

PAST AND PRESENT



ARRANGERS



OF CHEMICAL ELEMENT SYSTEMS

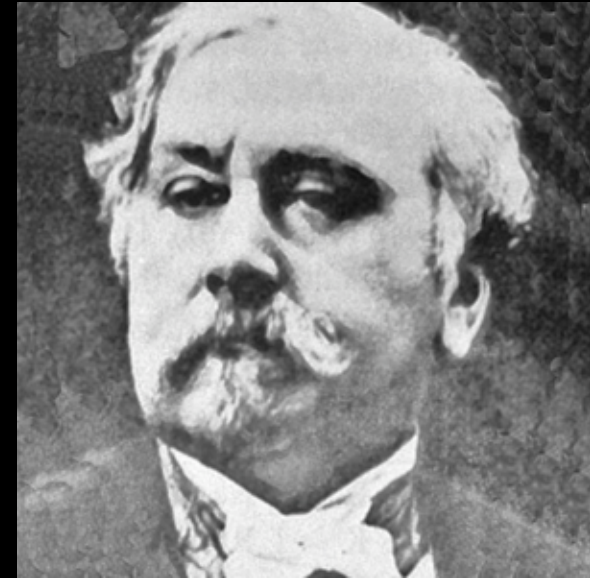
In Ancient Greece, Democritus had the right idea, but Aristotle then sent Europeans in the wrong direction.

Lavoisier experimented - closing in on reality.

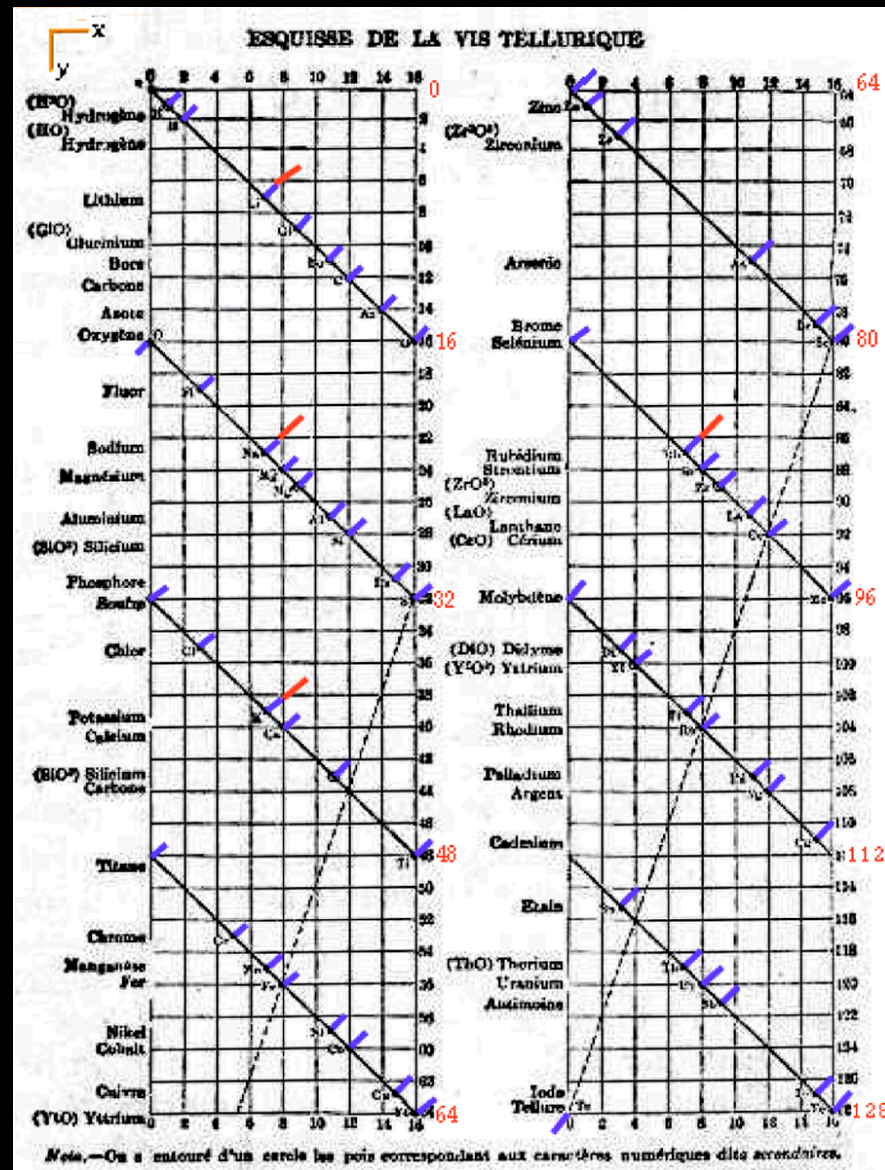
Dalton furthered element identification, and finally, Cannizzarro - using Avogadro's Hypothesis – brought order to the confusion with more correct element weights.

