

Pitty Hollow, Wirksworth.

A BOTANICAL STUDY.

By THOMAS GIBBS.

WIRKSWORTH is situated at the south eastern extremity of the plateau of Carboniferous Limestone which occupies so large an area in West Derbyshire. The limestone is here bounded by a series of faults, two of which form important features in the scenery. One of these is the great fault known locally as "the Gulf," which, commencing near Wirksworth Station runs north westwards towards the village of Middleton-by-Wirksworth, almost following the line of the road below the great quarries; to the other we owe one of the most lovely spots of a beautiful district "The Yokecliffe." Here the plateau ends abruptly in a steep escarpment crowned by a strip of rocky woodland, below which in place of the cold and rather monotonous scenery of the limestone plateau we have the softer and more undulating scenery of the "Limestone Shales." At the western extremity of the Yokecliffe about a mile from the town, a spur projects southwards from the plateau, terminating in another steep declivity overhanging a deep and picturesque ravine. According to the Geological Survey Memoir this spur "is bounded by a zig-zag line of fault at the southern end of which, where the Limestone and Shale Grit escarpments stand face to face across the ravine the throw is probably 300 feet."

This ravine is the subject of the present paper. It is often called the "Pitty Wood," but the Ordnance Survey

map confines that name to the piece of recently replanted woodland on the north-eastern side of the area, the steep rocky hillside being called "Sprink Wood" and the rough fern-covered hillside on the opposite side of the valley "Rough Pitty Side." In the old Survey maps the names of the two woods are given as "Petty Wood" and "Petty Sprink." For the purpose of this paper it will be convenient to have a single name for the whole area and I have therefore called it "Pitty Hollow."

The botanical interest of the ravine lies in the great variety of soil and situation comprised within a small area. Owing to the geological features mentioned there are here in close proximity two types of rock which form a remarkable contrast in their physical features and chemical characteristics and consequently in their floral products. These are the Carboniferous Limestone and the Millstone Grit. The former is a crystalline calcareous rock, hard and non-absorbent. As it disintegrates chiefly by aqueous solution it forms but little soil to hold the surface moisture, which is therefore soon lost in the large cracks or joints with which the hard non-flexible rock abounds. It therefore forms a dry and consequently a warm soil. The Millstone Grit on the other hand is a sandstone rock and holds water like a sponge; it disintegrates readily by the dissolution of the binding matrix and forms a deep, moist but rather poor soil. In a position geologically intermediate between these two rocks we find in Derbyshire certain beds of dark shales interspersed with thin beds of sandstone and limestone. These were until recently generally considered to be the local representatives of the "Yoredale Rocks" of north-west Yorkshire, but this identification is now disputed and the Geological Survey map gives them the strictly non-committal title of "Limestone Shales." These shales are of a clayey and impervious nature so that the water which drains through the overlying grit can pene-

trate no further and issues forth at the junction of the two formations in springs and where it cannot get away freely forms rushy or muddy swamps or true Sphagnum bogs.

The Pitty Hollow forms a conspicuous indentation in the edge of the area of hilly country which forms the western boundary of the Ecclesbourne valley. In shape it is roughly quadrangular its extreme length from Stainsboro Lane on the west to where the stream leaves the wood on the east being nearly three quarters of a mile. The hills on the northern, southern, and western sides rise to upwards of 800 feet but the eastern side is open to the main valley and forms the exit of a small stream which joins the Ecclesbourne Brook at the Haarlem Mill Dam. This streamlet has its origin in a group of swampy runnels which gather on the hillside at the head of the valley between the 600 and 800 feet contours. Where it emerges from our area it has an altitude of about 450 feet, its total fall therefore is between 200 and 300 feet in about half a mile.

