



Photo-Engraved & printed at the Offices of the Survey of India, Calcutta, 1911.

Photograph of the trail of the Meteorite of the 24th of November 1910,
taken at Mhow by Sergeant Hampstead and reproduced in the
journal through the courtesy of the "Times of India."

The Journal
of the
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SESSION 1910-1911.

[No. 7.]

**Report of Meeting of the Society held
on Tuesday, the 25th April 1911.**

H. G. TOMKINS, F.R.A.S., *President*, in the Chair.

The usual Monthly Meeting of the Astronomical Society of India was held in the Imperial Secretariat Buildings (ground floor) on Tuesday, the 25th April 1911.

The Proceedings were opened by the President, who called on Mr. U. L. Banerjee, in place of the Secretary who was ill, to read the Minutes of the last meeting, which were duly confirmed. The President next read letters from the Astronomer Royal, Greenwich, and Professor Turner of Oxford, congratulating the Society on the start it had made, and agreeing to place the Society on their lists of exchanges. The letters were received with applause, and a vote of thanks was passed to the Astronomer Royal and Professor Turner, the special thanks of the Society being conveyed to the former for his promise to send the Society lantern slides occasionally for their meetings of objects taken at Greenwich. It was also announced that the Society had received a very valuable present from Lt.-Col. Lenox Conyngham in the Atlas Stellarum Variabilium. The work was in several parts, and would be one of the most valuable contributions to the Library. The gift of the Atlas, which was on view, was greatly appreciated by members, and a hearty vote of thanks was accorded to the donor for his generosity and interest in the Society.

Other presents announced were :—

- (1) The Monthly Weather Review for December 1910 from the Director-General of Observatories in India.

- (2) *Annuaire Astronomique* for 1912.
Annales de l'Observatoire Royal de Belgique
received from the Royal Observatory, Belgium.
- (3) Bulletins of the Barcelona Astronomical Society
for January, February and March 1911.
- (4) Royal Astronomical Society's Monthly Notices for
February 1911.
- (5) Journal and Transactions of the Leeds Astronomical
Society for 1909.
- (6) Bulletins of the Italian Astronomical Society of
Turin for January and February 1911.

The election of the following members by the Council was then confirmed :—

1. MR. B. R. MUKHERJI
2. MR. KILIAN EULER.
3. MR. JOSEPH CONNELL RITTER.
4. MR. FREDERICK BEALE.
5. MRS. L. LUKIS.
6. MRS. E. V. KEELAN.

The President then read extracts from a paper by Professor Emanuelli of Rome on the Total Eclipse of the Sun of April 1911, which had been very kindly translated and submitted by Mrs. Fairweather of Barrackpore, who, though not a member of the Society, was interested in its work. The extracts created considerable interest, and were to be placed in the Library with the original paper. A vote of thanks was accorded to Mrs. Fairweather for the work she had done for the Society.

The next paper of the evening on Time, and How It is Measured, was read by Mr. Rakshit, Director of the Meteor Section, who dealt with his subject in a very interesting and exhaustive manner, ably illustrating his remarks with lantern slide pictures.

In calling for a vote of thanks to Mr. Rakshit, the President remarked that he (Mr. Rakshit) took a great interest in the JOURNAL and had now contributed several papers on different subjects towards it, all of which he had dealt with in a very able manner, and members would, he thought, look forward to seeing the present paper in print. A hearty vote of thanks was duly accorded to Mr. Rakshit.

A lantern slide was then shown of the Meteor of 24th November 1910, which had been taken by Sergt. A. Hempstead, Mhow, the negative of which Mr. H. B. Holmes had been fortunate enough to obtain the loan of, and had kindly sent it in to the Society for reproduction in the JOURNAL as well as for the Monthly Meeting. This slide proved of great interest to all present, as the subject had already afforded

considerable discussion and comment at the last Monthly Meeting.

