

THE VASCULUM

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Edited by

T. C. DUNN, B.Sc.

THE POPLARS, CHESTER-LE-STREET

BY THE WAY

Secretaries of societies and other contributors to the "Vasculum" are invited to send their notes to the Editor before 15th March 1977.

SUBSCRIPTIONS

The annual subscription for members, affiliated societies and institutions taking the 'Vasculum', were due on January 1st. If you have not yet paid could you please let the Treasurer have what monies are due as soon as possible. Gifts towards publication costs over and above the basic contribution will be most welcome.

HEDGEROWS

The tearing out of hedgerow plants to make larger fields has been going on for some time and has been mentioned in these pages in previous issues. The practice was most prevalent in East Anglia but our own counties have not been free from this nuisance. Around Medomsley, for example, Mr. Pirt reports that he can now see for miles from where he lives, whereas once the more near view was of field hedgerows. Although his view has been extended the prairie-like quality of it is no longer so interesting.

Another practice has more recently been creating havoc in the hedges. This is the use by farmers of the rotary hedge saw powered from the standard farm tractor. No longer do we see the neat laying of a hedge by knife once every 5 or 6 years but the more rapid tearing away at the hedge sometimes twice a year.

The total effect of both practices is to reduce the wildlife value of hedgerows to a very small part of what it ought to be. The first eliminates habitat altogether and the second prevents the bearing of berries through the winter and produces tremendous disturbance at other times of the year. It is well known that the yellow hammer is at present suffering an alarming down-turn in numbers. We would suggest that the disappearance of hedgerows and disturbance due to excessive cutting could at least be partly responsible. Small birds of the finch family are also declining and the magpie is having to resort entirely to the margins of woodland for nesting sites. Our hedgerows, although artificial, are one of our most important types of wildlife refuge in a world where increasing agricultural efficiency is removing all the little odd corners of wasteland

at an ever-increasing rate. Soon the hedgerow will be all that remains between life and death for some of our native species. We must do something to halt this trend before it is too late.

PIT HEAPS

Writing about the destruction of hedgerows reminded us of another rapidly disappearing habitat, the pit heap. Older members are only too familiar with the shaleheaps which once covered our north eastern landscape. The practice here is called reclamation and it is arguable that this is a beneficial one which gets rid of local eyesores. Most people would agree that the huge tips of a few years ago were ugly blots on the skyline. So they were smoothed out, covered with soil and either grassed for pasture or put to some other agricultural use. Some of them were very old and had not been used for tipping for many years. When it was proposed to rub out the old heap at Haswell, we were asked, by a group of local naturalists, to look at its wildlife value. It was superb, a lovely irregular waste area with a very diverse covering of flowering plants, hordes of butterflies and other unusual insects and, of course, flocks of birds feeding on the insects and nesting in the rough vegetation. The local people wanted to know if it could be kept or at least only modified to a minimum extent. We talked with the planners but it had already been decided what to do with it, so it disappeared. We had a similar experience at Ludworth concerning another extremely old pit heap. One by one they are being smoothed out and made to blend with the landscape, and at the same time millions of invertebrates are being killed, thousands of plants buried and the birds and mammals banished to perish elsewhere. This is a difficult subject to complain about since there is often a conflict of interests within the local community itself, but always we lose another wild habitat and we are so much the poorer in terms of wildlife. Can the trend be stopped or modified or are we too late?

DIELDRIN AND ALDRIN

Dieldrin and aldrin were two of the persistent organochlorine pesticides implicated in the decline of several birds or prey, in the 1960's. Following pressure from conservation groups production of both chemicals was stopped some years ago. Stocks were still left, however, and a period of grace was allowed to suppliers and farmers to use up the remainder. The period was then further extended to 31st December 1975. The MAFF then wrote to all firms known to be holding supplies of Aldrin/Dieldrin seed dressing informing them that an extension to use up any remaining stocks of these pesticides in 1976 could not be granted and any surplus materials on hand after the deadline should be disposed of safely. Firms were put in touch with experts in the Department of the Environment for advice on safe disposal procedure. So ended a black period in the history of wildlife conservation, but we must never assume that all is well once more. All interested in the countryside should keep a constant watch for the appearance of practices which could be deadly dangerous in many other ways.

THE SOCIETIES

NORTHERN NATURALISTS' UNION

The 53rd Annual Meeting was held in the Hancock Museum on March 26th, 1977 by kind invitation of the Natural History Society of Northumbria.

During the short business meeting the Treasurer reported that there had been a slight surplus of £7 37 on the year's working, in spite of the larger than usual October Vasculum and consequent larger printing bill. After the Secretary's remarks the proposed field meetings were agreed as follows:-

May 21st Shipley and Great Wood, Eggleston, Teesdale.

June 4th Junior meeting at St. Mary's Island.

July 6th Gall hunting at Wittonle-Wear.

July 9th Wolsingham, riverside shingle bank.

September 10th Ainwick Wooler Railway track.

October 1st Junior fungus foray, Hollinside Woods, Durham.

The election of officers followed, during which Mr. Dunn and Mr. Hall were re-elected Treasurer/Editor and Secretary respectively.

Under the heading of "Any other business" the proposal to store atomic waste in the Cheviots was discussed. It was decided that a protest letter should be sent to the appropriate authority.

The President, Dr. Tom Geyer, then gave his lecture entitled "Near Horizons". This was basically about variation in common species to be found in many of our easily accessible habitats. By means of coloured slides the lecturer showed us some of these habitats, particularly those with harsh environments such as old railway lines and waste places. The microhabitats were many and diverse, so that the plants and animals surviving there had to be more than usually adaptable. Thus plants such as Creeping Cinquefoil (*Potentilla reptans L.*), Mouse-ear Hawkweed (*Pilosella officinarum*), Woodsage (*Teucrium scorodonia L.*), Toadflax (*Linaria vulgaris Mill.*), and Harebell (*Campanula rotundifolia L.*), were all shown as examples having very many forms and varieties and so able to become globally distributed in a very large number of different habitats.

On a similar basis, we were shown a number of common birds, grass-hoppers, spiders, plant bugs, froghoppers, ladybird beetles, moths, a number of Hymenoptera and Diptera and the snail *Cepia nemoralis*. Lastly it was shown that this variation is merely a function of the D.N.A. of chromosomes and here reference was made to human blood groups, dog whelk size and Israeli frogs.

Mr. Hird moved a vote of thanks in which reference was made to the care and order that had gone into the construction of the lecture. Altogether this was a very scholarly exposition which everyone thoroughly enjoyed.

We then moved outside the lecture room to take the tea so well organised by Mrs. Hall and Miss Vincent. At the same time we were able to inspect the exhibits that had been brought along. These consisted of a collection of rocks, mosses and lichens from Upper Teesdale put out by Mr. Hird, some examples of our local Lycopodiums and Selaginellas with local records, details of life history etc. by Mr. J. Bowman, and the first N.N.U. Minute Book, a beautiful calendar with artistic paintings of wild flowers and some 'Country Side' magazines, (the latter to be taken away) by Mr. Dunn.

ANNFIELD PLAIN AND STANLEY NATURALISTS' CLUB

After the wonderful summer sunshine the end of season outings were somewhat of an anticlimax. The Buttermere outing on August 28th was a day more of cloud than sunshine a foretaste of the weather to come. The views were fine on Haystacks and Fleetwith Pike while the less agile enjoyed a gentle amble round the lake.

The trip to Blanchland on September 11th really caught it. This was the day of the great gale and several members of the party elected to stay in the coach. The remainder were somewhat buffeted but happy. Similarly, but in pouring rain, the walk from Felton to Weldon Bridge alongside the Coquet on September 25th was also somewhat difficult. The hardy ones enjoyed the autumn fruits and those unforgettable mushrooms! October 9th was a good deal better when we walked from Whittonstall to Lintz Ford by the side of the River Derwent. Once more the autumn fruits were much in evidence, a colourful end to the season's excursions.

The Annual Meeting and dinner was held in Stanley Civic Hall on 1st March 1977. The dinner was followed by a competition for the best photographic slide taken during the summer, then a film depicting the life and landscaping activities of 'Capability' Brown. During the business meeting the officers for the ensuing year were elected and the summer programme of walks was ratified. The outings to be arranged are to such places as Weardale, Teesdale, Osmotherley, Pen-y-ghent, High Cup Nick, Irthing Gorge, Brignall Banks, Castle Eden Dene the Lake District and the Cheviots.

DARLINGTON AND TEESDALE NATURALISTS' FIELD CLUB

The Annual Report for 1976 shows that there has been a very full and active year. The Annual Meeting on February 10th drew 68 members and after the election of officers there was some lengthy discussion about the writing of minutes and their reading at the next meeting. This was referred to the Committee for further consideration with the result that several modifications and improvements in procedure have been adopted. Indoor meetings have been consistently well attended with an average of 66 people present. The outings too, have always been patronised in sufficient numbers to fill at least one coach.

Two notable achievements have been the help we have given towards enabling Durham County Conservation Trust to come to an arrangement with British Rail about Brinkburn Pond, and our successful efforts to save the Rock Well, Haughton from being obliterated under a new housing estate.

NOTES AND RECORDS

NOTES

Red Squirrels. A farmer relative of mine told me of the death of four red squirrels within 50 yards of his farm. The Snods, Shotley. They all happened during the last week in August and the first week in September. Two were killed on the road by some sort of motor vehicle, one had been savaged by a cat, dog, weasel or stoat and the fourth had been drowned in the farm cattle drinking trough. I wondered if the long drought had tempted them away from their usual woodland haunts in search of water for them to come to grief in unusual surroundings. In any case, it was a sad sight to see four red squirrels suffer such tragedy, yet at the same time I could not help reflecting that four squirrels in such a small area in such a short time was a most unusually high density. R. Pirt.

Bramblings. On January 17th 1977 a group of unusual and very beautiful birds were seen in the grounds of a house on the outskirts of Darlington. A flock of 18 returned the next day to feed on beech mast and other seeds under two large beech trees in the grounds. They remained for so long that they were easily identified as Bramblings. We were delighted to be able to watch them from such close quarters. R. Pirt.

The River Wear from Fatfield to Wearmouth. Wearmouth has a long history of industrialisation and as a result has tended to be overlooked by naturalists. During recent investigations interesting records have come to light and what is more pleasing a number of intact salt-marsh communities have been discovered at a time when we are losing them elsewhere.

Timber Beach at Southwick is a small but 'textbook' salt marsh, where *Salicornia* and *Suaeda* species give way to *Scirpus maritimus* L. and thence to *Phragmites communis* Trin. Nearby we found an area dominated by *Agropyron pungens*(Pers.) Roem & Schult., a grass which reaches its northern limit at this station. The marsh is bordered by limestone grassland which has the Bee Orchid and, strangely enough, heather.

Claxheugh Rock is much visited by geologists but is more deserving of the attentions of botanists. The rock possesses a good limestone flora with *Panetaria judaica* particularly abundant. *Molinia caerulea*(L.) Moench. can be found growing with *Sesleria caerulea* (L.) Ard., an association which is common in Germany but not so in east Durham. Claxheugh Rock is fronted by an area of mudflat with salt marsh to one side.

Barro's Quay is mainly salt meadow surrounded by scrub and woodland. The composition of the turf varies, the main species being *Festuca rubra* L., *Armeria maritima* (Mill.) Willd., *Puccinellia maritima* (Huds.) Parl., *Aster tripolium* L. and in wet places *Juncus gerardii* Lois.

Between Hylton and Coxgreen there are steep wooded banks occasionally interrupted by fields and scrub. Maritime species persist inland to Coxgreen where *Scirpus maritima* may still be found. Thereafter *Phalaris arundinacea* L. becomes dominant though *Oenanthe crocata* L. remains plentiful.

This area will certainly repay a visit from anyone interested, providing that they are prepared to ignore the smell!

Derek Hall.

The Backhouse family. In order to satisfy an inquiry, I had occasion to look at the entries for the Backhouses in the 'Biographical Index of British and Irish Botanists', Britten J. and Boulger, G.S., 1931. The following notes were taken from this book together with a note compiled by Sunderland Museum on Edward Backhouse. I thought members might be interested in this talented family.

Backhouse, James (1794-1869): b. Darlington, 8 July 1794; d. York, 26 January 1869. Nurseryman. Botanized in Teesdale. Missionary Friend in Norway and Southern Hemisphere, 1831-41. 'Esculents of Van Diemen's Land', London's Gardeners' Magazine 1835, p.338. MS Flora of N.S.W. (2 vols.) at Kew. Hook, Kewand Winch correspondence. Memoir by sisters (with portrait) 1870. Journ.Bot. 1869 p.32. Garderners' Chronicle 1869, p.136. Friends' Biographical Catalogue in London Friends' Institute 188, no. 29. Also in Annual Monitor, or Obituary of the Society of Friends, 1870. Biographical Notes on the Early Botanists of Northumberland and Durham, N.H.S. Trans. XIV, p.82 Report of the Australian Association for the Advancement of Science, Sydney 1907, p.1 72. Mennell's Dictionary of Australian Biography 1892, p. 21. Curtis's Botanical Magazine 4133. *Backhousia* Hooker is named after him.

Backhouse, James (1825-1890): b. York, 22 Oct.1825; d. York, 31 Aug. 1890. F.L.S. 1885. Son of J. Backhouse mentioned above, with whom he botanized in Teesdale, Norway (1851), Ireland (1854), and Scotland (1859) etc.) Discovered *Viola arenano* in Teesdale (1862). Hooker correspondence at Kew. Published 'Monograph on British Hieracia' 1856. Contributions to Phytology (1846 62).

Journal of Botany 1890, p. 353 (with portrait). Royal Society correspondence i,147, xiii p. 227.

Backhouse, William (1779?1844): b. 1779?; d. Darlington, 9 June, 1844. Banker. Cousin of Jas. Backhouse senior. English Botany by J.E. Smith pp. 1984, 2529, 2922, etc. List in Longstaffe's Hist. Darlington Nat. 1864, p.42. Winch correspondence at Linn. Soc. Baker's Notes in N.H.S. Trans. p. 83.

Backhouse, Edward (1808 1879). The Backhouse collection was presented to Sunderland Museum in 1906 (Edward Backhouse lived in Sunderland). It included less than 20,000 specimens including 6,000 exotic and British butterflies and moths; over 4,000 British and foreign shells, 1,500 geological specimens (many formerly the property of Canon Greenwell) and some 600 flint implements. Previously, in 1894 he had given the museum his Herbarium of British Plants c. 650 sheets (old classification); British Mosses, 140 sheets; Fungi, 80 sheets and in 1904 a collection of Seaweeds of Sunderland, 170 sheets. There were also other items. Edward Backhouse was one of 3 life members of the Sunderland Lit. and Phil. Soc. He was a man of many parts interested in natural history, archaeology, and art. He was a deeply religious man, famous for his philanthropy and took part in the Anti-Slavery movement. Sunderland Museum also possesses the "J.B" Herbarium collected 1870-80. Could this be J. Backhouse jun. (1825-90)? A. G. Long.

RECORDS

LEPIDOPTERA BUTTERFLIES AND MOTHS

<i>Nymphalis antiopa</i> L. Camberwell Beauty	66,69
One seen at 12.30 p.m. on September 5th 1976, near Grass Hill, Harwood in Teesdale (66). Simon Hodgson.	
One at Moorhouse Research Station, 25th August (69). J. Parkin.	
<i>Pararge megera</i> L. Wall Brown butterfly	67
Wylam, in August (R. T. Swinburn). Whitley Bay, 2 seen on 4-9-76, the first records for Northumberland. J. Parrack.	
<i>Inachis io</i> L. Peacock	66,68
About 30 on thistle heads and knapweed, Smalesmouth, N. Tyne on 17 th August 1976. J. Parrack. Chester-le-Street, in my garden, up to 4 on my Buddleias every day from 15 th August to 29th August 1976, never here before. T.C.D.	
<i>Argynnis aglaia</i> L. Dark Green Fritillary	67,68
Larvae plentiful on <i>Viola</i> sp.. Holy Is., and Bamburgh dunes, 22nd May (68).	
	J. Parrack
An adult on Buddleia in the University campus in Queen Victoria Road in the centre of Newcastle-upon-Tyne, 26th August (67) Judith MacDonald.	
<i>Scoliopteryx libatrix</i> L. Herald	
Plentiful at sugar, Kielder, 17th August (68) and at least 26 at Staward on 27th August, 1976. (67) J. Parrack	
<i>Geometra papilionaria</i> L. Large Emerald	67
One at Staward, 7th July 1976	
<i>Aporophyla lunula</i> Stroem. Black Rustic	67
One at Staward, 27th August 1976.	
<i>Mormo maura</i> L. Old Lady	67
Several by the riverside at sugar, Staward, late August 76.	

<i>Agrotis pita</i> Hubn. Shuttle-shaped Dart.	68
Kielder trap, 21 8 74	
<i>Procus versicolor</i> Borkh. Rufous Minor.	68
Kielder trap, 18 in 1974 (not taken previously).	
<i>Chloroclystis coronata</i> Hubn. V-pug.	68
Kielder trap, 20 8 74.	
<i>Ennomos quercinaria</i> Jufn. August Thorn	68
Kielder tap, 24 8 74	
<i>Odontotia carmelita</i> Ep. Scarce Prominent.	68
Kielder trap, 13-5-75 J, Parrack.	
<i>Xanthorhoe spadicearia</i> Schiff. Red Twin-spot Carpet	68
Callaly Crag and Castle Hill, 13-6-76.	
<i>Hepialus hecta</i> L. Golden Swif.	68
Callaly Crag and Castle Hill, 13-6-76.	
<i>Scopula lactata</i> Haw. Greater Cream Wave	68
Callaly Crag and Castle Hill, 13-6-76	
<i>Ematurga atomaria</i> L. Common Heath Moth	68
We were surprised to find adults of this moth (6 males) on the top of Long Crag on 3-8-76. We have never taken the presumed second generation of this species before.	
<i>Phytometra viridaria</i> Clerck. Small Purple-barred.	68
Holystone Junipers, 12-6-76. 1. & B. Wallace	
<i>Eulithis mellinata</i> Fabr. Spinach.	66
One in house garden, Hartlepool, 1 7 76.	
<i>Ennomos fuscantaria</i> Haw. Dusky Thorn	66
One caught in Brierton Lane, Hartlepool, 19-8-76	
<i>Diloba caeruleocephala</i> L. Figure of Eight	66
Three caught in Brierton Lane, Hartlepool, 15 to 18-10-76	
<i>Orgyia antiqua</i> L. Vapourer	66
Larvae defoliated a hawthorn hedge on Hartlepool Trading Eastate, July 1976.	
<i>Dicestra trifolii</i> Hufn. Nutmeg.	66
Small numbers caught in Brierton Lane, Hartlepool, on nine nights 8-8-76 to 26-8-76. R. T. McAndrew and J. K. Williams	
<i>Boloria selene</i> Schiff. Small Pearl bordered Fritillary.	66
A thriving colony on Knitsley Fell, July 1976 F. B. Stubbs	

FLOWERING PLANTS AND FERNS

<i>Lycopodium clavatum</i> L. Common Clubmoss.	67
Slaley Forest, 1965.	
<i>Lycopodium alpinum</i> L. Alpine Clubmoss	67
Slaley Forest, near the last, 1965. G. White	
<i>Lycopodium clavatum</i> L. Common Clubmoss	67
Slaley Forest. Abundant 300 m. South of Mr. White's station where it is now scarce, March 1977.	
<i>Lycopodium alpinum</i> L. Alpine Clubmoss	66,67
Knitsley Fell, Weardale (66), July 1976. Also in Slaley Forest (67) plentiful in the same place as the last, March 1977. J. T. B & D. Bowman	

<i>Carduus nutans</i> L. Musk Thistle. Holy Island in 1976	68
<i>Malva neglecta</i> Wallr. Dwarf Mallow On Holy Island, 1976. L. P. Hird	68
<i>Thalictrum minus</i> L. Lesser Meadow Rue. Claxheugh	66
<i>Cakile maritima</i> Scop. Sea Rocket. North and South Docks, Roker.	68
<i>Coronopus squamatus</i> (Forsk.) Aschers. Swine-cress. Roker, 1975.	66
<i>Thiaspis arvensis</i> L. Field Penny-cress. South Hylton, 1974	66
<i>Rorippa islandica</i> (Oeder) Borbas. Marsh Yellow-cress Fatfield.	66
<i>Sagina maritima</i> Don. Sea Pearlwort South Docks (and Seaham Docks)	66
<i>Honkenyapeploides</i> (L.) Ehrh. SeaSandwort South Docks and Roker	66
<i>Spergularia media</i> (L.) Gresh. Coxgreen to Southwick.	66
<i>Spergularia manna</i> (L.) Griseb South Hylton to Southwick	66
<i>Beta vulgaris</i> L. <i>spp.mantima</i> (L.) Thell. Sea Beet Roker Beach.	66
<i>Atriplex littoralis</i> L. Shore Orache South Docks	66
<i>Atriplex glabriuscula</i> Edmondst. Babington's Orache. Roker and South Docks	66
<i>Suaeda maritima</i> (L.)Dum. Herbaceous Seablite Barren's Quay, Timber Beach and South Docks.	66
<i>Salicornia dolichostachya</i> Moss. Timber Beach	66
<i>Malva moschata</i> L. Musk Mallow. Fatfield.	66
<i>Hydrocotyle vulgaris</i> L. Marsh Pennywort Hylton Dene.	66
<i>Apiumgraveolens</i> L. Wild Celery. Barren's Quay and Claxheugh.	66
<i>Apiummodiflorum</i> (L.) Lag. Fool's Watercress Hylton Dene.	66
<i>Parietario judaica</i> Coxgreen to Claxheugh.	66
<i>Glaux maritima</i> L. Sea Milkwort Coxgreen to Timber Beach	66
<i>Blackstonia perfoliata</i> (L.) Huds. Yellow wort Claxheugh to North Docks	66

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THE POPLARS, CHESTER-LE-STREET

BY THE WAY

Secretaries of Societies and other contributors to the "Vasculum" are invited to send their notes, for the December number, to the Editor before November 15th 1977.

