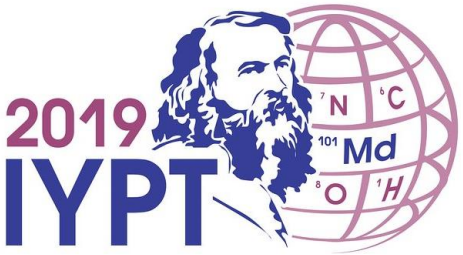
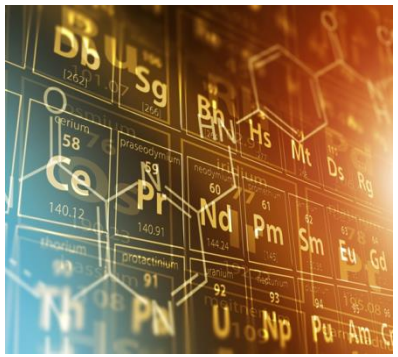
International Year
of the Periodic Table of Chemical Elements





1869 is considered as the year of discovery of the Periodic System and therefore **2019** will be the **150th** anniversary of its discovery.

The Periodic Table of Chemical Elements

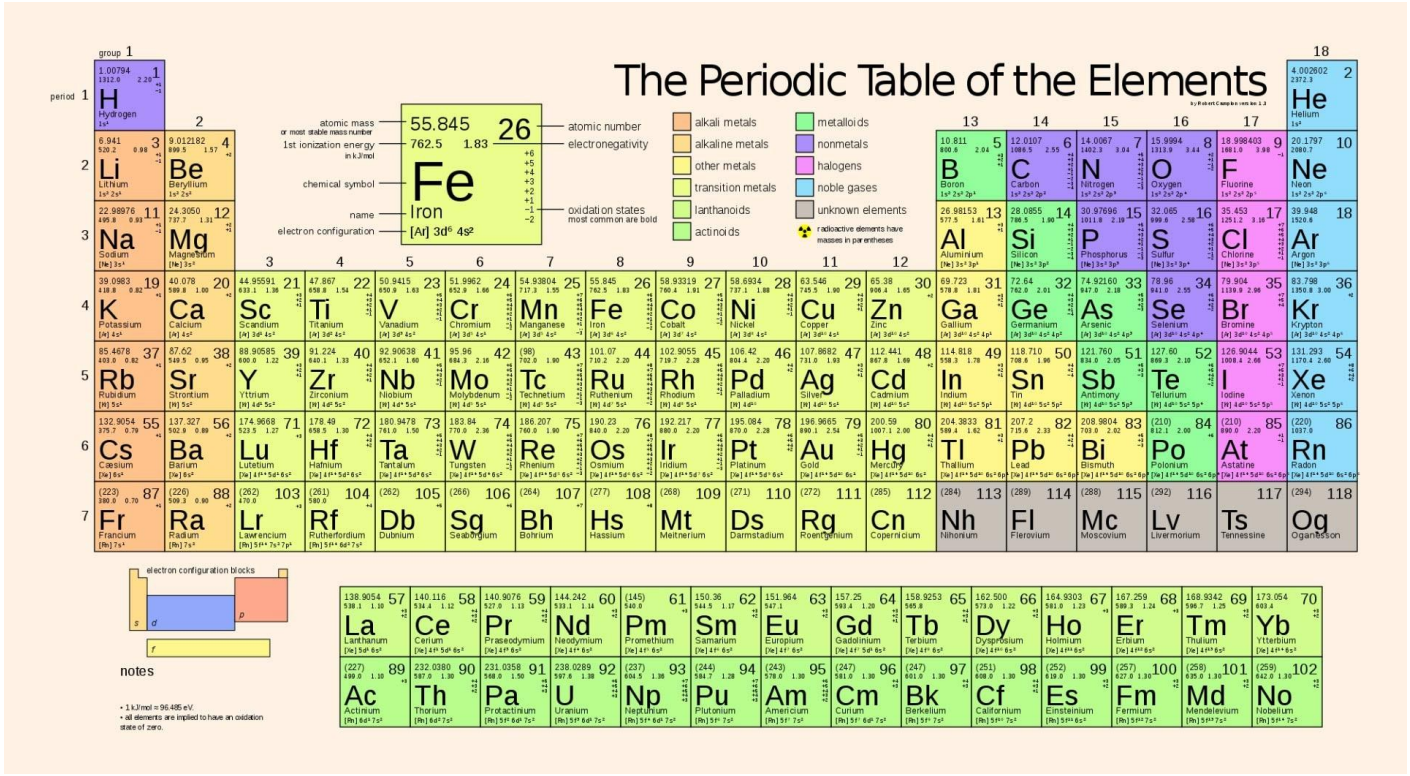
is a unique tool enabling scientists to predict the appearance and properties of matter on Earth and in the Universe

It is one of the most significant achievements in science, capturing the essence not only of chemistry, but also of physics and biology

The Periodic Table of Chemical Elements is a Language for Science

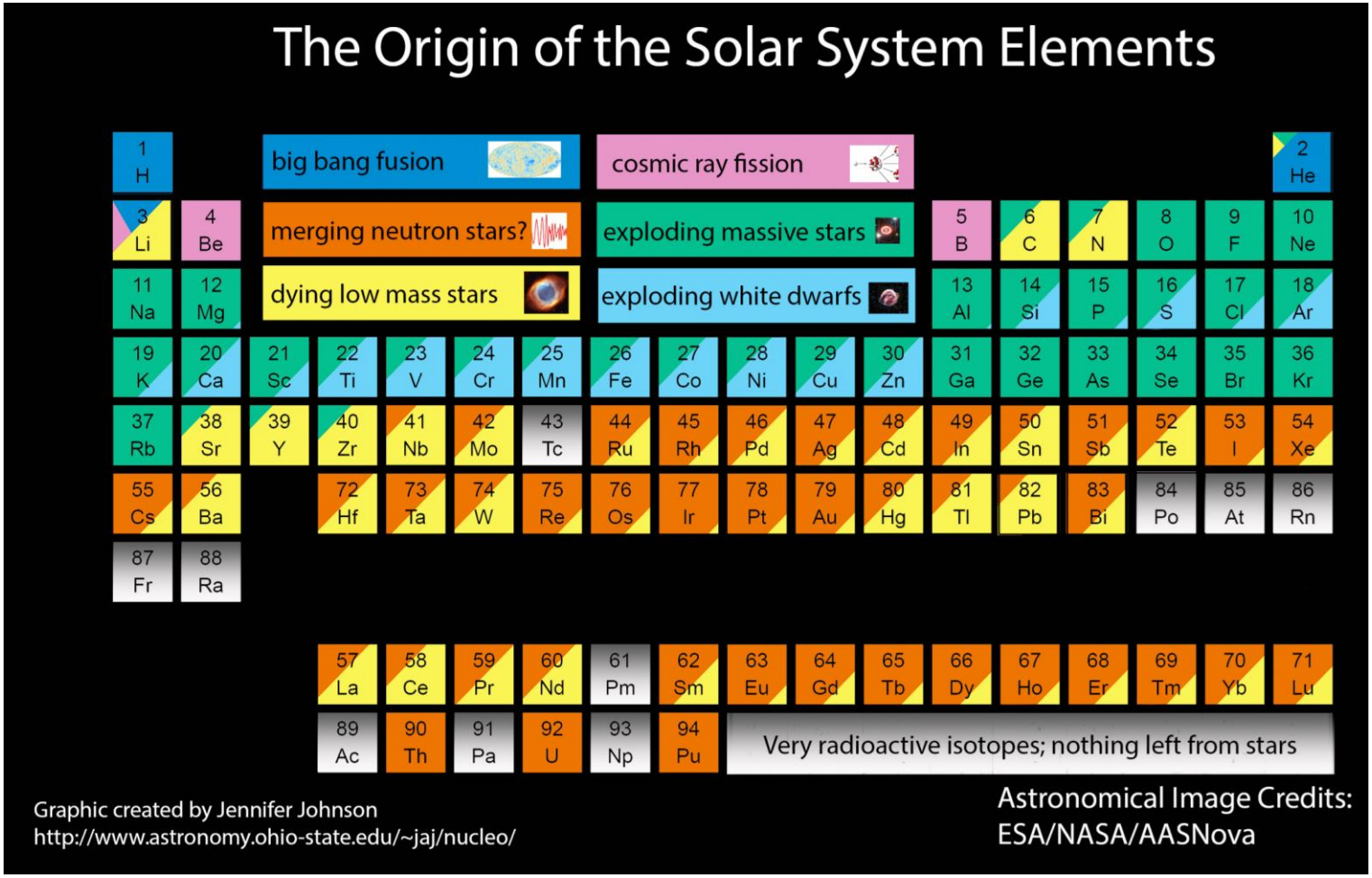
The Periodic Table enabled to order the chemical knowledge

Each element box evidences symbolic, microscopic and macroscopic characteristics: the three levels of Chemistry



Related Scientific Disciplines

The Periodic Table has broad implications in Astronomy



The Periodic Table has broad implications in Biology

THE PERIODIC TABLE FOR BIOLOGISTS

	I	II
1	1.01 1 H hydrogen	
2	6.94 3 Li	9.01 4 Be
3	22.99 11 Na sodium	24.31 12 Mg magnesium
4	39.10 19 K potassium	40.08 20 Ca calcium
5	85.47 37 Rb	87.62 38 Sr
6	132.91 55 Cs	137.33 56 Ba
7	223.02 73 Fr	226.03 74 Ra

The most commonly occuring elements in living organisms are:

C 6 carbon · H 1 hydrogen · O 8 oxygen · N 7 nitrogen

Other common elements are shaded in green.

relative atomic mass · atomic number

1.01 1 H hydrogen

element name

	III	IV	V	VI	VII	VIII
1						4.00 2 He
2	10.81 5 B	12.01 6 C carbon	14.01 7 N nitrogen	16.00 8 O oxygen	19.00 9 F	20.18 10 Ne
3	26.92 13 Al	28.09 14 Si	30.97 15 P phosphorous	32.06 16 S sulphur	35.45 17 Cl chlorine	39.95 18 Ar
4	69.74 31 Ga	72.59 32 Ge	74.92 33 As	78.96 34 Se	79.91 35 Br	83.80 36 Kr
5	114.82 49 In	118.69 50 Sn	121.75 51 Sb	127.60 52 Te	126.90 53 I iodine	131.30 54 Xe
6	204.37 81 Tl	207.19 82 Pb	208.98 83 Bi	210.00 84 Po	209.99 85 At	222.02 86 Rn

non-metals

transition-metals

44.96 21 Sc	47.90 22 Ti	50.94 23 V	52.00 24 Cr	54.94 25 Mn manganese	55.85 26 Fe iron	58.93 27 Co cobalt	58.71 28 Ni nickel	63.55 29 Cu copper	65.38 30 Zn zinc
88.91 39 Y	91.22 40 Zr	92.91 41 Nb	95.94 42 Mo	98.91 43 Tc	101.07 44 Ru	102.91 45 Rh	106.42 46 Pd	107.87 47 Ag	112.41 48 Cd
178.49 72 Hf	180.95 73 Ta	183.85 74 W	186.21 75 Re	190.23 76 Os	192.22 77 Ir	195.09 78 Pt	196.97 79 Au	200.59 80 Hg	

Lanthanide and actinide elements (and 104 - 109) have been left off.

Some elements are used universally in nature—though their uses can be diverse.

N 7 nitrogen
- Amino group of amino acids (the monomers of proteins)
- Also used in chlorophyll.

S 16 sulphur
- Source of energy for chemosynthetic bacteria in hydrothermal vents
- Found in the R-Group of cysteine, an amino acid, and can form disulfide bridges in protein folding.

Na 11 sodium · K 19 potassium
- Generate resting and action potentials in neurons.
- Used in maintaining osmosis. Sodium is the main cation (positive ion) in blood plasma, potassium in cytoplasm.
- Sodium-potassium pump is an example of active transport

Fe 26 iron
- Has a high affinity for oxygen
- Used in hemoglobin and myoglobin to carry oxygen in blood and muscles
- Used in ferredoxin in photosynthesis
- electron carrier in some bacteria

P 15 phosphorous
- Phospholipids make up the plasma membrane.
- Sugar-phosphate backbone of DNA structure.
- Bonds between phosphate ions store energy in ATP.

Ca 20 calcium
- Extracellular component of bone matrix
- Forms exoskeletons
- Stimulates synaptic transmission between neurons
- Used in muscle contraction

Condensation reactions create bonds between organic molecules, making polymers.

Hydrolysis reactions break bonds.

example:

amino acids (monomers)

hydrolysis: *hydrolase* used · water in

condensation: *polymerase* used · water out

peptide bond

dipeptide (polymer)

Organic Compounds

contain carbon and are found in living organisms.

Some examples include:

amino acids

glucose · ribose

fatty acid · glycerol

Some exceptions are:

CO · CO_2 oxides of carbon

CO_3^{2-} carbonates

HCO_3^- hydrogen carbonates

Na_2HCO_3 · $CaCO_3$ · Na_2CO_3

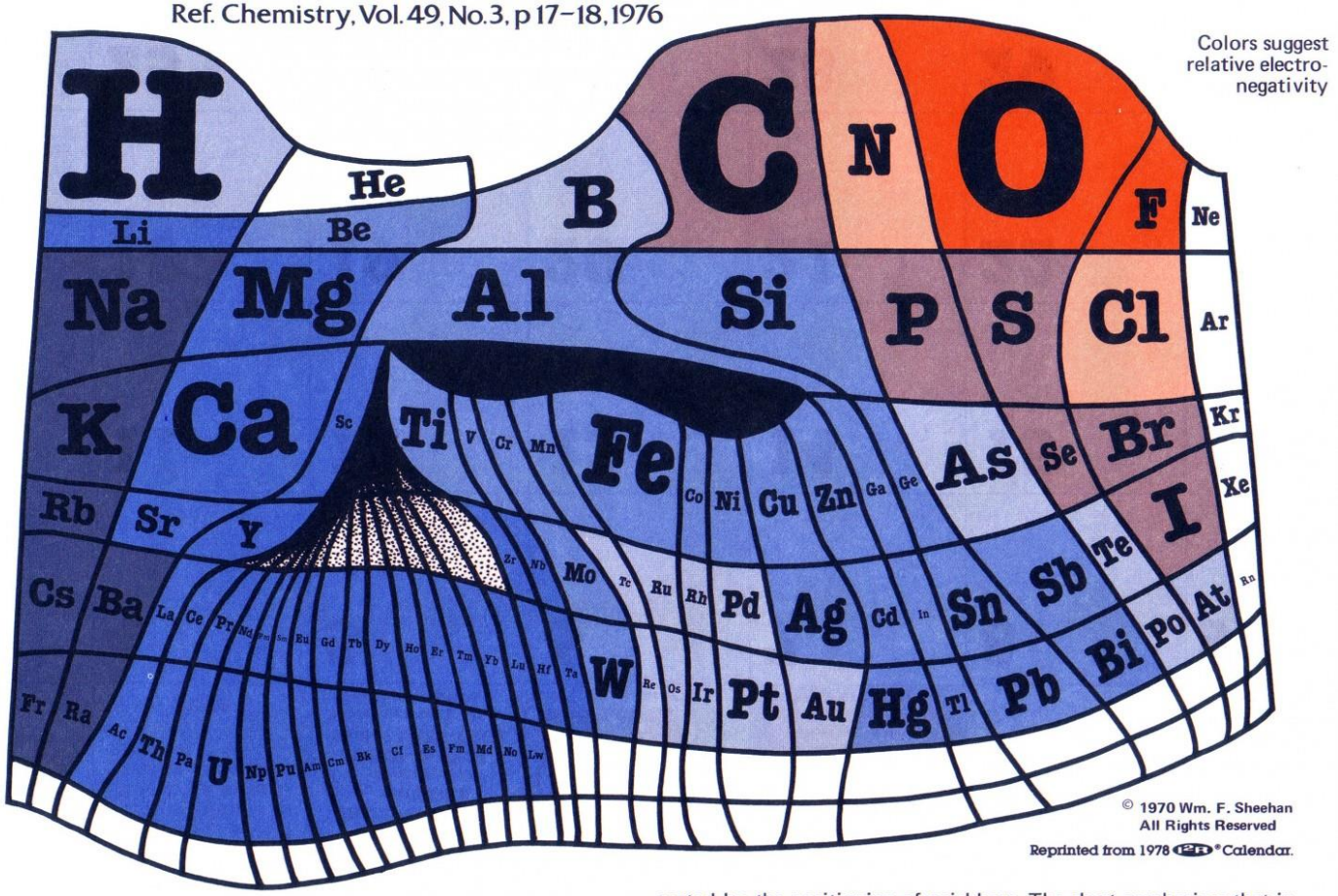
Resources used:

- Kent, M. Advanced Biology. Oxford University Press, 2000.
- Allott, A & Mindorff, D. Biology Course Companion. Oxford University Press, 2007.