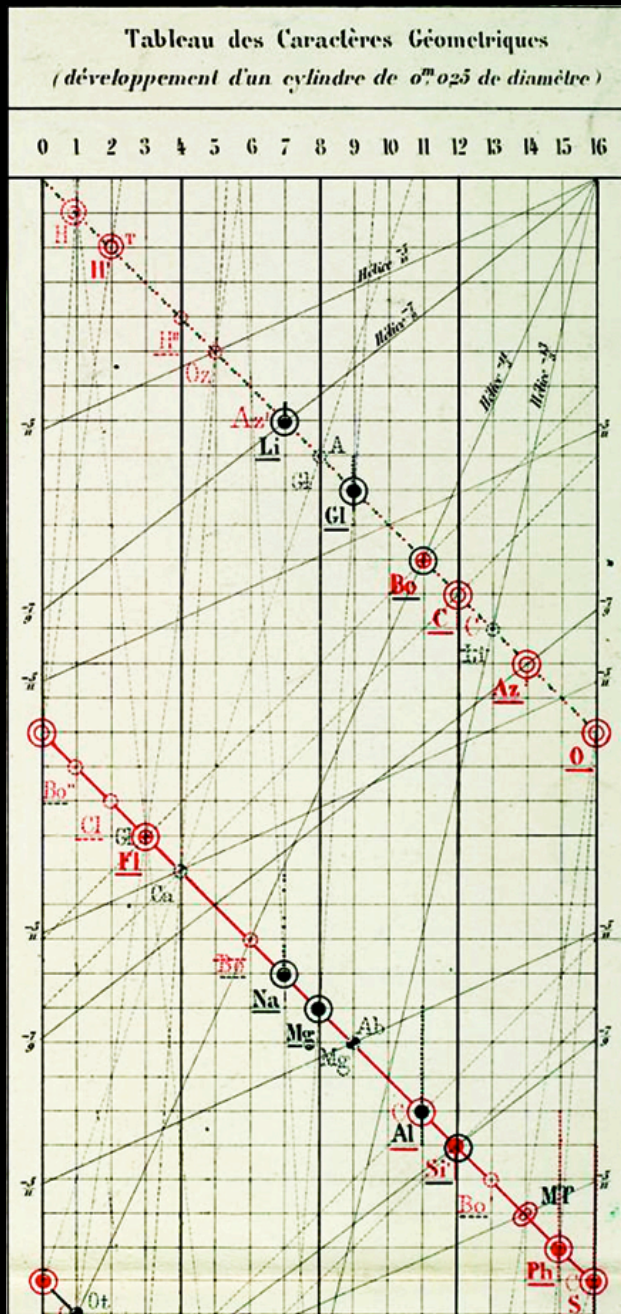


With Cannizzaro's element weights, **Alexandre-Émile de Chancourtois** connected the elements on the outside of a cylinder so similar elements appeared in the same vertical line, the first published arrangement of elements that displayed true periodicity.



This first periodic table was called the **Vis Tellurique**, and presented in a paper to the French Academy of Sciences, then published in *Comptes Rendus*, their in-house journal in 1862.





The paper- describing a **3D helix** - was not accompanied by a picture or model, so with these omitted, and worded mainly for geologists, got little or no attention from chemists until **Mendeleev**'s periodic table aroused popular interest in the periodic table years later.



