

very rare; *E. sylvaticum*, *Polypodium Dryopteris* and *Phegopteris*, *Polystichum Lonchitis*, Ben Hulich; *Asplenium viride*, *Asp. Trichomanes* and *Adiantum-nigrum*, rare—*ruta-muraria* altogether absent; *Hymenophyllum Wilsoni* in several places; *Isoetes lacustris* in Loch Chailleach on Ben Hulich (Mr Rogers); *Lycopodium*, all the species; *annotinum*, Ben Hulich; *inundatum*, below Schiehallion (Mr Rogers).

The following varieties and aberrations also occurred at Rannoch:—

Scabiosa succisa, with flowers very pale pink; *Bellis perennis*, with the usually ligulate ray florets tubular; *Achillea Millefolium*, with flowers dark crimson; *Senecio Jacobæa*, flowers with the ray absent; *Calluna vulgaris*, *Erica cinerea*, and *E. Tetralix*, with white flowers; *Erica cinerea*, pink-flowered variety; *Gentiana campestris*, white flowers; *Thymus Serpyllum*, flowers white, and the plant altogether smaller; *Pteris aquilina*, one frond with all the pinnæ bifurcated.

On a future occasion I hope to be able to give some notes on the Bryology of Rannoch, which is much richer than the Phanerogamous Flora.

III. Notice of a New *Carduus* gathered during a botanical visit to Ross-shire. By Mr CHARLES HOWIE and Mr CHARLES JENNER.

The discovery in our day of a large Phanerogamous plant, apparently new among the Scotch mountains, is a subject of much interest, and I confess that I have great pleasure and satisfaction in being able this evening to bring such a plant under the notice of this Society. Our mountain district, comparatively narrow, having been so thoroughly searched, it seems strange that the large *Carduus* which Mr Howie and I found last summer should have escaped the observation of botanists; and I feel sure that it must be not only limited in its distribution, but in all probability is a natural hybrid of recent origin, perpetuating itself as a determinate well-marked species. We found the plant during an excursion in Ross-shire and Inverness-shire, in July last. It was many miles from any cultivated land, growing in peaty soil,

among heather, on a high bank above a rocky streamlet. Grim, old, indigenous trees, of the *Pinus sylvestris*, were thinly scattered up and down, and mountains of considerable elevation shadowed the place. So far as our observation enabled us to judge, the station for the plant was limited to an area of twenty feet. The purpose of our excursion having been only to collect cryptogams and the smaller alpine plants for my rockery and frames, we had not taken with us any drying-paper or boards; and we lifted only one root of this *Carduus*, which is now growing in my garden. The peculiarity of its foliage, however, as well as its head of flowers, was so foreign to our experience, that we preserved a few leaves, part of a stem, and a corymb, which my wife pressed in a small drying-book she carried.*

We left the district on the following day, but each subsequent examination of the fragments more and more excited our interest. We failed altogether to identify it with any species in our British flora. On our return to Edinburgh we made a new examination of the root, which had been sent home on the day it was dug up. We were confirmed in the opinion that the plant was at least new to Britain, if not to Europe.

The only *Carduus* we could find, in the books to which we had access, that had any near resemblance to ours, was the *Carduus helenioides* of Linnæus, described in his "Species Plantarum," 2d ed. 1763, vol. ii. page 1155: "(21.) *Carduus helenioides* — foliis amplexicaulibus lanceolatis, dentatis; spinulis inequalibus ciliatis, caule inermi (Hort. Cliffortianus, 392; Hort. Ups., 250). Antecedenti simillimus (*C. heterophyllus*) sed duplo, seu homine altior. Radix vix repens, foliis omnibus indivisis, subtus albis, at non ut illi niveis. Caulis sulcatus, totus foliosus. Foliis 40 ad 50, semiamplexicaulibus (auriculis rotundis, reflexis, adnatis) dentatis, ciliatis spinis inermibus; Floralibus subulatis. Habitat in Anglia, Sibiria."

In the 1797 edition by Willdenow, vol. iii. part iii., page 1674, No. 25, we find,—"*Cnicus helenioides*, W.—foliis subcordatis-amplexicaulibus lanceolatis ciliatis subtus tomen-

* The fragments thus gathered in July, as well as the plants subsequently obtained—in all twelve sheets—were laid on the table, at the Society's meeting.

toxis, inferioribus subincisis; floribus aggregatis, calycinis squamis lanceolatis adpressis mucronatis. W.

“Variat magnitudine; differt vero ab antecedente floribus non solitariis terminalibus, sed ternis aggregatis. W.

