

## Charles Edmund Worley (1935–1997)

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**Abstract.** In keeping with its co-sponsorship by members of both the “close” and “wide” binary star communities, IAU Symposium 240 has been jointly dedicated to the honor of Czech astronomer Mirek J. Plavec and the memory of U.S. astronomer Charles E. Worley.

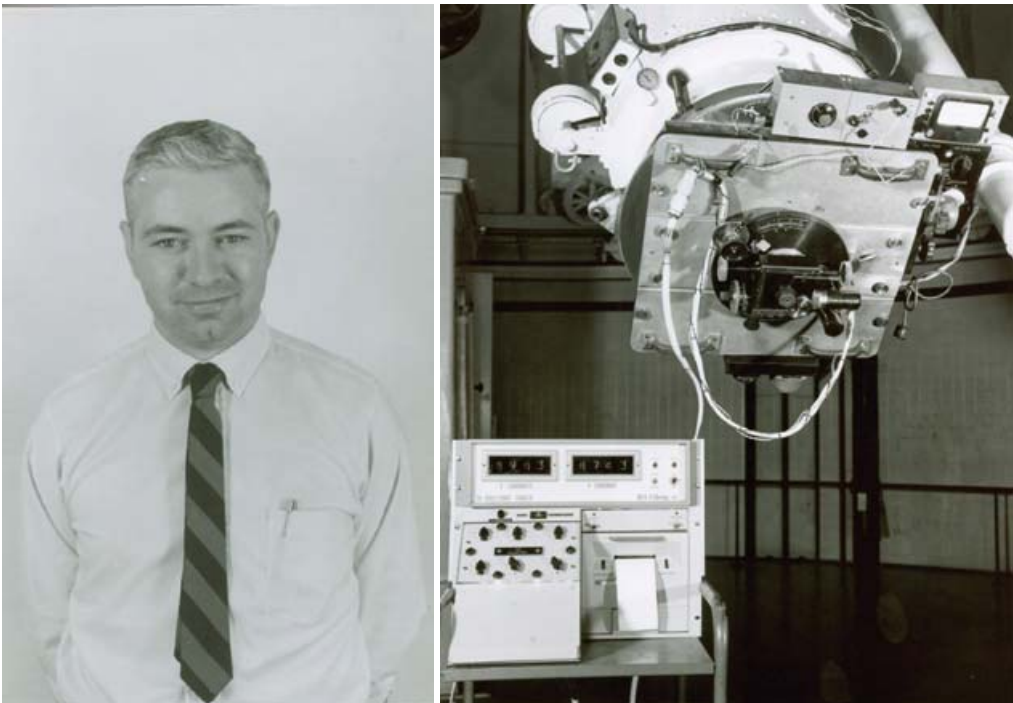


Charles Worley, long-time astronomer at the U.S. Naval Observatory, was born on May 22, 1935, in Iowa City, Iowa, and grew up in Des Moines the son of an M.D., Charles L. Worley, and his wife Iona Cooney Worley, a homemaker. He became interested in astronomy at age nine.

His first observational work as an amateur astronomer was plotting and recording more than 10,000 meteors for the American Meteor Society. Continuing his love for astronomy he attended Swarthmore College, where he took part in the parallax program as an Observing Assistant. He also met the other love of his life, his wife, Jane Piper. They were married in 1956 next to Sproul Observatory on the Swarthmore campus. He obtained a B.A. in mathematics from San Jose State College in 1959. He worked for the Lick Observatory in California (1959–1961) as a Senior Assistant and Research Astronomer under a Naval Research grant to observe double stars. After arriving at the U.S. Naval Observatory in 1961, he was the motive force behind an extensive program of double star observation (being himself, a prolific observer), instrumental innovation, and double star cataloging. He quickly gained recognition as one of the world's leading experts in the field of double star astronomy. Charles died on New Year's Eve, 1997, two days before his scheduled retirement.

**Keywords.** binaries (including multiple): general, binaries: visual, catalogs, history and philosophy of astronomy

## 1. Micrometer Observer



**Figure 1.** *Left:* Charles in 1964, a few years after his arrival at the USNO. *Right:* The micrometer, constructed by the USNO instrument shop and used for most of his observations, mounted on the 26".