Mr. Holmes—You will remember that when I read my paper at the last Meeting, I gave you a very rough drawing of the course of this Meteor as it seemed to appear and was photographed by Sergt. Hempstead. I have now been fortunate enough to obtain the loan of the original negative from Sergt. Hempstead, and this reproduction will give you a clear idea of the original, which bears out what I said at the last meeting, that instead of starting right away from the top of the picture, it seems to start part of the way down. The zig-zag course of the Meteor, these bright spots, and its seemingly sudden end here, are the points which I wanted to draw attention to.

The President—We are very fortunate indeed in having obtained this slide. Mr. Holmes telegraphed down to Sergt. Hempstead and asked him if he could not see his way to oblige the Society by lending his negative for a reproduction, and Sergt. Hempstead has very kindly sent it to us. We have been enabled to make this reproduction which we have before us of the luminous trail of the Meteor, and I think that the photograph is probably unique and at any rate very rare.

The President then read a letter which he had received from Mrs. Voigt on the subject of meteors.

Mr. Holmes—What is her point ?

The President—I think the idea is that a meteor may have some kind of rotation on its axis, and that on combustion taking place, this might result in a sort of spiral trail, giving the effect of the bright spots in it which appear in this photograph. The idea is ingenious, and I am sorry Mrs. Voigt could not be here to join us in this discussion.

Another meteorite has lately been seen in India, and I think one of our members has something to say on the subject.

Mr. Bhima Sena Rau then read an account from the *Bangalore Post* of a Meteor seen on the 19th of April 1911 at Bangalore, and another account of the same Meteor which appeared in the *Madras Mail*.

The President—There is one other point, which is, that there has just appeared in the Scientific Journals a contention that the luminosity of meteors may after all not be due to the accepted idea of friction with the earth's atmosphere. This comes as rather a shock to some of us, who may have taken it for granted that the luminosity is caused by the earth's atmosphere without considering the matter very deeply. The author of the suggestion works out the amount

of air which a meteor from space would encounter on reaching the earth's atmosphere, and compares it with the air resistance which a bullet from a rifle encounters at sea level. The result in his opinion is to show that the resistance would not be sufficient either to stop the meteor or to render it luminous. The matter is one which evidently needs further investigation, and perhaps some of our members might take it up.

Mr. Holmes—Before we close this subject, I should like to say one thing in regard to Sergt. Hempstead. As I mentioned to you the other day, I think Sergt. Hempstead has taken so much interest in us, and been so obliging, that I should like to forward him free copies of the JOURNALS in which anything on the subject of this meteor appears.

The President—I think that goes without saying.

A hearty vote of thanks was duly returned to Mr. Holmes for his very interesting subject, and the amount of trouble and pains he had been at to obtain the negative, and to Sergt. Hempstead for lending the negative.

The President then showed a lantern slide diagram sent in by Mr. Hart of Mangalore, also reading a note on its use to determine the position of Mercury and Venus sent in by the same gentleman.

Mr. Simmons—What would be the present position of Venus to-day, being the 25th of April 1911?

The President—It would be just about here (indicating the place on the diagram).

A vote of thanks was duly accorded to Mr. Hart.

The Chair now being taken by Mr. Simmons, the President read a short paper submitted by himself on Mars, illustrating the same with some very beautiful lantern slide pictures received from Dr. Lowell.

Mr. Holmes—Do you mind putting on the other slide again. There is a great difference between the two slides.

The President—They were taken in two different years.

Mr. Holmes—How does he account for the fact that on one there is a mark practically right across the Equator; then you have the Polar Cap; then below that it is more or less fairly clear; with the other slide it seemed to me to be just the reverse.

The President—I think that does bring us to his point. The Polar Cap is much larger on one set of photographs than on the other. Dr. Lowell's contention is that when the snows melt and the Cap diminishes, the water is taken by some means towards the Equator, where it causes vegetation to spring up. I take it therefore that in the two slides there has been a difference of the seasons, thus giving rise to the contrast between the photographs.

Mr. Holmes—Does the same thing apply to the Southern Hemisphere ?

