

# Tribute to Professor Pierre Noyes (1923-2016)

Science advances by a process of accretion of contributions from a myriad of diverse sources. Many famous during their lifetime are often soon forgotten when Time, the great Judge of real value, fails to recognise them in the long term. History is cluttered with the forgotten 'famous'. However Pierre Noyes was interested in science not in fame and he was no minor contributor to science. He promoted two ever lasting principles: the role of alternative thinking and the whole subject of discrete physics. Doubtless his reputation and stature will rise in time. Mainstream science is always out of date. There is a natural lag because those who teach science, write books about it, lead academic research and learned societies are always from the previous generation. It may take a hundred years for any really new and creative idea to become mainstream as with the Copernican revolution. Pierre realised there was a need for a forum for alternative points of view that may become the mainstream for the future. His idea of making an *ad hoc* discussion group into an established but still informal association for this purpose was a masterly stroke. No doubt with the philosophic influence of Ted Bastin, the Alternative Natural Philosophy Association was born. ANPA met in England at Cambridge for nearly 30 years with a later ANPA West meeting at Stanford for those in the United States who could not always make it to England. It may perhaps be likened to the Bourbaki group of mathematicians in France. ANPA filled an enormous gap as the much vaunted principle of 'peer review' is only effective for incremental advance for no really original and creative idea can have any peers. Free speech reigned with the principle to take on all-comers who wanted to attend and speak at meetings but beware any speaker who with ill thought out ideas that could not be substantiated for such would be subjected to merciless questioning. The success of this policy can be judged by the deterioration in originality whenever censorship creeps into ANPA.

Although the need to reconcile Maxwell's equations in electromagnetism with the notion of space led Einstein to his theories of relativity and despite attempts at quantum gravity, there was no formal theory connecting gravity and electricity and magnetism before Frederick Parker-Rhodes produced the arithmetic algorithm which became known as the *Combinatorial Hierarchy*. The study of this acted as a long-term focus and cohesive force for the very diverse group that make up ANPA consisting of a core of regular members, a fringe of occasionals and a regular stream of others who only attended once or twice. Pierre Noyes faithfully supported ANPA with his attendance making the annual trip from California to Cambridge, England.

Pierre's other great achievement is bit string discrete physics. This also came from the Combinatorial Hierarchy according to which the ordered set or 'bit-string'  $\langle 0,1 \rangle$  is the fundamental object of ordering in Euclidean space. However Einstein showed that space is non-Euclidean and we now know from Category Theory that the Universe is a *Topos* open at the bottom but closed at the top and without natural numbers. This leads to a top-down approach confirming the conclusion of Alfred North Whitehead that speculative metaphysics based on the notion of *process* is needed to replace algebraic models. Process has been a pervasive theme of ANPA meetings. The outcome is that the bit-string  $\langle 0,1 \rangle$  should be recognised as representative of the arrow of Category Theory and that the Combinatorial Hierarchy should be turned on its head. The final term is really its first as the magnitude of gravity throughout the Universe and there is no limiting zero at the bottom. Although Pierre never made use of Category Theory his scientific rigour led him to realise that the standard Euclidean origin was untenable:

"I now realize that it is the failure to make the distinction between vector bit-strings and line segments connecting the tips of two vectors from a common origin which has rendered some of my previous work ambiguous or just plain wrong."

[ON THE LORENTZ INVARIANCE OF BIT-STRING GEOMETRY\* SLAC-PUB-95-6760  
September 1995 at p 13]

This humble intellectual honesty is typical of Pierre's faithful adherence to the application of scientific method without regard to any personal interest. It can now be shown from Category Theory applied to the Process 'paradigm' (to use the vocabulary introduced by his former student roommate Thomas Kuhn) of Alfred North Whitehead that Natural Philosophy exhibits a fundamental 'alternative' distinction between the old mainstream continuum of Dedekind's Cut and the 'non-separability' of co-limits in the *Topos* and that distinction is to be recognised as *Process*.

The non-separability of co-limits has been utilised in quantum theory for representing the entangled parts of causally non-separable processes. The inclusion of such processes in a categorial universal logic gate diagram, sometimes called a Dolittle diagram, now underpins much of Pierre's development of quantum theory, with his emphasis on the universe as a process of operations on strings of bits, and his assistance with the Combinatorial Hierarchy.

The time comes to all of us when our work on this Earth is done and we are ignorant of future scientific advances. ANPA however works at the 'cutting-edge' of science where we may have a privileged peep into what may well be main-stream science one day after we have passed on. As members of ANPA we are indebted to its founder Pierre Noyes for such glimpses for eternity.

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January 2017