A probable new star, RS Ophiuchi.

(Harvard College Observatory Circular No. 99).

New stars can be distinguished from variables, in many cases, only by their spectra. The usual life of a new star is marked by its sudden appearance, where no star is previously known to have existed, and a gradual fading away during which it changes into a gaseous nebula. But the New Star of 1866, T Coronae, had already been recorded in the Bonn Durchmusterung, and is still visible as a star of the tenth magnitude. The New Star of 1901, Nova Persei, No. 2, was shown by earlier photographs to be a very faint variable, and the New star of 1600, P Cygni, is still well seen as a star of the fifth magnitude, which does not now vary perceptibly. Moreover, η Carinae appears as a star of the seventh magnitude, after undergoing great and irregular changes in light during nearly a century.

From the Draper Memorial photographs it has been shown that the spectra of variables of long period are generally either of the third type, Class Md, in which one or more of the hydrogen lines, $H\delta$, $H\gamma$, and $H\beta$, but not $H\epsilon$, are bright, or of the fourth type, Class N. The spectra of the bright novae are very complex, but when faint even at maximum only a few bright lines are visible. These consist of the hydrogen lines $H\epsilon$, $H\delta$, $H\gamma$, and $H\beta$, and one or more bright lines between 4600 and 4700, which appear to coincide with the characteristic bands of spectra of the fifth type. Nova Centauri, however, had a wholly different spectrum.

In Circular No. 76 (A. N. 3948), Mrs. Fleming pointed out that the spectrum of the star 174406_n, RS Ophiuchi, on July 15, 1898, was of the third type in which the hydrogen lines $H\zeta$, $H\epsilon$, $H\delta$, $H\gamma$, and $H\beta$ were bright, and also two lines which appear to coincide with the bright bands 4656 and 4691, in γ Velorum. As these bands have a width of several units and are sometimes brighter on one edge than on the other, it is impossible to give their exact wavelengths. This spectrum, therefore, closely resembles that of Nova Sagittarii and Nova Geminorum. A photograph taken on the preceding day, July 14, confirms the presence of these lines, while a photograph taken on August 28, 1894, showed that at that time the spectrum was of Class K, with no evidence of bright lines. Mrs. Fleming's record in 1899, after examining the first of these, was »Nova?«

Miss Cannon, from an examination of the light curve, called attention to the remarkable increase in the light of this star which took place in 1898. The star has been photographed at this Observatory each year since 1888, except in 1889. The year, number of photographs, mean magnitude, and average deviation of the separate results are given in Table I. The individual results in 1898 are given in Table II.

Harvard College Observatory, 1905 May 15.

Table I. Annual Results.

Year	No.	Mean	A. D.	Year	No.	Mean	A. D.
1888	1	10.86	—	1898	11	—	—
1890	2	10.88	0.02	1899	14	10.56	0.26
1891	2	10.78	0.02	1900	24	9.67	0.32
1892	4	10.65	0.11	1901	34	9.82	0.23
1893	7	10.26	0.10	1902	41	9.97	0.18
1894	6	10.46	0.28	1903	26	10.28	0.20
1895	6	10.36	0.07	1904	51	10.24	0.18
1896	9	10.21	0.18	1905	4	9.78	0.26
1897	11	10.50	0.23				

Table II. Results for 1898.

Date	Magn.	Date	Magn.
April 2	10.70	Aug. 15	9.27
May 27	10.76	20	9.32
31	10.81	Sept. 7	10.00
June 30	7.69	29	10.28
July 14	8.26	Oct. 8	10.81
15	8.22		

It will be seen from these tables that the star appears to have had the magnitude 10.9, before 1891, then increasing gradually about half a magnitude to 10.4 and retaining this brightness during 1893 to 1897. In 1898, it was at first faint, magnitude 10.8, until May 31. A month later, on June 30, it was more than three magnitudes brighter, or 7.7, and decreased regularly about a magnitude a month until October 8, when it was again magnitude 10.8. The following year, 1899, it remained faint, 10.6, but in 1900 it attained the magnitude 9.3 in April, diminishing to 10.0 in September. This change accounts for the large average deviation in the fourth column. Since then, the variations have been slight. An examination of several good chard plates, shows only one star in this position.

Nearly all of the objects mentioned above are shown on the Harvard Map of the Sky. RS Ophiuchi appears on Plate 31, (118, 58); T Coronae, on Plate 18, (113, 59); Nova Persei, No. 2, on Plate 12, (131, 185); P Cygni, on Plate 20, (72, 149); η Carinae, on Plate 50, (153, 64); γ Velorum, on Plate 49, (155, 168); and Nova Geminorum, on Plate 13, (39, 107).

Both the spectrum and the light curves therefore indicate that this object should be regarded as a Nova, rather than a variable star, and its proper designation will be Nova Ophiuchi, No. 3, the new stars of 1604 and 1848 having also appeared in the same constellation.

Edward C. Pickering.

(19) Fortuna. Korr. der Ephemeride (B. J. 1907): Juli 8 — 10°53' + 6"2. W. Luther.

(156) Xanthippe. Corr. all'effemeride (A. N. 4031): Luglio 9 + 1^m20^s + 3'5 Gr. 10^m4. E. Bianchi.

(500) [1903 LA]. Corr. all'effemeride (Veröff. R. I. 26): Luglio 12 — 4^m13^s — 16'4 Gr. 11^m9. E. Bianchi.