets: 2(543 + 210) = 1504 +2, or read as 4 triplets as in figure 15-1.

Expanded with triplets from 987 - 876 etc. the chain gives the approximate whole mass of 24 ams. Intervals in each step = 111 sum up to 24 times B-chains à 74.

Fig 15-1: *Triplets from elementary chain 5 to 0 and the same chain expanded:*

543 —— $\underline{432 — 321 — 210}$ Sum 1506
= G + C, **963** = U + A,
-1 +3

The series expanded:

$\underline{987 + 876 + 765 + 654}$ + $\underline{543 + 432 + 321 + 210}$
= **3282** <——|——> **1506**
$\underline{1776}$
24 B-chains à 74 A

A note about number 3282:

Number 3282 is also the difference between products of base pair numbers:
G 151, C 111, U 112, A 135:

2 x G x C = 33522
|------- **3282**
2 z U x A = 30240

3282 = 6 x 547. 5 x 547 = 2735 = 20 ams, without the double-coded ams.

(½ x 3282 = 1641 is said to have something to do with a formula for first amount of prime numbers.)

A "condensed" or undeveloped elementary chain 5 - 0, dimensionally, written:

5 - 4 -3 - $\underline{2 - 1 - 0}$, ~ 5433 ~ 546 ("before disintegration") =2 x 273.
= 3

546 x 6 = 3276, the sum of 24 ams R+B unbound.

b) A-N-Z-numbers of ams approximating the triplets:

Fig 15-2: *A-N-Z- as triplets in codon groups:*

210 = Z-number UG-UC-AC-AG, +1 = G, C in 2^{nd} position
321 = Z-number UU-UA-AU-AA-coded, +2 ↑
432 = N-number U1+A1-coded ↑
543 = A-number G+C-coded ams -1 ——————> ↑
G + C = **544** A. U1+A1 = **432 N, 528 Z.** (U2 + A2 -/+1).

The chain A→> N→>Z implies polarization steps from mass to charge as assumed in the background model.

Cf. figure 13-8 file 13, approximate the same numbers halved.

[A connection wirg the ES-chaib and its first number 5'?
1/543 – **1/210** = -**292**.03 x 10^{-5} .]

c) B-chains:

In a peptide bond between ams their side-chains come to point in opposite directions. For the triplets 543 and 210 arranged in such a way, see figure 16-2 below,. When read in opposite directions, we get the B-chains of 12 ams á 74 A = 888 as divided 543 + 345.

Fig 15-3: *Triplets 543, 210 written as neighbor R-chains in opposite directions:*

753
▲210
543 <=====>345 | B-chains → 543 + 345 = **888**
012▼
753 R-chains

888 = 12 B-chains `74. A division on numbers 543 and 345 gives:

543 / 12 = 45,25 ~ 45 A = COOH

345 / 12 = 28,75 ~ 29 A = H2N-CH

The B-chain gets approximately divided in the COOH-part 45 and H2N-CH-part 29. Cf. the similar division in the ES-series.

345 —|— 210
135 = mass of the A-base

135 is also mass of Meth, R+B, when losing its end group CH2 = -14 at start of protein synthesis.

012 + 345 = 357 = sum of A+C+C, the common ends of tRNA.

Sum of a triplet chain "inwards" 012-123-234-345 = 2 x 357.
A-base 012+123 = 135, plus first two intervals = + 2 C-bases 111 = 357.

B-chains as periodic numbers:

Fig 15-4:

```
   5 4 3 —   3 4 5
 + 0 1 2 — - 2 1 0
 = 5 5 5   = 1 3 5
     ↓         ↓
     Λ         Λ
   1/555     1/135
     ↓         ↓→ = 74, 0 74 0 74 0 74... x 10-4     B-chains `74 A
     |———————→   -  18, 0 18 0 18 0 18... x 10-4     H2O, - condensation
                 ________________________________________________________
               =  56,0 56 0 56 0 56... x 10^-4     Series of bound B-chains
```

Cf. a similar series:

56 56 56 →√ = 752,101..., x 2 ≈ 1504,2..., total of 24 ams R

A note:

543/3 = 181 = Tyr, R + B
321/3 = 107 = Tyr R.

Two steps in the triplet series = -222 = 3 x 74, the normal B-chins unbound

Two more numbers from the elementary chain 5 - 0:

4/5 + 3/4 + 2/3 + 1/2 = 1/2 x **5,43**3333

$[1/5 + 1/4 + 1/3]^4 = 376{,}5.\ x\ 10^{-3}$; $x\ 2\ x\ 10^3$ = **753**,037.

