The Journal of the
Astronomical Society of India.

VOL. III.] SESSION 1912-1913. [No. 6.

Report of Meeting of the Society held on Tuesday, 25th March 1913.

THE ordinary monthly meeting of the Society was held on Tuesday, the 25th March 1913, in the Imperial Secretariat (Treasury Buildings), at 5 P.M.

Mr. W. J. SIMMONS, F.R.A.S., *President*, in the Chair.

MR. C. V. RAMAN, M.A., *Honorary Secretary*.

The minutes of the previous meeting were read and confirmed.

The following presents received since the last meeting were announced and the thanks of the Society were accorded to the donors :—

1. Monthly Notices of the Royal Astronomical Society, Vol. LXXIII, No. 3.
2. Journal of the British Astronomical Association, Vol. XXIII, No. 4.
3. Revista Di Astronomia, Anno 7, No. 1.

4. Bulletin of the Astronomical Society of Barcelona for February 1913.
5. The Observer's Handbook for 1913. (From the Royal Astronomical Society of Canada.)
6. Monthly Weather Review for October 1912.
7. India Weather Review, Annual Summary 1911.
8. La Rotation de la Terre. (From the Vatican Observatory.)

The names of the following gentlemen who had been elected as members at the last Council Meeting were read and their election was formally confirmed :—

1. The Hon'ble Justice Sir Ashutosh Mukerjee, Kt., C.S.I., M.A., D.L., etc.
2. The Hon'ble Mr. J. G. Apcar.
3. Miss Bernice Mabel Cooper.
4. Miss Demetrius.
5. Mr. Ramnarain Tewary.
6. Mr. Nabin Chandra Mukerjee.
7. Mr. Monmotho Nath Paramanick.

President.—I will ask Mr. Tomkins to read the 5th instalment of his paper on "The Construction of a Cheap Telescope."

Mr. Tomkins.—Mr. President, before beginning my paper, I should like to call your attention to the fact that at the meeting before last we sent our congratulations to our Vice-President, His Highness the Maharaj Rana of Jhalawar, in connection with his election as a Fellow of the Royal Astronomical Society; last month we had the pleasure of congratulating you on a similar honour; and now at this meeting we have to congratulate another of our members who has received a signal honour. Our Vice-President, Colonel Burrard, has been awarded the Victoria Medal by the Royal Geographical Society for his researches in connection with the mountain barriers between Central Asia and India, and I think we may send our hearty congratulations to him.

This was supported by the President and carried with applause. (*Mr. Tomkins's paper on "The Construction of a Cheap Telescope."*)

President.—Are there any members who would like to put questions to Mr. Tomkins on the paper he has just read?

Mr. Raman.—I understand the idea is first to get the knife edge and the artificial star roughly at the centre of curvature of the mirror. Could this not be done in the usual way by using a flame and a screen on which to receive the reflected image ?

Mr. Tomkins.—It is so easily done by experiment in the way I describe that I do not think any other way would be worth the trouble. You can catch the light in about three or four minutes and can see it as a blaze of light on the mirror ; you can't miss it.

President.—I think you referred to a scale marked with $\frac{1}{100}$ of an inch. Do you buy it or make it ?

Mr. Tomkins.—I made one, and I also purchased one from a shop where they sell scales and rulers for surveying.

President.—In microscopical work a scale divided into hundredths and thousandths of an inch is used, which you have to buy as it needs a special instrument to make it. It is ruled on glass.

Mr. Tomkins.—In the present case you do not need a scale more than one inch long and it is sufficient if divided to $\frac{1}{100}$ of an inch. The one I am speaking of is ruled on a bit of metal. It wants a bit of practice in making it by hand, and moreover they are so easy to get that it is not worth while to make one. You do not want an optically accurate scale. The last one I used was of wood which is used in surveying for drawing purposes.

President.—Are there any further remarks ?

President.—In returning a vote of thanks to Mr. Tomkins, I should mention that the value of these papers on " The Construction of a Cheap Telescope " have been realised in Barcelona. The Astronomical Society there has asked permission to print a Spanish Translation of them in their Journals, which I think is a compliment to Mr. Tomkins and our Society. (*Mr. Mitchell's notes on " Venus " and on the " Ray System in the Neighbourhood of Proclus " were then read.*)

President.—Are there any remarks to be made on this paper ? I may here mention that I have observed Venus with a 3″ telescope lately.

Mr. Raman.—I have been watching Venus recently. There is such a large amount of light due to atmospheric scattering surrounding the planet that I fancy it is practically impossible to see the dark portion inside the crescent.

Mr. Tomkins.—I think that the dark portion of Venus has only been seen on rare occasions and I am very doubtful if it can be seen in Calcutta at all. There is nothing important about it, it is only a test of vision. Mr. Mitchell's observation regarding the horns of Venus is confirmed by several notes I have seen lately in scientific papers. There was also a white spot on one of the horns ; but whether it is still there I do not know.

