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Report of the Meeting of the Society held on Tuesday, the 30th April 1912.

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

W. J. SIMMONS, for the *Secretary*.

The usual Monthly Meeting of the Astronomical Society of India was held in the Imperial Secretariat Buildings (Ground Floor) on Tuesday, the 30th April 1912.

The Minutes of the previous meeting were read by Mr. Simmons, in the absence of Mr. Mukerjee, and confirmed.

The President then announced the following presents given to the Society, and a vote of thanks was accorded to the donors :—

1. Monthly Notices of the Royal Astronomical Society (Vol. LXXII, No. 4).
2. Journal of the British Astronomical Association (Vol. XXII, No. 5).
3. Revista Di Astronomia Anno VI No. 3.
4. Monthly Weather Review of the Alipore Observatory for December 1911.
5. Anuales de L'Observatoire Royal De Belgique (Tome V. Fasigule I).

6. Rappert Annuel Sun l'Etat de L'Observatoire de Paris Pour l'Annee 1911.

7. Journal of the Royal Astronomical Society of Canada Vol. V, No. 6.

8. Bengali Journal "Bignan," Vol. I, No. 3.

The President then reminded the members of the fact that the telescope given by Dr. Harrison had come, and would shortly be mounted, and said that members might use it on sending in their applications to the Secretary or himself, stating when, where and for what purpose they were going to use it.

The President also announced that the monthly treatises of the Royal Astronomical Society purchased out of the donation, so kindly given by His Highness the Maharajah of Jhalwar, had arrived and were now in the library and available to members who would like to make use of them.

The election of the following members was then confirmed: Mr. E. Moller, Mr. G. Pierce, Mr. K. S. Dikshit, Mr. C. L. Demetrius, Miss M. C. Feline.

The President then called on those members present who had not done so, to sign the Roll of the Society and he then formally admitted them.

The President then asked Mr. Simmons to read his paper on the "Habitability of Planets and the Apparent Waste in Nature."

Before reading his paper Mr. Simmons expressed the pleasure of himself and the members at seeing their President again in the Chair after his recent accident.

The President, in asking members if they had any observations to make on the paper, said that there were three points which struck him during the reading of Mr. Simmons' paper.

First with reference to the mention of the star Algol. A paper regarding Algol had been given about a year ago by Colonel Lenox-Conyngham showing that the variation of Algol was due to a dark planet revolving round it. Members might like to refer to this paper, which is in one of the early numbers of the Journal.

The second point was in connection with the question of waste. It was necessary to have some definition of waste, and he thought one was going a little too far when he spoke of a planet as waste because it was uninhabited. He was not quite sure whether Mr. Simmons intended to put this forward as a finality, but the idea that a planet would be wasted without life seemed to arise from what was said. He thought that many might disagree with this view, and he himself would not care to go so far as to say it was the case. The third point was in the termination of the paper. It is said that the pith

of a letter is found in the post scriptum. He did not mean to say the same of Mr. Simmons' paper, which was full of interest throughout, but it occurred to him that Mr. Simmons had included a very valuable suggestion in the last paragraph of his paper. He referred to the use of analogy in considering scientific matters. He (the President) thought that analogy was a most useful aid in research work. It at any rate serves to prevent people from propounding impossible theories to account for phenomena which they do not understand, and when we are asked to accept these fairy tales, analogy with things which we know is a very useful test. For instance, it was against the idea that meteors came down with such force and of such size on the Moon as to result in formations there over four hundred miles in diameter. We had no experience of this kind of thing, nor was there anything analogous to it that we know of elsewhere.

Analogies are very useful to enable us to reason from those things which we know to those which we do not know and thus to help us to a true explanation of what we wish to investigate. They are of course only an aid to research and should not be pushed too far, but Mr. Simmons gave us a very valuable lesson when he spoke in his paper of applying analogy to matters of the kind he treats of as well as many others.

Mr. Simmons said his views of what constituted "waste" were influenced by Mr. Lowell's remarks as to life being an inevitable phase of planetary evolution, the outcome of a planet cooling down. Mr. Lowell's postulate was that life was Nature's highest product. If this was correct, then if a planet failed to produce life it must be regarded as a case of apparent waste in Nature.

