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Balfour

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V. *Notice of Botanical Excursions in 1873.* By Professor BALFOUR.

A visit was made on the 15th May to the sandstone quarry of Craigleith, for the purpose of seeing the fine specimens of fossil trees which had been recently exposed by the workmen. We were enabled to see the largest specimen to great advantage, and observe the angle at which it was inclined, to measure its size, and to observe certain phenomena connected with its fossilisation. The other trunk showed a difference in the mode of its inhumation in the sandstone. It was an entire trunk, and its structure was not so hard as the former. The large specimen has, through the kind exertions of Sir Robert Christison, been transferred to the British Museum; while a portion of the smaller one, 9 feet in girth, has been sent to the Edinburgh Botanic Garden, and a section of it has been made for preservation in our Botanical Museum as well as in the British Museum. The section made by Mr M'Glashan has been polished, so as to exhibit the appearance presented by the vessels of the wood; here and there a dim outline of circles is seen, but the greater part of the tissue is obscured by the infiltration of carbonate of lime and by pressure. The structure, however, is well seen under the microscope. These trees have been fully described by Sir Robert Christison (Proc. Roy. Soc. Edin. vol. viii. p. 104). There is in the Botanic Garden the trunk of a fossil tree discovered in the same quarry in 1830, and described by Mr Witham in 1831, and we expect to get this supplemented through the kindness of Mr Archer, who has another portion of the same tree in the Museum of Science and Art in Edinburgh.

In an early excursion in spring, Mr Sadler gathered specimens of *Equisetum umbrosum* in fructification on the banks of the Esk, near Penicuik House, where it had previously been noticed. The plant is by no means rare in Scotland, but it is seldom gathered in good fructification, because of the early period of the year at which it sends up its spikes.

Excursions in May to Roslin, Kinghorn, and Queensferry—in June to Drem, Currie, St Boswells, Melrose, and

Clackmannan, and in July to Lindores Loch, did not add much to our knowledge of the flora of these districts.

Lathræa squamaria was found abundantly in Roslin woods. *Vicia lutea* was observed in flower at North Queensferry, indicating that the station has not yet been destroyed by the blasting operations which are now injuring the whole extent of the fine cliffs in that quarter.

Allium Schænoprasum was seen as formerly on the rocky shore near Inverkeithing. Blasting operations are also causing much havoc on the trap-rocks at the western side of North Queensferry, and ere long we may expect that such plants as *Astragalus glycyphyllos*, *Thalictrum majus*, *Spiræa Filipendula*, and others, will disappear from that locality.

Scopolia bulbosa was seen in considerable quantity near Gullan.

In the neighbourhood of Currie and Colinton the shales yielded good specimens of *Lepidodendron gracile*, and other species, as well as specimens of *Sigillaria* and *Stigmaria*, and of *Adiantites Lindseæformis*, the last in the station indicated by Professor Geikie.

Between St Boswells and Melrose the following plants were noted:—*Ranunculus floribundus*, *Aquilegia vulgaris*, *Olema Vitalba*, *Nasturtium sylvaticum*, *Draba muralis*, *Hypericum humifusum*, *Saxifraga umbrosa*, *Viburnum Opulus*, and *Lonicera Caprifoliina*. During this Saturday's excursion 175 species were collected, of which 144 were named and laid out for study in the class-room at the Botanic Garden on Monday morning at eight o'clock.

The district of Clackmannan had not been previously visited by our party. The day, however, was very unfavourable, and our botanising was much hindered. Among the plants of interest gathered were *Epilobium angustifolium*, *Sempervivum tectorum*, *Vaccinium Oxycoccus*, *Habenaria chlorantha*, *Listera ovata*, *Orchis incarnata*, and *Lastrea spinulosa*. A visit was made to the rocks below Stirling Castle, and the following plants were collected:—*Verbascum Lychnitis*, *Sedum album*, *S. reflexum*, *Lactuca virosa*, *Smyrnium Olusatrum*, and *Petroselinum sativum*.

The Lindores excursion yielded *Nuphar luteum*, *Veronica scutellata*, *Typha angustifolia*, *Bidens cernua*, *Potamogeton*

plantagineus; and on the trap rocks of Marc's Craig, near Newburgh, were collected *Dianthus deltoides*, *Potentilla argentea*, *Sagina subulata*, *Geranium columbinum*, *Sedum reflexum*, and *Anthemis arvensis*. On the ruins of Lindores Abbey were seen *Verbascum Lychnitis*, *V. Thapsus*, *Malva moschata*, *Scrophularia vernalis*, *Vinca minor*, and *Sedum album*.

