

Chemical Elements

- Electron Shells and the Periodic System -

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

First to establish is the fact that an elementary number chain $2x^2$, ($x = 5 - 0$) lies behind the periodic system and electron configurations in atomic shells. That is to say a version of the same kind as the dimension model described in part *Physics*.

Whole shells and number of electrons in the orbitals from the number chain $2x^2$ ($x = 5-0$), "theoretically":

x:	⑤	—	④	—	③	—	②	—	①	—	①
$2x^2$:	50	—	32	—	18	—	8	—	2	—	0
Intervals:	(18)		14		10		6		2		= number of electrons in the orbitals
Orbitals:	(x)		f		d		p		s		

Whole shells "theoretically";

K s	2 e
L s p	8 e
M s p d*	18 e
N s p d f*	32 e
(O s p d* f* (x) -)	-)

Orbital "x" here regarded as decomposed in what has been called the "P"-and "Q"-shells".

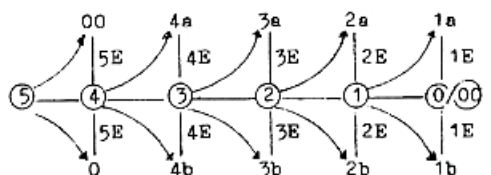
*Through the displacement of d- and f-orbitals to next shell, we get the real number series for whole shells:

$$\begin{array}{cccccc}
 +32 \leftarrow & +18 \leftarrow & +18 \leftarrow & +8 \leftarrow & +8 \leftarrow & 2 \\
 \text{P} & \text{O} & \text{N} & \text{M} & \text{L} & \text{K} \quad \text{etc.} \\
 86 & 54 & 36 & 18 & 10 & 2
 \end{array}
 \quad (\Sigma = 86)$$

The $2x^2$ -series may also be derived as a chain of energy, as Force times Distance in the dimension chain of our model. We have defined higher dimension degree (d-degree) in relation to a lower one as a binding force, the lower one as potential with number value ("E") = sum of the outer poles (or partial structures):

A dimension chain:

Fig. 01-2:



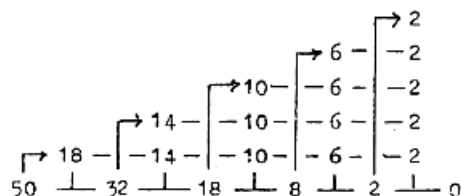
$$\begin{array}{cccccc}
 \text{Force x "distance":} & 5 \times 10 & 4 \times 8 & 3 \times 6 & 2 \times 4 & 1 \times 2 \\
 & 50 & — & 32 & — & 18 & — & 8 & — & 2
 \end{array}$$

Counting on 5 orbitals, although the 5th (x) not realized, the theoretical maximum of Z becomes 110 Z, sum of the $2x^2$ -chain.

As in the dimension model, we may regard higher numbers transformed into lower ones. The whole series of elements may be regarded as developed through one and the same dimension chain, with secondary development in each step giving a level chain: (This implies the aspect of “half-step” displacements of the type “border to interval”, which in these papers has been suggested as an elementary definition of a quantum jump.)

With numbers for the $2x^2$ -chain as “borders”:

Fig. 01-3:



We get number of electrons theoretically in orbitals s, p, d, f:

s	5 x	2 e	=	10	} 92 Z = Uranium, heaviest element in Nature
p	4 x	6 e	=	24	
d	3 x	10 e	=	30	
f	2 x	14 e	=	28	
x	1 x	18 e	=	18	

In reality a full second f-orbital of U is replaced by 4 s, 6 p, 1 d, 3 f electrons.

E-numbers and orbitals - sp(d)-hybridization:

Another way to derive the orbital numbers could be to interpret them as sums of outer poles in lower degrees, in agreement with the general postulates in our dimension model: higher d-degrees polarized to outer poles in the lower d-degree.

“E-numbers”*:	⑤ -	④ -	③ -	② -	① -	①	
	10	8	6	4	2	2	= sum of outer poles
		f	p	p	p	p	42 elements in f + p
	10	8	6	4	2	2	41 elements in d + s
			10	2			(of 1-83 Z)
			d	s			

This interpretation may give aspects on sp(d)-hybridizations in d-degree step (3)-2-1:

			$d^x sp^y$			
			/	sp^x		
Orbitals:	(18)	14	10	6	2	Level “+1” → Level 0
Shells:	50	32	18	8	2	Level “-1”

Such hybridizations, regarded as a superposed level, could indicate that in the underlying scheme the whole shell numbers may precede their differentiation into different orbitals.

*(As to this derivation of orbital numbers, see also paragraph 9.a).

There is still a third way to get the $2x^2$ -chain from a simple number chain 5-4-3-2-1-0 which could be mentioned here. It concerns transformations between number-base systems (nb-x). (Such transformations give number relations in the genetic code. See pdf-files on “*The Genetic Code*” on the menu bar.)

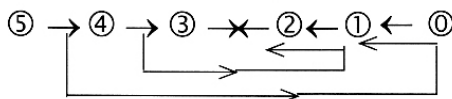
Assuming the elementary number chain $x \cdot 10$ represents d-degrees connected with declining number-base systems we have:

$$\begin{array}{cccccc}
 \frac{\text{nb-10}}{50} & \frac{\text{nb-8}}{40} & \frac{\text{nb-6}}{30} & \frac{\text{nb-4}}{20} & \frac{\text{nb-2}}{10} & \\
 = \mathbf{50} & \mathbf{32} & \mathbf{18} & \mathbf{8} & \mathbf{2} & \text{in nb-10}
 \end{array}$$

2. Lower steps or degrees in the number chain as debranched from higher steps:

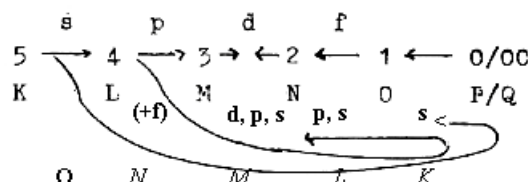
With respect to the orbital forms the s-orbital represents the innermost orbital, the least polarized one but simultaneously the last step in number of electrons in the chain. We could here apply the loop model of a dimension chain, where debranched d-degrees from higher d-degree steps meet “the other way around”:

Fig. 02-1:



A sketch with question marks for the development of the f-orbitals:

Fig. 02-2:



The periodic system should be possible to regard from the double aspect of polarizations and synthesis, where the direction of polarization or disintegration on some underlying level is followed by the synthesizing direction (inwards) on a superposed level.

In this sense Uranium (the heaviest atom in Nature) as a potential mass on a field level could be thought of as an equal primary element as H, D, or He (1, 2, 4 A). (Cf. perhaps the atomic radius of He and Fr (87 Z): both = 2,7 Å.)

Counterdirection “from outside” may be interpreted as a condition for development of the higher orbitals. The filling up of d-orbitals “demands” such counterdirection from outside, expressed as s-electrons of the next higher shell further out, and filling up of the f-orbital demands both s- and p-electrons in still another shell further out.

Regarding a secondary centre in step 3-2 and Pd:

Pd, 46 $Z = \frac{1}{2} \times \text{max. } Z$ in Nature, is the only element where the d-orbital is “naked”, the outmost one, without any s-electron further out. It could represent a centre in the 3-2-step, the step of the d-orbital number 10, where counterdirections meet, perhaps a virtual way to level developments? Or a channel in to the nucleus? Compare the geometrically sensitive experiments with Pd for cold fusion?

Compare too that Z-numbers about 46 has been identified as one kind of border in the periodic system (between fusion and fission forces? (*Gamow*). See figures 07-2, 09-4.

3. Orbital forms - dimensional aspects on the geometries:

Reference here: <http://winter.group.shef.ac.uk/orbitron/AOs/5d/index.html>.

There are three different aspects on these orbital forms:

- Geometrically the occupied dimension degree of the orbits.
- Form of individual electron orbits as stepwise halved lobes.
- Angle polarization between the orbits of opposite electrons in electron pairs.

Geometries:

These imply a stepwise increase in occupied dimension degrees (1→2→3) or orientation in $p \rightarrow d \rightarrow f$ -orbits, as inwards in the dimension chain, in accordance with the increasing number of electrons.

→ 1: linear: **p**-orbits along the co-ordinate axes

→ + 2: plane quadrants: **d**-orbitals also in plane quadrants, 2-dimensional

→ + 3: space quadrants: **f**-orbitals, 2 of them obviously also occupying space quadrants (solid angles).

		Volume	Surface	Lines	Motions	
5	—	4	<— 3	<— 2	<— 1	0/00 → Elementary dimension chain geometries.
		f ↗	d ↗	p ↗	s ↗	
50		32	18	8	2	0 → 2x ² -chain.
		14	10	6	2	→ Intervals, number of electrons.

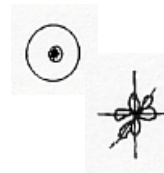
The **s**-orbital illustrates the 0/00-relation between centre (0) and anti-centre (00).

In the **s**1-orbital one electron in a pair seems located in the centre or within the nucleus as occupying 0 dimensions. The other one in the pair (He, 2 Z) represents a more or less undefined anti-centre. (This fact could eventually explain some special characteristics of the alpha-particles and liquid He?). To fit in the geometrical scheme above we have to regard the elementary **s**-orbitals as expression for what in our model is the **d**-degree of Motions; 0/00 equivalent with 5' and as such a whole on a secondary level.

