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6. NECROLOGY

Charlotte Moore Sitterly, 91, retired NBS physicist and astronomer, died of heart failure at her home in Washington, DC., on March 3, 1990. Her principal publications appeared under her maiden name, Charlotte E. Moore.

Charlotte Moore made significant contributions to the description and interpretation of the solar spectrum over a period of some 60 years. She was more widely known, however, for her critical compilations of atomic spectroscopic data obtained from laboratory observations. Her tables of wavelengths with energy-level identifications sorted by multiplets are still indispensable for astronomers and spectroscopists, and her classic *Atomic Energy Levels* (Vol I, 1949; II, 1952; III, 1958) constitute one of the most highly respected and frequently cited sources of basic atomic data ever published.

Charlotte Emma Moore was born September 24, 1898, in Ercildoun, Pennsylvania. Her mother was a teacher, her father Superintendent of Public Schools in Chester County, PA. She attended the local public schools, graduated from high school in 1916, and went on to Swarthmore College, where she selected mathematics as her major. She graduated from Swarthmore College in 1920 with a B.A. in mathematics and astronomy, and was elected to membership in Phi Beta Kappa. She then went to the Princeton University Observatory where, as a computer, she began an association with Henry Norris Russell (1877-1957), the doyen of American astronomers, that lasted until his death in 1957. In the 1920s Russell was struggling to gain a better understanding of stellar spectra. Under his influence, Moore went to the Mt. Wilson Observatory in

1925 to collaborate with C. E. St. John (1857-1935) and others on the first revision of H.A. Rowland's table of solar-spectrum wavelengths. She returned to Princeton in 1928 as a research assistant, and helped Russell use the solar line strengths, together with theoretical multiplet intensities, to make the first major determination of the Sun's chemical composition from the Fraunhofer spectrum.

During 1930-31, Moore earned a PhD in Astronomy on a Lick Fellowship at the University of California with a dissertation on "Atomic Lines in Sun-Spot Spectra." Returning to Princeton in 1931, the solar research program led her to work on energy-levels analyses of several complex atomic spectra. Russell and Moore's comprehensive monograph on Fe I appeared in 1944, and in 1945 she completed her extensive compilation, the *Multiplet Table of Astrophysical Interest* (Contributions from the Princeton University Observatory No. 20, 1945; reprinted in NSRDS-NBS 40, 1972). The latter publication made a large mass of spectral wavelength data easily available to astronomers and other users; its reliability and thoroughness were characteristic of its author.

In 1945 Moore moved from Princeton to Washington, DC., to join W. F. Megger's spectroscopy section at the National Bureau of Standards (NBS, now NIST, the National Institute of Standards and Technology). About that time it had become apparent that a new compilation of atomic energy levels was urgently needed by physicists, chemists, and astronomers; the number of known levels had increased by a factor of four or five since the publication in 1932 of an excellent compilation by Bacher and Goudsmit. In 1946, with the backing of a National Research Council committee chaired by Russell and of the new NBS Director, E. U. Condon, Meggers initiated an Atomic Energy Levels Program with Charlotte Moore Sitterly in charge.

She did indeed take charge. Far from regarding the job as a gathering of published data, she drew on her wide knowledge of the research of many atomic spectroscopists to obtain extensive unpublished material. She critically examined the data for each spectrum. As her surveys of the available material revealed important gaps or dubious analyses, she persuaded the best qualified spectroscopists to carry out new observations and analyses. The resulting three volumes of *Atomic Energy Levels* (1949-1958) included data for 485 atomic species in a uniform, clear format with standardized notation. The convenient availability of these data during the past three to four decades has had a large influence on research in atomic, optical, laser and plasma physics, chemistry and astronomy. Charlotte Moore's work also served as a model for other data centers at NIST and elsewhere.

In October 1946, about a year after Charlotte Moore's arrival at NBS, Richard Tousey's group at the Naval Research Laboratory used a V-2 rocket to obtain ultraviolet spectra of the sun extending down to 2200 Å. Upon hearing this news, Moore immediately telephoned Tousey and was given a print of the spectra. She felt the excitement expressed by Russell, who after his study of similar spectra, wrote in 1947 to Leo Goldberg: "My first look at one gives me a sense that I was seeing something that no astronomer could expect to see unless he was good and went to heaven!" Moore gave Tousey advance copies of her new *Ultraviolet Multiplet Table*, and in the early 1950s began working with him on analyses of ultraviolet solar spectra in a collaboration that continued until her death. After retiring from NBS in 1968, Moore joined Tousey's group at the Naval Research Laboratory (1971-78) and also continued her work at NBS. Her last series of compilations of laboratory data, the elegant *Selected Tables of Atomic Spectra* (1965-85), covered several elements of special astrophysical interest.

As a diversion from scholarly work, Moore maintained a vegetable garden and baked four-loaf batches of crispy white bread, sharing the products of these activities with her neighbors, colleagues, and relatives.

Moore was a Fellow of the American Association for the Advancement of Science (Vice President, Section D (Astronomy), 1952), of the American Physical Society, the Optical Society of America, and the Washington Academy of Sciences; a member of the American Association of University Women, of the American Astronomical Society (Vice President, 1958-60), Astronomical Society of the Pacific, International Astronomical Union, and the Philosophical Society of Washington. She served as a representative of the International Astronomical Union on the Joint Commission for Spectroscopy (1950-53), Triple Commission for Spectroscopy (1960-65), International Committee on Data for Science and Technology, and as President of its Commission of Fundamental Spectroscopic Data (1961-67); and as a member of the National Research Council (NRC) Committee on Line Spectra of the Elements (1925-70), and of the Advisory Board, NRC Office of Critical Tables (1961-69).

Charlotte Moore, who has been called a one-woman world data center for spectroscopic and astrophysical data, received many awards and honors: The Annie J. Cannon Medal (1937) of the American Astronomical Society; Associate of the Royal Astronomical Society (1949), the first woman to receive this honor, breaking a 129-year-old tradition; Meritorious Service Award (Silver Medal, 1951) and Exceptional Service Award (Gold Medal, 1960) of the U.S. Department of Commerce; Federal Woman's Award (1961) of the U.S. Civil Service Commission, one of the first six to receive this award for which there were 74 nominees from a total of 25,500 eligible candidates; asteroid 2110 named "2110 Moore-Sitterly" (1962) in her honor by its discoverer; Annie Jump Cannon Centennial Medal (1963), Wellesley College; Career Service Award (1966) of the National Civil Service League; William F. Meggers Award (1972) of the Optical Society of America, "Atomic Spectroscopy in the Twentieth Century," a feature issue of the *Journal of the Optical Society of America* (Vol. 5, October 1988), was dedicated to her in recognition of her 90th birthday; and the Bruce Medal of the Astronomical Society of the Pacific is to be awarded to her at its 1990 summer meeting. She received Honorary DSc. degrees from Swarthmore College (1962), University of Michigan (1971), Georgetown University (1988), and an Honorary Doctorate from the University of Kiel in 1968.

In 1937, Charlotte Moore married fellow astronomer Bancroft W. Sitterly. He died in 1977. She is survived by several nephews and nieces.