

ertheless, five plates were obtained between October 22, 1940, and January 2, 1941, of which the last two are reproduced in Plate VIII. The plate of December 18 is a 30-minute exposure on an Imperial Eclipse plate (H&D 1200), and the January 2 plate is a 15-minute exposure on an H α plate (panchromatic). All plates were taken with an 8-inch flat-field Schmidt camera,¹ constructed by the writer.

The December 18 exposure shows that the comet had two distinct tails, one over two degrees long containing filaments, and the other less than one degree long and diffuse. The two tails persisted until after December 26, according to a private communication received from Charles and Harold Lower of San Diego, California, who obtained a plate on that date with their new 8-inch $f/1.5$ Schmidt camera. By January 2, there remained only the long filamentary tail, which can be traced for three degrees to the edge of the plate. On that date the comet was sufficiently bright to be seen with the naked eye, appearing as a hazy star of about the fourth magnitude. Unfortunately, the tail was made invisible by the presence of the moon, but was easily seen with the aid of binoculars.

LICK OBSERVATORY
MOUNT HAMILTON, CALIFORNIA
January 14, 1941

VARIATIONS IN THE SPECTRUM OF HD 108

BY P. SWINGS AND O. STRUVE

The spectrum of HD 108 (BD $+62^{\circ}2363$; mag. 7.4) has been described by J. S. Plaskett² and by Merrill, Humason, and Burwell³ on the basis of spectrograms taken before 1924. The spectrum was very interesting as it showed absorption features corresponding to type O6, together with strong hydrogen emis-

¹ *Pub. A.S.P.*, 52, 355, 1940.

² *Pub. Dom. Ap. Obs.*, 2, 302, 1924; see especially Plate I, D.

³ *Ap. J.*, 61, 408, 1925.

sion, bright He II 4686 and also bright lines of N III and C III in the region $\lambda\lambda$ 4634–4650. The bright Balmer lines could be followed in emission as far as $H\zeta$. Merrill, Humason, and Burwell noted also that D3, He I 4471, and Si III 4552 were bright. In the catalogue of Be stars by Merrill and Burwell¹ HD 108 (MWC 1) was the only Of star² included in the table; the reason for its inclusion being the presence of well-marked bright hydrogen lines which are not greatly different from those found in Be stars.

Two spectrograms of HD 108 secured at the McDonald Observatory on August 21 and November 12, 1940, show that the spectrum has changed considerably. On August 21, 1940, bright $H\alpha$ was still fairly strong and $H\beta$ had also an emission component; but $H\gamma$ appeared already as pure absorption. On November 12, 1940, the emission line at $H\alpha$ was considerably weaker and $H\beta$ appeared purely in absorption; the N III emission had also become very weak.

These observations show that the emission in HD 108 is not a permanent feature. A similar temporary character has been found for other emitting shells of Of stars. For example, HD 34656 and HD 190864 which, a few years ago, were classified among the Oe or Of stars,³ appeared to be pure absorption-line objects in 1939.⁴ Vice versa, bright $H\alpha$ which, according to Merrill,⁵ was absent in η Sagittae in 1913, was fairly strong in 1939.⁶ In view of these variations, it appears interesting to follow continuously a number of representatives of class Of.

McDONALD OBSERVATORY
November 1940

¹ *Ap. J.*, **78**, 87, 1933.

² The suffix "f" used by the Victoria observers refers to the emission at $\lambda\lambda$ 4634, 4640, and 4686.

³ *Pub. Dom. Ap. Obs.*, **5**, 99, 1931. In HD 34656, J. S. Plaskett observed that the lines $\lambda\lambda$ 4634–4640 were hovering between absorption and emission.

⁴ *Ap. J.*, **91**, 546, 1940.

⁵ *Lick Obs. Bull.*, **8**, 24, 1913.

⁶ *Ap. J.*, **91**, 546, 1940.