Forms of the orbits:

These imply polarizations as halvings of the form in growing number of lobes of an electron orbit through $s \rightarrow p \rightarrow d \rightarrow f$ orbits; polarizations inwards in opposition to how lower dimension degrees are created by polarization of higher ones in our dimension model when it concerns geometrical structure and where the degree of motions increases towards lower structural degrees. See annotations below.

s 1 e = 1 whole sphere, the other "a centre". Fig 03-1: *s*-orbital



p 1 e = 1 lobe. 1 e per half axis:

6 electrons along the c-ordinate axes.

(An electron pair "dumbbell" formed).

Fig 03-2: *p*-orbital



d 1 e = 2 lobes along whole co-ordinate axes.

3 electrons with halved ("dumbbell" formed) orbits along x-y-z-axes.

1 ring-formed around z-axis in the x-y-plane

(Rotation as a 2-dimensional motion separates x-y-plane from third z-axis.)

6 electron orbits halved along secondary axes through the 12 plane quadrants.

f 1 e = 4 lobes. 2 + 6 = 8 out of 14 electron orbits are halved once again:

One of two possible arrangements is called the "cubic form":

6 e along co-ordinate axes, each e-orbit divided in one lobe, one more “ring”-formed, (similar as cones* thread into one another with middle in the origin).

6 e in plane quadrants as in d-orbits but here each e = 4 lobes.

2 e obviously in space quadrants, 1 e = 4 lobes.

* Note that these “conical” forms of the f-orbitals could be regarded as one partial expression for a 0-00-relation, ”outer” poles of d-degree 4 in our model.

Angles between electron orbits in the pairs:

Regarding the angle or sign relations we also have the polarization direction inwards, in opposition to our hypothesized order when it concerns the complementary poles of structure in the dimension chain: steps $5 \rightarrow 4 \rightarrow 3 \rightarrow 2$ implying angle steps $360^\circ \rightarrow 180^\circ \rightarrow 90^\circ \rightarrow 45^\circ$. There is only the same angle relation in the middle step, i. g. in the d-orbital.

The f-orbital, in number of electrons related to step 4-3, get the angle relation 45° , in our model hypothesized as in step 2-1.)

50	—	32	—	18	—	8	—	2	—	0	
		f		d		p		s			Relation between electron orbits in a
		45°		90°		180°		360°			pair, given opposite signs:

s-orbital = 360° , centre versus a whole sphere.

p-orbital = 180° , the opposition between halves of each co-ordinate axis.

d-orbital = 90° , the opposition between different co-ordinate axes.

f-orbital = 45° . Polarities of both 180° , 90° and 45° seem represented.

This is descriptions of lowest s-p-d-f-orbitals: the same orbitals in outer shells get still more divided.

The higher orbitals represent cumulative results, include the orientations of the lower ones: only 6 of the 10 electrons in a d-orbital occupy plane quadrants, only 2 of the 14 f-electrons the space quadrants.

Annotations regarding directions in the dimension chain:

In our elementary dimension chain decreasing d-degree of structure corresponds to increasing d-degree of motions (d-degree 1 when polarized into “external motions”).

Motions possible to imagine as more or less substantiated in their patterns:

00/0 ← 1 ← 2 ← 3 ← 4 ← 5 Degree of motions

Structures: $5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 1 \rightarrow 0/00$

We can remind of the fact that orbits are just patterns of motions and electrons as “matter” are closest to the world of Vacant Space as anti-matter on an elementary level in our model.

We have the counterdirections of the loop model in these chains but the number of motions is of course much to simple to apply in this context of electron orbits.

The hypothesis presented in other files that the 2^x -chain could be valid from the end of the dimension chain inwards, is more in agreement with the orbital divisions. (2 as log-base from the sum of outer poles 1a---1b of d-degree 0/00. Numbers 5-4-3-2-1 becoming exponents.

To get the 2^x -chain in accordance with halvings of orbital forms above it seems that we have to count on electron *pairs*:

2^5	—	2^4	—	2^3	—	2^2	—	2^1	—	2^0
32		16		8		4		2		1
				f		d		p		s

s-orbital, 1 pair: = 1 “sphere”, and the other e as a “centre” counted as 0).

p-orbital, 1 pair = 2 lobes. If all e-orbits were “lobes”: Sum 3 pairs x 2 = 6.

d-orbital: 1 pair = 4 lobes. Sum 5 pairs x 4 = 20.

f-orbital: 1 pair = 8 lobes. Sum 7 pairs x 8 = 56

(Total sum 82-83 “lobes”. Cf. total number of “stable” elements!)

However, counting - more appropriate perhaps - with ring-formed orbits separately, the number of forms in first s-p-d-f-orbitals may approximately be found in an x^3 -chain as intervals if rightly counted:

		f	d	p	s	
x:	5	4	3	2	1	0/00
x^3 (x = 5-0)	: 125	— 64	— 27	— 8	— 1	— 0
Intervals:		37	19	7	1	0
		\swarrow \swarrow				
		44				

44 = f-orbital lobes: 37 + 1 drop- or conical formed lobes + 7 - 1 “ring”-formed ones.

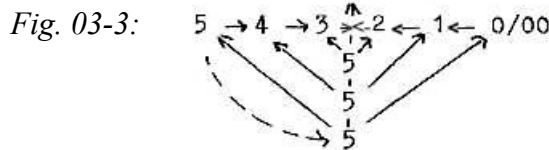
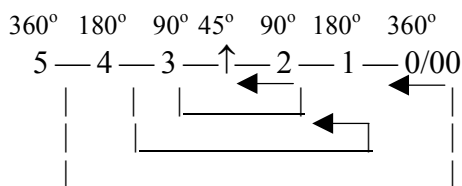
19 = d-orbital lobes: 12 + 6 + 1, including 1 ring-formed.

8 = p + s “lobes”, counting in that case with two spherical ones of s-orbitals.

s + p + d = 27 = 3^3 .

Total sum 63, also = $1 + 2 + 4 + 8 + 16 + 32 = \text{sum of } 2^0 - 2^5$.

About halvings of the angle relations, also in opposite direction to our elementary model: two ways to illustrate what we have called the loop model;



How to account for the *f*-orbital in such a scheme? It doesn't fit into the periodic system either, and the aspect here could be one explanation.

Could we assume that one branch represent a return inwards, one “upwards” towards a new level (including new angles)? In that case corresponding to the two forms of *f*-orbitals, the “cubic” one and the “general” one in terms of the reference?

Illustrating polarizations as angle steps in a unity circle, we get from “2” one branch inwards higher degree “3” in the figure below, one branch “outwards”:

Fig. 03-4:

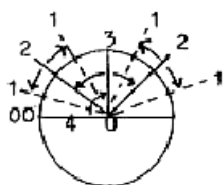


Fig 03-5:

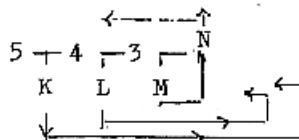
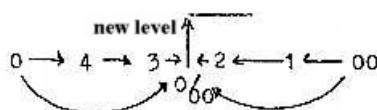


Fig.03-6:



Poles in a 3-dimensional co-ordinate system (CS):

A simple counting of poles in the CS-system could give an additional aspect on the figuration of orbitals:

As poles of d-degree 4 = 0---00 in our model: centre = origin and (undefined) anti-centre. = 2 poles .

As poles of d-degree 3 = 4a---4b in our model 8 space quadrants = 8 poles.

Part of f-orbital: 2 e-orbits = 8 lobes.

As poles of d-degree 2 = 3a --- 3b in our model: 12 plane quadrants, as pairs = 6.

Part of d-orbital: 6 electron = 12 lobes.

As poles of d-degree 1: 2a---2b in our model: along x- and y-axes, 2 e-orbits of opposite signs, together 4 lobes. Another part of the d-orbit.

As pole of d-degree 0/00: 1a---1b in our model: 1 e-orbit along z-axis with 2 lobes. + the ring-formed one - which seems to represent a secondary centre *. Third part of the d-orbital. Cf. the division of d-degree 3 in d-degrees 2 + 1.

*Note perhaps also that the ring-formed electron orbit may represent a factor of uncertainty, that is in the direction around the z-axes. The "uncertainty principle" possible to connect with the 00-pole as anti-centre in last step.

We could regard a variation of the elementary number chain, assuming multiplications in d-degree steps corresponding to force times distance:

$$\begin{array}{r}
 5 \text{ --- } 4 \text{ --- } 3 \text{ --- } 2 \text{ --- } 1 \text{ --- } 0/00 \quad \text{Compare: } 20 \text{ --- } 12 \text{ --- } 6 \text{ --- } 2 \\
 5 \times 4 \quad 4 \times 3 \quad 3 \times 2 \quad 2 \times 1 \quad \quad \quad \backslash \quad 32 / \quad \backslash \quad 18 / \quad \backslash \quad 8 / \\
 = \quad 20 \rightarrow 12 \quad 6 \quad 2 \quad 0 \quad \quad \quad \sim 4 - 3 - 2 \text{ in the } 2x^2\text{-chain} \\
 \searrow \\
 8 \quad 6 \quad 4 \quad 2 \quad (\rightarrow \text{intervals } 8+6 = 14, \sim f\text{-orbital}, 6 + 4 \sim d\text{-orbital})
 \end{array}$$

8 space quadrants, 6 outer poles of x-, y-, z-axes. 4 outer poles of x- y-axes, 2 outer poles of z-axis. In this "energy" chain orbital numbers appear raised 1 d-degree step.