FARMING AND WILDLIFE.

Because the changes have taken place so gradually, not everyone has noticed the slow alterations in the patterns of landscape in our farmlands. The introduction of mechanisation has caused a complete revolution in farming methods over the last 30 years. Few of the younger generation have ever seen a pair of Clydesdales pulling a plough, yet these magnificent horses were the only means of farm traction only a short time ago. Tractors, combine harvesters and other agricultural mechanical wonders have altered the scene completely. The work can now be carried out in a shorter time and with a much smaller work force. The farming industry is said to have become more efficient and to have increased its output tremendously. Seldom do we hear of the huge expenditure of energy in the process, or of the import bill for oil which has been necessary.

Hand in hand with the machinery for sowing and reaping have come new monsters for carrying out drainage projects and also the increased availability and use of fertilisers, insecticides and herbicides.

It is only recently that we have begun to notice the effects on the wildlife. Little badly-drained patches have disappeared from the fields, odd corners of wasteland or scrub that just could not be dealt with by hand without a lot of time and effort, have also gone. Large marshy areas and ponds have been drained, filled and made to produce crops. Hedges have been pulled out and small copses clear-felled in order to produce the larger fields that can be dealt with more easily by the new machinery. The reclamation of moorland has proceeded steadily although it is not disappearing quite so rapidly as the more lowland wildlife habitats. As a result of all this it has suddenly become apparent that the loss of habitat for wildlife has become serious. Several plants and animals have become extremely rare and are in danger of extinction. All of our butterflies are suffering, some are on the endangered species list already and unless there is a miracle of some sort, others will have to be added soon.

In addition to loss of habitat, persistent chemicals which accumulate in the soil through successive years of overuse are carrying out a programme of mass murder by poisoning. Thus good farming no longer supports abundant wildlife as a by-product of keeping people off the land, but is eliminating it rapidly. Farmers however are not to blame. Economic and political policies are such that more food must be produced for the ever increasing population. There are just too many people requiring to be fed. The increase in farm production will have to continue. There are two ways of doing this, either by increased yields from land already under cultivation or by increasing the acreage of cropping land. It is to be hoped that increasing yields will be the method adopted as nibbling away at our wilderness will continue to deprive our wildlife of their share of the cake. Many farmers wish to conserve wildlife so for this and other reasons the Nature Conservancy Council have been looking at both the practical and administrative parts of the problem. We can only hope that they will find some useful answer or the quality of life will continue to deteriorate.

A CODE OF CONDUCT FOR BOTANISTS.

In the interests of conservation of wild plants the Botanical Society of the British Isles has recently produced a leaflet containing their version of a code of behaviour.

The main points are under three headings, observe the law, safeguard the habitat and avoid thoughtless introductions.

Concerning the law, it is now illegal for anyone, without the permission of the owner or occupier, to dig up any wild plant. A small number of rare plants in danger of extinction are fully protected in every way, that is one may not pick their flowers, take their seed or take cuttings in addition to the rule about not digging them up. The B.S.B.I. advises that even common flowers should not be picked unless for some special purpose, but should be left for others to enjoy. Keen botanists wishing to identify unusual plants are asked to take only the smallest adequate bit, or use a sketch or photograph if this is possible.

Safeguarding the habitat is very essential. It is only too easy for naturalists to trample vegetation in search of rarities for recording or examination. Soil can be compacted by the impact of many feet and photographers can damage other plants not only with their feet but by trimming the nearby vegetation to get a better picture. The sites of extreme rarities should not be made common knowledge. These points are particularly important to teachers and leaders of natural history outings.

The last point concerns the scientific study of distribution of plants, which can be completely upset by the introduction of alien plants to the countryside, particularly if the habitat is an unusual one for that plant. If an "escape" does occur the matter should be notified to the local Conservation Trust or records centre.

Fuller details with the list of endangered plants can be obtained from our Field Secretary, Dr. P. Doody. (Stamped, addressed envelope please.)

THE SOCIETIES.

NORTHERN NATURALISTS' UNION

The 146th Field Meeting took place on May 21st, at Shipley and Great Woods near Eggleston in Teesdale, by kind permission of Eggleston Hall Estates. Drs. Tim Bines and Pat Doody led the expedition from Eggleston Bridge where special parking facilities had been arranged along the access road to the Tyne-Wear-Tees Tunnel works. Here about thirty members and friends gathered together, but sadly, the Consett and Annfield Plain Clubs were again absent.

The area was new ground to most people so that there was a tendency to break up into little specialist groups which then proceeded to get down to the work of listing the species present. These will be entered in the Vasculum records in this and subsequent editions. The botanists found an impressive number of unusual flowering plants, but the list of Bryophytes was by far the most spectacular. Mr. Dennis Hall noted 53 species mostly from the riverside alone, without having enough time to look into the greater possibilities of the woodlands themselves. Mr. and Mrs. Lowe listed 28 species of Mollusca and Dr. Davies found about 30 species of Diptera. Of the butterflies, the Orange-tip and Green-veined White were in fair numbers, whilst Peacocks just out of hibernation were plentiful. The Small Tortoiseshell was also about but in small numbers.

The junior meeting to St. Mary's Island on June 4th drew fewer young people than usual this year, possibly due to the nearness of G.C.E. examinations, but a lovely fine day made it a good one for those who did turn up. The tide was exceptionally low so that we were able to forage in the Laminaria beds, something which is rarely possible. The abundance of star fish, beadlet and strawberry anemones was remarkable and a very interesting morning resulted.

ANNFIELD PLAIN AND DISTRICT NATURALISTS' CLUB

The 1977 outings started on March 5th by a trip to Grasmere and Glenridding. Three separate walking parties alighted from the coach at different points to converge on Glenridding some time later. Although it remained fine all day, there was little to report from the naturalists' point of view, apart from a little frog-spawn in a mountain pool.

On March 26th, Mr. Clayton led a party from Hasty Bank to Osmotherley, following the end portion of the Lyke Wake Walk. Although it was dry at first, heavy drizzle started towards the end of the walk. The few signs of spring inducted a few interesting birds and a surprising number of active ladybirds just emerging from hibernation.

April 9th saw us following Mr. J. Puckering along field and woodland paths on the Pennine and Maiden Ways from Alston via Whitley Castle Camp and Slaggyford to Lambley. Wild life was still scarce due to the continuing low temperatures, with little more than coltsfoot in evidence. Lapwings, chaffinches and pied wagtails were seen.

On April 23rd the outing was to Pen-y-ghent, Ribbleshead and Horton. From Horton the two walking parties set off in the direction of Pen-y-ghent. On arriving at the Bull and Hunt Pots, one party returned whilst the other went on to climb the hill. Although the day was overcast and the wind blew strong on the top, there were rewarding views, but only a little of the purple saxifrage was seen in bloom. Lower down a few more flowers were beginning to awake in this cold spring, such were cowslip, primrose and lesser celandine. Active birds noted were lapwing, grouse, wheatear and kestrel.

NOTES AND RECORDS

NOTES

Bird Notes. Goosanders were again present at lowland waters in south-east Northumberland during the winter months: there were a duck and a drake at Seaton Burn on January 7th and on Gosforth Park lake on February 15th. The usual large congregation of coots gathered on Seaton Burn lake where there were 320 on January 7th. The cold spells which continued throughout the month, however, caused many waterfowl to disperse.

Great Crested Grebes appeared at Seaton Burn and Gosforth Park during March.

Maggies and Jays continue to increase with the break up of the big estates and the decline in game keeping. There were two magpies near the Home Farm, Low Gosforth, on March 25th.

The Chiffchaff, Willow Warbler, and Tree Pipit were heard in Gosforth Park on April 10th, the Sand Martin appeared on April 13th. Swallow April 16th. House Martin April 17th and Swift May 6th.

The Whitethroat continues to recover from the setback in 1968, and is fairly well distributed in south-east Northumberland and in the lower Derwent Valley; Sedge Warblers are also back to normal at Gosforth Park and Seaton Burn Lakes. The local population of Stonechats was wiped out in 1968, but the bird has returned to its coastal habitats and is now appearing inland: I was interested to see a male on the Coquet above Alwinton on May 21st.

There were 8 nests this year in the rookery adjoining St. Thomas Church, Newcastle. C.J. Gent

Ladybirds. On 19th April, I was walking along the Cleveland Way on the edge of the Black Hambleton Hills between grid 488933- 481940. I saw an enormous number of 7 spotted ladybirds. There was a "plate" of around 100 insects at the foot of each heather plant on regenerating moorland. They covered an area of approximately 500 yards by 50 yards, which indicates that there were well over a million insects in the area. The weather was sunny with a south westerly wind.

W.B. Woodward.

The Otter A note about the status and national survey of the otter was given in the December 1976 issue of the *Vasculum*. Nine months ago a joint working group was set up by the Nature Conservancy Council (NCC) and Society for the Promotion of Nature Conservation (SPNC), because of the concern expressed by various organizations about the apparent decline in otter populations, particularly in England. The objectives of the study undertaken by the group were: to establish the extent of our knowledge on the biology and distribution of the species, to determine future research requirements and to consider measures which should be undertaken to conserve the otter.

The first report of this group (Otters 1977)*has recently been published. In part one a brief description of the otter, its food and habitat requirements and breeding biology are given. The evidence that there has been a change in its status is discussed at some length and the pressures presently threatening the species, are considered. The relevance of existing legislation to otter conservation and the current survey and research projects are outlined.

In part two, the report makes a number of recommendations which include the necessity for considerable further research and survey, recognising the lack of hard factual evidence about the otter and its status. However, despite this lack of information the report suggests several positive courses of action which should be initiated immediately. These include:

Site Protection

-the establishment of otter havens where otters and their habitats are given special consideration on whole or parts of rivers.

Management

- some limitations on recreational activities where these may be harmful to otter populations.
- prevention of unnecessary destruction of riverside vegetation and encouragement of marginal vegetation where this is possible.
- during the course of major engineering works special attention should be given to minimising destruction and disturbance of nearby areas not affected by the works.

-when drainage and flood protection works are carried out, as many natural features as possible of the river should be retained.

Legislation

-a fundamental reappraisal of wildlife legislation would be made by NCC. (A long term measure);
-in the short term the otter should be afforded legal protection either by amending the Wild Creatures and Wild Plants Act (1975), or by a specific otter bill.

Hunting

-ideally there should be a voluntary ban on otter hunting, but in the absence of this, hunts should continue their policy of not killing. In addition, the impact of their activities on otters and their habitats should be minimised. This would include only hunting any one part of a river system once a year and avoiding those where breeding animals were known to exist.

The sponsor organisations, NCC and SPNC have endorsed the report's recommendations and have taken action to initiate new otter surveys, written to the Secretary of State recommending the otter to be afforded legal protection and are discussing with the Anglian Water Authority the setting up of experimental otter havens.

Many of the recommendations can only be implemented with the help and co-operation of the land owners, those who make decisions about the use of land (particularly the Water Authorities), those who use the land for recreation or sport and the Nature Conservation bodies. To this end we can play a part by being vigilant and reporting the presence of otters or threats to them or their habitats. In addition we should also take opportunities as they arise to convince others about the need to conserve the otter.

"Otter, 1977" available from the Librarian, Nature Conservancy Council 19/20 Belgrave Square, London SW1 SPY. J.P. Doody.

An unfortunate owl. An exciting incident occurred when my wife and I were staying with relatives on the outskirts of Darlington. The house has very large windows reaching down to floor level.

While we were sitting at the window chatting after a meal, a tawny owl flew out of a nearby tree and crossed the garden from one side to the other. It disappeared from view to one side and immediately there was an almighty crash. The owl had flown into a similar sized window in the adjoining house. Possibly the reflection of the trees in the glass had caused the error. We all ran out to investigate but by then the owl had recovered sufficiently to fly to a tree in the garden. It was quickly followed by many small birds, starlings, sparrows, blackbirds and a missel thrush all of which had been disturbed by the noise of the shattering window. The mobbing was so vigorous that the owl flew off to another tree, this time mobbed by three angry vociferous rooks.

This incident occurred in the afternoon at about 3.30 p.m. on April 7th 1977.

R. Pirt.

The Wolf Spider, *Pardosa agricola*. When walking along the shingle banks of the North Tyne a peculiar species of spider was noticed in some numbers running about amongst the pebbles. I photographed one of them and it was identified as probably *Pardosa agricola* by your president, Dr. Tom Geyer. He provided the following notes.

It has conspicuously annulated legs, a dark brown abdomen with lighter patches or spots following a median stripe. It is a northern species, locally abundant, frequenting the edges of lakes and rivers, especially if sandy or shingly.

There are 17 species of wolf spiders, most of which are said to have fairly precise habitats, so reducing the possibility of competition. Two or three of the so-called species may only be races.

Wolf spiders hunt their prey on foot and have quite keen sight for the purpose. Courtship may be quite intricate with the males 'semaphoring' their intentions with their anterior palps and legs. Egg cocoons are carried by the females while they continue to hunt. The young spiders are carried for a while on the mother's back. While many spiders have a more or less annual life cycle, wolf spiders live for about two years. Much of their energy is spent in hunting, so wolf spiders probably take longer to develop and mature.

P.W. Long (Per T.C.D.) and T Geyer.

Holy Island Notes. On May 26th 1977, I was walking towards the Lough on Holy Island and was nearly there when I saw a bird with a robin-like posture with its back towards me. It was sitting on the sandy bank of the old railway line that used to carry the limestone to the kilns. I lay on the bank and watched it for about 15 minutes. When it turned around I was surprised to see that it was a male bluethroat. It was only six yards away from me and I had to wait a few minutes until it moved away a little before I could focus my binoculars on it. I could see very clearly the pale cream stripe above the eyes, the deep blue throat and the cream line across the breast where the blue ended, a glorious sight indeed. I mentioned it to the farmer, Malcolm Brigham, who is a keen bird watcher, and he was very pleased to see it later.

The many flowers in bloom included Early Forger-me-not (*Myosotis ramosissima* Rochel), Sea Campion (*Silene Maritima* With.), Bugloss (*Anchusa arvensis* (L.) Bieb.), Heartsease (*Viola tricolor* L.), Hairy Bittercress (*Cardamine hirsuta* L.), Scurvy Grass (*Cochlearia officinalis* L.), Dove's-foot Cranesbill (*Geranium molle* L.), Corn Salad (*Valerianella locusta* (L) Beteke), Germander Speedwell (*Veronica chamaedrys* L.), Slender Speedwell (*Veronica persica* Poir.), Wall Speedwell (*Veronica arvensis* L.), Thyme-leaved Speedwell (*Veronica serpyllifolia* L.) Primrose (*Primula vulgaris* Huds.), Common Tare (*Vicia sativa* L.), and Coralroot Orchid (*Corallorhiza trifida* Chat.) The most impressive flowers, however, were the carpet of Meadow Saxifrages (*Saxifrage granulata* L.) covering the Heugh, the great masses of Bog Bean (*Menyanthes trifoliata* L.) flowers-and also the Water Crowfoot (*Ranunculus aquatilis* L.) on the Lough and the Fairy Foxglove (*Erinus alpinus* L.) in full flower in the Priory.

L.P. Hird.

A Moth on the move. Three years ago I recorded the Broad-barred White (*Hadena bicolorata* Hufn.) from Chester-le-Street and noted that it was the first to be found in Durham County v.c. 66 (Vasculum Vol. 59, No. 2, p. 14). This year two further individuals were taken in my garden , one on June 5th and the other on June 19th. More significantly Mr. R. Henderson has recorded one on June 3rd, one on June 21st and eight on June 25th, all at street lighting along the edge of Chopwell Woods. Apparently it is breeding in some strength in this latter habitat, but it has not been seen there before this year and Mr. Henderson visits the area quite often and has done over the past eight years.

T.C.D

RECORDS.

MOLLUSCA SNAILS AND SLUGS

Carychium minimum
Great wood, Eggleston ,21-5-77
Lymnaea truncatula As above 66
Lymnaea peregre As above 66
Ancylus fluviatilis As above 66
Cochlicopa lubrica As above 66
Cochlicopa lubricella As above 66
Lauria cylindracea As above 66
Marpessa laminata As above 66
Clausilia bidentata As above 66
Arianta arbustorum As above 66
Helix hortensis As above 66
Hygromia hispida As above 66
Discus rotundatus As above 66
Arion circumscriptus As above 66

Arion sylvatica As above 66
Arion hortensis As above 66
Arion ater *agg.* As above 66
Euconulus fulvus As above 66
Vitrea crystallina As above 66
Vitrea contracta As above 66
Oxychilus cellarius As above 66
Oxychilus alliaris As above 66
Retinella radiatula As above 66
Retinella nitidula As above 66
Vitrea pellucida As above 66
Limax cinereoniger As above 66
Lehmannia arborum As above 66
Agriolimax reticulata As above 66

R.H. and M.M. Lowe.

LEPIDOPTERA BUTTERFLIES AND MOTHS.

Anthocharis cardamines L. Orange-tip Butterfly.

A male near Hollinside June 8th. (C.J. Gent); common and widespread. Great Wood and Shipley Wood, Teesdale, May 21st

.T.C.D.

Nymphalis io L. Peacock.
 Several by Eggleston Bridge, May 21st 1977. T.C.D.

Hadena bicolorata Hufn. Broad-barred White.
 At street lighting Hookergate, 3rd June, 21st June and a large number, 8 seen, on June 25th
 1977. R. Henderson.

