

THIS ARTICLE IS NOT YET FINANLIZED!

ALL ELEMENTS CONSIST OF HYDROGEN

Prout (1815) proved true: elements are made up of hydrogen atoms

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Introduction

The untenable quantum shell model of the atom is the base for the explanation of chemical bonding and the periodic table; therefore quantum physical chemistry is untenable. Prout's thesis in 1815 that all elements are made up of hydrogen atoms is proved true. The dogmatic exclusion of chemical philosophy and therefore the prevention of a rational metaphysics are the cause for the long sleep of Prout's ingenious idea that the constituents of atoms are hydrogen atoms and that therefore the chemical equivalents in reactions and compounds are expressible by integer numbers. Stoichiometry shows that for example carbon, oxygen, and the two isotopes of chlorine consist of 12, 16, 35 and 37 hydrogen atoms, respectively. If for convenience carbon has the atomic weight 12, then why the atomic weight of oxygen is not exactly 16?

Inertial mass has nothing to do with an intrinsic property of an atom but is a measure of the resistive force that an electromagnetic medium exerts during acceleration and high velocity upon the *ionized* atom. These so-called inertial forces (a misnomer) are not additive, e.g. the repulsive force for a structure of 16 hydrogen atoms may be smaller than 16,00 if for carbon the repulsive force are 12,00 for convenience.

Prout's thesis that all elements have hydrogen as constituent building blocks is true. The erroneous interpretation of what the mass spectrograph is measuring has prevented the evidence of Prout's chemical philosophy till now.

The mass spectrograph measures not the *inertia in vacuo* but a repulsive force due to a cosmic drag from a medium. This repulsive force is not additive and depends on the structure of the atom.

Constituents of all atoms are hydrogen atoms. The number of hydrogen atoms determines a chemical element. Isomers have the same number of hydrogen atoms but different structures.

Mass spectrographs don't measure the number of the constituents of atoms directly but because the shielding effect is relatively small, spectrograph measurements show nearly integer numbers, indicating that the cosmic drag is nearly additive and for instance an atomic weight (a misnomer!) of 15.99... for O refer to an atom which is a construct of 16 H-atoms.

Chemical equivalents or constituent amounts in reactions or in compounds represent the ratios of the H-constituents of the elements taken into consideration. H₂O is a compound of 18 H-atoms.

The exact ratios, the exact moles are the result of *stoichiometry* and not of mass spectroscopy because atomic weights do not represent ratios of 'stuff'!

After the discovery of the isotopes it should have been clear that common chlorine is a mixture of ^{37}Cl and ^{35}Cl and that Prout was right. But the misunderstanding of ‘atomic weights’ (measured by mass spectrographs) as quantity of stuff prevented the insight that stoichiometry calculated the exact chemical ratios long ago. I present a new *Proutian* periodic table.

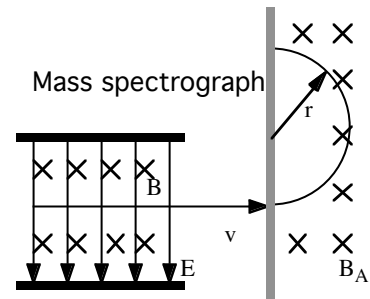
Mass spectrography

Take for example the mass spectrograph of Bainbridge: Ions from a discharge tube enter a velocity filter. By crossed electric (E) and magnetic (B) fields all ions are filtered out except those with

$v_0 = E/B$. In the magnetic analyser (B_A) the ions are deflected according to the formula $m/q = r BB_A/E$... where q is the charge and r is the radius of the deflection. Because v_0 is a low speed the measured masses are roughly the so-called rest masses m_0 .

Therefore, the mass spectrometer measures for one and the same velocity the ”rest” masses of the atomic ions or of the sub-atomic particles p and e .

Therefore the results we get are the inert masses of ionised atoms. And we do not know exactly the inert mass of the neutral atom because we **cannot** simply **add** the inert mass of the electron to get the mass of the neutral atom.



A look at the table for all masses of ionised atoms shows that **inertia is not an additive property**, there is no linear increase with increasing mass number A . If C has the relative mass 12.0 and He has 4.0026, the inert mass is not an additive property.

This outcome is inconsistent with classical theory of inertia, which stated that inertia (laziness!) is proportional to the amount of mass or stuff. Because it is supposed that the motion of the body takes place in vacuity, inertial forces must have their origin in the body.

Laziness of stuff is not the cause for erroneously so-called inertial forces. The cause of inertial forces is a resisting force of a dielectric medium.

