SPECTRA OF STARS OF SECCCHI'S TYPE IV.

I. 280 Schellerup = DM 50° 28 10 (Mag. 7.8).  
II. 273 Schellerup = 19 Piscium (Mag. 5.5 ±).  
III. 132 Schellerup = U Hydrae (Mag. 5.5 ±).  
IV. 152 Schellerup (Mag. 5.5).
SPECTRA OF STARS OF SECCHI'S FOURTH TYPE.

Some of the results of a photographic study of the spectra of stars of Secchi's type IV (Vogel's IIIδ), upon which Mr. Ellerman and the writer have been engaged for over a year, were presented at the Harvard Conference last August (see Astrophysical Journal, 8, 237, 1898). Since that time, on account of the substitution of a train of three prisms and a short camera \((f=10.8\) inches) for the single prism and longer camera \((f=20.0\) inches) used with the spectrograph in most of the earlier work, much better photographs have been obtained with shorter exposures. Four of these spectra are reproduced herewith. The order of arrangement corresponds with that mentioned in the paper referred to above, in which it was stated that it had been found possible to group ten stars in a series. This grouping presumably represents the normal order of development. The spectra of other stars in the series might also have been reproduced, but the four selected may be taken as fairly representative of well-defined steps in the evolutionary process. The individual spectra, which will shortly be illustrated in more detail, and discussed in connection with the measures of the wave-lengths of the bright and dark lines, are of present interest in their bearing upon Professor Dunér's important paper "On the Spectra of Stars of Class IIIδ" in the March number of the Astrophysical Journal.

The presence of bright lines in the spectra of these stars, announced by the writer at the Harvard Conference, is now abundantly confirmed. Some of the more conspicuous of these lines were seen by Professor Dunér with the Upsala refractor before the photographic study of the spectra was undertaken here. They have recently been observed visually by Professors Keeler and Campbell at the Lick Observatory. In any attempt to connect these spectra with those of other types the bright lines must not be overlooked.
The difficulty of establishing such a connection cannot be said to have materially lessened. No star intermediate in character between type IV (III 6) and any other known type has yet been found. This is perhaps hardly surprising, as the spectrum of such a star would not be likely to exhibit striking characteristics which might lead to its early detection. No systematic search for such a star has been attempted here, as the Observatory does not possess instruments especially adapted to the purpose. Advantage will be taken of Professor Pickering's kind offer to photograph suspected objects with an objective prism. Should the character of the spectra thus obtained be such as to warrant more detailed study, the 40-inch refractor and stellar spectrograph of this Observatory will be employed for the work.

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