A future blog on Nucleosynthesis (posted in the Summer hols of 2019)

As those of you who are familiar with my blogs will know, I know a tiny bit of Chemistry, and a tiny bit of Maths, and I know very little about Physics and almost nothing about Biology – but in the course of the next few weeks/months it is my intention every weekend to try to make myself slightly more knowledgeable about "nucleosynthesis". One of my heroes, Fred Hoyle, was one of the greatest Astrophysicists that this country has ever had, and he was the man who (post WWII) gave rise to our modern understanding of how the heavier elements were formed. His 1953 paper "On nuclear reactions occurring in very hot stars. I. The synthesis of elements from Carbon to Nickel" *Astrophysical Journal Supplement, 1*, p121-146 is not well known, nor is his 1960 paper with Fowler "Nucleosynthesis in Massive Stars and Supernovae", *The Astrophysical Journal,132*(3), although his 1957 paper: Burbridge, Burbridge, Fowler and Hoyle "Synthesis of the Elements in Stars", *Reviews of Modern Physics,* 29(4), pp 547-650 is better known. From some time after the end of WWII, in lectures given in the 1950s and certainly in the afore-mentioned papers, Hoyle showed that the heavier elements **above Iron** in the Periodic Table could not have been formed other than in *collapsing* supernovae provided that a supernova does not collapse into a 'singularity' (and this is what I understand to be a 'back hole').

Hoyle's contribution to the understanding of the formation of the heavier elements followed on from the contribution of astrophysicists in the 1930s who had developed our understanding of the formation of elements in the fusion of everything inside an ordinary star (from Hydrogen onwards) until the formation of Iron – and from that point onwards (I think) it requires the temperatures and pressures generated by a collapsing supernova to form the heavier elements. I use the phrase "I think" because I am not a sufficiently competent physicist/mathematician to follow the arguments developed by Hoyle (and Fowler and the two Burbridges and Clayton).

My interest in the formation of the elements in stars was sparked by watching a BBC Four programme on the beginning and end of the Universe, and subsequent reading about the beginning of the Universe then led me to evidence put forward by Victor Alpher, in his paper " Ralph A Alpher, George Antonovich Gamow, and the Prediction of the Cosmic Microwave Background Radiation", *Asian Journal of Physics, 23*(1 and 2), 2014, that his father's contribution to the understanding of CMBR had been unfairly attributed to George Gamow. My attention was immediately engaged because I am unhappy that the Nobel Prize for the discovery of Pulsars was incorrectly given to Hewish and Ryle **when in fact it was the unbelievably modest Jocelyn Bell who actually discovered Pulsars** (and the same unfairness can be seen in the treatment of Rosalind Franklin/Lise Meitner/et alii). I do hate it so when men (especially "Establishment" men) treat women badly. Such behaviour *is so petty and so ungentlemanly.* When I have done my research, and when I think that I have understood the historical sequence of events that unfolded, I shall put on this website a blog similar to the one "Participants in the development of Molecular Biology, UK 1920-1970" that I published in June 2019.

I hope that you are all enjoying your Summer hols. In the Summer hol after I left school (1958) my best friend at school and I hitch-hiked round the whole of France stopping to work for three weeks in the hospitals in a place called Lourdes in the Pyrénées, and I loved every minute of my 'rite of passage'! Sadly, hitch-hiking would be much too dangerous a thing for a teenager to do these days. When occasionally, while I am driving on a longish journey, I stop for a hitch-hiker, my grandchildren go ballistic and berate me for being so stupid and for taking such a risk. *It is sad that we human beings can no longer rely on each other to behave well, and that being 'nice' to a stranger is considered too great a risk to take.*