LETTERS TO THE EDITOR.

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The Solar Eclipse of April 28.

THE failure of the observers at Vavau to obtain a satisfactory view of the eclipse is very unfortunate, and the whole astronomical world will share their disappointment. It is welcome news to hear that perfect conditions prevailed at islands situated some distance from Vavau, and equally well placed as regards the line of totality.

I have received a letter from Mr. C. L. Wragge, who observed the eclipse under ideal conditions from the island of Moungaone in the Tongan group. He writes to me from Lifuka as follows:—

"It was entirely successful, with a clear sky, and magnificent beyond words. A lovely sketch to scale was also secured by another member of my special party at Lifuka—duration of totality, about two minutes. Four great streamers were seen.

"The shadow-bands rippling over the cocoanuts, and the dark purplish-black of the ocean, obliterating the lovely tinges of blue and green water around the coral reefs, were superb.

"The natives rushed into their houses, and came out and cheered when, with a blaze of glory, the sun reappeared."

The photographs secured have been taken back to New Zealand for development, but a sketch enclosed with the letter shows the corona with four magnificent streamers of the type characteristic of the solar sunspot minimum, and also a very large prominence. The streamers and inner corona are described as "silver-white," and the following *approximate* measurements are given:—

Highest streamer of corona, about 649,000 miles.

Large red flame, about 217,000 miles.

The streamers were in pairs, two extending north-east and two south-west, while silver-white ridges of the inner corona extended round the north-west quadrant.

CHARLES W. RAFFETY.

2 Park Hill Road, East Croydon, Surrey, June 18.

Dinoflagellates and Diatoms on the Beach.

IN walking across the beach between tide-marks at Port Erin on April 7, I noticed a greenish-brown discoloration of the sand in places—especially along the edges of the ripple-marks and other depressions—which I supposed to be caused by a deposit of diatoms. The examination of a sample in the laboratory soon showed, however, that although a few diatoms (*Navicula amphisbaena*, or some closely allied form) are present, by far the greater part of the deposit is formed of the active little peridinian or dinoflagellate *Amphidinium operculatum*, Clap. and Lachm., which has not, so far as I can ascertain, been previously recorded on the British coast.

The innumerable specimens of Amphidinium were all alive, reproducing by longitudinal fission, and very active in their movements. They would leave the sand-grains to which they were adhering, swim round rapidly in the water, and then settle down again upon a sand-grain. These dinoflagellates remained abundant on the beach at Port Erin until the end of April, when the observers had to return to Liverpool. During these weeks the patches of discoloured sand changed a little with each tide, increasing, diminishing, shifting, or even disappearing for a day, and then reappearing. Samples placed in dishes of sand and sea-water in the Biological Station flourished, and the organisms increased so as to form a dark-coloured layer over the sand, eventually rendering the water impure and causing the death of the dinoflagellates.

At the meeting of the Linnean Society on June 1 I directed attention to this unusual occurrence of this small Amphidinium in vast quantities, and exhibited specimens. Two days later I was again on the beach at Port Erin, and found what were apparently the same patches of discoloured sand, but on examining scrapings with the microscope saw that the deposit was now wholly composed of a golden-yellow diatom, one of the "*amphisbaena* group" of Navicula. I searched the beach carefully between tide-marks, and examined samples from every suspected patch of sand, but could find no trace of the Amphidinium so abundant a few weeks before. The Navicula, which was present in April in very small quantities, seems completely to have replaced the dinoflagellate. We have probably much to learn in regard to the comings and goings of such microscopic forms and their physiological inter-relations in connection with what may be called "the metabolism of the beach."

W. A. HERDMAN.

Liverpool, June 12.

A New Method of Chemical Analysis.

WILL you permit me to step outside usual practice in this instance and to direct wider attention to the exceptionally brilliant and momentous work described to the Royal Institution on Friday evening, April 7, by its present professor of natural philosophy, as reported in NATURE of June 1, p. 466?

OLIVER LODGE.

THE author of the present note is probably one of the few chemists living who was originally brought up in the Berzelian electrochemical theory (for which idea Berzelius was indebted to Davy), and, as shown in an article published in 1877 (see also Arrhenius-Jubelband), he made a sharp distinction between elements playing the "electropositive" and "electronegative" *rôle*. So, *e.g.*, the connection between the position of elements in Mendeléeff's periodic system and their valency was expressed thus: The *positive* valency of the elements (towards the negative oxygen) may change between 1 and 8; the *negative* valency (towards the positive hydrogen) may change between 1 and 4 only.

But such ideas, for which I was formerly reproached of being "unmodern," are very modern indeed to-day.

This is seen from the highly interesting lecture, published in NATURE of June 1, by Sir J. J. Thomson, "A New Method of Chemical Analysis" (p. 466 *et seq.*).

Without referring to the results communicated in this lecture with anything but high admiration, I beg to point out that Sir J. J. Thomson finds that, when the elements hydrogen and carbon had passed—originally positively charged—through the kathodes of his tubes, they appear also *negatively* charged. This he calls "remarkable, for *hydrogen* is generally considered to be a strongly *electro-positive* element," and "the atom of *carbon*, also regarded as an *electro-positive* element, is also conspicuous on the *negative* side."

I desire to remark that there is an analogy, but also a certain difference, between the notion "positive" and "negative" as used by the chemist or by the physicist. Physically, and also chemically, a positive atom carries positive charges, and the negative atom *vice versa*. This holds good of Sir J. J. Thomson's atoms (see the article) and of the atoms in solutions which we chemists call "ions." The difference lies in the point that, as regards the atoms constituting the chemical *compounds*, the terms "*positive*" and "*negative*" have only a *relative* value, as pointed out in the introductory lines. Hydrogen is *positive* towards chlorine in hydrogen chloride, H_+Cl_-, and many other compounds, whereas it forms the *negative* constituent of potassium hydride, K_+H_-, and other similar compounds (CaH_2, LaH_3, CeH_4, &c.).

The physical analogy of this relativity is the zero position of hydrogen in the electrical tension series. It is *positive* compared with the "noble" metals and the metalloids; it is *negative* compared with the "ignoble" metals like those of the alkalies, alkaline earths, and the earths.

As regards carbon, it is *positive* in C_+O_{2-}, but it is *negative* in $H_{4+}C_-$ and in the more popular calcium carbide, Ca_+C_{2-}.

In the compounds KH, CaC_2, and also in $Na_{3+}N_-$ we had already suspected latent negative chemical ions. Chemists will be indebted to Sir J. J. Thomson that he has shown their existence physically. It is interesting, but not surprising, that the said elements take up *negative* charges under the conditions of his experiments.

BOHUSLAV BRAUNER.

Bohemian University, Prague, June 6.