

Observations of the Gegenschien.

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My object in communicating this note to the Society is chiefly to stimulate the systematic observation of the Zodiacal Light and allied phenomena by the members of the Society who may be situated away from the smoke and glare of the city of Calcutta. Even here, in the midst of Calcutta, I have often had excellent views of the Zodiacal Light before the dawn in the early morning hours when sweeping for comets. From the 9th to the 12th of November last I was at Bankura engaged in working up my observations of Jupiter in company with the Revd. J. Mitchell of Bankura. I put up at the Dāk Bungalow close to Mr. Mitchell's observatory, and got out of bed every morning between 3 and 4 to watch the magnificent cold weather skies. The Zodiacal Light as I saw it then in the east was a glorious phenomenon and most fascinating to watch. The Dāk Bungalow was situated in a retired area, and there were no street lights anywhere that could light up the sky and injure the brilliancy and form of the Zodiacal band of light, which stretched almost right up to the Zenith. To one who had not studied it before, the sight would have been almost a revelation. The distance of the apex from the Sun must have been considerably in excess of 90°

Looking up on the opposite part of the sky I noticed in the constellation of Aries, a faintly luminous area of fairly small dimensions, probably about 5 degrees each way, which was clearest at a very early hour and gradually became more and more difficult to see till at last it merged into the luminosity of the horizon (I may mention here that the horizon and the part of the sky immediately above it seemed to me brighter than the rest of the non-galactic part of the sky). I noted the position of this area in the constellation and from Klein's atlas I subsequently found the position to be approximately, Dec. 15° North, and R. A. 3° . From the Nautical Almanac I find that the position of the Sun on the 10th of November was Dec. 17° South, R. A. 15° . It will thus be seen that the position of the area was more or less exactly opposite the Sun on that date. There seems little doubt that what I saw was the Gegenschien. The area of light was some distance away from the Milky Way and quite dissociated from it. From the description of the Milky Way given in Herschel's *Outlines of Astronomy*, it seems fairly

clear that in the particular region of the sky there was no extension of the Milky Way which could have been mistaken for the Gegenschien.

However this may be, there is no doubt that for us in India, we have in the Zodiacal Light and allied phenomena, a splendid field for serious work by amateur astronomers who are situated away from the smoke and glare of the Calcutta sky, and the purpose of this note will be fulfilled if it encourages others to take up the subject. It would, no doubt, be possible to arrange for photometric observation, etc., of the Zodiacal Light.

Lord Rayleigh has shown that a cloud of small particles whose dimensions are small compared with the wave-length of light scatters twice as much light towards the direction of the Sun as in a direction at right angles to it. It seems possible that on the meteoric swarm theory, this result of mathematical theory may explain the special brightness of the Zodiacal band of light in a direction opposite to that of the Sun. If we assume that the greater portion of the cloud of matter outside the Earth's orbit is situated within two or three hundred thousand miles of the Earth, we should see a circular hole in the patch of light corresponding to the shadow of the Earth cast by the Sun. It does not appear that this has ever been observed and possibly the entire illumination is so faint that no detail can be distinguished.

Extracts from Publications.

Snow.

When first observed no snow could be detected upon the planet (Mars), but the north polar zone was enveloped in cloud, as indicated by its bright yellow color, and the pole itself was turned away from us, as shown by the table, at an angle of 10° . The south polar zone was distinctly reddish, as far as the pole itself, and was apparently clear of cloud. August 14 a greenish white spot was seen in the extreme north, extending along the limb some 20° . It was whitish for about 20° farther, and then faded into yellow. The greenish white is probably a contrast effect, and quite different from the greenish grey due to vegetation, which will be noted later. This seems to have been the first appearance of snow. Its diameter was 1,300 miles, assuming it to continue