The President—Yes; I think so. Of course we are not in a position to see that in these photographs.

Mr. Simmons—In inviting discussion on the subject of the President's paper, Mr. Simmons said one point would be the "Canals." The President had rightly directed attention to the rather unfortunate selection of the term. It suggested human agency and was an instance of the great influence words exercised on thought. If the word "Channel" had been used instead of "Canal," much of the discussion which has taken place over the subject would probably have been avoided. Then, with regard to the phenomenon of "doubling," he thought it was noteworthy that while the earliest observer had counted 177 canals, Professor Lowell had counted 437. The phenomenon probably was an optical illusion as suggested by some but, on the other hand, the increase in the number observed was due to the use of instruments which could not be assumed to have deteriorated in the interval. Photographs also reproduced the canals. Then, again, in dealing with the question of life, the anthropomorphic tendency of the human mind had to be kept in view. The life in Mars need not be a mere duplicate of the life forms with which we are familiar. The geological eras of our own earth's history gave us instances of forms unlike those now in existence; and the microscope revealed a world of life forms in our midst which did not resemble those with which we are all familiar in the world around us. He declared the subject open for discussion.

Mr. Bhima Sena Rau—Has Professor Lowell mentioned the breadth of the canal on the figures ?

The President—Yes, about 2 miles. Of course it is an open question whether a line 2 miles will show on these small pictures.

Mr. Holmes—Do the canals extend right up to the Polar Cap ?

The President—Yes.

Mr. Dutt—Mr. President, may I enquire if a 3" refractor will show the Polar Caps ?

The President—Yes, certainly it would show the Polar Caps. I do not think it would show the canals, however.

Mr. Dutt—What is about the size of a telescope which would show the canals ?

The President—I have seen some accounts by an observer with a telescope $4\frac{1}{8}$ " diameter, who thinks he has seen them. Personally, I rather doubt it, and should not think anything

less than 8 or 10 inches would show them ; but though I have no doubt they are there, I do not mind saying that I have never seen them, not having made any great study of Mars.

A vote of thanks was duly returned to the President for his paper, and also a vote of thanks was accorded to Dr. Lowell.

The President next showed two other slides received from Dr. Lowell, the first being a photographic picture of Jupiter.

Mr. Holmes—The belts are clear ; what are they ?

The President—Yes, those are the equatorial bands. They are generally considered to be atmospheric phenomena on Jupiter.

The next picture shown was a very beautiful photograph of Saturn.

Mr. Ramaswami now read a note on a diagram which he had drawn, illustrating the Lunar eclipse which was to take place on the 12th May 1911. He explained that was only a penumbral eclipse, but made the diagram in the hope that some of the members would look out for it.

With a vote of thanks to Mr. Ramaswami, the proceedings came to a close, and the President then adjourned the Meeting to Tuesday, the 30th May 1911, at 5 p.m.

A Note on the Penumbral Eclipse of the Moon, 12th May 1911.

BY C. RAMASWAMI.

The diagram opposite, drawn roughly to scale, represents graphically the penumbral eclipse of the moon in May.

A. R. B. D. is the Earth's shadow and K. M. N. the penumbra. The straight line LX represents the path traversed by the centre of the Moon, and the small circles X_1 , X_2 , etc., show the positions of the Moon at different times. As the circles representing the Moon do not intersect the circle A. R. B. D. but only the outer circle K. M. N. the eclipse is only penumbral. The beginning and end of the eclipse are easily determined from the diagram. The Moon travels in the direction LX and the eclipse will begin when the Moon touches the penumbra, or in our diagram at the point where the little circle representing the Moon touches the K. M. N. Drawing this circle the time can be easily read off from the line LX, which is about 15h.-50m ; or more accurately 15h.-46m. The end of the eclipse is similarly seen to be at 20h.-7m.

The time used throughout is Greenwich mean time, which can be converted into Calcutta Standard Time simply by the addition of $5\frac{1}{2}$ hours.