On 12th July we visited the Red Sandstone cliffs between Arbroath and Auchmithie. Mr James Scrymgeour from Dundee, and Mr Andrew Wilson of Arbroath, met the party. The cliffs are productive, and the vegetation very luxuriant. Among the plants gathered may be noticed:—*Geranium sanguineum*, *Campanula glomerata*, beautifully in flower; *Astragalus glycyphyllos*, *Habenaria viridis*, *Fumaria micrantha*, *Trifolium hybridum*, *Vicia sylvatica*, *Conium maculatum*, very luxuriant; *Gentiana campestris*, *Eupatorium cannabinum*, and *Scolopendrium vulgare*.

From the 17th to the 19th July a combined excursion of botanists, zoologists, and geologists was made to the island of Arran. The party consisted of Professors Carus, Geikie, and Balfour; Professor M'Nab of Dublin, Dr Stirling, Mr Ellis, Mr Sadler, and upwards of fifty students.

The botanists were accommodated at the Douglas Hotel, Invercloy, and most of the zoologists at Lamlash.

The party at the Douglas Hotel, numbering about fifty, proceeded to the Corriegills' shore, and gathered some good plants, such as *Anagallis tenella*, *Samolus Valerandi*, *Erythraea linariifolia*, *Calamintha Clinopodium*, and *Hypericum Androsæmum*.

The party was divided into three companies. Some proceeded to Lamlash to join Professor Carus in dredging; some accompanied Professor Geikie to examine the geology in the neighbourhood of Glen Sannox, and the others botanised on the coast between Brodick and Corrie. In Brodick Bay were collected *Mertensia maritima*, *Brassica monocensis*, *Salsola Kali*, *Juncione montana*, &c. On the shore towards Corrie were picked *Ceanothe Lachenalii*, *Lycopus europæus*, *Juncus maritimus*, *Schenus nigricans*, and *Scirpus maritimus*. On the carboniferous sandstone rocks in the woods were collected *Hymenophyllum Wilsoni*, *H.*

Trubridgense, *Lastrea æmula*, *Asplenium marinum*, and *Scolopendrium vulgare*.

The morning of Saturday 19th July was unpromising, thick mist being on all the hills. About nine o'clock the botanical party started to ascend Goatfell. On their way they were able to note the stages of ascent by *Pteris aquilina*, extending to about 700 feet, *Erica Tetralix*, to about 1350, and after that by *Saxifraga stellaris*, *Alchemilla alpina*, and *Salix herbacea*—the latter at 2100 feet. The shrubby region was marked by heathier, heaths, and *Myrica Gale*. It rained heavily, and the mist was so dense that the party had to take their bearings by the compass.

Dr Stirling gives the following report on the results of the zoological excursion:—

“On Friday morning, July 18th, a party of twenty-four, under the superintendence of Professor Carus, started dredging operations in Lammlash Bay. The company was divided into three divisions, under Professor Carus, Mr Barclay, and Dr Stirling.

The weather on the whole was very favourable for dredging operations within the bay and round Holy Island, but outside the bay it was not considered safe to run the risk of losing the dredge. The wind was rather too strong for using the towing net, and this accounts for the absence of medusoid oceanic forms in this report. A small dredging party ventured out on Saturday morning, while the remainder were contented to examine the shore at low water.

Amongst Sponges, the genera *Halichondria* and *Cliona* were found, the latter easily recognised from its habit of boring into cast-off shells. The only *Hydrozoon* was the single genus *Hydractinia*. As representatives of the *Actinozoa* were the *Anthea*, a sea-anemone differing from the others in its not being able to retract its long finger-like tentacles upon irritation. Many representatives of the *Adamsia* were obtained. This genus offers an example of what Van Beneden has named “Commensalism.” This *Adamsia* is always found to coat the shell containing the hermit-crab. The hermit-crab and its shell may be often found without the *Adamsia*, but the *A.* never unless in connection with the shell of the hermit-crab. These two animals seem to live together for their common weal, just

the same arrangement as is seen in the glass-rope Sponge of Japan (*Hyalonema*), with its encrusting Zoantharian.

