10. RESULTS FROM AN ANALYSIS OF THE RADIAL VELOCITY CURVES OF RR LYRAE

By A. Van Hoof

A modified Baade procedure, applied to Struve and Blaauw's* determinations of radial velocity and of spectral type and to Walraven's† light curve yielded for this star a median radius

$$\overline{R} = 2{\cdot}0 \times 10^6 \text{ km.} \pm 0{\cdot}06 \times 10^6 \text{ km. (m.e.).}$$

The median thickness of the atmospheric layer that is limited by the representative level of the $H_{\beta, \gamma, \delta}$ lines at the top and by that of the metallic lines at the bottom was found equal to

$$\delta = 0{\cdot}14 \times 10^6 \text{ km.} \pm 10\% \text{ (estim. m.e.).}$$

Conclusions

1. The star now appears to obey rather well the empirical relation

$$\overline{R} = 4 \times 10^6 \times P_{\text{days}} \text{ km.}$$

found to exist for cepheids with $P > 1$ day. If this holds for the other cluster variables, the period-luminosity law simply expresses a radius-luminosity law and is in fact equivalent to

$$L \sim R^2 T_{\text{eff.}}^4$$

from which it is immediately deduced when the period-spectrum relation is taken into account.

2. With $\overline{R} \sim P$, $P\sqrt{\rho} = \text{const.}$ reduces to $\frac{\mathfrak{M}}{\overline{R}} = \text{const.}$ which makes the period-luminosity law equivalent to the mass-luminosity law for cepheids and moreover implies the same central temperature for all cepheids. But the validity of $P\sqrt{\rho} = \text{const.}$ becomes questionable.

3. The amplitude of the pulsation in the layer considered amounts to 100% of the average layer thickness; the velocity of propagation of the compression wave in it is supersonic (30 km./sec. against 10 km./sec. for the velocity of sound).

4. It is tempting to think of the pulsations as originating, not at the centre of the star but in a spherical stratum far from the centre. This might explain the occurrence of secondary maxima beat periods and perhaps even the gaps in the frequency function of the periods.

11. SPECTROSCOPIC CHARACTERISTICS OF THE CLUSTER-TYPE VARIABLES

By Wilhelmina Iwanowska, *Astronomical Observatory of N Copernicus University, Toruń, Poland.* (*Presented by* O. Struve)

The cluster-type variables deserve particular attention since they are connected with two problems of fundamental importance: the phenomenon of pulsating stars and the existence of different subsystems or populations of stars in our own and other galaxies. On the other hand there are some obscure points in our understanding of the physical and dynamical properties of this group of stars as, for instance, their failure to give a period-spectrum relation or to obey the proper period-density relation. With this in view Dr Struve suggested to me during my stay at the Yerkes and McDonald Observatories to undertake a comparative spectrophotometric investigation of a series of these stars. The spectra of nineteen galactic cluster-type variables in different phases and those of twenty standard non-variable stars of early spectral class have been photographed by

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