NR046-720

UNIVERSITY of PENNSYLVANIA

FINAL REPORT ON CONTRACT Nonr-466(00) NR046-720

MEASUREMENT OF VISUAL BINARY STARS
BY INTERFEROMETER AND MICROMETER

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As called for in the schedule of this contract, the Investigator conducted basic astronomical research involving interferometer and micrometer measurements of double stars during the period of performance, June 1951 to September 1951.

The measurements of these stars were all performed by means of the 18-inch refracting telescope of the Flower Astronomical Observatory, Upper Darby, Pa. The telescope was available for this purpose for at least half the night on 80 nights. Measurements of double stars were actually performed on 51 nights. On the remaining nights measuring work was impossible due to cloudiness or other adverse atmospheric conditions.

Altogether 187 separate positive measurements were made on 75 different stars. In addition, 58 negative or uncertain observations were made on these same stars, and about 17 negative or uncertain observations of 11 other stars. Thus, in total, 262 observations were made of 86 different stars.

Stars generally were chosen for observation when such measures promised material contribution to determination of their orbits, and, consequently, their masses.

A few wide pairs were included because of interest in their proper motions. Seven stars were included because of orbits computed by the Investigator; 4 stars because of prospective orbital investigations by Dr. S. Wierzbinski of the Poznan University Observatory; and 1 star for the same purpose requested by Dr. Joseph Ashbrook of Yale University Observatory.

Thanks are due to the Fels Planetarium of the Franklin Institute for the loan of two high-power Zeiss Orthoscopic eyepieces.

Many stars which were too faint or too widely separated for interferometer measurement were viewed without it and measured by the usual micrometer methods. Again, as in 1950, one incidental result of this part of the investigation was proof that the 18-inch telescope, even in its present condition and position, is as efficient as any of its size for resolving and measuring close double stars. Thirty-eight of the direct micrometer measures accomplished on the present contract were of stars separated by ½ second of arc or less, although ¼ second is the limit of resolution for an 18-inch, according to some authorities.

A new double was accidentally discovered and measured whose separation was less than 1/5 second of arc. A special publication discussing this resolving power question is now being contemplated. Such discussion of resolving power for the interferometer was presented by the Investigator to an annual meeting of the American Astronomical Society on December 29, 1950 at Haverford College, Pa. An abstract of this paper was published in the Astronomical Journal for April 1951 (Vol. 56, No. 2, pp. 52-53; also in The Sky and Telescope for February 1951 (p. 95).

A complete report of work done in the summer of 1950 on Contract Nonr-05400 was published in the Astronomical Journal for May 1951(Vol. 56, No. 3, pp.68-74). It is expected that a complete report of work on the present contract will also appear in the Astronomical Journal in the near future.