$5 \times 4 = 20 = 8$ space quadrants + 12 plane quadrants.

First interval 8 as debranched, disintegrated into 2 + 6, as s + p orbitals.

$4 \times 3 = 12 =$ plane quadrants

$3 \times 2 = 6 =$ outer poles or half axes in a 3-dimensional co-ordinate system

$2 \times 1 = 2 =$ poles centre - anticentre, 0 and 00.

Two extra annotations:

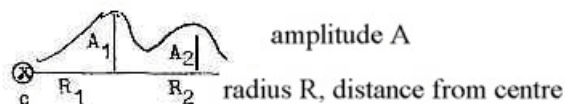
a) The thought of a secondary centre in step 3 - 2 could be taken as illustrated in the **orbital forms at sp^x -hybridizations (and spd^x)**: resembling a centre - anti-centre figuration in the polarization of signs but here as more separated: half a bigger sphere "surrounding" a little whole sphere:

Fig. 03-7:



b) The charge curve of the 2s-orbital has been illustrated like this:

Fig. 03-8c:



$R1 / A1 = 4 / 1$. (Compare figure 03-3 above, polarization $5 \rightarrow 4/1$.)

$R2 / A2 = 64/9 = 4^3 / 3^2$. Secondary quotient $64/9 \div 4/1 = (4/3)^2$.

The quotients could be interpreted dimensionally:

The radius as expression for d-degree 4 defined by the poles 0 and 00, c and ac.

The amplitude interpreted as expression for d-degree 3, at straight angle.

Quotient R/A increases from inner to outer maximum with $[4/3]^2$ - as an expression for d-degree step 4 - 3. Observe that this curve concerns the 2s-orbital, not the first one.

4. Quantum numbers n, l, m, m_s :

The differentiation of the electron structure of atoms are usually described through 4 quantum numbers n, l, m, m_s :

n = whole shell number,

l = partial shells, representing the orbitals s, p, d, f above, also describing the eccentricity of the orbits in one of the atom models.

m_l = the angle of the orbit in relation to the magnetic axis of the atom, and

m_s = spin direction of the electrons: $\pm \frac{1}{2}$.

The 4 numbers are enough to identify a certain electron orbit. However, they are attached to an older, more simple atomic model and they seem not quite easily compatible with the newer views on orbits described above, especially the l -number.

With 5 whole shells (n) we get 4 developed orbitals ($l = n - 1$), 3 magnetic quantum numbers ($m_l = l - 1$), divided in opposite signs: $\pm 1, \pm 2, \pm 3, \pm 0$. And 2 spin directions: $\pm \frac{1}{2}$.

These numbers of possible states for each quantum number, $5 \rightarrow 4 \rightarrow 3$ (and 2) reminds of the dimension model but is it possible to interpret the different properties which they refer to in that way?

Here is one suggestion:

- n : **The number of the whole shell**, expression for the polarization in inner / outer shells as in poles *centre - anti-centre*, $0 \longleftrightarrow 00$: Concerns also a sphere in relation to the planes of the l -number. Each whole shell is said to have a spherical form. D-degree 4 with outer poles 0 and 00. Or in the latter feature d-degree 3.
D-degree 4-3.
- l : **Shape of the orbit planes (s, p, d, f), spherical to “elliptic”**. Quotient between the half axes of the orbit planes describes the transition from spherical to what here is called a more and more elliptic form. Elliptic orbits imply features of inward/outward (4a/4b, outer poles of d-degree 3) in motional direction.
In a secondary sense it could also be regarded as expressing the opposition *circular* \longleftrightarrow *radial*, in this model assumed as the geometrical poles of d-degree 3, outer poles in d-degree 2. concerning planes of d-degree 2. (This opposition circular - radial could be connected with the orbitals form along the z-axis in the d-orbital, one electron orbit along the z-axis, as radial, and the ring-formed one as circular, and similar forms in the f-orbital, defining “conical” surfaces?
D-degree 3 - 2.
- m_l : **Angle of inclination of the orbit planes in relation to the magnetic axis** of the atom. A polarization along the circumference between planes as an expression for the step $2 \rightarrow 1$ in terms of this older model? Also to be regarded as a crystallization of 1-dimensional directions around the atom.
(This property seems to correlate with - or express the same as - the steps between different d-degrees, *c/ac* \rightarrow linear \rightarrow plane quadrants \rightarrow space quadrants in analysis of orbits in the preceding section 3. In this more elaborated model the 1st degree is represented by the added or debranched degree 1 in each d-degree step.)
D-degree 2 - 1.

- m_s : **Spin direction of the electron pairs**, $\pm 1/2$: a polarization into opposite motional moments (or direction of inherent "waves") as poles out of their connecting lines: an expression for d-degree step 1 \rightarrow 0/00.

$$\begin{array}{cccccc} 5 & - & 4 & - & 3 & - & 2 & - & 1 & - & 0/00 \\ & & n & & l & & m & & m_s & & ? \end{array}$$

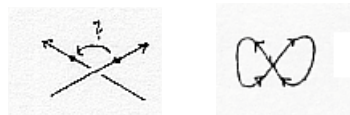
A 5th polarization or quantum number? Probably to identify with the polarization of an atom in nucleus and electron shell, the primary centre - anticentre relation?

A footnote:

About connections between electron pairs:

Fig. 04-1, 2:

Is two crossing lines - or orbitals possible?

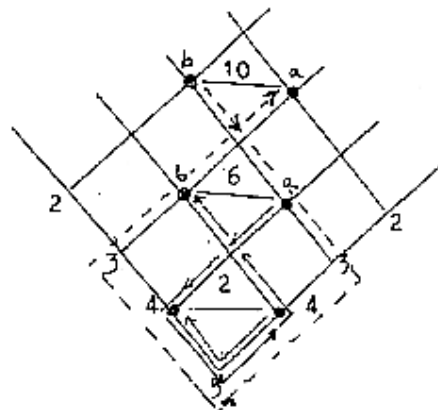


Is it possible for an electron just to change orbit? (Cf. a figure of Feynman.)

Doesn't such a change claim an underground passage as in the metro? A way via underlying levels? The further out in an orbit, the more underlying levels and clutch stations involved.

Number of steps demanded for changing position from a to $b = 2, 6, 10$ - as electron numbers in s-, p-, d-orbitals, if the change demands passing via centre "5":

Fig. 04-3:



5. The “Octet Rule”:

In the periodic system as a whole “the octet rule” creates one of the fundamental polarities. (Other ones are the fusion - fission “directions and lightest - heaviest elements. N-Z-relations may be regarded as a third.)

The octet rule separate more or less oxidation numbers, valences and defines the difference between non-metals and metals. It has been described as a “striving” of the atoms for filled s- and p-shells furthest out and cannot be explained by the elementary balance between numbers of protons in the nucleus and electrons in the shell. Inert gases have this figuration; 2 + 6 electrons, one s-orbital and one filled p-orbital furthest out, which gives a “complete” shell, stability, indisposition to react with other atoms.

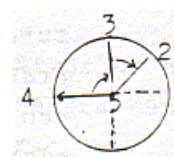
From a purely electromagnetic point of view the equal number of protons and electrons itself in every element could have been thought of as making them “self-sufficient”. It doesn’t. Nor does the structure of orbits according to the reference above. We have to look for some other determining factor.

Why do 8 electrons furthest out represent the most stable configuration, defining whole shells? Here some suggestions.

