rigorous calculation of the structure of model atmospheres, assumed to be in radiative equilibrium. The method is based on the use of tables facilitating the calculation of mean intensity and net-flux in stellar atmospheres. Methods of calculation of the continuous spectrum and absorption lines were discussed, and a numerical iteration method of solution of K. Schwarzschild's integral equation for the problem of the absorption lines, based on the above-mentioned tables, was illustrated by an example. Applications of the methods outlined to solar and stellar model atmospheres were mentioned.

Some of the possibilities of future work in this field were briefly discussed. Among the problems mentioned were those of the blanketing effect, of non-coherent scattering in absorption lines, of the theory of subordinate lines, of the possibilities of the curve of growth method, of the effects of electron scattering, and of the theory of convection in stellar atmospheres.

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Struve, Otto. Peculiar H lines in the spectrum of RR Lyrae and some comments on the problem of Cepheid variation.

In September, 1946, at a conference at the Leiden Observatory Miss H. A. Kluiver¹ described recent results by L. Detre² on the light curve of RR Lyrae and requested that radial-velocity determinations be made covering the entire 41-day cycle of the secondary light variation. This long period, as contrasted with the principal period of 0.567 day, is associated with the names of Russell, Shapley, Hertzsprung, Prager, A. de Sitter, and others. It has received little attention from spectroscopic observers. Between June 3 and July 15, 1947, I secured at the McDonald Observatory nearly 400 spectrograms of the variable, using the Cassegrain quartz spectrograph with 500 mm camera which gives a linear dispersion of 40 Å/mm at $\lambda 3933$. The exposure times ranged from 1 minute to 1 hour.

One of the first results was the discovery of peculiar hydrogen-line contours, on the ascending branch of the light curve. On June 5 and 6, at approximately the time of median increasing brightness, the lines $H\gamma$ and $H\delta$ consisted of exceedingly narrow and weak absorption cores resembling the hydrogen lines in certain shell-type spectra. These cores were bordered on the violet side by a strong, but narrow, emission line.

A very faint red emission border may also have been present. This structure was superposed over an exceedingly broad and peculiarly shallow absorption line. The entire phenomenon lasted only about 20 minutes. Prior to it the H lines were fairly strong and fairly narrow, being more or less normal for a high-luminosity spectrum of type F. Afterwards they were strong and broad, being normal for an A-type star of average luminosity.

This remarkable phenomenon was observed on all available occasions throughout the 41-day cycle. It became less conspicuous in the middle of June, and disappeared completely in the latter part of the month. In this stage the narrow lines of type F became rapidly converted into the broader ones of type A, without passing through the peculiar stage.

Early in July the peculiar contours of the H lines again became easily observable and by July 15 the entire phenomenon closely resembled that of June 5. A correlation with phase in the 41-day cycle is strongly indicated.

Unpublished results of photoelectric observations by Walraven at Leiden and of photographic observations by Detre at Budapest agree in placing the maximum of conspicuousness of the peculiar H -contours (June 5) somewhere near Detre's phase $\psi = 0.2$. This corresponds to the time, within the 41-day cycle, when the range of light variation is increasing (being about halfway between minimum range and maximum range) and when the time of median increasing brightness has its greatest positive displacement from the mean light curve. It does not coincide with the time the curve has its steepest rising branch.

The time of greatest development of the peculiar contours within a single cycle of 13.6 hours seems to undergo a slight variation within the 41-day cycle. In June it seemed to coincide with the time of median increasing brightness. When the phenomenon reappeared early in July it occurred about 20 minutes earlier, provided the phases were computed with a mean period. It is probable that this variation is identical with the shift in the light curve between Detre's phases $\psi = 0.8$ and $\psi = 0.2$. Hence, the physical phenomenon in the atmosphere of RR Lyrae probably took place at the same point on the instantaneous light curve.

On one occasion I succeeded in obtaining a fine series of short exposures throughout the critical stages. The succession of changes may be de-