We were fortunate in obtaining many fine specimens of *Echinodermata*, which seem to be specially well represented over the ground where we dredged. Twice were we successful in obtaining half a dredge full of the exceedingly pretty rosy tinted *Comatula rosea* (Forbes). It is rather unfortunate that the colour on these animals cannot be preserved in spirits. Through the kindness of Mr Barclay, we had an opportunity of examining the young stage of this genus (formerly described as a distinct genus under the name of *Pentacrinus europæus*), which is stalked and fixed, while the adult form has no stalk, and can move from place to place.

The Ophiurids were specially abundant, including *Ophiura tenturata* (Forbes), *Ophiocoma bellis*, *O. neglecta*, and *O. rosula*.

The *Asteroidea* were also plentiful; *Uraster rubens*, *Solaster papposa*, *Goniaster equestris*, *Cribella rosea*, and the famous *Luidia fragilissima*, only a single specimen of which was found; and it afforded a good example of the reason why it receives the specific name *fragilissima*, for before it could be removed from the dredge it broke off two of its arms, and it was only by handling it with the greatest care that it was preserved in a very fair condition. It had the characteristic red brick colour, and seven rays.

The regular Urchins were represented by several specimens of *Echinus sphaera* and *E. miliaris*. The irregular forms by *Spatangus purpureus* and *Brissus lyrifer*, with its fiddle-shaped dorsal impression.

The *Vermes* (Worms) were pretty generally represented by the genera *Nereis*, *Polynoe*, *Nemertes*, *Serpula tubularia*, *S. contortuplicata*, *Spirorbis communis*, and *Phyllodoce viridis*.

The *Crustacea* were tolerably abundant in quantity, but chiefly of the common genera. *Portunus*, *Gammarus*, *Carcinus*, *Caprella*, *Talitrus*, and *Pagurus*, which was specially abundant; and the genus *Inachus*, which has the remarkable habit of nipping off with its pincers small parts of the sea-weed near it, and sticking these all over its back and appendages, so that it is scarcely possible to distinguish it

from a mass of floating sea-weed when so coated. When it has worn these adornments for a sufficient length of time, it sets to and takes them all off again, and then bedecks itself anew. For this latter fact we are indebted to Mr Robertson of Glasgow. It uses for this purpose both the *Ulva* and the *Phyllophora rubens*.

Molluscoidea.—The *Ascidians* were represented by the single genus *Ascidia*, three or four specimens of which were taken on the Saturday excursion.

The *Polyzoa*.—The genera *Tubulipora*, *Crisia*, *Salicornaria*, *Lepralia*, and *Membranipora*, which was specially abundant, occurring in circular patches on the expanded fronds of the common tangle.

The *Mollusca proper* were moderately well represented. The *Bivalves* by a large species of *Pecten*, *P. opercularis*, *Anomia ephippium*, *Solen ensis*, and *Lima hians*, the latter being found in considerable abundance. Its nest also was found, and for the most part consisted of the beautiful red weed, *Phyllophora rubens*, or sometimes this in combination with the branched roots of the tangle (*Laminaria*). In the roots of the tangle also several species of worms were found creeping.

Gasteropoda.—*Patella*, very large specimens, *Trochus*, *Littorina*, and *Chiton*; the *Nudibranchiata* by the two genera *Doris* (Sea-lemon) and *Eolis*; the latter is specially beautiful, with the highly-coloured tufts on its back. These tufts are prolongations of the intestine, and their bright colour is due to cells, containing colouring matter, lining them, which in all probability secrete bile."

Professor Geikie gives the following notes on the geological work:—

"On the first evening an examination was made of the remarkable lower carboniferous breccias on the shore near Invercloy, and evidence was collected bearing on their probable glacial origin. The well-known basalt-dykes of that coast-line were likewise examined, especially with reference to their influence on the surrounding rocks, and their varying modes of weathering.

Friday was devoted to an examination of the relations of the Old Red Sandstone and carboniferous strata between Brodick Bay and the North Sannox Water. Traces of a

great fault were found by which the carboniferous rocks are separated from the Old Red Sandstone—a fault which in that part of the island, at least, prevents the usual unconformability between the two formations from being seen. The common idea that there is a gradual passage along the east of Arran, from the carboniferous into the Old Red Sandstone was found to be quite erroneous. Special attention was given again to the character of the breccias, and some curious indications of their ice-borne origin were obtained to the north of Glen Sannox. Evidences of contemporaneous volcanic activity in a low part of the carboniferous series occurred in the form of a thick bed of amygdaloidal melaphyre, with coarse volcanic agglomerate seen on the shore some way north from the thick marine limestone of Corrie—perhaps, the earliest indication of volcanic action in Arran.