The Periodic Table has broad implications in Geology

The Elements According to Relative Abundance

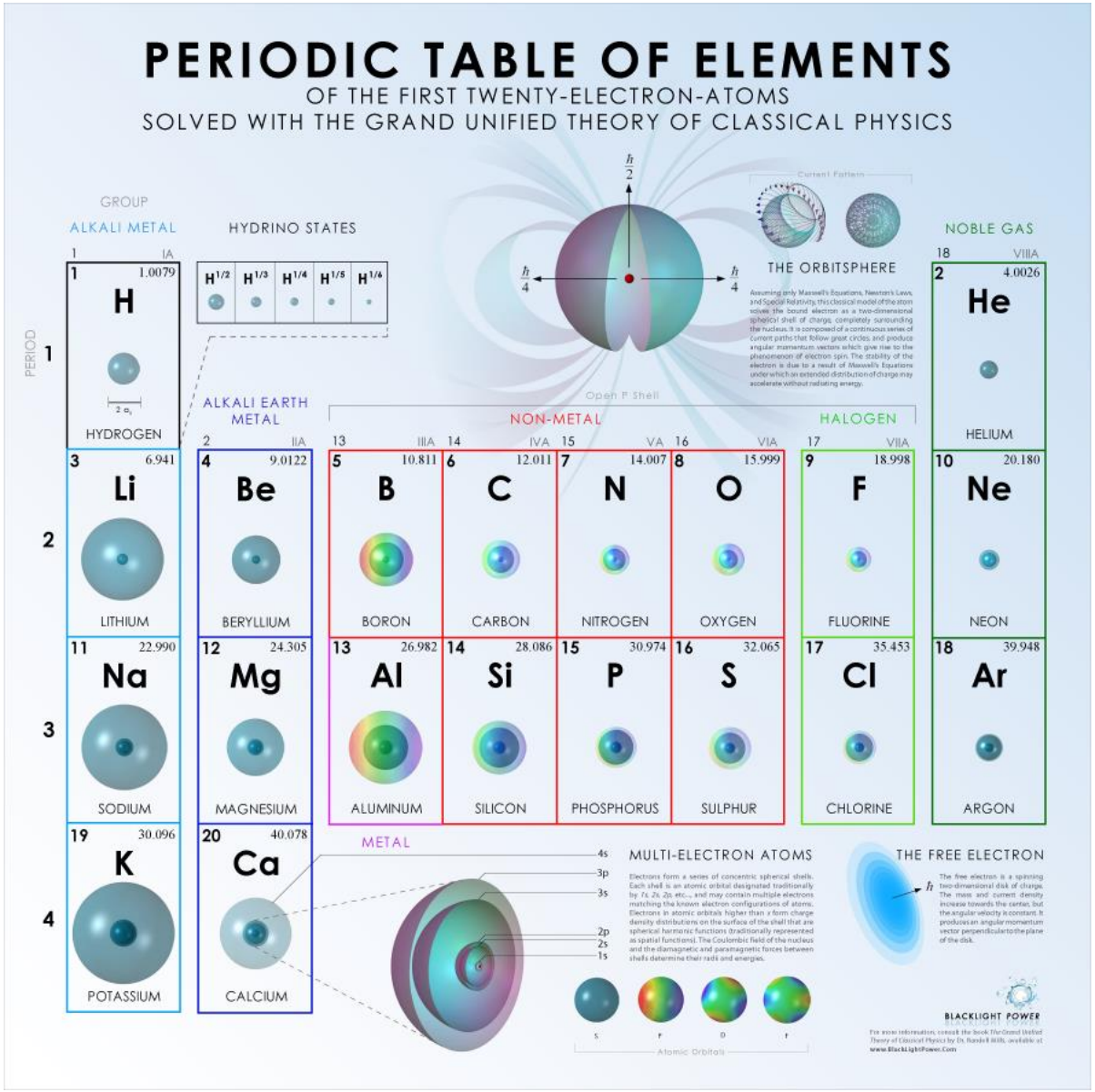
A Periodic Chart by Prof. Wm. F. Sheehan, University of Santa Clara, CA 95053
Ref. Chemistry, Vol. 49, No. 3, p 17–18, 1976



Roughly, the size of an element's own niche ("I almost wrote square") is proportioned to its abundance on Earth's surface, and in addition, certain chemical similarities (e.g., Be and Al, or B and Si) are suggested by the positioning of neighbors. The chart emphasizes that in real life a chemist will probably meet O, Si, Al, . . . and that he better do something about it. Periodic tables based upon elemental abundance would, of course, vary from planet to planet. . . W.F.S.

NOTE: TO ACCOMMODATE ALL ELEMENTS SOME DISTORTIONS WERE NECESSARY, FOR EXAMPLE SOME ELEMENTS DO NOT OCCUR NATURALLY.

The Periodic Table has broad implications in Physics



The Periodic Table has also implications in Mathematics

Mathematical Expression of Mendeleev's Periodic Law

By Valery Tsimmerman

February 15, 2012

Mendeleev's dream of finding mathematical expression of his Periodic Law has finally come true. Here it is:

Periodic Law: Z=A+g

Where **A** represents atomic numbers of alkaline earth metals that can be expressed by following formula:

$$A = \left(\frac{p^3 + 3p^2 + 2p}{6}\right)\left|cos\frac{p\pi}{2}\right| + \left(\frac{p^3 + 3p^2 + 5p + 3}{6}\right)\left|sin\frac{p\pi}{2}\right|$$

and **g** is an integer representing groups of elements that has following boundaries: $(1 - L) \leq g \leq 0$

Term *L* represents period lengths and can be found from the following formula:

$L = \left(\frac{p^2}{2}\right)\left|cos\frac{p\pi}{2}\right| + \left(\frac{p^2+2p+1}{2}\right)\left|sin\frac{p\pi}{2}\right|$ representing period lengths.

Term *p=1,2,3,4....* represents periods in all formulae.

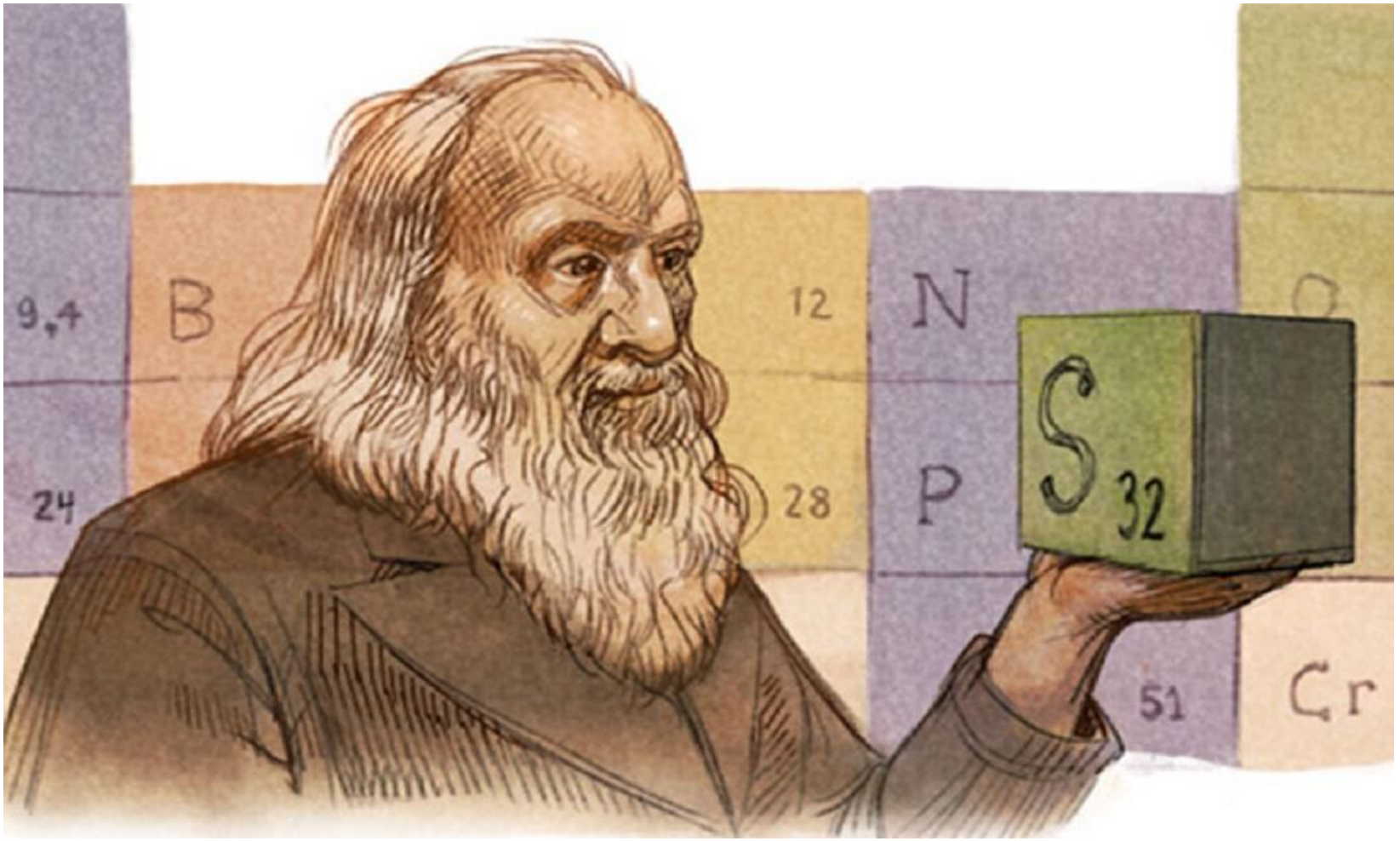
Formula Z=A+g assigns He(2) with Alkaline Earth metals. Helium could be treated as a special case and assigned with noble gases if lower boundary of term g was violated: g=(-L) for p=2. Similarly, Mg could be placed next to Zn if g=(-L) and p=4. Therefore, placing Helium in the same group with Ne, Ar, Kr, etc. is an example of a special case that can be regarded as Periodic Law violation.

Conclusion:

All groups and periods of the periodic system of chemical elements can be mathematically recreated by solving the above equations for p=1,2,3,....

Valery Tsimmerman

Date: 02/14/2012

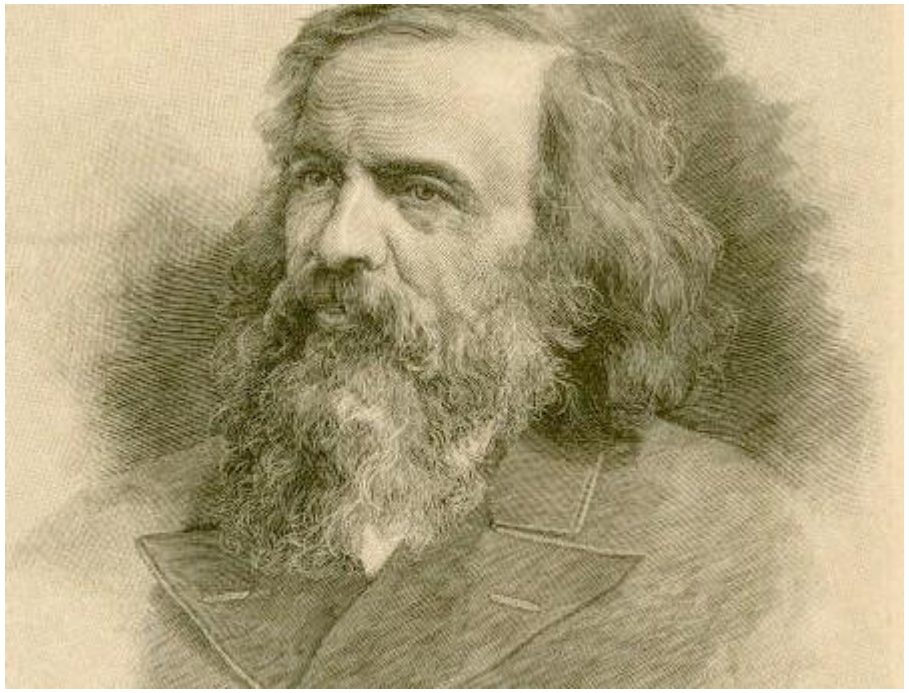


Dmitry Mendeleev is considered the father of the Periodic Table (at the beginning called Periodic System)

Dmitry Mendeleev

- He was born on February 8, 1834 in Verkhnie Aremzyani, in the Russian province of Siberia
- In 1856 he was awarded a master's degree in chemistry at the University of St. Petersburg
- He spent most of the years 1859 and 1860 in Heidelberg, Germany, where he had the good fortune to work for a short time with Robert Bunsen at Heidelberg University
- In 1864 he became professor of Technical Chemistry at St. Petersburg University
- In 1867 he was transferred to the professorship of General Chemistry at St. Petersburg University
- In 1869 he published the first version of his Periodic table
- He died on February 2, 1907 in Saint Petersburg, killed by influenza

At his funeral in St. Petersburg, his students carried a large copy of the Periodic Table of the elements as a tribute to his work

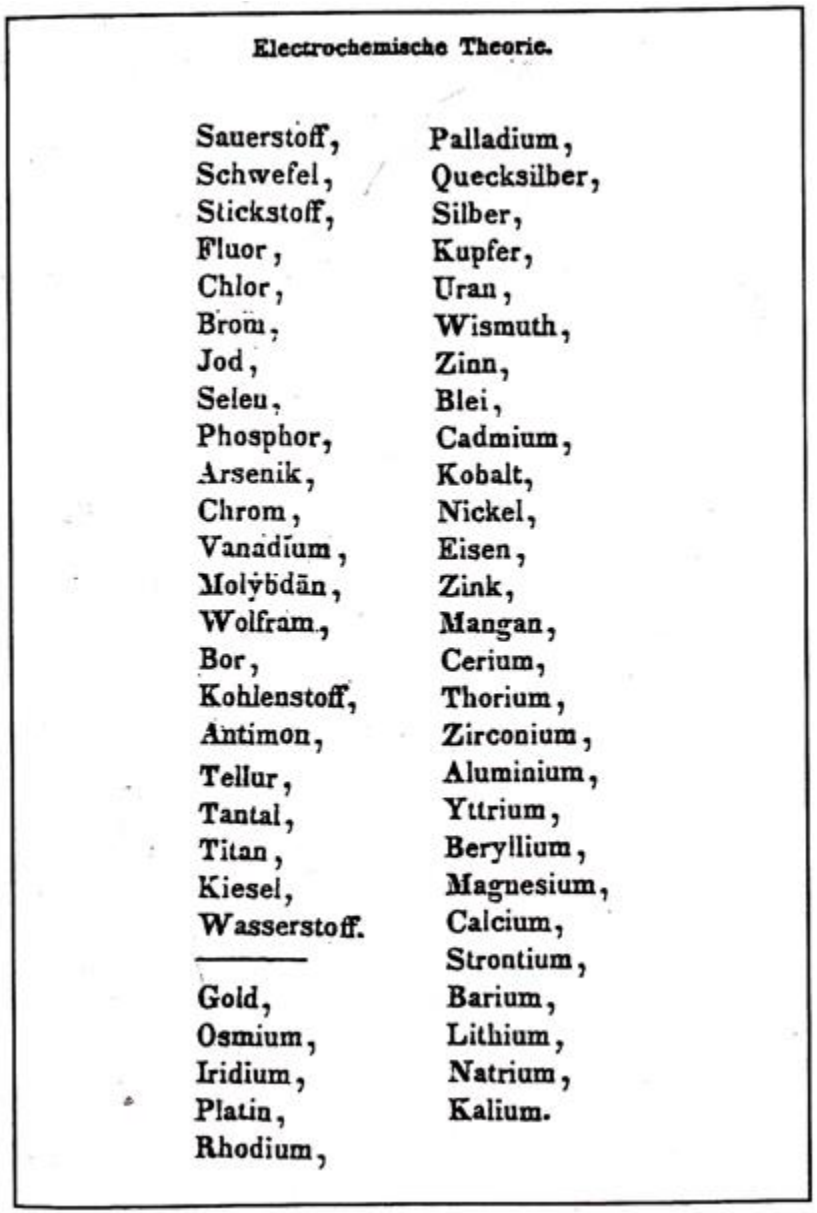


Historical and Public Figures Collection
New York Public Library Archives

Dmitry Mendeleev is considered the father of the Periodic Table (at the beginning called Periodic System)