The area of the woodlands swamps and rough uncultivated land included within the fences is according to the Ordnance Survey slightly under 77 acres. The inclusion of some small swampy areas beyond the fence at the head of the valley however brings the total area up to about 80 acres, one eighth of a square mile. On the northern hillside according to the Geological Survey map an east and west fault cuts off the limestone between the 600 and 700 feet contours, while two north and south faults at about the same elevation form the boundary of the limestone on the east and west, so that the limestone area is comprised in a small rectangular space of upwards of 600 feet elevation. The face of the hill is everywhere steep and in one place precipitous and there are some bare faces of limestone rock. The hilltop is riddled with old lead workings and, connected with these is a cavern

called on the map "the Dream Mine," but known locally as "the Bone Hole," and made famous by the researches of Dean Buckland nearly a hundred years ago.

The hill which shuts in the ravine on the south and west is capped with sandstone rock belonging to the "Shale Grit," the lowest member of the Millstone Grit series; the outcrop being on the southern slope a little below the 700 feet contour but rising sharply to nearly 800 feet where the hill curves northwards round the head of the valley. The trough of the Hollow between the limestone hill on the north and the outcrop of the Shale Grit on the southern hillside is, except for a small area on the east which is covered by Glacial clays occupied by "Limestone Shales." Through the centre from east to west runs the little Alder-fringed streamlet already mentioned. Owing to the clayey impervious nature of the soil its margin and indeed most of the level valley bottom are waterlogged and swampy, the water being in many places strongly impregnated with oxide of iron derived from the Shales, while near the south-western corner between the 600 and 700 feet contours is a true bog with large patches of oozy Sphagnum and other characteristic plants.

The only truly indigenous trees of the area are probably the Alder (*Alnus rotundifolia*) which abounds all along the stream-course and round the edges of the swamp, the Oak (*Quercus sp.*)¹ which grows on the drier ground on the grit and shales, the Ash (*Fraxinus excelsior*) more especially a tree of the limestone dales but here growing freely both on the limestone and on the shales, and the Hawthorn (*Crataegus monogyna*) which grows freely on all the formations. A few scattered trees of Crab Apple (*Pyrus Malus*), Mountain Ash or Rowan (*Pyrus Aucuparia*), and Wych Elm (*Ulmus glabra*), may also be considered natives

¹ Both the pedunculate and sessile-fruited species or sub-species occur but the former is the prevalent form.

in the sense of not having been intentionally introduced by man. Pitty Wood and Sprink Wood are modern plantations, the latter of not more than 20 years growth.

THE NORTHERN HILLSIDE.

With the exception of the Alder swamps and some copses chiefly of Oak, Ash, and Thorn on the Southern Hillside nearly all the woodlands are comprised in the area distinguished on the Ordnance Survey map by the names "Pitty Wood" and "Sprink Wood." Although there is no definite boundary line between the areas distinguished by these names there is a marked difference in character. Pitty Wood lies almost entirely upon shales overlaid below the 500 feet contour by Glacial clays and the soil is generally fairly deep. Sprink Wood on the other hand lies almost entirely on a steep limestone hillside; the soil is therefore very thin and in one part the rock is exposed and the face is actually precipitous. Pitty Wood is well planted with mixed timber, Sycamore (*Acer Pseudo-platanus*) and Larch (*Larix europaea*) being the most frequent, the other trees including Oak, Ash, and Wych Elm. In the lower part Spruce are mixed with Larch while the stream at the bottom is edged with its native Alders. The undergrowth is abundant and varied. The dominant plant is the Bluebell (*Scilla non-scripta*) which luxuriates in the deep rich soil. Here and there are little groups of Red Campion (*Lychnis dioica*), and Stitchwort (*Stellaria Holostea*), with scattered plants of Yellow Dead Nettle (*Lamium Galeobdolon*), these forming a pleasing relief in the general covering of deep purple blue. More or less co-terminous with the Bluebell but not here so abundant as on the Southern side is the Bracken Fern (*Pteris aquilina*). In the denser parts of the wood the Dog's Mercury (*Mercurialis perennis*) covers large patches and where it occurs almost excludes other vegetation. In the more open places we find the

Sky-blue flowers of the Bird's Eye Speedwell (*Veronica Chamaedrys*) and Wood Forget-me-not (*Myosotis sylvatica*), the Herb Bennet (*Geum urbanum*), Crosswort (*Galium Cruciata*), and several common grasses including *Arrhenatherum elatius*, *Alopecurus pratensis*, *Dactylis glomerata*, and in the wetter places great tufts of Tussock Grass (*Deschampsia caespitosa*). The following occur in one or two large colonies:—Raspberry (*Rubus idaeus*), Giant Bell-flower (*Campanula latifolia*), Rose-Bay Willow-Herb (*Epilobium angustifolium*), and Wood Garlic (*Allium ursinum*).