FLOWERING PLANTS AND FERNS

<i>Calystegia sepium</i> (L.) R. Br. (sensu strictu). Bellbine. Fatfield.	66
<i>Scrophularia auriculata</i> Coxgreen.	66
<i>Clinopodium vulgare</i> L. Wild Basil. North Hylton.	66
<i>Plantago maritima</i> L. Sea Plantain. Coxgreen to South Docks.	66
<i>Plantago coronopus</i> L. Buck's-horn Plantain. North and South Docks.	66
<i>Sambucus ebulus</i> L. Danewort. Barren's Quay, 1974.	66
<i>Pulicaria dysenterica</i> (L.) Bernh. Fleabane. Timber Beach and Hylton Dene.	66
<i>Aster tripolium</i> L. Sea Aster. Hylton to Timber Beach	66
<i>Carlina vulgaris</i> L. Carline Thistle. Claxheugh to Timber Beach.	66
<i>Leontodon taraxacoides</i> (Vill.) Merat. Hairy Hawkbit Timber Beach.	66
<i>Triglochin palustris</i> L. Marsh Arrow-grass. Hylton Dene.	66
<i>Triglochin maritima</i> L. Sea Arrow-grass. Coxgreen to Southwick.	66
<i>Potamogeton pusiflous</i> L. Coxgreen and Hylton Dene.	66
<i>Potamogeton crispus</i> L. Curled Pondweed. Hylton Dene.	66
<i>Juncus gerardii</i> Lois. Mud Rush. Claxheugh, Barren's Quay, Timber Beach.	66
<i>Juncus maritimus</i> Lam. Sea Rush. Timber Beach.	66

<i>Epipactis helleborine</i> (L.) Crantz. Broad-leaved Helleborine. Fatfield.	66
<i>Ophrys apifera</i> Huds. Bee Orchid. Timber Beach, 1976.	66
<i>Dactylorhiza purpurella</i> (T. & T.A. Steph.) Vermeul. Northern Fen Orchid. Timber Beach.	66
<i>Scirpus maritimus</i> L. Sea Club-rush. Coxgreen to Southwick.	66
<i>Carex pendula</i> Huds. Pendulous Sedge. Coxgreen.	66
<i>Molinia caerulea</i> (L.) Moench. Purple Moor-grass. Claxheugh.	66
<i>Puccinellia maritima</i> (Huds.) Parl. Sea Poa. Low Barmston to Southwick.	66
<i>Puccinellia distans</i> (Jacq.) Parl. Reflexed Poa. Coxgreen to South Docks.	66
<i>Catapodium rigidum</i> (L.) C.E. Hubb. Hard Poa. South Docks.	66
<i>Catapodium marinum</i> (L.) C.E. Hubb. Darnel Poa North and South Docks.	66
<i>Sesleria albicans</i> Kit. ex Schult. Blue Sesleria. Claxheugh Rock.	66
<i>Zerna erecta</i> (Huds.) S.F. Gray. Upright Brome. Hylton Dene.	66

Derek Hall

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THE NORTHERN NATURALISTS' UNION

EDITORIAL

1977 has so far proved to be the poorest year for recruitment for about 10 years. Actually, there has been a net loss in our membership. This is disastrous from the financial point of view and we trust that members will take the necessary steps to put it right. Once again we would thank those members who have made donations above the normal subscription rate and especially the Washington New Town Corporation for their generosity towards the publication costs of this edition.

THE CONSERVATION OF THE SEMI-NATURAL VEGETATION OF THE MAGNESIAN LIMESTONE

1. THE DURHAM ESCARPMENT

J.P. DOODY

Nature Conservancy Council, Newcastle

Introduction

About 270 million years ago there were desert conditions in Britain and in a large hypersaline sea covering much of the present North Sea basin, including parts of Eastern England, limestone evaporites were deposited. These sedimentary rocks have a high proportion of magnesium carbonate and form the magnesian limestone which outcrops in Tyne and Wear, County Durham and to some extent in North Yorkshire and Derbyshire.

Soils derived from calcareous strata typically support a wide variety of plants and animals and the 'natural' vegetation which has developed in north east England, both inland on the escarpment, and along the coast on the magnesian limestone is no exception. The grasslands in particular support a wealth of species which include elements of the Arctic-Alpine calcareous grasslands and of the more wide-spread lowland grasslands. Thus, we find *Epipactis atrorubens*, *Antennaria dioica*, *Trollius europaeus* and *Primula farinosa* near their lowland southern limit growing together with *Unum anglicum*, *Bromus erectus*, *Ophrys apifera* and *Serratula tinctoria* near their northern limit.

The semi-natural woodlands (including the denes) and the wetlands are also rich in species. In the case of the denes these seem to have affinities, as far as their flora is concerned, with the pre-alpine woodlands of Central Europe, (Bellamy 1970).

These habitats, together with rough pasture, scrub and disused quarries, exist as small refuges in an otherwise intensive agricultural landscape. Their conservation requires a knowledge of the distribution of the more important examples of the various habitats and the problems associated with their management. It is hoped

that the following descriptions of the major habitat types (grassland, woodland, wetland and disused quarries), their management problems and the relative importance of individual sites will enable sound decisions to be made on the use of the magnesian limestone escarpment, which take account of wildlife conservation requirements.

The boundaries of the study area are restricted to the magnesian limestone scarp within the new County of Durham and exclude those areas of magnesian limestone in Tyne and Wear and along the Durham coast. From a biological point of view the distinction between these areas is artificial and it is hoped that the rest of the Magnesian Limestone in North-East England will be surveyed in 1977.

The Grasslands

The calcareous grasslands in which *Sesleria caerulea* (blue-moor grass) is dominant or co-dominant occur in a marked zone across Northern England to Western Ireland and form a link between the limestone grasslands of the south (Class *Festuco-Brometea*) and the Arctic-alpine grasslands (Class *Elyno-Seslerietea*) (Shimwell 1969). The magnesian limestone grasslands of County Durham and Tyne and Wear form an important association of the Sub-alliance *Seslerio-Mesobromion* of the Class *Festuco-Brometea*. This association, the *Seslerio-Helictotrichetum*, identified by Shimwell (1968) is a grassland type unique to the limestones of eastern Durham.

Within the study area the two best examples of this grassland in Britain are found at Thrislington and Cassop Vale. From a wildlife conservation point of view these areas are valuable not only because they represent a unique vegetation type which is important to an understanding of the way in which the "natural" grasslands in Britain developed, but also because they contain a number of plant and animal species near the limits of their geographical distribution. Among the more interesting of these are *Bromus erectus* and *Unum anglicum*, southern lowland species at their northern limit in Britain and *Epipactis atrorubens*, *Antennaria dioica* and *Trollius europaeus* all near their southern limits.

In addition, the grasslands support a wide variety of other plant species which are much more widespread but, nevertheless, restricted to limestone areas where they are important constituents of the sward, e.g. *Helianthemum chamaecistus*, *Briza media*, *Thymus drucei*, *Poterium sanguisorba* and *Carex flacca*. The first of these species is particularly important because it is the food plant of the Durham Argus, a form of the Northern Brown Argus butterfly found only in eastern Durham.

There are, of course, many other species of butterfly and moth associated with this habitat. One of the more interesting butterflies, in addition to the Durham Argus, is the Dingy Skipper; whilst the more widely distributed Common Blue, Small Heath, Small Copper and Large Skipper are often plentiful. Of the moths, the most important are the Cistus Forester, the Least Minor, the Chalk Carpet and the Five and Six Spot Burnet. The first of these only occurs on Sherburn Hill, whilst the second is only found in Cassop Vale.

Undoubtedly there are other groups of insects of interest in addition to the Lepidoptera and indeed at Thrislington Plantation an uncommon bug has been found. At the present time, however, there is little information about these groups and further investigation is required.

Quarrying and the extension and intensification of agriculture, in particular, have combined to reduce the area of the magnesian limestone grasslands which is now mainly restricted to the steeper slopes where cultivation is difficult. Even within these areas the effects of over-grazing accompanied by eutrophication or under-grazing followed by scrub encroachment are further reducing their species diversity. These problems, together with a number of others are considered in relation to the various sites within the Study area.

At Thrislington Plantation SSSI three Sub-associations of the Association *Seslerio-Helictotrichetum* have been identified by Shimwell (1968). The Association is characterised by the presence of *Sesleria caerulea* and *Epipactis atrorubens* in combination with *Poterium sanguisorba*, *Helictotrichon pratense*, *Anthyllis vulneraria*, *Scabiosa columbaria*, *Koeleria cristata* and *Helianthemum chamaecistus* which all occur at Thrislington. The first two of the sub-associations are found where there has been little or no disturbance, the third where periodic burning has taken place. Details of each are given below.

1.Sub-association "typicum". The natural grassland type occurring where there has been little disturbance and where *Epipactis atrorubens*, generally restricted to this sub-association, is present.

2.Sub-association *Caricetosum pulicariae* in which *Cerexouttceris* occurs as a co-dominant with *Sesleria* and in several places almost replaces the latter; a variant of this in which the uncommon *Antennaria dioica* is present has been identified at Thrislington Plantation.

3/Sub-association of *Helictotrichon pubescens* characterised by *Helictotrichon pubescens*, *Dactylis glomerata* and *Daucus carota* and occurring where grazing has taken place. At Thrislington a variant with *Rosa pimpinellifolia* can be seen which is associated with periodic burning.

The continued survival of the species-rich magnesian limestone grassland at Thrislington is threatened in two ways. The first of these is the development of hawthorn scrub which in places has almost completely eliminated the more sensitive species of plants. The presence of calcicoles depends on a combination of factors, including a high level of free carbonate, high pH, low organic matter and high levels of calcium and magnesium. At Thrislington, the presence of hawthorn appears to cause a reversal of these soil properties such that, overall, fewer nutrients are available as the soil becomes more acid (McCulloch 1974). This problem is relatively easily overcome by the removal of hawthorn which allows the carbonate ions to be recharged by capillary action reversing the process of acidification.

" This process has been started in 1977 with the help of Tyne Tees Conservation Volunteers and the cooperation of the owners, Sreetley (Dolomite) Ltd.

In addition the introduction of grazing would prevent the growth of coarse grasses and the reinvasion of scrub. [Locally, a small rabbit population maintains a short heavily grazed turf].

The second problem is the threat of total destruction by the advancing Thrislington Quarry works. Attempts are presently being made to determine the feasibility of transplantation as a means of maintaining the genetic stock of individual species and perhaps also some of the plant communities, in the event of the extension of quarrying.

The second most important site is Cassop Vale SSSI, where the steeper slopes support semi-natural grassland communities including variants of the two sub-associations found at Thrislington. These are:-

1. **Sub-association *Caricetosum pulicariae***, the *Pinguicula-Selaginella* variant which occurs on steep, damp, north-facing slopes.
2. **Sub-association of *Helictotrichon pubescens***, the typical heavily grazed variant.

The problems associated with the conservation of the grasslands in Cassop Vale are not as acute as those at Thrislington. However, ploughing, over-grazing, eutrophication, fertilisation and in some areas, scrub encroachment, have all resulted in a loss of wildlife interest. Threats from quarrying may also be important in the future although there are no current proposals.

There are several other sites amongst which Town Kelloe Bank SSSI, Silent Bank, Pig Hill and Sherburn Hill are the most important supporting good examples of magnesian limestone grassland.

The grassland at Town Kelloe which was recently scheduled as a SSSI appears to contain all the species typically found in this habitat and in addition supports several other local plants including *Primula farinosa*, *Pinguicula vulgaris* and *Parnassia palustris*. The grassland on the very steep slopes is periodically grazed by cattle at a fairly low intensity. Although there is some scrub encroachment this is not at present threatening the interest and, in fact, this is the only site containing semi-natural magnesian limestone grassland which is not immediately under threat.

At Sherburn Hill, in particular, the problem of scrub encroachment is critical. Here, the open *Sesleria caerulea* grassland has been much reduced by the spread of gorse and hawthorn with the latter species over a large part of the site having covered most of the species rich grassland. However, there is still a small area of *Sesleria* turf and a larger area of grassland with open gorse and *Rosa pimpinellifolia* scrub. This scrub grassland was identified by Shimwell (1968) as the *Rosa* variant of the Sub-association of *Helictotrichon pubescens* also found at Thrislington Plantation, and appears to have resulted from periodic burning of the site. It is interesting to note that *Coeloglossum viride*, formerly found in some quantity in the grassland on Sherburn Hill, is now only present in an area adjacent to the village which is grazed by horses. [This species, which grows naturally in the magnesian limestone grasslands at Thrislington and Pig Hill, appears to be susceptible to competition].

The grassland at Silent Bank is extremely restricted, being confined to a narrow

roadside verge. Shimwell (1968) classified this as being the typical Sub-association (undisturbed) of the Association *Seslerio-Helictotrichetum* also found at Thrislington and Cassop Vale. The site contains many of the plants typical of this semi-natural grassland type and includes at least one rarity. As with so many of the other sites, scrub encroachment threatens the interest and in addition the stock-piling of salt has come close to destroying some of the grassland. However, these problems can be overcome and recent scrub removal has, at least, reduced this threat.

The last of the more important sites still retaining semi-natural magnesian limestone grasslands can be found at Pig Hill. Here, the remaining areas of vegetation are restricted to the steeper slopes where cultivation is difficult. As at Cassop Vale, the problems associated with the conservation of the more important parts of the site are complex. In one part of the site the bank above Caldwell Burn, although now with considerable scrub growth, supports *Coeloglossum viride* and *Primula farinosa* in a small patch of *Sesleria caerulea* grassland. In another area, grazing and eutrophication have almost destroyed the more interesting plant species, but there remain several small areas of species rich grassland including *Gymnadenia conopsea*. A small, very old disused quarry also supports many typical limestone species including *Thymus drucei* and *Helianthemum chamaecistus*.

There are several other sites worthy of particular consideration because of the semi-natural magnesian limestone grassland they support. Several of these areas appear to have been of greater interest in the past, for example Quarrington Hill (Heslop Harrison and Richardson 1953). Here continuing scrub encroachment and quarrying have reduced the area of interest. Shimwell (1968) identified Sub-association "typicum" and the Sub-association of *Helictotrichon pubescens* at this site.

The first of these Sub-associations was also found by Shimwell (1968) at Thornley Dene (The Bottoms). This site is, however, heavily grazed and the more interesting grassland is very restricted. As in the case of Quarrington it is not known whether *Epipactis atrorubens* still survives. Another site where the wildlife conservation interest has been much eroded as a result of over-grazing, eutrophication and recreational pressures is Pittington Hill. Clearly, although one site is directly threatened with destruction by quarrying, the main requirement for the conservation of the grasslands is positive management in the interests of wildlife. A summary of the major problems associated with the survival of the more important grassland sites and their solution is given in Table a.

The Quarries

Although quarrying today threatens one important natural grassland site and undoubtedly has in the past destroyed other areas of interest from a wildlife point of view, quarries have provided a refuge for many plant and animal species of the natural grasslands as these have been destroyed. This paradoxical situation was first noted by Heslop Harrison (1953) and its importance to conservation, particularly in relation to industry, was discussed by Davis (1976). It appears that when agricultural expansion began during the second World War there were a number of disused quarries e.g. Wingate Quarries and Bishop Middleham, where working

Table a

Summary of the more important semi-natural magnesium limestone grasslands and the problems and opportunities associated with their conservation.

Site	Status	Threats	Solution
Thrislington Plantation	SSSI	Scrub encroachment Quarrying Competition	Clearance Grazing/mowing Control Transplant vegetation
Cassop Vale	SSSI	Ploughing Overgrazing/ Eutrophication Fertilizer application Scrub encroachment Competition Recreation	Control Clearance Introduce controlled grazing/mowing
Town Kelloe Bank Silent Bank	SSSI None	Scrub encroachment Scrub encroachment Road verge cutting Salt stocking	Control Clearance Clearance Agree management programme with County Surveyor
Sherburn Hill	None	Scrub encroachment Competition	Clearance Introduce controlled grazing/mowing
Pig Hill	None	Scrub encroachment Overgrazing/Eutrophication Competition	Control by agreement
Quarrington Hill	None	Quarrying Scrub encroachment Competition	Prevent Clearance
Pittington Hill	None	Overgrazing/Eutrophication Scrub encroachment Recreation	Control by agreement Clearance Control

ceased in 1930 and 1934 respectively (Spencer 1976). These provided a substrate free from competition where many of the grassland species were able to survive as their more 'natural' habitats were destroyed. It is unfortunate that today when the semi-natural grasslands are so reduced many of these secondary habitats have either already been destroyed or are threatened by reworking, tipping and recreational activities.

Shimwell (1968) identified in several disused quarries, including Bishop Middleham, a fourth Sub-association of the Association *Seslerio-Helictotrichetum*. This Sub-association of *Encalypta* and *Plantago maritima* appears to be the second stage of colonisation of quarry spoil banks which replaces a weed community of *Epilobium angustifolium*, *Hypericum spp.*, *Erigeron acer* and *Equisetum arvense* and is probably a seral stage below the Sub-association of *Helictotrichon pubescens* found under grazed or disturbed conditions in the more natural grassland sites.

The most important site is undoubtedly Bishop Middleham Quarry SSSI which despite extensive reworking and tipping still retains important plant communities. Here the communities, which have developed naturally over the past 40 years, contain a wide variety of species typical of soils derived from the magnesian limestone and include a number of rarer species, in particular, *Epipactis atrorubens*.

The survival of these important habitats is not only threatened from reworking and tipping but also from recreational activities (motor cycle scrambling) and scrub development. This is shown particularly at the second most important site within the study area, Wingate Quarry. Here, although there has been no reworking, tipping, recreational pressures and hawthorn encroachment, present problems for the conservation of this site. The proposal to establish a Local Nature Reserve under Section 21 of the National Parks and Access to the Countryside Act 1949, associated with transplanting within the quarry from a proposed tipping area of the more interesting plants, and management including scrub clearance in the remaining area to ensure the retention of the succession from open magnesian limestone to mature grassland, is an important development in the conservation of the flora of the magnesian limestone.

There are a number of other quarries in the Study area which, whilst not as extensive as Wingate or as rich in species as Bishop Middleham, are of considerable value for Wildlife. At Raisby Hill for example there is a small part of the large quarry complex which has been long disused and where there is an interesting community adjacent to an area of semi-natural limestone grassland now much overgrown with hawthorn. The species include *Sesleria caerulea*, *Helianthemum chamaecistus*, *Coeloglossum viride*, *Dactylorhiza purpurella* and *Epipactis atrorubens* and their presence seems to illustrate the role played by these disused quarry sites providing substitute habitats for some, at least, of the more interesting species. Within the Cassop Vale SSSI there are several small quarries which, as at Raisby, have been recolonised by plant by many of the typical and some of the more interesting plant species including *Pinguicula vulgaris* in one and *Anacamptis pyramidalis* in another.

Trimdon Grange Quarry, a private nature reserve of the Durham County Conservation Trust, is a very small disused quarry again containing a wide variety of typical magnesian limestone plants including notably *Coeloglossum viride*. Another small disused quarry, Garmondsway Moor, appears to be the only Durham locality for the woolly thistle, *Cirsium eriophorum* while near Pitlington and Ferryhill and in Joint Stocks Quarry, Tuthill Quarry and Aycliffe Quarries a variety of interesting plants occur. Perhaps the most important of these last sites is at Aycliffe where there is a disused quarry on the west side of the A167 and an active quarry on the east.

In some undisturbed parts of the active quarry at Aycliffe, two colonies of the Bee orchid have been found, one threatened and since transplanted with the co-operation of the quarry manager, the other still present at its original site. Again it seems likely that this species found refuge in a number of disused quarries [including Old Wingate (Heslop Harrison 1953) where it is no longer present].

The disused quarry at the west of the A167 contains many typical limestone plants but appears to be at a fairly early stage of colonisation when compared with those mentioned above and does not contain any of the rarer plants found in the other quarries. However, it does have an interesting insect fauna which includes both the 5 and 6 spot burnet moths.

The probably natural succession of these 'open' quarry floors is shown at Old Wingate where one part of the quarry complex is overgrown completely with mature hawthorn and regenerating ash. Clearly during the course of the development the hawthorn will have eliminated most of the more typical magnesian limestone plant species, as it has done on grassland sites. This problem is relatively easily overcome by removal of the hawthorn as is proposed at Wingate Quarry. Unfortunately the other problems associated with the conservation of this habitat are not so easily dealt with.

At least two of the quarries included in the paper by Heslop Harrison (1953) and noted for their interesting plant communities, Catley and Highland quarries, have since been destroyed by tipping. More recently another quarry at Sherburn Hill, rich in both plants and insects, and parts of Bishop Middleham Quarry SSSI and Wingate Quarry PLNR have also been destroyed by tipping. To some extent in the last of these, transplantation of the more interesting turf from an area scheduled for tipping to another within the boundary of the PLNR, will help ensure the continued survival of the variety of plant species at this site. However, it must be pointed out that only a relatively small portion of the vegetation can be saved in this way, and whilst the variety of species *may* be retained the plant communities and associated animal species will be largely destroyed.

