

Fireballs

IN addition to the occurrences recently recorded in your columns, it may be well to quote a further observation communicated in a letter, by Lady Borthwick, to the *Morning Post* for August 16, dated from Derculich, Ballinlaig, Perthshire, from which I extract the following particulars:—

As several curious phenomena of a like kind had been described as having occurred in Edinburgh during a terrific thunderstorm on Tuesday, August 12, the writer proceeds to detail what had been witnessed by herself and some others in her neighbourhood. The storm began at 10 o'clock in the morning and continued with unabated violence till past 10 at night. It appeared to be at its height from about 3 till 7 p.m., when as many as three flashes of lightning occurred to one peal of thunder. In many cases they were of a vivid pink colour. At about 6 o'clock a loud noise was heard, unlike any preceding it: "the heavens seemed to open, and there issued from the clouds what appeared like a ball of fire, about the size of a man's head, which exploded with a terrific crash, emitting quantities of sparks." It then appeared to descend at a distance of not more than twenty yards from the house. Mr. J. K. Laughton, commenting upon the phenomenon in the next issue, states that "ball lightning" is not solid, but yet in "passing along the surface of soft land it ploughs it up in a way that no cannon ball could do," and refers to an instance of this mentioned by Scott in his "Elementary Meteorology."

At a recent meeting of the Paris Academy of Sciences, M. Gaston Planté illustrated some remarks upon globular electric bolts by producing artificially effects analogous to those of fireballs, and it would be interesting to know more respecting their nature. As they appear to occur only very occasionally, on account of the rare conditions of the atmosphere producing them, it is certainly advisable to collect all the evidence respecting them that is obtainable. By such means it may in the course of time become possible for those who are competent to deal with the facts, to arrive at some definite conclusions concerning this little understood phenomenon.

WM. WHITE

September 2

Deep-Sea Corals

PROF. H. N. MOSELEY, F.R.S., in his masterly address to the Biological Section of the British Association at Montreal, dealt, amongst other matters, with the zoological position of the remarkable genera of deep-sea corals named *Guynia, nobis*, and *Haplophyllia* and *Duncania*, of Pourtales. He states that he has found, after examining sections of the last-named genus, that the soft parts indicate that it and the others are *Hexactinia*, and have the construction of *Caryophyllia* and of all other corals of that group. These genera were placed amongst the *Rugosa*, the first-mentioned by myself fourteen years since, and the others by Pourtales later on. On April 3 of the present year I read a communication to the Linnean Society, entitled "A Revision of the Families and Genera of the Madreporaria," and this revision is published. As Prof. Moseley left England before I could send him a copy, he and some other naturalists who study the corals will be perhaps interested by knowing that I have placed those genera where Prof. Moseley has located them subsequently. They form an alliance in the family *Turbinolida*, and I was led to alter the classificatory position on account of a careful examination of the hard parts.

August 30

P. MARTIN DUNCAN

Iridescent Lunar Halos

ON the evening of July 4, from 5.30 p.m. to 7 p.m., the moon, eleven days old, was surrounded with a series of extraordinary halos consisting of a succession of concentric rings; fine, clear starlight; very light airs from south-west and west-south-west; thermometer, 42°.

At 5.30, very light fleecy scud from south-west, the moon surrounded with a halo of about three times its diameter, of dullish white within a ring of orange; rapid changes ensued: the moon appeared within an opaque circle intensely white, surrounded with chromatic rings in the following order—yellow, orange, red, indigo, a broad ring of blue, yellow, orange, red, indigo, deep blue, bordered by a faint ring of orange. At this time the moon appeared as a bright boss on a many-coloured shield; changes rapidly followed: at 5.35 the rings were as follows—white, yellow, orange, red, indigo, blue, yellow, orange; for

some moments the outer ring of orange became blurred, the broad ring of blue very deep and beautiful; at 5.50 all of the halo had disappeared; sky clear, bright starlight all round, except where a few light fleecy clouds lay to the north-east. At 6.10 light scud from south-west; at 6.12 halo again formed, as follows—white, yellow, orange; in a few moments were added red, indigo, blue, orange; soon a mass of whitish scud, light and fleecy, seemed to gather round the moon widely, in a huge irregular oval, changing almost to a circle with uneven edges. At 6.20 the halo had disappeared; then came a bow-shaped yellowish coloration on the south-west of the moon, changing instantly to orange, red, indigo, faint indistinct orange; at 6.22 all clear again; at 6.29 bright almost dazzling rays immediately surrounded or jettied from the moon. At 6.30, north of the moon, orange appeared on some light scud; soon changes again took place: immediately on the edge the moon, where the rays were so brilliant, was now very dark with jagged edges within an intensely white ring, surrounded with a series of sharply-defined chromatic rings in the order they appeared at 5.35. At 6.35 another mass of whitish scud widely surrounded the moon as before described; at 6.48 all clear again; instantly after an orange patch appeared on scud to the north; at 6.56 orange on east; at 7 p.m. all was again clear; rays as dazzling as at an earlier period; temperature sensibly lower; frost at night.

T. H. POTTS

Ohinitahi, N.Z., July 5

Sextants

IN your review of the "Encyclopædia Britannica" published last week I notice that reference is made to an article on navigation by Capt. Moriarty, and attention is called to the very serious error in sextants arising from false centering. Having had some experience in the examination of these instruments, I can practically testify to this most important defect. Only a week or so since two sextants were received here for trial, one of which belonged to a captain of the mercantile marine. In both instances, although the mirrors and shades were good, yet the arc error due to false centering was excessively large, increasing from 0° to 0° to + 7' at 60°, while at 90° it amounted to 10'. Surely this must be a serious matter to navigators, but, as you point out, for the small fee of five shillings persons ordering a sextant may direct the maker to send it to the Observatory, where suitable apparatus is arranged not only for examining the arc but also the mirrors and shades. It is only fair, however, to say that when instruments are sent direct from the makers we do not often have occasion to reject one. Indeed, superior sextants by first-class makers rarely have an error exceeding 1' of arc, and often not more than 30', but how few these are in comparison with the hundreds of inferior instruments that pass into the hands of the public without being tested.

T. W. BAKER

The Kew Observatory, Richmond, September 2

Electrical Rainbow

I WAS one of a deputation of River Tyne Commissioners who visited the South Foreland, to see the experimental lights now on trial there, on Saturday night, August 30. We were walking across the fields from the lights towards the observing hut No. 2, a distance of about a mile and a half. There was a fog more or less, and a shower of rain as we were approaching the hut, and every time the electric light from A tower revolved, a rainbow, very like a faint lunar bow, made its appearance. I could not see any prismatic colour, and the bow was only produced by the large electric light, with carbons of 1½ inch in diameter. There was no bow visible from the old light, which has carbons of about ¾ inch square, and none from either the gas or oil lights. I was informed that this was the first time such a phenomenon had been observed.

R. S. NEWALL

Ferndene, September 3

Rainbow on Spray

A CURIOUS appearance, which I have never observed before, was visible here for a few minutes this forenoon. Large breakers were rolling in to the bay, and their fronts (covered with foam) were brilliantly white in the sunshine. But, as each passed a particular spot, directly opposite to the sun, the spray blown back from its crest took a bright reddish-brown colour. This was the apex of the primary rainbow. When observed from a