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When the picric acid comes through clear, the stem is ready for the next part of the process. It is removed, and, if intended for sectioning purposes, is cut up into small pieces and placed in alcohol of at least 90 per cent. strength. In this it is decolorised, and after a few days is in good condition for sectioning purposes. The liquified elements of the conducting system are stained a fine pink. A good contrast is obtained by ground staining with hæmatoxylin on the slide. If the stem be intended for dissection of vascular system, the picric injection may be omitted and the preparation allowed to lie for a time in weak picric acid, and then preserved in alcohol until required.

PYRUS ARIA AND ITS VARIETIES IN ARRAN.

By Rev. DAVID LANDBOROUGH.

(Read 8th July 1897.)

I know the island of Arran well, and it seemed to me strange that its Rare *Pyrus* should be confined to a small portion of the north. There are places in other parts of the island seemingly suitable for its growth. Might it not also be found in some of these? I determined to search Arran for it. I wished, further, to ascertain if it could not be had in additional varieties; and if the varieties were accidental, or resulted from discoverable causes. This led to several excursions. I mention the principal:—

UNSUCCESSFUL EXCURSIONS.

First.—At the end of May, with one of my sons, I started from Brodick, in the centre of the east coast; went up Glen Rosa to the Garbh Allt ($2\frac{1}{2}$ miles); ascended this stream; descended into Glen Iorsa; forded it; ascended the connecting stream to Loch Tana; thence to Loch Dubh; descended Glen Schaftigill; passed into Allt-na-h-Airidhe; descended to Dougrie; thence to Shedog Inn.—Twelve hours afoot.—No success.

Second Excursion.—Next day we took, for four miles, the road to Brodick; at Glen Loig, turned up the Craigan, the most considerable glen running southward through the

centre of the island; examined it and its tributaries; crossed the highway between Lamblash and Lag at its saddle; ascended to Loch Urie; descended by the Knockenkelly Glen to Whiting Bay; thence to Kildonan—13½ hours.—No success, save finding a magnificent plant of the Guelder Rose (*Viburnum Opulus*) overhanging a waterfall in Craigan Glen.

Third Excursion.—With the Rev. Robert Drummond, Lothian Road, Edinburgh. From Lochranza, in the north of Arran, we passed along the hillside southward, visiting the Fairy Dell and the Great Rent, the latter about 950 feet above the sea, and nearly forty feet in depth (recognisable by a mountain ash growing at its entrance); descended at the Old Salt Pans; advanced to Lagan, famous for its fossil beds; ended at Corrie.—No success.

Fourth, Fifth, and Sixth Excursions.—Visited North Glen Sannox; ascended its greatest gorge to the east shoulder of the first of the high Sannox range (*Suidhe Fhearghas*); passed by it into South Glen Sannox. Visited the glens and gorges on the side of Glen Sannox, and also those above Corrie to Maol Donn—half-way to Brodick. Ascended the gorges on both sides of Glen Chalmadale.—No success.

SUCCESSFUL EXCURSIONS.

First Successful Excursion.—Having been unsuccessful in south, east, and west, both in the centre of the island and by the coast, I drew nearer the already-known habitats of the Rare Pyrus. Having landed by the Fairlie and Campbeltown steamer at Pirn Mill, six miles south of Lochranza, I ascended the Allt Gobhlach to the beautiful little waterfall (The Raven's Nest), two or three hundred feet above sea-level. Above this the botanical feature of the stream is the abundance of the aspen (*Populus tremula*). This was a good omen, as a plant of it grows with the Rare Pyrus in the tributary at the head of Glen Catacol. From the Allt Gobhlach stream I passed by the south shoulder of Beinn Bharain to Loch Dubh. In it I found *Lobelia Dortmanna* and *Utricularia vulgaris*, both of which grow also in Loch Tana and in Loch-na-Davie (1182 feet above sea-level).

A Striking Peculiarity.—Loch Dubh is a quarter of a mile in length and is about twelve hundred feet above sea-level. It is situated on the shoulder of Beinn Bharain, and must receive a very copious supply of water, yet in the map of the Ordnance Survey no outlet is assigned it. At the northern extremity there is the bed of a stream leading to Loch Tana, yet, though there had been considerable rain recently, in the upper portion there was no water, though there was abundant evidence that at times in it there is the rush of a torrent. The explanation must be that the basin and sides of the loch are so gravelly that in ordinary weather the water finds through them sufficient exit.

I now passed to Loch Tana (the Long Loch) and thence directed my course eastward.

