

MONTHLY NOTICES

OF THE

ROYAL ASTRONOMICAL SOCIETY.

VOL. XXXII.

May 10, 1872.

No. 7.

PROFESSOR CAYLEY, President, in the Chair.

Report on Observations made by the Government of India on the Total Eclipse of the Sun on Dec. 11-12, 1871. By Lieut.-Col. Tennant, R.E., F.R.S. (Abstract.)

This paper is an official report on the observations of the Total Eclipse of December last, which was observed by Lieut.-Col. Tennant and his coadjutors by the orders of the Indian Government.

A letter to Dr. Huggins, published at page 70 of the present volume of the *Monthly Notices*, will have given the Fellows of the Society some knowledge of what was observed, and as Col. Tennant's paper will appear at greater length it will not be necessary to make this notice very long.

Dodabetta, the station of observation, is the principal peak of the Nilgherry Hills, situated in N. Lat. $11^{\circ} 24'$, E. Long. $76^{\circ} 43'$. Its height above the sea is 8650 feet nearly, and the observations made here, and especially the photographs (of which glass transparencies were exhibited at the meeting), are valuable for comparison with those of the observers of the British expedition whose stations were at a far lower level.

Col. Tennant expresses himself very positively as to the absence of any well-defined and nearly uniformly bright portion of the corona whose extent is limited to some four or five minutes from the Sun; up to the limit to which it was examined the light

faded away. He also is confident that those portions of the corona to which his attention was directed were constant, and this is evidenced not only by his own photographs but by comparison with the pictures taken by Lord Lindsay's assistant, Mr. Davis, at Bekul, as there exists the most marked resemblance.

The spectroscopic results are described as in the paper before mentioned. Identifications of the lines are given, but of course these are liable to some considerable uncertainty. The prominent point is that the green line considered to be identical with K 1474 was apparently continuous across the rifts. Of course there was no possibility of recording the numerous lines which Capt. Herschel saw as the solar limb appeared. It is the fact that they were so numerous which is of importance.

As regards the photography the report gives some details as to the procedure, and then proceeds to describe the photographs. These descriptions would hardly be intelligible without the pictures themselves, copies from which were examined with much interest by many of the Fellows. The corona is extremely beautifully depicted in the four early photographs, while the fifth, though less sharply defined, is still exceedingly good. The sixth is defective, evidently from the clock having ceased to act; and as it was stated that it was going after the set was completed, it seems not improbable that one of the clamps which had slipped once before had again temporarily yielded. The encroachment of the corona and prominences on the lunar limb is very marked, and it produces the *elongated appearance* of the Moon which Colonel Tennant, in his letter to Dr. Huggins, mentions having noticed in the hurried examination he was able to give before it left. The transparencies on opal glass were much admired, and do great credit to Captain Waterhouse, who made them from the negatives, which are themselves the result of his manipulation.

As regards Polariscopes observations, Col. Tennant gives a result by Mr. Broughton, B. Sc. London, who found no polarization before total phase, but that Savart's Polariscopes showed the characteristic bands brightly at the instant when the coronal light appeared.

Colonel Tennant concludes by giving the results at which he has arrived from an examination of the results reported in this and his preceding paper, and a comparison with those known to him as having been attained by others. He says:—

“The following, then, seems to be the constitution of our Sun. There is a nucleus which gives out continuous white light like solid or liquid bodies, and even dense gases. Surrounding this is a layer of heavy vapours intensely heated, but far less so than the nucleus, and in which, if a state of equilibrium could exist, the heaviest vapours would be lowest. Above this is a layer of glowing hydrogen of very slight density accompanied by that gas which gives out the line D₃. Still further up these gases in a cooler state become mixed with what gives out the green line K 1474; and, lastly, that alone seems to remain.”

Colonel Tennant has deposited the original negatives of the photographs taken on this occasion with the Astronomer Royal.

On Errors in Vlacq's (often called Briggs' or Neper's) Table of Ten-figure Logarithms of Numbers. By J. W. L. Glaisher, B.A., F.R.A.S., Fellow of Trinity College, Cambridge.

As, with the exception of Vega's *Thesaurus* &c., the only complete table of ten-figure logarithms that has been published is the original one, partially calculated by Briggs and completed by Vlacq, the publication of errors detected in this work is of very considerable importance. Lists of errata have been given by Vlacq himself, by Vega, Sherwin, Lefort, and others, but it is not possible to find without comparison to what extent these lists are concurrent or supplementary; the main object of this note is, therefore, to give the results of an examination of these tables of errata, and to supplement them with some not previously published. In order to render clear what follows, it is necessary to premise some facts with regard to the original calculation of the logarithms of numbers.

The first table of logarithms to the base 10 was calculated by Henry Briggs, Savilian Professor of Geometry at Oxford, and published by him under the title, *Arithmetica logarithmica, sive logarithmorum chiliades triginta, pro numeris naturali serie crescentibus ab unitate ad 20,000: et a 90,000 ad 100,000. . . . Londini, excudebat Gulielmus Jones, 1624.** This table contains the logarithms of the natural numbers from unity to 20,000, and from 90,000 to 100,000 to 14 places of decimals. There is thus left a gap from 20,000 to 90,000, which was filled up by Adrian Vlacq, who published at Gouda, in 1628, a table containing the logarithms of the numbers from unity to 100,000 to 10 places of decimals. Having calculated 70,000 logarithms and copied only 30,000, Vlacq would have been quite entitled to have called his a new work. He designates it, however, only a second edition of Briggs, the title running, *Arithmetica logarithmica, sive logarithmorum chiliades centum, pro numeris naturali serie crescentibus ab Unitate ad 100,000. . . . Editio secunda aucta per Adriannum Vlacq, Goudanum. . . . Goudæ excudebat Petrus Rammasenius, 1628.* This table of Vlacq's was published, with an English explanation prefixed, in London in 1631. The title of the English work is, *Logarithmicall Arithmetike*;

* Some copies, with the same title-page, contain an additional chiliad; viz., the logarithm of numbers from 100,000 to 101,000. The library of Trinity College, Cambridge, contains one of these copies, which belonged to Dr. Brinkley. In 1517 Briggs published his *Logarithmorum chilias prima*.