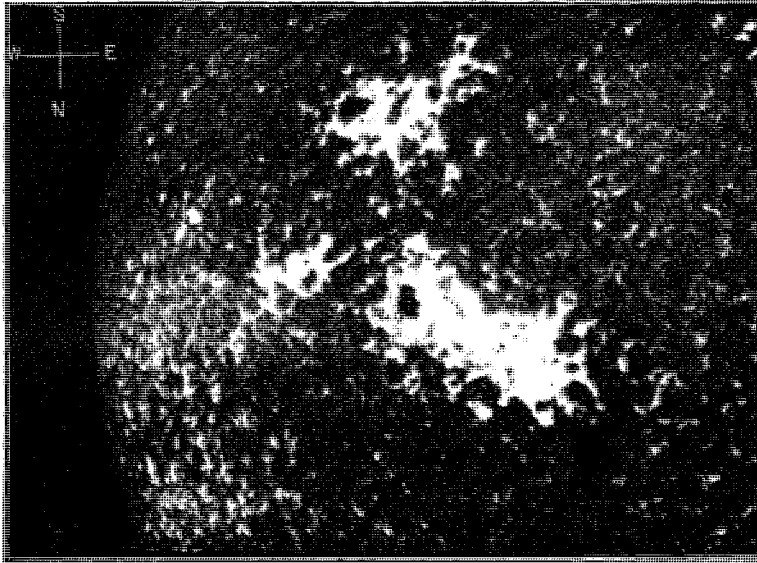


SUN SPOTS TAKEN AT KODAI KANAL OBSERVATORY IN  
THE 'K' LIGHT WITH THE SPECTROHELIOGRAPH.



1. Two large spots with their trains of Flocculi approaching the west limb of the Sun. Taken 12th September 1908.

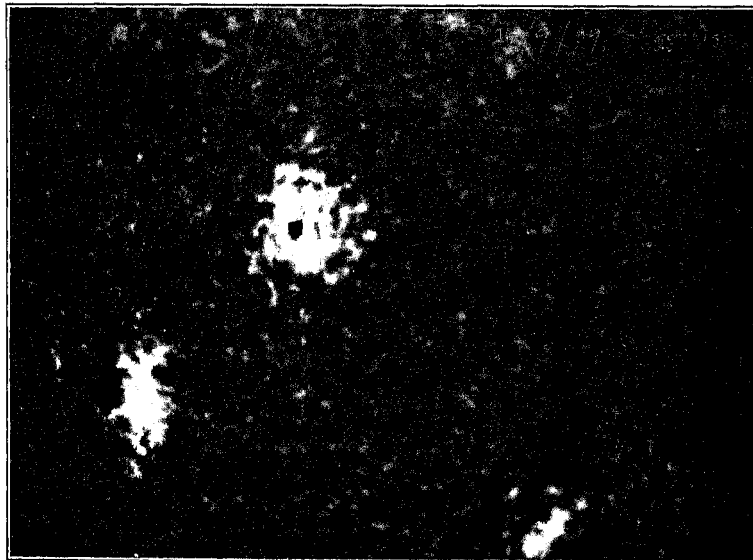


Photo-Engraved & printed at the offices of the Survey of India, Calcutta, 1911.

2. Spot of September 1909, taken the day before the great magnetic storm with which it was associated.

# The Journal

of the

## Astronomical Society of India.

VOL. I.]

SESSION 1910-1911.

[No. 5.

### Report of Meeting of the Society held on Tuesday, the 28th February 1911.

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

P. N. MUKHERJI, M.A., F.S.S., *Secretary*.

The Ordinary Monthly Meeting of the Astronomical Society of India was held in the Imperial Secretariat Buildings (ground floor) on Tuesday, the 28th February 1911, at 5 p.m.