The magnitude of that counter force depends on the shape of the body. Therefore this drag is not proportional to the number of the constituents of the atom. Think of a minute shielding.

It is historically interesting that in 1920 (!) Rutherford [23] theorized on inert mass similarly:

The fact that the mass of the helium atom 3.997 in terms of oxygen 16 is less the mass of 4 hydrogen atoms, viz., 4.032, has been generally supposed to be due to the close interaction of the fields in the nucleus resulting in a smaller electromagnetic mass than the sum of the masses of the individual components.

Rutherford never explained that the mass defect is due to binding energy but due to an electromagnetic resistance that depends non-additively on the number of components of the elements.

Tables list up the inert masses of the corresponding ions of the atoms – with one exception, namely for neutral hydrogen:

The value that you can find in textbooks and handbooks is a calculated one. It is wrong because it was supposed that inertia is additive.

It is not the case that $m(H^0) = m(p^+) + m(e^-) = 1.00727647 + 0.00054858 = 1.00782505$

QUANTITAS MATERIAE

OR THE NUMBER OF ATOMIC CONSTITUENTS IS CONSERVED:

Inert masses are not conserved. Inert mass is just a number without a ‘dimension’

In nuclear or chemical reactions the number of atomic constituents must be conserved. Creation out of the void or annihilation is impossible. This was meant with the conservation of *quantitas materiae* or quantity of mass.

Inert mass should not be confused with mass as amount of stuff. Inert mass is a measure of the resistance that a medium exerts on a moving particle or atom. This resistance depends on the atomic structure and is not an additive property. Inert masses are not conserved.

We cannot convert an *inert mass* defect into energy according to $E = mc^2$, this is ontologically impossible.

The author argues that Prout in 1815 was right claiming that all atoms are made up of hydrogen. So, the unit of *quantitas materiae* may be hydrogen. Carbon has 12 hydrogen constituents. During motion through the all-pervasive cosmic medium a force is exerted on the carbon atom (exactly speaking it is C^+). This force is for low velocities proportional to the acceleration \mathbf{a} .

By convenience we set the resistive force for carbon $\mathbf{R} = 12 \mathbf{a}$. Oxygen has 16 hydrogen constituents. Now the resistive force is empirically not $\mathbf{R} = 16 \mathbf{a}$ but $\mathbf{R} \approx 15.999 \mathbf{a}$ because resistance is not additive due to a minute shielding effect. So we can write

$$\mathbf{R} \approx d_{El-A} A \mathbf{a},$$

where A means the amount of hydrogen constituents or mass number and d_{El-A} means drag coefficient for the specific chemical element with mass number A .

Because the drag coefficient depends on the number of hydrogen atoms (A) and on the configuration of these atoms, isomers have different drag coefficients.

Take for instance C-14 and N-14 with their respective masses 14.003241988, 14.003074005. Both atoms have 14 hydrogen constituents but their configuration and therefore their drag coefficient is different: $d_{C-14} \neq d_{N-14}$

(Misnamed) *inert mass* or $m = d_{El-A} A$ is just a number or a proportionality factor without a so-called dimension. It depends mainly on the number of hydrogen constituents or mass number A but differs slightly on the atomic configuration that is specified by the chemical element (El). For carbon C-12 we set $d_{C-12} \equiv 1$. (Exactly speaking we can only measure the inert mass of the carbon ion.)

Again: The object experiences an exterior resistive force! But exactly speaking, inert mass is not this force, this resistance to motion. Inert mass is the quantification of the ether drag force. For the force, a force law is necessary, for example $F = ma$.

Inert mass or $m = d_{El-A} A$ depends mainly on the mass number A but differs slightly on the atomic configuration that is specified by the chemical element (El) and its isotopes. The factor d_{El-A} is a coefficient that depends on the specific atomic structure of the atom. The value of this coefficient and the atomic mass number A determine the drag of the cosmic dielectric medium.

From this it is comprehensible that inert mass is not an intrinsic or innate property of the atom, something like the laziness of the atom. Inert mass is a relational concept.

Haisch/Rueda/Puthoff [9] explained the role of inert mass correctly:

The m in ... $F = ma$ is nothing more than a coupling constant between acceleration and an external electromagnetic force...

To put it simply, the concept of mass may be neither fundamental nor necessary in physics...

Inert mass is only a name for a force coefficient or force proportionality factor times A. Obviously, *inert* mass is a misnomer because there is no innate property of *inertia* in the body!