During his career Charles made over 40,000 measures of double and multiple stars using the USNO filar micrometer on telescopes in the northern and southern hemispheres, making him the 3<sup>rd</sup> most prolific double star observer ever. His special interest in nearby stars led to the discovery of 39 new, cool stellar companions. These companions, which are faint and difficult to observe, provide critical census information on the solar

neighborhood. Apart from this foray into new binaries, his work was almost exclusively the measurement of close, fast moving known pairs where the scientific return was maximized. He was never interested in resolving new pairs for the sake of discovering more. His “mean positions” in the WDS were the result of many nights, each of many measurements per night, to ensure that his measurements were as accurate as possible. He was certainly gifted with the “double star eye,” and was always able to push telescopes to their theoretical resolution limit when seeing permitted. Charles was introduced to double star work by Olin Eggen while at Lick Observatory. His micrometer wires were of etched tungsten rather than spider threads, and he was always eager to upgrade his technology, first with digital encoders and line printers, whenever possible.

## 2. Cataloger

In 1965 Charles arranged for the database of double star data, the *Index Catalogue of Visual Double Stars* (IDS), to be transferred from the Lick Observatory to the USNO and later renamed it the *Washington Double Star Catalog* (WDS)<sup>†</sup>.

This database became a truly comprehensive resource under his guidance, and is formally recognized as the international source of double star data by the International Astronomical Union (IAU). He updated the database on a continual basis, adding 290,400 observational records to the original 179,000 and increasing the original 64,000 systems by an additional 17,100 through careful literature searches and extensive communication with other double star observers throughout the world.

In collaboration with William Finsen and later Wulff Heintz, Charles produced two *Catalogs of Orbits of Visual Binary Stars*, the most recent published in 1983. At the time of his death he was preparing what would have been a new version. He was known for exacting standards and high quality best typified by his paper challenging all other double star observers; “Is This Orbit Really Necessary?”



**Figure 2.** Collecting data in the USNO Library for inclusion in the WDS.

<sup>†</sup> Charles was justifiably proud of the WDS and said that his catalog was “the oldest continuously maintained dataset in astronomy.” He was right that sunspots were not continuously a maintained dataset. I think I won by saying the calendar was older, but he argued, in a typically curmudgeonly fashion, that counting sunrises was not data or at least not astronomy. *Anecdote courtesy of Demetrios Matsakis.*

### 3. IAU involvement

Charles first attended a General Assembly in 1961, and with the exception of R.G. Aitken, the first Commission 26 President, was personally acquainted with every Commission 26 President. He was a frequent correspondent with many double star luminaries of the day and his postal exchanges with, for example Finsen at the time of the closing of Republic Observatory, are a treasure trove of personal anecdotes and insights into selected events. He vociferously advocated for the reorganization of the stagnant administration of the Double Star Commission in the 1970s. In 1994 he became president of Commission 26.



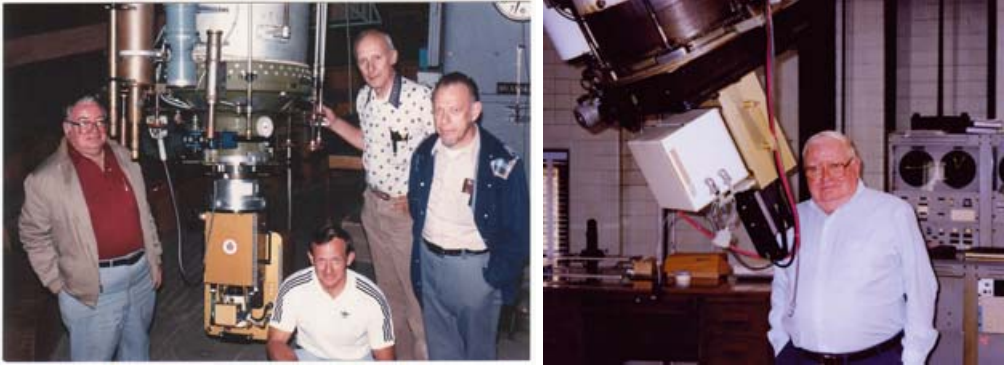
**Figure 3.** *Left:* At the Santiago de Compostella Double Star Meeting (1996) with Jose Docabo (current Vice President of the Commission). *Right:* IAU Colloquium 100: Fundamentals of Astrometry (Belgrade, Yugoslavia, 1987) with his wife, Jane.

### 4. Speckle Observer

Recognizing the accuracy and precision afforded by speckle interferometry over micrometry, Charles advocated obtaining a speckle interferometer for the USNO. This addition, obtained well into the autumn of his career, was to improve his double star measurements. During the last seven years of his life, he oversaw improvements in both instrumentation and software implementation that resulted in making the USNO the world's second largest producer of double star observations using a speckle interferometer. Under Charles' direction more than 9,200 observations were made with the speckle interferometer on 1,100 systems down to separations of one-fifth of an arcsecond, the theoretical limit of the 26-inch refractor.

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**Figure 4.** *Left:* Charles visiting speckle observers at Lowell. *Right:* With the USNO camera on the 26".

