

## 6816 Z Lyrae.

Das Minimum Z Lyrae muß sicher unter 12<sup>m</sup> liegen, da ich diesen Stern noch nicht oder nur sehr schwach gesehen habe. Es stehen mehrere Sterne am Orte des Veränderlichen.

## 7056 RV Aquilae.

1902 Juli 14 und 26 war RV 9<sup>m</sup>2, Aug. 22 aber schon unter 10<sup>m</sup>.

Valkenberg, 1902 September.

## 7063 TT Cygni.

Diëser rote Veränderliche war 1902 Juli 14 und 26 und Aug. 28 ungefähr 7<sup>m</sup>7.

## 7658 X Pegasi.

X Pegasi war 1902 Juni 14 schon schwach und noch abnehmend.

## 7961 Y Pegasi.

Juli und August 1902 war Y Pegasi in Abnahme begriffen und hatte Aug. 22 sicher 13<sup>m</sup> erreicht.

*Mich. Esch, S. J.*

## William Herschel's observed nebulous regions

52 in number, compared with Isaac Roberts' photographs of the same regions, taken, simultaneously, with the 20-inch reflector and the 5-inch Cooke lens.

By Dr. Isaac Roberts, D. Sc., F. R. S., F. R. A. S.

The nebulous regions referred to in the above title were described by William Herschel in a paper which he communicated to the Royal Society in the year 1811 and which was published in the Philosophical Transactions vol. 74 under the heading »Construction of the Heavens«.

So far as I can gather, no systematic efforts were made to verify Herschel's observations of these fifty-two regions, until six years ago, when the work of photographing them was commenced at my Observatory, using for the purpose the 20-inch reflector and the 5-inch Cooke lens.

The photographs were taken in duplicate, simultaneously, with exposures of 90 minutes duration, and at times when the objects were as near as practicable to the meridian and the sky clear during the exposure. The plates were selected and tested for sensitiveness, so that with the reflector

the images of stars to about the 17<sup>th</sup> magnitude would appear on the plates and stars of about the 15<sup>th</sup> magnitude would appear on the plates exposed with the Cooke lens.

My long previous experience in photographing the heavens enabled me to judge that under those conditions nebulousity of at least the degree of faintness that could be seen by Herschel with his two and four foot reflectors would be shown on the photographic plates.

The tabular method adopted by Herschel in publishing the results of his telescopic observations enables me to give the photographic results in a concise and intelligible form, coinciding line by line with his, by comparing the headings and reading the descriptive matter relating to each object respectively.

Table of William Herschel's fifty-two regions.

| No. | $\alpha$ 1900                                 | $\delta$ 1900 | Herschel's descriptions in the Phil. Trans. 1811    | Dates when photographs were taken | Isaac Roberts' descriptions of his photographs   |
|-----|---|---------------|---|-----------------------------------|--|
| 1   | 0 <sup>h</sup> 10 <sup>m</sup> 8 <sup>s</sup> | + 9° 26'      | much affected with nebulousity                      | 1900 Nov. 22                      | sky clear; stars small and faint and few in number; large areas void of stars; no nebulousity on plate   |
| 2   | 0 17 37                                       | + 3 59        | much affected                                       | 1899 Sept. 5                      | sky clear; stars small and faint and not very numerous; large areas void of stars; no nebulousity on plate; film dark  |
| 3   | 0 22 23                                       | +29 9         | affected  | 1899 Sept. 9                      | sky clear; stars small and very very numerous; one star of 5.9 mag. BD. +28°75 on plate; small areas void of stars; no nebulousity   |
| 4   | 0 25 37                                       | + 3 59        | much affected                                       | 1900 Nov. 22                      | sky clear; stars few and faint, large areas void of stars; no nebulousity on plate   |
| 5   | 0 30 11                                       | +23 25        | much affected                                       | 1900 Oct. 27                      | sky clear; stars faint and numerous; nebulae H. III 476 and NGC. 169 d'Arrest and Ld. R. together with other fainter ones on plate; many areas void of stars but no diffused nebulousity |
| 6   | 0 36 28                                       | + 0 29        | appeared to be affected with very faint nebulousity | 1899 Oct. 28                      | sky very clear; stars small and very few in number; large areas void of stars; some small nebulae on plate; no diffused nebulousity  |
| 7   | 0 38 0  | +41 10        | affected with nebulousity                           | 1895 Oct. 17                      | sky very clear; stars crowded on plate; many small areas void of stars; several photographs have been taken of this region, which includes   |