MOLECLULAR MASS IS NOT THE SUM OF INERT MASSES OF ATOMS

Molecules or compounds are groups of atoms held together by chemical bonds. According to textbooks, the molecular (inert) mass may be simply calculated from the molecule formula by adding up the atomic masses of the atoms making up the molecule!

We are taught that the mass of the missing electron is negligible, so that we are quasi authorized to take the masses of ions for the masses of atoms. An expert in the field, John Roboz [rob] p.9, calculates the masses of the molecular ions of the isobars

$C_2H_6^+$ (30.0469), CH_2O^+ (30.0105) and CH_4N^+ (30.0344). Let us calculate the mass of $C_2H_6^+$: $2 \times 12.000 + 6 \times 1.007825 = 30.04695$.

Here Roboz for H has taken the calculated value for $m(H^0) = m(p^+) + m(e^-) = 1.00727647 + 0.00054858 = 1.00782505$ that is not justified. When using only the masses of H^+ and C^+ we obtain: $2 \times 12 + 6 \times 1.00727647 = 30.04365882$! Recipe #1 (add up masses of ions and calculated masses of neutral hydrogen atoms) and recipe #2 (add up masses of all ions) are not physically justified. A high-resolution mass spectrograph should give the answer!

Next question concerns the additivity of atomic (inert) masses of molecules. Can we simply add up the masses of the constituent atoms or is there some shielding effect? Even if we have only the inert masses of the ions, we can try to answer the question. There are indications that no shielding effect occurs.

Take for example the mass spectrum of CO^2 : As a result of the ionization process the following main fragments occur: C^+ , O^+ , CO^+ , O_2^+ and CO_2^+ . The line diagram of the mass spectrum [robo] shows for this fragments the corresponding masses of 12, 16, 28, 32 and 44 in a linear distribution. Therefore probably no shielding effect occurs or inert masses of molecule constituents can be added up. The cause for this pattern is that the atoms are far away from one another.

Second examples are isomers, for example metylether CH_3-O-CH_3 and ethanol CH_3CH_2-OH . The constituents of isomers are the same but the molecular configuration is different. The mass spectra of metylether and ethanol indicate that molecular configuration of atoms has no effect on inert mass.

Now I will continue with chemistry: What is the molar mass of atoms or molecules or a formula? The recipe given in textbooks is: Take the atomic masses, **in g**, from a table and sum up! So a mole Na = 22.98977 g, a mole of water = 18.02... g. These numbers are non-representational, the reasons given above. Chemists became totally confused by physicists. Again, the inert mass is not identical with the quantum of a substance.

What chemists really require are the ratios of substances in compounds or reactions and not weights or inert masses. To obtain these exact ratios is the objective of stoichiometry.

NEW AXIOMATICS OF MECHANICS

Undefined concepts: space, motion, time, force and *quantitas materiae* (not inertial mass).

$F \approx ma$ is a law-sketch and not the definition of force. Inertial mass is a coefficient, a number without a dimension. (In classical mechanics m has the dimension m [M] because mass is the prime concept. Force is a defined concept according to $F = ma$.

Therefore the dimension of force is F [ML/T²]. This epistemological error has troublesome consequences: The gravitational force for instance is $F = \Gamma m_1 m_2 / r^2$. If the dimension of force is F [ML/T²], then you must assign to Γ the dimension: Γ [L³/MT²]! But Γ should be just a number because it is a proportional coefficient.)

Because for higher velocities **$F \propto F(A, v^2)$** and not **$F \propto ma$** there is **no** conservation of momentum. Maintenance of uniform motion in a resisting medium is impossible. Kinetic energy is not an innate property ($mv^2/2$) of a particle moving in the vacuum but the work done to overpower the resistance **$F \propto ma$** of the all-pervasive electromagnetic medium: $E \approx m \Delta v^2/2$

If the force is $F = ma\gamma^3$ ($\gamma = 1/[1 - (v/c)^2]^{1/2}$), one gets for the energy the relativistic expressions for the masses and energies:

$$E = \int^v ma \gamma^3 ds = \dots = mc^2[\gamma - 1] = mc^2\gamma - mc^2$$

See the article Refutation of Rest Energy $E = mc^2$.

