OBITUARY

JOHN W. EVANS

John Wainwright (Jack) Evans, a major figure in solar physics for almost four decades, died at home in Santa Fe, New Mexico, on 31 October 1999, at the age of 90.

Jack received a Bachelor's degree in mathematics from Swarthmore College in 1932, a Master's degree in astronomy in 1936, and a Doctorate in astronomy in 1938, both from Harvard. From 1938 to 1942 he was an instructor, and then assistant professor, of mathematics and astronomy at Mills College, Oakland, California, where he taught undergraduate and graduate courses.

His high expertise in optics was initially acquired while he worked at the Institute of Optics, University of Rochester, from 1942–1946. During these wartime years, he developed a number of optical devices for military use. As an Assistant Professor of Optics at the University during the 1945–1946 school year, he taught advanced courses in photometry and continued optical research at the Institute.

Jack's solar career started in 1946 when he was hired by the High Altitude Observatory. His first projects were the design of a 40-cm coronagraph and other instruments. During his six years at HAO, he worked both in Boulder and at Climax, Colorado.

With this background he was a natural choice, in 1952, to become Director of the Air Force's new Upper Air Research Observatory located at Sacramento Peak at an altitude of 2830 m in southern New Mexico. Jack's choice of the village name, Sunspot, became its postal address. He spent the rest of his career here at 'Sac Peak'. (In 1956 the institution became the Sacramento Peak Observatory, and subsequent to the National Science Foundation replacing the Air Force as manager, the National Solar Observatory/Sacramento Peak.)

He quickly assembled a group of talented young scientists, and under his leadership, Sac Peak developed into a world-class astronomical institution.

Jack liked to say that Sunspot was 'a bit of heaven on earth'. It was here that he and Betty raised their three children, Nancy, Jeanne and Wain. Their warm hospitality, friendship and kindnesses, which they extended to many hundreds of scientific residents, visitors, and their families, over the years, created a very special ethos in this remote observatory location.

He served on the Editorial Board of *Solar Physics* from its inception to 1976. After retiring as Director at the end of 1974, he continued to work at the Observatory, first as a staff member, and later as a part-time consultant, designing,

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building, testing, and operating new instrumentation. He and Betty moved to Santa Fe in 1985.

His research was characterized by constant innovations, especially in the field of optics. In 1939 he invented the birefringent filter, only to find that Bernard Lyot and Yngve Öhman had preceded him. His invention of the split-element version of the Lyot filter represented a major advance in the design of this type of optical filter. In 1949 he described the polarizing two-beam-interferometer analogous form of Lyot filter elements that today is the basis of many helioseismic imaging instruments. He made a further major contribution to the subject of narrow-band, tuneable optical filters in his derivation of a very simple, exact analytic expression for the spectral transmittance of Šolc-type filters, which previously could be dealt with only by laborious numerical methods. He then applied the Šolc filter to a tunable monochromator, permitting the use of high-order gratings.

He developed an externally occulted form of the solar coronagraph which has been used extensively in satellite coronagraphs. The same principle is incorporated in the Evans sky photometer that is used at solar observatories around the world. He also designed a double-pass spectrograph for reduction of instrumentally-scattered light in solar absorption lines. This invention was spectacularly successful, reducing scattered light to an almost undetectable level, and hence solving a most troublesome problem of determining precise line profiles. He incorporated this concept into his design of the Sac Peak spectroheliograph which is still used in daily monitoring of solar activity. He pioneered the idea of using a Sun-pointed solar spar on which multiple separate solar telescopes could be mounted, with a roller-type drive to give high-precision and ultra-smooth guiding. Many other innovative solar instrumental systems, too numerous to describe here, form part of Jack's tremendous contributions to the field. We mention only three: his prototype flare-patrol solar telescope, the optical specifications of which became the standard for the International Geophysical Year; a Doppler–Zeeman Analyser for measuring solar magnetic fields with high linearity; and one of the first vector magnetographs.

Jack's solar physics interests were broad. He led two eclipse expeditions to observe the height-resolved chromospheric spectrum, the first to Khartoum, 1952, and the second to Puka Puka in the South Pacific, 1958. For these he designed two slitless spectrographs, and a jumping-film camera. The data from the Khartoum eclipse were critical in establishing the relative temperatures of the solar chromosphere and photosphere. Of particular note were his detailed investigations, starting in 1960, of small-scale motions in the solar atmosphere, especially of the nature of the five-minute oscillations–the first quantitative measurements of the velocity amplitudes as functions of line strength and height in the solar atmosphere. Flare mechanisms were also of special interest. For example, in 1958 he obtained data during the progress of a flare that showed, for the first time, associated changes in sunspot magnetic fields.

Jack received many honors and awards during his career, including: Newcomb Cleveland Prize of the American Association for the Advancement of Science (1957); Fellow, American Academy of Arts and Sciences (1964); Honorary Doctor of Science, University of New Mexico (1967); Honorary Doctor of Science, Swarthmore College (1970); George Ellery Hale Prize of the Solar Physics Division of the American Astronomical Society (1982); and Richardson Medal of the Optical Society of America (1987). He also received several prizes and awards from the U.S. Air Force, including: Distinguished Civilian Service Award, Department of Defence (1965); Guenter Loeser Memorial Award, Air Force Cambridge Research Laboratories (1967); Rockefeller Award for Distinguished Public Service (1969); and the Outstanding Achievement Award, Air Force Office of Aerospace Research (1970).

Such honors, however, do not completely reflect Jack's contributions to the discipline. Certainly, his pursuit of excellence, combined with his scientific judgment, have had a major impact on the field. But he was a true leader, a person of vision and infectious enthusiasm for the science, his ability to lead and inspire stemming from his outstanding human qualities. While modest about his own work, he encouraged countless young solar astronomers to reach their own potentials as scientists. He is remembered by his colleagues as a mentor, supporter, and genuine friend. A plaque at the John W. Evans Solar Facility succinctly expresses Jack's profound influence on the discipline of solar physics: "Named in honor of the first Director (1952–1975) of Sacramento Peak Observatory, who transformed a remote mountain-top observatory into a world-renowned center for solar astronomy." And that legacy continues.

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