The construction of the Periodic Table required time and the involvement of several scientists

1836: Berzelius' Electronegativity Table

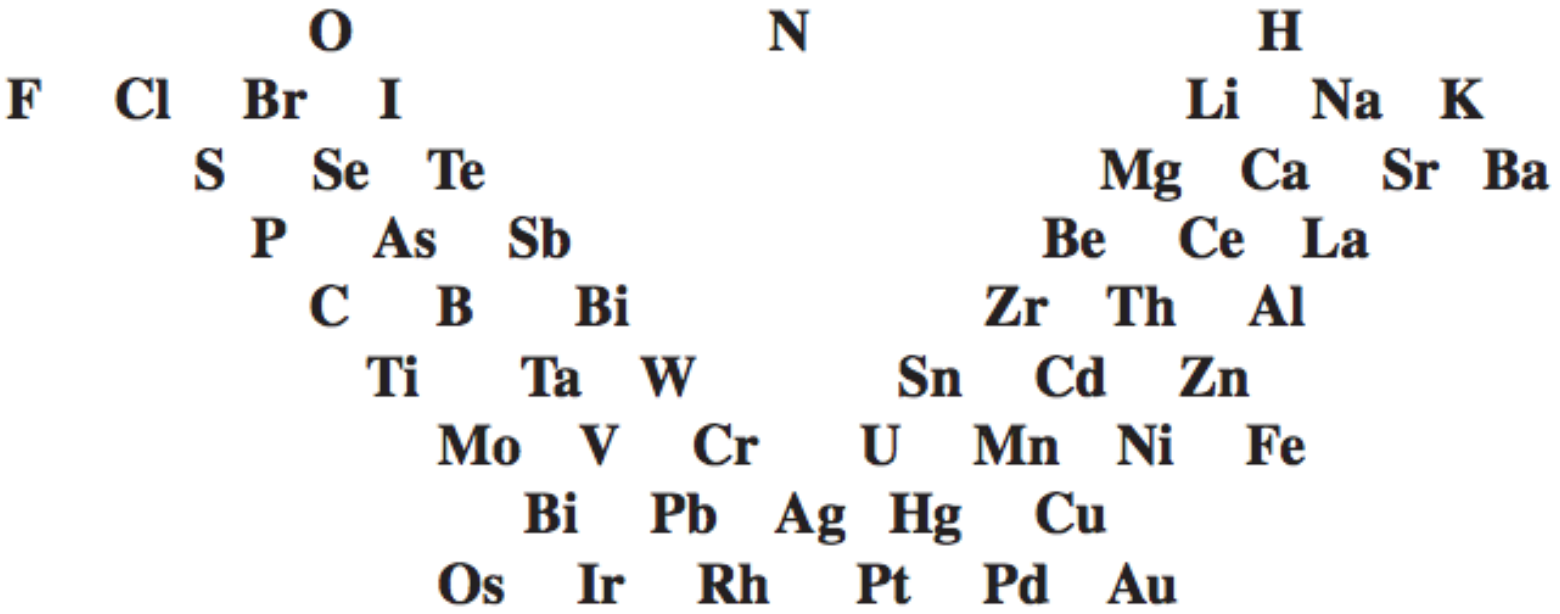


Electrochemische Theorie.

Sauerstoff,
Schwefel,
Stickstoff,
Fluor,
Chlor,
Brom,
Jod,
Selen,
Phosphor,
Arsenik,
Chrom,
Vanadium,
Molybdän,
Wolfram,
Bor,
Kohlenstoff,
Antimon,
Tellur,
Tantal,
Titan,
Kiesel,
Wasserstoff.

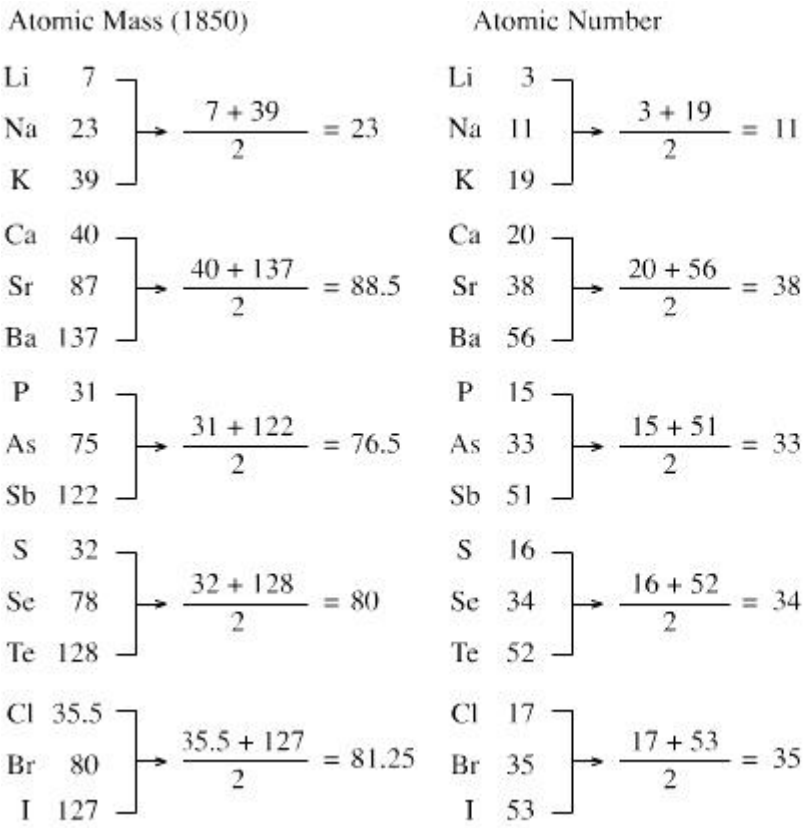
Gold,
Osmium,
Iridium,
Platin,
Rhodium,
Palladium,
Quecksilber,
Silber,
Kupfer,
Uran,
Wismuth,
Zinn,
Blei,
Cadmium,
Kobalt,
Nickel,
Eisen,
Zink,
Mangan,
Cerium,
Thorium,
Zirconium,
Aluminium,
Yttrium,
Beryllium,
Magnesium,
Calcium,
Strontium,
Barium,
Lithium,
Natrium,
Kalium.

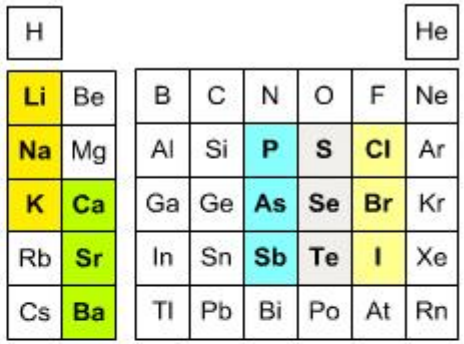
1843: Gmelin's System



1850: Dobereiner's Triads

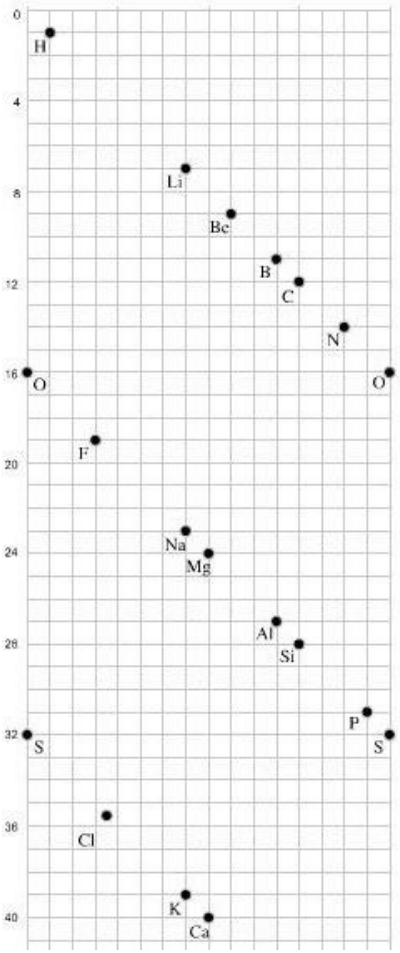
Johann Dobereiner found 'triads', namely sequences of three similar elements, where the middle element has a mass equal to the average of the least and most massive

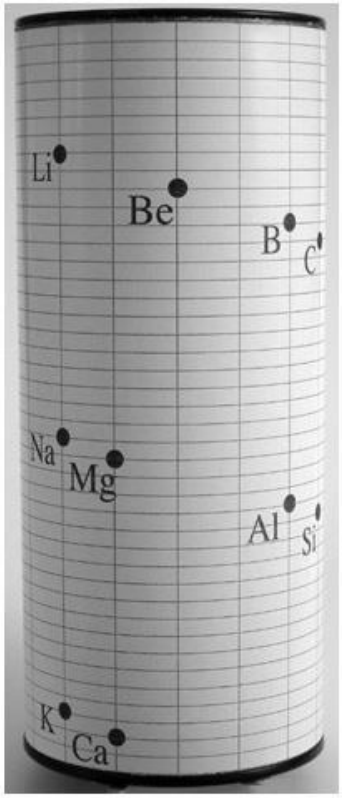




1862: Alexandre-Émile Béguyer de Chancourtois

The first attempt to make use of atomic weights to produce a classification of periodicity. He drew the elements as a continuous spiral around a metal cylinder divided into 16 parts. Tellurium was situated at the centre, prompting *vis tellurique*, or *telluric helix*





1862: Meyer's Table

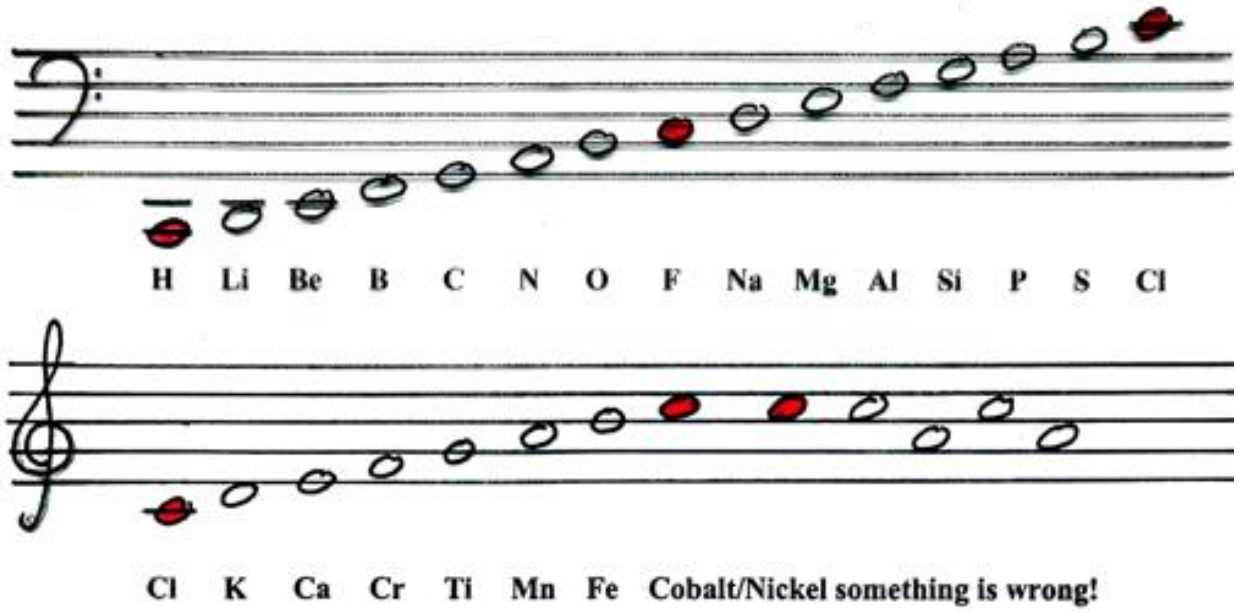
Lothar Meyer devised a partial periodic tables consisting of 28 elements arranged in order of increasing atomic weight in which the elements were grouped into vertical columns according to their chemical valences

Eric Scerri: The Periodic Table: A Very Short Introduction

	4 werthig	3 werthig	2 werthig	1 werthig	1 werthig	2 werthig
	––	––	––	––	Li = 7.03	(Be = 9.3?)
Differenz =	––	––	––	––	16.02	(14.7)
	C = 12.0	N = 14.04	O = 16.00	Fl = 19.0	Na = 23.05	Mg = 24.0
Differenz =	16.5	16.96	16.07	16.46	16.08	16.0
	Si = 28.5	P = 31.0	S = 32.07	Cl = 35.46	K = 39.13	Ca = 40.0
Differenz =	$\frac{89.1}{2}$ = 44.55	44.0	46.7	44.51	46.3	47.6
	––	As = 75.0	Se = 78.8	Br = 79.97	Rb = 85.4	Sr = 87.6
Differenz =	$\frac{89.1}{2}$ = 44.55	45.6	49.5	46.8	47.6	49.5
	Sn = 117.6	Sb = 120.6	Te = 128.3	I = 126.8	Cs = 133.0	Ba = 137.1
Differenz =	89.4 = 2 x 44.7	87.4 = 2 x 43.7	––	––	(71 = 2 x 35.5)	––
	Pb = 207.0	Bi = 208.0	––	––	(Tl = 204?)	––

1864: Newland's Octaves

Newland noticed that if he broke up his list of elements (arranged by atomic weight) into groups of seven – starting a new row with the eighth element – the first element in each of those groups had similar chemistry



Mendeleev was said to have been inspired by the card game known as solitaire, and "patience"

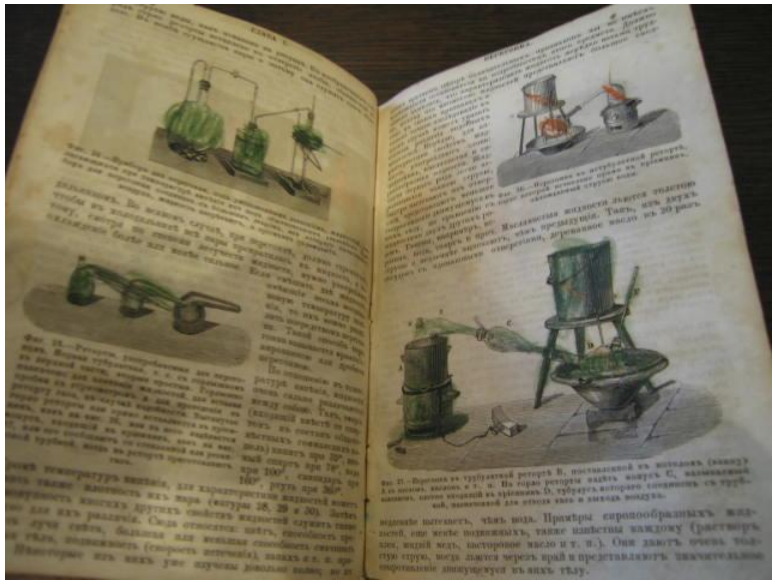
The Mendeleev's study located in the Twelve Collegia building of St. Petersburg State University