| No. | $\alpha$ 1900  | $\delta$ 1900   | Herschel's descriptions<br>in the Phil. Trans. 1811  | Dates when photo-<br>graphs were taken | Isaac Roberts' descriptions of his photographs  |
|-----|----------------|-----------------|--|--|---|
| 7   | $0^h 38^m 0^s$ | $+41^\circ 10'$ |  |  | the great Andromeda nebula M. 31, part of the n. f. end of which would cross Herschel's field of view in this sweep   |
| 8   | 0 39 27        | +39 16          | unequally affected   | 1900 Oct. 17                           | sky clear; stars crowded on plate; many small areas void of stars; part of s. p. end of M. 31 on plate; no other diffused nebulosity  |
| 9   | 0 41 19        | +43 30          | suspected faint nebulosity   | 1900 Oct. 26                           | sky clear; stars small and crowded on plate; many small areas void of stars; no diffused nebulosity   |
| 10  | 0 48 38        | +43 35          | suspected faint nebulosity   | 1900 Oct. 26                           | sky clear; stars small and crowded on plate; numerous areas void of stars; nebula NGC. 317 on plate; no diffused nebulosity   |
| 11  | 1 41 8         | +29 48          | suspected to be tinged with milky nebulosity   | 1900 Nov. 27                           | sky clear; stars small and numerous; large areas void of stars; no nebulosity   |
| 12  | 2 27 55        | +19 0           | much affected with nebulosity  | 1900 Dec. 13                           | sky clear; stars small and not very numerous; large areas void of stars; some very small and faint nebulae on plate; no diffused nebulosity   |
| 13  | 4 2 14         | +25 11          | much affected  | 1901 Febr. 13                          | sky very clear; stars small and numerous; large areas void of stars; no nebulosity  |
| 14  | 4 23 51        | +35 7           | suspected pretty strong nebulosity   | 1901 Febr. 13                          | sky very clear; stars small and crowded on s. and s. p. sides but few on the rest of the plate; large areas void of stars; nebula H. I. 217 and also a 10 <sup>th</sup> mg. star surrounded by very faint nebulosity 11.5 n. f. H. I 217 on plate; no nebulous region   |
| 15  | 4 24 51        | +35 8           | suspected nebulosity   |  |   |
| 16  | 4 26 29        | - 7 30          | strong milky nebulosity  | 1901 Febr. 14                          | sky clear; stars small and very few on plate; large areas void of stars; no nebulosity  |
| 17  | 4 29 2         | +20 50          | much affected  | 1901 Febr. 15                          | sky very clear; stars small and very numerous; small areas void of stars; no nebulosity   |
| 18  | 4 44 5         | +20 50          | much affected  | 1901 Febr. 15                          | sky very clear; stars small and crowded on plate; small areas void of stars; no nebulosity  |
| 19  | 4 52 17        | +26 45          | strong suspicion of very faint milky nebulosity  | 1901 Mar. 9                            | sky clear; stars small and very few; large areas void of stars; no nebulosity   |
| 20  | 5 15 50        | +25 1           | very much affected   | 1901 Mar. 12                           | sky clear; stars small and very few on plate; large areas void of stars; no nebulosity  |
| 21  | 5 19 20        | +25 1           | affected   |  |   |
| 22  | 5 28 53        | - 6 56          | affected with milky nebulosity   | 1901 Mar. 13                           | sky clear; stars not very numerous; large areas void of stars; H. IV. 33 Orionis on plate; no nebulosity  |
| 23  | 5 30 10        | - 2 43          | affected   | 1901 Mar. 12                           | sky clear; stars small and very few; large areas void of stars; no nebulosity   |
| 24  | 5 31 56        | - 4 18          | visible and unequally bright nebulosity. I am pretty sure that this joins to the great nebula in Orion | 1902 Mar. 5                            | sky very clear; stars small and not very numerous; areas void of stars; no nebulosity on plate  |
| 25  | 5 35 34        | - 2 31          | diffused milky nebulosity  | 1900 Jan. 25                           | sky clear; stars very numerous on preceding half of plate but few on following half where there are large areas void of stars. Large cloud of nebulosity north following $\zeta$ Orionis with broad division void of stars, but with some nebulosity in south following to north preceding direction; other divisions break up the cloud into separate masses. To the south of $\zeta$ is a stream of nebulosity, 54 minutes of arc in length, with an embayment free from nebulosity dividing it in halves. Another faint nebulosity extends from $\zeta$ 27 minutes of arc towards the south, south |

