NOTES

A SEARCH FOR THE BANDS OF BORON COMPOUNDS IN STELLAR SPECTRA

In the course of an investigation of the SiF bands in late-type stellar spectra,[1] we found that a careful search for BH in the spot spectrum, with very high dispersion, would be valuable, as BH gives the only possibility of blending for the SiF band head at λ 4368. Such a search has been made by R. S. Richardson,[2] who has shown conclusively that the bands of BH are absent in the spot spectrum.

We have tried without success to find the BH bands in late-type stars. Advantage was taken of the fact that sixteen strong lines of the Q branch near λ 4332.7 should be superposed. We first used plates of K and M stars taken with the three-prism spectrograph of the Yerkes Observatory; afterward, we used coudé and other plates of the Mount Wilson Observatory for spectral types as far as M8.[3] No trace of BH appeared.

This absence seems rather surprising. The computation of the theoretical numbers of BH and BO molecules made according to Russell's theory[4] shows that the BH molecules should be much more abundant in M stars than BO is in the sun-spots. The absence of the BH bands is thus interesting in connection with the abundance of boron in stellar atmospheres. Owing to the fact that the boron atom has an unobservable ultra-violet spectrum, a careful search for BO in late-type spectra of sufficient dispersion would be valuable.[5] BO has been found in the spot spectrum by Nicholson and Perrakis,[6] but it has not been definitely observed in any late-type star. Theo-

[1] *Arkiv för Matem., Astr. och Fysik*, **25**, B, No. 2.

[2] *Pub. A.S.P.*, **47**, 275, 1935.

[3] We are indebted to Dr. Joy for these plates.

[4] *Ap. J.*, **79**, 317, 1934.

[5] Theoretically, BO is more abundant in M giants than in M dwarfs; the contrary is true for BH.

[6] *Ap. J.*, **68**, 327, 1928.

retically, the number of BO molecules must be more than a thousand times greater in M stars than in the sun-spots, and thus the BO bands should appear unless the sun is exceptionally rich in boron.

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A II IN THE SPECTRA OF B-TYPE STARS

In a recent note[1] we have given some evidence for the presence of *A* II in the spectra of B-type stars. A careful discussion showed that most of the strong *A* II lines are hopelessly blended with lines of other elements, but the presence of the *A* II line λ 4348 in γ Pegasi and β Orionis seems to manifest the presence of this element.

Recent investigations by B. Edlén[2] show that several lines which had been previously attributed to *N* II[3] (namely, λλ 6114.6, 4806.0, 4765.0, 4735.8, 4726.9, 4609.60,[4] 4426.05, etc.) are actually due to argon. Consequently, the stellar line λ 4425.95 which appears in γ Pegasi and β Orionis is not due to *N* II but has to be attributed to λ 4426.01, intensity 15 ($4s^4P_{3/2}-4p^4D^\circ_{5/2}$), of *A* II.

This supplementary result gives conclusive evidence for the presence of *A* II in normal stellar spectra.

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[1] *Bull. Acad. Roy. Belg.*, **21**, 186, 1935.

[2] Private communication. To appear soon in *Zs. f. Phys.*

[3] A. Fowler and L. J. Freeman, *Proc. R. Soc.*, A, **114**, 662, 1927.

[4] Consequently, *N* II does not take part in the stellar line 4609.70.