## The Spectrum of Mira Ceti.

values in Rowland's table. It seems, therefore, impossible to certainly identify any of these lines with the metallic emission lines, though their appearance and their isolated positions in the general absorption in that region scarcely admit of any other interpretation of their character than the emiss-A further evidence in this regard is their appearance in some of the other early spectra, in which the expoive one. sure was insufficient to show any but the faintest trace of absorption spectrum in the given region. Stebbins, in his paper found only one of the above lines as bright,  $\lambda$  4233.36, but did not attempt any identification. He also finds  $\lambda$  4178-84 as apparently bright, but considers it to be only a bright place between two absorption lines. He gives no record of the other lines registered as bright here, and evidently they were not visible in his spectra. Professor Campbell, in his observations says there is good reason to believe in a bright line at  $\lambda$  4102.8, evidently the same as the one observed here at  $\lambda$  4102.95. He also mentions one or two : ore as probably present on the violet side of  $H\delta$ , but no such lines can be seen in our spectra.

The absorption spectrum of o Ceti is of the banded type, Secchi's third, Miss Manry's XX., and has scarcely any recognizable similarity to the solar type. It is considerably different from  $\alpha$  (*)rionis* and even further advanced than Herculis. character is well shown by the identifications in the tables of measures of plates 486 and 515. The only absorbing elements present in the strong and best defined lines, those which were measured, are Ti, V, Fe, Mn, Cr, Ca also is present, and a stray Mg line appears in No. 515, which is undoubtedly the same line seen as distinctly bright by Stebbins. The first specified are those which are most strongly affected in the spectra of sun spots, and which, as Professor Hale and Mr. Adams have shown,\* are much intensified in the spectrum of Arcturus and still more so in  $\alpha$  Orionis as compared with their intensity in the Apparently, they are even more prominent in o Cett than sun. as our measures have disclosed no other elements in a Oric

\* Contributions of the Solar Observatory, Nos. 8 and 12.

56