Mendeleev said:

I saw in a dream a table where all the elements fell into place as required. Awakening, I immediately wrote it down on a piece of paper

The Periodic Table was also born for didactic reasons

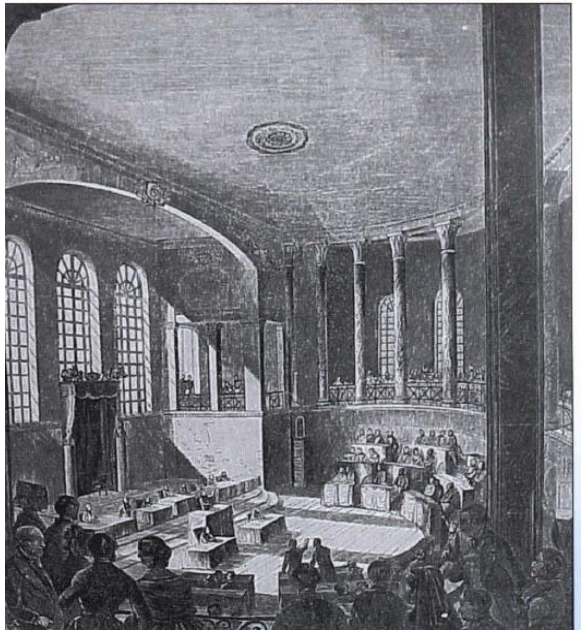
Mendeleev was convinced that the difficulty in understanding chemistry was the lack of any clear system for classifying the known elements:
"Without one, only particulars about specific building blocks of matter can be offered to the students, but no framework that would explain the relationships between different substances"



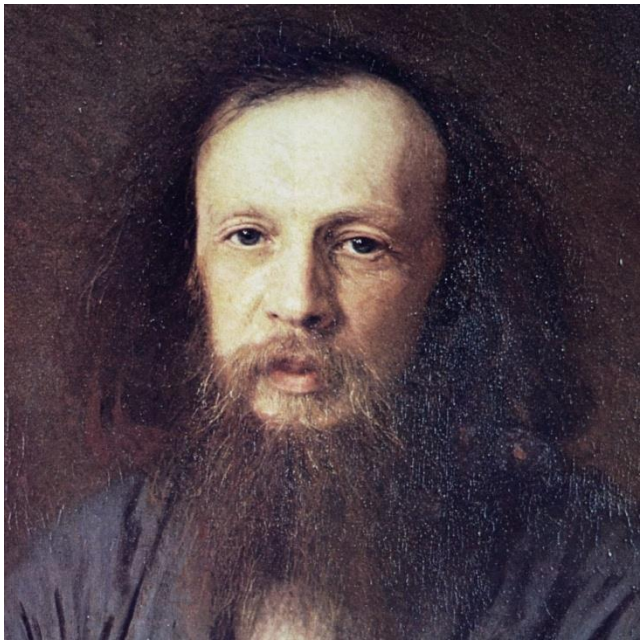
Some Mendeleev's Chemistry books

Mendeleev's participation in the First International Chemistry Congress held in September 1860 at Karlsruhe (Germany), where he met Cannizzaro, was of fundamental importance for his work of constructing the Periodic Table

Ständehaus (right) where the Chemical Congress of 1860 was held

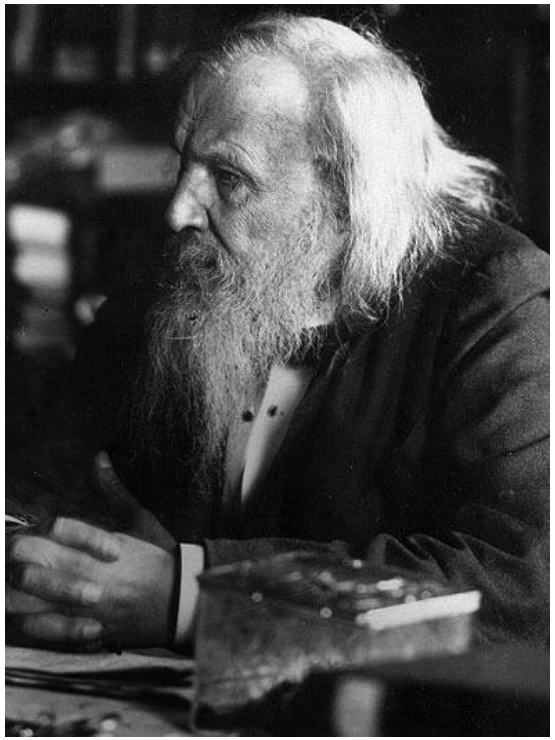


The meeting hall where the Chemical Congress of 1860 was held



Dmitry Mendeleev is considered the father of the Periodic Table

He used the table to accurately predict the existence and properties of unknown elements. For example, Mendeleev used his table to predict an element one row down from silicon. He denoted this with Sanskrit digit for "1" ("eka") and thus named the element "ekasilicon." The properties he predicted would eventually be proved to be incredibly accurate, and we now know this substance as "germanium.

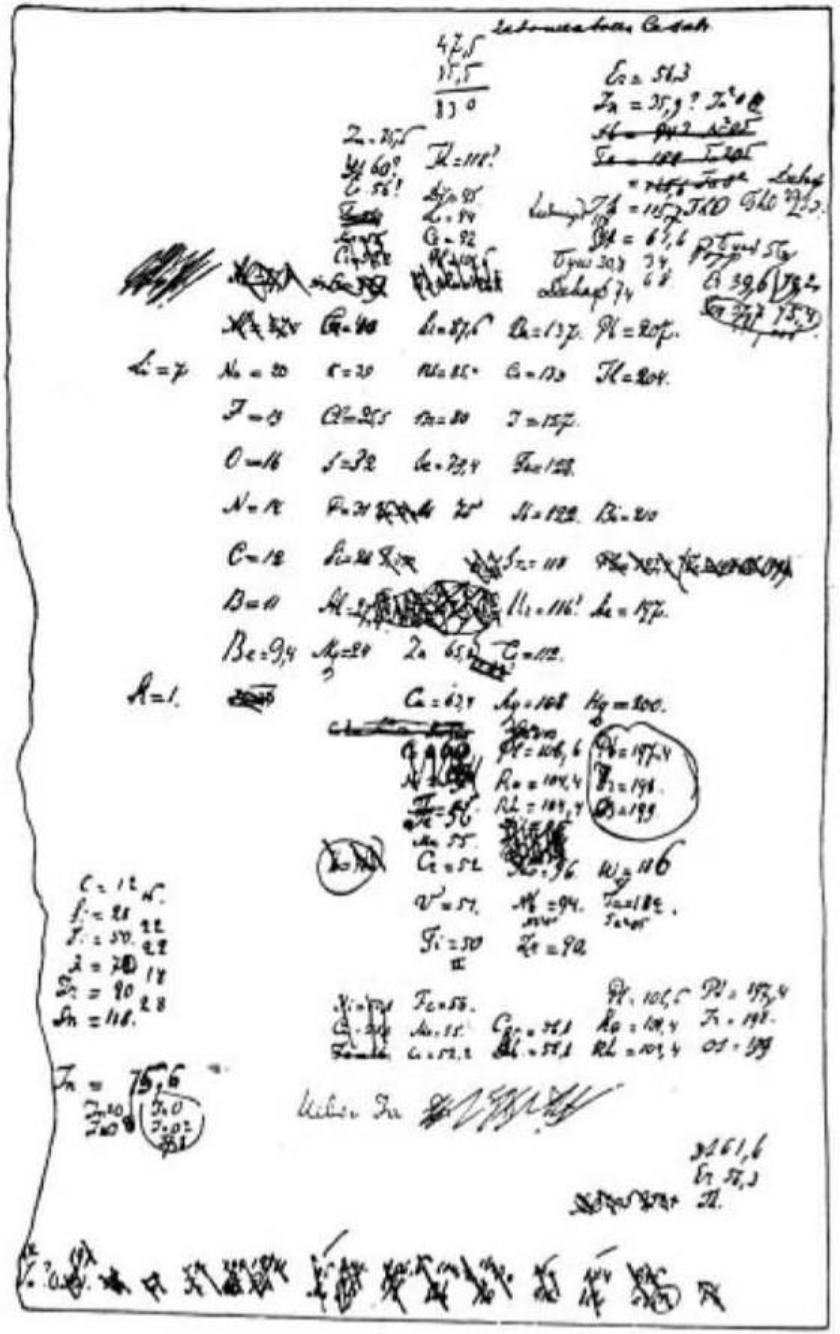


Dmitry Mendeleev is considered the father of the Periodic Table

In devising his table, Mendeleev did not conform completely to the order of atomic mass: he swapped some elements around

Although he was unaware of it, Mendeleev had actually placed the elements in order of increasing "atomic number"

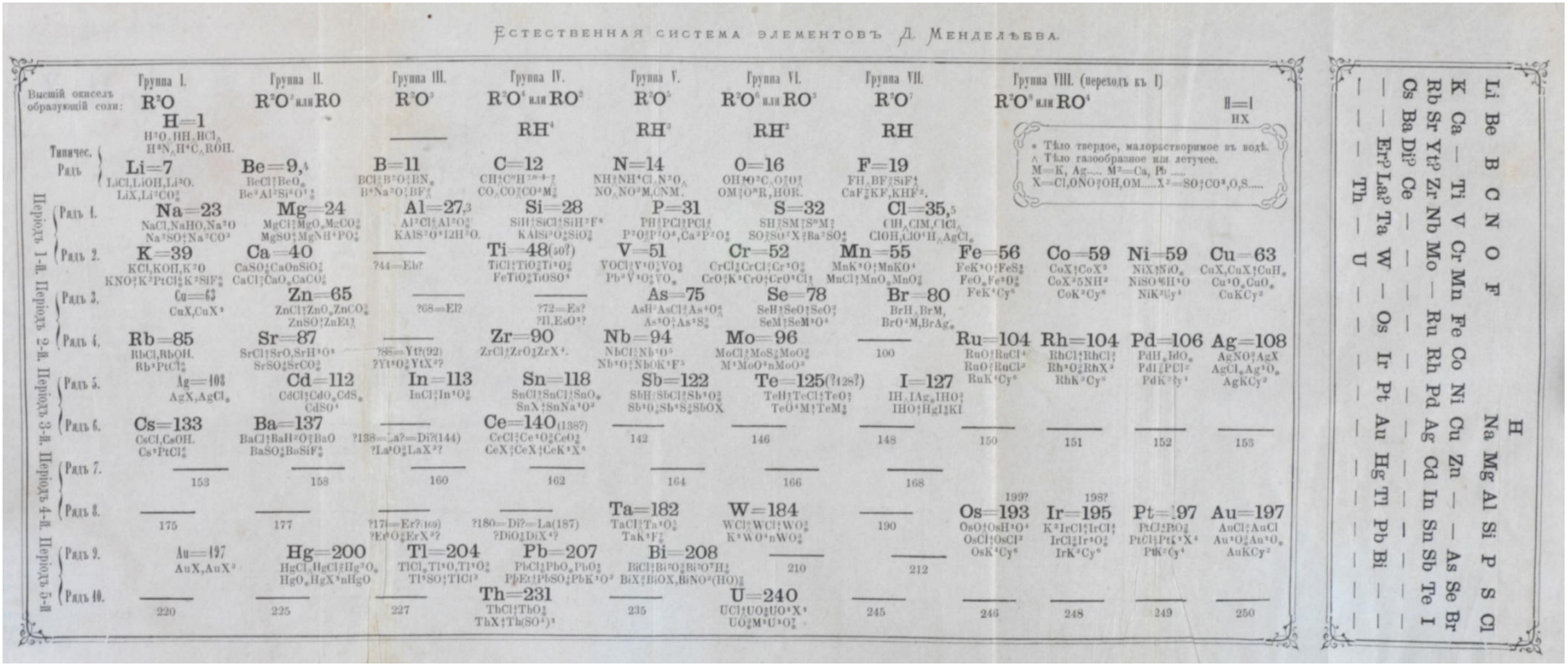
1868: Handwritten draft of the first version of Mendeleev's Periodic Table based on increasing atomic weight



1871: Mendeleev's Table II

Reihen	Gruppe I. — R^1O	Gruppe II. — RO	Gruppe III. — R^2O^3	Gruppe IV. RH^4 RO^2	Gruppe V. RH^3 R^2O^5	Gruppe VI. RH^2 RO^3	Gruppe VII. RH R^2O^7	Gruppe VIII. — RO^4
1	H = 1							
2	Li = 7	Be = 9,4	B = 11	C = 12	N = 14	O = 16	F = 19	
3	Na = 23	Mg = 24	Al = 27,3	Si = 28	P = 31	S = 32	Cl = 35,5	
4	K = 39	Ca = 40	— = 44	Ti = 48	V = 51	Cr = 52	Mn = 55	Fe = 56, Co = 59, Ni = 59, Cu = 63.
5	(Cu = 63)	Zn = 65	— = 68	— = 72	As = 75	Se = 78	Br = 80	
6	Rb = 85	Sr = 87	?Yt = 88	Zr = 90	Nb = 94	Mo = 96	— = 100	Ru = 104, Rh = 104, Pd = 106, Ag = 108.
7	(Ag = 108)	Cd = 112	In = 113	Sn = 118	Sb = 122	Te = 125	J = 127	
8	Cs = 133	Ba = 137	?Di = 138	?Ce = 140	—	—	—	— — — —
9	(—)	—	—	—	—	—	—	
10	—	—	?Er = 178	?La = 180	Ta = 182	W = 184	—	Os = 195, Ir = 197, Pt = 198, Au = 199.
11	(Au = 199)	Hg = 200	Tl = 204	Pb = 207	Bi = 208	—	—	
12	—	—	—	Th = 231	—	U = 240	—	— — — —

1871: Mendeleev's Table II



ЕСТЕСТВЕННАЯ СИСТЕМА ЭЛЕМЕНТОВЪ Д. МЕНДЕЛѢЕВА.

Высшій окисель образующій соли:	Группа I. R^2O	Группа II. R^2O^2 или RO	Группа III. R^2O^3	Группа IV. R^2O^4 или RO^2	Группа V. R^2O^5	Группа VI. R^2O^6 или RO^3	Группа VII. R^2O^7	Группа VIII. (переходъ къ I) R^2O^8 или RO^4
	H=1			RH⁴	RH³	RH²	RH	HX
Типичес. Рядъ	Li=7	Be=9,4	B=11	C=12	N=14	O=16	F=19	
Рядъ 1.	Na=23	Mg=24	Al=27,3	Si=28	P=31	S=32	Cl=35,5	
Рядъ 2.	K=39	Ca=40	?44=Eb?	Ti=48(50?)	V=51	Cr=52	Mn=55	Fe=56 Co=59 Ni=59 Cu=63
Рядъ 3.	Cu=63	Zn=65	?68=El?	?72=Es? ?Il,EsO³?	As=75	Se=78	Br=80	
Рядъ 4.	Rb=85	Sr=87	?85=Yt(92)	Zr=90	Nb=94	Mo=96	100	Ru=104 Rh=104 Pd=106 Ag=108
Рядъ 5.	Ag=108	Cd=112	In=113	Sn=118	Sb=122	Te=125(?128?)	I=127	
Рядъ 6.	Cs=133	Ba=137	?138=La?=Di?(144)	Ce=140(138?)	142	146	148	150 151 152 153
Рядъ 7.								
	153	158	160	162	164	166	168	
Рядъ 8.					Ta=182	W=184		Os=193 Ir=195 Pt=197 Au=197
	175	177	?171=Er?(169)	?180=Di?=La(187)			190	199? 198?
Рядъ 9.	Au=197	Hg=200	Tl=204	Pb=207	Bi=208			
Рядъ 10.				Th=231		U=240		
	220	225	227	235		245	246 248 249 250	

* Тѣло твердое, малорастворимое въ водѣ.
∧ Тѣло газообразное или летучее.
M=K, Ag..... M²=Ca, Pb .....
X=Cl,ONO³,OH,OM.....X²=SO⁴,CO³,O,S.....

