which I have lately described (Proc. Roy. Soc., vol. lxxxix., p. 133). Moreover, the merging of two such series into one formula is open to the objection that it involves multiplication by 4 of the series constant, which would otherwise be universal. It may be possible, however, to test this point by observations of the Zeeman effects on the lines, and I shall make this experiment at the first opportunity.

I may add that experiments made by Prof. Strutt and myself are in harmony with those of Mr. Evans in showing that the lines under consideration do not occur in mixtures of hydrogen with neon or argon.

A. FOWLER.

Imperial College of Science and Technology, South Kensington, September 13.

The Elephant Trench at Dewlish—Was it Dug?

THE Rev. Osmond Fisher makes the interesting suggestion that the curious trough at Dewlish, in which numerous remains of *Elephas meridionalis* were found, was an artificial trench, dug as a sort of pitfall to intercept and disable wild animals driven across it. Perhaps, as having seen the excavations made by Mr. Mansel-Pleydell, I may say a word on this point.

Open trenches in the soft chalk are unknown elsewhere, though they are common enough in the hard mountain limestone. I therefore examined this trench most carefully, in order to find out how it had originated, and whether man had had anything to do with it. I am still much puzzled as to its exact mode of excavation; but certain peculiarities convinced me that it was due to natural agencies, and that it was probably cut by the swirl of the fine dust-like quartz-sand which, mixed with polished flints, now fills its lower part. I could find no implements, and could nowhere see traces of pick marks. The sides of the trench, where not damaged by the workmen who had just cleared it, were curiously smooth; but the flint-nodules projected into the cavity from either side, as though the softer chalk had been scoured away. The abrupt rounded end of the trench was most peculiar, and as I cleaned this out myself, dusting away the sand from the smoothed face of the chalk, I am sure that there were here neither tool-marks nor rubbings such as might be made by a man working in the trench, or by wild beasts. In short, the smooth, rounded contours suggested the eddying of wind, and the absence of any crack or joint showed that here at any rate the rounding was not likely to be due to percolating water.

Beneath the elephant bones, which occurred in a layer a few feet down, the infilling of the trench seems to be a fine dust-like, unfossiliferous sand, which was not bottomed, as Mr. Mansel-Pleydell's excavations were made primarily to obtain elephant remains, and these were in such a soft condition as to make removal almost impossible. If this sand-filled fissure is found to continue downward, but is too narrow for a man to work in, it will show that the trench is not artificial. I could only just squeeze past in one or two places; but the upper part of the trench was passable; I think, however, that it tended to narrow downward, but at the time of my visit the bones had not been removed, and I could not excavate below them.

Perhaps someone acquainted with plateaus of soft limestone under desert conditions can say whether there is any tendency for the wind to cut trenches with rounded blind ends, such as the Dewlish trench has. In this connection, it is worth noting that our newer Pliocene land-faunas show distinct indications of drier and more sunny conditions than we have at present. A gazelle, an antelope, and several land and fresh-water mollusca point in that direction. Under dry conditions, and before the loose flints were swept away during the glacial period, our chalk-downs would probably be stony deserts, quite unlike the green hills we now see.

CLEMENT REID.

Milford-on-Sea.

Red-water Phenomenon due to Euglena.

THE red-water phenomenon due to a Euglena described by Prof. Dendy in NATURE of August 7 has been observed by me in Pretoria. In this case, however, the Euglena swims freely about in the water, and also forms a red gelatinous scum on the surface of the damp mud on the side of the pond. In swimming they seldom show euglenoid movement. A flagellum longer than the body can be easily seen under the microscope at the anterior end of the body, but it always trails along the body with lashing movements. If they become stranded on the mud at the edge of the pond, they soon become spherical and encysted in a mucilaginous covering much wider than the body and showing a layered formation. I have not observed any bubbles of gas given off, although I have kept large quantities of them under observation for long periods. They appear to prefer the encysted form, as they always swim to the edge of the vessel towards the light and form a deep red line along the edge, which gradually becomes dry. If more water is added and the vessel turned round, they will leave their cysts and again swim towards the light side. They are of a fairly large size, and have a cylindrical body tapering to a sharp point at the posterior end, where the last portion is free from pigment Chlorophyll is present, and is easily seen amongst the red in those that have just come out of the encysted stage, but later on it entirely disappears.

HORACE A. WAGER.

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August 30.

Distance of the Visible Horizon.

MR. W. MOSS's account in NATURE for August 7, p. 583, as to how to get the area of a sphere theoretically visible at any altitude is interesting; but can he, or any of your readers, say what the formula is for obtaining the distance actually visible with an average amount of refraction? So far as I can discover, all ordinary books of tables ignore this, although such a table would be very useful.

A table is given in Chamber's Mathematical Tables, p. 436, for the distance of the visible horizon, but the explanation, p. xl., states that this is theoretical, and that a correction for refraction should be made, although nowhere is any table or formula given for such correction.

T. W. BACKHOUSE.

West Hendon House, Sunderland
September 6, 1913.

ATMOSPHERIC refraction is such a varying quantity that no rule respecting it can be laid down applicable in all circumstances; as in cases of mirage, for instance, where vessels below the horizon are seen standing above it, and turned upside down. The refraction of the sea horizon is the great difficulty in obtaining correctly the position of vessels at sea. This can be eliminated in most cases by taking observations of the heavenly bodies to opposite sides of the horizon; for latitude in a north as well as in a south direction; for longitude in an east as well as in a west direction. When only one heavenly object is available this is not always practicable, but it can be done when the altitude is 60° or upwards.