Received Nov. 12, 1772.

XX. *A Letter from* Patrick Brydone, *Esq*; *to Sir* John Pringle, *Bart. Pres. R. S. containing an Account of a fiery Meteor, seen on the* 10*th of* February *last*; *and also of some new electrical Experiments. Dated* Eccles, *(in the Shire of* Berwick) 7 July, 1772.

SIR,

Read Feb. 4, 1773. ABOUT fourteen years ago, I took the liberty of communicating to you some electrical experiments; which, you thinking worthy of the attention of the Royal Society, were pleased to lay before that respectable body; and those gentlemen did me the honour of publishing them in the first and second part of the fiftieth Volumes of the Philosophical Transactions. Since that time, I have often been engaged in operations of the same kind, some of which, particularly the experiments with the electrical kite, I thought to have troubled you with; but as these were made in foreign countries, and as I was informed that something of the same kind had been done in England, I suspected that you might already

ready have been acquainted with them; and this conſideration prevented me. However, laſt winter, on my return to this kingdom, I obſerved ſome facts in electricity, which I flatter myſelf you will not think undeſerving of your notice. What led me to make theſe experiments, was the ſtrong electrical appearances that the air exhibited during the laſt great froſt, and the obſervation of ſeveral meteors, and other phænomena, that poſſibly depend on electrical cauſes. One of theſe meteors was ſo remarkable, that I muſt beg leave to give you ſome ſhort account of it.

On Monday the 10th of February laſt, exactly at ſeven in the evening, as I was riding through Tweedmouth, a village at the ſouth end of Berwick-bridge, I obſerved that the atmoſphere was ſuddenly illuminated in a very extraordinary manner. The light of the moon, which was about half full, ſeemed to be extinguiſhed by the blaze; and I ſaw my ſhadow projected on the ground, and almoſt as diſtinct, and well-defined, as in ſunſhine. I turned round to ſee from whence the light proceeded, when I beheld a long, bright flame, moving almoſt horizontally along the heavens. It was of a conical form, and from the baſe to the apex could not be leſs than ſix or ſeven degrees; its height, when I firſt obſerved it, ſeemed to be about fifty degrees; but it deſcended gently, and appeared to burſt about five or ſix degrees lower. Its courſe was from north-weſt to ſouth-eaſt, and ſeemed to have an inclination to the horizon; but this might be only a deception. The baſe of the cone was rounded like a ſphere; and

and apparently of about one third of the diameter of the moon at her greateſt height; but its light was brighter than that of the planet Venus, and in colour reſembled the flame of burning camphire. Near the end of the tail there was a kind of waving motion, which with the whole appearance, I have endeavoured to repreſent by this figure —— 

In about ten or twelve ſeconds it ſeemed to burſt, dividing into a number of ſmall luminous bodies, like the ſtars in a ſky-rocket, which immediately diſappeared.

As I had formerly obſerved exploſions from meteors of this kind, I had preſence of mind to pull out my watch (which has a ſecond hand) to meaſure the exact time the report ſhould take in reaching me. I waited for upwards of four minutes, which in my ſtate of expectation appeared a much longer time; when, deſpairing of any report, I rode on, but had not got to the middle of the bridge, when I was ſtunned by a loud and heavy exploſion, reſembling the diſcharge of a large mortar, at no great diſtance, and followed by a kind of rumbling noiſe, like that of thunder. I examined my watch, and found, that the ſound had taken five minutes, and about ſeven ſeconds, to reach me; which, according to the common computation of 1142 feet in a ſecond, amounts to the diſtance of at leaſt 66 miles. It did not occur to me to meaſure the duration of the light,

which probably did not exceed ten or twelve ſeconds; and during this ſhort period, the length of the path, the meteor ſeemed to deſcribe, could not be leſs than 30 degrees. I expected to have ſeen ſome account of this phænomenon from Newcaſtle, as, by its direction and diſtance, I imagined it had burſt pretty near to the zenith of that city; but I have found no notice taken of it in the news-papers there. About a week after, I mentioned what I had ſeen to Sir John Paterſon, of Eccles, who told me he was at that time on the road, betwixt Greenlaw and his own houſe, in company with Mr. Thomas Cockburn, of Edinburgh; and, as they were riding to the ſouth, they obſerved the meteor from its firſt appearance, which was about three or four ſeconds ſooner than I had time to turn about and view it; and this, perhaps, is the reaſon that it appeared ſo much higher to them than it did to me. Theſe gentlemen obſerved, that when it firſt became luminous, it was almoſt vertical, but went off deſcending to the ſouth-eaſt, and had in other reſpects the appearance I have deſcribed. They added, that ſome conſiderable time after the light diſappeared, they heard a great report, which they took for a clap of thunder; for the interval was ſo long, that they did not imagine this ſound had any connection with what they had ſeen.