History of Quantum Chemistry

GAY-LUSSAC IN 1809:

MEMOIR ON THE COMBINATION OF GASEOUS SUBSTANCES WITH EACH OTHER

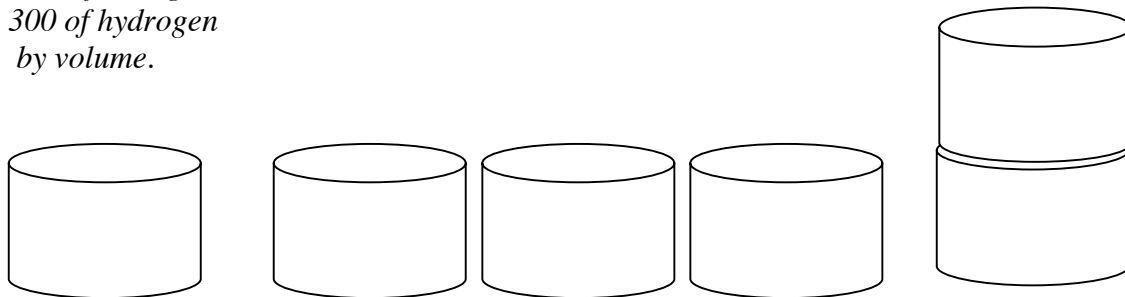
AVOGADRO IN 1811:

ESSAY ON A MANNER OF DETERMINING THE RELATIVE MASSES OF THE ELEMENTARY MOLECULES OF BODIES, AND THE PROPORTIONS IN WHICH THEY ENTER INTO THESE COMPOUNDS

Gay-Lussac stated that *gases always combine in the simplest proportions when they act on one another. Gases...combine...to compounds whose elements by volume are multiples of each other. And:...the apparent contraction of volume which they experience on combination has also a simple relation to the volume of the gas, or at least to one of them.*

For example according to the experiments of Berthollet, *ammonia is composed of*

*100 of nitrogen
300 of hydrogen
by volume.*



If Gay-Lussac's integer number combinations of gases and Dalton's atomic combinations of compounds are the premises then Avogadro's claim that in each of the four volumes of the combination mentioned the number of the respective atoms is the same is a conclusion and therefore a theorem.

This conclusion is necessary because each N-atom needs 3 H-s for the association NH_3 . Only if in each volume the number of atoms is the same, every N meets its 3 necessary partners for *liaison*.

Presupposed is that all volumes are underlying the same pressure and temperature.

Cannizzaro examined *the relationships of the reacting quantities of substances*.

For hydrogen being the relative mass $m_{\text{H}}=1$, Cannizzaro obtained many relative masses. Among them I cite some correct ones:

C =12, N =14, O = 16, Na = 23, Mg = 24, S =32, Cl =35.5, K =39, Ca = 40, Mn = 55,
Fe = 56, Br = 80, Ag =108, I =127,...

for many molecules Cannizzaro also determined the relative masses correctly.

In 1858, Cannizzaro could not have noticed the isotopes. Therefore, he could not explain why the relative mass of chlorine was not an integer number (Cl = 35.5). But Cannizzaro determined Cl = 35.5 correctly by stoichiometric methods, whereas some contemporary chemists obtain Cl = 34.45..., erroneously using the irrelevant inert masses of $^{35}\text{Cl}^+$ and $^{37}\text{Cl}^+$ for the calculation (see above).

For Ag = 108 he obtained the correct magnitude because the fractional abundance's of ^{107}Ag and ^{109}Ag are nearly 50%.

DAVY, WOLLASTONE, THOMSON, BERZELLIUS,

for all of them it was a striking feature that:

As in all well-known compounds, the proportions of the elements are in certain definite ratios to each other; it is evident, that these ratios may be expressed by numbers; and if one number be employed to denote the smallest quantity in which a body combines, all other quantities of the same body will be multiples of this number...

Hydrogene gas... is the substance of which the smallest weights seem to enter into combination...
(From Davy's *Elements of Chemical Philosophy* in 1812, see [giu])

European chemistry of the early nineteenth century culminated in the ingenious idea of Prout that hydrogen is the constituent of all elements. That other chemists at this time had similar train of thoughts became evident by the above-cited Davy.

In my essay it is impossible to repeat the historical development of this idea. But fortunately Rocke [rock] treated this topic in full detail.

Rocke presents (p. 82) a comparative table of atomic weights according to Davy, Thomson, Wollaston, Berzellius and Prout. But to compare Prout's numbers with the 1971 IUPAC atomic weights is untenable. Prout's numbers mean the hydrogen constituents of an element whereas the erroneously so-called atomic weights represent the relative repulsion forces ('inertial forces') of a medium upon the moving *elemental ions*.