On Saturday morning the party ascended the stream to the south of the White Water, and found a fine section there of red well-bedded trap-tuff underlying a thick coulée of porphyrite, and interstratified among the carboniferous red sandstone of the district. This volcanic intercalation could be traced for fully half a mile up the hill towards the granite, but before reaching the latter rock its further course is completely hidden under the immense moraine heaps and boulders which descend from the corrie under Goatfell to the shore. It seemed open to question whether there is really any Old Red Sandstone there between the carboniferous area and the granite. If there is not, then it would follow that the main mass of the Arran granite cuts off and alters carboniferous strata. The inclemency of the weather prevented a further examination of this point, as well as of the sections on Maoldon."

On 26th July a party of thirty visited Dumfries, and examined the left bank of the Nith between Glencaple and Caerlaverock. In the salt marshes were collected *Suaeda maritima*, *Salicornia herbacea*, *Samolus Valerandi*, *Blysmus rufus*, and *Carex extensa*. In salt pools Mr G. G. Balfour found *Ruppia maritima* var. *rostellata* and *Zannichellia pedicellata*; and Professor M'Nab discovered *Statice bahu-siensis* on the shore. Near Caerlaverock Castle were gathered *Ananthe fistulosa* and *Hypericum maculatum*.

On 30th July a visit was made by Professor Balfour and Mr Sadler to the Bass Rock, in company with several members of the Berwickshire Naturalists' Club. The Tree Mallow (*Lavatera arborea*) was gathered in fine flower, and also *Beta maritima*. Two species of flowering plants not hitherto recorded from the Bass were collected, viz., *Sagina procumbens* and *Peplis Portula*.

An excursion to Killin was undertaken on 5th August. At one o'clock the party started for Cham-a-creag. The day was dull and rather cold. Among the plants collected were—*Thalictrum alpinum*, *Cochlearia granlandica*, *Sagina subulata*, *Cherleria sedoides*, *Cerastium alpinum*, *Sibbaldia procumbens*, *Potentilla maculata*, *Dryas octopetala*, *Saxifraga nivalis*, *Saussurea alpina*, *Azalea procumbens*, *Gentiana nivalis*, *Veronica saxatilis*, *Armeria maritima*, *Salix herbacea*, *S. reticulata*, *Tofieldia palustris*, *Sesleria cœrulea*, *Polystichum Lonchitis*, and *Botrychium Lunaria*.

Next morning the whole party, consisting of Professors Balfour and Dickson, Drs T. A. G. Balfour, C. Stuart, W. Craig, Messrs W. Carruthers, A. Gibson, I. B. Balfour, G. G. Balfour, W. Macfarlane, and J. Sadler, started at 9 A.M. in a two-horse drag for Benmore. They stopped at the foot of the hill, and ascended by the valley on the east side, and visited Bheinean or Stobinean, a mountain 3827 feet in height, returning in the evening about 7.30. The day was fine, but the wind was very high. Among the plants gathered were the following:—*Thalictrum alpinum*, *Draba rupestris*, *Cerastium latifolium*, *Cherleria sedoides*, *Sibbaldia procumbens*, *Epilobium alpinum*, *E. angustifolium*, *Saxifraga nivalis*, very large, *Carex pulla*, *C. Persoonii*, *Allosorus crispus*, *Polypodium alpestre*, and *Hymenophyllum Wilsoni*. On the summit of Bheinean were gathered *Sibbaldia procumbens*, *Gnaphalium supinum*, *Carex rigida*, *Saxifraga stellaris*, *Festuca ovina* var. *vivipara*, *Salix herbacea* in fruit, and *Luzula spicata*.

On 7th August the party visited the grounds of Finlarig, and measured several of the old trees there. A full-grown sycamore measured in circumference 15 feet 2 inches, at 4 feet from the ground; a branch on it had been bent downwards in early growth and become grafted into the main trunk. *Staphylea pinnata* was seen in fruit, also *Campanula latifolia* and *Ribes alpinum*.