Sprink Wood as I have already said is steep and thin soiled and in places rocky and precipitous and the herbage varies in character according to the steepness of the hillside and the depth of the soil. In the centre is a precipitous face of limestone rock the crest of which at midsummer is brilliant with the golden flowers of Stonecrop (*Sedum acre*), while in the crevices of the rock grow the uncommon *Cardamine impatiens*, and two limestone loving ferns *Asplenium Trichomanes* and the rarer *A. Adiantum-nigrum*. Just within the boundary wall there is a level area covered with rough and coarse herbage; the flora of this area and of the dry marly slope below includes many characteristic limestone plants such as the Spindle Tree (*Euonymus europaeus*), Rock Rose (*Helianthemum Chamaecistus*), Marjoram (*Origanum vulgare*), *Viola hirta*, *Geranium lucidum*, while among plants not confined to limestone the following may be noticed:—

Arenaria serpyllifolia.

Geranium dissectum.

G. molle.

Trifolium repens.

T. dubium.

Fragaria vesca.

Agrimonia Eupatoria.

Senecio Jacobaea.

Veronica Chamaedrys.

V. arvensis.

Nepeta hederacea.

Myosotis sylvatica.

M. collina.

M. arvensis.

*Galium Cruciata.**Galium verum.**Pteris aquilina.*

The field above the boundary wall is a typical limestone pasture, thin soiled and with outcrops of bare rock. The flora includes the following : those marked * being characteristic of a limestone soil :—

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|--------------------------------|-----------------------------|
| * <i>Thlaspi virens.</i> | <i>Galium verum.</i> |
| * <i>Helianthemum</i> | <i>Taraxacum officinale</i> |
| <i>Chamaecistus.</i> | <i>var erythrospermum.</i> |
| <i>Viola lutea.</i> | <i>Hieracium Pilosella.</i> |
| * <i>Arenaria verna.</i> | <i>Myosotis collina.</i> |
| <i>Lotus corniculatus.</i> | <i>Veronica arvensis.</i> |
| <i>Trifolium dubium.</i> | * <i>Thymus Serpyllum.</i> |
| * <i>Poterium Sanguisorba.</i> | <i>Festuca ovina var :</i> |
| * <i>Sedum acre.</i> | <i>duriuscula.</i> |

Below the rock and steep slope is a gentler slope covered with rough grass and coarse herbage and recently planted with young trees of Ash, Sycamore, Poplar, Beech, and Spruce. That this is beyond the limestone is shown by the complete absence of the characteristic plants. The herbage is generally coarse and rank including such grasses as *Dactylis glomerata*, *Arrhenatherum elatius*, *Alopecurus pratensis* and *Deschampsia caespitosa*, and abundance of Nettles, Docks, and Thistles, also colonies of Raspberry, *Lotus corniculatus*, *Scrophularia nodosa* and the Bedstraws *Galium Cruciata*, *verum*, *saxatile*, and *palustre*, and here and there scattered plants of Primrose (*Primula vulgaris*). The chief habitat in the district for the last named plant is the well known "Primrose Hill," just outside the boundary fence at the head of the hollow. Here a moist clayey hillside, Bracken covered in summer and with bushes of Thorn, Bramble, and Briar Roses is carpeted in the spring with the beautiful pale yellow blossoms.

THE SOUTHERN HILLSIDE.

