

## TO THE 100<sup>th</sup> ANNIVERSARY OF BIRTH OF GEORGY ANTONOVICH GAMOV

*During preparation of the first in the USSR  
experiment on atomic nucleus splitting*

*G. A. Gamov was a scientific consultant at the  
Ukrainian Institute of Science and Technology*



GEORGY ANTONOVICH GAMOV (b. March 4, 1904, Odessa, Ukraine, d. Aug. 19, 1968, Boulder, U.S), physicist and cosmologist who was one of the foremost advocates of the big-bang theory, according to which the universe was formed in a colossal explosion billions of years ago. In addition, his work on deoxyribonucleic acid (DNA) made a basic contribution to modern genetic theory.

Gamow attended Leningrad (now St. Petersburg) University, where he studied briefly with A.A. Friedmann, a mathematician and cosmologist who suggested that the universe should be expanding. At that time Gamow did not pursue Friedmann's suggestion, preferring instead to delve into quantum theory. After graduating in 1928, he traveled to Göttingen, where he developed his quantum theory of radioactivity, the first successful explanation of the behaviour of radioactive elements, some of which decay in seconds while others decay over thousands of years.

His achievement earned him a fellowship at the Copenhagen Institute of Theoretical Physics (1928-29), where he continued his investigations in theoretical nuclear physics. There he proposed his "liquid drop" model of atomic nuclei, which served as the basis for the modern theories of nuclear fission and fusion. He also collaborated with F. Houtermans and R. Atkinson in developing a theory of the rates of thermonuclear reactions inside stars.

In 1934, after emigrating from the Soviet Union, Gamow was appointed professor of physics at George Washington University in Washington, D.C. There he collaborated with Edward Teller in developing a theory of beta decay (1936), a nuclear decay process in which an electron is emitted.

Soon after, Gamow resumed his study of the relations between small-scale nuclear processes and cosmology. He used his knowledge of nuclear reactions to interpret stellar evolution, collaborating with Teller on a theory of the internal structures of red giant stars (1942). From his work on stellar evolution, Gamow postulated that the Sun's energy results from thermonuclear processes.

Gamow and Teller were both proponents of the expanding-universe theory that had been advanced by Friedmann, Edwin Hubble, and Georges LeMaître. Gamow, however, modified these theories and named his version the "big bang." He and Ralph Alpher published this theory in a paper called "The Origin of Chemical Elements" (1948). This paper, attempting to explain the distribution of chemical elements throughout the universe, posits a primeval thermonuclear explosion, the big bang that began the universe. According to the theory, after the big bang, atomic nuclei were built up by the successive capture of neutrons by the initially formed pairs and triplets. This theory is sometimes called the Alpher-Bethe-Gamow theory, Gamow having added Hans Bethe's name to the paper so that this theory of cosmogenesis would be associated with three men whose names approximate the first three letters of the Greek alphabet.

In 1954 Gamow's scientific interests grew to encompass biochemistry. He proposed the concept of a genetic code and maintained that the code was determined by the order of recurring triplets of nucleotides, the basic components of DNA. His proposal was vindicated during the rapid development of genetic theory that followed.

Gamow held the position of professor of physics at the University of Colorado, Boulder, from 1956 until his death. He is perhaps best known for his popular writings, designed to introduce to the nonspecialist such difficult subjects as relativity and cosmology. His first such work, *Mr. Tomkins in Wonderland* (1936), gave rise to the multivolume "Mr. Tomkins" series (1939-67); among his other writings are *One, Two, Three . . . Infinity* (1947), *The Creation of the Universe* (1952; rev. ed., 1961), *A Planet Called Earth* (1963), and *A Star Called the Sun* (1964). For his achievement as a popularizer of science, Gamow won the 1956 Kalinga Prize from UNESCO. He received other honours as well, including a fellowship in Churchill College, Cambridge (1965), and membership in the Royal Danish Academy of Sciences (1950) and the U.S. National Academy of Sciences (1953).