H
Li Be B C N O F
Na Mg Al Si P S Cl
K Ca — Ti V Cr Mn Fe Co Ni Cu Zn — — As Se Br
Rb Sr Yt? Zr Nb Mo — Ru Rh Pd Ag Cd In Sn Sb Te I
Cs Ba Di? Ce — — — — — — — — — — — —
— — Er? La? Ta W — Os Ir Pt Au Hg Tl Pb Bi — —
— — Th — U — — — — — — — — — —

Chemical Heritage Foundation

Scientists continued and still continue to adjust the Periodic Table as new elements are found and/or created

IUPAC Periodic Table of the Elements

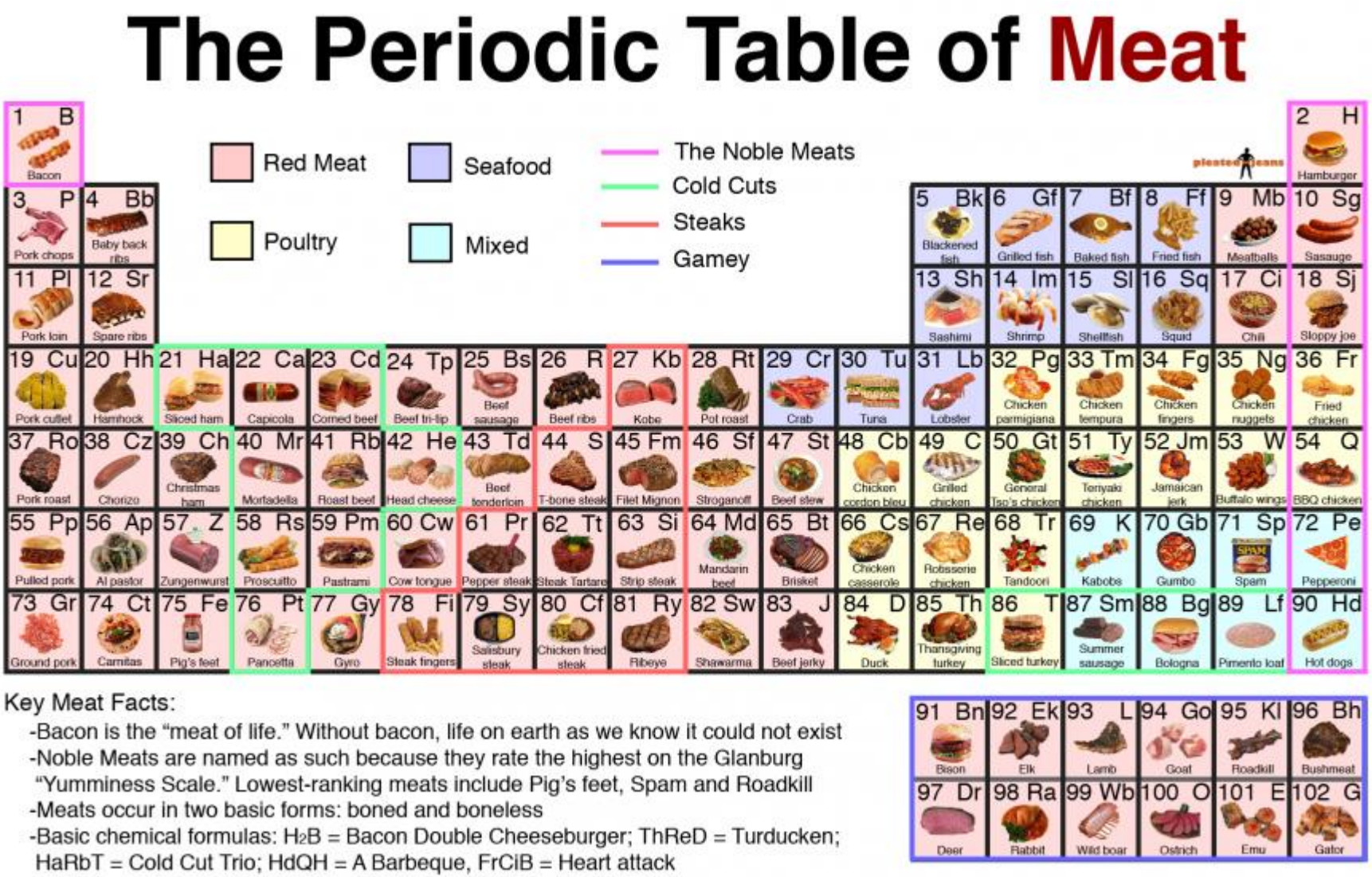
1												13	14	15	16	17	18
1 H hydrogen 1.008 [1.0078, 1.0082]	2		Key: atomic number Symbol name conventional atomic weight standard atomic weight														2 He helium 4.0026
3 Li lithium 6.94 [6.938, 6.997]	4 Be beryllium 9.0122											5 B boron 10.81 [10.806, 10.821]	6 C carbon 12.011 [12.009, 12.012]	7 N nitrogen 14.007 [14.006, 14.008]	8 O oxygen 15.999 [15.999, 16.000]	9 F fluorine 18.998	10 Ne neon 20.180
11 Na sodium 22.990	12 Mg magnesium 24.305 [24.304, 24.307]	3	4	5	6	7	8	9	10	11	12	13 Al aluminium 26.982	14 Si silicon 28.085 [28.084, 28.086]	15 P phosphorus 30.974	16 S sulfur 32.06 [32.059, 32.076]	17 Cl chlorine 35.45 [35.446, 35.457]	18 Ar argon 39.948
19 K potassium 39.098	20 Ca calcium 40.078(4)	21 Sc scandium 44.956	22 Ti titanium 47.867	23 V vanadium 50.942	24 Cr chromium 51.996	25 Mn manganese 54.938	26 Fe iron 55.845(2)	27 Co cobalt 58.933	28 Ni nickel 58.693	29 Cu copper 63.546(3)	30 Zn zinc 65.38(2)	31 Ga gallium 69.723	32 Ge germanium 72.630(8)	33 As arsenic 74.922	34 Se selenium 78.971(8)	35 Br bromine 79.904 [79.901, 79.907]	36 Kr krypton 83.798(2)
37 Rb rubidium 85.468	38 Sr strontium 87.62	39 Y yttrium 88.906	40 Zr zirconium 91.224(2)	41 Nb niobium 92.906	42 Mo molybdenum 95.95	43 Tc technetium	44 Ru ruthenium 101.07(2)	45 Rh rhodium 102.91	46 Pd palladium 106.42	47 Ag silver 107.87	48 Cd cadmium 112.41	49 In indium 114.82	50 Sn tin 118.71	51 Sb antimony 121.76	52 Te tellurium 127.60(3)	53 I iodine 126.90	54 Xe xenon 131.29
55 Cs caesium 132.91	56 Ba barium 137.33	57-71 lanthanoids	72 Hf hafnium 178.49(2)	73 Ta tantalum 180.95	74 W tungsten 183.84	75 Re rhenium 186.21	76 Os osmium 190.23(3)	77 Ir iridium 192.22	78 Pt platinum 195.08	79 Au gold 196.97	80 Hg mercury 200.59	81 Tl thallium 204.38 [204.38, 204.39]	82 Pb lead 207.2	83 Bi bismuth 208.98	84 Po polonium	85 At astatine	86 Rn radon
87 Fr francium	88 Ra radium	89-103 actinoids	104 Rf rutherfordium	105 Db dubnium	106 Sg seaborgium	107 Bh bohrium	108 Hs hassium	109 Mt meitnerium	110 Ds darmstadtium	111 Rg roentgenium	112 Cn copernicium	113 Nh nihonium	114 Fl flerovium	115 Mc moscovium	116 Lv livermorium	117 Ts tennessine	118 Og oganesson

57 La lanthanum 138.91	58 Ce cerium 140.12	59 Pr praseodymium 140.91	60 Nd neodymium 144.24	61 Pm promethium	62 Sm samarium 150.36(2)	63 Eu europium 151.96	64 Gd gadolinium 157.25(3)	65 Tb terbium 158.93	66 Dy dysprosium 162.50	67 Ho holmium 164.93	68 Er erbium 167.26	69 Tm thulium [illegible]	70 Yb ytterbium 173.05	71 Lu lutetium 174.97
89 Ac actinium	90 Th thorium 232.04	91 Pa protactinium 231.04	92 U uranium 238.03	93 Np neptunium	94 Pu plutonium	95 Am americium	96 Cm curium	97 Bk berkelium	98 Cf californium	99 Es einsteinium	100 Fm fermium	101 Md mendelevium	102 No [illegible]obelium	103 Lr lawrencium

INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

For notes and updates to this table, see www.iupac.org. This version is dated 28 November 2016.

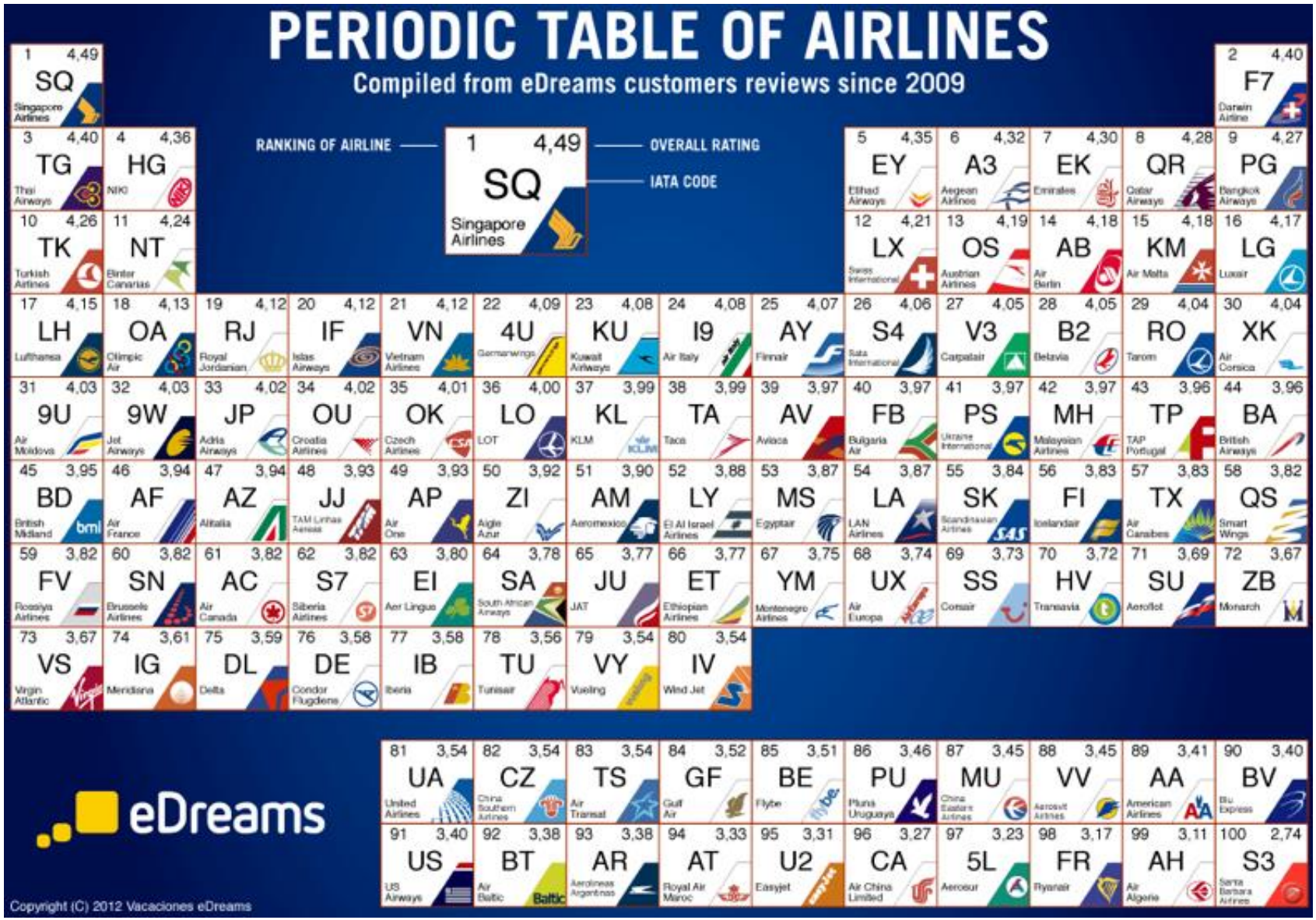
Its shape is used to order very different "things"



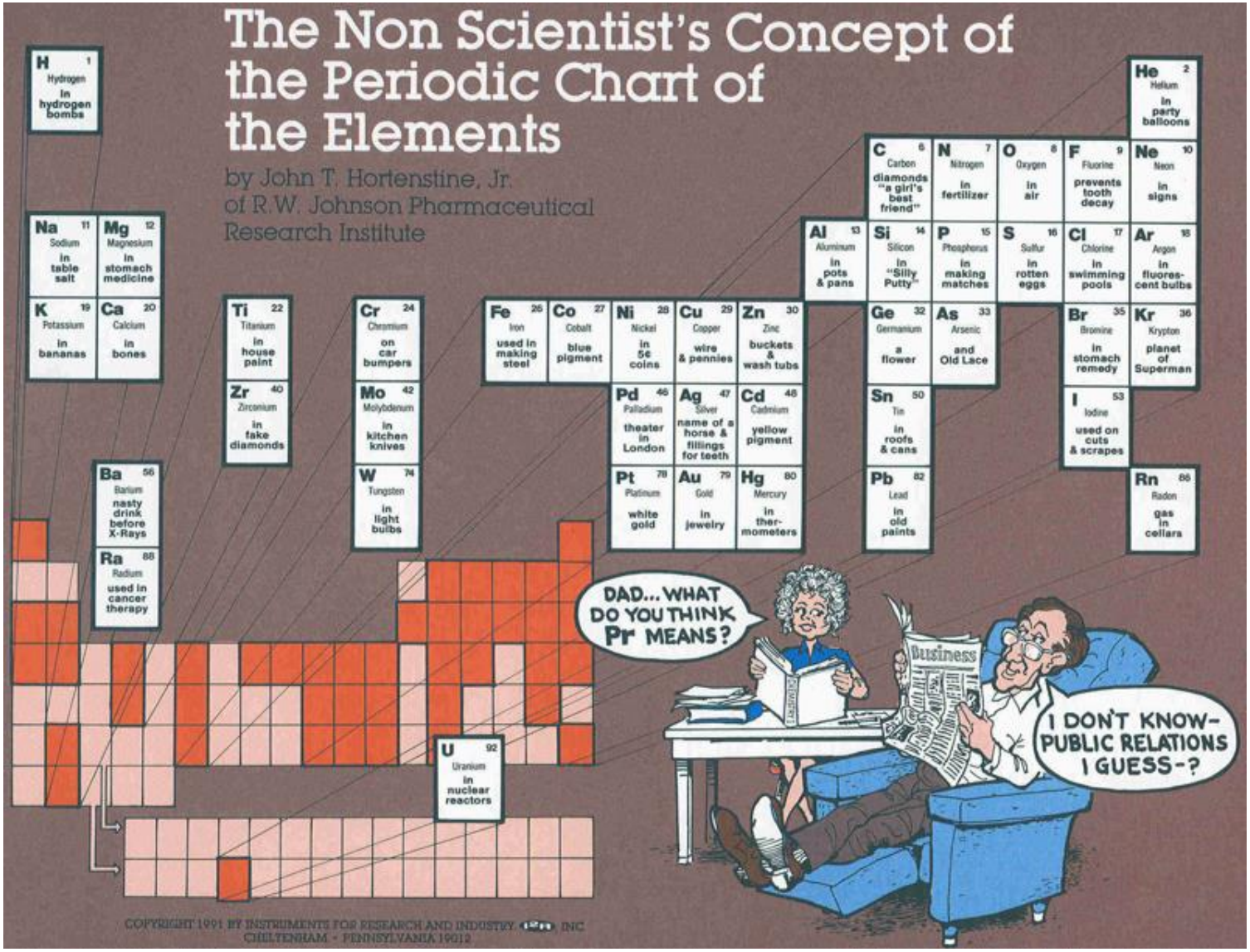
Key Meat Facts:

