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REMINISCENCES OF GEORGE GAMOW AND NUCLEAR ASTROPHYSICS

PREFACE

I welcome this celebration of George Gamow, partly for the personal reason that my entry into astrophysics was very much tied up with Gamow's inspirational work. My first contact with astrophysics came in the summer of 1951 at Cal. Tech., well after my Ph.D., when Willy Fowler asked me to calculate how nuclear burning may proceed beyond helium in evolved stars. The whole motivation and starting point for all these attempts was the work by Gamow and his colleagues on how far one can – and cannot – get with element-cooking in the early universe. Big Bang Nucleosynthesis is still an exciting topic, as shown by talks in this twin-celebration, and it is obvious how strong an impact Gamow's pioneering work had on me and on others working on energy production and element-cooking in stars. Two other things are less obvious: (1) cosmic black-body radiation was all over these early papers of Gamow's and yet I failed to grasp its importance and (2) other early writings and talks by Gamow also had a strong influence on me.

Although I took no interest in astrophysics until 1951, one of the few books I bought on a graduate student's salary was Gamow and Critchfield: "Theory of Atomic Nucleus and Nuclear Energy-Sources", written in 1947. The scribbled notes in the margins of my copy of this book testify to the important influence the book had on me and other youngsters in the early fifties. However, the first reference in my first paper on nuclear astrophysics was neither to this book nor to Big Bang Nucleosynthesis, but to another Gamow inspiration: Although pre-supernova nuclear reactions are very different in detail to the build-up of elements my first reference was to a pioneering paper on this topic by Gamow and Schoenberg (and to a paper by Fred Hoyle).

On a more personal level – probably the most important educational experience I ever had in astrophysics was my attendance at a "summer-school" at the University of Michigan on the summer of 1953. There were quite a number of influential series of lectures given at that meeting, but two speakers dominate my memory of that summer: Walter Baade speaking on the observations of Stellar Populations and George Gamow speaking on theories of Absolutely Everything. One aspect of Gamow's affect on us was his humanity and his exuberance. This exuberance included his drinking Vodka from water pitcher (which we youngsters luckily did not imitate) and his interest in and speculation on amazingly different topics. Unformally he talked on many things during that summer on 1953, including the Genetic Code, but even his formal lectures included a topic which became fashionable only a couple of decade later – the formation of galaxies. Here also he discussed the relic cosmic background radiation (whose importance I again did not appreciate), but he also showed that today's clustering properties of the galaxy distribution give information on the original turbulence spectrum in the universe. His paragraph on this connection still sounds pretty modern today and maybe we should all reread

Gamow's 1953 lecture notes, just in case we find some further inspiration for some future topic.

Good Luck for such a search and for this twin-celebration.

E. Salpeter