“(24.) *Onicus heterophyllus*, W. = *Cirsium helenioides*, Allioni Flor. Pedemont. 553, tab. 13.

“Caulis sesquipedalis seu brevior. Foliis 5 ad 10 non dentatis ciliatis subtus niveis; aliis integris, aliis laciniatis. Radix repens.”

Allioni, in his “Flora Pedemontana,” gives a plate of *C. helenioides*, as well as the following account of it:—

Cirsium helenioides, page 152, vol. i., tab. 13.

“*Cirsium* foliis ciliatis subtus tomentosis, radicalibus petiolatis ovato-lanceolatis aut semipinnatis. *Hall. Helv.* tom. i. n. 180, tab. 7.

“*Carduus helenioides*. *Linn. Sp. Pl.* 1155.

“*Cirsium* singulari capitulo squamato, vel incanum alterum. *Bauh. Pinax*, 377. It is also marked as being *Cirsium anglicum* of Bauhin, *Hist.* III. p. 45; radice Hellebori nigri modo fibroso, folio longo.

Desc.—Altitudo tripedalis et sexpedalis. Folia semiamplexicaulia, auriculis rotundis, lanceolata, subtus incana denticulata usque ad medium minutis pinnulis ciliata, denticulis majorem spinam exerentibus. Caulis araneosa lanugine indutus longe foliis nudus et semel aut bis in longissimos pedunculos divisus. Calyx ventricosus, conicus, floribus extra calycem instar *Centaurea* exsertis. Flos purpureus quinquefidus fere bilabiatus, hoc est, segmento uno profundius fisso, tubo purpureo; flosculorum pars inferior alba, qua parte purpureum colorem acquirit, inflectitur, et curvatur. Interni centrales flores minus incurvati, tubo longe extra florem protenso ad extremitatem suam violaceo colore intensius colorata incisa. Calycis squamæ triangulares apice tantum inter se recedunt, non reflexæ. Calyx ea ratione qua semina grandescunt, ventricosior redditur et cogit tubos flosculorum incurvari: Pappus sessilis, plumosus sericeus multus: Receptaculum pilosum.

“*Localis.*—Abunde in pratis fertilioribus editiorum montium et presertim secus fluentes aquas. Circa Tenda, Mont Cenis, Grassonay.”

The plate No. 13 in the work seems scarcely to agree

with Linnæus' description, and I venture to think Allioni had not the same species under his notice.

In De Candolle's Prodrômus, *C. helenioides* of Linn., as also that of Allioni, is made a synonym of *Cirsium heterophyllum* under the division *indivisum*, and reference is made to Eng. Bot., plate 675, as well as to the plate of Allioni previously referred to; but neither the plate in English Botany, nor the letterpress description given there, agrees with Linnæus or with Allioni, any more than Allioni agrees with Linnæus, and I cannot think the authors had before them identically the same plant.

In Rees' Cyclopædia occurs the following notice, under *Carduus helenioides*. Linn. Spec. Plant. 21. *Onicus helenioides* (Willd.), 25. "Leaves embracing the stem, lanceolate toothed ciliated with small unequal spines, stem spineless, (Linn.) In habit much resembling *C. heterophyllum*, toothed, not lacinated, half embracing the stem, with round reflexed adnate auricles, floral leaves awl-shaped. Flowers four or five at the top of the stem, only half the size of those in *C. heterophyllum* (Willd.) From a living plant; a native of Siberia. Dr Smith assures us that he has not seen it, either wild or cultivated, in Great Britain."

The editor of the Cyclopædia omits all mention of *Anglia* as a habitat for the plant, but that station is given by Linnæus in his 1753 as well as in his 1763 edition of Spec. Plantarum, though in Willdenow's edition of 1794 *Anglia* is omitted; and all subsequent authors seem also to have dropped it. In a footnote to the letterpress description of *C. pratensis*, in English Botany, date 1793, botanists in Britain are requested to look for *C. helenioides*.

I now give the descriptive characters of our plant, and leave it to be seen how far it coincides or differs with the plants of the authors.

CARDUUS CAROLORUM. *The Charles Thistle.*

Root perennial, fibrous, deeply rooting in the soil, crown cæspitose, producing several stems.

Stems from two to four feet high, furrowed, slightly cottony, leafy from top to bottom, terminating in a corymb of from five to nine capitula.

Leaves.—Root leaves lanceolate, gradually tapering at the base

into a long petiole, sinuate-dentate, fringed with short unequal bristles, cottony beneath (but not so snowy white as *C. heterophyllus*), the upper surface pilose.

