In Appreciation
George Gamow: Scientific Amateur and Polymath

Eamon Harper*

George Gamow (1904–1968) was among the first of the many brilliant scientists who forsook Europe for the United States in the early 1930s. Although most were fleeing the fascist imperium of Hitler and Mussolini, Gamow was one of a few who managed to escape the burgeoning despotism of Stalin in the Soviet Union. His early application of quantum mechanics to the atomic nucleus and his subsequent insight into the role played by the physics of the atom and its nucleus in stars, galaxies, and the universe identifies him as a scientist of unusual genius. Gamow displayed a boisterous, infectious – almost Rutherfordian – interest in all aspects of pure science. His interests were broad and his industry prodigious. His scientific output covered areas as diverse as nuclear physics, astrophysics, cosmology, biological genetics, and the fascinating question of the relationship of the large-scale structure and development of the universe to the properties of elementary particles and fields. He also was an immensely imaginative and prolific author of popular expositions on scientific subjects. One who is as well-known for his authorship of the Mr. Tompkins series of science popularizations as for his contributions to the development of the physical consequences of the big-bang theory of the expanding universe and the prediction of the cosmic background radiation must be unique in the scientific pantheon.

Key words: nuclear physics; Lev Landau; alpha decay; liquid-drop model; Cavendish Laboratory; Rutherford; Bohr; Cockcroft and Walton; nuclear and thermonuclear reactions; Edward Teller; The George Washington University; Urca process and supernovae; big-bang; cosmic background radiation; Alpher, Bethe, Gamow, Herman; genetic code; Mr. Tompkins; Paul Dirac; variation of gravitational constant.

Introduction

Among the documents preserved in the museum and archives of the Cavendish Laboratory in Cambridge there is a pair of photographs (figures 1a and b) that shed light on the character of the unusually ebullient and imaginative polymath of science, George Gamow (1904–1968).** In the first photo, Gamow’s friend, the

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** Gamow has left an informative and characteristically entertaining account of his early life in his posthumously published autobiography, My World Line (New York: Viking Press, 1970). The account there of his early years (before he fled the Soviet Union in 1933) is quite detailed, but the story of his later life in America is more vestigial. One is left with the impression that he intended to publish a more exhaustive account of his later life at a future date.
Fig. 1 a and b. A moment of physical insight and satisfaction as George Gamow (right) obtains agreement between the predictions of his theory and the experimental findings of John Cockcroft (left) for some nuclear reaction. (Credit: The Cavendish Laboratory.)

rather taciturn John Cockcroft, appears to attend closely as Gamow calculates the cross section for perhaps the reaction in which a proton splits the lithium nucleus into a pair of alpha particles. This is the process for whose successful execution Cockcroft (together with his collaborator at Cambridge, Ernest Walton) was to win the Nobel Prize for physics in 1951. In the second picture of the sequence, Cockcroft is seen beaming in gleeful satisfaction at the triumphant outcome of Gamow’s quick calculation, and Gamow himself appears to be about as delighted as Cockcroft with the result. The image of questioning and joyous discovery and capacity for capitalizing on adventitious resources conjured up by this photographic sequence seems to me evocative of George Gamow’s merry pursuit of scientific questions.

Wolfgang Yourgrau once likened Gamow’s attitude toward creative science to that of Anton Chekov’s little bird who responded to the question, “Why are all your songs so brief?” by observing that life itself was short, and since he had so many songs to sing, he was afraid that he might not be able to sing all of them before the inevitable end. I believe that the social and intellectual philosophy encapsulated in such a riposte again reflects well George Gamow’s effervescent attitude toward science. During his lifetime he gained a reputation for being a skimmer in his scientific approach, for being bad at arithmetic and at balancing the