

The gap I referred to appeared at first as a kind of swelling, but afterwards the colours in the swelling and zones merged and we could only see it as a gap. But there are difficulties and I can at best only make a few suggestions.

And, after all, we must not be dogmatic for our knowledge of the planet is still meagre. But I think "we have seen sufficient to show us that the planet is not yet in a condition to sustain life such as this Earth sustains." It is evidently still in its infancy, but surely it is being prepared for some noble purpose. Can such a magnificent orb, with such a magnificent array of attendants circling round it, exist merely to reflect a feeble light to a few planets in this Solar system? I cannot think this. I would prefer to think its Creator has designed it for a higher purpose. I prefer to apply to it the words of the great inspired seer who spoke: "For thus saith the Lord that created the heavens, God himself that formed the world and made it; he hath established it, he created it not in vain, he formed it to be inhabited."

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## Saturn and His System

By C. V. RAMAN, M.A.

At the Town Hall on the evening of Friday the 12th March 1915, a lecture on Saturn, his system of rings and moons was delivered by Mr. C. V. Raman, M.A., under the auspices of the Astronomical Society of India. The Hon. Mr. W. A. Lee presided.

The lecturer said that Saturn was undoubtedly the most beautiful and most interesting of all planets, if not indeed of all celestial objects; and the constitution of the planet and rings as disclosed by modern telescopic and spectroscopic research certainly added greatly to this interest. Saturn was known and his movements had been studied from the remotest antiquities and in common with the other planets he had been given a place in the Pantheon. The fact that had most impressed the ancients was the extreme slowness of his movement along the signs of the Zodiac. The lecturer explained that according to modern ideas, this apparent movement was due jointly to the movements of Saturn and the Earth round the Sun, and its smallness was due to the great length of the period of revolution of Saturn; and also to his distance from the Sun being large compared with the diameter of the Earth's orbit. This slowness of Saturn's

movement was remarked by the ancients and was given an astrological significance. The ancients had rightly placed Saturn at the extreme outer limit of the planetary system as then known to them. It was a matter of speculation whether the ancients were aware of the beautiful ring-system that circled the planets. Among the Assyrian tablets unearthed by Layard were some representations of the god Nisroch in which he was shown surrounded by a circular ring, and there were also other tablets which suggested that the Chaldeans had, at least in a crude way, observed the rings of Saturn. This did not seem inherently improbable as there was tangible evidence that the Assyrians knew the art of making glass and of shaping lenses, though perhaps only of an imperfect kind. The lecturer said that of late he had been making careful observations of Saturn through the seven-inch Merz equatorially mounted telescope belonging to the Science Association in Bow Bazar Street and was much struck with the extraordinary fineness of the detail that could be made out with the instruments. The lecturer explained from optical principles how it was that planetary detail far beyond the limit of resolution of a telescope as applicable in the case of multiple stars could be readily made out and appreciated.

The lecturer said that he had studied this question of the visibility of planetary detail by laboratory methods. It was essentially a case of obliteration of detail by the "diffraction" of light due to the finiteness of the aperture and of the wave-length of the light, and it appeared that a dark gap such as the Cassini's division in the ring-system of Saturn would continue to be visible to the eye long after a double or multiple star of equal separation would merge into one continuous spot of light. The lecturer said it was this that was the real explanation why visual observation of planets even through a small telescope showed a great deal more than a photograph of the planet secured even with the aid of the largest telescope.

The lecturer then gave an account of the various phenomena exhibited at different periods by the rings and satellites and explained how the shadow of the ball on the rings and of the rings on the ball, and the transparency of the innermost and outermost portions of the rings all contributed to the telescopic appearance of the planet. Photographs of the planet and of the spectrum of the ball and the rings had been taken at several observatories and the lecturer explained how these revealed the structure of the rings surrounding the planet as consisting of separate discrete particles of matter reflecting sunlight.