

continuous, though they are sometimes as bright as true magnetic auroras which show the citron line.

The average number of nights on which I have seen these irregular auroras in the past 28 years, chiefly at Sunderland, is 1.9 per annum; and, if doubtful cases are included, 2.7. They agree with magnetic auroras in so far as they show some tendency to an eleven-year periodicity, being most frequent about 2 years after the sun-spot maximum, and least so about 5 years later.

T. W. BACKHOUSE.

Sunderland, January 15.

MR. STROMEYER'S letter in NATURE of the 9th inst. (p. 225) reminds me of a magnificent display that I once saw of luminous white clouds, transparent to the stars, which shone brightly through them. These clouds were extended like ribbons from north to south across the sky, in a way not uncommon with true clouds. I thought, and still think, that they were an aurora. May not those described by Mr. Stromeier have been the same?

Belfast, January 15.

JOSEPH JOHN MURPHY.

The Meteorite of Mighei.

WITH reference to the interesting meteorite of Mighei, examined by M. Stanislas Meunier, I have not observed, in any of the notices I have seen, any statement as to whether the organic matter exhibited any traces of an organized structure. I would suggest that, if it has not already been done, it should be carefully examined to see if the carbonaceous matter shows any such traces.

J. RUTHERFORD HILL.

January 11.

Achlya.

I SHALL be very grateful to any of your readers who can send me specimens of *Achlya* with the sexual reproduction, which I cannot at present obtain in my cultures. The culture should be dropped bodily into a cold saturated solution of corrosive sublimate, in a wide-mouthed corked bottle, and this filled up with the liquid to the cork before posting.

MARCUS M. HARTOG.

5 Roseneath Villas, Cork, January 6.

The Parallelogram of Forces.

WHAT is the force of the word "rigid," introduced into the statement and proof of the parallelogram of forces and other theorems in Statics, as quoted by Mr. W. E. Johnson from the ordinary text-books?

The word "rigid" requires definition; it describes a state of things which is not met with in Nature; and it is redundant and limiting; because the conditions of equilibrium of a body are the same, whether elastic to an appreciable extent, or to such an inappreciable extent that the word "rigid" may be applied to it.

Better omit the word "rigid" altogether.

A. G. GREENHILL.

Foot-Pounds.

IN the statics and dynamics paper set in the last Woolwich entrance examination, candidates are asked to determine the magnitude of a moment of a force in *foot-pounds*. Surely it is unfortunate to introduce this term in such a sense. One foot-pound is a unit of work, and though its dimensions (ML^2T^{-2}) are the same as that of a unit of a moment of a force, the two conceptions are perfectly distinct, and the introduction of a foot-pound as a unit of a moment of a force is likely to cause confusion, especially in the minds of beginners.

A. S. E.

Chiff-Chaff singing in September.

IN a review of certain recent ornithological works, in one of your latest issues, doubt seems to be thrown on the fact of the chiff-chaff singing late in September.

I believe it is not an unusual occurrence. It always nests in my garden, and this year, as I see by a note made at the time, it sang on the 20th, 21st, and 22nd of that month. We had a slight frost on the 21st.

F. M. BURTON.

Highfield, Gainsborough, January 6.

EAST AFRICA AND ITS BIG GAME.¹

FOR sporting purposes Cape Colony and the adjoining districts are long ago "used up," and the hunter who would fain see "big game" must follow Mr. Selous into Matabele-Land and Mashoonaland, if he does not find it better to cross the Zambesi. Even here, some of the largest animals are already exterminated. The redoubted hunter whose name we have just mentioned has not met with a White Rhinoceros during the past four seasons, and his "bag" of ivory shows a yearly diminution. So much for the south of the Dark Continent. The northern entrance to the great Interior, which afforded Sir Samuel Baker and those who followed him such splendid sport on the Atbara and Settite, has been closed up by the Mahdists, and until we have made up our minds to "clear out Khartoum," no European can hope to penetrate in this direction. There remains, therefore, only the eastern coast as a mode of access to the wild interior of game-tenanted Ethiopia, the west coast being practically closed by swamps and fevers.

On the eastern coast of Africa, however, immediately under the equator, a splendid stretch of high-lying land, full of big game, and easy of access, is still open to the enterprising sportsman. First made known to us by the German missionaries Rebmann and Krapf, the "Kilimanjaro District," as it is now usually called, was subsequently opened to us by Von der Decken, New, and Hildebrandt. To these explorers succeeded Mr. Joseph Thomson on his route to Masai-Land, and Mr. H. H. Johnston on his expedition up the Kilimanjaro Mountain, to which Dr. Hans Meyer and other more recent travellers have also devoted their special attention. Access to this sportsman's paradise is rendered easy by the port of Mombas, now under the benign sway of the British Imperial East African Company, and connected with Aden by a regular line of steamboats. Here, in the autumn of 1886, having made the necessary preparations at Zanzibar, the author of the present volume, with his brother sportsmen Sir Robert Harvey and Mr. H. C. V. Hunter, assembled their caravan. Their plan was to reach as quickly as possible the forest of Taveta, distant about 250 miles from the coast and within ten miles of the base of Kilimanjaro, and having established their headquarters in this favoured spot, to work thence the surrounding plains and open country. Mr. C. B. Harvey, the brother of Sir Robert, was to join them when his leave commenced, a month later.

How well this programme was carried out the entertaining pages of Sir John Willoughby's narrative fully explain to us, while the map at the commencement clearly shows the route and the nature of the different districts traversed, as they appeared to the eyes of the enthusiastic sportsmen. Much time and trouble was saved to the expedition by the selection of a Maltese named Martin as "chief of the staff." Martin had accompanied Mr. Thomson during his adventurous journey into Masai-Land, and was, moreover, the owner of a "freehold building-site" at Taveta. Hereon was a house and a range of huts, forming three sides of a large square, while the fourth was bounded by a sparkling rivulet well stocked with fish. Such a haven of refuge, protected, as it was, by a thorn-hedge with a strong gateway, and situated in the immediate vicinity of a good game-country at an elevation of 2400 feet above the sea-level, seemed little less than a Paradise to our travellers, who arrived here on December 26, about sixteen days after leaving Mombas. Into their various excursions from this convenient centre we need not closely follow them. Suffice it to say that their routes were

¹ "East Africa and its Big Game, the Narrative of a Sporting Trip from Zanzibar to the Borders of the Masai." By Captain Sir John C. Willoughby, Bart., Royal Horse Guards. With Postscript by Sir Robert G. Harvey, Bart. Illustrated by G. D. Giles and Mrs. Gordon Blake; those of the latter from photographs taken by the Author. (London: Longmans, 1889.)