

Object NGC 5694 a Distant Globular Star Cluster. By C. O. Lampland and C. W. Tombaugh.

A new member has recently been added to that small select group of objects, the globular star clusters, observed on photographs taken with the 13-inch Lawrence Lowell telescope and the 42-inch reflector. This object carries the number 5694 in *Dreyer's* New General Catalogue of Nebulae and Clusters of Stars. Its stellar character has apparently not been previously detected.

The discovery of the new globular cluster is a by-product of the extensive photographic survey of zones along and parallel to the ecliptic being carried on by Mr. *Tombaugh* with the new Lawrence Lowell photographic telescope. In his careful Blink-comparator examinations of the photographs many faint nebulae have been detected which do not appear in the published lists and catalogues, and of special interest among these are several clusters of very faint extra-galactic nebulae. The lens gives excellent definition over a wide field, and the small and sharply defined images make it possible to distinguish very small nebulae from the faint stars. The present globular cluster as shown on the photographs with the 13-inch telescope may be described as Class I in *Shapley's* system of classification — the highly condensed type of cluster. On these photographs the image is so small and condensed that it could not be definitely recognized as a globular cluster but its stellar nature was suspected. A photograph with the 42-inch reflector by Mr. *Lampland* brought out clearly that the object was a condensed globular star cluster.

In *Dreyer's* New General Catalogue of Nebulae and Clusters of Stars this object carries the following numbers and description:

NGC 5694; GC 3954; JH 3576; WH II 196 *cB*, *cS*, *R*,
psbM, *r*, *9.5 *sp*

Reference to *Herschel's* original list shows that he first observed the object on May 22, 1784.

The following position of the cluster was measured on a 42-inch reflector plate, referred to three comparison stars from the Cordoba Astrogaphic Catalogue:

RA. (1900) Decl. (1900)
1932 June 8 14^h33^m47^s.8 -26°6'27"

Photographs of the cluster with exposures of one hour on Eastman 40 plates were made with the 42-inch reflector on June 8, 23, and 25. A Blink comparator examination of these photographs did not give any certain evidence of variability of the cluster stars but it is quite possible that observations with a more powerful instrument will be required for this part of the problem.

Angular Diameter. The angular diameter of the cluster on the 42-inch reflector plates is about 45 seconds of

arc for the central denser part. For the extreme diameter any estimate from the available material is likely to be somewhat uncertain; it may exceed 90 seconds of arc. Much longer exposures with the largest telescopes may show a considerable increase in the diameter in recording more of the fainter outlying stars a considerable number of which appear to be feebly shown on the present plates.

Integrated Magnitude. A quantitative determination of the integrated light of nebulae and clusters is a troublesome problem. For small objects similar to the one here in question the estimated brightness will be much influenced by the instrument used, speed of plates, and exposure times. Integrated magnitude estimates of NGC 5694 for different photographs taken with apertures ranging from one inch to 40 inches may be given as magnitude 7.5 or brighter, or as faint as magnitude 11 or fainter. We have available for these brightness estimates photographs with the 42-inch Lowell reflector, the 13-inch Lawrence Lowell telescope, the 5-inch Cogshall camera (the last two lenses are of the Cooke Astro type, ratio 4.5 both giving excellent definition over a wide field), a reproduction of a photograph with the 10-inch Franklin-Adams camera of the Union Observatory, the »Harvard Sky« charts (negative glass plates, double contact copies from the originals at Harvard College Observatory). The larger apertures give considerably brighter integrated magnitudes, a result to be expected. To facilitate brightness estimates and to make the results more comparable as dependent upon the scale some of the observations were made with the 42-inch reflector and 13-inch Lawrence Lowell photographs reduced to the scale of the smaller instruments. With such a reduction of the large scale photographs the increased brightness of the cluster as compared with the images of the smaller instruments becomes still more evident. The estimated brightness depending upon the instrument used may be more than three and a half magnitudes. There appears to be no difficulty in accounting for the considerably greater brightness on the reflector photographs as the much larger aperture records more of the faint outlying stars.

Approximate estimates of the brightness of the cluster are as follows:

42-inch Lowell reflector	7 ^m .5 (or brighter)
13-inch Lawrence Lowell telescope	9.3
10-inch Franklin-Adams camera	10.1
5-inch Cogshall camera	10.4
1-inch »Harvard Sky« camera	11 (or fainter)

Lowell Observatory, Flagstaff, Arizona, 1932 July 5.

Carl O. Lampland, Clyde W. Tombaugh.

Bemerkung über das Spektrum von γ Cassiopeiae.

Herr *O. Struve* bemerkt in AN 5886, daß die Breite des Kernes der Linie H_{α} im Spektrum von γ Cassiopeiae nach Messungen von *Merrill* und *Curtis* viel geringer ist, als aus unseren Messungen folgt. Es möge dazu hier bemerkt werden, daß bei unseren Messungen die Breite der ganzen Linie H_{α} (mit Flügeln) gemessen ist. Vielleicht ist diese Breite aber mit den Breiten von H_{β} , H_{γ} und H_{δ} nicht vergleichbar, da diese

Linien keine Emissionsflügel zeigen. Nach dieser Sachlage ist es wohl möglich, daß aus dem Vergleich der Breite von H_{α} mit der von H_{β} , H_{γ} und H_{δ} keine Schlüsse über die Richtigkeit der Doppler-Effekt-Hypothese gezogen werden dürfen.

Kolhoz Merewo bei Leningrad, 1932 Juli 25.

N. Kosirev und V. Ambarzumian.

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