Although Rocke conceived the gedankenexperimental nature of Descartes' *inertia*, he ascribed to inertia utility and heuristic value. So, he failed to see that Prout's *ansatz* is correct. There is no utility and heuristic value for inertia, in the contrary, corpuscularian inertial physics in the

vacuum is somewhat like the *Untergang des Abendlandes*. [spe] (Spengler's contribution to the metaphysics of modern physics is not concise, but he conceived some of the greatest weaknesses of modern physics: its instrumentalism.

The Rutherford-Bohr model of the atom *means nothing*; data are *under laid with a picture* (of a minute planetary system). Contradictory *chart houses* of hypotheses will be saved by new *ad hoc* hypotheses...)

PROUT WAS RIGHT

Prout suggested in 1815 that hydrogen is the *prima materia* or πρωτη υλη, namely that hydrogen is the sole constituent of all atoms. [giu] The ratios of atomic weights of atoms and compounds known in 1815 were expressible in whole numbers (or nearby). This striking feature made it plausible to Prout to conclude that the atomic weights are integers because each atomic weight is an exact multiple of the atomic weight of hydrogen.

Prout: *Indeed, I have often observed the near approach to round numbers of many of the weights of the atoms...*

I would like to cite some *round numbers* of Prout: H =1, N =14, C =12. O =16, Na =24 (not correct), Ag =108, I =124 (not correct) etc.

One round number became fatal for Prout: ... *the specific gravity of chlorine will be found 36 times that of hydrogen.*

Indeed, it was found that the atomic weight of chlorine was 35,45 –35,5! At those time isotopes were unknown and one counterexample brought this fine theory in troubles. Therefore, Stas, after several attempts to save the theory, could say: *I conclude then by saying: as long as we hold to experiment for determining these laws which regulate matter, we must consider Prout's law as pure illusion, and regard the undecomposable bodies of our globe as distinct entities having no simple relation by weight to one another.*

And Mendeleev: *the compound character of the elements and...the existence of primordial matter ... must be classed amongst mere utopias...*

There are other speculations of Prout, like: *That all the elementary numbers, hydrogen considered as 1, are divisible by 4, except carbon, azote, and barytium, and these are divisible by 2, appearing therefore to indicate that they are modified by a higher number than that of unity or hydrogen. Is the other number 16, or oxygen? And all substances compounded of these two elements?*

I shall discuss this argument later in connection with my proposal of a Proutian periodic table.

The first ardent supporter of Prout was *de Marignac*. Marignac [mari] himself deduced from his experiments of 1843 the following numbers:

Ag =107,924, N =14.02, S =16.029...

For chlorine Marignac found 35.456, but this was no reason for him to abandon the theory.

He wrote: *It seems to me permissible to conclude, that if, after fresh improvements have been made in the method of purification of the substances or in the experimental methods, some chemists at future date take up the same series of experiments with still greater guarantees of accuracy...*

I confess that I shall not be convinced of the accuracy of an atomic weight determination... unless this weight has been obtained by several absolutely independent methods, based on the analysis of a number of compounds altogether distinct from one another...

Then Marignac cited as evidence for better experimental results *from the analysis of silver salts of organic acids, which gave me the figure 107.968 as the atomic weight of silver.*

(According to Prout, 108 is the mean of Ag 109 and Ag 107 when the abundance is 1:1)
...by different methods, I mean methods which depend on the analysis or synthesis of absolutely distinct compounds...

Then Marignac speculated that gravitation might be not additive: If atoms are certain groupings of the primordial matter (H), then it is possible that these atoms would obey gravitation *in such wise that the weight of each group might not be exactly the sum of the weights of the primordial atoms composing it?*

Indeed, even in classical mechanics gravitation is not an additive force because the force is proportional to $1/r^2$. Therefore the orientation of the atom and the configuration of the constituents (H-building blocks)

ASTON IN 1919 ESTABLISHED THAT THE ISOTOPES ARE NOT RESTRICTED TO RADIOACTIVE ATOMS BUT HE DID NOT HAVE THE INSIGHT THAT THEREWITH PROUT'S PROGRAMME WAS FULFILLED

The results of the mass spectrograph measurements made it clear to Aston that neon, mercury and chlorine *are unquestionable "mixed"*.

The mass spectra of chlorine

appear to prove conclusively that this element consists of at least two isotopes of atomic weights 35 and 37. Their elemental nature is confirmed by lines corresponding to double charges at 17.5 and 18.5, and further supported by lines corresponding to two compounds HCl at 36 and 37, and in the case of phosgene to two compounds COCl at 63 and 65...