Turning our attention to the Southern Hillside we find a flora of quite a different type. Here the dominant plant is the Bracken Fern (*Pteris aquilina*), a characteristic plant of sandstone soils and fond of well drained hill-slopes. The fern-covering gives its character to the hillside varying in tint with the season. Thus in the height of summer when the neighbouring hills are becoming parched and brown the fern-clad slope is daily showing a deeper green through the up-growing of the young fronds. Then in autumn this deep green changes first to golden yellow and finally to a rich russet-brown, thus making the hill-side perhaps more beautiful in winter, especially on a bright sunny morning after rain, than at midsummer.

Next to the Bracken the most characteristic plants of the hillside are the Bluebell (*Scilla non-scripta*), the Common Soft-grass (*Holcus lanatus*), and the Hair-grass (*Deschampsia flexuosa*). The Bluebell grows among and is largely co-terminous with the Bracken and in spring and early summer when the young fern fronds are just shooting up it clothes the slope with a sheet of pale purplish blue. The situation is however less favourable than is the deep soil of the woodland opposite, the growth is therefore thinner and the mass of colour less dense. The Soft-grass to a great extent occupies the same ground as the Bracken and Bluebell, but also grows in large patches where they are absent or thin. The Hair-grass is even more characteristic of the Gritstone than is the Soft-grass. Unlike that grass it requires the ground to itself, consequently it grows in large colonies which when in flower wave in the wind and glisten with a beautiful purplish-silvery sheen. The Foxglove (*Digitalis purpurea*) also a sandstone lover and rarely found on limestone rears its tall handsome spikes here and there among the Bracken, and among the humbler inhabitants of the

hillside may be named the Greater Stitchwort (*Stellaria Holostea*) in little groups among the Bluebells, the Lesser Stitchwort (*S. graminea*), Heath Bedstraw (*Galium saxatile*), Tormentil (*Potentilla erecta*), Woodsage (*Teucrium Scorodonia*), Milkwort (*Polygala serpyllacea*), the Sorrels (*Rumex Acetosa* and *R. Acetosella*), and the Adder's Tongue Fern (*Ophioglossum vulgatum*). The Creeping Fumitory (*Corydalis claviculata*) grows in a rough stony copse on the hillside, and the Sweet-scented Buckler or Mountain Buckler Fern (*Lastrea montana*) in small quantity under the fence on the hilltop and also in a tree sheltered hollow on the hillside but is more at home in the swamp below.

THE CENTRAL SWAMPS.

The most interesting of the swampy areas is the large bog already mentioned near the south-western corner of the hollow. The predominant plants can be roughly picked out from the hillside above by their colouring. Thus at midsummer there is the Bog-moss (*Sphagnum sp*) pale bright green, Giant Hair-moss (*Polytrichum commune*) dull dark green, the common rushes *Juncus effusus* and *conglomeratus*, brown, and the Jointed Rush (*J. sylvaticus*), a dark but rather bright green, while the area is diversified by promontaries and islands of young pale green Bracken and there is a large "island" of short grass made conspicuous by masses of the white flower of the Heath Bedstraw (*Galium saxatile*). The interesting Insectivorous plant the Round-leaved Sundew (*Drosera rotundifolia*) grows sparingly among the Sphagnum. The swamp is edged on all sides by Alders, under which the soil is almost entirely black slimy mud and the vegetation is scanty and chiefly composed of the Marsh Marigold (*Caltha palustris*), Creeping Buttercup (*Ranunculus repens*), Bugle (*Ajuga reptans*) and Yellow Pimpernel (*Lysimachia nemorum*), with abundance of the common moss *Mnium hornum*.

Another type of swamp follows the course of the stream and is characterised by dense masses of coarse herbage, parts being monopolised by the Giant Willow Herb (*Epilobium hirsutum*), other parts by the Great Horsetail (*Equisetum maximum*), Meadow-sweet (*Spiraea Ulmaria*), Tussock Sedge (*Carex paniculata*), Wood Sedge (*Scirpus sylvaticus*) or Reed Grass (*Phalaris arundinacea*), with, in the early summer, an abundance of the golden flowers of the Marsh Marigold.