The meeting was opened by the President, who called on Mr. P. N. Mukherji, Secretary to the Society, to read the Minutes of the previous Meeting, which were duly confirmed. The following donations were announced and a vote of thanks accorded to the donors:—

<i>Library.</i>	RS.	A.	P.
P. N. MUKHERJI, ESQ., M.A., F.S.S.	20	0	0
R. W. GILLAN, ESQ., B.A., LL.B., I.C.S.	32	0	0
THE HON'BLE MR. J. S. MESTON, C.S.I., I.C.S.,	20	0	0
J. C. MITTRA, ESQ., M.A., B.L.	20	0	0
S. C. MITTRA, ESQ., M.A., B.L.	5	0	0
J. C. DUTT, ESQ., M.A., B.L.	10	0	0
JATINDRA NATH BASU, ESQ., M.A., B.L.	10	0	0
W. J. BRYNING, ESQ.	5	0	0
E. P. HARRISON, ESQ., PH. D.	15	0	0
D. N. MULLICK, ESQ., M.A., F.R.S.E.	10	0	0
C. W. PEAKE, ESQ., M.A. (OXON)	25	0	0
SURANATH MAITRA, ESQ.	1	0	0
C. N. RAMASWAMI, ESQ., M.A.	2	0	0
T. C. RAY, ESQ., B.A.	2	0	0
H. M. COOK, ESQ.	15	0	0

	Rs.	A.	P.
MRS. M. PERCY BROWN	. 5	0	0
R. H. DRACOTT LACEY, ESQ.	. 5	0	0
RAI MATI LAL GANGULI BAHADUR	. 5	0	0
F. ALLAN LAWRIE, ESQ.	. 5	0	0
H. B. HOLMES, ESQ.	. 25	0	0
J. H. MANNING FOX, ESQ.	. 10	0	0

*Quarters.*

J. C. DUTT, ESQ., M.A., B.L.	. 10	0	0
E. P. HARRISON, ESQ., PH. D.	. 15	0	0
D. N. MULLICK, ESQ., M.A., F.R.S.E.	. 10	0	0
E. W. PEAKE, ESQ., M.A. (OXON)	. 15	0	0
H. M. COOK, ESQ.	. 15	0	0
RAI MATILAL GANGULI BAHADUR	. 5	0	0
H. B. HOLMES, ESQ.	. 25	0	0

*Donation of Books, &c.*

R. T. WATSON, ESQ.	. Klein's Star Atlas.
C. N. RAMASWAMI, ESQ., M.A.	. Comets and Meteors, by SIR R. BALL.
W. E. BUCHANAN, ESQ.	. Working plans of a Speculum Grinding Machine.
W. J. SIMMONS, ESQ.	. Two Planispheres.
PROF. EMMANUELLI	. Paper on the Total Solar Eclipse of April 1911.
PROF. LOWELL	. Four slides of Mars, Jupiter and Saturn.

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

THE HON'BLE MR. BHUPENDRA NATH BASU, M.A., B.L.  
 PULIN BEHARY DAS, ESQ., M.A.  
 A. C. JORE, ESQ.  
 COL. F. HAWKINS, I.A.  
 RAI SAHIB GOPAL CHANDRA CHATTOPADHAYA, B.A., C.E.  
 JOGESH CHANDRA RAY, ESQ., M.A.  
 DR. ZIA UDDIN AHMED, M.A., D.SC., PH.D., F.R.A.S.

The President next announced that the Society had received letters from the Royal Astronomical Society and the British Astronomical Association, and that both these two Societies had put the Astronomical Society of India on their list of exchanges. The thanks of the Astronomical Society of India was unanimously accorded to these Societies. The President also announced that he had a letter from Professor Lowell, of the Flag Staff Observatory, congratulating the Society on their start in India and wishing it every success. Professor Lowell stated in his letter that he was

sending out some lantern slides of Mars, Jupiter and Saturn to the Society, which he hoped would prove of interest. A vote of thanks was accorded to Professor Lowell. The President also announced that Mr. Evershed, now Director of the Kodai Kanal Observatory, had kindly consented to forward the contents of such Kiel cablegrams as might be of interest to the Society, if the Society were willing to pay for the Indian telegram. It was explained that Kiel was the central bureau, to which most of the Astronomers in the world communicated their discoveries, and that these were then communicated to all important observatories. One such observatory was Kodai Kanal, and it was a matter of much congratulation that Mr. Evershed had so kindly agreed to forward on the news to the Society. The result would be that important discoveries and items of astronomical interest would appear on the notice board of the Society very shortly after the event, and also find a place in the next JOURNAL.