Mr. Smith, Monkredding, Kilwinning, in a remarkable paper, entitled "New View of the Arran Granite Mountains," read March 1895 to the Glasgow Geological Society, and since printed, writes: "The Allt-an-Champ (the Camp Burn) gets its name from an old practice of the natives to camp here with their cattle during summer, and remains (traces) of their huts are still to be seen. It presents us at one part with a little glen cut in the solid rock to a depth of perhaps twenty feet. Growing out of a joint of the granite and overhanging the glen is a much-branched specimen of *Pyrus aria*, rare in this country. This is one of the few trees in the granitic area, and has not escaped the notice of the natives, who have a tradition that 'once upon a time a strange bird brought a seed and planted it here, and out of the seed grew this tree.'" The Allt-an-Champ is a western tributary of the Iorsa and joins it $2\frac{1}{2}$ miles south of Loch-na-Davie. Guided by Mr. Smith's interesting statement, and with the hope that the plant he mentions might not be a solitary example, I struck this stream half-way up and followed it up and down. I was successful, as I found several of the rare tree. I now pushed on by Loch-na-Davie to Corrie.—Eleven hours.

Second Successful Excursion.—When visiting, on former occasions, the head of Glen Catacol at its eastern division, where the Rare *Pyrus* has long been known to grow, I had noticed the steep gorge here ascending from its left

side, and thought it also a likely habitat for the Rare *Pyrus*, all the more that a young plant grows near its junction with the stream. I determined to examine it. I was rewarded by finding the Rare *Pyrus* in considerable abundance. One of the plants, of the intermediate type, had the largest leaves I had yet noticed in any of the varieties—one, not including stalk, $5 \times 3\frac{1}{4}$ inches. Here also I found a specimen of *Sedum Telephium*. I passed over the ridge, and descended the gorge on the opposite side. Great abundance in it of *Pyrus Aucuparia*, and of the *Aspen*; but none of the Rare *Pyrus*.

Third Successful Excursion.—At the mouth of Glen Catacol is an amphitheatre of level ground, with a radius of half a mile. It has evidently been formed by detritus brought by the stream. In addition to the Catacol, four little torrents flow into it. The course of the two on the south side I examined without success. So also on the north, the Abhain Bheag (the Little Stream). But at the north-east corner is the Uisge Solus (the Water of Light, *i.e.* the Sparkling Water). This is a remarkable stream. It is a main stream, and not a tributary. It comes down the side of a high steep, leaping and dancing in many a foamy fall, resembling the White Water at Corrie, only the falls more numerous and the body of water less. It was not likely to have on its banks the Rare *Pyrus*, as it was near the sea, and the rock was slate, while this *Pyrus* had hitherto been found only in the granite, and at a distance from the sea. The stream, however, was inviting, and I ascended. I had gone only half a mile (afterwards measured), and to the height of 400 feet, when, on passing a little sheep bridge, I came upon the Rare *Pyrus*, which continued at intervals till the bare moorland was almost reached. A number of things were notable. (1st) There was good shelter, for it was a cross stream, that is, a tributary, and thus not exposed to the tremendous blasts which render tree-life almost impossible in the great glens. (2nd) The stream abounded in little waterfalls, presenting specially cosy nooks. (3rd) The rock is contorted schist, "gnarled and twisted, with many minute cross grains" (Smith), which decomposes into a soil specially suitable for nourishing plants, while its many crevices provide

abundant hold for their roots. (4th) There is here a rare union of flora—Hawthorn (long stemmed and very narrow leaves), Honeysuckle, Scotch Rose, Juniper, Lycopodium, the Common Butterwort and the rare Seaside Butterwort (*Pinguicula lusitanica*), the Red Bearberry, this Rare Pyrus, Birch, Rowan, etc. (5th) The Rare Pyrus was all of one variety, the pinnate. It was the most pinnate I had seen in Arran, generally three of the lower segments cut to the mid-rib, while in those found at other stations rarely are even two of the lower segments thus deeply cut. (6th) This station is further remarkable as being situated in the slate, while all the others are in the granite; and also from being near the sea, only three-quarters of a mile from it, while those known previously are from $2\frac{1}{2}$ to 6.

The discovery of this station is thus of special importance, as it introduces new data into the questions regarding the Rare Pyrus.

Fourth Successful Excursion.—The Rev. Duncan Mc'Nicol, Dunoon, informed me that the Rare Pyrus grew at the stream side, near the foot of the steep ascent at the head of Glen Catacol. I visited the place and found a considerable number. I ascended here Allt-na-Calmen (the Dove's Glen-side Stream), the highest tributary of the Catacol. In it are various cascades, and beside them are a dozen of the Rare Pyrus. The peculiarity here is that it is much more common than the Rowan, of which there is only one tree standing.

