

after having looked in vain for their hive in its old place. At night I picked the exhausted bees up, and, having restored warmth to them (by leaving them for a time upon my coat-sleeve), I returned them to their companions.

Here was an illustration that the faculty of *memory* was superior to that of *observation*; but that was not all. Nearly every bee which I picked up during the twenty-three days through which this effort of memory lasted was an *old one*; as was easily deduced from observing the worn edges of the wings: showing that, whilst the young insects were quick in receiving new impressions, and in correcting errors, the nervous system of the old bees continued acting in the direction which early habit had affected. So true is it that "One touch of *Nature* makes the whole world kin."

Marlborough House, Torquay

JOHN TOPHAM

Pollen-grains in the Air

WILL you allow me to ask Mr. Hubert Airy, in reference to his interesting paper on the "Microscopic Examination of Air," in *NATURE*, vol. ix. p. 439, on what ground he refers the "triangular pollen" captured on his slide to the birch and hazel? Observations of my own have led me to the conclusion that the pollen of plants which depend exclusively on the wind for their fertilisation is perfectly spherical, at all events before the form of the grain is disturbed by the emission of the pollen-tubes, and this indeed one might expect from *à priori* considerations. Among the pollen-grains I have especially observed, are those of *Corylus avellana*, *Betula alba*, and *Populus balsamifera*. I shall be much obliged if any of your readers could refer me to any accurate published description of the form of pollen-grains beyond those contained in Fritzsche's "Beiträge zur Kenntniss des Pollen."

ALFRED W. BENNETT

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Lakes with two Outfalls

I AM a little surprised to find, by the recent letters in your paper, that Science makes so wide a mouth over this phenomenon, though its exceptional character, and the general correctness of Colonel Greenwood's theory, must readily be recognised. My surprise is occasioned by the fact that Norway, which is now visited by thousands of educated English tourists every year, can supply, not one, but several, I had almost written many, apparent examples of this double outflow. I have not myself passed the watershed at the Lesjeskaagen Lake, though I was close to it in August last, and would have examined it if I had known its importance; but I know enough of the locality to think that Colonel Greenwood is probably right in his explanation of it. But there is another, which I have passed, and which is situated on perhaps the most frequented route in Norway, viz. that from Lærdalsøren over the Fille Fjeld, to which I hardly think the same explanation would apply. Between Nystuen and Skogstad is a chain of lakes crossing the watershed, the highest of which (not the one marked on the Vei-cart over Norge, I think) sends its waters to the west, past Nystuen to the Sogne Fjord, at Lærdalsøren, and on the east by the Lille Mjösen, and Aadalen to the Tyrifjord, and so past Drammen to the Christiania Fjord. This lake is a small one, and the double outflow is close to the high road. I cannot imagine any commercial object for an artificial cut, and it must be well known to hundreds who annually pass it. The Vei-cart shows several other instances, I know not how authentic, though I have always found it fairly accurate, erring rather by omission than commission. But in lat. 62° N., long. 24° 40' E. or thereabouts, is a very remarkable watershed, having a complication of outfalls; the Bredals-Vand sending one to the N.W. to the Geiranger Fjord, and a second to the Vaage-Vand and Gudbrandsdalen; which is also joined by a draft from a lake to the S.W., which likewise sends a feeder to the Opstryen Vand, and so W.S.W. to the Nord Fjord. This I have not myself seen, but I was at Merok on the Geiranger for some days last August, and was assured by my landlord that the map was correct in this particular. As the Norwegian peasantry are well-educated, intelligent, and truthful, and this route forms their regular short cut to Christiania, I cannot doubt but that it is the fact. However, I have engaged to go over the track this summer with Captain Dahl, the well-known jolly commander of the *Erknö*, and I will take care to ascertain the truth and report the result. If, moreover, there are any geological or geographical points to be attended to, and Colonel Greenwood will kindly furnish me with instructions, I shall be happy to attend to them.

I have a strong recollection of having passed two or three cases of double outfall on a small scale in my wanderings; but

not having been aware of the importance of the point, I did not take notice sufficiently precise to enable me now to put my finger on them with certainty, but my general conviction is strong, that Norway can furnish several, if not many examples, which are the more significant from the fact that it is one of the oldest countries in the world.

Burghley Road

W. B. THELWALL

WILL you permit me to correct a mistake as to a matter of fact in *NATURE*, vol. ix. p. 441. Loch-na-Davie, Arran, has two outlets, as is correctly represented in the Ordnance Map, and also in that in Bryce's "Geology of Arran." In August 1872 I walked up the north stream from Loch Ranza to its outfall from Loch-na-Davie. I think Colonel Greenwood ought at least to have made himself acquainted with the Ordnance Map.