Fig. 05-1:

$2x^2$:	5	4	3	②	1	0
	50	- 32	- 18	- 8	2	0
				6	2	
			orbitals	p	s	

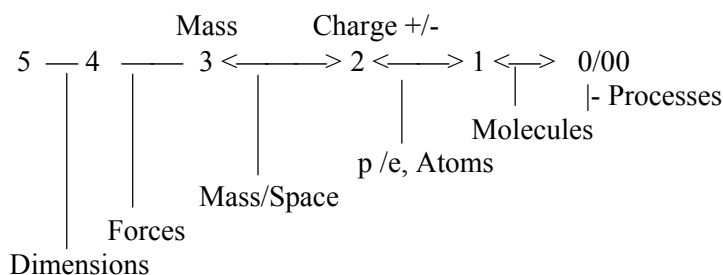
- a) D-degree 2, giving **number 8** in the $2x^2$ -chain, represents geometrically surfaces, the character of “shells”. May be interpreted as disintegrating into 6 + 2.
- b) 3 polarizations lead to number 8 in the $2x^2$ -chain. 3 polarizations in the $2x^x$ -series do the same: 1 → 2 → 4 → 8, as in d-degrees from 0/00 → 1 → 2 → 3.
- c) In our model d-degree 2 has the outer poles (or partial structures) 3a and 3b:
3a—2—3b: possible to read as 2 + 6.
- d) 3 angle steps from $360^\circ \rightarrow 180^\circ \rightarrow 90^\circ \rightarrow 45^\circ$ implies an 8-division of a circle. This angle 45° doesn’t appear in the orbit structures of s and p above but with the *f*-orbital (in step 4-3 in the number chain). In the loop model we have the connection between step 4 → 3 and 2 ← 1.
 (Loop-model: Step 5 → 4 corresponds to step 1 ← 0/00 (s), step 4 → 3 corresponds to step → 2 ← 1 (p).) Fig. 05-2:



Could the completeness of the number 8 eventually be connected with the fact that the coefficient of direction at 45° is 1, $\sin = \cos$? A balance between directions “inward /outward, poles of d-degree 4 in our model, as they appear in d-degree 2?

e) 8 space quadrants make up a full, complete Volume (d-degree 3). In the *f*-orbital only 2 electrons, each with 4 lobes, occupy these solid angles as noticed above. This fact could be thought of as translated into the *s+p*-orbitals in the lower degrees.

f) **Charge** as such, as one of the elementary properties of matter, has in this model been assumed as a 2-dimensional one in relation to mass when analyzed as 3-dimensional. If so, could this imply that d-degree 2, giving number 8 in the $2x^2$ -chain, constitutes a certain border; electron shells as expression for total positive / negative charge?



g) A related aspect refers to views on development in this model: from Forces to Mass to Matter of opposite Charge etc. The electromagnetic force assumed to develop in d-degree step 3 - 2 with elementary particles of “matter” as p and e appearing in d-degree 2. In following step 2 - 1 we could assume the differentiation of chemical elements. in next step molecules.

h) Charge as property has naturally roots in higher degrees as d-degree 4. The elementary polarization of d-degree 4 may be written: $4 \rightarrow 3+1$. These figures doubled give $6 + 2$, the numbers for *p* + *s*-orbitals.

With these a bit different aspects we reach number 8 In several ways towards the middle of the chain (3 or 2) from higher or lower d-degrees, the kind of centre where directions outwards and inwards meet in the loop model.

Oxidation numbers and ionizations depend more or less on this “octet rule”.

Worth noting is that e.g. Cl (17 Z) as a ion Cl^- , with 6 e- furthest out, that is with “completed” s + p-orbitals, has a bigger radius than Ar 18 Z. Hence, the “stolen” electron doesn’t supplement the p-orbital into symmetry, nor to inactivity. The number 8 itself doesn’t explain the inertia of the inert gases. Elements, which through ionization get the full s+p-number 8 furthest out, as Cl^- , K^+ , Mg^{2+} etc. etc. are actively involved in molecular processes, those gases not.

Only where this number 8 or filled s+p-orbitals in outer shell coincides with the equivalence between number of protons in nucleus and electrons in the shell, the inertia appears. The geometry of filled p-orbitals may be one factor.

Generally speaking, we should count on dimension chains developed on many different levels and with different relations in the steps, expressed as operators of different kinds working in the d-degree steps. Then the octet rule could perhaps express such a conjunction between two (or more) levels or properties. One example:

In the dimension chain as Force times Distance (an 1-dimensional potential) the products led to the same number 8 of s + p:

$$5 \times 4 = 20, 4 \times 3 = 12, \text{ the lower steps } 3 \times 2 = 6, 2 \times 1 = 2.$$

On a deeper level, in a dimension chain of forces, the strong force (Fst) has been assume developed in d-degree step 2-1. With the electromagnetic force regarded as developed in step 3 - 2 and Charge as property in d-degree 2, the first polarization of charge in protons and electrons becomes a condition for the development of the strong force. Cf. the outer poles of d-degree $2 = 3 + 3 = 6$: **3a — 2 — 3b**. We could perhaps imagine that such processes on different levels coincide at d-degree 2, defining the octet rule?

Could there exist some connection too between the octet rule and the fact that the strong force in nuclei isn’t fully developed before ≈ 8 protons?

Transformations of numbers between number-base systems (nb-x):

As said above: the possibility of a connection between different d-degrees and different number-base systems (built on E-numbers as sum of poles) has been developed in the files about *the genetic code*, the possibility of an inherent mathematical operator on an underlying level to physics and biochemistry (?).

The $2x^2$ -series behind electron shells read as 8-base-numbers:

	<u>Intervals</u>	<u>10-base</u>	<----	<u>8-base ($2x^2$)</u>	
		40	---- 10 ----	50	5
	14 ———	26	---- 6 ----	32	4
	10 ———	16	---- 2 ----	18	3
Octet rule in step 3-2?	8 ———	8	— 0 ----	$8 \sim 10 = +2, \sim s \rightarrow (s+p)$	2
	6 ———	2	-----	2	1
	2 ———	0	-----	0	0/00
	Σ	92	↓		
	= Z U			= 10 - 6 - 2 - 0 ... = d-p-s-orbitals	

Intervals in the 10-base number chain:

= f-orbital 14, d-orbital 10, s+p-orbital 8, p-orbital 6 (+ s-orbital 2).

Cf. the chain of multiplications Force times Distance and transformations nb10 to nb-16:

	<u>16-base</u>	<u>10-base</u>
5 x 4	= 20	32 2 x 4 ²
4 x 3	= 12	18 2 x 3 ²
<u>3 x 2 + 2 x 1</u>	<u>= 8</u>	<u>8</u> 2 x 2 ²
	40	

6. Factor 21 and Z-sums divided on elements in different orbitals:

Bi, 83 Z, is often regarded as the highest “stable” element. The whole sum of 1 - 83 Z = 3486 Z.

This sum is divided on the elements in different orbitals like this:

50 - 32 - 18 - 8 - 2 - 0	Chain $2x^2$, x = 5 - 0
14 10 6 2	Orbitals
f d p s	
5 - 4 - 3 - 2 - 1 - 0	Elementary chain
→ 43	21 x 43 = Z-sum of elements in f -orbitals
← 123	21 x 123 = Z-sum of s+p+d -orbitals

f-orbital elements 21 x 43 = 903

s-p-d-orbital elements 21 x 123 = 2583 = s 258 + p 894 + d 1431. (s 258 = 6 x 43.)

Note the factor 21 [factors 7 (4+3) and 3 (2+1)].

7. Metals — Non-metals:

This polarity concerns the relation to the octet rule and oxidation numbers.

Most of non-metals are characterized by negative oxidation numbers (in addition to positive ones with the exclusion of oxygen (O) and fluorine (F) which have only negative ones). There is H in the first s-orbital and the rest elements in the incomplete p-orbitals. That's besides the inert gases without oxidation numbers.

The non-metals dominate first whole shells K, L and M, get fewer in higher shells. In these first two to three shells we find the structure building elements of life, characterized by covalent bonds, which imply *shared lack* with regard to the octet rule.

(With the loop model of the dimension chain in mind, and the aspect of opposite directions in the chain, we could regard these elements of life as representing the higher d-degrees 5-4-3. At the same time, as lightweight elements with Z-number in lowest degrees, they should represent stages where more degrees are debranched into motions, characterizing life.)

Negative oxidation numbers for L-shell elements C, N, O = -4, -3, -2, (for H in K-shell -1), and for P, S in M-shell : -3, -2. It seems as these numbers referred to d-degrees too, on a higher molecular level.

All oxidation numbers, plus/minus, for instance of carbon (C):
C: surplus of +4, in relation to a full K-shell (1s), surplus +2 in relation to full 1s and 2s in K+L-shell. deficit of -4 in relation to full K-shell and L-shell s+p-orbitals = 10 e/Z.

Pauling's curve over the gradual change in electronegativity of elements gets the S-form, where a "concave" part turns to a "convex" part with a dividing inflection point. In our model we have suggested such a polarity in geometrical terms between poles from the polarization of d-degree 2: 2b = concave, 2a = convex. One expression for the polarity 0 \longleftrightarrow 00-poles in lower d-degrees in terms of our model.

Pauling's curve defines also the ("gradual") transition from covalent bonds to ion bonds between element.

In part *Biochemistry* in this booklet series, we deal with *chemical forces* developed into a whole dimension chain on the superposed molecular level, forces expressed in different bond types. We suggest to interpret covalent bonds as expressions for the chemical force 4b (outward direction) in relation to metallic bonds 4a (inward direction) which represent a shared surplus.* (All b- and a-poles with features inherited from the first polarity 0-poles and 00-poles respectively.)

To summarize: in these senses and on this level we may regard the polarity non-Me / Me as referring to a centre - anticentre or 0 / 00-relation (turned the other way around in the $2x^2$ -series).

In each shell metals has a bigger circumference than non-metals as anti-centra in relation to centra. When ionized, this relation is reversed.

*The ion bonds are interpreted as the force in d-degree step 3-2, connected with the primary electromagnetic polarity (+/-) as it is. Dipole bonds are interpreted as expressions for the force in step 2-1 and van der Waal bonds (depending on motions) as the force in step 1-0/00.

Number of metals and non-metals:

With the f-orbital elements excluded we have a number relation about 2 / 1 among elements 1-83 (83 Z regarded as the highest "stable" element.)

