

*November 19, 1885.*

THE PRESIDENT in the Chair.

In pursuance of the Statutes, notice of the ensuing Anniversary Meeting was given from the Chair.

Mr. Cornelius O'Sullivan and Dr. Sydney Howard Vines were admitted into the Society.

Professor W. G. Adams, General Boileau, Dr. Huggins, Dr. Perkin, and Dr. Rae, having been nominated by the President, were by ballot elected Auditors of the Treasurer's Accounts on the part of the Society.

The Presents received were laid on the table and thanks ordered for them.

The following Papers were read :—

- I. "On the Total Solar Eclipse of September 9, 1885 (in a Letter to Professor STOKES, Sec. R.S.)." By JAMES HECTOR, M.D., F.R.S., Director of the Geological Survey, New Zealand. Received October 22, 1885.

Wellington, September 12, 1885.

DEAR SIR,

On the 5th instant I duly received your note of the 15th July, enclosing instructions drawn up by the Committee for observing the solar eclipse which took place here on the 9th.

The instructions were circulated in all quarters where they were likely to be of use. You will observe from the enclosures that unfortunately both the parties equipped by Government, in their anxiety to get as near the line of centrality as possible, encountered bad weather, so that no observations were made which can be considered

to have scientific exactitude. The eclipse, however, was very distinctly seen at Wellington, and I have been able, with the assistance of friends and the accounts in the newspapers, to obtain the following information concerning it.

Scarlet prominences were only moderately developed, and were clustered chiefly at the equatorial and polar regions of the sun. The best observers agree that the corona had a very irregular outline, and was most continuous and vivid close to the sun's limb, having the longest expansion reaching to nearly two diameters from the western equatorial region. This large expansion appears to have had a strongly marked spirally twisted structure, while all the other appendages consisted of radiating pyramids. No laminated structures appear to have been observed in any part of the corona.

Most observers agree in describing an intensely brilliant flash or meteor, lasting for two seconds, at the commencement of totality on the eastern side of the sun, and exactly over the position of a large sun-spot that was just coming into view at a few degrees south of the sun's equator. This flash is described as having looked like a large electric lamp suspended at a little distance from the moon's edge. At the close of totality another flash, similarly bright, but not so large and pointed, was seen on the western limb of the sun in a position corresponding with a large sun-spot that was within 1' of arc of passing over the sun's edge.

The following is a list of the enclosures :—

1. Notification of the Committee's instructions.
2. Charts of shadow path showing the position of Dreyertown and Otahao.
3. General time plan of eclipse by Mr. Arthur Beverly.
4. Silver print of totality by M. Cazneau, Wellington.
5. Enlarged drawing from a negative  $\frac{1}{8}$ " in diameter of the totality, photographed by Mr. Gell, Wellington.
6. Sketch by Mr. J. Buchanan, F.L.S.
7. Three sketches taken during totality at Wellington by Mr. T. W. Kirk. These were taken in succession as marked 1, 2, 3, the sun being intersected by a plumb-line, and disclose the remarkable feature that the N.W. extension of the corona shifted its position with reference to the prominence.
8. Generalised sketch from various sources, showing the outline of the corona, the position and shape of the prominences, and the positions, marked by red crosses, where vivid flashes of light were seen at the moment of beginning and end of totality. All agree that these flashes were like electric lights, and quite dazzling, the first being large and round, while the last seen was small and pointed.
9. Sketch of the large spirally twisted flame of the corona over the N.W. quadrant, as sketched by Mr. H. P. Higginson, C.E., with a

binocular glass. As Mr. Higginson observed and sketched the great eclipses of 1869 and 1870 in India, and is an accomplished draughtsman, he had previous experience to assist him.

10. Complete sketch by Mr. Higginson of the total eclipse finished from a drawing made with a binocular.

11. Sketch with the naked eye, by Mr. Alfred de Bathe Brandon, junr., which also shows the twisted character of the large coronal appendage.

12. Sketch showing the position of the sun-spots that were visible at the time of the eclipse, (*a*) being a very large spot that was just passing off, (*b*) a spot not visible before the eclipse, which has since developed into an intensely black sharply defined spot of moderate size.

13. Extracts from newspapers.

In conclusion, it is hardly necessary for me to state how much I regret that I am unable to give you fuller and more precise information founded on my own observation.

(Signed) J. HECTOR.

[The publication of a selection of the illustrations is deferred until some additional drawings or photographs expected from New Zealand shall have arrived. Enclosure No. 1, giving an account of a lecture delivered by Dr. Hector before the eclipse, is subjoined, with the omission of a portion at the beginning, the interest of which has now passed away.]

*(Extract from Enclosure No. 1.)*

The chief interest of the eclipse will lie in the observation of the scarlet prominences and of the silvery light of the corona or halo that surrounds the sun during the period of total darkness. The prominences may be expected to have great brilliancy, as for some weeks past the spots on the sun have shown that its surface is in a state of violent activity, and one of such unusual size as to be almost visible to the naked eye, will have reached such a position that it will coincide with the left hand edge of the sun at the time of the eclipse, and from this point unusually large flames should be looked for; for observing these flames it is necessary, in order to intensify their light, to use a fragment of rose-tinted glass. On the other hand, to observe the light of the corona to perfection, a very pale blue-tinted glass is necessary, so as to cut off the red light and intensify the pale silvery light of the corona. A telescope of high power is quite unsuitable to the observer, but a wide field opera glass will be useful. Instructions have been received from the Committee of the Royal Society, which relate partly to the taking of a photographic, spec-

troscopic, and other observations that require special instruments, but the following extracts may be of use to most observers :—Drawings of the corona have only seldom proved to be of great utility. If such drawings are attempted on the present occasion, observers ought to pay attention to the general outline of the corona rather than to points of detail. A plumb line ought to be suspended, if possible, between the observer and the sun, so as to fix the position of the corona in the sky as accurately as possible. The vertical line ought to be indicated on the drawing. Observers will find it useful to draw the black disk of the sun and the vertical line before the beginning of totality. . . . Observers unpractised in accurate drawing will obtain more useful results by paying attention to certain features of the corona than by attempting what can only be a very rough and inaccurate sketch of the corona. Definite answers as to the following questions, for instance, would be of great value :—(a) To what distance from the sun, estimated in solar diameters, can you trace the corona? (b) Does it extend further in some directions than in others, and what are the directions of greatest and least extent? (c) Is there a line of approximate symmetry in the corona, and what is the direction of that line? The answers to the last two questions ought, if possible, to be given in angles from the vertical line, or from some definite great circle.

II. "On the Total Solar Eclipse of September 9, 1885 (in a Letter to J. N. LOCKYER, F.R.S.)." By A. S. ATKINSON.  
Received November 19, 1885.

I observed the eclipse from a spot in my own ground in Nelson, which, as determined for the transit of Venus, is in lat.  $41^{\circ} 17' 1.9''$  S., and long.  $173^{\circ} 17' 57.5''$  E.

The sky was very clear, and there was no wind, but the air was optically very unsteady.

As totality was approaching, perhaps two or three minutes before, I tried with the telescope (5-in. Cooke, power 60) if I could see anything of the corona behind the moon, but could not in the time I allowed myself; I was afraid of waiting longer, as I had made arrangements for taking some small photographs, and had to superintend; and as I wished also to answer the questions of the Committee of the Royal Society, I thought it best to observe the main phase with the naked eye.

I may, perhaps, note here, that in finding my way with the telescope to the moon's following limb, I chanced upon Jupiter, the appearance