

A STRONG EMISSION LINE OF  $C_{III}$  IN HD 192639\*

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Recent work on the absorption O stars with emission lines<sup>1</sup> has shown that in addition to the usual bright lines of  $N_{III}$  ( $\lambda\lambda$  4634 — 4640),  $He_{II}$  ( $\lambda$  4686),  $H\alpha$  and  $H\beta$ , several other bright lines are sometimes present. These are  $N_{IV}$  ( $\lambda$  4058),  $N_{V}$  ( $\lambda\lambda$  4603 — 4619),  $Si_{IV}$  ( $\lambda\lambda$  4089 — 4116) and  $C_{III}$  ( $\lambda$  5696). A very striking selectivity is observed in these lines: for example,  $C_{III}$  ( $\lambda$  5696) may be present in emission, while the other strong line of  $C_{III}$ ,  $\lambda$  4647, is in absorption. The three O stars investigated previously were all poor in carbon: bright  $C_{III}$  was observed as a faint line only in one star, 9 Sagittae. Hence we suggested that these stars are related to the nitrogen sequence of the Wolf-Rayet stars. The same conclusion was reached for two pure absorption O stars, HD 34656 and HD 190864, as well as for P Cygni.

We have now found that the O star HD 192639, classified as O7sfk at Victoria<sup>2</sup> is related to the carbon sequence.  $C_{III}$  ( $\lambda$  5696) is the strongest bright line in the spectrum and it has probably the usual P Cygni character.<sup>1</sup> Other emission lines are:  $N_{III}$  ( $\lambda\lambda$  4634 — 4640), weak  $H\alpha$ , and perhaps  $He_{I}$  ( $\lambda$  5876).  $C_{III}$  ( $\lambda$  4647) is an absorption line;  $N_{IV}$  and  $Si_{IV}$  are also present in absorption.

It is of considerable interest that of the two stars, 9 Sagittae and HD 192639, which resemble one another in their absorption spectra,<sup>3</sup> the former is related to the WN sequence, while the latter is related to the WC sequence.

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\* BD + 36° 3958;  $\alpha(1900)$  20<sup>h</sup>10<sup>m</sup>8;  $\delta(1900)$  + 37° 03';  $m = 7.02$ .

<sup>1</sup> *Ap. J.*, **91**, 546, 1940.

<sup>2</sup> J. S. Plaskett and J. A. Pearce, *Pub. Dom. Ap. Obs., Victoria*, Vol. 5, No. 2, 1931. The symbol *f* means emission at  $N_{III}$  ( $\lambda\lambda$  4634–4640); *s* indicates sharp lines and *k* refers to the presence of interstellar lines of  $Ca_{II}$ .

<sup>3</sup> The spectral type of 9 Sagittae is O7fk; *Pub. Dom. Ap. Obs., Victoria*, Vol. 5, No. 2, 1931.