About the elementary series as exponents to 2 as a binary lnguage and Serine, see file 17.16.point 6.

II. The x^4 series:

The x^4 series as an underlying chain?
It would agree with the general thoughts behind this research that chains as x^4 and x^3 (x = 5 - 0) could underlie the ES-chain on deeper levels.

In the chain, figure 15-2 below, we have that 625 - 81 = 544, the G+C-coded ams and 625 + 256, + 81 = 962, the U+A-coded ams +2. The operation -/+ 81 in this series x^4 is comparable with the similar operation -/+ 208 in the ES-chain.

Fig 15-5: *An x^4-chain, some codon groups of ams:*

$$\begin{array}{cccccc} 5^4 & 4^4 & 3^4 & 2^4 & 1^4 & \\ 625 \;—— & 256 \;—— & 81 \;—— & 16 \;—— & 1 \;—— & 0 \end{array}$$

625 - 81 = **544 = G + C**
<u>625 + 256 + 81 = **962** = **U** + **A** + 2</u>
½ x 544 -/+ 81 = 191, G1, and 353, C1.

P-group and its energy-storing bonds in step 3-2:

$$\begin{array}{llll} & 3^4 \;—— & 2^4 & 1^4 \\ H_2PO_3^- & 81 \sim & 16 \cdots & 1 \quad \text{Sum 98: } H_3PO_4 \end{array}$$

Number 81 is both a charged molecule H2PO3 but also the R-chain of His (the only ams that not derives from Glycolysis-Citrate cycle but from the A-base).

It could be observed that -/+ 81 gives the individual codon base groups in 1st order in the ES-chain:

½ x 544 -/+ 81 = G1 191, C1 353,
544 - 81 = U1 463
416 + 81 = A1 497. (An eventual influence of phosphorus groups, P-group H2PO3~ = 81 or of His, R 81?)

Sum $4^4 + 3^4 = 337$ is 1/3 of the total sum of the ES-chain..

16. An x^3- series

1. Middle numbers 27 and 8:

In an x3-series, (x = 5 - 0), the numbers 27 and 8 appear around the middle step 3 - 2. They are the factors in the astonishing regular table of ams with mixed codons below, where the ams with differentiating 3rd base in their codons amount to 594.

An x^3-chain and factor 35 in the 12-group 770:

$$\begin{array}{l} \qquad\qquad 3^3 \qquad\qquad\quad 2^3 \\ 125 — 64 — 27 —\text{- } (19\ ) — 8 — 1 — 0.\ (x = 5 - 0) \end{array}$$

Table 2:

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

Sums of rows in the table:

385: 27 + 8 = 35, → x 11 = 385
209: 27 - 8 = 19; → x 11 = 209... Sum 594 = 27 x 11 x 2.
176: = 8, → x 11 x 2

One 27 number disintegrates into interval 19 and 8 into rows two and three..
(The factor 11 in this group of ams with mixed gets no special explanation in this x3-chain.)

A note:
About factor 11 among ams with mixed codons as an expression for double-direction in steps (file I-05): 01 + 10 = 11, the last step in the elementary chain 5-0. Cf. steps in the half orbital chain 9-7-5-3-1 read as 97 - 75 - 53 - 31 = - 2 x 11 in each step.
(Are there eventually any 11-factor in quark computers?)

Compare also the atomic mass of bases A and U and interval 27 - 8 = 19 divided 5 - 14, (interval 9 as in a simple reading of the step in opposite directions 32 - 23)

A-base 5 x 27 = 135, U-base 14 x 8 = 112

Cf. these numbers 112 and 135 from quotients between spectral lines of hydrogen (end of Introduction
About some other numbers in the x3-chain compared with the ES-chain, see below.

2. A root in physics of number 544?

Numbers 27 and 8 have appeared in group theories of elementary particle physics (Gell-Mann M in *The Eightfold Way* 1964)), this mentioned with nothing of a closer knowledge in that field.
A suggested connection here seems supported by following relations in figure 16-1 below, which could imply that number 544 for the G+C-group of ams had its root in the the mass quotient between the electron (e) and the proton (p) of a single H-atom - or rather (e + p) / e ≈ 1837.117 x10-6.*

* p/e ≈ 1836.12, /\ = 544,623 x 10-6. If p/e = 975 x 103 / 531 (a quotient in the middle in the chain of halved orbital numbers = 1836.158, the inverse becomes 544.615 x10-6. (Two similar or equivalent numbers may of course have very different origins as similar words in languages.)