Should this integer relation prove general, it should do much to elucidate the ultimate structure of matter...[giu]

Aston was near by the truth. Hear the tragic story of science:

Aston... found some minor discrepancies with the whole-number rule. Thus the atomic weight of hydrogen is given not as 1 but 1.008, of oxygen-16 as 15.9949...Aston attempted to show why these values are so tantalisingly close to the integral values of Prout – why the isotopes of oxygen are not simple 16 and 17 times as massive as the hydrogen atom.

In reality, these isotopes are exactly 16 and 17 times as massive as the hydrogen atom, namely their constituents are ^{16}H and ^{17}H , respectively.

The quantity of matter ratio is therefore 16 or 17, respectively. Inert mass measurements from the mass spectrograph do not determine stuff ratios because they measure non-additive forces caused by an accelerated motion in a medium.

I don't know who was the first in applying the magic mass/energy conversion formula

$$E = mc^2.$$

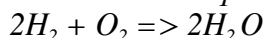
Anyway, Aston *...argued that the missing mass is in fact, by the mass-energy equivalence of Einstein, not really missing but presents the binding energy of the nucleus.* [giu]

The last quotation reflects the prevailing doctrine to that topic.

STOICHIOMETRY

Oxford Paperback Encyclopaedia 1998 accurately defines stoichiometry:

The ratios in which the reactants in chemical reaction combine to form the products. For example two moles of hydrogen react with one mole of oxygen, giving two moles of water. The stoichiometric equation summarizes this as



In stoichiometric compounds, the elements are present in simple whole number ratios; for example, the ratio is one to one in hydrogen chloride, HCl.

In the tradition of chemistry, atomic *inert* masses had nothing to do with stoichiometry. Take for example the famous case of chlorine. By different methods stoichiometry found out that the ratio for chlorine is 35.5, H being 1.

This number you can find in traditionalistic handbooks [nyl], resulting from the relative chemical masses (not inert masses!) of some chlorine compounds. Probably the majority of chemists are 'heretic' and use 35.45... for chlorine, a number that they calculate as a mean average by the inert masses of $^{37}\text{Cl}^+$ and $^{35}\text{Cl}^+$. This is erroneous, the reason given above.

It is a striking feature that the inert masses of $^{37}\text{Cl}^+$ and $^{35}\text{Cl}^+$ (and of all other atoms) are nearby integer values.

According to Prout's hypothesis ^{37}Cl and ^{35}Cl are different structures with 37 or 35 H-atoms as building blocks, respectively. If the $^{37}\text{Cl}/^{35}\text{Cl}$ ratio is 1:3 the mean average is exactly 35.5, the ratio that stoichiometry found out. [nyl]

Therefore, stoichiometry deals with the conservation of matter, or conservation of the H-quanta and their ratios in compounds. (Abundance of isotopes is not a constant, it depends on location... The ratio 1:3 mentioned for the chlorine isotopes may be called the result of a natural tendency.)

What's the use of mass spectroscopy?

- To find out the chemical composition because the characteristic 'inert' mass indicates the constituents of molecules.
- The outcome of mass spectroscopy indicates that the inert mass of ionized atoms is not an additional property. This is inconsistent with the supposed classical inertial physics in the vacuum. Non-additivity of 'inert' masses is only conceivable as a non-additive drag force in a medium.

Stoichiometric methods and mass spectroscopy are a confirmation of Prout's hypothesis that all atoms are associations of H-atoms. We don't know the relative inert masses of the atoms; therefore we don't know the inert mass of hydrogen. But we don't need this knowledge!

We want the relative amount of stuff of the atoms or the relative *rest* masses. The relative rest masses of the atoms are identical with the number of the H-constituents of the atoms!

Therefore, the relative mass (not the *inert* mass!) of H = 1! The relative mass of C = 12 etc.

The Proutian atom

According to Prout an element is a specific configuration of Hydrogen's. Take for instance Helium. It consists of 4 Hydrogen's. Because each Hydrogen comprises a proton and an electron, Helium comprises 4 protons and 4 electrons. In the QM atomic model of Helium 2 electrons are extra-nuclear electrons that surround the nucleus. The nucleus consists of 2 protons and 2 neutrons.

Ionization data indicate that only 2 electrons can be removed from the Helium atom. In terms of QM in the ionization process the two extra-nuclear electrons are removed.

The QM atom contains Z electrons in the shells, Z is atomic number. The atom of QM contains no more electrons because the neutrons are treated as elementary particles that do not contain electrons.

Only after an intermediating process the end product of the decaying neutron are proton and electron. That theory is wrong. So-called neutrons are in reality stable hydrogen's that consist of a proton and an electron. Only in the case of fission some hydrogen are exerted and decay into their composite parts electron and proton. See the article on neutron.

