

theless, he is known to have his pet theories about the antiquity of the Moa, and is very impatient of any contradiction.

I have thought it right to offer this explanation in order to prevent your readers being misled on a subject of considerable scientific interest.

JULIUS VON HAAST

Canterbury Museum, Christchurch, N.Z., March 14

Visibility of the Satellites of Uranus

THE question of the visibility of these satellites in telescopes of moderate dimensions has lately excited considerable attention, but it does not appear that this question can be settled by any amount of verbal discussion. I take the liberty, therefore, to propose two test objects by means of which any one can, I think, satisfy himself whether he can see these satellites or not.

1. The companion of Regulus, north, preceding, and distant about three minutes of arc, has itself a small companion, which was discovered by the late Prof. Winlock. Any one who can see this small companion may be certain that he can observe the two *outer* satellites of Uranus and the satellite of Neptune.

2. The star of fifth magnitude, A Leonis, has a companion discovered at the Naval Observatory by Mr. G. Anderson. Any one who can observe this companion can, I think, see the two *inner* satellites of Uranus when at their elongations.

Of course in the case of such faint objects very much depends on the condition of the atmosphere, but the above tests are very nearly correct.

ASAPH HALL

Washington, May 14

Protective Resemblance in the Sloths

IN a note upon the above subject, dated December 29, 1875, which appeared in vol. xiii. p. 187 of NATURE, I omitted to quote a passage from a letter written by Dr. Berthold Seemann to the late Dr. J. E. Gray (dated April 1, 1871), with regard to a specimen of *Acotopithacus*, of a well-marked green colour, obtained by the former naturalist in Nicaragua. Of this Sloth he says, *inter alia* :—"It should be borne in mind that it has almost exactly the same greyish-green colour as *Tillandsia usneoides*, the so-called 'vegetable horsehair' common in the district; and if it could be shown that it frequented trees covered with that plant (a point I hope to ascertain during my next visit in June next), there would be a curious case of mimicry between this Sloth's hair and the *Tillandsia*, and a good reason why so few of these sloths are seen." (Note on the species of *Bradypodida* in the British Museum, by Dr. J. E. Gray, F.R.S., *Proc. Zool. Soc.*, May 2, 1871.) It would be interesting to know whether Dr. Seeman succeeded in solving this question; I am, however, not aware of any later reference made by him to this subject.

I here take the opportunity of correcting two misprints in my former letter, both of them in the Latin quotations, viz., "cum" for "eum," after the word "velleri," in the first, and "coque" instead of "eoque" after the word "possint," near the end of the second passage.

J. C. GALTON

OUR ASTRONOMICAL COLUMN

THE SECONDARY LIGHT OF VENUS.—During the next few weeks a very favourable opportunity will be afforded to observers in these latitudes for further examination of the planet Venus, with the view to a satisfactory solution of what must yet be regarded as a *questio vexata*—the visibility of that part of the disc, which is unilluminated by the sun, as the planet approaches or recedes from the inferior conjunction.

The subject is treated in detail in a communication to the Bohemian Academy of Sciences, from Prof. Safarik of Prague, entitled "Über die Sichtbarkeit der dunklen Halbkugel des Planeten Venus," which appears in *Sitzungsberichte der k. böhmischen Gesellschaft der Wissenschaften*, July 18, 1873. The author has collected together the many scattered observations extending over upwards of one hundred and fifty years, and presents also an outline of the various explanations which have been put forward.

The earliest mention of the faint illumination of the dark side of Venus is by Derham, in a passage in his *Astro-Theology*, to which attention was first directed by Arago. Derham refers to the visibility of the obscure part of the globe "by the aid of a light of a somewhat dull and ruddy colour." The observation is not dated, but appears to have been prior to the year 1714. A friend of Derham's is also stated to have perceived the same illumination very distinctly.

The next observations are by Christfried Kirch, second astronomer of the Berlin Academy of Sciences, June 7, 1721, and March 8, 1726, and were found in his original papers and printed in *Ast. Nach.* No. 1586. The image on the first occasion was tremulous, but though he could hardly credit his vision, he appeared to discern the dark side of the planet. In 1726 he remarked that the dark periphery seemed to belong to a smaller circle than the illuminated one. Kirch observed with telescopes of sixteen and twenty-six feet focal length, powers 80 and 100. Two other persons confirmed his observation in 1726.

