now appears that one of the markings corresponds to the Maia nebula. The other irregularities seem to afford indications of the Merope nebula. There is also a faint narrow streak of light projecting from Electra on the following side.

PROF. LANGLEY ON THE EMISSION-SPECTRA OF BODIES AT LOW TEMPERATURES.—Prof. Langley having traced the solar spectrum in the infra-red so far as $\lambda = 0{\cdot}0027$mm., where it suddenly ceased, has since examined the emission-spectra of various terrestrial substances at temperatures from that of fusing platinum to that of melting ice, and more particularly of temperatures corresponding to the ordinary conditions of the soil. The result of his observations has been to show that the maximum of heat from cold and black bodies has in every case a wave-length greater than 0·0027mm.,—greater, that is to say, than that of the lowest solar heat which reaches us; and that further, that part of these spectra which has a greater wave-length than that of the point of maximum, represents a larger total amount of heat than the part with shorter wave-length. Prof. Langley believes that he has been able, by means of his bolometer, to trace out the emission-spectra of cold bodies so far as $\lambda = 0{\cdot}0150$mm., a wave-length more than twenty times as great as that which Newton found for the lower limit of the spectrum, viz. $\lambda = 0{\cdot}0007$mm.

FABRY'S COMET.—Dr. H. Oppenheim has computed the following fresh elements and ephemeris for this comet:—

T = 1886 April 5·5398 Berlin Mean Time

$$\left.\begin{aligned} \omega &= 126^\circ\ 50'\ 27''{\cdot}6 \\ \Omega &= 36\ 19\ 54{\cdot}0 \\ i &= 82\ 11\ 15{\cdot}0 \end{aligned}\right\} 1886{\cdot}0.$$

$$\log q = 9{\cdot}804021$$

Ephemeris for Berlin Midnight

1886	R.A. h. m. s.	Decl. ° ′	Log. r	Log. Δ	Brightness
March 7	23 19 34	31 19·6 N.	9·9441	0·1621	8
11	23 18 54	32 29·8	9·9171	0·1424	10
15	23 18 11	33 42·0	9·8904	0·1191	12
19	23 17 29	34 54·6 N.	9·8650	0·0916	16

The brightness on December 2 is taken as unity.

BARNARD'S COMET.—The following ephemeris by Dr. A. Krueger is in continuation of that given in NATURE for February 18, p. 376:—

For Berlin Midnight

1886	R.A. h. m. s.	Decl. ° ′	Log. r	Log. Δ	Brightness
March 6	1 54 54	22 35·8 N.	0·1229	0·2415	4·10
10	1 53 55	23 45·9	0·1001	0·2390	4·61
14	1 53 6	24 58·9	0·0757	0·2352	5·25
18	1 52 26	26 14·9 N.	0·0497	0·2299	6·07

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 MARCH 7-13

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on March 7

Sun rises, 6h. 34m.; souths, 12h. 11m. 10·0s.; sets, 17h. 48m.; decl. on meridian, 5° 11′ S.: Sidereal Time at Sunset, 4h. 49m.

Moon (two days after New) rises, 7h. 16m.; souths, 13h. 21m.; sets, 19h. 36m.; decl. on meridian, 0° 28′ N.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian ° ′
Mercury	6 54	12 49	18 44	1 47 S.
Venus	5 1	10 30	15 59	6 48 S.
Mars	17 23*	0 15	7 7	9 24 N.
Jupiter	19 10*	1 15	7 20	0 16 N.
Saturn	10 54	19 5	3 16*	22 46 N.

* Indicates that the rising is that of the preceding evening and the setting that of the following morning.

Occultations of Stars by the Moon (visible at Greenwich)

March	Star	Mag.	Disap. h. m.	Reap. h. m.	Corresponding angles from vertex to right for inverted image ° °
8	B.A.C. 408	6½	18 11	near approach	54 —
9	64 Ceti	6	17 31	18 38	118 342
9	ξ′ Ceti	4½	18 35	19 39	156 310
13	130 Tauri	6	16 49	18 1	91 253

Saturn, March 7.—Outer major axis of outer ring 43″·0; outer minor axis of outer ring 19″·3; southern surface visible.

