(see Fig. 2, *f*) is a short piece of capillary glass tubing, to which is fixed a thin sheath of copper, *b'*, which slides on it, and supports a small plate of polished copper, *a'*, in such a manner that the latter can be held vertically at a small distance from the inner opening of the tube, and so regulate the size of the bubble of air to be directed upwards into the graduated tube *a b*.

The apparatus is filled by placing the lower end of the main tube under water, closing the tubes *f* and *i* (with caoutchouc tubing and clips), and opening the stopcocks *a* and *d*. Water is then sucked in from *a*, and the whole apparatus carefully filled. The cocks are then turned, and the cut end of the shoot fixed into *i*, as stated: care must be taken that no air remains under the cut end at *i*, and the end of the shoot must be at the level *k l*. This done, the tube *f* may then be opened.

The leaves of the shoot transpire water, which is replaced through the stem at the cut end in *i* from the water in the apparatus. A bubble of air passes through the tube *f*, and at once ascends into the graduated tube *a c*. The descent of the water-level in this tube - which may conveniently be graduated to measure cubic millimetres—enables the experimenter at once to read off the amount of water employed in a given time.

It is not necessary to dwell on obvious modifications of these essentials, nor to speak of the slight difficulties of manipulation (especially with the tube *f*). Of course the apparatus might be mounted in several ways; and excellent results for demonstration in class could be obtained by arranging the whole on one of the pans of a sensitive balance.

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AURORAL RESEARCHES IN ICELAND

IN my last communication to NATURE on the aurora borealis in Iceland (vol. xxix. p. 537), I mentioned that the unusually adverse state of the weather had frustrated my plan of erecting one of the "utströmnings" apparatus invented by Prof. Lemström for the production of the artificial aurora borealis (see NATURE, vol. xxvii. p. 389) on Mount Esja, 2500 feet in height, and about two geographical miles north-east from Reykjavik.

The greatest part of February passed too without showing any improvement, and the prospects of getting the apparatus in working order on the mountain whilst the Arctic night still reigned became smaller and smaller. Although I regretted this, the study of the aurora which I had observed during the winter had, as indicated in my last communication, gradually convinced me that such an apparatus, even at a great height above the level of the earth, would, at all events in this part of Iceland, give but a negative result.

In spite of the favourable position of the island, the electrical forces, for which the aurora borealis is a visible indicator, appear to possess exceedingly little energy and intensity here, which has particularly been the case during the past few months. In consequence I came to the conclusion that should even all my arrangements be carried out to perfection there was little prospect of producing the "artificial" aurora borealis here.

On February 22, however, a change in the weather set in, and we had a few lovely days with a clear sky, no wind, and a pleasant temperature. Now, if ever, the time had come for realising my plan; and as the weather held for three entire days I fixed the departure for noon of the 25th.

I was fortunate enough to be able to make the journey in pleasant company, two of the burghers of the town and two Englishmen engaged at some sulphur mines in the vicinity volunteering to accompany me to the top of the mountain. We started at about 10 a.m. in a large sailing boat, with the poles, wires, and the rest of the apparatus.

In about three hours we landed at the foot of Esja, and took up our quarters in the farm Mogilsau, from whence I despatched the crew in every direction to call up all able-bodied men to assist in bringing the materials up to the top. Already the same afternoon I had ten of the poles carried up to a height of about 1500 feet.

The next morning broke clear and fine, promising a day as fine as the previous one. I had then sixteen men at my disposal. They began work at 6 a.m., carrying the heavy things up the mountain, and at 9 the last were taken out of the boat, and we all followed upwards.

We ascended from the southern side of the mountain about two miles in length. Only now and then we found snow, otherwise the ground consisted of sand and gravel mixed with boulders. The incline is not very great at first, but at times hills and ridges are encountered which tax the muscles and the lungs severely enough. However, the first 2000 feet of the road were not difficult or dangerous; in fact the only part which could be called so were the last 500 to 600 feet. Here the mountain rises abruptly (Esja is formed in terraces), and was covered with a thin layer of snow having a dangerous ice-coating. It was impossible to proceed here without first having hewn steps in the ice.