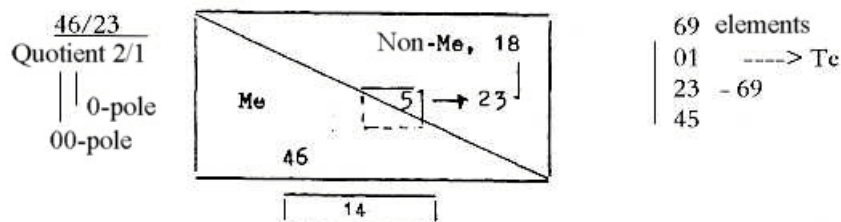
18 elements non-metals including 5 inert gases.

5 elements described as “transition elements”:

in used source Ge 32, As 33, Sn 50, Sb 51, Te 52 z.

46 elements metals in s-, p-, d-orbitals.

Fig. 07-1:



1-92 Z, division of Me and non-Me:

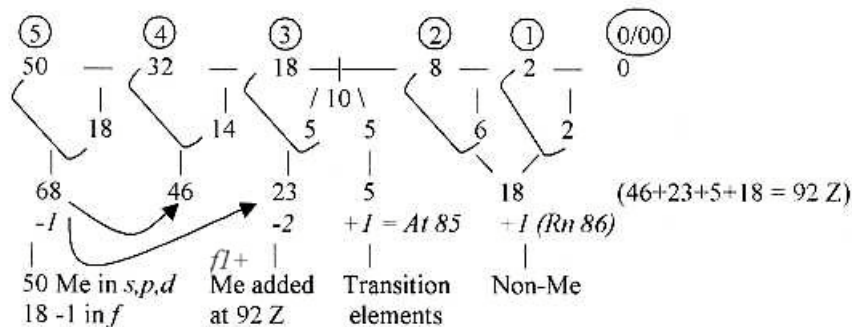
In the figure below a sketchy suggestion on how to look at it:

Sum of the $2x^2$ -chain = 110, - 50 = 60

One orbital chain (18+14+10+6+2) = 50, - 18 = 32.... Sum 92.

Numbers for higher d-degrees as 50 and orbital 18 transformed into lower ones.

Fig. 07-2:



Of 50 Me: elements, in $s+p$ -orbitals 18 +1, in d -orbital 32 -1.

Z-sums of elements Non-Me without transition elements:

Non-metals $\approx 1/10$ of elements 1 - 83 Z = 340 / 3486.

$\approx 1/10$ of elements 1 - 92 Z = 426 / 4278.

(In this relation we could eventually find one arithmetic expression (1 - 10) for the 0- and 00-poles or b- and a-poles in our model. (Very hypothetically a base for 10-power displacements in arithmetical number derivations and operations.)

Z-sum of Me + Transition elements of 1-92 Z = = 3852.

Expressed in the triplet series: $3852 = 4 (432 + 321 + 210) = 12 \times 321$.

Cf. mirrored number 2583 = 21 x 123 = $s+p+d$ -orbital sum 1-83 Z.

$2583 = 21 \times 123$ (1-83 Z, $s+p+d$ -orbitals)

$3852 = 12 \times 321$ (1-92 Z, Me + Transition elements in $s+p+d+f$ -orbitals)

Could those mirrored factors reflect some turns both concerning the f-orbitals versus $s-p-d$ -orbitals and in the opposition Me- Non-Me - and of additional non “stable” elements 82 - 92 Z? Cf. 50 - 32 - 8 - 8 - 2 - 0: $50+32 = 82$, $2 + 8 = 10$, opposite part of the chain.

Different between factors: $21-12 = 9$ and $321-12 = 198$:

$84 - 92 Z = 792 Z = 4 \times 198 =$ difference between triplets in the dimension chain:

“outwards” - “inwards”: $(543 + 432 + 321 + 210) - (345 + 234 + 123 + 012)$.

8. Mass views: ^1H — ^{238}U , lightest - heaviest element in Nature:

a. Here we find number relations between H and U through the elementary number chain 5-4-3-2-1-0 behind the $2x^2$ -series.

$p/e \approx 1836,12$.

$$\begin{array}{cccccc} & & 975 & | & 531 & \\ & & 9 & 7 & 5 & 3 & 1 \\ / & \backslash & / & \backslash & / & \backslash & / & \backslash \\ 5 & - & 4 & - & 3 & - & 2 & - & 1 & - & 0 \end{array} \quad 975 \times 10^3 / 531 = \mathbf{1836,158}.$$

Uranium 238 - heaviest element in Nature:

Fig. 08-1:

$$\begin{array}{r|l} 543 & \\ 432 & - 975 \\ 321 & \\ 210 & - 531 \end{array} \quad \frac{975}{531} + \frac{531}{975} \times 10^2 = 238,08 \approx \mathbf{238}.$$

Abbreviated: $975 / 531, \times 10^2 = 183,61. \approx 2 \times Z\text{-number } 92 (91,80).$

$531 / 975, \times 10^2 = \text{the inversion} = \text{the surplus of neutrons} = 54. (54.46.)$

b. A couple of Uranium atoms from inversions of two main triplets of the dimension chain:

U, 238 A, 92 Z:

Assumed
relative d-degrees
of the properties:

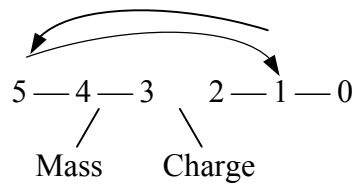


Fig. 08-2:

Triplet
numbers

543	∧	$\times 1/2, \times 10^5 = 92,08 \approx 92. = Z \text{ U}$
210	∧	$\times 1/2 \times 10^5 = 238,09 \approx 238. = A \text{ U}$

Hence, the inversions of main two triplet numbers in the dimension chain give 2 times the Z- and A-numbers of Uranium.

Noteworthy is the division A/Z-numbers, \sim mass / charge in the middle of the chain. Compare the inverted log-numbers for 3 and 2 squared:

$$[(1 / \lg. 2)^2 + (1 / \lg. 3)^2]^2 = \mathbf{238,0237}$$

c. Decimals of the inverted number 210:

$$1 / \mathbf{210}, \times 10^5 = 2 \times 238,095238$$

$$\begin{array}{l} \underline{\hspace{2cm}} 95238 = \underline{4 \times 238, 0952375} \times 10^x \\ \hspace{10cm} | \hspace{2cm} \text{etc.} \end{array}$$

d. The natural logarithm e as dividing the elementary dimension chain:

$$\begin{array}{ccccccc}
 & & & e & & & \\
 5 & \text{---} & 4 & \text{---} & 3 & \text{---} & 2 & \text{---} & 1 & \text{---} & 0/00 \\
 \hline
 & & & & & & & & & & \\
 5 - e & = & 2,2817 & & & & & & e & = & 2,71828\dots
 \end{array}$$

$$543 / (5 - e) = 238. \quad (237,98.) \quad \text{Mass number of U.}$$

$$210 / (5 - e) = 92. \quad (92,04) \quad \text{Charge number of U}$$

$$\text{Difference } 543 - 210 = 333: 333 / (5 - e) = 146. (145,94.) = \text{neutron number of U.}$$

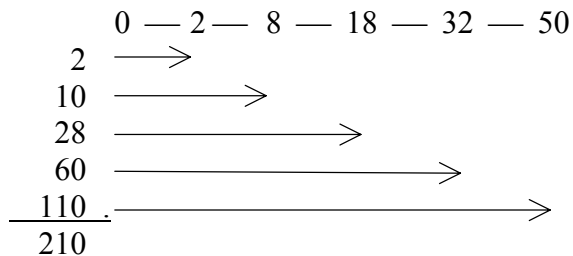
$$(543 - 146) = 397: 397 / e = 146, 04.$$

(As for the triplets inverted in point b. the interval 333 inverted gives 2 times the N-number 150., that is 4 u too much. Some hidden connection with α -emissions?)

The quotient between triplets 543 and 210 is about the same as between A and Z-numbers of U: 2,586. compared with 2,587. This number $\approx 2^{2/3} + 1^{2/3}$ is a number appearing in *the genetic code*, see in these files about *the Exponent series*.

$$\text{N/Z-quotient of U} \approx 2^{2/3}.$$

e. Number 210:, the inverse of which gave 2 times mass number of U (point b), is a cumulative sum in the $2x^2$ -chain:

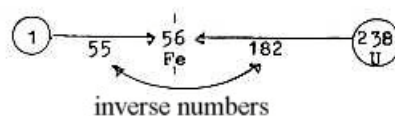


(Compare maximum mass number for "stable" isotopes 209, Bi 83 Z?)

f. Numbers ≈ 238 as sum of 2 numbers which are inversions of each other:

Number 55 = half of the sum of the $2x^2$ -chain 110:

Fig. 08-3:



Compare point a. above.

$$\text{Sum } 55 + 182 = 237, \text{ sum } 56 + 179 = 235. 54 + 185 = 239..$$

More about mass number 238 of Uranium and other numbers in the Periodic system in Appendix.

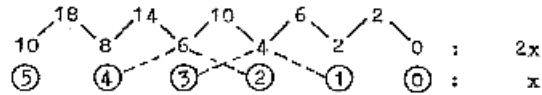
9. Fusion and fission:

a. Fission: The disintegration series of ^{238}U , ^{235}U and ^{232}Th :

A multiplication operator acting in the electron shells?

