William Jackson Humphreys

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ON NOVEMBER 10, 1949, W. J. Humphreys died in Washington, D. C., in his 88th year, after an illness of two months. He began his distinguished scientific career as a physicist, and, although he entered the field of meteorological physics in the service of the U. S. Weather Bureau and became best known as a meteorologist, he remained first and foremost a physicist throughout his life. His name is starred as a physicist in all editions of *American Men of Science* in which that procedure was followed.

Dr. Humphreys was born in a one-room log house at Gap Mills, West Virginia, February 3, 1862. His undergraduate training was at Washington and Lee University, where he received the degree of A.B. in 1886, and C.E. in 1888. After a year of further study at the University of Virginia, 1888–1889, he taught at Miller School, near Crozet, Virginia, 1889–1893, then at Washington College, Chestertown, Maryland, 1893–1894. In 1894, he began graduate research in physics at The Johns Hopkins University, studying under the great physicist Henry A. Rowland and other noted men; he received the Ph.D. degree in 1897.

His notable contribution to physical science began during his graduate work at Johns Hopkins. His early investigations, chiefly in the field of radiation and spectroscopy, included the fundamental discovery of the displacement of spectrum lines from their normal positions by the effect of pressure. The pressure shift was found during an examination of the spectra produced by electric arcs under different pressures, which had been suggested to him and J. F. Mohler by J. S. Ames; the phenomenon was investigated in detail at low pressures by Mohler, and at high pressures (eventually up to 101 atmospheres) by Humphreys. His early work also included important researches on the solution and diffusion of metals and alloys in mercury. From 1897 to 1905 Dr. Humphreys was instructor in physics at the University of Virginia. In this period he became as well known in astronomy as in physics. His contributions to spectroscopy were of fundamental significance for astrophysics; and at the dedication of the Yerkes Observatory, October, 1897, he presented a paper on his investigations of the pressure shift of spectrum lines. He was a member of two U. S. Naval Observatory eclipse expeditions—to Griffin, Georgia, to observe the eclipse of May 28, 1900, and to Sumatra for the eclipse of May 18, 1901—with the object of obtaining photographs of the flash spectrum.

On July 1, 1905, Dr. Humphreys was appointed meteorological physicist in the U. S. Weather Bureau, a position which he held for 30 years. From 1905 to 1908 he was supervising director of the Mt. Weather Observatory, which had been established for the investigation of physical phenomena of the atmosphere; thereafter he served continuously at the Central Office in Washington, D. C. He turned his attention from spectroscopy to the physical problems of the atmosphere, and soon provided the explanation of the existence and principal characteristics of the stratosphere, first announced on June 30, 1908, to the Physics Section of the American Association for the Advancement of Science and the American Physical Society. This was followed by a long series of contributions to meteorological physics that brought him international recognition and many honors.

On December 31, 1935, Dr. Humphreys was retired, after having been retained in the service, by Presidential order, for four years past the official age limit of 70; but retirement did not end his scientific activity. He was immediately appointed Collaborator, and for several years he kept regular office hours nearly every day. Meteorology is greatly indebted to Dr. Humphreys. At the time of his appointment to the Weather Bureau in 1905, he was almost the only trained physicist among meteorologists; and for many years he was nearly alone in his efforts to develop meteorology on a proper physical basis. His textbook *Physics of the Air* must be reckoned as one of his major contributions; its influence, and the reputation of its author among physicists, were important factors in obtaining for meteorology a wider recognition as a branch of physics. This treatise originated in a series of lectures given during January, 1914 to aviators in training at San Diego, California. The

first edition appeared in 1920, the third in 1940, and it is still unique among modern textbooks: it is a systematic treatment of the physical phenomena of the atmosphere arranged according to the traditional subdivisions of mechanics, thermodynamics, electricity, acoustics, and optics. It also includes a long section on geological climates that embodies the author's own original contributions to this problem which, representing the result of careful thought by a competent meteorologist and able physicist, deserve more widespread consideration than they have received.

Not the least of his services were his popular books: the delightful *Weather Proverbs and Paradoxes* (1st edition, 1923); *Fogs and Clouds* (1926; an inferior 2nd edition appeared in 1943); the entertaining *Weather Rambles* (1937), a collection of his best popular articles; the popular treatise *Ways of the Weather* (1942), which won a recommendation by the Book-of-the-Month Club; and the thought-provoking *Rainmaking and Other Weather Vagaries* (1926). He also prepared Wilson A. Bentley's exquisite microphotographs of snow crystals for publication and wrote the text for the book, published in 1931.

Among his other official duties, Dr. Humphreys was in charge of the seismological work, which was carried on by the Weather Bureau from 1914 to 1924. During 1931–1935 he was editor of the *Monthly Weather Review*. He also served on the National Advisory Committee for Aeronautics. Among outside activities, he was special editor for meteorology on the editorial staff of Webster's New International Dictionary. Beginning in 1913, he was an associate editor of the *Journal of the Franklin Institute*. From 1911 to 1933 he was professor of meteorology at The George Washington University, offering graduate courses in physical and mathematical meteorology; in 1933 he was made professor emeritus.

Dr. Humphreys was a member of the American Association for the Advancement of Science, American Physical Society, American Geophysical Union, American Meteorological Society, American Philosophical Society, American Astronomical Society, Optical Society of America, Seismological Society of America, American Mathematical Society, American Academy of Arts and Sciences, The Franklin Institute, Washington Academy of Sciences, and Philosophical Society of Washington. The many offices that he held in several of these societies included that of president of the American Meteorological Society in 1928–29, of the Washington Academy in 1922, and of the Philosophical Society of Washington in 1919; national chairman of the American Geophysical Union, 1932–1935; general secretary of the American Association for the Advancement of Science, 1925–1928, and chairman of Section B in 1917. He was a corresponding member of the Meteorological Society of Hungary, and of the State Russian Geographical Society; and an honorary member of the Astronomical Society of Mexico. He was also an honorary member of the Eugene Field Society, for literary excellence.

Dr. Humphreys was married in January, 1908, while stationed at Mt. Weather, to Margaret Gertrude Antrim of Charlottesville, Virginia, who survives him. An authentic record of his personal life is fortunately available in his autobiographical work "Of Me," privately published at Washington, D. C., in 1947. The hardships of life on Mt. Weather, described in this autobiography, were only the beginning of the difficulties and discouragements with which he was forced to contend during most of his service. Very shortly after he entered the Weather Bureau, circumstances developed which must have made it doubtful whether this move had been a wise one for his own welfare; and it is questionable whether the inestimable benefit to meteorology that resulted from his giving up his career in physics at the University of Virginia was adequately reciprocated.

A complete bibliography of his writings is included in his autobiography, with a list of memberships and offices in scientific societies, and of the honors which came to him. He was president of the Cosmos Club in Washington during 1936, and for 16 years he was chairman of the Entertainment Committee. Dr. Humphreys' character was distinguished by unswerving devotion to scientific inquiry, uncompromising insistence on rigorous standards of scholarship and industry, and the highest ideals of integrity and honor.