Recently the reworking of several of the more important disused quarries under existing planning consents, as at Bishop Middleham, Running Waters and very recently at Aycliffe, has also resulted in the destruction of large areas of important magnesian limestone vegetation. Grazing and recreational pressures at Pitlington and motor cycle scrambling at Joint Stocks and Wingate Quarry are reducing the wildlife value of these areas and it is clear that further loss of the more important

Table b

Summary of the more important quarries and the problems and opportunities associated with their conservation.

Site	Status		Threats	Solution
Bishop Middleham	SSSI (Proposed private reserve)	(Proposed nature)	Tipping (part already destroyed) Reworking (part already destroyed)	Control Control
Wingate	PLNR		Tipping (parts already destroyed) Scrub development Recreation	Control Prevent the more damaging - control use
Raisby Hill	SSSI		Tree regeneration	Clearance
Cassop Vale	SSSI		Scrub encroachment Competition from coarse grasses	Clearance Management
Garmondsway			Grazing	Control stocking level
Joint Stocks			Tipping Recreation (Scrambling)	Prevent in more important areas Control
Trimdon Grange	Private Reserve	Nature	Tree regeneration	Clearance
Merryknowle			Scrub encroachment	Clearance
Highland House			Tipping (interest destroyed)	
Sherburn Hill			Tipping (interest destroyed)	
Aycliffe			Reworking (part west quarry destroyed)	Control
Tuthill			Tipping	Prevent in more important areas

quarry sites, whether from tipping or reworking, would be unacceptable from a nature conservation point of view.

There are a number of other older smaller quarries which contain natural woodland and are of general wildlife interest. Two quarries near Pittington, Cobblers Hill and another along Lady Pinkney's Lane have mature canopies of ash and elm respectively and are of value for a number of typical woodland plants and animals.

The problems associated with the conservation of the older quarries are many and various, but at least the most destructive, i.e. reworking and tipping, must be prevented if their interest is to be retained. A summary of the more important problems and their solution is given in Table b.

Wetlands

Wetlands support a characteristic range of plant and animal species which depend for their survival on the presence of a regular supply of water and are generally not found in other habitats. Thus, as these sites are drained, particularly in the lowland agricultural situation, the species associated with them become even more scarce. In addition, those sites which are fed by water influenced by the magnesian limestone, as most sites within the study area are, support a wide range of species including several uncommon plants.

There are, in fact, relatively few wetlands of interest within the study area, the most important being marsh land along the Coalford Beck and near Holdforth Bridge, subsidence ponds at Running Waters and near Kirk Merrington and a small pond in Cassop Vale. In addition, there are a number of other sites outside the study area which contain interesting plant communities associated with the lime-rich waters issuing from the Magnesian Limestone.

The first of these sites is an area of marshland between Pittington and Coalford Bridges, much of which has been reclaimed to arable since 1959. However, near Pittington Bridge there is a small species-rich marsh with a number of sedges including *Carex paniculata* and *C. rostrate*, together with *Dactylorhiza purpurella*, a patch of *Phragmites australis* and another of *Iris pseudacorus*. This small remnant of a more extensive marsh land habitat is threatened by further reclamation and at one end a tip is already spilling into the stand of *Iris*.

The site at Running Waters is also threatened from agricultural reclamation, being surrounded by arable fields. However, this subsidence pond retains a number of typical wetland plants and in addition several which are local in their distribution including *Dactylorhiza purpurella*, *Potentilla palustris* and *Hippuris vulgaris*. This site also has ornithological interest and is reported to be the only lowland breeding colony of the black-headed Gull in Durham. The other subsidence pond near Kirk Merrington is slightly more extensive than Running Waters and supports a wider range of plant species, which include the rare *Carex riparia*, *Sparganium erectum* and *Potentilla palustris*, in addition to many other typical wetland plants.

With the Cassop Vale SSSI the pond and surrounding marsh is also of interest and although slightly polluted contains several interesting wetland plants including

Potentilla palustris, *Schoenoplectus lacustris* and *Hippuris vulgaris*. This wetland is valuable for bird life, but the disturbance resulting from the close proximity of Cassop Village reduces this considerably. The waer feeding the sites mentioned above is, on the whole, only partly enriched by the Magnesian Limestone and they do not support plants requiring a very high base status. Amongst these perhaps *Primula farinosa* and *Parnassia palustris* are the most interesting and appear only to be present at one inland marsh at Holdforth Bridge. [These species have been found in three other areas but all are grassland sites where the soils are flushed by water draining from above, and which do not, therefore, contain true wetland communities.

There are several other wetland sites not directly associated with the Magnesian Limestone but which support a number of typical wetland plants. These include a small pond near Bishop Middleham, another near Elemore within an NCB plantation and two subsidence ponds near Pig Hill. In addition, within the proposed Local Nature Reserve at Wingate there are several areas dominated by *Phlaris arundinacea*, two ponds with polluted water and another small marsh with degenerating willow carr. It is hoped that these last habitats will in the future be improved from a wildlife point of view by management.

There are other sites outside the main study area which should be mentioned, the most important being Hell Kettles SSSI. This is undoubtedly the most valuable lowland wetland site in County Durham, supporting several very uncommon plants requiring base-rich conditions including *Cladium mariscus*.

Near Fishburn there is another pond with fringing vegetation which dries up periodically, but nevertheless has an extensive marsh which includes the local *Stellaria palustris*. Redcarr Carrs is another base poor site which is fairly rich in species including *Potentilla palustris* and *Carex elata* and the fen within the Hardwick Country Park is perhaps one of the best in lowland Durham.

Comparison of the 6" O.S. maps of 20-30 years ago with the present situation shows that in the study area several marshy areas have been drained and reclaimed to arable land. These include a wetland known as The Bottoms near Haswell Plough two small areas near Wingate and a species rich marsh near Coldwell Burn at Elemore. This last site has only been drained within the last 3 years. Undoubtedly, more extensive wetlands occurred in the past and the "carrs" associated with a glacial drainage channel running through Ferryhill Cut and the Bradbury and Morden Carrs are now of only limited botanical interest, most of the land having been reclaimed to further agricultural use.

Although there is still a danger of further loss of this important habitat through drainage, other factors such as pollution from illegal tipping and contaminated water, poaching by cattle and human disturbance are attaining more significance. On the magnesian limestone scarp where wetland habitats were probably never extensive and where there are few created by man (e.g. subsidence ponds) If even the most common plants and animals are to survive, most of the remaining areas, will need to be conserved.

Woodland and Scrub

Wooded sites within the study area are very scarce and it would appear, with a few exceptions, that the situation has not altered greatly since 1865. Most of the woodlands present today are mixed broad-leaved/conifer plantations and there are only very few apparently semi-natural woodlands in the area.

Typically, ash woodland develops naturally on soils derived from calcareous rocks and there are two examples of importance within the Cassop Vale SSSI, Heugh Hall Wood and Cassop Wood. The former has a mature canopy dominated by ash and despite heavy grazing there is a good ground flora with many typical woodland herbs including *Primula vulgaris*. The latter is ungrazed and has an under-storey which includes hazel and a fairly rich herb layer with *Anemone nemorosa*. [Heslop Harrison and Richardson (1953) compared these woodlands with the Durham Denes which are far more extensive and contain a much richer flora and fauna. The species lists compared in that paper are largely those which would be obtained today]

There is only one small oak wood on the Durham escarpment which appears to have developed naturally, "Cleveland Gorse" near Trimdon Colliery. Typically oak woodland develops on acid soils and it is, perhaps, not surprising that there is only one site with this type of semi-natural vegetation in the study area. However, whilst it is not of great intrinsic wildlife value it is useful for comparison with the woodlands developed on more calcareous soils.

The development of scrub is the absence of grazing, as the first stage in succession to woodland takes several forms which are to be seen in the Cassop Vale SSSI. Adjacent to the existing woodland, hazel scrub has developed, whilst on the north facing slopes of the vale gorse is the dominant species, and hawthorn dominates the south facing slopes. The reason for these spatial differences is difficult to ascertain, although the presence of a local seed source may be important in the case of hazel. Throughout the study area hawthorn seems to be the species which usually colonises ungrazed magnesian limestone grassland to be followed by ash. This can be seen on Sherburn Hill, at Thrislington Plantation SSSI, in Wingate Quarries and to some extent in Shadforth Dene. Also on Sherburn Hill there is a scrub community which is composed of gorse and *Rosa pimpinellifolia* which is thought to have resulted from periodic burning and it is perhaps this that determines whether hawthorn or gorse develops. It is important to recognise that whilst these areas of scrub and secondary woodland are of general value for wildlife, particularly small birds, where they replace semi-natural species-rich grassland there will be considerable overall loss of botanical interest.

Away from the thin soils developed directly on the Magnesian Limestone where species-rich grasslands exist, the areas of scrub may be considered of general wildlife interest. Of these the most important are a small area of hawthorn and ash in the valley of Sherburn Beck, a patch of willow at Willow Garth and gorse and hawthorn at Limekiln Hill. The last of these is in the process of being grubbed out, and it is clear from the study that there are several other areas which have been removed and the land reclaimed for arable crops.

All the other woodlands within the study area appear to have been planted but despite this, in a landscape which is lacking in tree cover, they are important as a refuge for many plants and animals typical of this habitat. Undoubtedly the woodlands around Elemore, which are composed of mixtures of larch, pine, ash, beech and sycamore, are of value, particularly because they are the largest in the area. Although less extensive, Kelloe Plantation is also of value mainly because it is composed largely of native deciduous trees including ash and wych elm and has a fairly rich herb layer. There is also some evidence of natural ash regeneration. Other plantations of general interest are: Duckett Wood and Redworth Wood which have oak, ash, birch, beech, elm, pine and sycamore in their canopies, with a sparse understorey and herb layer; Wicket Wood which has a mixed deciduous canopy and a good understorey and the screening woodland on the west of Steetley's Thrislington Quarry.

There is some evidence from the 1865 Ordnance Survey map that there were several woodlands in the study area which have since been cleared. Two of these were lost soon after 1865 when expansion of the Raisby and Joint Stocks Quarries took place. The rest have been felled and the land reclaimed for agriculture.

Other Habitats

Although the four different habitat types mentioned above represent the more important areas from a wildlife point of view there are clearly others which must be considered in any overall policy for wildlife conservation. These include hedgerows, roadside verges, disused railways, river banks and some areas of industrial dereliction. There is no doubt that the first of these is the most extensive and whilst it has not yet been possible to identify the more interesting hedges, i.e. those with the best structure and species composition a few general points should be borne in mind.

The older hedges, particularly those along parish boundaries, are often the richest and represent, to some extent, a substitute woodland habitat and support many of the plants and animals normally found there. Even the more recent hedges, which may be composed of but a single species, hawthorn, if managed so as to retain a good structure are of value for wildlife. Within the northern part of the study area an attempt was made to determine the extent of loss of this habitat by noting boundaries present in the 6" O.S. Survey maps of 1940 or 1960 but not present in 1976. In all some 15 miles of hedgerow appear to have been lost * but this is concentrated into several relatively small areas particularly around Bishop Middleham. This in fact represents a relatively minor loss of wildlife habitat and whilst in one or two areas this may be significant, within most of the study area the most important factor from a wildlife point of view is the way the remaining hedges are managed. Since the majority of the area is in intensive arable use the

** Since there are very few walls or fences in the study area it seems reasonable to assume that most, if not all of the boundaries which have been lost, were probably edges at one time.*

need for stock proof fences is virtually non-existent. There would appear to be little or no traditional hedge laying, and most cutting is probably done by machine which retains the hedge but results in a deterioration in its structure and a loss of value for wildlife.

A number of roadside verges have been identified by the Durham County Conservation Trust. On the whole the verges in this area are valuable because they support communities of plants typical of the magnesian limestone grasslands. The most important of these are beside the unclassified road running through the Cassop Vale SSSI and along the A181. This second road verge site includes Silent Bank which has been considered under the section on grasslands.

There is little doubt that management of road verges is important and it is hoped that the present liaison between the DCCT and County Surveyor can be extended. Despite the D.O.E. circular suggesting that no cutting of verges should be carried out, it is hoped that one cut a year in late Summer will be maintained. In time, if cutting ceases completely the coarser grasses would eliminate the more interesting delicate herbs and eventually scrub would develop.

Most of the areas of industrial dereliction in the study area are magnesian lime-stone quarries and their importance for wildlife conservation has already been discussed. However, there are a number of others including old tip heaps some of which have been planted and others such as a site at Ludworth where some interesting plant and animal communities have developed. In this latter case a partially reclaimed tip planted with pine has a flora which includes several species typical of acid, heathy places such as *Calluna vulgaris* growing together with other plants more typical of alkaline conditions including *Carlina vulgaris*.

Conclusion

The history of Man's influence on the natural vegetation of the magnesian limestone escarpment of Durham can be traced back for approximately 5,000 years with an early massive clearance of the forest about 3,500 years ago in the vicinity of Bishop Middleham. This was some 2,000 years before the badly drained soils of the area were converted to agriculture and this much earlier clearance is attributed to the presence of the light, freely draining soils of the magnesian limestone (Bartley et. al. 1976). The pattern of agriculture and industrial development since then, so important in determining the type of vegetation in the study area, has passed through many phases which have caused the extension or reduction of the various habitats. Details of some of the more recent of these are given by Spencer (1976).

To place the problem in perspective it is instructive to look at the area of land included in this study. Of the total area surveyed, some 15,500 hectares, approximately 430 hectares or 3 per cent, has been identified as retaining wildlife habitat worthy of special consideration. This includes semi-natural grasslands (Table a), wetlands, woodlands and the disused quarries (Table b), together with the mixed plantation around Elemore.

Of this 430 hectares, some 70 hectares or 16 per cent of the areas of greatest wildlife interest have been destroyed in the last 20 or 30 years. These include Bishop Middleham Quarry S.S.S.I. where 10 of the originally scheduled 24 hectares have been lost as a result of tipping and reworking, and Coalford Beck where 50 percent of the marsh has been reclaimed to arable. Thus, within the study area only some 2 per cent of the land retains habitats of particular significance for wildlife conservation.

The survival of the unique flora and fauna of the semi-natural grasslands of the magnesian limestone in County Durham has been aided by the availability of substitute habitats in disused quarries. There are a number of active quarries which might in the future provide equally suitable substrates for colonisation. However, it seems likely that with the rate of loss of interest, both in the semi-natural grasslands and long disused quarries, that there will not be sufficient seed sources available to take advantage of these areas, as and when they cease to be worked. It is imperative, therefore, that the more important disused quarries are protected from tipping and reworking and the remaining semi-natural grasslands managed so as to retain their maximum wildlife interest. Similarly, the more important plants and animals associated with the woodlands and wetlands will only survive as long as the habitat in which they exist is retained.

As a first step towards the conservation of the wildlife on the escarpment there must be a concerted effort to protect the most important sites from the many damaging developments, which are presently reducing or destroying their value for wildlife. In the longer term the integration of nature conservation requirements in an overall land management strategy is essential if the diversity and abundance of wildlife is to be retained.

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References

- Bartley, D.D., Chambers, C. and Hart-Jones, B. (1976) "The Vegetational History of parts of South and East Durham." *New Phytol.* 77,437-468.
- Bellamy, D.J. (1970) "The vegetation" in, Durham County and City with Teesside. *B.A. Handbook 1970*, ed. J.C. Dewdney, 133-141.
- Davis, B.N.K. (1976) "Wildlife, Urbanisation and Industry." *Biol. Con.* (10) 249-291.
- Heslop-Harrison, J.W. and Richardson, J.A. (1953) "The Magnesian Limestone Area of Durham and its Vegetation." *Trans. North. Nat. Union* Vol. 2. Pt. 1. 1-28.
- McCulluck, J. (1974) "*An Investigation of hawthorn (Crataegus monogyna) succession on the Magnesian Limestone Soils of County Durham.*" M.Sc. Thesis, Durham University.

- Shirwell, D.W. (1968) "*The Phytosociology of Calcareous Grasslands in the British Isles.*" Ph.D. Thesis, Durham University.
- Shimwell, DW. (1969) "The Status of the Class *Elyno-Seslerietea* Br. -B I. 1948 in the British Isles. "*Mitt. Flor. Soziol. Arbeitagem.* NF. 14,309-321.
- Spencer, V.A. (1976) "*Problems in the Conservation of an Ecological Resource: The Magnesian Limestone Flora of County Durham and Tyne and Wear.*" M.Sc. Thesis, University College, London.

THE DIPTERA OF CASTLE EDEN DENE

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This list of Diptera (flies) recorded from Castle Eden Dene supplements previous papers on the Coleoptera (Luff, Selman and Foster, 1974) and Lepidoptera (Sheppard and Monck, 1976) of this wooded limestone valley in Co. Durham. For details of the Dene, see these papers, and also the thesis by Scott (1965). Unlike the previous lists, which were compiled from recently collected species, this list is derived from two main sources, outlined below.

1. Specimens collected by staff or students of the Department of Agricultural Biology (formerly Agricultural Zoology) of Newcastle University from 1970 to date. These are denoted by the letter 'N' after each species in the list. The majority have been identified by Mr. P. Skidmore of Doncaster Museum to whom we are indebted. A few species have also been seen by other authorities, viz: Mr. A. Stubbs, Nature Conservancy Council, some Tipulidae and Syrphidae; Mr. E.A. Fonseca, Bristol, some Dolichopodidae. Some identifications, mainly of Syrphidae, are the responsibility solely of the Agricultural Biology Department.
2. Specimens collected either in the Dene, or its immediate vicinity (Edderacres, Shotton, Horden) by C.T. Trechmann, whose collections are in Sunderland Museum. Identified species of Diptera in this collection were listed by Scott (1965), and the existence of most of these in the collection was confirmed by the authors, although the identifications were not checked. Such species are denoted by 'S' in the list. There were also many unidentified specimens of Diptera among the Trechmann material. Most of these were identified by Mr. Skidmore, and are listed as 'T'.

A total of 379 species have been recorded to date, which is about 6% of the British dipteran fauna. The presence of 184 of these (48.5% of the total list) has been confirmed by collecting since 1970. The order of families, and nomenclature of the list has been adjusted to follow the recently published Diptera section of the

Second edition of the Check List of British Insects (Kloet and Hincks, 1976).

Some general remarks and comments on the habitat or rarity of particular species precede the main list. For these, we are again grateful to Mr. Skidmore. The list includes a number of species typical of woodlands on limestone (e.g. *Otites guttata* (Otitidae), *Thricops nigrifrons* (Muscidae) and the inclusion of several common lignicolous syrphids infers an old established coverage of trees. There also appears to be a rich marsh fauna, with some fairly local species. The most interesting species in the list is *Tetanura pellidiventris* (Sciomyzidae), an extremely local snail parasite, for which Castle Eden Dene is the only known locality in Northern England. There are several northern species, such as occur in Pennine valleys (e.g. *Symphoromyia crassicomis* and *Spania nigra* (Rhagionidae), *Pogonomyia brumalis* and *Phaonia zugmayeriae* (Muscidae), or on heath land (e.g. *Chrysotoxum arcuatum*). There are also some southern species which are probably near their northern limit (e.g. *Stratiomys potamida* (Stratiomyidae), *Herina germinationis* (Otitidae), *Asteia amoena* (Asteiidae), *Helina lasiophthalma* (Muscidae), *Micropeza corrigiolata* (Micropezidae), *Fannia pallitibia* (Fanniidae).

The Syrphidae include some interesting lignicolous species (e.g. four *Xylota* species and two *Criorrhina*), and are generally well represented. *Chrysops* species (Tabanidae) are decidedly local in Northern England, yet two occur in the Dene. *Pales pavidus* (Tachinidae) was reared from the caterpillar of *Apamea crenata* (Lepidoptera) by D. Shephard and is the first tachinid parasite reared from this host. (Ford, 1976).

There are some major omissions in the list, resulting from either selective collecting, or difficulty in identification of some families. Thus there are few *Chironomidae*, despite the presence of the burn itself, with an interesting water beetle fauna (Luff, Selman and Foster, 1974). *Mycetophagidae* (fungus gnats) are absent from the list altogether, although present in almost any woodland litter, or on fungi. The gall midges (*Cecidomyiidae*) might also be expected to be numerous in the dense woodland of the Dene, but have not been studied. The *Phoridae* are another soil, litter and fungi inhabiting family which was not collected. There is therefore ample scope for future study of the Diptera of the Dene.