The square root of 8/27, x 10^{-3} = **$[2/3]^{3/2}$ = 544.331**... x 10^{-3} is a similar number, however not exactly the same.

A suggested connection here seems supported by following relations in figure 16-1 below, which could imply that number 544 for G+C-group of ams may have its root in the p/e-quotient of a single H-atom:

Fig 16-1: *Square roots of 27/8, and inversions of 27 and 8:*

$\sqrt{27/8}$ x 10^3 = 1837,12. ≈ p/e-quotient + 1 (e). /\ = **544**,33. x 10^{-3}

$\sqrt{8/27}$ x 10^3 = **544**,33. ~ G+C = $(2/3)^{3/2}$ x10^x

|- interval ~**352**, = C1 -1

$\sqrt{1/27}$ x 10^3 = **192**,45. ~ G1 = $3^{3/2}$ /\ x 10^x (G1 = 191)

$\sqrt{8}$ inverted (/\) x 10^3 = **353**,55. ~ C1 = $2^{3/2}$ /\ x 10^x (C1 = 353)

↓

Sum **546 = 2 x 273,** (x 6 = total **3276,** R+B)

$[8/27]^4$ x 10^5 = 770,734 66. ≈ 2 x 385.

8/27 = 0,296 296...as period: **296** = 4 times number 74 of B-chains.

1/4 of the period 296 = 2/27 = 740740740... (x10^x) is the inversion of A-base number 135.

Inversions may be regarded as one kind of references between units or energy levels in complementary fields outside - inside number 1 as a ring around the origin in a coordinate system.

The numbers 1836 and 544 among ams as quotients, however, concern units on different levels, referring to number of e and number of u (~ shell versus nucleus in the atom). If we could assume that quotients as such reappear on different levels, already a single H-atom in some way could include resonances in the future development of life.

More reasonably expressed, the same underlying elementary number series in its development gives such number relations on different levels through the evolution.

A bit curiously the "same" number 544,33..as from √8/27 is given out of a "factor chain", 1 to 5 times 2-figure numbers of steps in the elementary chain:
(8/27 → √ = 544,3310540 x 10-3, → √ = 1,837117307.)

A "factor chain:"
1 x 54
2 x 43
3 x 32
4 x 21
+5 x 10 ---> 54 86 96 84 50 → √ = 74074,074074... → √ = 272,165...
= 370
5 x 74 x 2 = 544,3310540*

*The numbers differ after the 11th digit!

(A factor chain in opposite direction, 1 x 45, 2 x 34 etc.. gives the sum 5 x 47, the factor in total ams R 1504 and the mass of Cys.)

To summarize, the numbers 27 and 8 may through simple operations join approximate numbers the inverted p/e-quotient , the masses structuring ams masses (R) of mixed codons, the sum 544 of G1 + C1 and its division on these codon groups and the A-base with its inversion of a periodic 74, the mass of unbound B-chains of ams..

If the numbers 27 and 8 in group theory for elementary particles has been connected with the e/p-quotient is left unknown here. Perhaps it is two different hypothesis that are involved in the figure above for the origin of the number 544?

The number 385 gets its simple explanation directly from 27 and 8, apart from factor 11, and 544 was shown as ≈ √2 times 385, through inversions and halving connected with approximate number 367, the sum of the 12-group of ams with non-mixed codons (in file I-8, fig 8-1).

The e/p-quotient, or e/(e+p) as a deeper root for number 544 seems to concern a more fundamental issue about inversions and conjugates in higher dimensions; inversions as a property of steps towards higher levels of complexity and the biochemistry of life.

Cells are in some respects the inversions of an atom, especially in the relation of charges, with dominating negative charge inside, mostly carried by the proteins, and positive charge outside. The hydrophobic bonds in P-lipids of cell membranes could be imagined as one expression for an inversion (center to anti-center) of the strong force (Fst) on this higher level. (The mentioned group theories are also used in analysis of the electroweak and strong forces.)

3. Some numbers in the x3-chain times 3 compared with the ES-chain:

Besides the middle numbers 27 and 8 here, the x3-chain as a whole doesn't any simple correlations with elementary codon groups of ams in similar ways as in the x4, x1 and x2-chains (files II: 13, 15, 16).