Stem leaves from twenty to thirty (cottony beneath also, and pilose above), lower, narrowing into long winged petioles, lobed as well as deeply toothed, upper leaves more nearly sessile, semi-amplexicaul with decurrent auricled prolongations; nearer the summit smaller, sharply toothed, acute at the point; floral leaves awl-shaped.

Involucres obovate or globular.

Phyllaries lanceolate, adpressed, acuminate, dentate towards the apex.

Pappus deciduous, short, rigid, feathery, forming a ring at the base.

Achenes ovate, compressed with a circular depression into which the pappus is inserted.

Flowers purple.

A very handsome plant.

There are, in my opinion, some peculiarities in our plant which are not specified by Linnæus; and that it differs from Allioni's I feel quite certain. But I leave the determination of this question to more able botanists than myself.

In the hope that I might be able to throw some light on the plant by an inspection of the herbarium of Linnæus, I took an opportunity of seeing it at the rooms of the Linnean Society in London; but although I found plants in his Hortus Siccus named *C. helenioides*, and also in the Cliffortian collection at the British Museum, they neither agreed with the letterpress description of Linnæus, nor with our plant. Indeed, whether I looked to the sources I have named, to the synonyms in De Candolle's Prodrômus, to the plate often referred to in Allioni's Flora Pedemontana, or to the synonyms given in those works, or in our later botanical publications, I found nothing but confusion; and the more I searched books and dried specimens, with their manifold alterations of names, the more confounded my confusion became. Under these circumstances, I betook myself again to nature, and an independent examination of my plant, and endeavoured, at least, to understand well what I had got. Mr Howie, with the love of science which distinguishes him, kindly undertook to improve our position by going north to the station again, and collecting more plants. We had lost, however, much

valuable time, for it was now October, and wind, frost, and snow had been there before him. Our plant, so full of beauty in July, was now dried, dashed, broken, and faded. He procured, however, a dozen roots, which are thriving well in my garden, and will, I trust, during the next summer, supply us with abundant details for interesting investigation, and the determination of all questions about the plant. Whether it is the *C. helenioides* of Linnæus or another, it seems to me a very notable scientific incident that this plant should now be found for the first time in a place that must have often been traversed by botanists and other students of nature. It is also to my mind no less remarkable that a plant, at least very like to it, is located in the north of Asia, and under conditions not dissimilar from those that govern the appearance of our stranger here. I can scarcely think that, however closely the two plants resemble each other, they have one common origin. That they originated in the same circumstances, or had an origin in common, I cannot doubt; and that which is common to the two localities may explain the case. I refer to the occurrence, both in Siberia and in our district, of *Carduus palustris* and of *Carduus heterophyllus*, to both of which the *C. helenioides* of Linnæus and our plant have a close resemblance, though distinguished by marked differences. Yet even in the differences there is a wonderful analogical affinity. At our station we found a few stray plants of *C. palustris* within a short distance, and also some isolated patches of *C. heterophyllus* not far removed. Mr Howie and I have made a strict and critical examination of the three plants, and I will submit a few of those relational attributes which lead me to think our plant is a true natural hybrid between the two species I have mentioned. It possesses some of the typical characters of both, but evolves in its individual form qualities different from the plants I suppose to be its progenitors. I ask your kind attention, in the faith that the matter is very worthy of notice, and if I am right, will be sure to come up again in connection with important physiological problems.

In the first place, we will see what relation the roots of these three species bear to each other, in what particulars they agree, and in what they differ. The root of our new

plant is perennial, caespitose, fibrous, rooting down deeply into the soil, and the young shoots push out from the axis of the roots, forming a clump of closely clustered stems. The root of *Carduus heterophyllus* is perennial also, but it is stoloniferous, and the stolons give off solitary stems a little removed, forming patches. The root of *Carduus palustris* is small and branched; it sends up only a solitary stem, and is biennial. In my judgment our plant has its rooting habit from *C. palustris*, but obtains its perennial powers and numerous stems from *C. heterophyllus*. The general aspect of *C. palustris* is so very different from our plant, that but for the accordance just noted in common with some others, which we shall presently refer to, affinity between them would not be suspected. *Carduus palustris* is all over a very spinous stiff plant (stem and leaves), the spines being hard and prickly; it has a slight, branched, solitary, winged stem. The stem leaves are lobed, the root leaves petiolate, and it has a clustered head of flowers. Each capitulum is small, and the pappus is short and rigid.