March h.
10 ... 2 ... Venus stationary.

Variable-Stars

Star	R.A. h. m.	Decl. ° ′		h. m.	
T Cassiopeiæ	0 17·1	55 10 N.	Mar. 10,	0 0	*m*
U Cephei	0 52·2	81 16 N.	,, 8,	20 36	*m*
			,,	20 16	*m*
V Tauri	4 45·4	9 42 N.	,, 12,		*M*
ζ Geminorum	6 57·4	20 44 N.	,, 10,	0 0	*m*
δ Libræ	14 54·9	8 4 S.	,, 11,	22 10	*m*
R Coronæ	15 43·9	28 30 N.	,, 12,		*M*
U Ophiuchi	17 10·8	1 20 N.	,, 9,	2 22	*m*
			,, 9,	22 30	*m*
X Sagittarii	17 40·4	27 47 S.	,, 10,	0 0	*m*
			,, 12,	21 30	*M*
U Sagittarii	18 25·2	19 12 S.	,, 9,	22 30	*m*
			,, 12,	22 30	*M*
S Vulpeculæ	19 43·7	27 0 N.	,, 11,		*m*
η Aquilæ	19 46·7	0 7 N.	,, 8,	4 50	*m*
S Aquilæ	20 6·4	15 17 N.	,, 13,		*m*
δ Cephei	22 24·9	57 50 N.	,, 12,	2 30	*m*

M signifies maximum; *m* minimum.

Meteor Showers

Two showers may be looked for on March 7, viz near γ Libræ, R.A. 233°, Decl. 18° S.; and near γ Herculis, R.A. 244°, Decl. 15° N. Other showers of the week:—Near ε Cassiopeiæ, R.A. 36°, Decl. 67° N.; from Virgo, R.A. 190°, Decl. 1° N.; from Cepheus, R.A. 300°, Decl. 80° N.

Stars with Remarkable Spectra

Name of Star	R.A. 1886·0 h. m. s.	Decl. 1886·0 ° ′	Type of spectrum
124 Schjellerup	9 45 48	22 29·0 S.	IV.
132 Schjellerup	10 31 54	12 47·6 S.	IV.
D.M. +68°·617	10 37 9	68 0·6 N.	IV.
136 Schjellerup	10 46 5	20 38·8 S.	IV.
56 Leonis	10 50 5	6 47·7 N.	III.
R Crateris	10 54 58	17 42·8 S.	III.
ω Virginis	11 32 35	8 45·9 N.	III.
145 Schjellerup	12 19 24	1 24·1 N.	IV.
152 Schjellerup	12 39 46	46 3·8 N.	IV.
155*b* Schjellerup	12 51 57	66 36·6 N.	IV.
40 Comæ Ber.	13 0 49	23 13·8 N.	III.

THE SUN AND STARS[1]

II.

First Conclusions

THE view of the solar constitution, which was based upon the early work to which I have referred—work which dates from about the year 1860, and is therefore about a quarter of a century old—the view which grouped together, and endeavoured to make a complete story of all the facts which were known then, was this: the chemical substances which had been found to exist in the sun's atmosphere existed quite close—relatively quite close at all events—to the photosphere. When subsequent work demonstrated the existence of hydrogen to a considerable height above this photospheric envelope, as I shall show presently, the idea was suggested that these chemical substances existed in the atmosphere, not pell-mell, not without order, because Nature is always full of the most exquisite order, but in the sequence of their vapour-densities, so that a very heavy vapour would be found low down in the atmosphere, and a very light one like hydrogen would be high up.

It was at first suggested that gaseous diffusion would prevent such a sorting out, until it was pointed out by an American mathematician, Prof. Pierce, that it was a good deal to ask that diffusion should act along a radius something like a million of miles long, and indeed he showed that it would not.

Before we go farther, I give tables of the different substances which so far have been traced in the sun's atmosphere by means of their spectral lines. The first gives the substances according to the results obtained by Kirchhoff,

[1] A Course of Lectures to Working Men delivered by J. Norman Lockyer, F.R.S., at the Museum of Practical Geology. Revised from shorthand notes. Continued from p. 403.