| No. | $\alpha$ 1900                                  | $\delta$ 1900 | Herschel's descriptions in the Phil. Trans. 1811    | Dates when photographs were taken | Isaac Roberts' descriptions of his photographs  |
|-----|--|---------------|---|-----------------------------------|---|
| 2   | 5 <sup>h</sup> 35 <sup>m</sup> 34 <sup>s</sup> | - 2° 31'      |   |                                   | preceding and north preceding. The star BD. -1°1001 is in the midst of nebulosity and it has a companion on the south preceding side. The star BD. -1°1005 is involved in a large cloud of streaky nebulosity, and it has a companion on the preceding side. The star BD. -2°1345 is H. IV. 24, NGC. 2023; it is in the midst of a large dense streaky cloud of nebulosity which has in it condensations and remarkable rifts free from nebulosity; near the south end of one of these rifts is a 12 <sup>th</sup> magnitude star. The star BD. -2°1350 is in the midst of a cloud of nebulosity with some faint structure in it; and it has a companion on the north preceding side. |
| 26  | 5 36 52  | - 6 57        | a pretty strong suspicion of nebulosity             | 1901 Mar. 22                      | sky clear; stars small and few; large areas void of stars; no nebulosity  |
| 27  | 5 43 11  | + 1 8         | affected with milky nebulosity                      | 1901 Mar. 13                      | sky clear; stars very few in number; large areas void of stars; no nebulosity   |
| 28  | 6 1 1  | + 3 44        | much affected                                       | 1902 Jan. 29                      | sky clear; stars crowded on north following and south preceding sides; large areas void of stars; no nebulosity   |
| 29  | 6 0 54   | -20 27        | affected  | 1902 Mar. 6                       | sky clear; stars small and very numerous; many areas void of stars; no nebulosity   |
| 30  | 6 40 7   | +41 16        | affected  | 1901 Mar. 22                      | sky clear; stars few in number; large areas void of stars; cluster H. VIII 71 on plate; no nebulosity   |
| 31  | 9 27 32  | -18 27        | affected  | 1902 Mar. 6                       | sky clear; stars small and few in number; large areas void of stars; no nebulosity  |
| 32  | 9 36 43  | +71 13        | much affected with very faint whitish nebulosity    | 1901 April 12                     | sky clear; stars small and numerous; several large areas void of stars; no nebulosity   |
| 33  | 10 11 50                                       | - 9 3         | very faint whitish nebulosity                       | 1901 April 15                     | sky clear; stars small and numerous large areas void of stars; no nebulosity  |
| 34  | 10 22 25                                       | +51 32        | much affected                                       | 1901 April 13                     | sky clear; stars small and not numerous; large areas void of stars; no nebulosity   |
| 35  | 10 40 59                                       | +62 45        | affected with very faint nebulosity                 | 1901 April 14                     | sky clear; stars small and not very numerous; large areas void of stars; no nebulosity  |
| 36  | 11 4 30  | +62 44        | affected  | 1901 April 15                     | sky clear; stars small and numerous; areas void of stars; several small faint nebulae on plate; no diffused nebulosity  |
| 37  | 12 2 5   | +30 37        | affected with whitish nebulosity                    | 1901 April 17                     | sky clear; stars small and few in number; large areas void of stars; H. II 321 and H. II 802 on plate; no nebulosity  |
| 38  | 12 12 40                                       | +30 37        | affected with whitish nebulosity                    | 1901 April 18                     | sky clear; stars few in number; large areas void of stars; four small prominent nebulae on plate; no diffused nebulosity  |
| 39  | 13 12 15                                       | +34 8         | much affected                                       | 1901 April 17                     | sky clear; stars not very numerous; large areas void of stars; no nebulosity  |
| 40  | 14 2 20  | +34 8         | very much affected and many faint nebulae suspected | 1899 June 2                       | sky clear; stars small and not numerous; areas void of stars; no nebulosity   |
| 41  | 15 9 37  | +18 57        | affected with very faint nebulosity                 | 1899 June 12                      | sky clear; stars small and not very numerous; areas void of stars; no nebulosity  |
| 42  | 21 3 26  | - 1 53        | much affected with whitish nebulosity               | 1902 Nov. 4                       | sky clear; stars very numerous; no nebulosity.<br>Herschel's sweep 42, as given in the Phil. Trans. (RA. 1800 = 20 <sup>h</sup> 58 <sup>m</sup> 20 <sup>s</sup> , NPD. 1800 = 92° 17') is not in sequence; as this may be   |