Orbital numbers 18-14-10-6-2 as sums of poles in d-degrees 5-4-5-2-1-0:

Fig. 09-1:



The point of this derivation of orbital numbers is that it makes it easier to imagine a potential dividing within the orbitals, p-orbital as $2 + 4 e^-$, d-orbital as $4 + 6 e^-$ or $1 + 3 (= 4) + .6$, f-orbital as $6 + 8 e^-$ or $2 + 4 (= 6) + 8$.

An angle change from \oplus to \otimes , from addition to multiplication relations in the e-shells, gives:

$$\begin{array}{l}
 \text{s-orbital:} \quad 2 \quad = 2 \\
 \text{p-orbital:} \quad 2 \times 4 \quad = 8 \\
 \text{d-orbital:} \quad 1 \times 3 \times 6 = 18 \\
 \text{f-orbital:} \quad 2 \times 4 \times 8 = 64
 \end{array}
 \left| \begin{array}{l} \\ \\ \\ \hline -92 \text{ Z } \text{ U} \end{array} \right.$$

$$\begin{array}{l}
 \text{s-orbital:} \quad (1 \times) 2 \quad = 2 \\
 \text{p-orbital:} \quad 2 \times 4 \quad = 8 \\
 \text{d-orbital:} \quad 4 \times 6 \quad = 24 \\
 \text{f-orbital:} \quad 6 \times 8 \quad = 48
 \end{array}
 \left| \begin{array}{l} \\ \\ \\ \hline -82 \text{ Z } \text{ Pb} \end{array} \right.$$

Through further division within orbitals the sum of the electrons gets 10 units higher.

The disintegration series of ^{238}U from 92 Z to Pb 82 Z goes through

8 alpha-steps = - 16 Z: compare the change above in f-orbital from 64 \rightarrow 48.

6 beta-steps = + 6 Z: compare the change above in d-orbital from 18 \rightarrow 24.

Compare from Physics:

f-orbital, from step 4 \rightarrow 3: Mass identified as a property in this step. Mass reduction connected with alpha radiation.

d-orbital from step 3 \rightarrow 2: Charge identified as a property in this step; beta steps implying change of charge.

Surely the distribution of electrons on different orbitals above will not correspond to that which the physicists observe - if they have time to observe what really happens?!

The same type of operations for all three disintegration series: ^{238}U , Uranium 235 and Thorium 232, 90 Z, suggestions:

$$\begin{array}{l}
 \text{238U} \\
 \text{Z 92}
 \end{array}
 \begin{array}{l}
 \text{f:} \\
 \text{d:} \\
 \text{p:} \\
 \text{s:}
 \end{array}
 \begin{array}{l}
 8 \times 4 \times 2 = 64 \\
 6 \times 3 \times 1 = 18 \\
 4 \times 2 = 8 \\
 2 = 2
 \end{array}
 \begin{array}{l}
 \xrightarrow{\text{"Rearrangements" within the atoms:}} \\
 48 = 8 \times 6 = -16 z (8 \alpha) \\
 24 = 6 \times 4 = + 6 Z (\beta+) \\
 8 = 4 \times 2 \\
 2 = 2
 \end{array}$$

^{235}U	f:	$8 \times 4 \times 2 = 64$		$49 = 7 \times 7 = -14 Z, -1 z$	
Z 92	d:	$6 \times 3 \times 1 = 18$		$21 = 7 \times 3 = +3 Z > +4 Z (\beta^+)$	
	p:	$4 \times 2 = 8$		$9 = 3 \times 3 = +1 Z$	
	s:	$2 = 2$		$3 = 2, +1 <$	

^{232}Th	↑	s+f: $16 = 4 \times 4 = 16$		$f = 48 = 8 \times 6$	
Z 90		d: $3 \times 3 \times 4 = 36$		$24 = 6 \times 4 = -12 Z$	
		p: $6 = 6$		$8 = 4 \times 2 = +2 Z > +4 Z$	
		-s: $- = -$		$2 = 2 = +2 Z$	
Start			End: Pb 82 Z		

^{235}U : In this disintegration series we have - 28 A:

- 7 alpha-steps,

+ 4 beta-steps = - 14 Z, + 4 Z

β -steps in this series occur in first steps in one (1) β^+ -radiation.

According to the suggestion above there should occur an inner β^+ -radiation.
(Possible to detect? Eventual connection with its use as nuclear fuel?)

^{232}Th , 90 Z: In the disintegration series to Pb 208 A we have - 24 A, - 8 Z:

- 6 alpha-steps,

+ 4 beta-steps = - 12 Z, + 4 Z.

One could of course ask why such changes in multiplication operations, (if so), should take billions of years.

Half-life times for 6 stations (of 15) in disintegration series of ^{238}U :

U 238:	$4,5$	$\times 10^9$	years
U 234:	$2,35$	$\times 10^8$	years
Th230:	8	$\times 10^4$	years
Ra226:	1621		years
Rn222:	4 days	$\approx 1,095 \times 10^{-2}$	years
Po 218:	3 minutes	$\approx 5,704 \times 10^{-6}$	years

Relations between half-life times:

U 238 - U 234 - Th 230 - Ra 226 - Rn 222 - Po 218
a b c d e f

$$\frac{b^2}{a \times c} = 2 \times \frac{d \times f}{e^2}$$

$$\begin{array}{ccc} | & & | \\ (153, 4) & \approx & (154, 2) \end{array}$$

b. The border between fusion and fission directions:

“The energy dale” - or from the opposite viewpoint the maximum of bond energy in the periodic system, is usually declared as about Fe, 26 Z, 56 A.

Another statement points to a flat maximum of bond energy around 60 A: Ni, 28 Z has one isotope 60 A.

A third statement says all elements above circa 150 A is α -emitting, i. g. elements about 62 Z.

Z-number of Fe, 26, is the sum in the middle step in the $2x^2$ -chain:

$$\begin{array}{cccccccc} & 5 & 4 & 3 & 2 & 1 & 0/00 & \\ \text{In the } 2x^2\text{-chain:} & 50 & - & 32 & - & 18 & - & 8 & - & 2 & - & 0 & \\ & & & & \setminus & / & & & & & & & \\ & & & & & 26 & & & & & & & \end{array}$$

The border around Fe, 26 Z is also the middle of the element series with regard to whole shells and orbitals:

- the middle shell M, counting on 5 whole shells (K-L-M-N-O); P- and Q-shells interpreted as before.
- the d-orbital of this shell (although displaced to N-shell): the middle step where we have d-orbital number 10 as interval,
- the middle of this orbital where we have Z-numbers 25-26.

Could it be allowed to read also the mass number (A) of Fe in this chain?

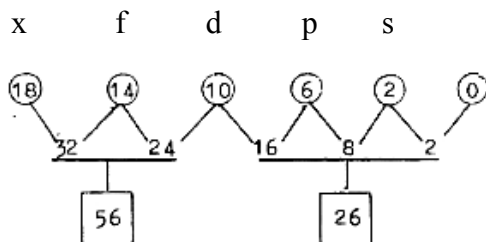
$$\begin{array}{cccccccc} & 5 & 4 & 3 & 2 & 1 & & \\ \underline{50} & - & \underline{32} & - & \underline{18} & - & \underline{8} & - & \underline{2} & - & 0 & \\ & | & & \setminus & / & & & & & & & \\ & 82 & \longleftrightarrow & 26 & & & & & & & \text{Z-number Fe} & \\ & | & & & & & & & & & & \\ & 56 & & & & & & & & & \text{A-number Fe} & \end{array}$$

A division of sum 82 (Z?) in Mass- and Charge numbers of Fe as properties related as d-degrees 3 to 2:

$$\begin{array}{cccccccc} & & & \textcircled{3} & & \textcircled{2} & & \\ & 50 & - & 32 & - & 18 & - & 8 & - & 2 & - & 0 & \\ & & & & \swarrow & \downarrow & \searrow & & & & & \\ & & & & \text{Mass} & 10 & \text{Charge} & & & & & \end{array}$$

Same numbers as a superposed chain on the orbital series:

Fig. 09-2:



Another number operation: 10 = d-orbital:

$$\begin{array}{r}
 18 \text{ --- } 8 \\
 | \\
 10
 \end{array}
 \quad \sqrt{10} \times \begin{cases} 18 = \mathbf{56,9} \\ 8 = \mathbf{25,3} \end{cases}
 \quad > \text{A/Z-numbers around Fe}$$

Products of numbers read in the superposed odd-figure chain:

Fig. 09-3:

$$\begin{array}{cccccccc}
 & & & 7,5 \times 3,5 & & & & \\
 & 9 & 7 & \rightarrow 5 & \leftarrow 3 & 1 & & \\
 5 & \diagdown & \diagup & & \diagdown & \diagup & & 0 \\
 & 4 & 3 & 2 & 1 & & & \\
 & & & 7,5 \times 3,5 & & & & \\
 & & & | & & & & \\
 & & & \underline{26,25} & & & &
 \end{array}$$

$$\begin{aligned}
 7,5^2 &= 56,25 \approx 56 && \text{(A-number at d-degree 3 for the Mass property)} \\
 5,3^2 &= 28,09 \approx 28 && \text{(Z-number at d-degree 2 for the Charge property)} \\
 &&& \text{(One unstable isotope of Ni 56 A.)}
 \end{aligned}$$

In the $2x^2$ -chain we have the number 60 at d-degree 4:

We have:

$$\begin{array}{ccccccc}
 & & & 60 & & & \text{Ni: 60 A, one stable isotope} \\
 50 & \text{---} & 32 & \text{---} & 18 & \text{---} & 8 & \text{---} & 2 & \text{---} & 0 & \text{32: N-number of this isotope} \\
 & & & \leftarrow & & & \leftarrow & & & & & \text{Ni 28 Z} \\
 & & & & & & 28 & & & & &
 \end{array}$$

According to first postulates in the dimension model higher d-degree is a binding force in relation to next lower one: d-degree 4 in d-degree 3, and mass as a property of d-degree 3 a binding force in relation to Charge, assumed as a property of d-degree 2.