The next observation in order of date, was found by Olbers, in "Observationes Veneris Grypswaldensis," cited by Schröter in his observations of the great comet of 1807. It was made by Andreas Mayer, Professor of Mathematics at Greiswald: on October 20, 1759, he observed the meridian passage of the planet, then at a south declination of $21\frac{1}{2}^{\circ}$, with a six-foot transit instrument by Bird, power not much over 50, and has the remark—"Etsi pars lucida Veneris tenuis admodum erat, nihilominus integer discus apparuit, instar lunæ crescentis quæ acceptum a terra lumen reflectit." As Prof. Safarik justly observes, considering the circumstances under which Mayer's observation was made with the planet only 10° from the sun, and not more than 14° above the horizon, the phenomenon on this occasion must have had a most unusual intensity.

It does not appear that Sir W. Herschel at any time perceived the secondary light of Venus, though he remarked the extension of the horns beyond a semi-circle.

Von Hahn, at Remplin, in Mecklenberg, the possessor of excellent telescopes by Dollond and Herschel, was fortunate in viewing the dark side of Venus on frequent occasions during the spring and summer of the year 1793, and he is considered by Safarik to have witnessed the illumination of this part of the disk under more varying conditions than any other observer. The light is described as grey verging upon brown. Von Hahn's observations were made with various instruments and at different hours of the day.

Schröter, at Lilienthal, on several occasions between the years 1784 and 1795, had remarked in full sunshine the extension of the horns of the crescent many degrees beyond the semicircle, the borders of the dark hemisphere being faintly illuminated with a dusky grey light; but on February 14, 1806, at 7 P.M., he saw for the first time the whole of the dark side, as he expressed it, "in äusserst mattem dunkeln Lichte." The sharply-defined contour had an ash-coloured light; the surface was more dimly illuminated. Schröter, in recording this observation, expresses his surprise that during the many years he had observed the planet, part of the time with his 27-feet reflector, with the full aperture of 20 inches, he had not previously perceived the whole of the dark side, but he was satisfied there was no illusion. At this time one-eighth of the diameter of Venus, about $48''$, was fully illuminated, the planet casting a very sensible shadow.

Harding, observing at Göttingen on January 24 of the same year, with a 10-feet Herschelien reflector, power 84, and full aperture of 9 inches, saw the whole dark side of Venus shining with a pale ash-coloured light, very distinctly perceived against the dark ground of the sky. The appearance was too evident to allow of the suspicion of an illusion; it was the same in all parts of the field of

view, and under various magnifying powers. Altogether the phenomenon was as distinct as in the case of our moon. On February 3, 16, and 21 it was not seen, but on the evening of February 28, it was again prominently visible to Harding; the illumination was now of a reddish grey, "like that of the moon in a total eclipse." Yet on the same evening Schröter looked in vain for the phenomenon at Lilienthal, showing how cautiously negative evidence should be received.

Observations of the secondary light were made by Pastorff in 1822 and by Gruithuisen in 1825.

The *Monthly Notices* of the Royal Astronomical Society contain many observations since the year 1842 by Messrs. Berry, Browning, Guthrie, Langdon, Noble, Prince, and others. Mr. Prince had favourable views of the illumination of the dark side in September 1863. Capt. Noble's observations, as remarked by Prof. Winnecke in his notice of Prof. Safarik's memoir, do not appear to refer to the secondary light as it has been perceived by other observers. He mentions that the hemisphere unilluminated by the sun has to him "always appeared distinctly and positively darker than the background upon which it was projected," a statement which certainly gives the observations a distinctive character.

There are also observations of the secondary light by Lyman, at Yale College in 1867, and about the same time by Safarik at Prague, and in August, 1871, more decidedly. In September of the latter year the whole disk of Venus was seen by Prof. Winnecke as described in *Ast. Nach.*, No. 1863. This astronomer has since stated that notwithstanding he has observed the planet many hundred times during the last twenty-four years, he has only succeeded in perceiving this remarkable illumination of the dark side on two occasions; and it should be added that Dawes, Mädler, and other eminent observers, have never detected it. We shall revert to this subject next week.

THE OBSERVATORY AT ATHENS.—The death is announced of Baron Simon von Sina, son of the founder of the Observatory at Athens, which has been successively under the direction of M. Bouris and Herr Julius Schmidt. The deceased Baron is mentioned as a liberal patron of this establishment, though not himself engaged in scientific pursuits, and Herr Schmidt writes doubtfully of the future of the Observatory. Every astronomer will entertain the hope that this most laborious and successful observer—distinguished not only by his great work upon the moon, but for his numerous discoveries and observations of variable stars, his long and important series of observations of comets, of short period and otherwise, in which he has made excellent use of the advantages of his southern position, and many other valuable contributions to observational astronomy—may continue to hold, under favourable auspices, the direction of an establishment which his exertions have made so honourably known in the astronomical world.

