

THE EDDINGTON MEDAL

CUSHIRO HAYASHI

The Council has awarded the Eddington Medal of the Society to Professor Cushiro Hayashi of the University of Kyoto, in recognition of his work on the pre-main sequence phase of stellar evolution, now known as the 'Hayashi Phase'.

Hayashi's work on stellar evolution has been, and still is, of the highest quality. Working in Japan with just a small group of collaborators he approached the subject with a unique combination of mathematical and physical insight, that enabled him to determine the essential features of stellar evolution without getting lost in a maze of computational detail. This approach enabled him to extend our knowledge of stellar evolution in the very advanced stages and the very early stages, as well as to increase our understanding of other phases in the evolution of a star. His article in *Supplement of the Progress of Theoretical Physics* (with Hōshi and Sugimoto) stands as a reference work in this field with an amazing wealth of information and new results.

As part of this whole investigation Hayashi and his collaborators developed, in a simple way, the surface boundary of stars, particularly for late-type stars with surface convective zones. In a penetrating and simple paper published in the *Proceedings of the Astronomical Society of Japan* in 1961, he applied these results to young contracting stars in the pre-main sequence phase and demonstrated that there existed a region in the Hertzsprung–Russell diagram in which stars could not exist, and that young stars should be fully convective and very luminous in the early stages. In the same paper he constructed detailed models of the whole contraction phase of stellar evolution, with fully convective, composite and radiative models, and showed that the contractional phases were shorter than had previously been calculated.

This paper has generated a whole sequence of similar investigations of greater detail and complexity, but the original breakthrough was due to Hayashi, and it is for this work that we honour him with the Eddington Medal of our Society.