- -Bacon is the "meat of life." Without bacon, life on earth as we know it could not exist
- -Noble Meats are named as such because they rate the highest on the Glanburg "Yumminess Scale." Lowest-ranking meats include Pig's feet, Spam and Roadkill
- -Meats occur in two basic forms: boned and boneless
- -Basic chemical formulas: H_2B = Bacon Double Cheeseburger; ThReD = Turducken; HaRbT = Cold Cut Trio; HdQH = A Barbeque, FrCiB = Heart attack

Its shape is used to order very different "things"



Various types of the Periodic Table



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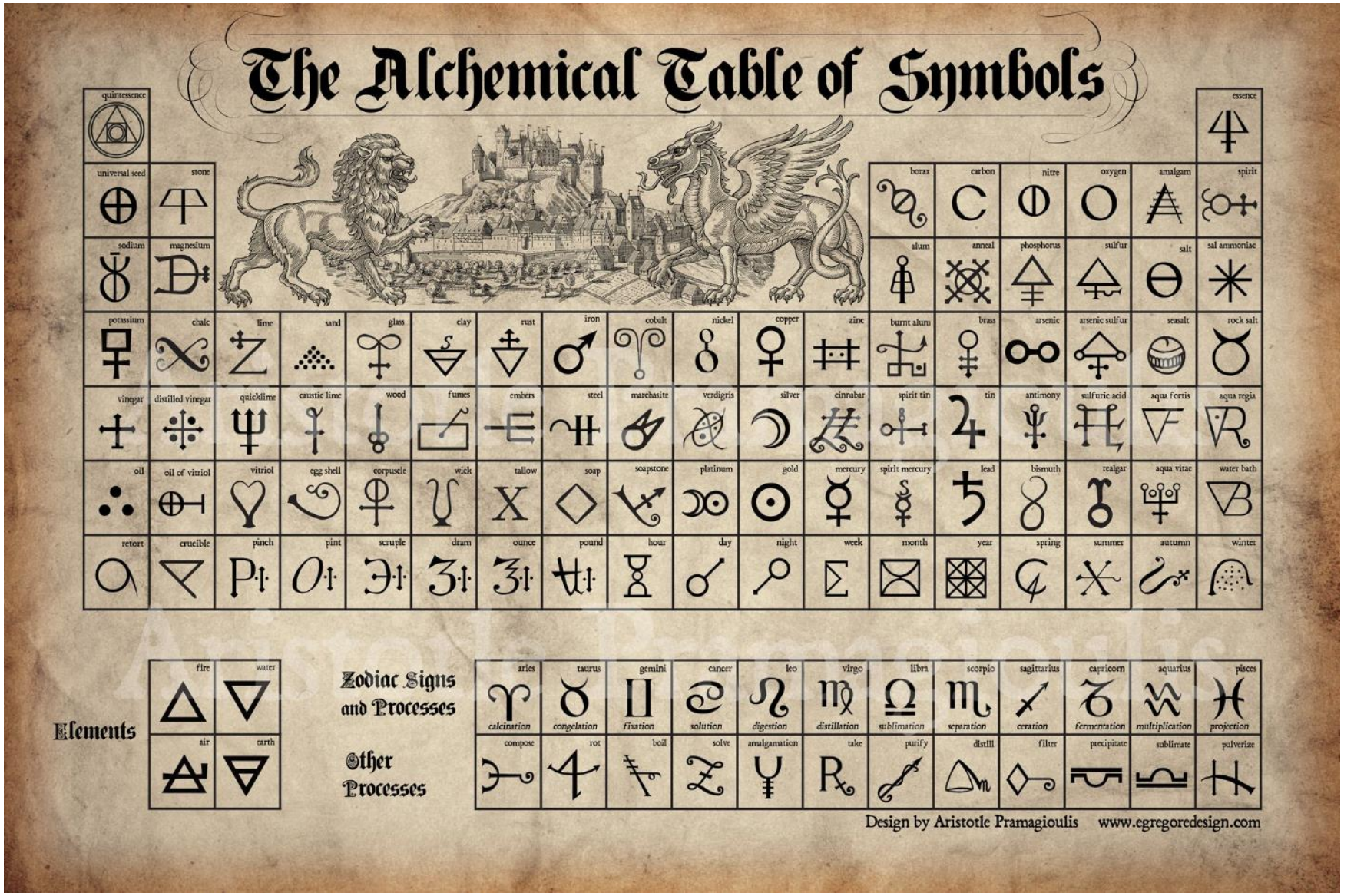
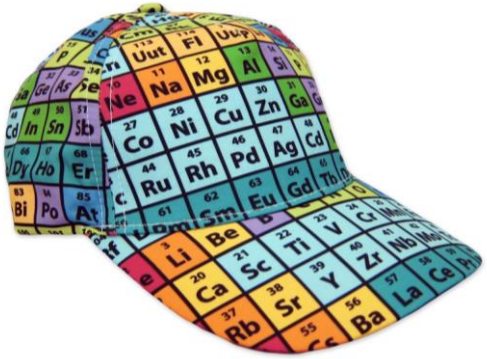
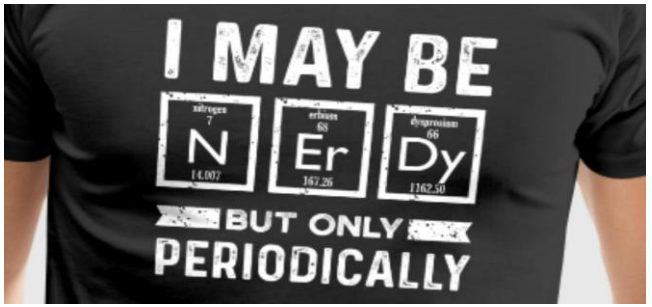


Various kinds of objects reproducing the Periodic Table





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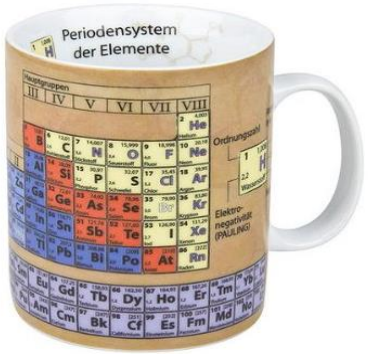
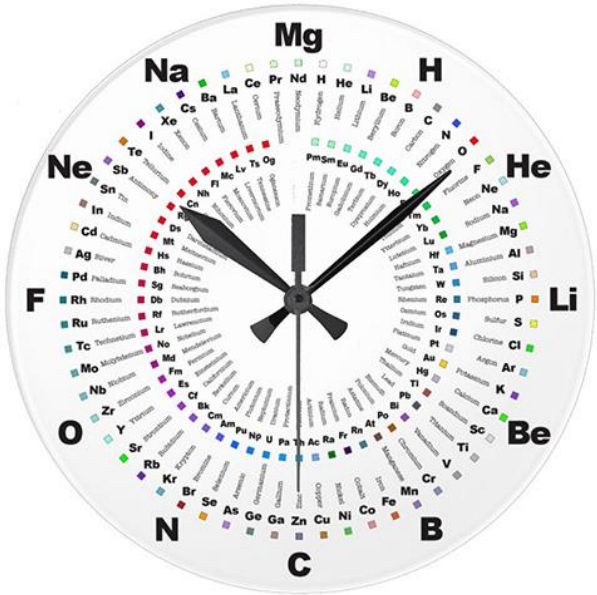
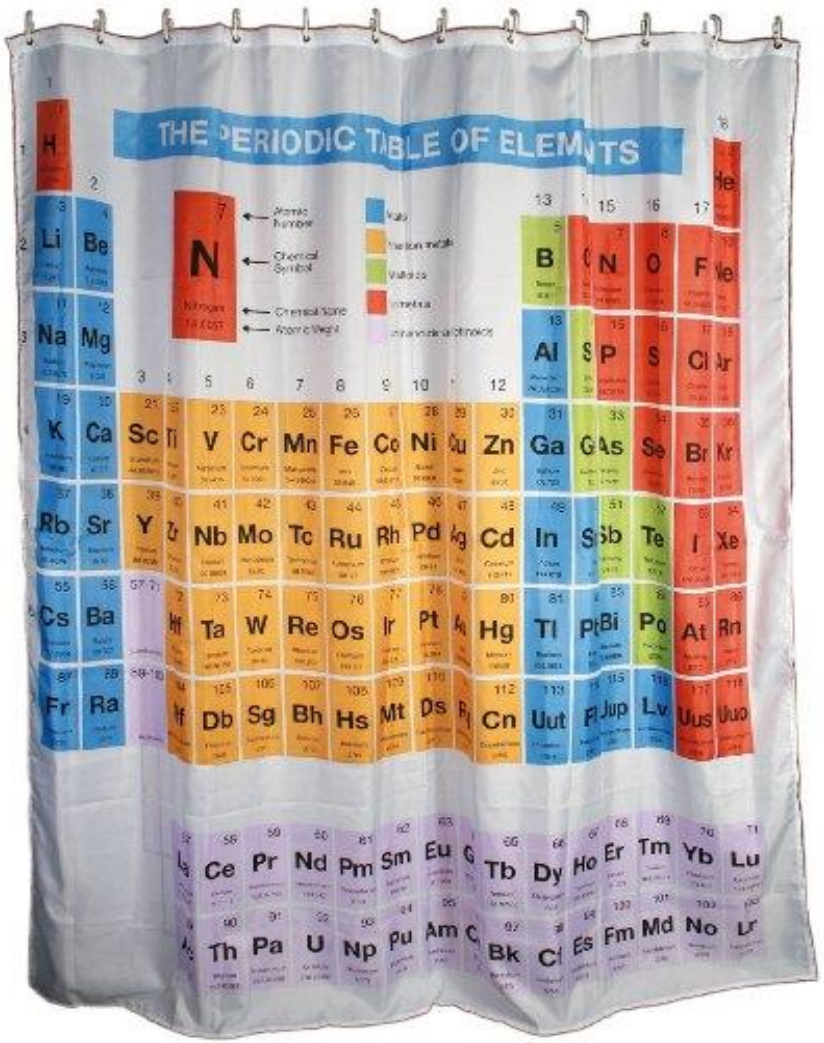