At 11.20 we mounted the crest of Esja. The mountain stretched snowy-white to all sides as level as a floor. It brought to my mind my ascent of the North Cape last summer. There was a slight breeze blowing which made the air feel chilly. The thermometer showed in the sun at 1 p.m. – 1·2°, at 2 – 0·2°, and at 3, in the shade, – 3·2° Cels.

Every hand now became busy with erecting the apparatus. The layer of snow on the surface of the mountain was not thick enough to support the poles, and as the ground was frozen hard, they were—thirty-one in number—raised in cairns of large boulders, of which there were great quantities on the edge of the plateau. The poles being raised, the copper wires, along which there were fixed more than a thousand fine points, were suspended over the insulators on their tops. The wires were 850 feet in length, and the poles were erected in such a manner that square spiral slings were formed, having a distance of 6 feet from each other. The total surface area of the "utströmnings" apparatus is therefore 4100 square feet.

The work of erecting the apparatus occupied about four hours, and from the four barometrical observations I had an opportunity of making during the time—in conjunction with those which were, at my request, simultaneously, and with a similar instrument, effected at Reykjavik—I have fixed the height at which the apparatus stands at 2616 feet.

At 3.30 the descent began. The first part of this was far more risky than the ascent, as the steps cut became worn down and new ones had to be made. Simultaneously a very strong copper wire, carefully insulated by layers of canvas and indiarubber—the insulation being 6 mm. in diameter—was brought down the mountain by the shortest road, as far as it reached.

The next morning welcomed us with wind and heavy clouds, with a rapidly-falling barometer. The remaining poles were now brought up the mountain, and the bare telegraph wire, 3200 feet in length, carried to the spot where the insulated conductor ended. Both wires were connected in the most careful and exact manner, and the bare wire laid down as an ordinary telegraph wire on poles with insulators as far as it went. I had expected from its great length that it would reach down to the foot of the mountain, but it did not; it only reached to a height of 714 feet. When the wires in increasing rain and wind were laid out, I connected the end with two zinc disks one of which was placed in a small waterfall with heavy stones on it, and the other buried in the earth. When, finally, I had by means of a telephone and a gal-

vanic element, conclusively ascertained that the conductor was in perfect working order right up to the top of the mountain, we began the descent and the return journey as rapidly as possible. We had no other choice, as the storm and rain which every moment increased precluded every possibility of doing more at that time. I had, however, some consolation in what already was done, my apparatus standing 1900 feet above the disks.

I left all the instruments to be used in connection with the experiments at Mogilsau in hopes that the weather would soon improve and allow me to return. The journey to Reykjavik was performed in a downpour of rain and a great storm.

As I had anticipated, the "utströmnings" apparatus has up to the present shown no signs of life whatever. I can see it plainly with a good telescope from my residence, and thus ascertain that it is in perfect order. In addition, I have just received a message from Mogilsau, informing me that the lower part is in perfect order too. Still during the few favourable nights we have as yet experienced not the slightest luminosity has appeared above the point in question.

If this be a negative result, it is a result, nevertheless, of considerable scientific interest.

The aurora borealis here has during the last few months been far more distinct in its appearance than during the first half of the winter. There is certainly, when the sky is sufficiently free from clouds, here and there a faint indication that the phenomenon does still exist, but such signs of life are very weak and limited.

I have at present no knowledge whether the aurora borealis has displayed less activity in other quarters of the globe during the winter than is generally the case, as letters take a long time from and to this island, but the Reykjavik people contend that the phenomenon displays usually far more energy and intensity than has been the case this winter. I am at present inquiring in various parts of the island whether the absence of the aurora borealis this winter has been noticed as generally remarkable, or its appearance is the usual one in Iceland.

In my last communication to NATURE I intended to have mentioned that I was curious to know what the effect would be of a sufficiently strong aurora covering the moon's disk. During the winter I have had several opportunities of observing auroræ projecting over the disk of the moon when full, but nothing more unusual is seen than the light of the aurora borealis disappearing within a radius of 5° to 10° around the moon. But in the appearance of the latter there is no difference.

