

The New Periodic Table

by William S. Aton

© Unpublished 2006 William S. Aton – All Rights Reserved

What if there were an easy geometrical solution to explain the layout of the periodic table? What if this explanation was shown to be necessary by a study of nuclear structure? Such a solution does exist and it points the way to a greater understanding of the nucleus and periodic trends.

Everyone who has studied Organic Chemistry knows the importance of the tetrahedral structure in carbon bonding. What they have not known till now is that the layout of the Periodic Table describes to the “T” a series of concentric tetrahedrons. If you add up the protons and neutrons added in each line and divide by four you get the number of nucleons that make up the sides of the next tetrahedron in the series.

Right here you might reply that if the solution is so simple then “Why has it not been noticed till now?” Well, it probably has been but, there are a few key principles that either were not yet known or had been missed.

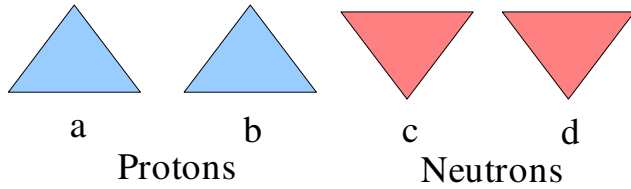
First, squares and circles will not fit into the four triangular sides of a tetrahedron, if you want to fill up a triangle properly you must use triangles to represent nucleons. And by the way, if you have not thought of it by now, what do we now know that there are three of in every proton and neutron? Why quarks of course.

Second, protons on different sides of these tetrahedrons can be allowed to contact each other. This seems to be a flaw because we all know that electric charges of the same kind repulse; but with further study of the quarks that make up these protons we see plainly that this is indeed required for the nuclear structure to exist and not a flaw at all.

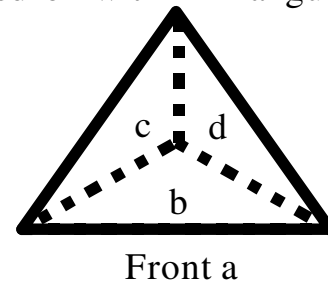
Next you may ask yourself “But how does this help me understand periodic trends?” The possibilities are endless. I could mention quite a few but that would make this introduction too long and complex. For now it suffices to say that I have not yet found a trend, and there are many, that this new model is not apt to explain in one manner or another. To the best of my knowledge there are no contradictions. The one trend we need to focus on here is the trend that makes all of the other trends discernible and that trend is the number of nucleons added in each row of the periodic table.

Finally, why is the new representation superior to the old and why should we go to the trouble of replacing a chart that fits nicely on the wall with something that will probably require computer animation to do justice to its intricacies. The most important distinction here is that the chart which we know now offers new rules and principles at each and every turn and is remarkably short on explanations for something that has been around for so long; whereas the new representation is a fertile field that replaces numerous rules and principles with geometric logic. Indeed it forms a subatomic basis for the very creation of the atomic nucleus itself.

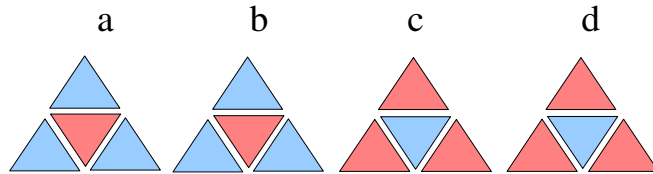
First Shell Helium, 2 Protons and 2 Neutrons