The following species also grow more or less freely in the swamps or wet grassy places :—

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|--------------------------------|---------------------------------------|
| <i>Ranunculus Flammula.</i> | <i>Senecio aquaticus.</i> |
| <i>R. repens.</i> | <i>Myosotis repens.</i> |
| <i>Cardamine pratensis.</i> | <i>Orchis maculata.</i> |
| <i>C. amara.</i> | <i>Juncus inflexus (acutiflorus).</i> |
| <i>Viola palustris.</i> | <i>J. bulbosus (supinus).</i> |
| <i>Lychnis Flos-cuculi.</i> | <i>J. bufonius.</i> |
| <i>Stellaria uliginosa.</i> | <i>Luzula multiflora.</i> |
| <i>Hypericum quadrangulum.</i> | <i>Carex muricata.</i> |
| <i>Lathyrus pratensis.</i> | <i>C. echinata.</i> |
| <i>Epilobium palustre.</i> | <i>C. remota.</i> |
| <i>Valeriana dioica.</i> | <i>C. leporina.</i> |
| <i>V. sambucifolia.</i> | <i>C. hirta.</i> |
| <i>Scabiosa Succisa.</i> | <i>Glyceria fluitans.</i> |
| <i>Cnicus palustris.</i> | <i>Athyrium Filix-foemina.</i> |

The following occur sparingly or locally :—*Radicula Nasturtium-aquaticum* (Water Cress).

One plant seen on the stream-side.

Stellaria nemorum.—In abundance in a strip of marshy woodland near the eastern boundary.

Rubus fissus.—On the edge of the great swamp.

Chrysosplenium alternifolium.—In some abundance in very wet places under the Alders.

Galium uliginosum.—Sparingly in a grassy swamp near the head of the hollow.

Taraxacum palustre.—Sparingly in the great swamp.

Polygonum Bistorta.—One small patch near the stream.

Myosotis caespitosa.—One plant seen near the stream.

M. versicolor.—Sparingly in drier places.

Lastrea montana.—Ditch-side in the great swamp.

Altogether some 200 species of Flowering Plants, Ferns, and Fern-Allies have been noticed in the area, and this number could doubtless easily be added to by a more thorough investigation of some of the more critical groups. Thus no attempt has been made to catalogue the forms of such protean genera as *Rubus* and *Rosa*, while the Grasses have not been at all thoroughly worked.

One remarkable deficiency has to be noted; that is the total absence of plants of the Heath family (*Ericaceae*). On the limestone area this was of course to be expected, but the southern hillside might have been expected to yield at least a little Ling (*Calluna vulgaris*) and Bilberry (*Vaccinium Myrtillus*), both of which occur in plenty elsewhere in the district, while the great swamp seems an entirely suitable locality for the Cross-leaved Heath (*Erica Tetralix*). Another fact worth notice is that of the British species of the genus *Myosotis* no less than six occur within our area; three of these, *M. repens*, *caespitosa*, and *versicolor*, being plants of swampy or at least moist habitats, *M. collina* is a plant of dry pastures, while of the remaining two, *M. sylvatica* our beautiful Wood Forget-me-not is a woodland plant, and *M. arvensis* the common Field Forget-me-not is equally at home in woodlands, waste places, or as a weed in cultivated land. The two absent members of the genus are the true Water Forget-me-not (*M. scorpioides*) which grows on the edges of ponds and streams and which has not here sufficient depth or extent of water, and the rare *Myosotis pyrenaica (alpæstris)*, for

which we have to go to the mountains of Scotland or the North of England.

In conclusion, I must acknowledge my great indebtedness to Brigadier-General H. A. Chandos Pole-Gell for kindly allowing me free access to his property, and I may say that the nomenclature corresponds with that of the latest edition of the *London Catalogue of British Plants*.



NO. I.—THE MARTYRDOM OF ST. LAWRENCE
AND THE FONT.

Copyright :
Alfred Loughton, Southwell.

TO FACE P. 193.