THE VISUAL DOUBLE STAR DATABASE

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Abstract. The collection of visual double star data in a systematic way began more than a century ago and has been continued regularly since that time. Thus, it forms the oldest extant database in astronomy. This contribution briefly reviews the history and highlights of the project, describes the current status and future prospects for this endeavor and comments on the current modes of data distribution.

Key words: databases – stars: binaries: visual

1. HISTORY

The systematic collection of visual double star data began with short lists by C. Mayer (Bode 1781) and W. Herschel (1782). In his now classical works, *Catalogus Novus* (1827) and *Mensurae Micrometricae* (1837), F. G. W. Struve provided data which satisfied users through much of the remainder of the 19th century. But by about 1880 S. W. Burnham had become dissatisfied with the increasingly fragmentary state of existing data, and had begun an effort to collect all extant visual data. This process has continued since that time with only slight interruptions. Southern observations began at a much later date than those in the north. Innes (1899) issued a short *Reference Catalogue of Southern Stars*, which was followed later by a more comprehensive work (Innes 1927). Meanwhile, Burnham (1906) had published his massive catalog, containing more than 13 000 objects within 120 degrees of the North Pole, and also provided for the continuation of the database by E. Doolittle, who, in turn, was succeeded by R. Aitken. Aitken (1932) issued his own catalog, which contained more than 17 000 objects, despite the adoption of magnitude and separation limits. Aitken continued to maintain

the database for some time after his retirement, but the task eventually fell to H. Jeffers. A similar evolution in the Southern Hemisphere led to W. van den Bos' continuing the database established by Innes.

About 1950 Jeffers and van den Bos resolved to combine their efforts and to convert the manuscript databases to punched cards. This was accomplished in about a decade, and resulted in the publication of the Index Catalogue (Jeffers et al. 1963), which listed more than 64 000 pairs from a database of about 179 000 means.

In 1965 the Lick catalog on magnetic tape was transferred by me to the U.S. Naval Observatory, where it has since resided. It has been continually updated and corrected, and most of the early (pre-1927) data has been incorporated, so that the database now contains about 453 000 means of 78 100 objects. In 1977 an updated magnetic tape, containing corrections and new discoveries, was issued. Following conversion of the punched cards to disk storage of data, "The Washington Visual Double Star Catalog, 1984.0", was issued (Worley & Douglass 1984). A new, and much improved version, of the same title but dated 1996, is now ready. It is described in detail in another contribution in these proceedings (Worley & Douglass 1997).

2. DATA DISTRIBUTION

Printed catalogs were for a long time the only effective means of a systematic distribution of double star data. These suffered from increasingly rapid obsolescence as the volume of new data increased. Data published subsequently to the closure date of the most recent catalogs could usually be obtained only by a laborious literature search, or by imposing on the good nature of the cataloger to supply manuscript data. The situation improved only with the introduction of machine-readable storage media. Even so, incompatibilities of machines and storage media often caused difficulty. The situation is now greatly improved by technological developments involving compatibility, storage densities and ease of data transmission. We initially supplied data on cards or listings, and occasionally on tapes, all of which required considerable card handling and mailing problems. The situation today is much more favorable, and we are able to provide a level of service previously not attainable and with much less expenditure of time and effort. For example, a request for data on a specific object results in a list which contains not only the data but specific information on coded remarks, references, notes

and orbital elements. The utility of this is attested by the increasing use of the database by our own personnel as well as by outside users.

REFERENCES

- Aitken R. G. 1932, *New General Catalogue of Double Stars within 120° of the North Pole*, Carnegie Institute of Washington
- Bode J. E. 1781, *Astron. Jahrbuch* for 1784, 183
- Burnham S. W. 1906, *A General Catalogue of Double Stars within 121° of the North Pole*, Carnegie Institute of Washington
- Herschel W. 1782, *Philosophical Transactions*, 72, 112
- Innes R. T. A. 1899, *Reference Catalogue of Southern Double Stars*, Ann. Royal Obs. Cape II, Pt. II
- Innes R. T. A. 1927, *Southern Double Star Catalogue, -19° to -90°*, Union Observatory, Johannesburg, South Africa
- Jeffers H. M., van den Bos W. H., Greeby F. M. 1963, *Index Catalogue of Visual Double Stars, 1961.0*, Publ. Lick Obs., 21
- Struve F. G. W. 1827, *Catalogus Novus Stellarum Duplicium et Multiplicium*, Universitatis Caesariae Dorpatensis
- Struve F. G. W. 1837, *Mensurae Micrometricae*, Petropoli
- Worley C. E., Douglass G. G. 1984, *The Washington Visual Double Star Catalog, 1984.0* (available on tape and CD-ROM)
- Worley C. E., Douglass G. G. 1997, *A New Edition of the Washington Double Star Catalog*, *Baltic Astronomy*, 6, 300