THE LOAN COLLECTION CONFERENCES

OWING to the pressure on our space this week, we can only refer briefly to what has been done since our last notice at the Conferences in connection with the Loan Collection. We give, however, in another part of the paper the presidential addresses of Dr. J. Burdon Sanderson, F.R.S., in the Section of Biology, and of Mr. John Evans, F.R.S., in the comprehensive Section of Physical Geography, Geology, &c. We hope in early numbers to be able to give at some length the principal papers which have been read in the various sections.

On Thursday last the concluding meeting in the Section of Mechanics was held, when the following papers were read:—"On Prime Movers," by Mr. Bramwell, F.R.S.; "The Construction of Furnaces," by Mr. Hackney; "A History of Electric Telegraphs," by Mr. Preece.

The first meeting in the Section of Biology was held on Friday, when the papers of which we gave a list in our last week's notice were read. This Section met also on Monday, when the following papers were read:—

Dr. Royston-Pigott, F.R.S., on a "Microscope with Complex Adjustments, Searcher, and Oblique Condenser Apparatus;" Prof. Rutherford, F.R.S., "On a Freezing Microtome;" Prof. Flower, F.R.S., "On the Osteological Preparations exhibited by the Royal College of Surgeons;" Herr Prof. Dr. Donders, "Ophthalmological Apparatus;" Dr. M'Kendrick, "Acoustical Instruments;" Prof. Yeo, M.D., and Dr. Urban Pritchard, "On Microtomes."

On Tuesday the first meeting in the Section of Physical Geography, Geology, Mineralogy, and Meteorology, was held, when, in addition to the President's Address, the following papers were read:—

Mr. R. H. Scott, F.R.S., "Meteorological Instruments in the Loan Collection;" Mr. G. J. Symons, "The Measurement of the Rainfall;" Dr. R. J. Mann, "Lightning Conductors;" M. le Professeur A. Daubrée, "La Géologie Synthétique;" Mr. J. E. H. Gordon gave an explanation of his Anemometer; Mr. C. O. F. Cator "On Anemometers;" Prof. von Oettingen gave a description of his Anemometer; Dr. R. J. Mann, "Lowne's Series of Anemometers;" Mr. John Evans, F.R.S., "Dalton's Percolation Gauge."

This Section meets again to-day and to-morrow, for which days the following programme has been drawn up:—For to-day.—Capt. Baron Ferdinand von Wrangell, "On Self-registering Tide-gauges;" Lieut. Cameron, R.N., "Physical Geography of South Tropical Africa;" Major Anderson, R.E., "Maps of Palestine;" Col. Walker, R.E., or Col. Montgomerie, R.E., "Discoveries in Tibet;" Mr. Francis Galton, F.R.S., "On Means of Combining Various Data in Maps and Diagrams;" Capt. Evans, R.N., C.B., F.R.S., Hydrographer of the Navy, "Hydrography, its present Aspects;" Capt. J. E. Davis, R.N., "The various forms of Sounding Apparatus used by Her Majesty's Ships in ascertaining the depth of the ocean, and the nature of its bottom;" Staff-Commander E. W. Creak, R.N., "Nautical Magnetic Surveys;" Prof. Roscoe, F.R.S., "Automatic Light Registering Apparatus." For to-morrow.—Prof. Ramsay, F.R.S., "The Origin and Progress of the Geological Survey of the British Isles, and the method on which it is conducted;" Mr. W. Topley, F.G.S., "The Sub-Wealden Boring;" Mr. C. E. de Rance, F.G.S., "Sketch of the Geology of the known Arctic Regions;" Mr. W. Galloway, "Colliery Explosions;" Prof. Baron von Ettingshausen, "The Tertiary Origin of the actual Flora;" Mr. J. S. Gardner, F.G.S., "The Tertiary Floras;" M. des Cloiseaux, Membre de l'Institut, "L'emploi des propriétés biréfringentes à la détermination des cristaux;" Mr. Walter Rowley, F.G.S., "Description of his Transit Theodolite for Mine Surveying, and other purposes;" The Rev. Nicholas Brady, M.A., "Desirability of a Uniform International Notation for Crystallography."

This will conclude these Conferences, which are admitted on all hands to have been a great success and to have added very much to the practical value of the collection. The popular expositions we referred to last week have been carried on with success, and apparatus may now be minutely inspected on Wednesdays, Thursdays, and Fridays, on application to the Director of the South Kensington Museum on forms provided for the purpose.

As we intimated last week, the Science and Art Department are organising a series of popular lectures in connection with the Loan Collection, to be given on the evenings of the free days—Mondays, Tuesdays, and Saturdays. We believe that the first of these lectures will be given on Saturday by Prof. Roscoe, F.R.S., on Dalton's Apparatus, and what he did with it."