points obtained from the observed profiles, for which the slopes in arbitrary units are

Minimum Radial Velocity: $a = +0.182 \pm .012$

Maximum Radial Velocity: $a = -0.041 \pm .012$

For a purely symmetric curve, $a = 0$. Since a changes sign with the radial velocity in accordance with theoretical expectations, I conclude that the asymmetry is real and that these results indicate the validity of the pulsation hypothesis.

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Sawyer, Helen B. Variable stars in the globular cluster NGC 6838.

The cluster NGC 6838, Messier 71, in Sagitta, is one of the most interesting globular clusters because, although bright and relatively near, it has been ranked as a globular cluster for only five years. Projected against a rich Milky Way field at galactic latitude -6° , it was for many years considered a galactic cluster. The color-magnitude diagram observed by Cuffey in 1943, and Mayall's conclusion in 1946 from his radial velocity determination and the appearance of the cluster on Crossley plates, resulted in its being included in the globular list in 1947.¹

Because of the early uncertainty as to its proper classification, it seemed to the writer to be an important cluster in which to hunt for variables. Accordingly in 1947 it was placed on the cluster observing program for the 74-inch David Dunlap reflector, and 87 plates have now been secured with that instrument. About 20 pairs of plates have been blinked for variables.

Two interesting variables were already known within the cluster limits, but these had not been published as associated with the cluster. Within the visible limits of the cluster this investigation at the David Dunlap Observatory has added two variables to the two already known. The cluster is therefore not rich in variables, but those present form an interesting assortment, well worth further study especially with a spectrograph which could reveal whether they are cluster members or field stars. The mean magnitude of the 25 brightest stars is 14.8; judged by their magnitudes, the variables could be actual cluster members.

Of the two new variables one is an eclipsing star whose period is not longer than several days. The eclipsing star is one component of a fairly close double which is resolved under good seeing conditions. The range is about two magnitudes, from 15.1 to 17.0. Because eclipsing stars are

virtually non-existent in globular clusters, it will be very important if the spectrograph can show this to be an actual cluster member. The second variable is of small range, about half a magnitude, and probably a cluster type Cepheid. The two known variables, Z Sagittae and Baade 48,² have slow light changes and ranges of over a magnitude, reaching the thirteenth magnitude at maximum. Series of plates numbering 32, taken with the 19-inch telescope, show periods of more than 100 days; further series are needed to show the amount of regularity and actual periods.

There are a number of variables in the field surrounding the cluster, some published and some marked as suspects by Mr. Ivan King who has kindly supplied me with his data. This cluster will be kept under investigation until some definitive periods have been obtained.

1. H. B. Sawyer, *Pub. David Dunlap Obs.* No. 20, 1947.

2. *A. N.* 232, 65, 1928.

*David Dunlap Observatory,
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Sen, Hari K. Solar noise storms and plasma oscillations.

"Noise storms" are short-lived bursts, of narrow band width, that occur in large numbers during periods of high solar noise intensity.¹ They are circularly polarized and associated with sunspots. With a view to elucidating this phenomenon, the author has considered the plasma oscillations in a system of electrons gyrating around a static magnetic field. Malmfors² first considered this problem. He obtained unstable oscillations and pointed its application to solar radio noise. Gross³ has, however, questioned Malmfors' result and derived a different dispersion relation from the consideration of the Boltzmann equation in a magnetic field. The author has considered the problem 'de novo' by Landau's operational method.⁴ His analysis confirms Gross's dispersion equation. He does not, however, get gaps in the frequency spectrum at multiples of the gyrofrequency that have been obtained by Gross. His analysis confirms Malmfors' conclusion of instability of oscillations in frequency bands around multiples of the gyrofrequency. A numerical application to spot magnetic fields at coronal distances indicates sufficient amplification to make plausible the theory of the origin of solar "noise storms" in plasma oscillations of electrons gyrating around the magnetic field of sunspots.