References

- Ford, T.H. (1976). Some records of bred Tachinidae - 2 (Dipt.) *Ent. Rec. Var.* 88: 68-71.
 Kloet, G.S. and Hincks, W.D. (1976). A check list of British Insects (2nd Edition) Part 5: Diptera and Siphonaptera. *Handbk Ident Br. insects*, 11 (5): 1-139.
 Luff, M.L., Selman, B.J. and Foster, G.N. (1974). The Coleoptera of Castle Eden Dene. *Trans. Net. Hist. Soc. Northumberland Durham and Newcastle*, 41 : 179-193.
 Scott, H.C. (1965). *Castle Eden Dene Nature Reserve*. Unpublished Dip. Conservation Thesis, University of London.

Sheppard, D.A. and Monck, W.J. (1976). The Lepidoptera of Castle Eden Dene historical and current review. *Vasculum*, 61(3): 53-79.

TRICHO CERIDAE

Trichocera hiemalis (Degeer) S;

TIPULIDAE

Tipula paludosa Meigen T,S; *T. ? vernalis* Meigen T; *T. staegeri* Nielson T; *T. varipennis* Meigen T,N; *T. irrorata* Macquart N; *T. meigeni* Mannheims T,N; *T. pagana* Meigen T,N; *T. signata* Staeger N; *T. scripta* Meigen N; *T. obsoleta* Meigen N; *T. oleracea* L. N; *T. lunata* L. N; *T. pseudovariipennis* Czizek N; *T. maxima* Poda N,S; *T. unca* Wiedemann N; *Nephrotoma quadrifaria* (Meigen) N, T, N. *flavescens* (L.) T; *N. flavipalpis* (Meigen) T,N; *N. guestfalica* (Westhoff) T; *Limonia duplicata* (Doane) N,S; *L. mitis* (Meigen) N; *L. trivittata* (Schummel) N,S; *L. nubeculosa* Meigen N; *L. flavipes* (F.) N; *L. tripunctata* (F.) N; *Antocha vitripennis* (Meigen) N; *Pedicea straminea* (Meigen) N; *P.liitoralis* (Meigen) T,N; *P. rivosa* (L.) N; *Dicranota guerini* Zetterstedt N; *D. pavidata* (Haliday) N; *Limnophila nemoralis* (Meigen) N; *Paradelphomyia senilis* (Haliday) N; *Gonomyia simplex* Tonnoir N; *Austrolimnophila ochracea* (Meigen) N; *Gonempeda flava* (Schummel) N; *Erioptera vicina* (Tonnoir) N; *E. lutea* Meigen N; *Ormosia bifurcata* (Goetghebuere) N; *O. haemorrhoidalis* (Zetterstedt) N; *Molophilus cinereifrons* de Meijere N; *M. undulatus* Tonnoir N;

PSYCHODIDAE

Psychoda phalaenoides (L.) S;

PTYCHOPTERIDAE

Ptychoptera albimana (F.) N,S; *P.lacustris* Meigen N; *P. contaminata* (L.) S;

CULICIDAE

Culiseta annulata (Schrack) T; *Culex pipiens* L. T;

CERATOPOGONIDAE

Forcipomyia sp. T;

CHIRONOMIDAE

Prodiamesa olivacea (Meigen) T; *Chironomus? pilicornis* (F.) T; *C. cingulatus* Meigen T; *C. riparius* Meigen T; *Camptochironomus tentans* (F.) T;

SIMULIIDAE

Simulium reptans (L.) S;

ANISOPODIDAE

Sylvicola zetterstedti (Edwards) T; *S. punctatus* (F.) N,S; *S. ienestrslis* (Scopoli)

BIBIONIDAE

Bibio ciavipes Meigen T,S; *B. lanigerus* Meigen T; *B. marci* (L.) N,S; *B. pomonae* (F.) S; *B. hortulanus* (L.) S; *B. johannis* (L.) S; *Dilophus febrilis* (L.) T,S;

SCATOPSIDAE

Scatopse notata (L.) S;

STRATIOMYIDAE

Beris geniculata Curtis T ,S; *B. chalybeata* (Forster) N,S; *B. vallata* (Forster) N; *Microchrysa cyaneiventris*(Zetterstedt) N,S; *M. polita* (L.) S; *M. flavicornis* Meigen S; *Sargus iridatus* (Scopoli) T,S; *S. bipunctatus* (Scopoli) T,N; *S. splendens* Meigen T,N,S; *Chloromyia Formosa* (Scopoli) S; *Stratiomya potemide* (Meigen) S;

XYLOPHAGIDAE

Xylophagus ater Meigen N;

RHAGIONIDAE

Rhagio scolopacea (L.) N,S; *R. notatus* (Meigen) N; *R. tringarius* (L.) v. *nigriventis* (Loew) S; *Symphoromyia crassicornis* (Panzer) S; *Spania nigra* Meigen N;

TABANIDAE

Chrysops caecutiens (L.) S; *C. relictus* Meigen S; *Haematopota pluvialis* (L.) N,S;

EMPIDIDAE

Tachypeza nubila (Meigen) S; *Tachydromia arrogans* (L.) S; *Platypalpus pallidiventris* (Meigen) N; *P. luteus* (Meigen) N; *P. minutus* (Meigen) N; *Hybos femoratus* (Muller) S; *H. culiciformis* (F.) S; *Bicellaria vana* Collin T; *B. intermedia* Lundbeck S; *Oedalia holmgreni* Zetterstedt N; *O. zetterstedti* Collin N; *Ocydromia glabricula* (F. alien) T N S; *Hilara maura* (F.) T; *Empis stercorea* L. N; *E. trigramma* Meigen N; *E. punctata* Meigen N,S; *E. tessalata* F. N.,S; *E. livida* L. S; *E. grisea* Fallen S; *E. bicuspidata* Collin S; *Rhamphomyia variabilis* (Fallen) T, R.

crassirostris (Fallen) T; *R. maculipennis* Zetterstedt S; *R. dentipes* Zetterstedt S; *R. sulcata* (Meigen) S;

DOLICHOPODIDAE

Dolichopus melanopus Meigen S; *D. wahlbergi* Zetterstedt S; *D. plumipes* (Seopoli) S; *D. cilifemoralis* Maequart N; *D. popularis* Wiedemann N,S; *D. unguatus* (L.) N,S; *D. griseipennis* Stannius S; *D. trivialis* Haliday S; *Hypophyllus obscurellus* (Fallen) S; *Tachytrechus notatus* (Stannius) S; *Scellusnotatus* (F.) S; *Liancalus virens* (Seopoli) S; *Thinophilus ruficornis* S; *Rhaphium caliginosum* (Meigen) N; *R. brevicorne* (Curtis) or *albomaculatum* (Becker) N; *Argyria diaphana* (F.) N,S; *A. argyria* (Meigen) S; *A. leucocephala* (Meigen) S; *Sciapus platypterus* (F.) T;

LONCHOPTERIDAE

Lonchoptera furcata (Fallen) v. *lacustris* Meigen S;

SYRPHIDAE

Baccha obscuripennis Meigen N; *B. elongata* (F.) N'; *Paragus tibialis* (Fallen) N; *Pyrophaena granditarsa* (Forster) N ,S; *Platycheirus manicatus* T ,S,N; *P. scutatus* (Meigen) T,S,N; *P. albimanus* (F.) T,S,N; *P. clypeatus* (Meigen) S,N; *P. angustatus* (Zetterstedt) S; *P. peltatus* (Meigen) S,N; *P. ambiguus* (Fallen) S; *P. scambus* (Staeger) N; *Melanostoma sealare* (F.) T,S,N; *M. mellinum* (L.) S,N; *Leucozona lucorum* (L.) S,N; *L. glaucius* (L.) S,N; *L. laternarius* (Muller) S,N; *Syrphus torvus* Osten-Saeken S,N; *S. vitripennis* Meigen S,N; *S. ribesii* (L.) T,N,S; *Epistrophe grossulariae* (Meigen) S,N; *Dasyrphus albostrigatus* (Fallen) S; *D. tricinctus* (Fallen) S,N; *D. venustus* (Meigen) S,N; *D. lunulatus* Meigen S,N; *Metasyrphus corollae* (F.); T,S,N; *M. latifaseiatus* (Macquart) S; *M. luniger* (Meigen) T,S,N; *Episyrphus balteatus* (Degeer) S,N; *Meliscaeva auricollis* (Meigen) T,S; *M. cinctella* (Zetterstedt) S; *Parasyrphus vittiger* (Zetterstedt) S; *Didea fasciata* Maequart N; *Melangyna cincta* (Fallen) S; *M. lasiophthalma* (Zetterstedt) S,N; *M. quadrimaculata* (Verrall) S,N; *M. arctica* (Zetterstedt) T,S; *M. umbellatarum* (F.) S; *M. compositarum* (Verrall) T,S; *Sphaerophoria scripta* (L.) S,N; *S. menthastri* (L.) S,N; *Scaeva selenetics* (Meigen) S; *S. pyrastris* (L.) N; *Chrysotoxum arcuatum* (L.) T; *Rhingia campestris* Meigen N,S; *Lejogaster metallina* (F.) S; *Chrysogaster hirtella* Loew S; *C. solstitialis* (Fallen) N; *Neoscia podagrica* (F.) T,S,N; *Sphegina clunipes* (Fallen) S,N; *Pipiza lugubris* (F.) S; *P. noctiluca* (L.) T,S,N; *P. austriaca* Meigen N; *Heringia heringi* (Zetterstedt) S; *Portevinia maculata* (Fallen) N,S; *Cheilosia illustrata* (Harris) S,N; *C. antiqua* Meigen S,N; *C. variabilis* (Panzer) S,N; *C. impressa* Loew S,N; *C. paganus* (Meigen) S,N; *C. albitarsis* (Meigen) S,N; *C. fraterna* (Meigen) T; *C. proxima* (Zetterstedt) S; *C. grossa* (Fallen) S,N; *C. intensa* Loew N; *C. scutellata* (Fallen) N; *Volucella bombylans* (L.) S; *V. pellucens* (L.) N; *Sericomyia silentis* (Harris) S,N; *Eristalis pertinax* (Seopoli) S,N; *E. intricarius* (L.) S,N; *E. tenax* (L.) N,S; *E. arbustorum* (L.) S,N; *E. horticola* (Degeer) S; *Myathropa florea* (L.) S,N; *Helophilus hybridus* Loew S,N; *H. pendulus* (L.) S,N; *Eumerus strigatus* (Fallen) N;

Xylota sylvorum (L.) S,N; *X. segnis* (L.) S,N.; *X. abiens* Meigen S; *X. tarda* Meigen N; *X. florum* (F.) N; *Xylotomina lenta* (Meigen) N; *Syrirta pipiens* (L.) T,N; *Criorhina berberina* (F.) S,N; *C. ranunculi* (Panzer) S

CONOPIDAE

Sicus ferrugineus (L.) T;

TEPHRITIDAE

Trypeta zoe (Meigen) T; *Euleia cognata* (Weidemann) T; *E. heraclei* (L.) T; *Myoleia caesio* (Harris) T; *Xyphostia miliaria* (Sehrank) T;

OTTIDAE

Otites guttata (Meigen) N; *Herina frondeseentiae* (L.) T,N; *H. germinationis* (Rossi) T'

MICROPEZIDAE

Calobatapetronella (L.) N,S; *Micropeza corrigiolata* (L.) S;

PSIIDAE

Loxocera ichneumonea (L.) S; *Psila rosae* (F.) or *nigricornis* Meigen N; *P. atra* Meigen N; *P. ?nigra* (Fallen) N; *P. pallida* (Fallen) T; *P. fimetaria* (L.) N,S;

HELCOMYZIDAE

Heterocheila buccata (Fallen) T;

DRYOMYZIDAE

Dryomyza flaveola (F.) T,S; *D. analis* Fallen T;

LAUXANIIDAE

Calliopum aenum (Fallen) T; *Tricholauxania praeusta* (Fallen) T,N; *Lyciella rorida* (Fallen) T,N; *L. pallidiventris* (Fallen) T; *L. affinis* (Zetterstedt) T,N;

HELEOMYZIDAE

Suillia pallida (Fallen) T; *S. ustulste* (Meigen) N; *Heteromyza rotundicornis* (Zetterstedt) T; *Tephroclamys rufiventris* (Meigen) T; *T. flavipes* (Zetterstedt) T; *Neoleria inscripta* (Meigen) T; *Heleomyza serrata* (L.) T;

CHYROMYZIDAE

Chyromya flava (L.) T;

SEPSIDAE

Nemopoda nitidula (Fallen) S; *Sepsis fulgens* Meigen S; *S. cynipsea* (L.) S;

SCIOMYZIDAE

Pelidnoptera fuscipennis (Meigen) N; *Pherbellia albocostata* (Fallen) T,N; *P. cinerella* (Fallen) N; *Tetanocera elata* (F.) T,N; *T. hyalipennis* von Roser T; *T. sylvatica* Meigen T,N; *T. phyllophora* Melander N; *Trypetoptera punctatets.* (Scopoli) N; *Limnia unguicornis* [Scopoli] N; *Tetanura pallidiventris* Fallen T,N;

SPHAEROCERIDAE

Sphaerocera denticulata (Meigen) T,N,S; *Copromyza atra* (Meigen) N; *C. equina* Fallen S;

PALLOPTERIDAE

Palloptera campta Cz. T,N; *P. umbellatarum* (F.) T,N; *P. ustulata* Fallen T;

PIOPHILIDAE

Piophilula vulgaris Fallen T;

OPOMYZIDAE

Opomyza germinationis (L.) T,N;

CLUSIIDAE *Clusiodes* sp. T;

ASTEIIDAE

Asteia amoena Meigen T;

EPHYDRIDAE

Hydrellia albiceps (Meigen) N; *H. griseola* (Fallen) N;

AGROMYZIDAE

Agromyza sp. N; *Melanagromyza aeneoventris* (Fall en) N; *Ophiomyia melandryi* de Meijere N; *Liriomyza pusille* (Meigen) T; *L. flaveola* (Fallen) T; *Napomyza elegans* (Meigen) S; *Phytomyza ranunculi* (Schrank) T;

CHLOROPIDAE

Elachiptera cornuta (Fallen) T;

TACHINIDAE

cyzenis albicans (Fallen) T,N; *Pales pavidata* (Meigen) N; *Phryxe vulgaris* (Fallen) N; *Lydella stabulans* (Meigen) T; *Siphona geniculata* (Degeer) T; *Voria ruralis* (Fallen) T; *Phyllomya volvulus* (F.) T;

SARCOPHAGIDAE

Sarcophaga albiceps Meigen S; *S. similis* Meade S; *S. carnaria* (L.) S;

CALLIPHORIDAE

Phormia terraenovae (R. - Desvoidy) S; *Calliphora vicina* R. - Desvoidy S; *C. vomitoria* (L.) S; *Lucilia caesar* (L.) S; *L. silvarum* (Meigen) S;

SCATHOPHAGIDAE

Cordilura pubera (L.) T; *Scathophaga suilla* (F.) T; *S. stercoraria* (L.) N,S; *S. lutaria* (F.) S; *Norellisoma lituratum* (Meigen) N;

ANTHOMYIIDAE

Mycophaga testacea (Gimmerthal) T; *Hydrophoria conica* (Weidemann) T,S; *Pegomya bicolor* (Weidemann) T; *Hylemya nigrimana* (Meigen) T; *H. strenua* R. - Desvoidy T; *H. partita* (Meigen) T; *Pegohylemyia sylvatica* (R. - Desvoidy) T; *Phorbia curvicauda* (Zetterstedt) T; *Delia coarctata* (Fallen) N;

FANNIIDAE

Fannia pallitibia (Rondani) T; *F. hamata* (Macquart) S; *F. rondanii* (Strobl) T,S; *F. manicata* (Meigen) S; *F. canicularis* (L.) T,S; *F. scalaris* (F.) T; *F. serena* (Fallen) T,N; *F. sociella* (Zetterstedt) N;

MUSCIDAE

Musca domestica L. S; *Orthellia viridis* (Weidemann) T; *Dasyphora cyanella* (Meigen) S; *Graphomya maculata* (Scopoli) S; *Myospila mediatunda* (F.) S; *Mesembrina meridiana* (L.) S; *Muscina stabulans* (Fallen) S; *M. ? pabulorum* (Fallen) S; *Morelliasimplex* (Loew) N,S; *M. hortorum* (Fallen) S; *Stomoxys calcitrans* (L.) S; *Haematobosca stimulans* (Meigen) T,S; *Drymeia hamata* (Fallen) S; *Ophyra leucostoma* (Wiedemann) S; *Pogonomyia brumalis* (Rondani) T; *Azelia zetterstedti* Rondani T; *A. triquetra* (Wiedemann) T; *A. aterrima* (Meigen) T; *A. cilipes* Haliday N; *Gymnodia humilis* (Zetterstedt) T; *Hebecnema nigricolor* (Fallen) T; *H. umbratica* (Meigen) T; *H. affinis* Malloch T; *Mydaea urbana* (Meigen) T; *M. scutellaris* R. - Desvoidy N,S; *Helina pertusa* (Meigen) T; *H. impuncta* (Fallen) T,N; *H. lasiophthalma* (Macquart) T; *H. laetifica* (R. - Desvoidy) T; *H. pubiseta* (Zetterstedt) N; *H. duplicata* (Meigen) N,T; *H. etricotor* (Fallen) N; *Macrorchis mediata* (Fallen) T; *Coenosia intermedia* (Fallen) T; *C. tigrina* (F.) T; *C. lineatipes* (Zetterstedt) T;

C. rufipalpis Meigen T; *C. tricolor* (Zetterstedt) T; *Trichopticoidea decolor* (Fallen) T; *Alloeostylus diaphanus* (Wiedemann) N,S; *Thricops nigritella* (Zetterstedt) T; *T. nigrifrons* (R. - Desvoidy) T,N; *T. semicinerea* (Wiedemann) T,N,S; *Lophoscelesmutatus* (Fallen) T; *Polieta lardaria* (F.) N,S; *P. albolineata* (Fallen) S; *Phaonia errans* (Meigen) T,N,S; *P. populi* Meigen T,N,S; *P. zugmayeriae* Schnabl N; *P. basalis* (Zetterstedt) N,S; *P. incana* (Wiedemann) T; *P. variegata* (Meigen) S; *P. rufipalpis* (Macquart) S; *P. signata* (Meigen) S; *Hydrotaea dentipes* (F.) T,S; *H. irritans* (Fallen) T,N,S; *H. occulta* (Meigen) S.

FRESHWATER IN WASHINGTON NEW TOWN

PART I: THE STREAMS AND PONDS AND THEIR FLORA

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Introduction

Washington New Town comprises 5,500 acres on the north bank of the Wear, 7 miles south of Newcastle, and 7 miles west of Sunderland. It was designated a New Town in 1964 and is due for completion in the early 1980's, with a target population of 80,000.

The New Town lies on an area of laminated and boulder clays with occasional outcrops of sand. In the southern part, six streams drain into the Wear, the most important of which is Biddick Burn. The central part of the New Town has no surface water, while the northern most boundary is defined by the upper reaches of the River Don. There are few ponds, and a balancing pond for Newalls Insulation Limited, established in the last century, is by far the largest.

In 1976 the Development Corporation initiated a survey of freshwater in the Town for two purposes:- (1) to discover the impact of development of the New Town on freshwater life, (2) to obtain information for the development of a policy on creating new freshwater features. Fieldwork was carried out in July-September 1976 and 1977. This paper gives a general description of the freshwater bodies and a description of the higher flora. A second paper in this journal will discuss the invertebrates and their use as indicators of pollution problems.

