

## FOREWORD

Red-giant stars display fascinating physical processes and regimes -- among them double-shell nuclear burning, complex mechanisms of convection and mixing, such peculiarities in surface chemical composition as enhancement of carbon and s-process elements, extended photospheres, pulsations, light variability, shocks, chromospheres, grain formation, circumstellar envelopes, and mass loss -- a wonderful variety of unusual natural experiments. At the same time the most evolved of these stars stand poised to shed their remaining envelopes as planetary nebulae -- indeed, some have already done so -- and enter a long cooling phase as white dwarfs.

This book reports the proceedings of Colloquium 106 of the International Astronomical Union, which considered red giant stars, focusing specifically on the chemically peculiar red giants. It was held July 27-29, 1988 at Indiana University, with its own long tradition of research in red-giant stars. The spacious Indiana Memorial Union Building provided a comfortable and stimulating setting for the conference.

Arising from a suggestion of the Working Group on Peculiar Red Giant Stars of IAU Commission 29, the conference was endorsed by the presidents of IAU Commissions 27, 29, 35, 36, and 45. We are indebted to the Chairpersons of these commissions -- Bela Szeidl, Guisa Cayrel de Strobel, Daiichiro Sugimoto, Keiichi Kodaira, and Robert F. Garrison, respectively -- for their foresight and timely support. Originally conceived as a sequel to the 1984 Strasbourg meeting on "Cool Stars with Excesses of Heavy Elements", the conference assumed a broader perspective and became in effect a continuation to several recent significant conferences. Interest in the late stages of stellar evolution continues at such a pace that frequent meetings are important to maintain community among workers.

Our goal was to trace and explain the evolutionary status and history of the many groups of peculiar red-giant stars, such as M, MS, S, SC, C, Ba, R, and CH stars. In particular, we were interested in discussing the properties -- luminosity, temperature, composition, binarity, and galactic distribution -- of each group of stars and then relating these to initial mass and composition.

Generous financial support by the International Astronomical Union helped provide travel assistance for several scientists. That support was a necessary and deeply appreciated part of the meeting, and the resulting international flavor of the conference was evident. Derek McNally, Assistant General Secretary of the IAU, was encouraging and helpful. Indiana University's office of Research and Graduate Development contributed significantly to the conference by a large grant, for which we thank its director, Morton Lowengrub (now Dean of the College of Arts and Sciences), who also officially opened the conference.

Meetings do not plan themselves. The Scientific Organizing Committee consisted of Michael Feast, Bengt Gustafsson, Carlos Jäschek, Hollis Johnson (Chairman), James Kaler, Robert McClure, Alvio Renzini, Vitautas Straizys, Allen Sweigert, Takashi Tsuji, Peter Wood, and Ben Zuckerman. Many suggestions regarding topics and speakers came from this group, and they are in large measure responsible for the excellent scientific content of the meeting. The hard-working Local Organizing Committee, headed by Kent Honeycutt, consisted of Haldan Cohn, Richard Durisen, Hollis Johnson, Paula Jentgens, Phyllis Lugger, and Karyl Robb. All conference participants benefited from the excellent arrangements.

The Conference Bureau of Indiana University and its representative, Karyl Robb, managed smoothly many details of the meeting. Much of the typing and mailing was handled by the secretaries of the Astronomy Department, Paula Jentgens and Brenda Records. Many graduate students pitched in to help with transportation, audio-visual equipment, and many other small and large tasks.

Richard Durisen, Chairman of Astronomy, was strongly supportive. Icko Iben entertained the participants with his after-dinner speech. Ann Honeycutt, Barbara Burkhead, and Grete Johnson helped spouses enjoy the event. Thanks to all!

These proceedings follow the format of the meeting; each (half-day) session begins with four invited papers and concludes with poster papers. Chairpersons of the five sessions of invited papers and discussion were R.F. Wing, M.S. Vardya, C. Chiose, V. Straizys, and J.B. Kaler, respectively. The full text of the invited papers and an abstract of all contributed papers are printed. A few short papers selected by the editors have also been included. Finally we present the full transcript of the final lively panel discussion. We hope this volume will be of substantial value in furthering interest and research on the evolution of the peculiar red-giant stars.

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Hollis R. Johnson

Ben M. Zuckerman