

Remarks.

The station of *W. H. Attwill* was at the photographic laboratory of the Observatory; latitude  $+42^{\circ} 22' 49''$ , longitude  $+4^{\text{h}} 44^{\text{m}} 31^{\text{s}}.18$ . The view of the fourth contact was impeded by the roof of a church to the southwest.

The station of *J. R. Edmands* was at his house, near the Observatory; latitude  $+42^{\circ} 22' 48''$ , longitude  $+4^{\text{h}} 44^{\text{m}} 30^{\text{s}}.41$ . Ten seconds before the time given above as that of the third contact, the observer remarked »Planet now in the waves«; that is, in the irregular undulations of the image of the Sun's limb; twenty-one seconds later, he remarked »Third contact past«. The time given as that of contact is estimated. No actual tangency of the limbs of Mercury and the Sun was observed.

The station of *E. S. King* was in the principal dome of the Observatory; latitude  $+42^{\circ} 22' 47''$ , longitude  $+4^{\text{h}} 44^{\text{m}} 30^{\text{s}}.99$ . The time given as that of third contact is the mean of two,  $9^{\text{s}}.3$  apart; the remark at the first of these times was »First possible time of third contact«; at the second »Contact surely past«. The time given for that

of fourth contact is five seconds later than one at which the remark was made »Contact supposed to have taken place«. This allowance of five seconds was made subsequently by the observer without knowledge of the record of *O. C. Wendell*, with which the corrected time exactly agrees.

The station of *E. C. Pickering* was in the west dome; latitude  $+42^{\circ} 22' 47''$ , longitude  $+4^{\text{h}} 44^{\text{m}} 31^{\text{s}}.05$ . The estimated time of third contact is  $3^{\text{s}}.8$  previous to that of a remark »Third contact apparently past«. At a time  $13^{\text{s}}.8$  later, it was estimated that the disk of Mercury was bisected by the Sun's limb.

The station of *O. C. Wendell* was in the principal dome; latitude  $+42^{\circ} 22' 47''$ , longitude  $+4^{\text{h}} 44^{\text{m}} 30^{\text{s}}.99$ . At a time  $4^{\text{s}}.5$  previous to that noted as the time of third contact, light was seen between the limbs of Mercury and the Sun. Fourteen seconds before the time of the fourth contact, the planet was still visible, and fourteen seconds after the fourth contact, that phenomenon was certainly past.

Stars having Peculiar Spectra.

New Variable Stars in Centaurus, Lupus, Pavo and Microscopium.

(Communicated by *Edward C. Pickering*, Director of Harvard College Observatory.)

An examination of photographs of stellar spectra, taken at the Arequipa Station of this Observatory under the direction of Professor S. J. Bailey, and forming part of the work of the Henry Draper Memorial, shows that the stars given in the following table have peculiar spectra. The designation of the star is followed by the approximate right ascension and declination for 1900, its catalogue magnitude, and a brief description of the object.

Design.	$\alpha$ 1900	$\delta$ 1900	Mg.	Description
Cd. GC. 10488	$7^{\text{h}} 53^{\text{m}}.5$	$-49^{\circ} 43'$	8	IV. Type.
BD. $-22^{\circ} 21' 60$	8 3.2	$-22 38$	8.6	IV. Type.
—	9 9.8	$-49 41$	—	V. Type.
Cd. GC. 14392	10 28.5	$-61 11$	3.6	$H\beta$ bright.
BD. $-13^{\circ} 34' 07$	11 30.7	$-14 2$	8.5	IV. Type.
Cd. GC. 18049	13 10.7	$-44 11$	7.2	Peculiar
Cd. GC. 18609	13 36.0	$-33 6$	6.9	Variable.
—	14 46.7	$-46 12$	—	Variable.
Cd. GC. 23935	17 34.7	$-57 40$	7.0	IV. Type.
BD. $+9^{\circ} 35' 76$	18 4.0	$+9 26$	9.4	IV. Type.
—	18 38.4	$-27 55$	—	Gas. Neb.
—	19 42.2	$+28 1$	—	V. Type.
Cd. GC. 27193	19 46.8	$-59 27$	7.5	Variable.
—	20 34.0	$-29 9$	—	Variable.

Cord. GC. 18049. The photographic spectrum of this star contains no blue light.