The Impact of Development

Before the development of the New Town, all the waterways lay in agricultural

land. The Don, Spring Gill, Toby Gill are still in such surroundings. Most of the area immediately around Biddick Burn and its tributaries has been developed as parkland but the stream itself is used to carry surface water run-off from the central area of Washington. The catchment area of the stream remains the same, but since most of it is now taken up by hard surfaces, the increased flow shortly after storm water is spectacular. About half way along the Burn the normal flow is 4cu. ft. per sec. but this can increase to 400cu.ft. per sec. after rain. The surface water run-off has 2 main effects:-

1. The erosion of the soft clay substrate is rapid, and the streams are deeply cut with frequently-collapsing sides. The banks are not stable enough for the development of more than a transient algal and bryophyte flora. The latter comprises *Conocephalum conicum*, *Pellia epiphylla*, *Fissidens bryoides*, *Fissidens taxifolus*, *Bryum spp.*, *Pholia delicatula*, and *Hypnum cypressiforme*. Numerous side pools are formed by erosion, but these are soon swept away or reformed.
2. The surface water run-off carries animal wastes, plant matter, fertiliser, engine oil, petrol, detergent, heavy metals, silt and general debris, the net result of which is a general deterioration in water quality.

The conditions described, therefore, produce a particularly rigorous environment for the growth of plants and the survival of animal populations which are disrupted by the effects of the storm overflow.

Some American sources (Bryan 1970, AESC 1970) consider storm water potentially a more serious source of pollutants than municipal wastes, so it is encouraging that there is a research group at Middlesex Polytechnic studying the problem.

Oil and petrol form a particular problem at Washington. Apart from coating surfaces of plants, during dry periods the oils cover the surface of still side ponds on the stream, reducing, or completely stopping the diffusion of grasses.

The Flora

All the higher aquatics on each stream and pond were recorded. Names follow Clapham, Tutin and Waburg (1962). No distinct associations were recognised. The most distinctive features were:

1. The mats of *Ranunculus repens*, *Glyceria spp.*, and *Agrostis stolonifera* which form at the edges of the water and float on it.
2. The dense clumps of *Epilobium hirsutum* which form in still waters.
3. The absence of shallow edges (except at Newalls Pond), which in part accounts for the poor flora.

The vegetation immediately around the streams is in most cases a mixture of *Crataegus monogyna* scrub and rough grass dominated by *Arrhenatherum elatius* and *Dactylis glomerata*. The shading from this is considerable, and several lengths of stream are effectively covered by hawthorn.

The occurrence of species on each site is set out in Table 1. The numbers in brackets refer to Figure 1.

A. The Streams

The Don (17-20) is a small stream on gravel and clay substrate densely shaded by hawthorn in many parts. Scattered clumps of *Phalaris arundinacea* and *Epilobium hirsutum* are found.

Usworth Colliery Burn (21) is shaded by Usworth Hall Wood, and grossly polluted by run-off from the adjacent industrial estate and seepage from old mine workings.

Blackfell Village Burn (11) is a narrow stream some 150 yards long exposed between two culverts as part of a landscape feature. It has developed *Epilobium hirsutum* and *Veronica beccabunga* stands and *Ranunculus re ens* and *Glyceria spp* mats.

Oxclose Burn (3) is fed from a culvert and surface water drains via a stilling pond. The mean width is about 1.5yds. It joins Biddick Burn (5, 7-9) in The Princess Anne Park. Several small ponds have been created artificially along it. Although heavily silted-up they support a varied flora of *Juncus articulatus*, *J. etthusus*, *J. ecutiilorus*, *J. intlexus*, *Alisma plantago-aquatica*, *Equisetum pelustre*, *Eleocharis petustris*, and *Sparganium erectum*. *Glyceria* mats are frequent, and *Isolepis setacea* and *Oenanthe crocata* are occasional. Of the tributaries, Biddick Wood Burn (4) is densely shaded and impoverished, and Harraton Burn (6) is grossly polluted and supports no aquatics.

The Coal Pits Stream (10) is densely shaded, and highly contaminated by iron oxide from an old iron works near its source. Nevertheless it has a large stand of *Juncus effusus* in one part.

The waterways within Washington Waterfowl Park (11, 12) are not of great interest, except the confluence of the main stream with the Wear, where *Apium nodiflorum* and *A. graviolens* are found.

Spring Gill and Toby Gill (13,15) are clean, undisturbed streams with small flows, for the most part densely shaded. *Oenanthe crocata* is found in the former.

B. Ponds

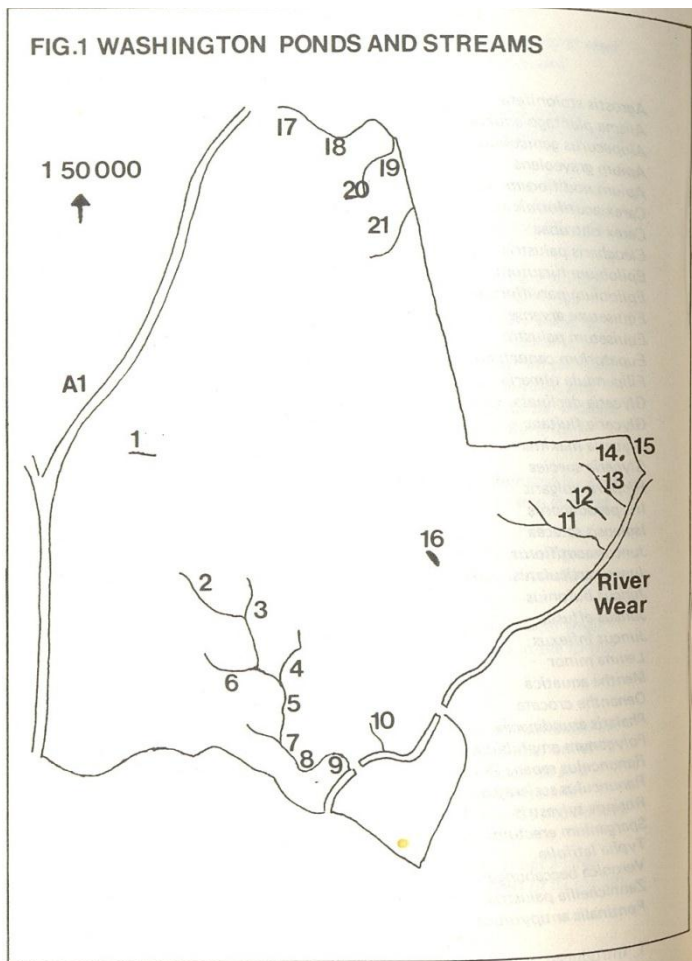
Newalls Pond (16) is by far the largest (about 1.5 acres), and is maintained as a balancing pond by pumping from the River Wear. It is densely shaded on its southern side by *Salix fragilis*, but *Juncus* spp., *Alisma plantago-aquatica* and *Typha latifolia* are abundant, and on the shallow northern margin, *Hippuris vulgaris*, *Ranunculus repens* and *Iris pseudacorus* are found. There is a small clump of *Glyceria maxima* which is rare in the county.

Low Barmston F arm Pond (14) was constructed in the 1840s. It has a large stand of *Sparganium erectum* at one side, but is shaded along the rest of its margin. A small amount of *Zanichellia palustris* grows at the open end.

Table 1. Occurrence of Macrophytes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
<i>Agrostis stolonifera</i>	*		*		*						*		*				*						
<i>Alisma plantago-aquatica</i>			*								*			*		*							†
<i>Alopecurus geniculatus</i>			*														*						
<i>Apium graveolens</i>											*												
<i>Apium nodiflorum</i>											*												
<i>Carex acutiformis</i>											*						*						
<i>Carex obtrubae</i>											†												
<i>Eleocharis palustris</i>																	*						
<i>Epilobium hirsutum</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Epilobium parviflorum</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Equisetum arvense</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Equisetum palustre</i>			*								*		*				*						
<i>Eupatorium cannabinum</i>											*		*				*						
<i>Filipendula ulmaria</i>			*		*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Glyceria declinata</i>	*										*												
<i>Glyceria fluitans</i>			*		*																		
<i>Glyceria maxima</i>																	*						
<i>Glyceria species</i>					*										*	*	*	*	*	*	*	*	*
<i>Hippuris vulgaris</i>																	*						
<i>Iris pseudacorus</i>																	*						
<i>Isolepis setacea</i>					*					*							*						
<i>Juncus acutiflorus</i>					*	*				*							*						
<i>Juncus articulatus</i>					*	*				*				*			*				*		
<i>Juncus bufonius</i>					*					*							*						
<i>Juncus effusus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Juncus inflexus</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Lemna minor</i>											*						*						
<i>Mentha aquatica</i>					*								*	*	*	*	*	*	*	*	*	*	*
<i>Oenanthe crocata</i>										*			*				*						
<i>Phalaris arundinacea</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Polygonum amphibium</i>																	*						
<i>Ranunculus repens</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Ranunculus sceleratus</i>																	*						
<i>Rorippa sylvestris</i>																	*						
<i>Sparganium erectum</i>			*											*			*						
<i>Typha latifolia</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	†
<i>Veronica beccabunga</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
<i>Zannichellia palustris</i>																	*						
<i>Fontinalis antipyretica</i>																	*						

† Introduced



Improvement of Freshwater Habitats

A full discussion of the problems of improvement is deferred to a second paper.

The main action taken by the Development Corporation as a result of the floristic survey has been to create new ponds by excavation, and to clear hawthorn from shaded streams and ponds to allow development of submerged and marginal plants.

Acknowledgements

We wish to thank Washington Development Corporation for permission to publish this account, and Newall's Insulation Ltd. and the Wildfowl Trust for access to their respective sites.

References

Avco Economic Systems Corporation (1970). *Stormwater Pollution from Urban Land Activity*. Fed. Wat. Qual. Admin. No. 11038.
 Bryan E.H. (1970). *Quality of Storm water Drainage from Urban Land*. Water Resources Res. Inst. Univ. N. Carolina N. 37.
 Clapham, Tutin and Warburg (1962). *Excursion Flora of the British Isles*. C.U.P.

Key to Fig. 1

		10	Coal Pits Stream
		11	Wildfowl Refuge
1	Blackfell Village Burn	12	Wader LakeStream
2	Blackfell Burn	13	Spring Gill
3	Oxclose Burn	14	Low Barmston Farm Pond
4	Biddick Wood Burn	15	Toby Gill
5	Biddick Burn (up to Harraton)	16	Newall's Pond
6	Harraton Burn	17	River Don 1.
7	Biddick Burn after Harraton 1.	18	River Don 2.
8	Biddick Burn after Harraton 2.	19	Don Tributary 1.
9	Biddick Burn after Harraton 3.	20	Don Tributary 2.
		21	Usworth Colliery Burn

SOME OBSERVATIONS OF THE GLACIAL PERIOD AND ITS EFFECT ON THE STRATA OF THE DERWENT VALLEY

GEORGE EVANS

4 Rothley Terrace, Medomsley, Consett

Introduction

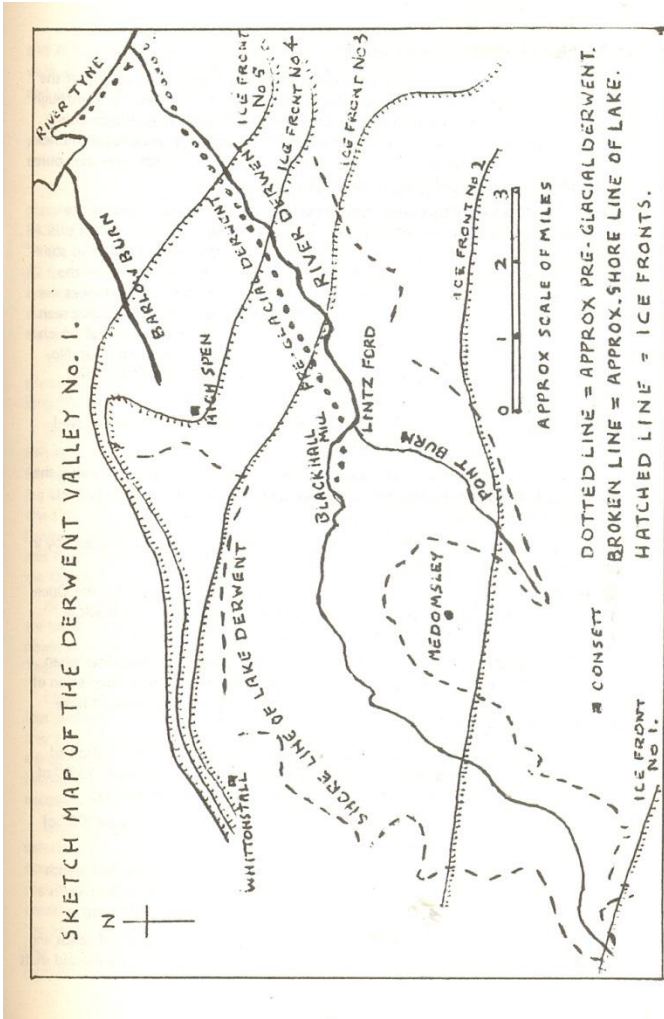
The River Derwent is a tributary of the River Tyne and is situated at the North- West boundary of the County of Durham. Its so called source is at Gibraltar, approx. two miles upstream from Blanchland, where the Beldon and Nookton burns join together to form the River Derwent.

The headwaters of the River Derwent, the Nookton, Beldon and Quickcleugh burns are included as part of the Derwent Valley. In my opinion the true source of the Derwent should be the headwaters of the Quickcleugh Burn. It should be noted as of some interest that the headwaters of the Quickcleugh Burn, the South Tyne, Wear and Tees all have their sources within a few miles of each other.

The geology of the area is simple, the stratigraphical sequence being the whole of the Carboniferous from the Upper Limestone group to the top of the Middle Coal Measures. The Millstone Grit is well exposed in the river at Shotley Bridge. The bedrock is covered by drift which varies in thickness, this being greatest in the bottom of the valley at Derwenthaugh, near the river's confluence with the River Tyne. The general dip is to the south-east, approx. at right angles to the valley.

It is well known that in Glacial Times, moving ice from the Firth of Forth and Tweed Valley was turned southwards down the coasts of Northumberland and Durham by Scandinavian ice which occupied the North Sea. This barrier of ice forced the Lake District ice, which was moving down the Tyne Valley to be also deflected southwards, The Derwent Valley has been affected in a marked way by this phenomenon.

It is also well known that the Derwent Valley was blocked by a moraine across the valley near Rowlands Gill. At the close of the Glaciation Period this moraine dammed back the meltwaters and caused a lake to be formed. This lake occupied the whole of the valley from the moraine up to the Sneep, and the Pont Valley up to Pont Head. Medomsley would then have been on a peninsular. Knowledge gained from extensive coal mining and the presence of numerous overflow channels in the rivers Team, Twizell and Cong burns area suggests, that in the retreat of the ice there were five distinct ice fronts. These ice fronts have had some effect on the formation and drainage of the so-called Lake Derwent by a sequence of overflow channels. These channels lowered the lake as the ice retreated. The ice fronts are shown on sketch map No. one.



The Boulder Clay and Later Deposits.

The Thornley moraine near Rowlands Gill was cut through in the laying of the Derwent Valley Railway which was opened to traffic in 1867. The cutting through the boulder clay was named the Thornley Cut. From this cutting a million cubic yards of clay was removed which proved ideal for brick making. As a result a brick works was set up at Rowlands Gill which is still working today, although the source of raw materials has changed, mainly to nearby opencast sites.

Twelve bore-holes were put down at Derwenthaugh at the beginning of the century and proved a thickness of drift varying from 115 to 149 feet. From this and many other bore-holes it has been ascertained that sea level had fallen to somewhere within the region of -169 feet O.D. at the time of the movement of the glaciers. The boulder clay lies on the pre-glacial surface and in many instances the pre-glacial course of the Derwent and its tributaries have been proved. I have seen in underground workings on a number of occasions the broken up material which formed the bed of the pre-glacial streams with the boulder clay on top. Map No. one shows the position of the pre-glacial Derwent between Blackhall Mill and Derwenthaugh.

A large area of the lower slopes of the Derwent Valley has only been proved during the last thirty years or so to show:-

The presence of unconsolidated deposits ahead of the coal workings where, the thickness of strata above the coal seam is expected to be less than sixty feet, (Coal Mine Regulations).

Where the coal seam has thinned or nipped out; the latter could be caused by a glacial wash-out or a "Torrent Course".

A sort of pattern drilling (a large number of bore-holes) put down by the Open-cast Dept. of the N.C.B. to prove the percentage of coal left in old shallow workings, which cannot be extracted by conventional mine working.

I have in my possession a borer's journal which was filled in at the time when the bore-holes were put down. This gives a considerable amount of information of the strata near the surface in and around the Derwent Valley. From this I have selected the following information:-

At Blackhall Mill two bore-holes were put down in the village. No. 1 showed 39'0" of sand, gravel, clay and boulder clay, 1'0" of sand and drift coal, 13'6" of mixed beds of sand, clay and boulders, and 6'0" of soft yellow sandstone.

No. 2 showed 49'0" of gravel beds, reddy clay and boulder clay, then 3'6" of water-logged sand and boulders.

As we had driven a roadway in the Brockwell seam under the river at a depth of approx. 22 feet, I am of the opinion that the pre-glacial course of the river is a little further north-west of the bore-holes as shown in sketch map No. one.

The John (disused pumping shaft) near Derwentcote proved 25'9" of sands and gravels, and 8'9" of boulder clay. At this point the river flows between the old shaft

and Armondside Farm. I assume the pre-glacial course of the river is slightly north- west of the farm. The nearly thirty feet of sands and gravels must be later deposits and give a strong suggestion of the presence of the Derwent Lake.

On the south-east side of the river near South Garesfield bore-holes have only proved thin boulder clay covered with approx. ten feet of brown clay. The latter could be a lake deposit.

Three bore-holes at Low Ewehirst (Pont Burn area) show the presence of sands, gravels and clays above the boulder clay; the thickness of the latter being 68'0", 64'6" and 59'0" in the three holes. The later deposits above the boulder clay are 21'0", 34'0" and 10'0". Near Southfield Farm (Pont Burn area) a bore-hole showed 82 feet of boulder clay with 3 feet of sand. Above the boulder clay were 20 feet of later deposits. A bore-hole at Billingside (near Pont Head) proved 10'6" of yellow clay, darker shaley clay, shaley clay and coal, and 4'6" of yellow sandy rubble with clay.

The amount of later deposits shown in the above bore-holes gives me the impression that the Derwent Lake of which the Pont Lake was a part, had a fairly long life.

Three bore-holes put down near the Derwent Walk Inn (Ebchester Bank) proved soft sandy clay and broken up yellow sandstone. There is nearly twenty feet of this formation near the Derwent Walk, which the landowner has thought about extracting to supply material to motorway contractors. A thick bed of sandstone was at one time quarried for building stone near the Raven Inn which is just above the Derwent Walk Inn. Its stratigraphical position is between the Towneley (Harvey) and Main Coal (East Durham Hutton) coal seams. Like other thick sandstones in the Derwent Valley, you can notice it as a steep part of the hillside roads.

Across the valley from the Derwent Walk Inn, large deposits of sands and gravels are being quarried at Marley Tile Works and Broad Oak Quarry. A bore-hole put down at Broad Oak Quarry proved 100 feet of sand on top of the boulder clay. There is no doubt that this is a lake deposit.

I have seen the bottom of the boulder clay on many occasions in the mine workings and have also seen at various times the coal seam washed out, but the seggar clay still intact. When seen underground the boulder clay is bluish grey in colour, a slightly damp and leathery substance which is very tough to hew out. When it becomes exposed to the air it gradually peels off the roof and sides making it necessary to close support the roadway.

When a coal seam approaches a wash-out (buried channel) the quality of the coal deteriorates, and I have often noticed a peculiar smell from the coal. On one occasion, when visiting a working place in the mine I noticed this smell from the coal. I said to the workman "we are approaching a wash-out; I can smell it". On breaking up a piece of coal in my hand I was then sure. The workman then said, "when you come to mention it I have also noticed a funny smell, just like stale beer". I do not know what stale beer smells like, but the word stale is a good description of the smell from the coal.

When putting down the drift mine at Elm Park near Shotley Bridge Hospital, We unfortunately found the mine was on the pre-glacial channel of the Snow's Green and Elm Park burns. The post-glacial stream is now two, one on each side of the pre-glacial channel. In the mine tunnel we encountered a fairly thick bed of water bearing sand among the boulder clay. This also happened on the site of the Derwent Reservoir.