Edinburgh

A. CRAIG CHRISTIE

THE "CHALLENGER" EXPEDITION *

IV.

TRISTAN D'ACUNHA

AMONGST the places in the Atlantic marked out by the Circumnavigation Committee as being of especial interest, the small island of Trinidad is noted with those whose vegetation is absolutely unknown, or all but so. From this fact Trinidad became a point of attraction which Mr. Moseley was most anxious to reach. Owing, however, to unfavourable winds and other causes, as well as to a desire of those in command of the ship to proceed south, the visit to this little island was abandoned, with the hope of calling there on the return voyage. After a narrow escape, also, of missing Tristan d'Acunha, the vessel anchored on the north side of the island, and the morning was spent in searching the low lands under the cliffs, 500 feet being the greatest height that was attained during the stay. On this side the island rises in a range of perpendicular cliffs of black volcanic rock, in appearance somewhat similar in structure to that exposed in section in the Grande Curial in Madeira. At the base of the cliffs here are *débris* slopes, and a narrow strip of low shore land of an irregular rocky and sandy nature. The settlement lies on a stretch of low land, broader and more even, and extends westward. The ascent to the plateau above the cliffs is comparatively easy, owing to the deep gullies by which the cliffs are broken.

Though the extent of the island is small, its actual area being not more than 16 square miles, the botanising was confined to the irregular strip of shore land just alluded to, and to the gully immediately above the settlement. Further exploration would have been made, but a sudden squall coming on, the recall was hoisted from the ship, and the party had to leave the island, after a visit of only six hours. Grasses, sedges, mosses, and ferns grow on the cliffs, and occasional patches of *Phytica arborea* Th., a rhamnaceous tree peculiar to the islands, as well as a species of *Empetrum*; these plants, however, are more prominent towards the summit. At the foot of the water-courses under the cliffs are bright green patches of *Rumex frutescens* Th. Mosses and liverworts cover the lower part of the cliffs, and the latter also abound beneath the grass in some situations to such an extent, indeed, as to cover the earth as with a green sheet. *Spartina arundinacea* Carm., grows in rounded tufts amongst the other herbage, and in the clefts of the rocks was seen in abundance *Asplenium obtusatum* Forst., and *Lomaria alpina* Spreng. It is remarkable that the plants of *Lomaria* when found in stony places, and in a comparatively starved condition, were mostly furnished with fertile fronds, whilst those growing in rich vegetable mould were barren. Amongst flowering plants the most common were *Apium australe* Th., *Pelargonium australe* Jacq., *Sonchus oleraceus* L. our common annual sow-thistle, *Hypochaeris glabra* L. a closely allied plant to the sow-thistle, and also found in many parts of England. A cinchonaceous plant, *Nertera depressa* Banks, was very abundant, and

* These Notes are founded on letters sent home by Mr. H. N. Moseley. Continued from p. 451.

Oxalis corniculata L., with its yellow flowers, was likewise seen, but not in any quantity.

An interesting plant—*Chenopodium tomentosum* Th.—grows abundantly on Tristan as well as on Inaccessible Island; it is known as the tea plant, and the leaves, which are strongly scented, are used for making a decoction which is drunk with milk and sugar.

In the gully above the settlement, shrubs of *Phyllica arborea* commence at an elevation of about 400 ft. No trees are found in this locality, having all been cut down at different times for fire-wood, but on other parts of the island there is abundance of wood. The diameter of the trunks of the trees on the upper plateau, it is said, reach to 18 in. On some fresh-water ponds close to the sea was a quantity of confervæ, but no chara was seen, a species of *Isolepis* also grew on the edges of these ponds which was not seen on the other two islands. A few willow bushes grew in a sheltered situation in a ditch near the cottages, and seemed to be thriving. Growing round the island is a belt of *Macrocystis pyrifera* Ag., a gigantic sea-weed, abounding in the southern temperate zone, and stretching up from thence along the Pacific to the Arctic regions. It occurs in immense lengths, single plants of from 100 to 200 ft. being common, and it is said that they are sometimes seen from 700 to 1,000 ft. in length, forming cable-like masses nearly as thick as a man's body, and having the appearance of huge buoys.

The surf on the rocky coast of Tristan is so heavy that the more delicate sea-weeds stand no chance, but are dashed and torn into numerous pieces.

The temperature of the fresh-water ponds at the sea-level gave a result of 54° F. while the water of the streams running down the cliffs stood at 50°, the difference being due evidently to the influence of the snow-water from above.

