the structure of the set of interval-differences characterizing a configuration-sequence, and have successfully applied it to the sequence $(1s^2)(2p^2)$.

This method, moreover, may be used to predict patterns of term structure in individual atoms. The crux of the method lies in the construction of analytic one-electron wave functions of a very general form. The $1s$, $2s$, and $2p$ wave functions are as accurate as the corresponding numerical wave functions of Hartree and Fock. The variational wave functions are used as the basis for a perturbation treatment, which can be carried out to any desired degree of accuracy.

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McLaughlin, Dean B. The Be shell star β^1 Monocerotis.

Among the bright Be stars on the Michigan program, excluding the binary ϕ Persei, β^1 Monocerotis is unique in being both a "shell" star and a conspicuous V/R variable. It is, therefore, of special interest to compare its changes with those of V/R variables that have weak absorption.

Although emission is very strong at $H\beta$, strong at $H\gamma$, and conspicuous at $H\delta$, all absorption lines give accordant velocities except $H\beta$ and occasionally $H\zeta$. With these excluded, the velocities since 1924 show smooth variation with a rough period of 12.5 years and range $+9$ to $+43$ km/sec. Maxima occurred in 1933 and 1945. $H\beta$ ranges about 55 km/sec, probably due in part to "crowding" by the stronger emission. Such crowding is evidently absent even at $H\gamma$ which agrees with higher Balmer lines. Deviations of $H\zeta$ are always negative and are attributed to blending with $\lambda 3889$ He I.

Differences between the two observed cycles show that large effects other than those of orbital motion are present. From 1905 to 1914 the velocity was constant, about $+23$ km/sec, and V/R constant at 1.0. It is concluded that recent variations are due wholly to the shell, and not to orbital motion.

The ratio V/R, the absorption velocity, and emission velocity from the mean of the outer edges are closely correlated in the same manner as in 25 Orionis¹ and π Aquarii.² The entire emission oscillates with the absorption, which remains nearly central. Minimum and maximum velocity are associated with minimum and maxi-

mum V/R. The outer emission edge toward the red has much larger amplitude than the absorption, the violet edge a lesser amplitude, the mean about equal to that of the absorption and in the same sense.

The shell absorption faded from 1938 through 1941 and recovered from 1942 to 1945. Its near disappearance late in 1941 occurred with V/R = 1, and radial velocity near the mean, both increasing. Absorption was well below normal strength in 1928, at a phase corresponding to the decrease. Such change may be a normal event of the cycle, and should be watched for within the next few years.

Interpretation of variations in terms of motions in a shell or ring would require total displacements of several astronomical units. However, rotational widening of the emission shows that it must originate wholly within about 0.3 astronomical units of the star, for any reasonable stellar mass.

1. Dodson, *Ap. J.* **84**, 180, 1936.
2. McLaughlin, *Pub. Obs. Univ. Michigan* **4**, 37, 1931; *Ap. J.* **77**, 221, 1933.

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Mayall, Margaret W. AE Aquarii.

AE Aquarii (203501) was put on the A.A.V. S.O. observing list about 3 years ago, and since then has been observed by a number of members. The variable has been classed as U Geminorum-type, with outbursts every 7 or 8 days. Its radial velocity is variable, with a period of 0.70 day. The A.A.V.S.O. observations show a number of maxima a little over one day apart, about 1904, but they do not recur regularly enough to consider the star periodic. More observations are needed, especially with photo-electric equipment.

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Miller, Freeman D. A comparison of star counts in the photographic and photo-red magnitude systems.

Galactic density gradients deduced from conventional analysis of general star counts according to photographic magnitude can be checked by parallel analysis of a set of companion counts on the photo-red system. This procedure has been applied to an area at the north celestial pole, where the necessary magnitude standards are well established, and the interstellar absorp-