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This theory is capable of considerable adjustment⁹ to meet varying demands, and suggests future types of variations that should be discovered.

The third hypothesis ascribes the wide character of the lines in these stars to anomalous dispersion effects. The calcium lines are sharp and narrow, due to the small traces of these elements existing in the star's atmosphere. It is not intended to pass on the merits or demerits of this theory, but the fact that it does not satisfactorily account for the periodicity in the radial velocities has prevented its receiving wide acceptance.

⁹Ap. J. Vol. XXXVI1, p. 1, 1913.

SUMMARY.

1. An orbit has been determined from 88 measures of radial velocity of χ Aurigae.

2. The amplitude shown by the calcium lines is about one-half that for the other lines of the spectrum.

3. An analysis of the different cases so far known where the calcium lines behave differently from the other lines shows that the phenomenon is one of type, and is best explained by the presence of calcium in a cloud surrounding the binary. The absorption of calcium takes place at a much higher level than that of the other elements.

4. The residuals given from the simple elliptic orbit were examined to ascertain if there might be a third body present. No secondary period was found, but the star should be observed with higher dispersion to test this point further.

5. The method of detecting periodicity in a set of observations from a consideration of the distribution of the velocities was tested. The value of this method is greatly interfered with by the effects of errors of measurement. If the ratio of error of measurement to range in the binary is as great as one-fifth, the resulting distribution of velocities is very much the same as would result from errors alone. If the ratio is as large as onethird, the distribution is almost identical. It is in these very cases that the method is most likely to be needed.

Dominion Observatory Ottawa June, 1916.

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