FUNERAL OF THE LATE DR. LIVINGSTONE

ON Saturday last the remains of David Livingstone, which left Central Africa now nearly a year ago, were interred in Westminster Abbey, in presence of a multitude such as was probably never collected therein on any similar occasion. The funeral procession, which started from the Geographical Society's Rooms, Savile Row, was of great length, though of the plainest description possible under the circumstances; we have not learned whether this was in accordance with the wishes of the late traveller's relatives, or whether it arose from scarcity of funds. Every mark of respect was shown to the procession along its route, and at several advantageous points considerable crowds had collected to witness the last journey of the great explorer.

Men of all ranks and of all pursuits in life formed part of the procession, and stood around the grave during the service in the Abbey. The patriarchal Dr. Moffat, Livingstone's father-in-law, and the traveller's two sons, Thomas and Oswald Livingstone, Mr. James Vavasour, Sir F. Steele, Dr. Kirk, Mr. W. F. Webb, the Rev. Horace Waller, Mr. H. M. Stanley, Mr. E. Young, Sir W. Fergusson, the Duke of Sutherland, Sir Bartle Frere (President of the Royal Geographical Society), Sir H. C. Rawlinson, Vice-Admiral Baron de la Roncière le Noury (President of the French Geographical Society), Dr. Hooker (President of the Royal Society), Mr. C. R. Markham, Mr. R. H. Major, Mr. H. W. Bates, Dr. Houghton, Mr. J. Young of Kelly, are the names of some of those who followed the body to the grave; there were besides, deputations from Edinburgh, Glasgow, and other places, and the carriages of Her Majesty the Queen, the Prince of Wales, and of many other noble and distinguished persons formed part of the procession. Among those who were waiting inside the Abbey were men of every shade of thought, political and religious, men distinguished in every walk of life, deputations from

many religious bodies, from the establishment outwards, and representatives of various scientific Societies. The bearing of the crowds both outside and inside the Abbey showed that they were brought together from genuine admiration and sincere respect for the memory of the simple-minded hero.

We think the character of the assemblage which gathered to do honour to Livingstone's remains is one proof that he has done a work calculated to call forth the admiration and gratitude of those whose suffrages constitute fame of the highest and most enduring kind. If to conceive a great and noble purpose and to carry it out even unto death, with indomitable energy, determination, and the greatest skill, in the face of every possible discouragement, discomfort, and obstacle, be a mark of greatness, his contemporaries have certainly made no mistake in raising David Livingstone to the lofty pedestal which he at present occupies. He has probably added more largely to the sum of exact geographical knowledge than any other explorer has hitherto done. As Dean Stanley eloquently said in his funeral sermon on Sunday afternoon:—"By his indomitable resolution we have now revealed to us, for the first time, that vast tract of Central Africa which, to the contemplation of the geographer, has been literally transformed from a howling wilderness into the glory of Lebanon. The blank of unexplored regions which in every earlier map formed the heart of Africa is now disclosed to us adorned with those magnificent forests, that chain of lakes 'glittering'—to use the native expression—'like stars in the desert';" those falls more splendid, we are told, even than Niagara, which no eye of civilised man had ever before beheld. And to his untiring exertions, continued down to the very last efforts of exhausted nature, we owe the gradual limitation of the basin within which must at last be found those hidden fountains that have lured on traveller after traveller, and have hitherto baffled them all."

A deputation of gentlemen interested in the family of the late Dr. Livingstone waited on Monday upon the Chancellor of the Exchequer and the Secretary of State for Foreign Affairs, for the purpose of representing to Her Majesty's Government the very general anxiety that was felt throughout the United Kingdom that some substantial recognition, in the shape of an adequate provision for his family, should be made of the services of the great traveller. A requisition to the Prime Minister, asking him to confer a pension on the family of Dr. Livingstone, was on Monday night circulated among members of Parliament at the House of Commons. A large number of signatures has already been attached by gentlemen on both sides.

About three years ago, Her Majesty, at the recommendation of Mr. Gladstone, conferred a pension of 300*l.* a year upon Dr. Livingstone, who, however, it is sad to think, never knew that his services had been so recognised by the Government. Upon the death of Livingstone the pension ceased, but it was deemed by Mr. Gladstone a matter of sheer merit, due to the great explorer, to confer some pecuniary benefit upon his children, and the figures on the civil list were thereupon reduced from 300*l.* to 200*l.*, which is actually the amount that will henceforth be paid by the Government to those he has left behind him. Though Dr. Livingstone made a large sum of money out of the first book he published, still he disbursed more than half that amount in his promotion of the exploration of the Zambesi.

Livingstone's devotion to the cause of science and of philanthropy has thus been the means of leaving his family very inadequately provided for; but as he has added so greatly to the glory of his native land, and as he spent his life in the service of civilisation, we feel confident that those for whom he was therefore unable to provide will be well cared for.

From a letter in yesterday's *Times* we see that the Diary kept by Jacob Wainwright for nine months after Livingstone's death will shortly be published.