A hearty vote of thanks was accorded to Mr. Evershed. The President next remarked that owing to the growth of the Society, and consequent increase of its work, it had been found necessary to appoint a paid man to look after it, and Mr. Ramaswami had been duly appointed on a salary of Rs. 25 per month. This was confirmed. He also remarked that 20 or 30 members had joined the classes held by Mr. Rakshit, the first of which classes was to be held on Friday, the 3rd instant, at 5 p.m. Members wishing to join these classes were requested to communicate with the Secretary.

The first paper of the evening from Mr. Buchanan of Simla, on the grinding of a 16" reflector, was then read by the President, while Mr. Saroda Charan Mittra took the Chair.

*Mr. N. Dhar.*—With the permission of the President, I should like to remark that I see that in this case the thickness of the glass was only  $2\frac{1}{2}$ ". This in my experience is rather thin, and I think I am right in saying the accepted thickness is usually one-sixth of the diameter of the mirror. Of course the difference is not very great, but with so large a disc I should have thought the full thickness necessary. I have usually found that a thin mirror is troublesome under the very fine method of testing which has to be adopted.

Another point is the grinding tool. I notice it was made of zinc. I have generally used two discs of glass—one for the mirror and the other for the tool. When these are ground together, the upper one—the mirror—becomes concave and the other convex. I find this satisfactory and

easier. Another point is the carborundum. I have never used carborundum and very rarely emery. I generally make use of sand.

*The President.*—Do you use sand for your fine grinding ?

*Mr. Dhar.*—Yes. I am quite able to read print through a sand-ground glass.

*The President.*—I presume you wash your sand in the same way as the emery ?

*Mr. Dhar.*—Yes, and to prevent sticking I keep it from getting too dry.

*The President.*—As regards the diameter of the mirror, Professor Richie makes it  $\frac{1}{4}$ th or  $\frac{1}{8}$ th of the diameter.

*Mr. Dhar.*—I have made 8" mirrors with 1" thickness.

*The President.*—Was it a success ?

*Mr. Dhar.*—Yes, quite.

*The President.*—I think that a  $\frac{1}{8}$ th thickness is pretty safe. Of course it can be made much thinner. Mr. Davies ground 12" mirrors only  $\frac{1}{2}$ " thick, but in this case it was a plane mirror. An amateur would find a  $\frac{1}{4}$ th thickness the best.

*Mr. Dhar.*—If the President would allow me I should like to send in a paper on the subject.

*The President.*—We should be very glad to receive your paper.

A vote of thanks was accorded to Mr. Buchanan for his interesting paper.

The next paper of the evening was read by Mr. Banerjee on the lunar ring plain Gassendi, who also showed some lantern slides to illustrate his remarks.

*The President.*—I should like to ask Mr. Banerjee one or two questions. I understand his process is that, when he has supposed his observer in the ring plain, he imagines himself to take a sharp knife and cut the mountain ring and spread them out in a line. Might I also ask whether you adopt a practical standard scale when you draw these mountains in your diagrams ? Are those heights to scale ?

*Mr. Banerjee.*—They are to scale.

In returning a vote of thanks to Mr. Banerjee, the President remarked that this was the third paper submitted by him, and that he had very ably dealt with a most interesting subject.

*Mrs. Tomkins* next read a paper on star photographs, explaining her remarks by the aid of some lantern slides taken by herself.