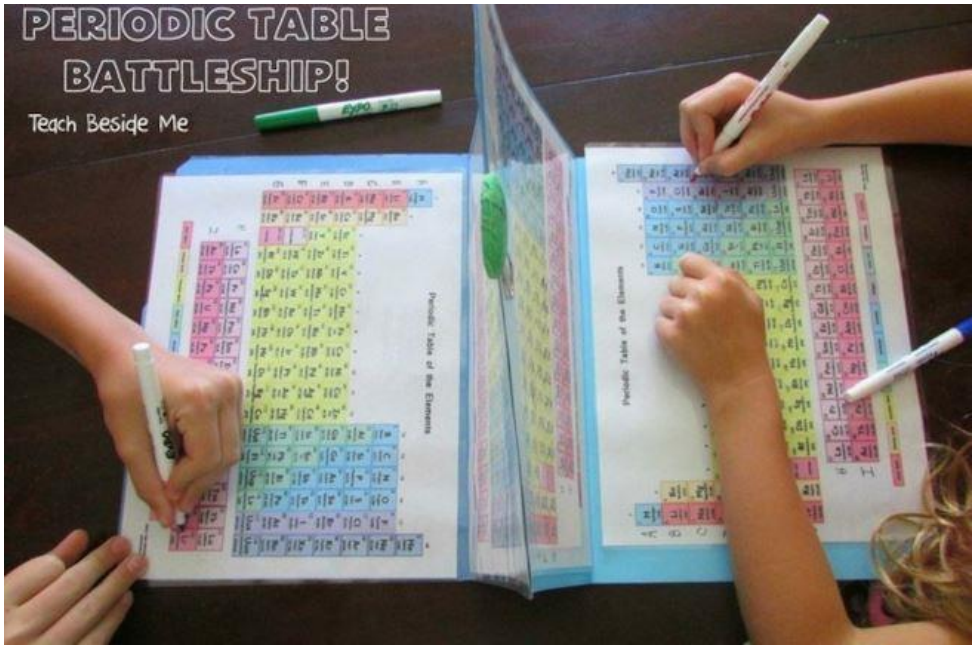


Shower curtain

Various kinds of objects reproducing the Periodic Table

Various kinds of objects reproducing the Periodic Table

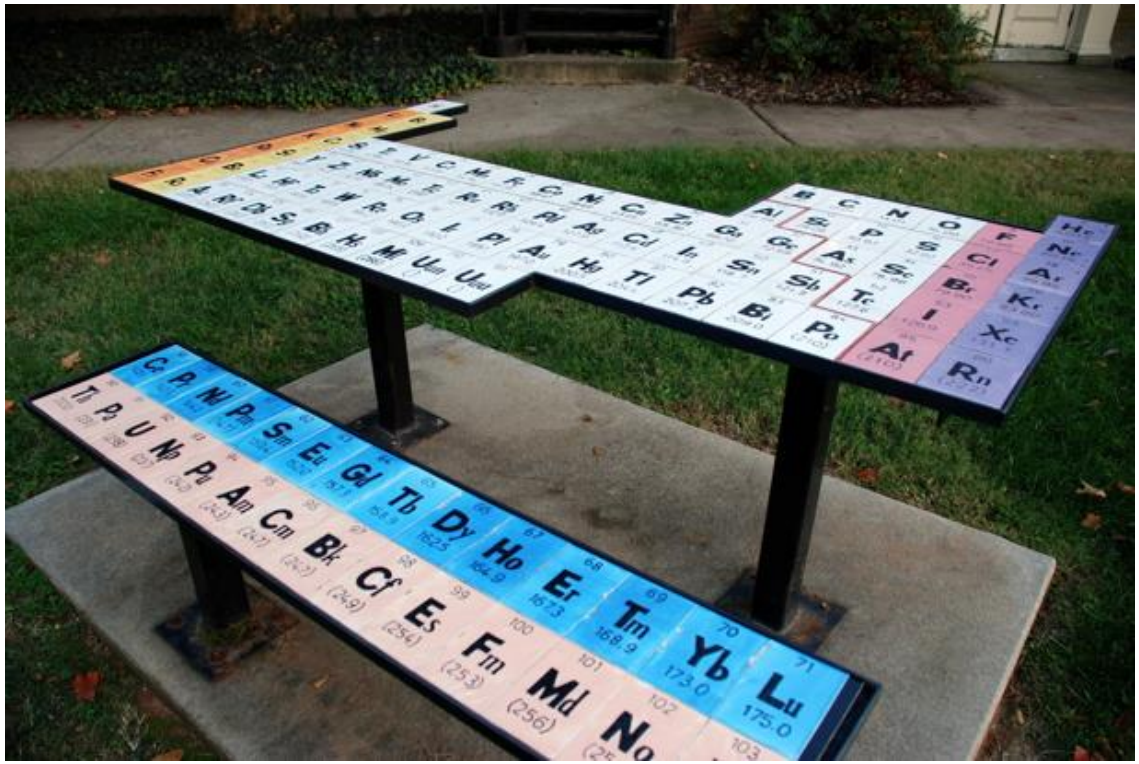
Playing cards



Various kinds of objects reproducing the Periodic Table

You can eat a sweet Periodic Table

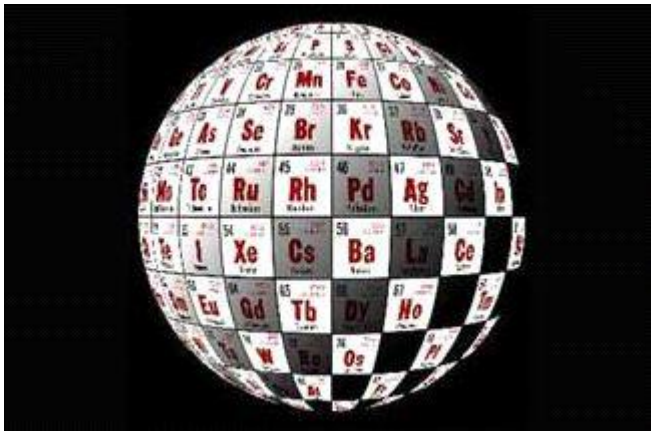
You can also eat on the Periodic Table

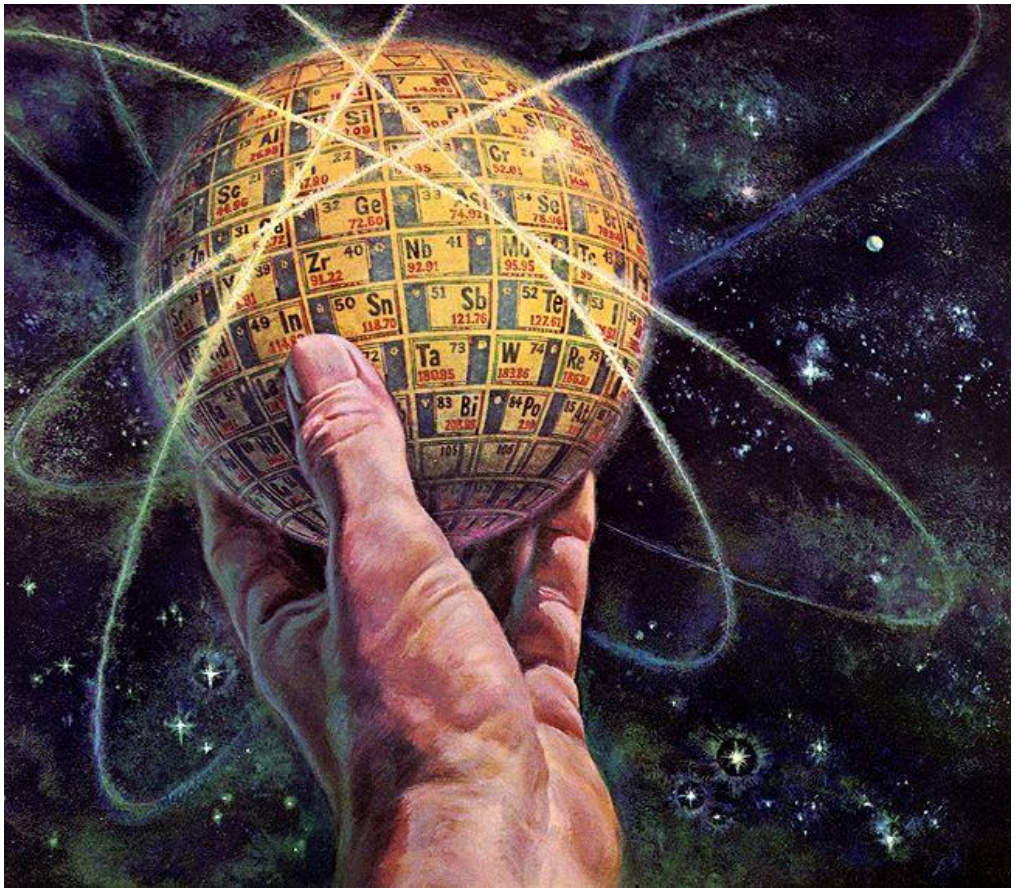


Various shapes of the Periodic Table

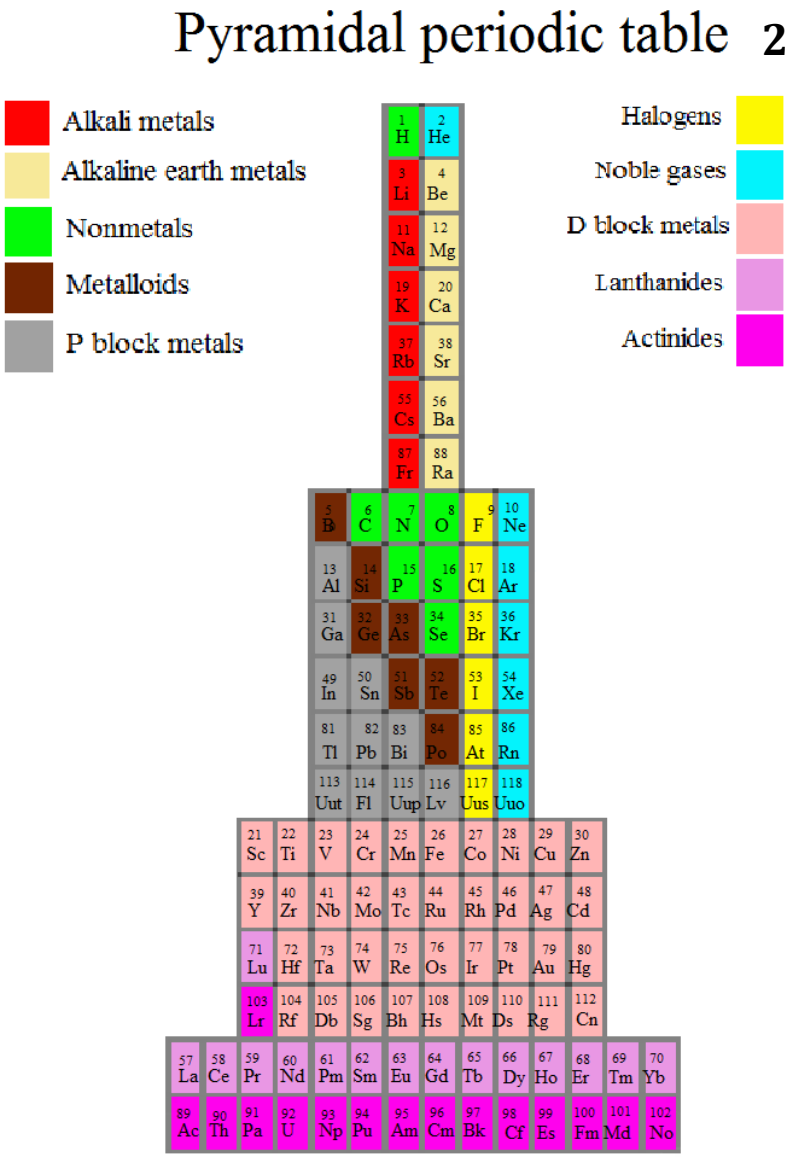
Spherical Periodic Table

Unfortunately, this wonderful formulation from a **Union Carbide** advertisement (1960) does not work; it is *not* (in this author's opinion) possible to wrap the Periodic Table onto a sphere

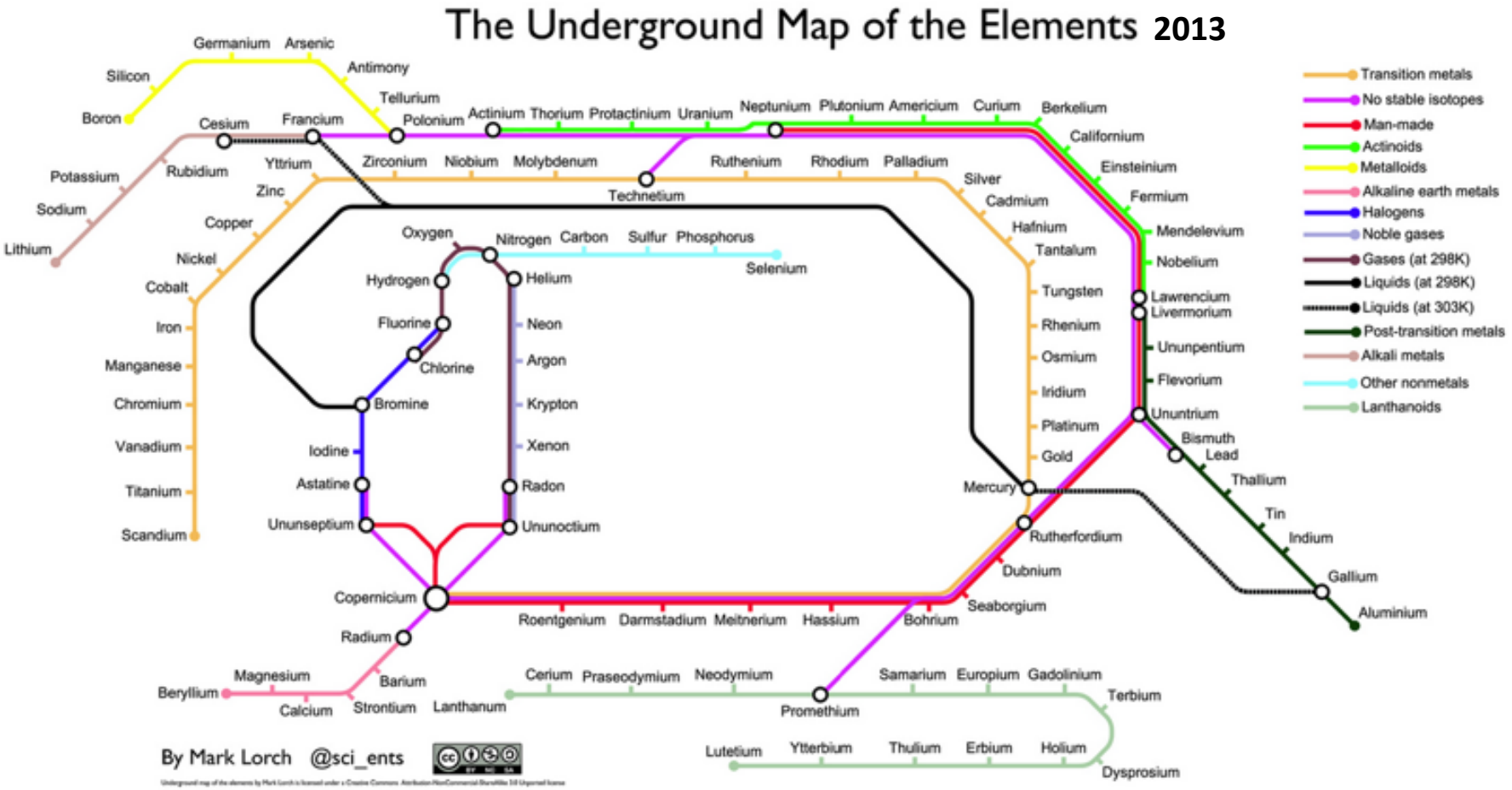




Various shapes of the Periodic Table



Various shapes of the Periodic Table



Real-life Periodic Tables

University of Iowa (USA)