SUMMARY.

I. By Mr. Smith's discovery and my own, the number of main streams in which the Rare Pyrus is known to grow has been doubled—from two to four.

II. By Mr. Smith's discovery and my further search, it has been shown that the Rare Pyrus is not confined to the north of the dividing ridge in the north of Arran—that is, to the north of Loch-na-Davie and Loch Tana—but has an established habitat several miles south of this ridge.

III. It has been shown that it is not confined to the granite area, nor to a distance from the coast-line.

IV. Its range in altitude has also been increased It

is from 300 feet in the Iorsa tributary, to 1100 feet on the north side of the range of North Sannox.

V. There are three varieties in Arran—(1st) the leaf narrow, little cut, very white, downy underneath, and slightly downy on the upper side; this is by much the most rare: (2nd) that which has the largest leaf, not so downy as the previous, pinnatifid, but seldom pinnate, running however into the third: (3rd) the three lower segments of the leaf generally pinnate.

VI. That the trees in the little stream at Catacol, where there is proximity to the sea and the rock—not granite, but a slate—are all of the third variety.

VII. The form of the tree conforms to the shape of the leaf. This is very notable in the first variety. In it the leaf being narrow, the branches and twigs are slender and drooping.

VIII. The bloom of all is fragrant.

IX. The range of the Rare *Pyrus* in Arran corresponds to that of the Red-berried Bearberry (*Arctostaphylus Uva-Ursi*). This plant had previously been noted in the Holy Isle. The writer was the first to notice it in Arran proper. He now adds that he has found it in the neighbourhood of all the habitats of the Rare *Pyrus*, and that he does not know of it being found elsewhere in Arran.

X. The known stations of the Rare *Pyrus* in Arran are—(1st) the Allt-an-Champ, a tributary of the Iorsa, fully two miles south of Loch-na-Davie; (2nd) a stream on the northern slope, at the head of the North Sannox range; (3rd) the three streams into which the Easan Biorach divides at the foot of the steep slope to Loch-na-Davie, that on the east being the lower part of the same stream mentioned in number 2; (4th) the stream (not a tributary) at the mouth of the Catacol; (5th) the eastern head of the Catacol; (6th) the eastern tributary to it; (7th) the head of the Catacol; (8th) Allt-na-Calmen, the Catacol's highest tributary—ten stations in all.

XI. In a letter to Professor Balfour, of which he was so kind as send me a copy, Professor Koehne, of Berlin, writes: "Messrs. Ley and Landsborough, if they search more carefully, will find forms of the Rare Arran *Pyrus*, scarcely to be distinguished from *Sorbus Aucuparia*, since they have

completely pinnate leaves, the upper leaves, however, a little decurrent on the mid-rib of the compound leaf, or are slightly fused together."

To some extent this has been realised, but the belief of the writer is that no more careful search in the formerly known habitats would have so resulted. It is entirely owing to the discovery of the new habitat in slate rock, and near the sea, in the Uisge Solus, at the mouth of Glen Catacol.


I send leaves of (1st) *the narrow-leaved variety*, gathered from a tree on the west tributary at the head of Easan Biorach (Lochranza Stream); (2nd) *the intermediate variety*, from the tributary stream to the eastern head-water of the Catacol; (3rd) the Pinnate variety, from the Uisge Solus.

I forward, also, the Ordnance Survey map of the north of Arran, on which I have encircled in red the area in which the Rare *Pyrus* has been found.

NOTES ON GLEICHENIAS. By PERCIVAL C. WAITE.

(Read 12th April 1894.)

The following is an abstract of the chief characteristics which I have observed:—

I. In the *Mertensias* the bundle of the petiole, as seen in T.S., is curved into a  shape; in the *Engleichenias* the arms of the bundle unite, so that the cortex embraced by them, together with the portion of bundle-sheath which separates the cortex from the bundle, is nipped off. We have thus an annular bundle surrounded by its bundle-sheath, and containing within it a portion of the outer cortex with a few cells of the bundle-sheath surrounding it. This is the case in the young petiole; later on this inner patch of cortex disappears.

That this peculiar arrangement of the bundle is developed in the way above described may be proved by examining the petiole of the *Engleichenias*, at different levels, as it emerges from the rhizome, where transition stages may be observed. There is first a stage resembling the arrangement in the *Mertensias*, then a little higher up