*Col. Lenox Conyngham.*—I would like to know if any attempt was made to determine the magnitude from these photographs.

*Mrs. Tomkins.*—Yes ; but the photographs were taken at too long intervals to give good results on this star—Algol.

*The President.*—They ought to be measurable, I think. When you are measuring the magnitude on an ordinary star, you judge your photographic magnitude by the diameter. If you trail a star, the width of that trail ought, I think, to give you a measurement of the magnitude. Of course you will have to make the usual reduction so as to be able to compare one plate with another.

Each variable star, taken on two plates at different times, might be affected by clouds developing, etc., and the trail of a fixed star would not always be of the same width ; but it should be of the same relative width to other stars in the plate, and this for bright variables will give a means of estimating the photometric magnitude. It is a question of interest to amateurs with cameras. These plates were taken not near enough together. A series of observations taken for, say, three hours would be interesting.

*Mr. Bhima Sena Rau.*—What are the dots just off the ends of the trails ?

*Mrs. Tomkins.*—They are for the identification of the stars. After exposing for the trail you put the cap on the lens and wait a short space of time and then give a second short exposure. This prevents any confusion of stars with defects in the plate.

*The President.*—It is most important to have some method of identification. One particular instance I remember. I was photographing an eclipse of the moon, and I got a most interesting object on the plate which I sent for opinion to a well known astronomer friend of mine. He suggested a hole in the dark slide and I found he was right !

*Mr. Ramaswami.*—Do I understand that the camera is mounted ?

*The President.*—Just an ordinary camera screwed on a support. There is one point which might be of interest to members, and that is the method of focussing.

The President then demonstrated his remarks by drawings on the blackboard.

The President next showed some lantern slide pictures received from the Kodai Kanal Observatory of the sun during a recent magnetic storm ; calling upon Dr. Harrison to kindly explain and comment on the pictures.

*Dr. Harrison.*—The Zeeman effect shown in the spectrum of those portions of the Sun's surface in the immediate neighbourhood of a spot, is a splitting up of what is normally a single line into two or more lines. The effect can be accounted for by assuming the atoms of matter to be associated with small electrically charged particles (electrons) of definite mass, the orbital vibrations of which give rise to light. Any particular wave length (and therefore any particular line in the spectrum of a glowing gas) is associated with a particular configuration of certain groups of electrons. A magnetic field will, in general, disturb the configuration, giving rise to one or more different periods of vibration, which is made evident to us as a doubling or trebling of what was originally a single spectral line. In the slide shown on the screen, the line of Calcium in the immediate neighbourhood of sun spots (which are always believed to be the seat of intense magnetic forces) is seen to be doubled in the one case and trebled in the other.

*The President.*—I think we are very much to be congratulated on having Mr. Evershed as one of our members to send us down these series of slides ; this makes the second instalment he has sent us. He has been a very good friend to the Society, and we all very much appreciate the privilege of seeing these wonderful pictures which many of us in India could not hope to otherwise enjoy. Mr. Evershed has now been appointed Government Astronomer and Director at the Kodai Kanal Observatory, and I am sure that the Society sends him its heartiest congratulations and thanks. This was unanimously agreed to, and a vote of thanks was returned to Dr. Harrison for explaining the slides.

Some photographs of the Orion Nebula were then shown, and one taken recently with the Presidency College instrument by Mr. Woodhouse. The definitions of Mr. Woodhouse's slide was much admired, the image of the Trapezium and Nebula being especially clear. A vote of thanks was returned to Mr. Woodhouse.

At the conclusion of the Meeting, Mr. Saroda Charan Mitra suggested that His Highness the Maharajah of Jaipur—who has been connected with Astronomy from the earliest times, and was in Calcutta—might be approached to see if he would join the Society. The suggestion was accepted and Mr. Mitra was asked to approach His Highness on the subject.

The Meeting was then adjourned to the 28th of March 1911.