Both our plant and *C. heterophyllus* are flexuous, the spines that arm them are soft, and they are thus easily handled. In *C. heterophyllus* the root leaves are ovate, lanceolate, glaucous on the upper surface, and have short petioles. The stem leaves are all sessile, with large rounded auricles; they vary very much in their external contour, as the name of the plant implies, and as is well shown by the specimens on the table. Many of the leaves are waved in their outline, tending somewhat to contraction about the middle. Many are deeply laciniated or incised, others have smooth entire margins. They do not appear, however, to be ever lobed, nor to attain the fine long narrow lanceolate form of those of the new plant. The flowers of *heterophyllus* are usually limited to one capitulum, but sometimes two and even three are met with. The capitula are broadly ovate, large, loose in habit, and the pappus partakes of the same character, being long, light, and thin; in this, as in both the others, the pappus is deciduous.

The root leaves in our new plant are very long, and finely lanceolate, with long slender petioles frequently exceeding the length of the laminae. The lower stem leaves have also very long petioles, but they are deeply lobed;

while the upper stem leaves, also lobed, are sessile, with winged prolongations. The topmost leaves are sessile, with short auricles; and the floral leaves are delicately awl-shaped. The heads of flowers, five to nine in number, are placed on the axis in a corymbose form, are much smaller than those of *C. heterophyllus*, but larger than those of *C. palustris*. The habit of each capitulum is close and contracted; the pappus is comparatively short and rigid. Some individual plants have a looser habit in flower, and indicate a leaning to *heterophyllus*.

Detailing now in a cursory way my idea of this hybrid, it appears to me that our new plant has its flexuose habit and soft spines, its lanceolate entire leaves and numerous stems, from *C. heterophyllus*; while its decurrent lobed stem leaves, its numerous capitula, the stunted form of the capitulum, and the short rigid pappus, are derived from *C. palustris*. The late period of the year when we got our plants (October), prevented that examination of the stamens and pistils, the corolla, the pollen, the ovary, &c., which we trust to make during next summer.

Hybrid forms of thistles seem to be not infrequent in nature, but I am not aware that any one has made them a subject of special study. Our *Carduus Forsteri* is regarded as a hybrid between *C. pratensis* and *C. palustris*. *C. tuberosus* is suspected to be a hybrid between *C. crispus* and *C. acaulis* (Bab. Flora, page 202, ed. 1867), and other crosses with *C. acaulis* are somewhat doubtfully referred to by the same authority. In Hartmann's "Hand-book of the Scandinavian Flora" (Stockholm, 1849), page 16, a hybrid is described between *C. heterophyllus* and *C. acaulis*, one between *C. oleraceus* and *C. heterophyllus*, and another between *C. acaulis* and *C. oleraceus*. Stations are given for each, and the degrees of affinity are explained, but no information is given as to the constancy of their forms.

I understand that *C. Forsteri* is a rare form, but I do not know whether it is a true species, always to be found by careful search in the localities where it may have been previously gathered. The interest that attaches to such hybrid forms must, it appears to me, vary with the power each form may have of maintaining its place in nature under her ordinary conditions, and of transmitting

its specific differences from generation to generation. When they do this I can but think they are good and true species, whether they had their origin in hybridisation, or in any other way.

Referring now to the *Carduus* which is the subject of this paper, my present experience demonstrates, that although the plants, so far as we at present know, are few, they must have been many years in the place we found them, and they have produced new young plants from seed. In proof of this we have perennial roots of considerable age and seedling plants of last year growing now in my garden. We have also among our dried specimens a first year's floral stem of a seedling with its corymb of small abortive flowers. The cauline leaves are on the stem, as is not unusual on the first year's growth of herbaceous perennial plants. If it shall prove that the plant is really limited to the small area within which we found it, the circumstances may be explained by the fact, that of sixteen capitula which were gathered in October from the withered stems, no less than fifteen had the seeds destroyed by insects, the larvæ being found among the pappus and chaffy scales of the receptacle. It will be borne in mind, too, that the pappus being deciduous does not favour the dispersion of the seed.

Should subsequent research prove this *Carduus* to be a persistent species of recent origin ; if time confirm its power of perpetuating itself in descendants with like distinctive characters to those which it possesses ; if its peculiarities are conserved in young new plants developed under natural conditions from its seed ;—I think we shall have ascertained one way, at least, in which nature enriches and varies the flora of the earth.

IV. *On the Botany of Frodsham Marshes, Cheshire.* By Mr JAMES F. ROBINSON. Communicated by Mr SADLER.

Frodsham Marsh is a large tract of low-lying land, bounded on the north-east by the river Weaver, and on the north-west by the river Mersey ; it is mostly well drained by gutters, which empty themselves into large ditches, the water eventually being conveyed to the river.