	Valence IV	Valence III	Valence II	Valence I	Valence I	Valence II	The mass difference
I line					Li	Be	~16
II line	C	N	O	F	Na	Mg	~16
III line	Si	P	S	Cl	K	Ca	~45
IV line		As	Se	Br	Rb	Sr	~45
V line	Sn	Sb	Te	I	Cs	Ba	~90
VI line	Pb	Bi			Tl		~90

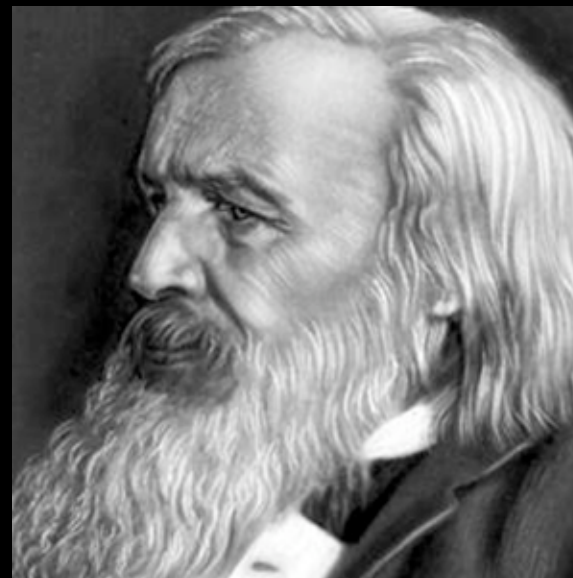
Lothar Meyer, in 1864, produced a periodic table of mostly main group elements listed by valence.

His principal contribution was recognition of a repeating pattern of element properties.

ОПЫТЪ СИСТЕМЫ ЭЛЕМЕНТОВЪ.

ОСНОВАННОЙ НА ИХЪ АТОМНОМЪ ВѢСѢ И ХИМИЧЕСКОМЪ СХОДСТВѢ.

		Ti = 50	Zr = 90	? = 180.	
		V = 51	Nb = 94	Ta = 182.	
		Cr = 52	Mo = 96	W = 186.	
		Mn = 55	Rh = 104,4	Pt = 197,4	
		Fe = 56	Rn = 104,4	Ir = 198.	
	Ni = Co = 59	Pl = 106,8	O = 199.		
H = 1	Cu = 63,4	Ag = 108	Hg = 200.		
Be = 9,4	Mg = 24	Zn = 65,2	Cd = 112		
B = 11	Al = 27,4	? = 68	Ur = 116	Au = 197?	
C = 12	Si = 28	? = 70	Sn = 118		
N = 14	P = 31	As = 75	Sb = 122	Bi = 210?	
O = 16	S = 32	Se = 79,4	Te = 128?		
F = 19	Cl = 35,5	Br = 80	I = 127		
Li = 7	Na = 23	K = 39	Rb = 85,4	Cs = 133	Tl = 204.
		Ca = 40	Sr = 87,6	Ba = 137	Pb = 207.
		? = 45	Ce = 92		
		?Er = 56	La = 94		
		?Yt = 60	Di = 95		
		?In = 75,5	Th = 118?		



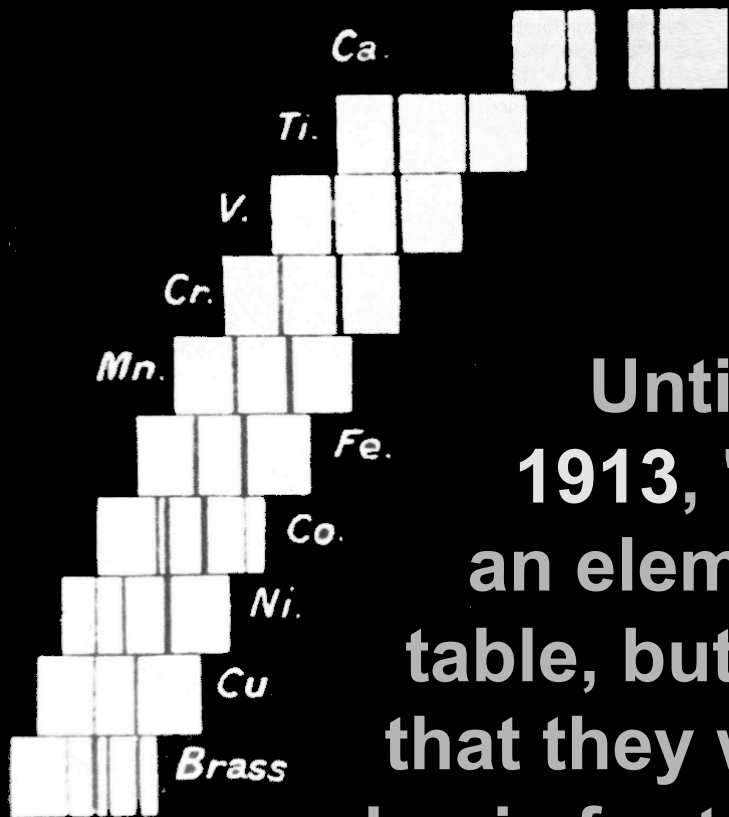
Mendeleev's was the clearest, most consistent, and most systematic of the early periodic tables, presented in March, 1869.