In the mine tunnel I estimated the boulder clay to be approx. 70 feet in thickness. On reaching the base of the boulder clay we found the tunnel had reached the bed of the old stream. The boulder clay in the nine feet wide tunnel was sloping up on each side of the centre line. For several feet down to the Brockwell seam, which was still intact, there was broken sandstone mixed with sand. I was certain that this was the debris of the bed of the old stream before the movement of the glaciers.

Wash-outs caused a considerable loss of resources of the Hamsterley Coal Co. One area of great loss of royalty was between the sixty feet fault near Longclose, the River Derwent, Hamsterley Mill Estate and Lintz Ford. In one area we had to leave a twenty yard strip of coal alongside a wash-out. The coal was of poor quality and not suitable for our contract to supply gas coal to Shotley Bridge Gas Works.

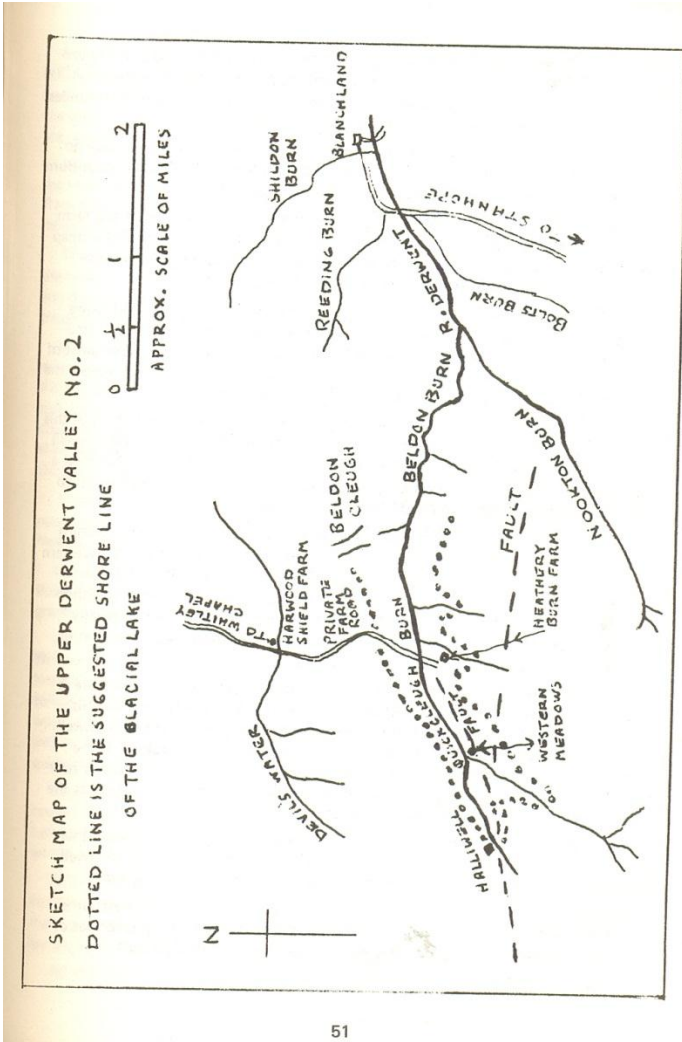
The Upper Reach of the Derwent Valley

In 1902, A.R. Dwerryhouse described "The Glaciation of Teesdale, Weardale, and the Tyne Valley and its Tributary Valleys". The Derwent Valley was only briefly mentioned as far as Hownes Gill.

A paper was read at Durham University on the 12th Feb. 1909 by T. Herdman B.Sc. on "The Glacial Phenomena of The Vale of Derwent". At that time little was known of the details of the boulder clay deposits between Lintz Ford and Shotley Bridge and I have tried to fill in that gap. He gave details of the foreign and local pebbles of various localities in the valley. I have at various times found all the types of pebbles which he mentions. For those interested, a good place for these specimens is the dry valley above Broad Oak Farm. Some of these are Borrowdale volcanics, Granites, Quartz, Grits and Porphyries.

Dwerryhouse described the ice flows to the north over Blanchland Moor which caused the closure of Beldon Cleugh (1,100 feet) and allowed the meltwaters of the Devil's Water Lake to over-flow over Acton Fell (1,050 feet) into the Derwent Lake. Waters impounded in the Upper Derwent Valley and the Burnhope Valley were joined together and flowed around the northern part of Edmundbyers Moor. This then flowed over Muggleswick Moor by a series of decreasing over-flows into the valleys of the Hisehope and Horseleyhope burns. The meltwaters occupying these valleys drained into the Upper Browney Valley through a series of three main over-flow channels. First we have Lindisfarne (at 1,015 feet) along the route of the North and South Letches past Lindisfarne Farm, Black Burn, Long Burn and Butsfield Burn into the River Browney.

With a further retreat of the ice the meltwaters over-flowed at Lyar Dene near Rowley at 850 feet into the Browney Valley via Oliver Burn, Beggarside Burn and



Knitsley and Smallhope burns. A further retreat opened up the Hownes Gill over-flow at about 750 feet. This is a well known and conspicuous over-flow channel. The channel is about 100 yards wide and crosses the watershed for over three miles into the River Browney via the Knitsley and Small hope burns.

Looking at the topography of the upper part of the Derwent Valley I have no doubt that the Beldon Cleugh blockage extended right across the Quickcleugh Burn and that a small lake occupied the area of the Quickcleugh Burn.

I have walked many times in that area and noted the steep descent of the farm road down to the bridge which crosses the Quickcleugh Burn. There is also a steep ascent on the other side to Heatheryburn Farm which is situated near the confluence of the Heathery Burn with the Quickcleugh Burn.

The Quickcleugh Burn as its name implies is a fast running stream, and flows through a small ravine between the Fell Top Limestone and the Corbridge Lime- stone. Friable shales and sandstones form the steep sides of the burn. Over most of its course the stream flows over a hard sandstone, and at a short distance below the bridge the Corbridge Limestone forms the bed of the stream.

I have often stood at the top of the farm road and observed the situation of this stream which seems to flow in a small gorge. I am inclined to think that this small ravine has only been cut during the last 12,000 years or so, and before this, that a small glacial lake occupied the area from just above the foot of Beldon Cleugh to the now disused farm house named Western Meadows.

Evidence of the presence of this lake is the green grass area called the western meadows. These are conspicuous between Heatheryburn Farm and the old Western Meadows farm house. Sketch map No. two shows the area described and the position of the lake as it would appear when the level of the water was near the 1,300 feet contour. Not knowing of any name for this presumed lake I usually refer to it as Heatheryburn glacial lake. Heatheryburn is the usual name given to this area of wild beauty.

Mr. Albert Patrick and his wife Irene who farm this area told me that there is nine inches of good soil on the meadows. Two geological faults run across this area. One of these comes across from the Allendale area, passes the old Halliwell farm house then across western meadows. This could be a continuation of the White Vein of the Hunstanworth area. The second fault branches off from it near the old western meadows farm house, and runs approx. on the same course as the Quickcleugh Burn; they are shown on sketch map No. two.

Having described the over-flows of the upper part of the Vale of Derwent we now come to the over-flow channels at a lower level than Hownes Gill. Redwell Hills near Pont Head seems to have been an over-flow for a very short time.

Herdman states: "The absence of well marked channels between Lindisfarne Gap (1,015 feet) and Hownes Gill (620 feet) seems to point to a rapid retreat of the ice for a considerable time after the commencement of the retreat".

My observations show that Hownes Gill must have been at at least 750 feet (the 800 feet contour is on each side of the over-flow). The retreat of the ice must have been very rapid, with an increased velocity and flow of the meltwaters entering the lake. This increased flow brought in large quantities of sands and gravels which are conspicuous in the Castleside area.

Hownes Gill and Redwell Hills must have overflowed at the same time. Due to the large width of Hownes Gill it eventually took all of the meltwaters, leaving Redwell Hills as a forsaken watercourse. The meltwaters of Redwell Hills during its comparatively short life entered the Team Valley via Clough Dene.

The Burnopfield over-flow came into operation at about 690 feet. This reduced the level of the lake still further, and as the ice front retreated the Fellside North and South overflows reduced the level to such an extent that, with the ice re- treating in the Tyne Valley the river began to flow over the much reduced moraine.

When walking through the Thornley Cut and looking at the meanders of the river below the ruin of Gibside Hall, I feel convinced that it was at this point where the last remnant of the lake changed to the River Derwent. The moraine having lost most of its ice content would be greatly reduced so that the waters cut a channel through it near the viaduct. After this the river makes a further sweep to Winlaton Mill and then alongside its pre-glacial course to join the Tyne near Derwenthaugh.

I have previously mentioned the Acton overflow from the Devil's Water Lake over Acton Fell into the Derwent Lake. The next intake is Shotley Field from the Newfield Gap at just over 800 feet.

Next is the Fairley and Highfield gaps at just under 800 feet. The meltwaters flowed in the direction of the head of the Mere Burn. The presence of sands and gravels in these two gaps and near the source of the Mere Burn are evidence of this.

As the ice retreated the meltwaters entered the Derwent Lake through the Whittonstall gap at about 600 feet. This gap is the Hollings of Herdman. I favour Herdman's names which are often the names of farms; this makes it more easy to follow the flow of the meltwaters. At this stage the ice retreat must have been very rapid, causing an increased velocity of the meltwaters through the Hollings intake. This accounts for the large quantities of sands and gravels now being quarried by Marley Tiles and Broad Oak Quarry.

The opening of the Spen Gap seems to have been a continuation of the rapid retreat. Huge quantities of sands and gravels were deposited into, the Barlow Lake from the Tyne Valley. A large quantity of these were carried by the melt- waters into the Derwent Lake through the Spen Gap at about 500 feet.

With the opening of the Normans Riding Gap at just over 400 feet there seems to have been a drop in the velocity and quantity of the meltwaters; there being no more large deposits of sands and gravels in this lower reach of the valley. There are deposits on the Shibdon side of Axwell Park, but these are in the Tyne Valley.

All the intakes into the Derwent Lake, which are of course the over-flows from

other valleys, and the over-flows from the lake that have been described are shown on sketch map No. three. The approximate shore line of the lake is also shown. This will vary according to which over-flow is operating at that time.

Various writers have suggested the presence of only a single lake in the Derwent Valley. I have suggested, with some evidence to support this, that there was also a lake in the Heatheryburn area.

I am also of the opinion that there could have been another lake in the same area as that now occupied by the Derwent Reservoir.

I have described how moving ice from the Tyne Valley was deflected south- wards. Some of this ice entered the Derwent and Pont Burn valleys. The presence of some fairly thick deposits of boulder clay at Derwenthaugh, Pont Burn, and at Shotley Bridge could be some evidence to support this. I would say that this ice would only go up the valley as far as the Sneep. Moving ice from the Tyne Valley into the valley of the Devil's Water could have passed over Acton Fell into the Derwent Valley in the same way as the later meltwaters.

In the construction of the Derwent Valley Reservoir dam, difficulties were met with thick boulder clay and water-bearing sand. This prevented the completion of a concrete core right across the valley. This suggests that there was a moraine across the valley where the dam is now. This would cause a lake to be formed at the close of the Glaciation Period. This lake would have had a short life as the melt- waters over-flowed over the moraine and quickly cut a channel through it.

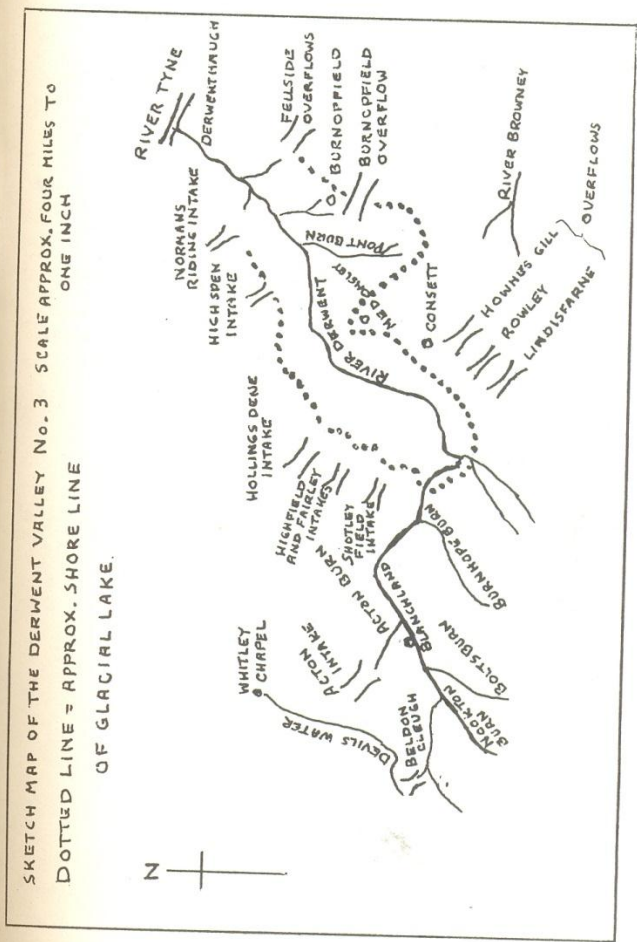
The Meanders

One effect of the Glaciation Period was to prevent' the post glacial Derwent from entering its pre-glacial course. I do not think that this applies to the meander, or should I say a number of meanders on a large meander, which is known as the Sneep. I have given a lot of thought to this rather unique meander on such a small river as the Derwent.

Between Blackhall Mill and Derwentcote, the River Derwent has changed course considerably during my life time. Footpaths have been eroded, sewer pipes dis- lodged, and an electric supply line to a pumping station at Derwentcote had to be re-routed. On the latter job the concrete base of a pole was left in the ground. The river eventually flowed around this and put at risk the road to Armondside Farm. On the humorous side of this, an irate farmer blamed me for it. To keep the peace, I took two workmen down to the river, and we blasted out with explosives the offending concrete block, together with the surrounding weeds which had grown up around it.

The bridge at Blackhall Mill has also been in danger. Groins were put in by the local authority to keep the flow of the river between the pillars of the bridge.

The meanders of the river between Lintz Ford and Winlaton Mill seem to have been started by the change of course of the post glacial river near Lintz Ford bridge. It is near the Ink Works that the river cut a channel in the solid strata



skirting the large large quantity of later deposits which had been carried into the Derwent Lake as previously described.

From Friarside the meanders down to Winlaton Mill are of the simple to and fro type the river at times trying to get over to its pre-glacial course. Near Friar- side Chapel the meander has put into great danger by erosion, the main Shotley Bridge road at Dipwood, near Rowlands Gill. Some of the houses on a housing estate were put at risk until preventive safety measures were taken by the local authority.

In mine roadways I have always treated the boulder clay with great respect as it can be the cause of the collapse of roadways. When it-becomes exposed to the air and on the surface, to the ravages of the weather, erosion can take place very quickly.

In conclusion I must say that there are still many questions that need to be answered regarding the effect of the Glaciation Period in relation to the Derwent Valley. Some of these can only be answered by the putting down of more boreholes. With the closure of the mines very little, if any, boring will now take place.

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THE POPLARS, CHESTER-LE-STREET.

BY THE WAY

Secretaries of societies and other contributors to the "Vasculum" are invited to send their notes to the Editor before 15th March 1978.

A NATURE CONSERVATION REVIEW

Published by the Nature Conservancy Council in July this year, the two volumes of *A Nature Conservation Review* form an immensely important, albeit expensive, contribution to nature conservation in Britain. (Vol.1, £35; Vol. 2, £25).

Since the Government of the day announced a policy for nature conservation in 1947, first the Nature Conservancy and more recently the Nature Conservancy Council have established a number of National Nature Reserves and scheduled many more sites as 'Sites of Special Scientific Interest' (S.S.S.I's). In carrying out this work, much surveying of wildlife, ecological research and other related types of investigation have built up a further knowledge of our wildlife, which has culminated in this publication.

Volume 1 classifies the ecological habitats that shelter and nurture our wildlife and describes them in detail. Criteria for selecting certain typical sites for conservation are outlined and discussed. This contains much of the scientific research that has gone on in this field during the last 30 years. Volume 2 lists those sites of national and in some cases international importance. There are 735 of them and it is pointed out right away that the Nature Conservancy Council on its own could never hope to obtain all of them as National Nature Reserves. However, all are desirable and the review suggests that voluntary bodies, County Councils and other organisations can all co-operate to have as many as possible protected in some way. The sites are listed in two categories or grades. Grade 1 sites are of very high quality and should be sought after first. Grade 2 sites are, in the main, second strings which are perhaps not of such high quality as Grade 1,-but

still of national importance, which would be looked to as conservation reserves if the Grade 1 site of similar ecological status were unobtainable for some reason.

In this list we find a number of local sites which members of the N.N.U. will recognise immediately because of past activities. Amongst those listed for Durham we find the N.N.R. in Upper Teesdale, together with Shipley and Great Woods (Eggleston), much of the Durham Coast, Castle Eden Dene, Thrislington Plantation and Cassop Vale. There are many more in Northumberland, namely the Lindisfarne N.N.R., Fame Islands, Coquet Island, Cheviot, Kielder Head, Harbottle Moors, Bilsmoor and Simonside, Monk Wood, Hesleyside Park, Hareshaw Linn, Border Mires, Crag Lough, Caw Lough, Holystone Woods and Newham Fen.

Several are already protected either as Trust Reserves or Local Authority Reserves, but many are still at the mercy of the planners and the developers. It will need the concentrated efforts of all the voluntary bodies as well as the Nature Conservancy Council to achieve the degree of protection that is necessary to safeguard the listed sites, which most naturalists would consider to be the absolute minimum for safety in retaining typical examples of our wildlife.

SEAL SANDS

The appalling news that the Secretary of State had reversed the findings of the inquiry into the fate of the remaining bit of Seal Sands, will be a great shock to all naturalists. After years of verbal fighting and publicity it was thought that we had won the fight to retain the last little bit of this nationally important estuary for feeding migrating birds. Alas it was not to be so. The claims of employment and development won the day.

The area is not to be developed for port facilities, however, until it is absolutely necessary and it would appear that the needs of industry are not immediate. We must still live in hope that requirements may change with the passing of the years. We will continue to carry on with the fight through publicity in these pages, for as long as there is any chance at all of a reprieve. In the meantime all members of the N.N.U. should do what they can to express their horror and disappointment at the Minister's decision.

THE SOCIETIES

NORTHERN NATURALISTS' UNION

The 147th Field Meeting was held at Wolsingham on July 9th 1977. About 20 members and friends gathered at Windy Nook car park and picnic site to be led along the bank of the River Wear by Mr. T. Dunn.

The shingle margin has long been famous for its wide variety of plants and this outing proved that it is as rich as ever. Even on the car park bank we found a flourishing colony of *Geranium pyrenaicum* Burm f. (Mountain Cranesbill), before we had made a real start. Other notable species seen during the course of the afternoon were *Campanula persicifolia* L., *Trifolium dubium* Sibth., *Ononis spinosa* L. (Restharrow), *Blysmus compressus* (L.) Link., (Broad Blysmus), *Salix purpurea* L. (Purple Willow), *Salix phylicifolia* L. (Tea-leaved Willow), *Salix caprea* L. (Goat Willow), *Salix nigricans* Sm. (Dark-leaved Willow), *Solidago virgaurea* L. (Golden Rod), *Hypericum hirsutum* L. (Hairy St. John's Wort), *Mimulus guttatus* DC (Monkey Flower), *Cochlearia officinalis* L. (Scurvy Grass), *Anthyllis vulneraria*

L. (Kidney Vetch), *Scrophularia aquatica* L. (Water Figwort), *Carduus Crispus* L. (Wetted Thistle), *Arenaria serpyllifolia* L. (Thyme-leaved Sandwort), *Hieracium perpropinquum* (Zahn.) Druce, *Triglochin palustris* L. (Marsh Arrow Grass), *Cardamine amara* L. (Large Bitter-cress), *Rorippa sylvestris* (L.) Besser (Creeping Yellow-cress), *Festuca arundinacea* Schreb. (Tall Fescue), and *Glyceria declinata* Breb. In such a wet habitat there was a wealth of sedges and the following were positively identified, *Carex lepidocarpa* Tausch., *C. riparia* Curt., *C. hirta* L., *C. flacca* Schreb., *C. remota* L., *C. paniculata* L., *C. echmata* Murr., and *C. divulsa* Stokes. Several odd individuals were also seen, thought to be hybrids but no certain identification was possible.