| No. | $\alpha$ 1900                              | $\delta$ 1900     | Herschel's descriptions<br>in the Phil. Trans. 1811                            | Dates when photo-<br>graphs were taken | Isaac Roberts' descriptions of his photographs  |
|-----|--|-------------------|--|--|---|
| 42  | $21^{\text{h}} 3^{\text{m}} 26^{\text{s}}$ | $- 1^{\circ} 53'$ |  | 1897 Aug. 28                           | due to a typographical error in one of the coordinates; a plate corresponding to (RA. 1800 = $20^{\text{h}} 38^{\text{m}} 20^{\text{s}}$ , NPD. 1800 = $92^{\circ} 17'$ ) was taken on Aug. 28 1897, as follows<br>sky very clear; stars crowded on plate; no nebulosity  |
| 43  | 20 53 15                                   | +16 44            | a good deal affected   | 1897 Oct. 20                           | sky clear; stars crowded on plate; no nebulosity  |
| 44  | 20 54 34                                   | +43 32            | faint milky nebulosity scattered over this space; in some places pretty bright | 1896 Oct. 10                           | sky very clear; stars crowded on parts of plate; large areas void of stars on others; nebula H. V. 37, NGC. 7000, forms part of this region; the photograph shows it as a magnificent object. I have published a photograph of this region in vol. II of Stars, Star-Clusters and Nebulae, pl. 24 pg. 155 and also in Knowledge Nov. 1 1898 |
| 45  | 20 57 34                                   | - 1 34            | much affected with whitish nebulosity  | 1897 Sept. 21                          | sky clear; stars small and numerous; no nebulosity  |
| 46  | 20 56 55                                   | +43 16            | suspected nebulosity joining to plainly visible diffused nebulosity            | 1896 Oct. 10                           | regions 44 and 46 are on the same plate, see description given above, Nr. 44  |
| 47  | 21 5 8                                     | +14 21            | affected.  | 1899 Aug. 6                            | sky clear; stars small and crowded on plate; no nebulosity  |
| 48  | 21 34 15                                   | +10 19            | much affected  | 1898 Oct. 12                           | sky clear; stars small and numerous; areas void of stars; no nebulosity   |
| 49  | 21 46 52                                   | +21 31            | affected   | 1899 Aug. 9                            | sky clear; stars small and crowded; areas void of stars; no nebulosity  |
| 50  | 22 57 24                                   | +25 45            | much affected  | 1898 Sept. 20                          | sky clear; stars very numerous; areas void of stars; no nebulosity  |
| 51  | 22 57 54                                   | +25 45            | affected   |  |   |
| 52  | 23 0 17                                    | +29 17            | a little affected  |  |   |

### Conclusion.

The final results of the correlation of Herschel's nebulous regions and my photographs can be given in a few words as follows:

Of the fifty-two nebulous regions described by Herschel, the photographs show diffused nebulosity on four of them

Starfield, Crowborough, Sussex, 1902 November.

only; there is no visible trace of diffused nebulosity on 48 of the areas, but on the remaining four which are Nos 7, 25, 44 and 46 respectively in the Table, there is nebulosity with remarkable characteristic features and these are delineated upon three of the photographs, regions Nos 44 and 46 being on the plate.

Isaac Roberts.

### Notiz betr. Var. 19.1902 Pegasi.

$21^{\text{h}} 57^{\text{m}} 8^{\text{s}}$   $+34^{\circ} 25'$  1855.

Über den Ort sind die folgenden Sucherzonen der BD. gegangen:

Z. 988. 1856 Aug. 2. Sch. Sehr klare Luft. Der Stern fehlt.

Es ist aber ein sonst nicht vorkommender Stern beobachtet:  $9^{\text{m}} 5 21^{\text{h}} 57^{\text{m}} 40^{\text{s}}$   $+34^{\circ} 31' 9''$ , der auf den Var. passen würde, wenn man den Teilstrich um  $-1^{\text{p}}$  korrigiert und  $-5^{\text{p}} 4$  statt  $-4^{\text{p}} 4$  liest. Die Dekl. des Sterns wird dann  $+34^{\circ} 25' 0''$  in bester Übereinstimmung mit obiger Position.

Bonn, 1902 Nov. 27.

Z. 1012. 1856 Aug. 24. Sch. Luft dunstig, heller Mondschein, einmal auch schon fliegende Wolken.

Auch in dieser Zone findet sich ein sonst nicht vorkommender Stern beobachtet:  $9^{\text{m}} 5 21^{\text{h}} 57^{\text{m}} 46^{\text{s}}$   $+34^{\circ} 5' 0''$ , der zu dem Var. paßt, wenn man einen leicht möglichen Fehler von  $3^{\text{p}}$  annimmt und den Teilstrich statt  $+0^{\text{p}} 6$  liest:  $+3^{\text{p}} 6$ . Die Dekl. des Sterns wird dann  $+34^{\circ} 25' 8''$ . Der Stern wäre somit in der BD. nachzutragen:

$+34^{\circ} 45' 52''$  a var.  $21^{\text{h}} 57^{\text{m}} 43^{\text{s}}$   $+34^{\circ} 25' 4''$ .

F. Deichmüller.