

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 "Vaoculum" are invited to send their notes to the Editor before 15th June 1976.

SUBSCRIPTIONS.

We would like to remind you all that subscriptions became due on January 1st. If you have not already sent your cheque or P.O. to the Hon. Treasurer, would you please remember to do so as early as possible. In order to stave off further increases in subscriptions an attempt is being made to further increase membership. Through these pages, we invite applications for membership from all those who profess the slightest interest in natural history.

LITTER.

Litter louts used to be people who dropped the odd empty cigarette packet in the middle of the pavement. These people are still litter louts, of course, but their transgressions are nothing to the modern varieties about which there is insufficient publicity. These are the people who fill their cars with old mattresses, plastic sacks of old plaster or bricks, sacks of garden rubbish or broken down old refrigerators. They then proceed to some remote part of the countryside where no one else is to be seen and then furtively dump the lot. The trouble is that they usually choose some beauty spot. Having done their dirtiest they then sneak back home to search for some more rubbish.

What makes people do this sort of thing? They must be completely devoid of any sense of beauty, completely irresponsible and stupid into the bargain. Stupid because that is the only description for some one who goes to all the trouble of scattering rubbish over the countryside and using expensive petrol to do so when they can have the rubbish properly disposed of by someone else and completely free of charge. We had an old mattress to dispose of some weeks ago. A telephone call to the District Council Offices was all that was necessary. The very next morning a special gang of waste disposal workmen called and collected the mattress. We hope it was destroyed painlessly. At any rate it was taken away promptly and without cost. The service is there. It is prompt, efficient and effective, so why do the dumpers continue to desecrate all that we hold beautiful? Is it a sign of the times or are people becoming less responsible? Or is it that authorities have failed to publicise adequately their collection services?

NORTH EAST ENVIRONMENTAL RECORDS CENTRE.

Mr. P. S. Davis, Keeper of Natural Sciences at Sunderland Museum has initiated, the formation of a centre of reference for biological and geological records for the Counties of Cleveland, Durham and Tyne and Wear south of the Tyne. It is intended that it will be organised in such a way as to fit in with the National Biological Records Centre and the National Centre for Geological Records.

The duties of whoever is in charge of the centre will be to enter records in the system, show these on large scale maps and revise the data continuously. Records on the distribution of species will be on a grid square basis from old and new discoveries in the field and from museum specimens. These will not only be stored away but will be accessible to all interested parties, except where they are classed as confidential by the initial recorder. The National Records Centre will have the information sent to them. Where gaps in local knowledge become evident the centre staff will be able to suggest worthwhile lines of inquiry and co-ordinate the activities of local workers. In addition, the life and work of local naturalists, both past and present, and a bibliography of local books, journals and scientific papers will be kept. It is hoped to encourage and promote the publication of new works wherever possible.

The Nature Conservancy Council and County Trusts will be consulted regarding enquiries relating to sites and reserves in which they are interested.

For the time being the databank will be located in Sunderland Museum but it will be transferred to South Shields Museum and Art Gallery when that institution is opened.

Needles to say members of the N.N.U. will want to give their fullest support to the scheme. We must all make many thousands of individual records each year. Many of these are noted in the Vasculum, but often the more common species or those species which have been noted before are left out. If you feel that the wildlife in the area where you live has been under-recorded, here is a chance to put yourself on the map. Information which is too confidential or unsuitable for the Vasculum can, of course, be sent directly to Peter Davis at Sunderland Museum.

DUTCH ELM DISEASE

The following notes from Habitat Digest make sober reading for anyone caring about the environment. The Forestry Commission has just published a survey for 1975. The disease has continued its spread, infecting a further 1.9 million trees in Southern England (i.e. south of a line from Chester to the Wash). These were elms in open countryside (parkland, hedgerows, etc.) or urban areas. If an allowance is made for trees in woodland, the estimated total is 5.6 million in 1975, almost 2 million more than in 1974.

The disease is much more severe in English elm (52% dead or dying) than in wych elm (24%) or small-leaved elm (13%). The only way to control the disease at present is for infected elms to be felled and the bark burnt.