Meanwhile Dennis Hall was very busy collecting Bryophytes which he later identified as *Acrocladium cuspidatum* (Hedw.) Lindb., *Amblystegium juratzkanum* Schimp., *Brachythecium rutabulum* (Hedw.) B.S. & G., *Brachythecium rivulare* B.S. & G., *Bryum bicolor* Dicks, *Bryum capillare* Hedw., *Bryum pallens* Sw., *Bryum pseudotriquetrum* (Hedw.) Schvvaegr., *Ceratodon purpureus* (Hedw.) Brid., *Cratoneuron filicinum* (Hedw.) Spruce., *Mnium longirostrum* Brid., *Conocephalum conicum* (L.) Underw., *Lophocolea bidentata* (L.) Dum., *Pellia endivifolia* Dicks, *Pellia neesiana?* (Gattsche) Limpr.

In September 1976 the outing to the old Alnwick to Wooller railway was a complete washout. It was the weekend of the great rains which ended the driest summer on record. It was therefore decided to try the same venue a second time. The weather was again poor when we met the leader, Mr. J. Bradley on September 10th, but the rain soon stopped and we had a very pleasant afternoon.

The old track was very rough and muddy at first, as it traversed a cutting but after passing through a section with sandstone cliffs on either side, it opened out into very pleasant birch and heather scrub with extensive views to the north.

Many galls were seen on rose, hawthorn, goat willow, eared willow, dark-leaved willow, ash and even the crow's-foot gall on the fern *Dryopteris dilatata* (Hoffm.) A. Gray. Plants noted included *Mentha aquatica* L. (Water Mint), *Galium palustris* agg. (Marsh Bedstraw), *Lychnis floscuclii* L. (Ragged Robin), *Rhinanthus minor* L. (Yellow Rattle), *Galeopsis tetrahit* agg. (Hemp Nettle), *Achillea ptarmica* L. (Sneezewort), *Chaenorhinum minus* (L.) Lange (Small Toadflax).

Although the weather was not suitable for sun-loving insects, we nevertheless saw specimens of *Procus literosa* Haw. (Rosy Minor) and *Citria lutea* Stroem. (Pink-barred Sallow), and one very sharp-eyed naturalist spotted a *Notodonta ziczac* L. (Pebble Prominent) caterpillar on goat willow.

There were many beautiful specimens of a wide range of Agaricine Fungi, many of which were carefully photographed, perhaps to be shown at some future meeting.

The junior outing to Hollinside Woods, Durham, on 1st October was a great success, with all told about thirty juniors and seniors arriving for instruction. Mr. D. Hall took off the first arrivals and followed a somewhat different route from the usual with the result that a second coachload of people were unable to find him for a time. After half an hour all were united and a large number of fungi were discovered, lectured about and identified.

The tenth Harrison Memorial Lecture was held in Darlington College of Education on 29th October 1977, by the kind invitation of the Darlington and Teesdale Naturalists' Field Club. The lecturer, Dr. G.A.L. Johnson, chose as his subject, "Recent Advances in the Geological Studies of Northern England."

During the last 50 years or so geological research has benefitted by the invention of many new machines for detecting the underground sequence of the rocks and more portable and sophisticated drills for taking core samples. With these tools the boundaries of the small Ordovician inlier at Pencil Mill in Upper Teesdale have been investigated. Although not yet completed new facts have emerged and a spin-off has been the discovery of the old bed of the Tees in a position contrary to previous thinking. Next an account of the putting down of the borehole at Rookhope was given. Here the discovery of the granite layer underlying the Pennines was totally unexpected. The actual cores have been preserved and can be seen in a special museum at Rookhope.

Other boreholes have proved the complete succession of the strata making up the Millstone Grit and Coal Measure Series. Dr. Johnson drew our attention to the way opencast coal mining has provided geologists with daylight views of the detailed stratification below the glacial drift, in a most spectacular way. Washouts of coal seams can now be examined under perfect conditions and in some cases whole trees standing upright in the coal seams have been revealed. One slide showed several together so that one could easily imagine the structure of the forest which must have been inundated very suddenly to fossilize the plants in such natural positions. Facts concerning the Permian Barrier Reef at Sunderland were also discussed and finally the geological changes taking place at present, such as the erosion occurring at Cow Green Reservoir, were also mentioned. This was a very important exposition, delivered in a masterly way.

Afterwards, tea was very kindly provided by the host society in the refectory area behind the lecture hall. Here, the usual exhibits were set out. A number of named mosses were shown by Mr. Dennis Hall, an exhibit of local fossils and mineral crystals had been arranged by the Darlington Field Club, a number of dissected bird pellets, nuts and other fruits damaged by birds, squirrels, mice, etc. were shown by the College of Education students and a number of migrant butterflies by Mr. Dunn.

Meanwhile Mrs. Burnip and Miss Radford sold Trust Christmas Goods to the value of £38.13 and a collection for teas towards the N.N.U. publications realised £6.55.

ANNFIELD PLAIN AND DISTRICT FIELD CLUB

Field outings have continued throughout the summer and autumn. The Irthing Gorge was visited on May 7th in pouring rain, followed by Talkin Tarn to Halton-le-Gate in lovely sunshine a fortnight later. Now the spring flowers and birds were seen at their best. Other outings have been to High Cup Nick and Dufton, Burnopfield to Lintz Ford, Eggleston to Hamsterley Forest, Town Yetholm and Kirk Yetholm, Brignall Banks, Eastgate, Watendlath, Castle Eden Dene, Butterstone to Cotherstone, and the Cheviots some six miles beyond Alwinton. The season has been patchy. We will all remember the lovely flowers and insects on the Lintz Ford via Chopwell Woods walk and the autumn fruits at Alwinton.

NOTES AND RECORDS

NOTES

Pollination of Himalayan Balsam. *Impatiens glandulifera* Royle, known as Himalayan Balsam or Policeman's Helmet arrived in this country as seed mixed with ship's ballast many years ago and is now a common plant alongside many of our streams and rivers. It sets seed very readily (I am sure many readers will have played with the fruits and caused them to burst explosively) and since it could not bring its insect pollinators with it, it was decided to keep a watch on it during the 1977 season to see which insects have taken on the job. This little bit of observation was prompted by a lecture given by Professor Valentine at the B.S.B.I. meeting at Newcastle University in April this year, and carried out only a few yards from my home on the banks of the River Wear at Chester-le-Street.

During July and August, the chief day time pollinator was *Bombus lucorum*. Counts showed that 91% of all daytime visits were by this insect. Others were *Apis mellifica*, *Bombus hortorum*, *Bombus pratorum* (only early in July), and *Bombus lapidarius*. *Bombus agrorum* was not seen on the flowers this year although it has been observed in previous years. This insect has had a bad year in our area. I saw very few of them about, a most unusual state of affairs for this normally very common bumble bee. There was one surprising observation; on September 11th, at 2 p.m., I watched a single Wall Brown Butterfly, *Lasiommata megera* L. visit three different flowers of balsam. I could not be certain that it was extending its proboscis into the corolla to feed each time, but it certainly settled on the lip portion with its head towards the throat of the flower each time.

At night time the following moths were seen on the flowers, always after dark at between 11 p.m. and midnight. Again, all appeared to be feeding but I could not swear to it. The illumination from a torch is not perfect nor are my eyes very good in the dark.

July 15th 1977. *Apamea monoglypha* Hufn. (2); *Caradrina morpheus* Hufn. (1); *Agrotis exclamationis* L. (1).

July 20th 1977. *A. monoglypha* (1); *Mythimna impura* Hubn. (5); *C. morpheus* (1); *A. exclamationis* (2); *Plusia festucae* L. (1)

July 23rd 1977. *A. monoglypha* (2).

July 30th 1977. *Autographs gamma* L. (2)

August 12th 1977. *M. impura* (1); *Mythimna pollens* L. (2); *Noctua pronuba* L. (1); *Luperina testacea* Schiff. (2).

August 15th 1977. *Mesapamea secalis* L. (5); *L. testacea* (1), *Noctua comes* L. (1).

September 9th 1977. *Xestia xanthographa* Schiff. (1).

The numbers in brackets refer to the numbers of moths seen on flowers.

T.C.D.

A Cuckoo Mystery. I have lived almost all my life in the Medomsley area, a district of beautiful woods and open spaces. This has always been rich in wildlife where roe deer, badger, fox, stoat, weasel, hare and rabbit have always been plentiful.

The cuckoo too, has always been a delight to hear until this year. Not a single "cuck" have I heard in 1977. I have asked friends in all walks of life, farmers, foresters, game keepers, clergymen, and other regular walkers in the countryside about their experiences. Some have said they have heard only one, others, "That reminds me, I haven't heard one either."

The general habits of the cuckoo are well known, its arrival in the fourth week of April each year and its practice of burdening other small birds like the meadow pipit with the task of bringing up its young. In most years I have seen as many as three males chasing after one female cuckoo, all calling away in the small area round my house. Is it the loss of meadow pipit nesting sites due to loss of habitat that has caused the cuckoo to seek other places to live or is it a real reduction in their numbers that we are witnessing?

One thing is certain I have been very disappointed that in all my 75 years this is the first time I have failed to hear the call.

R. Pirt.

Would other dedicated ornithologists care to contribute their experiences in 1977?

Ed.

Beech. It is said that in his 'Gallic Wars', Julius Caesar stated that there were no beech trees in Britain when he called here. However, he was not here for very long and there is some doubt about the meaning of the word he used. *Fagus*, our name for the beech was used by Virgil, a few years later, for the Edible Oak, *Quercus aesculus*. As beech pollen is reported from the peat for several thousands of year, it is probable that Caesar did mean the Edible Oak.

The word *Fagus*, is related to the Greek 'phagos' meaning 'edible' (cf. phagocyte and bacteriophage), so it could well apply to either the edible oak or the beech, the fruits of which are commonly fed to pigs and eaten by other animals. It is less well known that they have also been an important source of human food.

The seeds contain a poisonous principle, a saponin, but this is water soluble. After grinding and washing, the flour has been made into bread in parts of Eastern Europe. However, the more usual edible component was beech-oil, also from the seeds; it was claimed to rival olive oil in quality and to have been used as a butter substitute in Silesia and Southern France.

The vernacular name, Beech, can be traced back to the Anglo-saxon 'bee'. As the tablets, on which runes were carved, were often made of the wood, claims have been made connecting it with 'book'. Well maybe!

J. Thompson.

Holy Island Bird Report. I arrived on October 1st to find such a strong wind that most of the small birds had been blown off the island. This wind continued for most of the week. On the 2nd. there were 39 Grey Lag Geese, 8 Whooper Swans and a few birds on the Lough, all residents. On the 3rd more birds were in evidence, namely, pied and spotted flycatchers, redwings, snipe, bramblings, garden warblers and one kestrel. On the shore a flock of curlew, dunlin in large numbers, some turnstones and several golden plovers. On Tuesday, Wednesday and Thursday, 4th, 5th and 6th October, there was very little change in the numbers and kinds of birds present as the wind continued to blow. On Friday 7th, the fogs came and it rained and rained but the wind lessened and changed completely to the S.S.E. By Saturday morning 8th October birds started dropping in on the S.S.E. wind and the trees, hedges and fields were full of birds again. This day there were large numbers of goldcrests, chiff chaffs, blackcaps, pied flycatchers, spotted flycatchers, willow warblers, redstarts, bramblings, redwings, field fares, robins, and blackbirds, but no real rarities.

This would indicate that clear weather and a south-east wind are good for bird-watching on Holy Island. I would have liked to have stayed on a little longer to see if the wind change would bring anything unusual, but this was not possible.

L.P. Hird.

RECORDS

FLOWERING PLANTS AND FERNS.

Correction.

In Vol. 62, No. 2, on page 14, lines 14 and 15, four words have been omitted. They should read "Slender Speedwell (*Veronica filiformis* Sm.), Field Speedwell (*Veronica persica* Poir.), Wall etc.

<i>Agropyron pungens</i> (pers.) Roem. & Schult. Sea Coach-grass	L.P. Hird.
Timber Beach, Barren's Quay, Claxheugh.	66
<i>Agropyron junceiforme</i> (A. & D. Love) A. & D. Love . . Sand Couch-grass	66
North Docks, Sunderland	
<i>Agropyron X obtusiusculum</i> (pungens x junceiforme)	66
Barmston, near Washington.	
<i>Elymus arenarius</i> L. Lyme-grass	66
South Docks, Roker.	
<i>Helictotrichon protense</i> (L.) Pilger. Meadow Oat.	66
Claxheugh Rock	
<i>Calamagrostis epigejos</i> (L.) Roth. Bushgrass	66
Barron's Quay, Timber Beach	

<i>Parapholis Strigosa</i> (Dum.) C.E. Hubbard. Sea Hard-grass Barron-s Quay	66
	Derek Hall
<i>Potentilla palustris</i> (L.) Scop. Marsh Cinquefoil Harehill Moor, Flemingfield, Shotton Colliery.	66
<i>Epilobium parviflorum</i> Schrab. Hoary Willowherb Harehill Moor, Flemingfield, Shotton Colliery.	66
<i>Alopecurus myosuroides</i> Huds. Black-grass Harehill Moor, Flemingfield, Shotton Colliery.	66
<i>Stachys palustris</i> L. Marsh Woundwort Banks of Don, S.W. of West Boldon.	66
<i>Sesleria albicans</i> Kit. Blue Moor-grass Tuthill Quarry, Haswell	66
<i>Listera ovata</i> (L.) R'Br. Common Twayblade. Tuthill Quarry, Haswell.	66
<i>Echium vulgare</i> L. Viper's Bugloss Tuthill Quarry, Haswell.	66
<i>Catapodium rigidum</i> (L.) C.E. Hubbard. Fern-grass. Tuthill Quarry, Haswell.	66
<i>Rorippa islandica</i> (Oeder) Borbas. Marsh Yellow-cress Tuthill, Haswell.	66
<i>Zanichellia palustris</i> L. Horned Pondweed Haswell	66
<i>Sagina nodosa</i> (L.) Fenzl. Knotted Pearlwort Tuthill Quarry, Haswell.	66
<i>Anacamptis pyramidalis</i> (L.) Rich. Pyramidal Orchid Tuthill Quarry, Haswell.	66
<i>Typha latifolia</i> L. Great Reedmace. Haswell	66
<i>Erigeron acer</i> L. Blue Fleabane Tuthill Quarry, Haswell	66
<i>Cakile maritime</i> Scop. Sea Rocket Near Souter Point, Whitburn.	66
<i>Genista tinctoria</i> (L.) Dyer's Greenweed Near Souter Point, Whitburn.	66
<i>Honkenya peploides</i> (L.) Ehrh. Sea Sandwort Near Souter Point, Whitburn.	66
<i>Atriplex littoralis</i> L. Grass-leaved Orache Near Souter Point, Whitburn	66
<i>Arabidopsis thaleiana</i> (L.) Heynh. Thale Cress Grounds of Civic Centre, Sunderland; also Monkwearmouth	66
<i>Allium vineale</i> L. Wild Onion. Houghton Cut.	66
<i>Verbascum thapsus</i> L. Great Mulein. Houghton Cut.	66
	R.Stevenson
<i>Hottonia palustris</i> L. Water Violet. A number of plants in a drain near Swan Carr, Bradbury.	66

<i>Ranculus lingua</i> L. Great Spearwort	66
A few plants in the drain near Swan Carr, Bradbury.	
<i>Tholicticum flovum</i> L. Common Meadow Rue	66
in some quantity on the banks of the drain near Swan Carr.	

M. Burnip

BRYOPHYTES LIVERWORTS AMD MOSSES

All the following records are from Great Wood, Eggleston, 21.5.77.

<i>Conocephalum conicum</i> (L.) Dum	66	<i>Lumularia cruciata</i> (L.) Dum.	66
<i>Pellia endiviifolia</i> Dicks	66	<i>Metzgeria furcata</i> (L.) Dum	66
<i>Solenostema triste</i> (Nees) K. Mull	66	<i>Plagiochiea asplenoides</i> (L.) Dum	66
<i>Acrocladium cuspidatum</i> (Hedw.) Lindb	66	<i>Eurhynchium praelongum</i> (Hedw.)Hobk	66
<i>Amblystegium serpens</i> (Hedw.) B & S	66	<i>Eurhynchium swartzii</i> (Turn.) Cum.	66
<i>Barbula cylindrica</i> (Tay.)Schp.	66	<i>Eurhynchium riparioides</i> (Hedw.)Jennings.	66
<i>Barbula fallax</i> Hedw	66	<i>Eurhynchium confertum</i> (Dicks.)Milde.	66
<i>Barbula ?reflexa</i> (Brid.)Qnd	66	<i>Fontinalis antipyretica</i> Hedw.	66
<i>Barbula tophaca</i> (Brid.) Mitt	66	<i>Hypnum cupressiforme</i> Hedw.	66
<i>Barbula unguiculato</i> Hedw.	66	<i>Hygroamblystegium fluviatile</i> (Hedw.)	66
		Loeske.	
<i>Blindia acuto</i> (Hedw.) B & S	66	<i>Hygrohypnum eugyrium</i> (B & S) Loeske	66
<i>Brachythecium rutabulum</i> (Hedw.) B & S	66	<i>Isoetecium myosuroides</i> Brid.	66
<i>Brachythecium rivulare</i> (Bruch.) B & S	66	<i>Mnium hornum</i> Hedw.	66
<i>Brachythecium velutinum</i> (Hedw.) B & S	66	<i>Mnium cuspidatum</i> Hedw.	66
<i>Brachythecium plumosum</i> (Hedw.)B & S	66	<i>Mnium longirostrum</i> Brid	66
<i>Bryum bicolor</i> Dicks	66	<i>Mnium punctatum</i> Hedw.	66
<i>Bryum pollens</i> (Brid.) Rohl	66	<i>Neckera complanata</i> (Hedw.) Huben	66
<i>Cinclidotus fontinaloides</i> (Hedw.) P. Beauv	66	<i>Omalia trichomanoides</i> (Hedw.) B & S	66
<i>Cratoneuron commutatum</i> (Hedw.)Roth	66	<i>Orthodontium lineare</i> Schwaegr.	66
<i>Dichodontium pellucidum</i> Schp	66	<i>Philonotis fontana</i> (Hedw.) Brid.	66
<i>Fissidens bryoides</i> Hedw.	66	<i>Plagiothecium denticulatum</i> (Hedw.)B&S	66
<i>Fissidens adjanthoides</i> Hedw.	66	<i>Plagiothecium ?succulentum</i> (Wils.)Husn	66
<i>Fissidens ?incurvus</i> Starke ex Web & Mohr	66	<i>Pholia ?elongata</i> Hedw.	66
<i>Grimmia apocarpus</i> Hedw	66	<i>Pholid ludwigii</i> (Sprang) Broth	66
<i>Encalypta streptocarpa</i> Hedw.	66	<i>Thamnum alopecurum</i> (Hedw.) B&S	66
<i>Eurhynchium striatum</i> (Hedw.) Schp.emend	66	<i>Radula complanata</i> (L.) Dum.	66
Stormer.			
<i>Lophocolea heterophyllia</i> (Schrad.) Dum.	66		

Dennis Hall

AVES-BIRDS

<i>Calidris testacea</i> (Pallas) Curlew Sandpiper	67
One with Dunlin on a small pool beside Cresswell Pond 22 8 77	
<i>Apus apus</i> L. Swift.	67
The colony at West Gosforth has been very much below strength this year, maximum seen being six instead of the usual twenty or so. Swifts were last heard over West Gosforth on August 27th; two were seen at Monkseaton on the morning of September 3rd.	
	C.J. Gent.
<i>Locustella naevia</i> Grasshopper Warbler	66
Above the River Wear at Claxheugh at the site of the old reservoir on 3rd August 1977.	
	P.J. Doody