I. GENERAL REVIEWS AND SURVEYS

INTRODUCTORY ADDRESS

Mirek J. Plavec
Department of Astronomy, University of California
Los Angeles

Four years ago, in 1975, we met in Cambridge, England for our first IAU Symposium devoted entirely to binary stars. Most of the talks given there were theoretical, and at the end some of us felt that it would be appropriate to organize yet another Symposium soon, this time oriented more towards observations and their immediate interpretation. This is why we have come together here in Toronto. Four years is not a long interval of time, and few disciplines of astronomy repeat their Symposia on such a short time scale. While the need for another Symposium was clear to the binary stars investigators, it is not so obvious to other colleagues. We must therefore be very grateful to the Executive Committee of the International Astronomical Union for their great understanding of our needs. This understanding went far beyond approving and sponsoring this meeting: We have received a substantial financial assistance, which all went to the support of the travel expenses of some of the participants. Many more travel grants were possible thanks to a most generous support by the University of Toronto. I would like to thank both institutions.

Four years ago I said in Cambridge that the choice of the place had been most appropriate for a meeting dealing with the structure and evolution of stars: there certainly exists in Cambridge a *genius loci* maintaining the tradition of such studies. It is again not a mere politeness when I say now that the choice of Canada, and specifically of Toronto, is equally fortunate and symbolical for a meeting intended to deal mainly with observations. The tradition of Canadian astronomy is rich with work on binary stars and related subjects, and Toronto certainly shares with Victoria a prominent place in this tradition. Let us remember at least a few names of those who not long ago would have been among us here: Robert M. Petrie, John F. Heard, Ruth Northcott, and Carlyle S. Beals. It is so very sad to miss them here... Fortunately, Canadian astronomy continues to flourish in many disciplines, including binary star astronomy, and this makes our stay here doubly pleasant.

I am not sure that Dr. Beals -- who to our sorrow passed away just

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a few weeks ago -- ever considered himself an investigator of binary stars. Probably not. Yet his important work on early-type stars with emission lines has become a vital part of our effort to understand interacting binary stars. I think we can say that the discipline of binary star studies has, in the past decade or two, considerably overflown its original boundaries. In a recent textbook on Astrophysics and Stellar Astronomy, the discipline of binary stars is introduced as one of the "service" areas of astronomy, i.e. "areas whose main importance lies in the gathering of data for other areas". There is no doubt that studies of simple, detached binary systems provide most of the fundamental data on stellar characteristics, and it would be hard to overestimate the value of this service to astronomy. In general, however, I am of the opinion that we supply astrophysics more with problems and less with data. Perhaps our discipline is like the various service areas I had to deal with, for example with my car, where they fix a few troubles and at the same time create a few new ones.

I think that it is the most attractive feature of binary systems that they create the most puzzling, exciting and interesting objects in astrophysics. It appears that without interacting binaries, we would hardly enjoy the spectacular phenomena of novae, dwarf novae, symbiotic variables, of most if not all Wolf-Rayet stars, and of course of all the beautifully regular, interestingly distorted, or outright weird eclipses! Most of the complex phenomena we observe are somewhat related to mass transfer or mass loss in interacting systems. It is hard to believe that it has been only 12 years since the topic of mass transfer was first discussed at a scientific meeting (at Uccle in 1967). (I do not claim that the discipline was born there; there were some early pioneers, for example Donald Morton and Joe Smak, who are with us here, who made some first calculations several years before that, and many observers and theoreticians well before them again who pointed the way). Nevertheless, over the past twelve years the concept of mass transfer and mass loss expanded so much and enveloped so may different objects that we can say with confidence that this concept has become of the most fruitful ideas in astrophysics ever conceived.

Combined with this victorious campaign of theoretical explorations is the enormous progress of observational methods, including X-ray studies, far ultraviolet spectroscopy, radio observations, high time-resolution photometry, and great advances in the spectroscopy of the optical spectral region, and the infrared. This brought so many participants to this Symposium, and created an unusually heavy demand on time. We had to ask most of the contributing speakers not to exceed ten minutes, which certainly is a very restrictive rule. I think I must abide by it myself, and conclude this Introduction as fast as possible.

Permit me to make only two brief comments in the hope that they may be useful in the subsequent talks and discussions, since they are meant to clarify a bit of terminology. There is an endless confusion in the use of the terms primary and secondary for the respective components of binary systems. The primary star may be either the one of greater surface brightness, or greater visual magnitude, or greater bolometric magnitude, or larger current mass, or larger initial mass, etc. Since in most cases we will be dealing with mass transfer and mass loss, I propose that we label the components simply the loser and the gainer, respectively, thereby often evading the confusion. You will hear papers here claiming that most mass leaves the system rather than being captured by the gainer. This does not affect my proposed scheme. It simply means that we might often have the Las Vegas type of mass transfer, where the losers lose a lot while the gainers gain very little.

My second comment deals with the classification of eclipsing binaries. The old scheme distinguishing the Algols, β Lyrae stars, and W UMa stars is clearly obsolete. It was based on the outward appearance of the light curve in the visual or photographic domains. Long ago Kopal (1955) and myself (Plavec, 1964) argued that this scheme is misleading, since it lumps together systems of a very different character and evolutionary stage. Kopal showed that the constant light between eclipses, typical for the Algol class, disappears in actual Algols if we go sufficiently far to longer wavelengths to make the light of the distorted loser perceptible. Then these stars, including Algol itself, become β Lyrae objects. Perhaps for the sake of cosmic justice, it appears now that -- from the evolutionary point of view -- β Lyrae is probably an Algol-type system!

I think that the two classes, the Algols and the W UMa systems, have survived the test of time and should be preserved but partly redefined. The term Algols should describe systems which underwent the first phase of mass transfer, are now semi-detached, and the less massive component is of later spectral type. W UMa stars are contact systems of short period and with spectral types F or later (the spectral boundary may be disputable here). The β Lyrae class is in my opinion useless and produces only confusion. The old classification criterion of a marked ellipticity effect between eclipses was done away with by Kopal. β Lyrae, though not unique (see my talk at this Symposium), is sufficiently exotic and cannot be invoked as a prototype of a large class of systems. Our criteria should in the first place be based on structure and evolution.

It is time to start the regular session. Let me welcome most cordially all the participants, and express our thanks to our hosts for organizing this meeting.

REFERENCES

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