Reykjavik, March SOPHUS TROMHOLT

A CARNIVOROUS PLANT PREYING ON VERTEBRATA

AN interesting discovery has been made during the last week by Mr. G. E. Simms, son of a well-known tradesman of Oxford. It is that the bladder-traps of *Utricularia vulgaris* are capable of catching newly-hatched fish and killing them. Mr. Simms brought to me for examination a specimen of Utricularia in a glass vessel, in which were numerous young roach newly hatched from a mass of spawn lying at the bottom. Numbers of these young fish were seen dead, held fast in the jaws of the bladder-traps of the plant. I had never seen Utricularia before, and am indebted to my colleague Prof. Burdon Sanderson for the identification of the plant and a reference to Cohn's researches on it. Mr. Simms supplied me with a fresh specimen of Utricularia in a vessel with fresh young fish and spawn, and in about six hours more than a dozen of the fish were found entrapped. Most are caught by the head, and when this is the case the head is usually pushed as far into the bladder as possible till the snout touches its hinder wall. The two dark black eyes of the fish then show out conspicuously through the wall of the bladder. Rarely a specimen is seen caught only by the tip of the snout. By no means a few of the fish are, however, captured by the tail, which is swallowed, so to speak, to a greater or less distance, and I have one specimen in which the fish is caught by the yelk sac. Three or four instances were observed in which a fish had its head swallowed by one bladder-trap, and its tail by another adjacent one, the body of the fish forming a connecting bar between the two bladders.

I have not been able to see a fish in the actual process of being trapped, nor to find one recently caught, and showing by motion of the fore part of its body signs of life. All those trapped were found already dead, but I have had no opportunity of prolonged observation, and it will be remembered that Mr. Darwin, in his account of the trapping of Crustacea, worms, &c., by Utricularia, states that he was not able to observe the actual occurrence of the trapping of an animal, although Mrs. Treat of New Jersey often did so. I think it probable that the fact described by Mr. Darwin, and which is easily verified, that the longer of the two pairs of projections composing the quadrifid processes by which the bladders of Utricularia are lined "project obliquely inwards and towards the posterior end of the bladder," has something to do with mechanism by which the small fish become so deeply swallowed so to speak. The oblique processes, set all towards the hinder end of the bladder, look as if they must act together with the spring valves of the mouth of the bladder in utilising each fresh struggle of the captive for the purpose of pushing it further and further inwards. On cutting open longitudinally some of the bladders containing the heads and foreparts of the bodies of fish, and examining their contents, I found the tissues of the fish in a more or less slimy deliquescent condition, no doubt from decomposition, for Mr. Darwin failed to detect any digestive process in Utricularia. The quadrifid processes were bathed in the slimy semi-fluid animal substance, and the processes themselves appeared to contain abundance of fine granular matter, possibly the result of absorption, but the large quantity of surrounding animal matter present rendered the observation uncertain. The usual swarms of Infusoria were present in the decomposing matter.

Specimens of the Utricularia with the little fish fast in the bladder-trap, and their heads or tails hanging out, can be well preserved in spirits, and show the conditions well, notwithstanding that the plant becomes colourless, and there is no longer the marked contrast between the glistening white dead fish and the green bladders, which in the fresh condition renders the combination of the trap and prey conspicuous.

Mr. Simms, by whose permission I write this, intends shortly to publish an account of his observations himself. I have advised him to endeavour to prepare spirit specimens of Utricularia plants with numerous trapped fish *in situ* for sale to those interested in the matter who may care to apply for them. His address is 37, Broad Street, Oxford. H. N. MOSELEY

NOTES

M. PASTEUR read to the Academy of Sciences on Monday an account of his experiments on rabies. He maintains that he has twenty dogs which he has rendered insusceptible to the disease, and which, with twenty ordinary dogs, he is prepared to have bitten by a number of dogs in a rabid state. A Commission has been appointed by the French Government to test M. Pasteur's conclusions, the immense importance of which, if established, must be evident to every one. Eminent physiologists maintain, however, that M. Pasteur is far from having proved his position, and that it would be rash to give any positive opinion upon the subject until the experiment which he suggests has been made. We await the full report of M. Pasteur's paper before saying more upon