

## PREFACE

The organization of this Symposium had its beginnings at the International Astronomical Union General Assembly in Grenoble in 1976. The initial "rounding up" of the Scientific Organizing Committee was begun by Drs. Snow and Swings; most of us who became the eventual organizing committee met a few times during the Assembly and formulated the essential outlines of the meeting. Extensive correspondence with all the committee subsequently established the program. The idea was to bring together both observers and theoreticians to discuss the stellar winds and mass loss rates and their effects on evolutions of O-type stars.

On the observational side, there are now spectroscopic data from the far UV to the near IR regions concerning the stellar winds. There is also information about the free-free emission in the wind from the IR and radio portions of the spectrum. Fortunately, these different detection methods give more or less the same mass loss rate for the one star,  $\zeta$  Pup,, which has been observed at all wavelengths. One of the intents of the first three sessions of this Symposium is to outline the existing data on mass loss rates as it pertains to the O-type stars.

While there is some reasonable agreement about the mass loss rates observed in a few stars, there is not yet a consensus about the physical cause for very extensive stellar winds that are found. A panel discussion was suggested for Session 4 as a means by which the conflicting points of view on this problem could be addressed. The Organizing Committee made up a series of questions in advance, listed in Session 4, which it wished the protagonists of the various stellar wind theories to address. This theme of confronting the existing data was a reasonable success as may be judged by the contributed papers. There was agreement that the high terminal velocities observed are caused by radiation pressure, but apparently heating is present and is not understood. Observations from the forthcoming HEAD-B X-ray satellite will nicely confirm or eliminate one of the current theories for explaining the high ionization state.

A few detailed theoretical contributed papers are contained in Session 5, along with some results on binary stars, our only source of masses. The data are still rather skimpy, especially for Of stars which appear to be losing mass at the highest rates.

Sessions 6 and 7 are concerned with the theoretical considerations of evolution of O-type stars when mass loss is taken into account. Several indirect arguments about mass

loss are also presented there. Perhaps the most interesting general result is that the subsequent stellar evolution is very sensitive to the mass loss rate; factor of two differences either have little or no effect, or peel a star down to a helium core. Unfortunately, the actual mass loss rates for most stars are not known that accurately.

The final session is concerned with the descendants of the O-type stars, the WR objects, both from an observational aspect and from a theoretical one. A major problem, never really addressed during the Symposium, is the question of why these stars have mass loss rates appreciably larger than the most luminous O types; it does not appear possible that this is only due to radiation pressure.

In the very beginning of organizing the Symposium, it was decided to limit the subject to the O stars themselves. There was not enough time to address several related topics concerned with the mass loss and evolution. The stellar wind certainly has an effect on the surrounding interstellar medium due to its pressure effects, leading to stellar "bubbles", and to the possible initiation of subsequent star formation in adjacent molecular clouds. It also appears that if O-type stars lose an appreciable fraction of their mass while core hydrogen burning, their subsequent behavior as a supernova and a supplier of heavier elements to the galactic interstellar medium is greatly modified. The role of stellar winds in the production of X-rays in those close binary systems with collapsed companions also could not be addressed with the time available. Any or all of these broad themes resulting from the ubiquitous presence of stellar winds in O-type stars could well be a topic for future Colloquia or Symposia.

Practically all the invited contributors have presented camera-ready manuscripts which are contained in these Symposium Proceedings. Slides shown during the meeting were nicely handled by Mr. Ray Carlberg. The discussions were recorded on tape with the able assistance of Mr. R. Scholes; the participants also usually wrote down what they thought they said immediately after the session. Although these written comments form much of the discussions, a substantial fraction was taken verbatim from the tapes. In all cases, the participants had a final look at what they really had said and were able to make final corrections. In a few cases the Editors have eliminated extraneous questions or comments, but the transcript is otherwise reasonably verbatim. With some effort the Editors were able to resist listing "laughter" or "uproarious laughter" at a number of places in the discussions: These are best left to the reader's imagination.

Generally speaking, P.S. Conti was responsible for the preparation of the first half of the Proceedings and C. de Loore for the second part. In JILA, we were ably assisted in the preparation of the discussion sessions from the tapes by Ms. Krog and Ms. Briggs; the camera ready copy of the discussion, and some editorial work on several contributions was typed by Ms. Romey and ably organized by Ms. Volsky. At the Astrophysical Institute of the Vrije Universiteit at Brussels the discussion sessions from the sheets and the tapes was prepared and typed by Ms. Michiels. We would like to thank Dr. Werner Zits for assistance in interpreting parts of the General Discussion following Session 4 and David Van Blerkom for contributing the limericks.

The presence of participants from a number of institutions and countries was greatly aided by financial assistance from the International Astronomical Union and from the National Research Council of Canada. The Scientific Organizing Committee is greatly indebted to Drs. Cowley and Hutchings for the local arrangements of the meeting which was in most pleasant surroundings. The Symposium took place at the Qualicum College Inn, a rustic resort overlooking the beach and the Georgia Straits from Vancouver Island. The weather was invariably pleasant, greatly facilitating the outdoor interactions possible in a clement location. The night before the Symposium began it was noticed by all astronomers that a "close encounter" between Mars and Saturn was occurring in the sky. The Symposium Astrologer, Dr. Tony Hearn, was able to interpret this event as fortelling a few days of "war", followed by a peaceful ending and reconciliation. From the discussion sessions it may be observed how well this prediction was borne out.

The Editors