Periodic Table Monuments

St. Petersburg

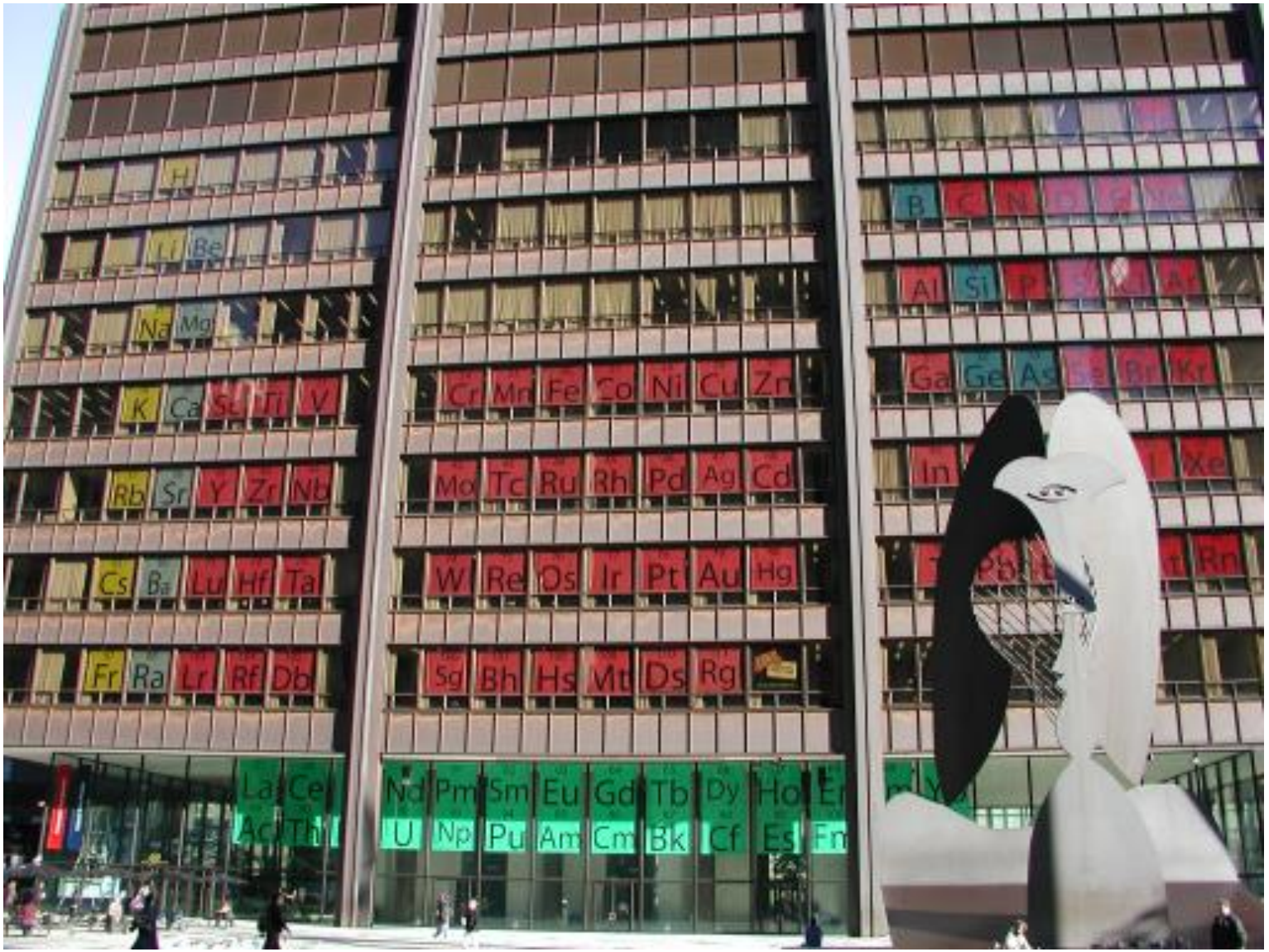
Periodic Table Monuments

Bratislava, Slovakia

Very big Periodic Tables

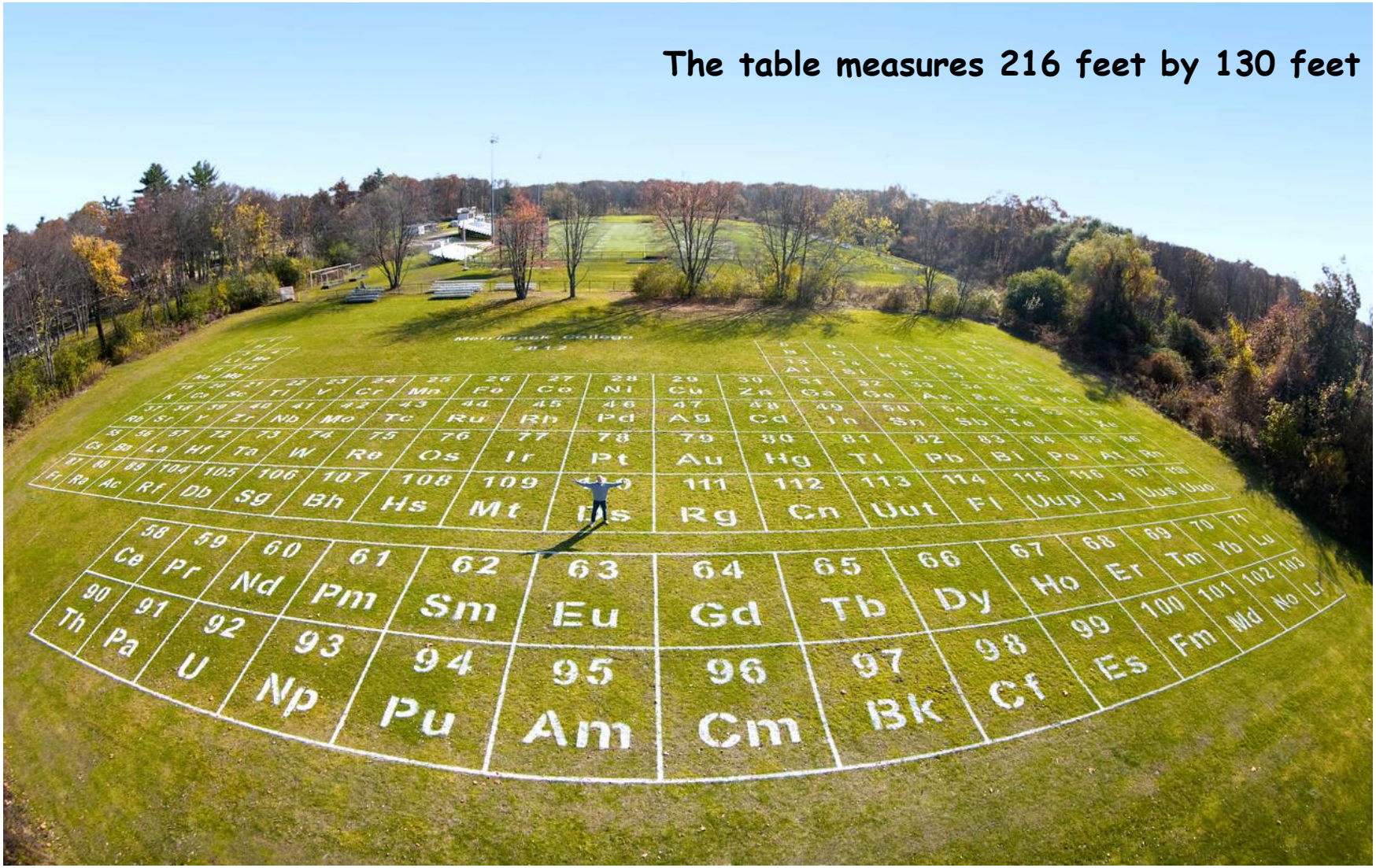
Murcia, Spain

Very big Periodic Tables



Daley Center, Chicago (USA)

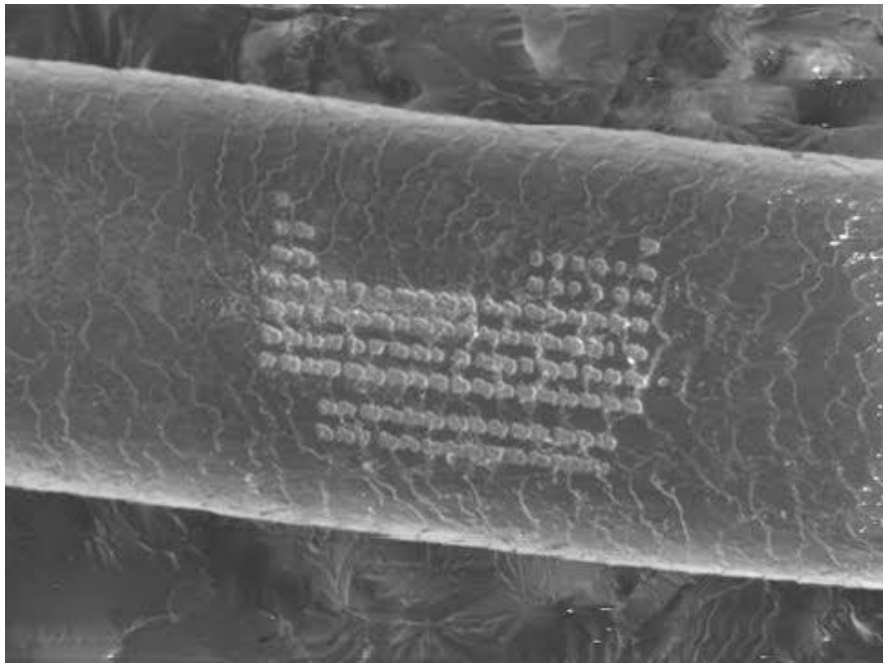
Very big Periodic Tables

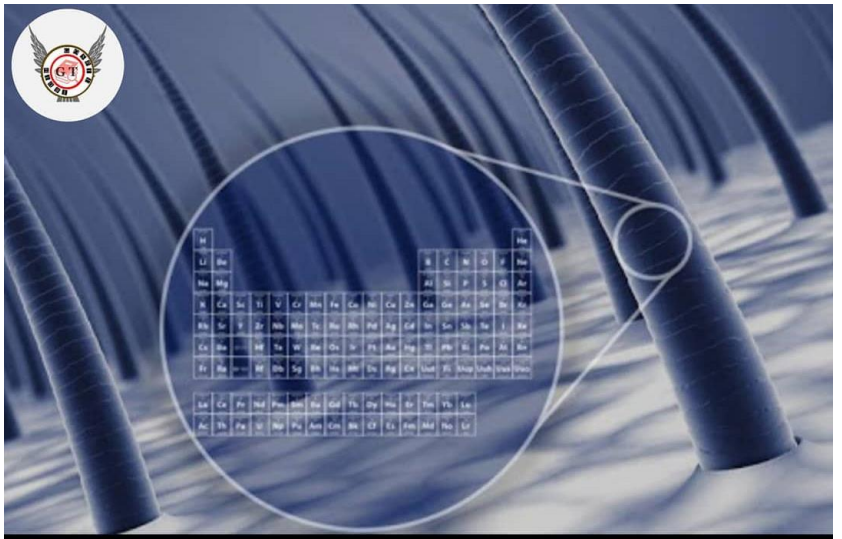


Merrimack College, North Andover, MA (USA)

Very small Periodic Tables

The world's smallest periodic table was also one of the world's smallest birthday gifts: it was a present to Prof. Martyn Poliakoff for his birthday in December 2010. Scientists used an ion beam and an electron microscope to etch the table onto one of his hairs, creating a table that was 89.67 microns wide and 46.39 microns tall





World's smallest periodic table was created on a strand of hair at the University of Nottingham. In this periodic table, each symbol measures about 4 millionths of a meter across.

Polyhedron 141 (2018) 1–4

Contents lists available at ScienceDirect

Polyhedron

journal homepage: www.elsevier.com/locate/poly

Review

Row 7 of the periodic table complete: Can we expect more new elements; and if so, when?

Jan Reedijk

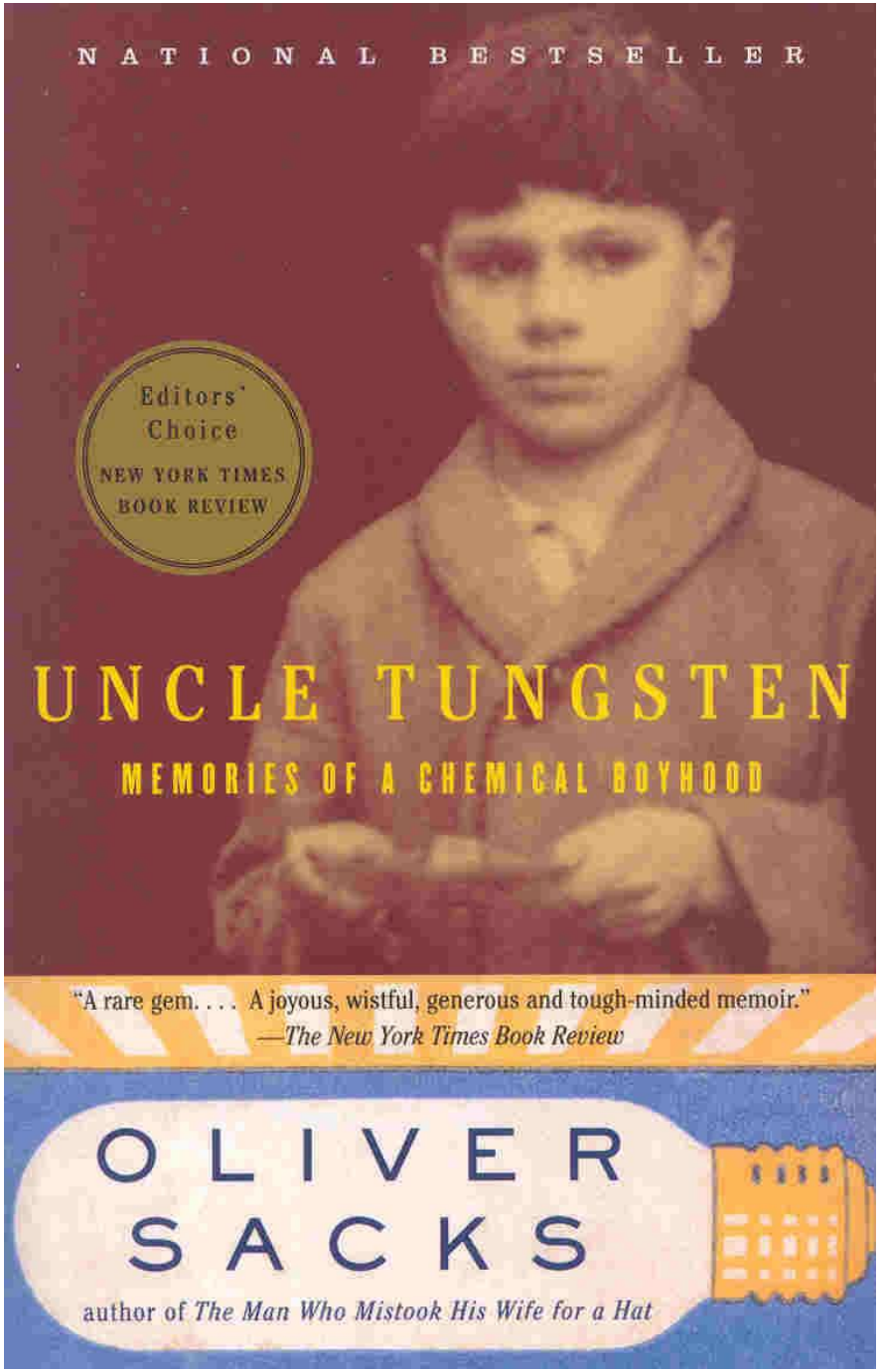
Two questions are arising:

1) How many elements can be added? Is the Periodic Table an infinite document?
2) Because the last elements exhibit properties quite different from those of the related elements in the preceding rows (for example Orgasson is more reactive than the noble gases), will the current concept of periodicity end? Will the Periodic Table collapse?

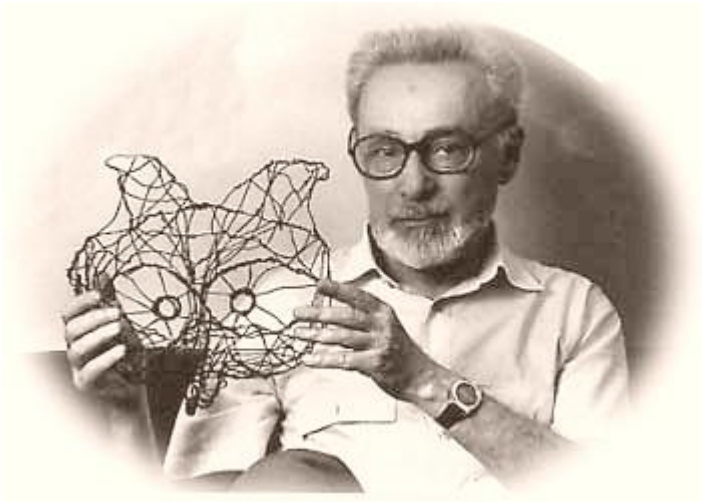
Oliver Sacks said

"The Periodic Table is the most important discovery in the history of Science: everything in its place"

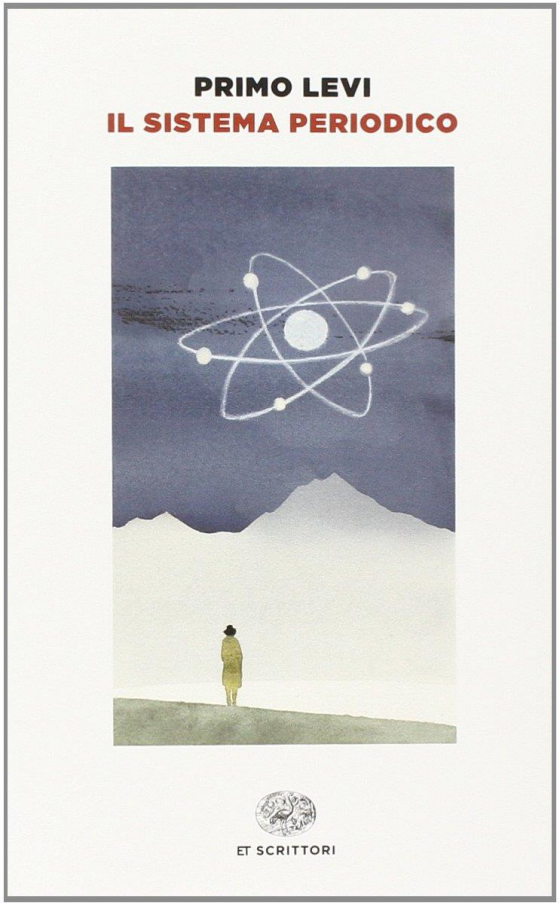
New York Times, April 18, 1999

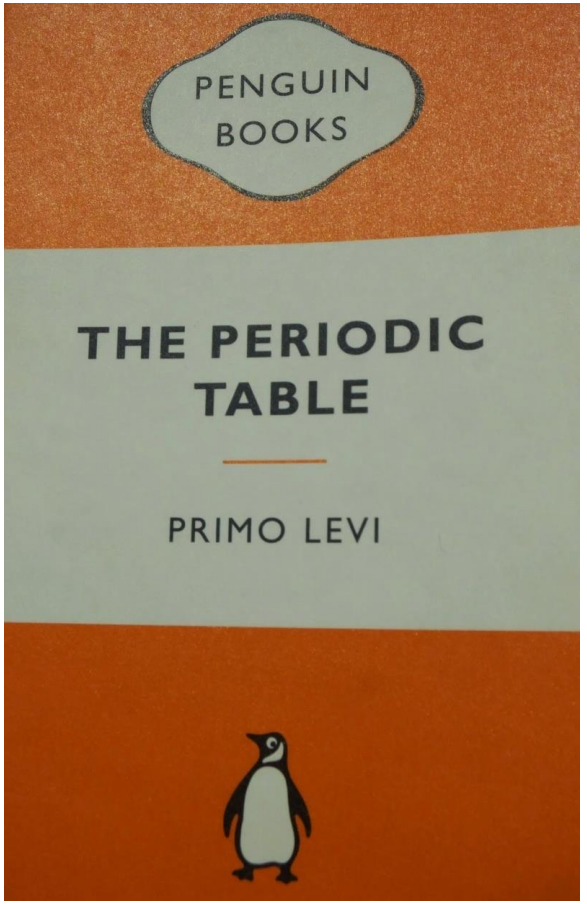


1975



Primo Levi (1919 – 1987)





2019 is also the 100th anniversary
of the birth of Primo Levi