According to current theory Z denotes the number of the extra-nuclear electrons that can be liberated in the ionization process.

So, what is the meaning of ionization for the atomic model of Prout? Very simple: Only the two electrons of the surface of our example Helium can be removed, the other remaining two electrons are shielded and cannot be removed by the low energies of ionization. Below you see the Proutian atomic model.

The assembling of elements that possess no electron shells

If there are no extra-nuclear electrons and if there are no neutrons then the fusion of elements can be thought of as assembling of building blocks to new elements.

Building blocks are H, D, He, C, O, ...

4 H's unite to He. He is a building block for other elements: 3 He unite to C, 5 He unite to Ne, 4 He unite to O. It is assumed that 3 He, and 4 He can form stable configurations.

Four ${}^4_2\text{He}$ form the oxygen building block ${}^{16}_8\text{O}$.

Example of element formation: Oxygen plus carbon unite to silicon:



But two ${}^{14}_{28}\text{Si}$ don't fuse to Fe: $2 ({}^{14}_{28}\text{Si}) \rightarrow {}^{28}_{56}\text{Fe}$ but ${}^{28}_{56}\text{Fe}$ does not exist. The physically possible Fe is ${}^{56}_{26}\text{Fe}$! But Fe can be formed also another way: fusion ${}^{24}_{52}\text{Cr} + {}^2_4\text{He} = {}^{26}_{56}\text{Fe}$.

Note therefore that not only the atomic weight must be conserved in the fusion but also the number of electrons at the surface, electrons that can be liberated by ionization.

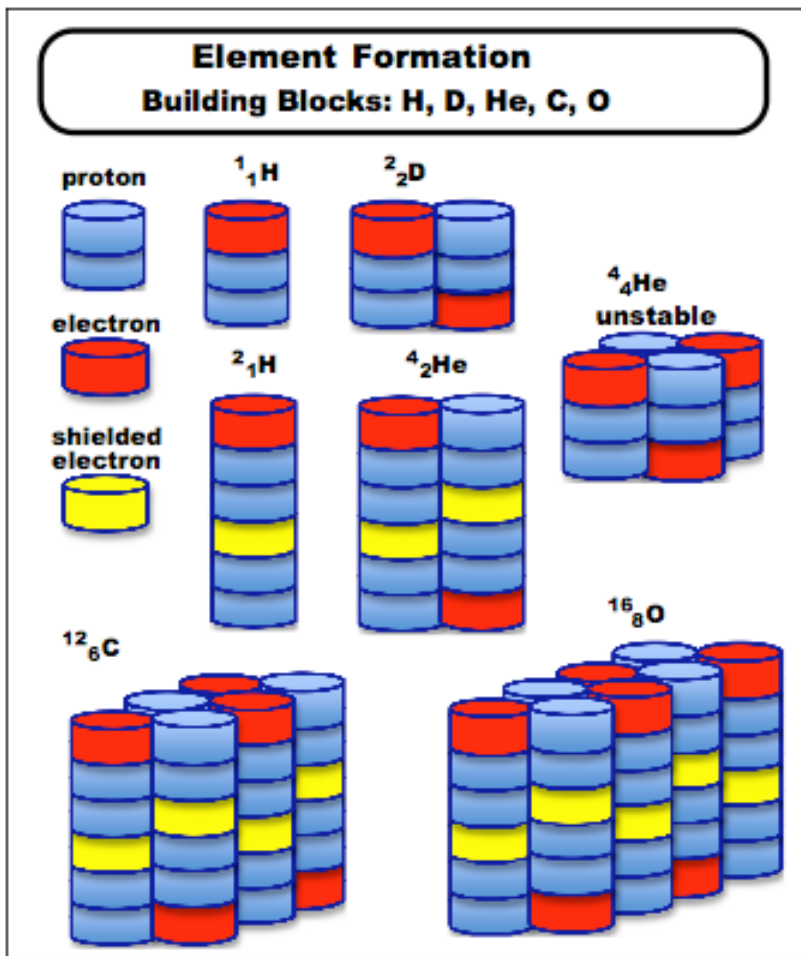
There are other electrons that are shielded. These shielded electrons are parts of Hydrogen atoms which number is $A - Z$. (For QM that is the number of neutrons N!)