ПЕРИОДИЧЕСКАЯ СИСТЕМА ЭЛЕМЕНТОВ											
ГРУППЫ	ЭЛЕМЕНТЫ	ГРУППЫ ЭЛЕМЕНТОВ					ГРУППЫ ЭЛЕМЕНТОВ				
		I	II	III	IV	V	VI	VII	VIII	0	
1	I	H ¹ 1,008								He ² 4,003	
2	II	Li ³ 6,940	Be ⁴ 9,02	B ⁵ 10,82	C ⁶ 12,010	N ⁷ 14,008	O ⁸ 16,000	F ⁹ 18,00		Ne ¹⁰ 20,183	
3	III	Na ¹¹ 22,997	Mg ¹² 24,32	Al ¹³ 26,97	Si ¹⁴ 28,08	P ¹⁵ 30,98	S ¹⁶ 32,06	Cl ¹⁷ 35,457		Ar ¹⁸ 39,944	
4	IV	K ¹⁹ 39,096	Ca ²⁰ 40,08	Sc ²¹ 45,10	Ti ²² 47,90	V ²³ 50,95	Cr ²⁴ 52,01	Mn ²⁵ 54,93	Fe ²⁶ 55,85	Co ²⁷ 58,94	Ni ²⁸ 58,69
	V	Cu ²⁹ 63,57	Zn ³⁰ 65,39	Ga ³¹ 69,72	Ge ³² 72,60	As ³³ 74,91	Se ³⁴ 78,96	Br ³⁵ 79,916		Kr ³⁶ 83,7	
5	VI	Rb ³⁷ 85,48	Sr ³⁸ 87,63	Y ³⁹ 88,92	Zr ⁴⁰ 91,22	Nb ⁴¹ 92,91	Mo ⁴² 95,95	Ma ⁴³ —	Ru ⁴⁴ 101,7	Rh ⁴⁵ 102,91	Pd ⁴⁶ 106,7
	VII	Ag ⁴⁷ 107,88	Cd ⁴⁸ 112,41	In ⁴⁹ 114,76	Sn ⁵⁰ 118,70	Sb ⁵¹ 121,76	Te ⁵² 127,61	J ⁵³ 126,92		Xe ⁵⁴ 131,3	
6	VIII	Cs ⁵⁵ 132,91	Ba ⁵⁶ 137,36	La ⁵⁷ 138,92	Hf ⁷² 178,6	Ta ⁷³ 180,88	W ⁷⁴ 183,92	Re ⁷⁵ 186,31	Os ⁷⁶ 190,2	Ir ⁷⁷ 193,1	Pt ⁷⁸ 195,23
	IX	Au ⁷⁹ 197,2	Hg ⁸⁰ 200,61	Tl ⁸¹ 204,39	Pb ⁸² 207,21	Bi ⁸³ 208,00	Po ⁸⁴ 210	At ⁸⁵ —		Rn ⁸⁶ 222	
7	X	Ra ⁸⁸ 226,05	Ac ⁸⁹ 227	Th ⁹⁰ 232,12	Pa ⁹¹ 231	U ⁹² 238,07					

ЛАНТАНЫ				LANTANIDES		
Ce ⁵⁸ 140,13	Pr ⁵⁹ 140,92	Nd ⁶⁰ 144,27	— ⁶¹	Sm ⁶² 150,43	Eu ⁶³ 152,0	Gd ⁶⁴ 156,9
Tb ⁶⁵ 158,93	Dy ⁶⁶ 162,50	Ho ⁶⁷ 164,93	Er ⁶⁸ 167,2	Tm ⁶⁹ 168,93	Yb ⁷⁰ 173,04	Cp ⁷¹ 174,99

He predicted the properties of several undiscovered elements that proved to be accurate, aiding his becoming the scientific figure given credit for originating the periodic table.

Moseley's X-Ray spectral lines of elements



Until **Henry Moseley's** work in 1913, "*atomic number*" was just an element's place in the periodic table, but he proved, using X-rays, that they were measurable - the basis for today's periodic tables.

**The Modern Periodic Table
was ready to become
THE ICON OF CHEMISTRY,
the most important arrangement of
data for understanding and working
with matter in existence.**

**...but more additions, changes, and
improvements were still to come.**

Thanks for watching.