Mr. Simmons agreed with the President in rejecting the meteoritic origin of the Moon, and was himself disposed to agree with those who considered that the Moon had once been part of our Earth, and had broken away from it leaving the gap we know as the Pacific Ocean. He also said that spectrum analysis as applied to stellar observations was based on the method of analogy.

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

The President then asked Mr. Simmons to read a note on a Meteor by Mr. Hart.

The President.—"It is doubtful whether the drawing is the exact colour of the meteor. The meteor is evidently a large one. Mr. Hart does not say whether there was any trail."

Mr. Raman.—"Can we get a spectrum of a meteor photographically?"

President.—I think it would be very difficult to photograph. I don't know if you have tried it, but I exposed seven plates during the meteor showers of November 1898. Though we recorded 52 meteors a minute at one time of the night, I was unable to take any photographs and the plates were blank.

If anything of the kind has been done I think it would be recorded in the Monthly Entries of the Royal Astronomical Society. This will be the best place to look.

The thanks of the members were then accorded to Mr. Hart for his note.

President.—“ If I am not imposing on Mr. Simmons, I will ask him to read the paper sent by Mr. A. McInerney on the construction of a universal sun-dial.”

I think in regard to this paper we must have Mr. McInerney's figures on the screen by means of a lantern slide as, A. C. B., etc., are Greek to the people present who are too far off to see the drawing. We had a design for a sun-dial some time ago which was very complicated in comparison to the one we have now seen. For the next meeting we will have a lantern slide of it.

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

President.—I will now ask Mr. Simmons to read the note sent us by our friend Rev. Mitchell on the appearance of the planet Mercury.

The notes were then read.

President.—Would any one like to make any observations regarding these notes ?

Mr. Banerjee.—We know that stars twinkle, but do planets twinkle too ?

Mr. Simmons observed that the phenomenon of twinkling was one which had not been quite cleared up. A Belgian observer, M. Montigny, who had given the subject his attention, found that the approach of rainy weather increased the twinkling of stars. It is more marked when a star is near the horizon (as Mercury always is when observed with the naked eye) but diminished as a star approached the zenith, and cited Sirius as an example. It is more observable from the surface of the ground than it is from mountain-tops. This showed that the depth of atmosphere through which a star is seen affects its twinkling. The Belgian observer also found that the phenomenon was to some extent dependent on the spectroscopic character of the light of a star.

President.—Would any one like to ask a question ?

Mr. Simmons has fully answered the question of twinkling, and twinkling in a planet is due to the cause that Mercury is never high up in the heavens.

There is very little doubt that twinkling is due to the atmosphere; it all depends on the state of the sky.

The President then showed some lantern slides on the very interesting subject of craterlets.

He then adjourned the meeting to the 28th May 1912.

The Habitability of the Planets and the Apparent Waste in Nature.

BY W. J. SIMMONS.

It is a recognised principle in science to argue from the known to the unknown. We are familiar in the world around us with the little pitted marks which rain leaves in the soil, and with the footprints which wading birds leave on the mud on the banks of a river, or which ripples leave on a sandy beach. When we discover similar markings in a stratum of rock buried deep down in the Earth's crust, we infer that tens of thousands of years ago rain fell, and wading birds stalked about, and ripples washed and broke on this planet in the old times before man appeared on the scene to till the ground. Furthermore, we may even be able to learn something from the silent testimony of the rocks about the direction from which the wind blew, and the intensity of the storm. We have argued from the known to the unknown; we have reasoned from parallel cases, *i.e.*, we have proceeded by the method of analogy, the method which has also been adopted in anthropology and other sciences.

So, too, when we find that one of the planets has its axis of rotation so adjusted to the plane of its orbit as to secure seasons which in some degree correspond to the seasons we experience on our Earth; when observation satisfies us that the diurnal revolution of the planet concerned gives it the phenomena of day and night; that its poles, alternately at intervals of a few months, put on white caps which suggest those worn by our Earth in its Arctic and Antarctic regions; that it has an atmosphere more or less cloud-laden, that when occasional glimpses can be obtained of its surface, markings are unveiled which bear what we may regard as a rough resemblance to the surface markings of our globe; that where clouds are there must be some fluid whose evaporation under the action of the Sun's heat forms cloud-masses