President.—Do I understand it is suggested that this detached bright spot is a mountain peak as in the case of our Moon ?

Mr. Tomkins.—Yes. That is, I think, what it is supposed to be.

Mr. Tomkins.—Before sitting down may I make a remark on the Lunar rays, which is the subject of Mr. Mitchell's other paper. It is a great pleasure to me to find that some one is taking up the work on the bright rays. There is no doubt a very peculiar system round Proclus. The map which Mr. Mitchell is referring to was based on one from Mr. Dennett. It was one he made, from observations which extended over a number of years, I think I am right in saying about 1879. The conclusion was that these rays were variable. It was not suggested whether they were regular variations or irregular. They were sometimes seen on one night and not on another. The map was a key map. I spent six or eight months looking into these investigations and I think the changes might have been due to libration or variation in the intensity of light. I think there were undoubtedly cases in which he saw the rays on one night and not on another, but there were some contradictions in the notes and I could not say that a complete case was made out. Mr. Mitchell in taking up this system of rays is therefore doing good work.

President.—I suggest a vote of thanks to Mr. Mitchell for his paper. (*Mr. Bose on the Eclipse.*)

Mr. Raman.—We had a fairly large party on the roof of the Indian Association for the Cultivation of Science watching the eclipse. We saw nothing till about 6-35 and then suddenly a narrow streak of light shone out. Beyond the uneclipsed portion, only a slight extension of the limb was visible on each side but the rest of the moon was practically invisible. This apparent denseness of the shadow was probably due to the haze that covered up the horizon. I saw the last total eclipse of the moon at Nagpur when the moon was quite low down

near the horizon, but the surface of the moon was quite clearly visible. This, I think, was due to the dryness of the air at Nagpur.

Mr. Tomkins.—At what time did you see the eclipse at Nagpur ?

Mr. Raman.—From three to five in the morning.

Mr. Tomkins.—The time was favourable because the fires were all out; there is very little smoke in Calcutta at three in the morning and we could get a good sky at that time.

Mr. Raman.—Another point which I noticed as the light gradually spread over the moon was that the umbra was very well defined.

Mr. Tomkins.—Did you see it with a telescope ?

Mr. Raman.—Yes, with a three-inch refractor. I do not quite understand, on theoretical considerations, how such a sharply defined shadow is to be expected.

Mr. Tomkins.—I watched the eclipse after the moon rose and I can bear out what Mr. Raman said about the sharpness of the shadow. The penumbra was not extensive and the shadow was sharp. On the occasion of the previous eclipse when the same thing was noticed, Mr. Mitchell said that the eclipse was a light one, and I think that this was due to the air at Bankura being clearer. At Barrackpore on this occasion the eclipsed portion of the moon was distinctly visible and was inclined to be red.

President.—Mr. J. C. Dutt, Miss Simmons and I watched the eclipse, and I thought there was a duskiness between the penumbra and the umbra. There was a bright spot which to us almost seemed to be shining by its own light.

Mr. Tomkins.—With regard to your white spot, here is Goodacre's map, and I have a strong suspicion that the spot you are referring to is Aristarchus.

President.—How do you account for the brilliant whiteness of the spot ?

Mr. Tomkins.—It is a white spot and very bright—in fact the whitest on the moon. It is often seen in the dark portion of the crescent moon.

President.—The spot I saw certainly seems to tally with the position of the formation you point out. Are there any more remarks to be made ? (*Paper on "Nebulæ" by Mr. P. C. Bose.*)

Mr. Raman.—The mention which Mr. Bose makes of "Nebulium" reminds me of Dr. J. W. Nicholson's recent work on the spectra of the corona and of the hypothetical gases, "Nebulium," "Coonium," etc.

Mr. Tomkins.—There is one point. I gather that Mr. Bose says that the people of the Stone Age saw Sirus on the other side of the Milky Way.

President.—Is there any record of this? Some Anthropologists consider there are finds which indicate some kind of worship in the Stone Age, but the subject is a very large one. For us in an Astronomical Society, I think it is better to depend on the telescope and photography than on what it is surmised the people of the Stone Age believed in.

President.—We should return a vote of thanks to Mr. Bose for his interesting paper.

Some lantern slides of antique forms of telescopes and their mountings were shown by Mr. H. G. Tomkins and a vote of thanks was returned to him.

The meeting was then adjourned.

The Construction of a Cheap Telescope.

BY

Mr. H. G. Tomkins, C.I.E., F.R.A.S.

Paper V.

In my last paper I explained the theory of the method of testing the surface of the mirror and it now remains to put the theory into practice. For this we shall want a little simple apparatus which any one can easily make for himself or at any rate get made without any difficulty. Three things will be wanted: a holder for the mirror, the artificial star, and the testing apparatus. The first is a very simple contrivance to enable the mirror to be set up on edge for testing without risk of rolling over and breaking. Two pieces of wood of sufficient width and strength are nailed together at right angles