With a bond energy about 8* MeV per nucleon one gets:

60 x 8 = 480 MeV of bond energy in such an isotope, equal to

$$\begin{aligned}
 &\approx \underline{938,3} \times \underline{0,511} \text{ MeV (479,5)} \\
 &\quad \downarrow \quad \downarrow \\
 &= \underline{p} \times \underline{e} \quad \text{in MeV.} \quad (*\text{More appropriate } 7,63\dots?)
 \end{aligned}$$

A certain angled relation between negative and positive charge (quarks?) in the nucleus à la 90°, representing a multiplication, could perhaps prevail at maximal bond energy. (?)

The Z-sum 1-83 Z = 3486 = 2 x 1743. A halving of the Z-sum to 1743 -- 1743 (+/-27) draws a border at 59 Z. (1743 ≈ 54,3 x 32,1).

A halving of the mass sum too of 1-83 Z ≈ 8291, (see Appendix about "More numbers") goes through Z 60-61:

$$\begin{array}{ccc}
 1 & \downarrow & 60/61 & \downarrow & 83 & \text{Z-numbers} \\
 & & 4191 & & 4100 & \text{A-number sums}
 \end{array}$$

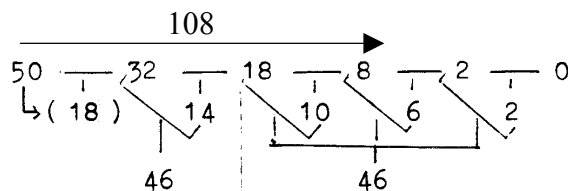
Compare the statement that all elements above ≈ 150 A which implies 60-62 Z, are α-emitting.

One fusion /fission border (a secondary one) also appears about 46 Z (Pd):

46 Z is half of max. Z 92: Pd 106-108 A. This according to one older statement (*Gamow*).

Cf. whole chain 110, (-2) =108.

Fig. 09-4:



Number 32 disintegrated in 14 + 10 + 6 + 2 includes one f-orbital 14 theoretically.

Division of the whole Z-sum 1 - 83 Z in quotient of the middle step 18 - 8 gives also a border around 46 Z:

$$\begin{aligned} \frac{18}{26} \times 3486 &= 2413. \longrightarrow, - 8 = 2405 = 47-83 Z \\ \frac{8}{26} \times 3486 &= 1073. \longrightarrow, + 8 = 1081 = 1-46 Z \end{aligned}$$

c. Fusion:

“A-Z-numbers” of atoms illustrating two parts of synthesis:

If we take a dimension chain with superposed odd figure level and add 2-figure numbers vertically downwards, we get numbers as “A-Z”-numbers of primary elements:

Exemplified: 95+94 = 189, 94+74 = 168, 74 + 73 = 147 etc.

“A-Z”-numbers:

O-atom:	16-8		9		7		5		3		1
N-atom:	14-7	/	\	/	\	/	\	/	\	/	\
C-atom:	12-6	5		4		3		2		1	0
			189	↓	147	↓	105		63		21 (D)
			↓	168		126		84		42	
			↓	O	N	C	B	(2α)	Li	He	H -H
			←-----		←-----		←-----		←-----		↑
			H ₂ O-OH ⁻ ----->								

- ionization of water equivalent with debranching of dimension step 1—>0 at step 5 → 4.

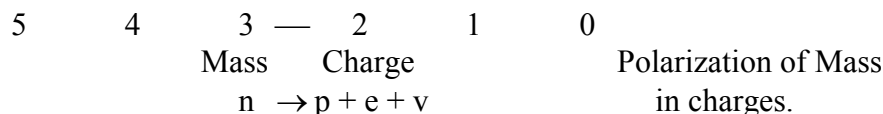
The “A-Z-numbers” give an illustration of fusion as in two halves of the chain inwards: the second one the carbon-nitrogen cycle in the sun: O ← N ← C.

The common factor in the “A-Z”-numbers is 21, which could be associated to step 2-1 where we in the dimension model should get the atoms and elements.

The illustration and concept of “A-Z-numbers”, although surely conceived as crazy, could point to a central role for the element boron (B), “A-Z”-number 105, bridging over the two parts of fusion.

10. N-Z-relations - a couple of aspects:

a. Neutrons outside atoms “disintegrate” into protons and electrons and neutrino radiation. We have in this fact a polarization step from a neutral mass particle into charges +/-.



Neutrons seem to have analogous function in multi-proton nuclei as neutrinos in individual particles, sewing together the structure.

As expressions for a binding force they could be associated to the higher d-degree in relation to a lower one according to general views or postulates in our model; where Mass and Charge as properties have been assumed defined in d-degrees 3 and 2 respectively. The postulates imply that Mass is a binding force in Charge as said above.

(It's said that according to some calculations the gravitational force (F_G) related to Mass at first, after Big Bang, was equal in strength with the electromagnetic force (F_{EM}) related to Charge - when counting with the whole Mass = 1. Perhaps comparable with the approximately equal number of protons and neutrons in the lightest elements (H excluded.)

In terms of the assumed quarks in the standard model, the polarization of neutrons means the up-quark becoming a down-quark, down-quarks becoming up-quarks in the proton, i. g. implying a total inversion of quark “directions” (dud → udu)*.

This reversal could possibly be connected with the opposite directions in our loop model of the dimension chain, in thirds of charge units: (-1, +2, -1) → (+2, -1, +2).

Mass — Charge-relation (A—Z) for elements 1-20 $Z \approx 432 — 210$.
(Triplet numbers from the dimension chain. $N = 222$)

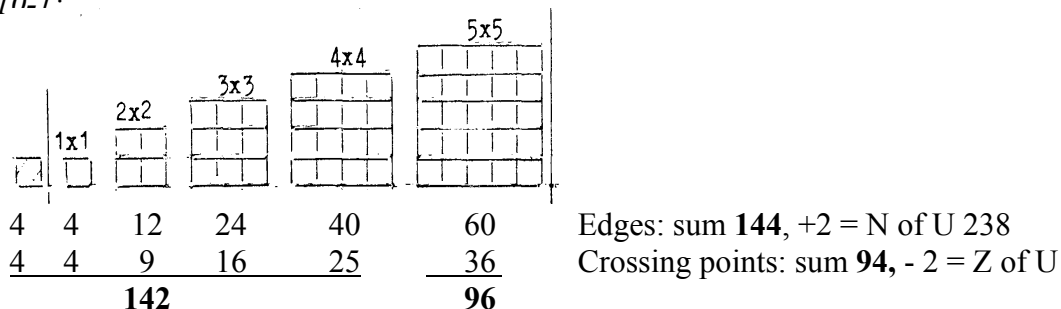
b. The quotient n/p increases towards heavier elements in the periodic system, from 0 → 1 (H → He) to about 1,587 ($\sim 2^{2/3}$). in Uranium 238.

One aspect is the fact that smaller volumes have bigger surfaces in relation to the volume than bigger volumes. This means relatively more contact with the outer polarizing space (as 00-pole), hence polarizations of neutrons: $n \rightarrow p + e\dots$

One suggested aspect here is to look at the relation N-Z as in some sense perpendicular, e.g. neutrons as intervals in relation to protons as borders: |—| p - n - p.

They appear as matrices to (or pattern of relations between) the proton groups. Such a relation could be illustrated by “chess board” squares with crossing points representing protons, edges neutrons.

Fig. 10-1



With the extra 1x1 square one get the sum 238 of Uranium

(Why an extra square? What should it represent?)

		<i>Quotient edges/crossing points</i>			
142-	1 x 1 square =	4 crossing points	4 edges	1/1	
	1 x 1 square =	4 "	4 "	1/1	
	2 x 2 squares =	9 "	12 "	4/3 = 1,33.	
	3 x 3 squares =	16 "	24 "	3/2 = 1,5	
	4 x 4 squares =	25 "	40 "	8/5 = 1,6	
96-	5 x 5 squares =	36 "	60 "	5/3 = 1,67	
	Sum =	94	+ 144		
		<u>92</u>	-2	+2	
		Z	146	N	Quotient Z/N for ²³⁸ U
					≈ 0,63 (∧ 1,587.)

The N/Z-relation of ²³⁸U is closest to 8/5, the quotient at 4 x 4 squares.