Note very well that not all atomic configurations are stable. Take for example Oxygen O. The formula is ${}^8_{16}\text{O}$, which means that the total number of Hydrogen's (H's) is 16, therefore the atom consists of 16 protons and 16 electrons. But 8 of the 16 electrons are shielded, therefore only 8 electrons can be slipped off by ionization. The configurations of Oxygen must therefore be such that 8 electrons must be at the surface, whereas 8 electrons must be shielded. According to this rule Oxygen and Sodium can be fused to Potassium only this way: ${}_{11}^{23}\text{Na} + {}_8^{16}\text{O} \rightarrow {}_{19}^{39}\text{K}$

In a Proutian theory the atom is an ordered cluster of Hydrogen atoms. Again, what does the atomic number Z mean in this model?

There are no extra-nuclear electrons but electrons at the surface of the atom that can be slipped off. There number is Z. Take now Li-7 for example. It consists of 7 Hydrogen's. 3 electrons are at the surface and can be liberated. See the graph. The remaining 4 electrons of the atom are shielded; they cannot easily be slipped off.

The number of the shielded electrons is the same as the number of the alleged neutrons. Remarkable is that an additional building block of O is accompanied by an increase of 8 additional electrons at the surface of the atom. This quantum jump can easily be explained. The additional building block of O contains some hydrogen's that have electrons inside of the block and can therefore not slipped off.



The graph shows some formations of elements: Two ${}^1_1\text{H}$ can be combined to ortho- ${}^2_1\text{D}$ where one electron can be removed and one electron is shielded.

${}^1_1\text{H} + {}^1_1\text{H} \rightarrow \text{ortho-}{}^2_1\text{D}$
 In this case the number of removable electrons is not conserved!

The alternate assembling gets
 ${}^1_1\text{H} + {}^1_1\text{H} \rightarrow \text{para-}{}^2_2\text{D} = \text{H}_2$

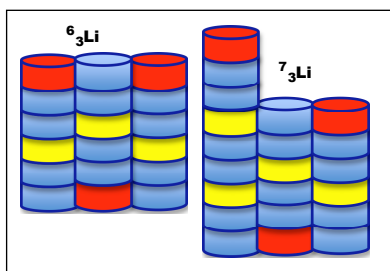
Then ${}^2_1\text{D} + {}^2_1\text{D} \rightarrow {}^4_2\text{He}$
 ${}^4_2\text{He}$ is two ${}^2_1\text{D}$ on top of each other.

A Helium atom that would consist of two ${}^2_1\text{D}$ side by side is instable.

It would be a ${}^4_4\text{He}$ atom because at the bottom and at the upper side there would be two electrons that could be liberated. Because this

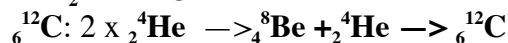
configuration is unstable also two of them on top of each other are instable. This atom would be ${}^8_4\text{Be}$ that is unknown. Only ${}^9_4\text{Be}$ is known.

The synthetic isotope ${}^8_4\text{Be}$ has a half-life time of only $6,722 \cdot 10^{-17}$ s. This is the proof that ${}^8_4\text{Be}$ is not stable. QM cannot explain why there is no element with mass number $A = 8$: ${}^8_4\text{Be}$.



Regarding the formation of carbon, it is possible that even the instable ${}^8_4\text{Be}$ can be a partner as a short time intermediate in the process of Carbon formation:

two helium ${}^4_2\text{He}$ unite to ${}^8_4\text{Be}$ and ${}^8_4\text{Be}$ unites immediately with ${}^4_2\text{He}$ to Carbon:



Oxygen, O, consists of four ${}^4_2\text{He}$. Now four ${}^4_2\text{He}$ assembled in series result in ${}^8_8\text{O}$.

An atomic structure ${}_{16}^{16}\text{O}$ is impossible because two adjacent charges with the same sign + or – destabilize the atom.

For the sake of clarity the graph shows the elements He, C and O “stretched”.

Some remarks regarding molecular and chemical bonding

Bonding is due to magnetic coupling because each hydrogen atom is a magnet; presumption: hydrogen itself is composed of 4 elementary ring magnets that are charged +—+—.

Metals or molecules are atoms conjoined in some way. Bonding is due to magnetic coupling. Bonding agents are hydrogen atoms.

There are 3 varieties of H-bonds:

A single hydrogen: —;

2 hydrogen atoms in series: — — or

2 hydrogen bonds parallel: =

For a periodic table due to element formation and configuration of atomic building blocks see the article *Element formation by H, D, He, C and O building blocks*

FOR MOLECULAR AND CHEMICAL BONDING SEE THE ARTICLE *THE NATURE OF CHEMICAL BONDING*.

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