Now, as theſe gentlemen were at leaſt 20 miles to the weſt of the ſpot where I made my obſervation, and as the appearance and height of this meteor ſeems to have been nearly the ſame to them as to me, it is probable that it was at a very great

great diſtance from the earth, and much beyond the limits that have been aſſigned to our atmoſphere. The ſmaller meteors, which we call falling ſtars, I have frequently obſerved from the mountain of St. Bernard, one of the high Alps; and laſt year I had the good fortune to ſee ſeveral of them from the higheſt region of Mount Etna; an elevation ſtill more conſiderable, and probably the greateſt acceſſible one in Europe, and they always appeared as high, as when ſeen from the loweſt grounds; ſo that probably the height of two or three miles, bears but a ſmall proportion to the common altitude of theſe bodies.

From their frequent appearance, during the laſt froſt, I was inclined to believe, that the air was then in a very favourable ſtate for electrical purpoſes; but not being provided with a common machine, I bethought me of a whimſical one to ſupply the want of it. The back of a cat, it is well known, often exhibits ſtrong marks of electricity; being, therefore, deſirous to try what effect this might produce, when made uſe of inſtead of the glaſs globe, I cut a quantity of harpſichord-wire into ſhort pieces, of five or ſix inches, and tying them together at one end, made the other diverge like the hair of a bruſh. I took a large metal peſtle of a mortar for my conductor, to the end of which I fixed the bruſh of wire; and inſulated the whole, by placing it on a couple of wine-glaſſes. I then took a cat on my knee, and bringing her back under the wires, I began to ſtroak it gently. The animal continued in good humour for a few minutes, and I had the ſatisfaction

faction to ſee that the conductor was ſo much charged, that it emitted ſparks of a conſiderable force, and attracted ſtrongly ſuch light bodies as were brought near it; but the cat at laſt becoming uneaſy, threatned to put an end to our experiment. The paſſage of the electrical fire, from the hair of her back to the ſmall wires, occaſioned, it ſeems, a diſagreeable ſenſation, which ſhe could not bear; ſo that turning about her head to defend her back, the tip of her ear happening to touch the conductor, and a large ſpark coming from it, ſhe ſprung away in a fright, and would not allow me to come near her more. However, after a long interval, the animal ſeeming to have forgotten her adventure, a young lady in company, leſs obnoxious to her than I was, undertook to manage her. Having firſt covered the back of this lady's hand with a piece of dry ſilk, that none of the electric fire communicated to the wires might be loſt, ſhe then began to ſtroke the cat as I had done, and the conductor ſoon after appeared fully charged: we drew large ſparks from it, and if the animal would have continued quiet, I have no doubt that we ſhould have ſhewn many of the common experiments in electricity; but ſhe ſoon became ſo outrageous, that we were glad to put an end to our operations, without any hopes of being able to repeat them, at leaſt with the ſame inſtrument. In this dilemma I recollected, that a lady had told me, that on combing her hair, in froſty weather, ſhe had often been ſenſible of a little crackling noiſe; and in the dark had ſometimes obſerved ſmall ſparks of fire to iſſue from it. I propoſed, therefore,

therefore, that one of the young ladies would ſuffer the experiment to be made upon her head, which ſhe agreed to. The conductor was then inſulated as before, and the lady having placed herſelf ſo, that the back part of her head almoſt touched the bruſh of wire, I deſired her ſiſter to ſtand behind her, on a cake of bees-wax; who, as ſoon as ſhe began to comb the hair of the former, the conductor emitted ſparks ſtill of a larger ſize than thoſe we had hitherto ſeen. The hair was extremely electric, and when the room was darkened, we could perceive the fire paſs from it along the ſmall wires to the conductor. The young lady who was on the wax, was not a little ſurprized to find, that the moment ſhe began to comb her ſiſter's hair, her own body became electric, darting out ſparks of fire againſt every ſubſtance that approached her. We found, however, that theſe ſparks were not ſtrong enough to fire ſpirits. I then coated a ſmall phial, and ſoon charged it from the conductor; but afterwards I did it more compleatly from the hair itſelf in the following manner. I fixed a bruſh of ſmall wires to the large one that went through the cork of the phial; and taking the phial in my hand, I followed every motion of the comb with the bruſh of wires; and, in the dark, could obſerve the fire paſs by theſe wires into the bottle. In a few minutes I found it was highly charged; when taking a ſpoonful of warm ſpirits in my left hand, and with my right, which graſped the phial, bringing the hook of the great wire near the ſurface of the ſpirits, a large ſpark darted from it,

gave

gave me a ſmart ſhock, and at the ſame time ſet the ſpirits on fire.

The day following, we wanted to repeat our experiments; but as the weather was hazy, and the froſt had greatly abated, they did not ſo well anſwer. However, from making them on ſeveral heads, we found that the ſtronger the hair, the greater was the effect; whereas, ſoft flaxen hair produced little or no fire at all.

It may not be improper to mention, that theſe experiments were made in a warm, dry room, before a good fire, and at a time when the thermometer, in the open air, was at ſix or ſeven degrees below the point of congelation. The hair, which ſucceeded beſt, was perfectly dry, and no powder or pomatum had been uſed on it for ſome months before.

I have the honour to be,

SIR,

Your moſt obedient,

and moſt humble ſervant.

Patrick Brydone.

XXI. *Some*