Some numbers could or should eventually be noted. With a factor 3 times the series we have 375 - 192 - 81 as first three numbers:
- 375 =1/2 x 750, 1/8 of a total sum 1500, approximating the total of R of 24 ams.
- 192 is a returning factor in 385-1, 770 -2, 575 +1 (the U+A-group in 12-group 734), in 960 (U+A-groups R) and in 1344 (sum of bound B-chains)
- 81, 3rd number in the x4-chain (file 15).
- 192 + 81 = 273, the mean value of 2 unbound B-chains.
- Interval 111, (cf. reference Scherbak) is the number for steps in the triplet series x1 (file 15). (111 in a hexagonal system = 273 in a decimal system.)

6 (3 x 2 in step 3 - 2?) times the x3-chain gives a series that have some similarities with the ES-series:

Fig. 16-2:

6 x (125 — 64 — 27 —— 8 — 1)

= 750 —— 384 —— 162 —— 48 —— 6

366 546 210 42

750 - 210 = 540, ~ G + C - 4
750 + 210 = 960, ~ U + A .... Cf. in the ES-series: 752 -/+ 208 = 544 and 960.

- 750 divided in ams with mixed (385) - non-mixed (367) codons (the first interval here), -1 in each group.

- 162 ~the difference G1 - C1.

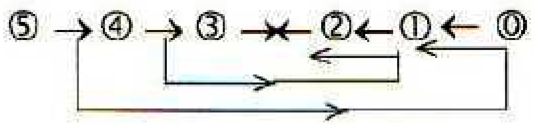
- 384 + 162 =385 + 159 + 2 = **546**, 2 x 273, (4' + 3').
  the mean value of 2 unbound ams.

- 384 + 210 = 4' + 3' + 2' in this chain = **594** = 385 + 209 in the table above

- Interval 4' - 2' = 384 - 48 = 336, 6 B-chains bound.

The sum of the whole series 225 times 6 = 1350. (6 x 207)
1350 → √ = 367.42 x10-1, → /\ =272.1655 x10-4 , x 2 = 544.331054 . 10-4 =
= 1/10 of √8/27.

However, if there is a deeper relation between the factors 27 and 8 here and the ES-chain remains an open question. It is possible that these numbers should not be associated with a whole x3-series at all but represent a transformation of exponents in step 3 → ← 2 of the ES-chain, with the background model (fig 03-3) in mind



and the double-directed processes, meeting in the middle step, somehow implying a change of the exponent 2/3 to 3/2 and including an inversion... Cf. the assumption in the background model of new levels developing through step 3 → ← 2.

$x^4 \rightarrow 3x^3 \rightarrow x^{3/2} \rightarrow \uparrow\uparrow \leftarrow x^{2/3} \leftarrow 2x^2 \leftarrow x^1$

There is a similar pattern of two-way direction in the protein synthesis, where tRNAs as from opposite strands of DNA meet mRNA "the other way around" at ribosomes in the "middle" of the process.

<u>Number of codons:</u>

This x^3-chain as basis for number of codons?

- 5 bases T/U-A-G-C become
- 4 inwards DNA and 4 outwards in RNA, which, become.
- 3 bases in codons, as 3 positions on ribosomes. Third position indifferent gives
- 2 bases relevant in one 3rd of codons. Then leads to
- 1 base in nucleotides, becoming active coenzymes in–MP, -DP, -Taprooms.

4 bases gives **64** possible codons but leads to
3 bases in actual codons = **27** differentiating ones including 3 stop codons,
2 bases relevant in 8 codons.

Rest 19, 27 - 8 codons with more or less halfway defined 3rd base in step 3 - 2:
- **8** ams with 3rd base U/C,
- **8** ams with A/G, A or G, (5 A/G-coded, 3 ams "3-base-coded"),
- plus 3, usually stop codons (or 2 if we count UA-A/G as one).

We could possibly imagine that it's the interval step 5' → 4' = 61 (125 - 64) that decides this reduction and appears in later numbers as potential "pre-codons" ?

(With this view it's possible to imagine that the not ams coding parts of DNA-strands, should be divided in quadruplets for the interpretation? Cf. perhaps how strands are cut, giving sticky ends?)

Number of codons as halvings:

64 → 32: 32 = "2-base-coded", x 4: 8 ams = 335
32 → 16: 16 = U/C-coded, x 2: 8 ams = 531
16 → 8: A/G-coded, x 2: 5 ams = 376, + 3 ams x 1, A or G = 262
+ 3x1, usually stop codons.