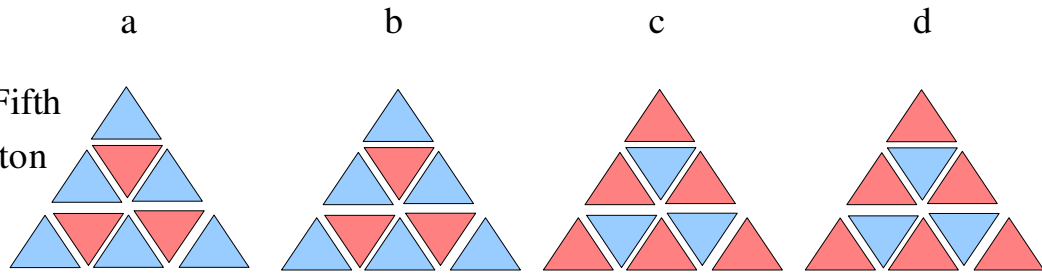
Tetrahedron with 4 Triangular Sides



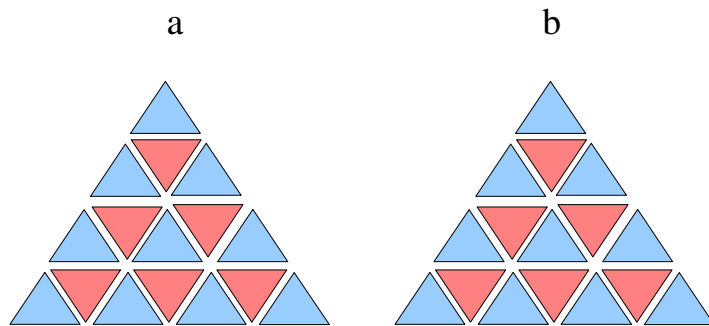
Second and Third Shells
Neon and Argon
8 Protons and 8 Neutrons



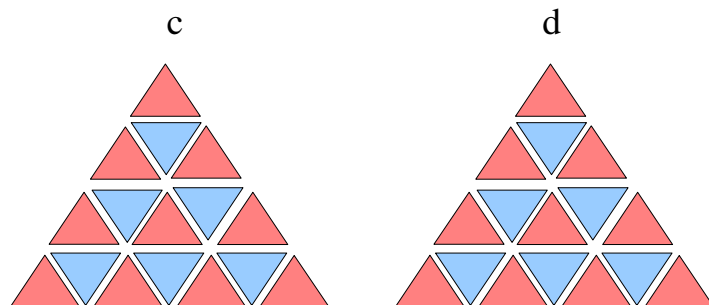
Fourth and Fifth
Shells, Krypton
and Xenon
18 Protons
18 Neutrons



Sixth and Seventh Shells
Radon and Undiscovered
32 Protons and 32 Neutrons



Note:
These are the base structures
and do not show or indicate
the significant number of
neutrons Bound to the
Structures



No attempt is made here to identify how the nucleons are added individually, not that this could not be done in the future for certain of the more obvious candidates. Indeed how you place nucleons into the structure defines the trends so obvious in our current periodic table. What is needed is a computerized representation which can calculate and show the dynamics involved. But here we must be satisfied with the most obvious of periodic trends, the numbers of protons and neutrons added in each of the seven rows to form the noble gas configuration; this is only an introduction, an astute scientist could go much further with just the explanations given here.

The general principles of chemistry give no satisfactory explanation for the existence of shells. Indeed they are widely considered to be electronic phenomena. The new model shows these properties have their roots in nuclear structure, not electronic orbitals.

On the following page is an introduction to the role of quarks and how they not only allow but require that protons be side by side on different planes of the nuclear shells. Here we introduce the restriction that the electronic field vectors of quarks be opposed at every interface both in and between nucleons and that neighboring quarks themselves be of differing sign (up quarks $+2/3$, down quarks $-1/3$); these restrictions are the basis for the creation of nucleons and the formation of atomic nuclei in the first place. The arrangements shown are the only ones possible; amazingly all protons, neutrons and quarks must be as shown for the structure to exist.

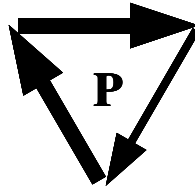
Up Quark



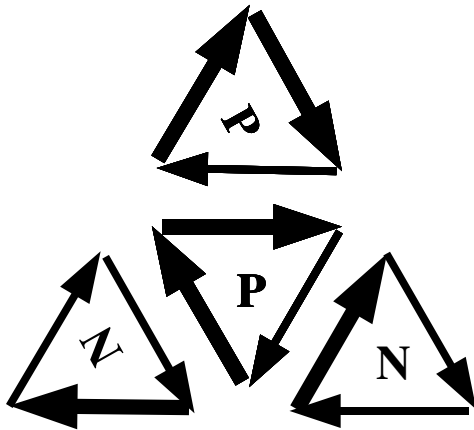
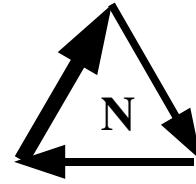
Down Quark



Proton



Neutron



Break Away View of All Four
Sides of the Helium Tetrahedron
Showing How and Why Protons Can
be Next to Each Other on the Edge
of Tetrahedral Sides

One of Four Sides of the Radon
Tetrahedron Showing the
Pattern of Nucleons.

Inner Shells not
Shown but
Implied.