Cord. GC. 18609. The hydrogen lines  $H\gamma$  and  $H\delta$  are bright in the spectrum of this star as photographed on May 24, 1894. It was therefore suspected of variability

since the spectra of so many variable stars of long period possess this peculiarity. Measurements of this star on plates taken on May 21, June 14, July 5, 1889; May 9, May 13, May 21, May 28, May 28, June 6, 1890; May 20, June 27, June 27, 1891; May 14, 1892; June 27, June 27, June 27, July 27, July 27, 1893; April 9, May 21, May 22, May 24, and May 24, 1894 gave the magnitudes 7.8, 7.7, 7.6; 7.7, 7.5, 7.8, 7.8, 7.8, 7.9; 7.9, 8.2, 8.1; 7.2; 8.0, 7.7, 7.9, 9.1, 9.0; 8.2, 7.8, 7.2, 7.2, and 7.1 respectively, thus proving the variability. The star is in the constellation Centaurus.

The lines  $H\gamma$  and  $H\delta$  are bright in the spectrum of the star whose approximate position for 1900 is  $\alpha = 14^{\text{h}} 46^{\text{m}}.7$ ,  $\delta = -46^{\circ} 12'$  as photographed on May 24, 1894. Measurements of this star on plates taken on June 13, June 13, July 2, 1889; May 5, May 20, 1890; May 16, May 20, June 10, June 10, June 11, June 23, June 23, July 11, July 11, September 8, 1891; April 1, April 23, May 16, May 16, 1892; April 24, April 28, May 7, May 7, June 3, June 23, 1893; April 14, April 18, May 23 and May 24, 1894 gave the magnitudes  $<12.2$ ,  $12.2$ ,  $12.4$ ;  $<12.0$ ,  $12.5$ ;  $<11.8$ ,  $11.6$ ,  $10.7$ ,  $<10.8$ ,  $11.0$ ,  $10.8$ ,  $10.5$ ,  $10.0$ ,  $10.0$ ,  $10.2$ ;  $<10.8$ ,  $12.2$ ,  $<11.1$ ,  $<11.9$ ;  $<12.1?$ ,  $11.8$ ,  $<10.3$ ,  $11.3$ ,  $10.6$ ,  $9.8$ ;  $11.5$ ,  $11.4$ ,  $9.8$ , and  $9.7$  respectively thus proving the variability. The star is in the constellation Lupus.

The new gaseous nebula, whose approximate position for 1900 is  $\alpha = 18^{\text{h}} 38^{\text{m}}.4$ ,  $\delta = -27^{\circ} 55'$ , was observed, and the character of its spectrum confirmed with the 15 inch Equatorial, by Professor E. C. Pickering on October 18, 1894. It precedes Cord. DM.  $-27^{\circ} 13' 15''$  mg. 9.6  $0^{\text{s}}.6$  and

north 1'6, and is perhaps identical with Cord. DM. 27°13'50 mg. 9.6 which according to the Cord. DM. precedes 13151, 2'3 and is north 3'7 but which does not appear in the sky nor on the photograph.

The spectrum of the star whose approximate position for 1900 is  $\alpha = 19^h 42^m 2$ ,  $\delta = +28^\circ 1'$  was photographed at Cambridge with the 8 inch Draper telescope.

Cord. GC. 27193. The hydrogen lines  $H\gamma$  and  $H\delta$  are bright in the spectrum of this star as photographed on July 29, 1892. Measurements of this star on plates taken on June 13, July 8, August 5, August 6, August 25, August 28, September 3, September 16, 1889; June 10, June 10, June 10, June 10, June 10, June 10, 1891; June 8, July 29, September 8, September 8, September 22, 1892; August 26, August 26, August 26, August 26, August 26, 1893 gave the magnitudes 8.7, 8.9, 9.4, 9.4, 9.6, 9.5, 9.6, 9.6; 8.0, 8.3, 8.2, 8.3, 8.3, 8.3; 8.6, 8.6, 8.8, 8.8, 8.6; 8.6, 8.6, 8.7, 8.7, 8.7, and 8.7 respectively thus proving the variability. The star is in the constellation Pavo.

The hydrogen lines  $H\gamma$  and  $H\delta$  are bright in the spectrum of the star whose approximate position for 1900 is  $\alpha = 20^h 34^m 0$ ,  $\delta = -29^\circ 9'$  as photographed on July 17, 1893. Measurements of this star on plates taken on July 8, August 2, August 5, September 20, October 7, 1889; May 24, 1890; May 21, May 21, May 30, May 30, June 2, June 2, July 13, 1891; June 13, September 8,

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September 8, 1892; April 30, April 30, July 21, July 21, July 25, July 25, 1893; and April 19, 1894, gave the magnitudes <11.5, 11.6, 11.6, 9.4, 10.1; 11.3; <10.2, <11.7, <11.0, <10.9, <11.1, <11.6, <10.3; 10.6, 10.5, 10.2; <11.9, <11.6, 9.3, 9.2, 9.2, 9.4; and 9.4 respectively, thus proving the variability. The star is in the constellation Microscopium.