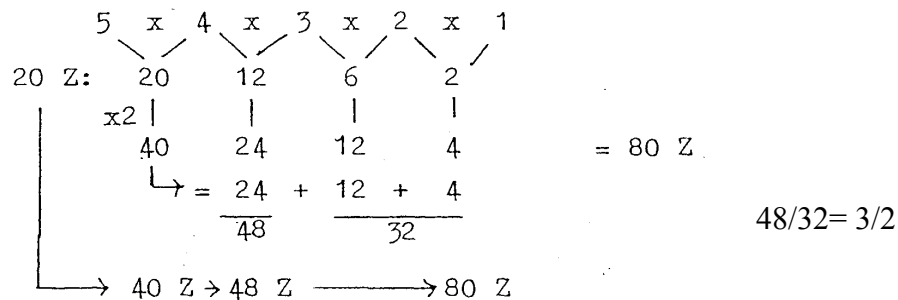
When ²³⁸U not disintegrates stepwise through α-emission but is splinted into 2 parts, the partition is about 2/3: mass maxima about 95 and 140: in Z-numbers: Ba 56 Z (A-number of isotopes 130-144) and Sr 38 Z (A-number of isotopes 84-95). Cf. the sum 94 Z above.

c. Development of the N/Z quotient in steps 5/5 → 5/4 → 4/3 → 3/2 → 3,2 / 2

	He	Ca	Zr	Cd	Hg	
Z:	2	20	40	48	80	--- (92)
	\ /					
N/Z ≈	5/5		5/4	4/3	3/2	(≈3,2 / 2)

Cf. chain steps of products:

Fig. 10-2:



$$\begin{aligned}
 \text{N/Z quotient at } 209 - 206 \text{ A} &= 126 - 124 / 82 - 83 \text{ Z} \approx 32 / 21: \\
 &\quad 3 \quad \text{---} \quad 2 \quad \text{---} \quad 1 \\
 &\quad 32 \quad \quad 21
 \end{aligned}$$

d. 137 is stated as the quotient between the nuclear force (F_{st}) and the electromagnetic force (F_{EM}) in strength (*Gamow*). This is the mass number at Z 56 (Ba) in the middle of the $2x^2$ -chain, just after 5 shells in the periodic system.

$$\begin{aligned}
 3,2/2,1 \times 54 &= \underline{82,29} \approx \text{Z } 83. \\
 3,2/2,1 \times \text{Z } 83 &= 126,48 \approx \text{N number max. at } 82-83 \text{ Z} \\
 3,2/2,1 \times \text{sum Z+N } 137 &= 208,76 \approx \text{A number max. at } 82-83 \text{ Z}.
 \end{aligned}$$

e.. Maximal surplus of N in relation to Z:

U 54 N (238 A)
Bi 43 N (209 A)

f. Even /odd mass isotopes. Number of isotopes and N/Z-divisions:

According to one source there should exist 284 isotopes regarded as stable ones. According to a Table on Physics one finds only 262 (of which 41 have unstable isomers).

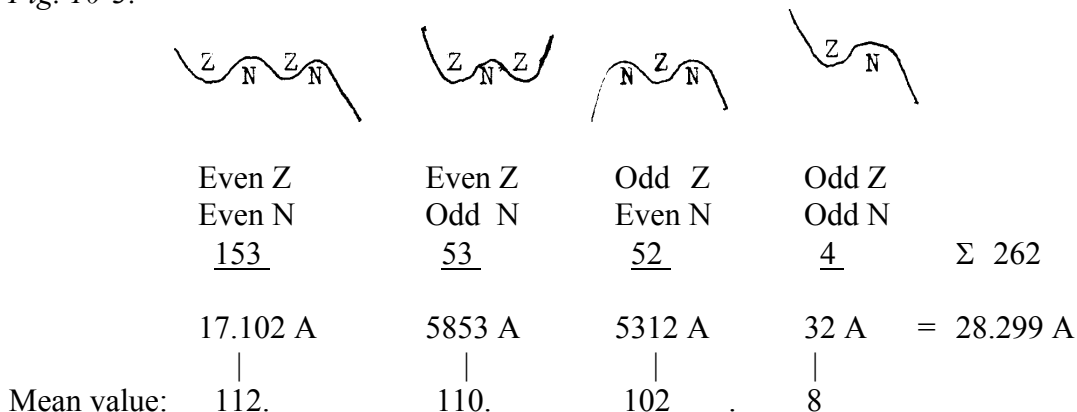
Division of these 262 isotopes on even and odd numbers:

Even Z / Even N:	153	
		> Even A-numbers: 157
Odd Z / Odd N:	4	
		157/105 \approx 3/2
Odd Z / Even N:	52	
		> Odd A-numbers: 105
Even Z / Odd N:	53	

\approx 3/2, the quotient between number of isotopes with even /odd A-number.

Figuratively the different groups could be illustrated as x^n -curves, $n = 4-3-2$:
(surplus of N disregarded):

Fig. 10-3:



Group E/E = 17.102

Group O/E + E/O = 11.165)... Quotient \approx 3/2. (Sum 28.267.)

Applying the x^n -curves as expressions for d-degrees:

4th root of 17.102 = 11,44.

3rd root of 11.165 = 22,35.

2nd root of 32 = 5,65 A relation \approx 1 — 2 — 1/2.

Mean value per isotope for the three bigger groups \approx 109,56. (for all four = 108,01.), This is numbers around 110, the sum of the $2x^2$ -chain related Z-distribution in the periodic system. It seems to connect the $2x^2$ -chain with mass numbers too (?).

About the quotient 3/2 of three bigger groups:

Compare the total number series 1-238 (A) = 28441 (nearly the same sum as 28.258 of “stable” isotopes):

$$\begin{array}{rcl}
 & 3/5 = 17.065 & \text{---> } +51 = \text{numbers 151-238 (17.116)} \\
 28441 < & \uparrow -51 & \\
 & 2/5 = 11.376 & \text{---> } -51 = \text{numbers 1-150 (11,325)}
 \end{array}$$

Almost the same sum divisions as in the three N-Z-distribution groups.

Cf. the statement that all elements above ≈ 150 A are α -emitting ones.

Element 150 A = 62 Z. In the $2x^2$ -chain 60 = sum of 4-3-2-1:

$$50 - \underbrace{32 - 18 - 8 - 2}_{60} = 0:$$

g1. Division of Z- and A-sums of 1-83 Z in quotients within a dimension chain, elementary or in the $2x^2$ form:

(A-sums more analyzed in Appendix.)

N/Z-division with respect to directions in the middle step of the chain:

$$5 - 4 - 3 \longleftrightarrow 2 \cdot -1 - 0 :$$

Middle step 3-2: opposite directions read as numbers 32 — 23:

g1) A-number sum 1-83 Z calculated to 8291 A:

$$\begin{array}{rcl}
 \text{A-number:} & 32/55 = 4824 \text{.--->} -19 & = 4805 = \text{N-sum} \\
 8291 < & \downarrow & \\
 \text{1-83 Z} & 23/55 = 3467 \text{.--->} +19 & = 3486 = \text{Z sum} \\
 & & 19 = \text{interval } 3^3 \longleftrightarrow 2^3
 \end{array}$$

g2. A-number sum 1-85 Z: 8500:

$$\begin{array}{rcl}
 & 32/55 = 4945 \text{.--->} -15 & = 4930 = \text{N-sum} \\
 8500 < & \downarrow -15 & \\
 & 23/55 = 3555 \text{.--->} +15 & = 3570 = \text{Z-sum}
 \end{array}$$

g3) 3/2-division of the A-sum 8291 A:

$$\begin{array}{rcl}
 & 3/5 = 4975, & \text{--->} -11 = 4964 = \text{A-sum for 57 - 83 Z} \\
 8291 < & \downarrow -11 & \\
 & 2/5 = 3316, & \text{--->} +11 = 3327 = \text{A-sum for 1 - 56 Z.}
 \end{array}$$

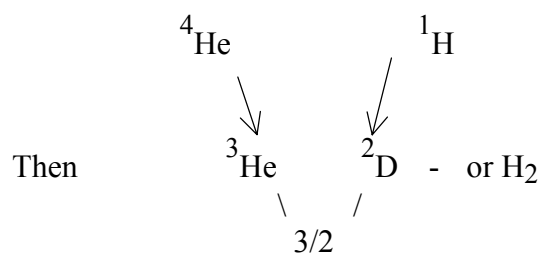
3/2-division marks a border at Ba/La, 56 / 57 Z, after 5 shells,
 \sim middle number in the $2x^2$ -chain.

11. Two extra annotations:

1. A-number 5 and He - H:

Why the mass number 5 doesn't exist at all as an isotope may perhaps be answered with the suggestion here that 5 is the number for the whole, the beginning of all!?

⑤ immediately polarized into H and He 4 <-----> 1



He + H: Almost still the dominating (identified) mass of Universe.

2. An inverse connection between the sum of the $2x^2$ -chain and sum of 20 + 4 double-coded amino acids in the genetic code:

20 + 4 amino acid unbound = 3276 , x 1/2 = 1638:

$$\begin{aligned}
 \text{Sum } 1 - 110 &= 6105 \\
 &\wedge \\
 &= \underline{1638} \cdot x \cdot 10^{-x}
 \end{aligned}$$

(See files about the genetic code.)

END

Appendix