

7. Preliminary Note on a New Method of Investigating the Properties of Knots. By Professor Tait.

As we cannot have knots in two dimensions, and as Prof. Klein has proved that they cannot exist in space of four dimensions, it would appear that the investigation of their properties belongs to that class of problems for which the methods of quaternions were specially devised. The equation

$$\rho = \phi(s),$$

where ϕ is a periodic function, of course represents any endless curve whatever. Now the only condition to which variations of this function (looked on as corresponding to *deformations* of the knot) is subject, is that *no two values of ρ shall ever be equal* even at a stage of the deformation. Subject to this proviso, ϕ may suffer any changes whatever—retaining of course its periodicity. Some of the simpler results of a study of this novel problem in the theory of equations were given,—among others the complete representation of any knot whatever by three closed plane curves, non-autotomic and (if required) non-intersecting.

The following Gentlemen were elected Ordinary Fellows of the Society:—

ROBERT A. MACFIE, Dreghorn, Colinton.

WILLIAM STIRLING, Sc.D., M.D.

Monday, 21st May 1877.

PROFESSOR KELLAND, Vice-President, in the Chair.

The following Communications were read:—

1. On the Cranial Osteology of Rhizodopsis, and on some points in the Structure of Rhizodus. By Dr R. H. Traquair.

2. Notice of Recent Earthquake Shocks in Argyleshire in 1877. By David Stevenson, Civil Engineer.

Two earthquake shocks have lately occurred in Argyleshire of so decided a character that a description of their effects, as observed

at four of the Lighthouse stations on the west coast of Scotland, will, it is thought, be interesting to the Society.

The first shock occurred on the 11th March, and was observed at the Lighthouse station of Hynish in the island of Tyree, and at Sound of Mull, near Tobermory, the distance between the two places being about 34 statute miles.

The report from Tyree states:—"On the 11th current (March), at half-past 11 o'clock A.M., a smart shock of earthquake was felt all along the island; a great many people both heard the noise and at the same time felt the earth to tremble. It was heard and felt very distinctly at the station." Bar. 30·18 at 9 A.M.

That from the Sound of Mull says:—"On the 11th, at 11.30 A.M., this district was visited by a smart shock of earthquake. It began by a rumbling noise like distant thunder. When the noise was at its height the houses, and everything about them, shook, and the slates on the roof rattled. The shaking was not of long duration, but the noise was heard a considerable time before and after the trembling of the earth." Bar. 29·92 at 9 A.M.

The second shock, which seems to have been more severe, took place on the 23d April, and was observed at the island of Phladda, off Easdale, and at Lismore, at the eastern entrance to the Sound of Mull, the distance between the two stations being about 73 statute miles.

The report from Phladda states:—"At 3.40 A.M. the Principal Keeper on the watch felt a severe shock of earthquake. The tower and dwelling-houses shook very much. All the neighbouring islands felt it at the same time." Bar. 29·74 at 9 A.M.

At Lismore the lightkeeper describes the effect as follows (the lighthouse clock had been under repair):—"I beg leave to report that on the morning of the 23d, at 3.30 A.M., while I was standing on the grating inside the lightroom I felt a heavy shock on the tower, with a strange rumbling sound of noise which lasted some seconds, and made everything in the lightroom shake at an alarming rate. It awoke all the inmates of the dwelling-houses. Mr M'Leod jumped out of bed, thinking the tower had fallen, but afterwards thought it was a peal of thunder. I do not think it was thunder. I saw no lightning, and the wind was

light at the time. There is no damage done to anything about the station so far as I can see.” Bar. 29·43 at 9 A.M.

These observations are valuable because of their trustworthiness as coming from wholly independent observers, and because few more sensible earthquake shocks have, so far as I know, been observed in Scotland. It is also remarkable that they do not appear to have been felt at any other lighthouse stations, although there are several others in the immediate vicinity. A record of them may therefore be useful to those engaged in seismic investigations.

3. Additional Remarks on Knots. By Professor Tait.

The author, in laying before the Society a revised and condensed version of the various papers recently communicated by him, took occasion to make some additional remarks. Of these only one need be given here. He pointed out that another fundamental term is requisite besides those already used viz., *Knots* and *Links*. For three endless cords may be inseparably entangled with one another, or locked together, even if no one of them be knotted and no two interlinked.

Monday, 4th June 1877.

DAVID STEVENSON, Esq., C.E., Vice-President,
in the Chair.

The following Communications were read:—

1. On the Structure and Relations of the Genus *Holopus*.
By Sir C. Wyville Thomson, F.R.S.

(*Abstract.*)

The “Challenger” Expedition had no opportunity of visiting Barbadoes, and this I regretted greatly, as Sir Rawson Rawson, who was at that time governor of the island, had paid great attention to the marine fauna, and was anxious to introduce us to his fine collection, which included many specimens of the rare and