Each of the variables mentioned above has been examined on the photographic plates and the variability confirmed by Professor E. C. Pickering.

Stars Cord. GC. 10488, 18049 and 23935 are described as red stars and are Nos. 256, 311, and 499 on pages 44, 174, and 66 respectively of »Cunningham Memoirs« No. V, but their class of spectrum is not there given.

The photographic spectra of faint gaseous nebulae and stars of the fifth type closely resemble each other and can only be distinguished by the wavelength of the principal bright line. In gaseous nebulae this line (5007) is of greater wavelength than  $H\beta$  while in stars of the fifth type the line (4688) is of shorter wavelength. A superposition of a chart and spectrum plate of the star whose approximate position for 1900 is  $\alpha = 15^h 10^m 0$ ,  $\delta = -45^\circ 17'$  which has been announced as a star of the fifth type (Astr. Nachr. Vol. 135, p. 195) shows that this object is in reality a gaseous nebula.

M. Fleming.

### Anzeige eines neuen veränderlichen Sterns BD. -6°54'19 in Aquila.

Der angeführte Stern war am 31. Aug. und 2. Sept. 1894 im Meridianfernrohr ( $4\frac{1}{2}$  z.) nicht zu sehen. An letzterem Datum bemerkte ich bei dunklem Felde einen Stern 9<sup>m</sup>8, welcher dem gesuchten um beiläufig 8 Secunden vorausging und in Declination wenig von ihm verschieden war. In Folge einer gütigen Mittheilung von Herrn Prof. Küstner, wonach die Position und die Grössenangabe von BD. -6°54'19 auf zwei gut mit einander harmonirenden Beobachtungen beruhte, habe ich dann am 17. October die Stelle nochmals revidirt und fand nun sofort den Stern -6°54'19, welcher mittlerweile die Grösse 9<sup>m</sup>0 erreicht hatte; der vorhin erwähnte Stern 9<sup>m</sup>8 wurde ebenfalls gesehen. Die ungünstige Witterung hat mich leider verhindert, den Veränderlichen nochmals im Meridian zu beobachten; da späterhin auch der Meridiandurchgang schon zu einer zu frühen Zeit stattfand, bat ich Herrn Dr. Holetschek den Stern am Refractor der k. k. Sternwarte zu verfolgen. Herr Dr. Holetschek hat diese meine Bitte in zuvorkommendster Weise erfüllt, und

Wien, v. Kuffner'sche Sternwarte, 1894 Dec. 6.

**Zusatz.** Dr. de Ball bittet mich, die Originalbeobachtungen von BD. -6°54'19 9<sup>m</sup>1 20<sup>h</sup> 7<sup>m</sup> 27<sup>s</sup>3 -6° 35'5, dessen Veränderlichkeit er vermuthet, mitzutheilen; es sind die folgenden:

- 1) Zone 109. 1876 Sept. 6; heller Mondschein, meistens sehr klar. 9<sup>m</sup>0 20<sup>h</sup> 7<sup>m</sup> 27<sup>s</sup>4 -6° 35'5
- 2) Zone 388. 1879 Juli 17; im allgemeinen belegte Luft. 9<sup>m</sup>3 20<sup>h</sup> 7<sup>m</sup> 27<sup>s</sup>1 -6° 35'4

Sonst sind keine Zonen über die Gegend gegangen.

Bonn 1894 Dec. 10.

mir die hierunter mitgetheilten, werthvollen Beobachtungen zugesandt, welche die Veränderlichkeit des Sterns bestätigen und in Verbindung mit meinen Beobachtungen die Epoche des Maximums in verhältnissmässig enge Grenzen einzuschliessen erlauben.

Die Beobachtungen von Herrn Dr. Holetschek sind:

»1894 Nov. 14. BD. -6°54'19 nahe so hell wie \* 9<sup>m</sup>5 BD. -6°54'16.

Nov. 16. Helligkeit zwischen derjenigen des \* 9<sup>m</sup>5 und der des um etwa 8<sup>s</sup> dem Veränderlichen vorausgehenden \* 9<sup>m</sup>8; schwankend.

Nov. 18. Var. = \* 9<sup>m</sup>8.

Nov. 21. Var. 1 bis 2 Stufen schwächer als der \* 9<sup>m</sup>8.

Nov. 22. Var. 2 bis 3 Stufen schwächer als der \* 9<sup>m</sup>8.

Dec. 2. Var. im 6 z. Refractor kaum zu sehen, mehr als 1 Grösse schwächer als der \* 9<sup>m</sup>8. Etwas Mondlicht, aber wenig störend.«

L. de Ball.

F. Küstner.