BADGERS AND TB.

In 1975 the bacterium *Mycobacterium bovis* has been isolated in 17% of 1300 badger carcasses collected in the South West of England. This is considered by veterinary experts a very high proportion. 160 herd breakdowns were analysed in Avon and Gloucestershire and 113 farms were within half a mile of locations where infected badgers had been found. After considering all the evidence, including fresh experimental evidence which was beginning to indicate that badgers can pass the disease to other badgers and calves, the panel recognised that the problem, although restricted to limited areas in SW England only, was a serious one, which justified the control measures proposed by MAFF.

MAFF is arranging to gas badgers in those localities in the SW where TB has been diagnosed, using hydrogen cyanide gas (veterinary experts agree that this is the most humane and effective way). Smaller, badly affected areas will be kept clear of badgers for a year to ensure that the disease organism does not persist to re-contaminate the badgers which, eventually, will recolonise the setts.

This is an unfortunate setback for the badger just when legislation was beginning to afford it some measure of protection.

THE SOCIETIES.

NORTHERN NATURALISTS' UNION.

The 52nd Annual General Meeting was held in the Hancock Museum on March 27th, by the kind invitation of the Natural History Society of Northumbria.

In the preliminary business meeting the Treasurer's report was of some importance because of the negative state of the finances at the end of 1974. It was, therefore, with some satisfaction that he was able to report a balance of £34.19 even after paying off the bank debt of 1974 and also the bill for the 1974 October Vasculum, representing in all a profit of £137.27 on the year. A statement from the auditor pointed out that unless there is a further increase in membership, and inflation fails to settle down, he projects a deficit again by 1978, in which case a further increase in subscription will have to be considered. Once again we would urge members to make every effort to do some recruitment.

After the General Secretary's report, the new president, Dr. T. Geyer was invited to take the Chair and conducted the rest of the meeting.

Mr. P. Davis, Keeper of Natural Sciences at Sunderland Museum was invited to speak about the proposed North East Environmental Records centre of the Tyne and Wear Museum Service. This is reported in greater detail elsewhere in this journal.

Dr. C. H. Dickinson then gave a lecture entitled "Disease, Deterioration and Decay". Basically this was an account of the decay of plant material by Fungi. Since these organisms do not possess a mechanism for photosynthesis they are essentially

organisms which break down carbohydrates, proteins and fats produced by green plants. Such pathogens of plants are very extensive, consisting of blights, mildews, rusts, smuts, etc., and these were illustrated by a series of slides. The majority are serious pests causing extensive deterioration of tissues, for example moulds on citrus fruits, club root of cabbages, apple scab, potato scab, etc. Break down of tissues sometimes becomes so complete that decay leading to death is the end product. It was pointed out that in some cases there is a benefit to mankind in the clearing up of much organic waste and dead bodies, although damage to our food and materials is a continuing menace.

After a vote of thanks by Mr. L. Hird we moved to a nearby laboratory for the tea provided by Mrs. Hall and Miss. Vincent. There were many exhibits laid out on the benches. Pressed specimens of grasses and sedges were shown by Mr. Hird, part of a current collection of local moths by Mr. R. Henderson, two Australian wildlife books by Mr. E. Tumbull, moth larvae in an old wasp's nest were brought by Mr. J. Bowman, Mr. H. Mattress showed a method of mounting large butterflies and moths in isopen and some live Privet Hawk pupae which he gave away to anyone interested, several live caddis fly larvae were from Mr. I. Wallace, a plant of the Chinese Tree of Heaven, *Ginkgo biloba* and African Toads in mating condition were from Mr. Dennis Hall, there were a number of striking photographs taken by Mr. Derek Hall in Hawthorn Dene, and lastly a variety of publications by Mr. Dunn together with specimens of the Scarce Gold Spot Moth, *Plusia gracilis* and the Grizzled Skipper Butterfly, *Pyrgus malvae*, both taken for the first time in Durham (v.c. 66) during 1975 and two specimens of the Honey Moth, *Aphmio sociella* which he thought were possibly adults of the larvae in Mr. Bowman's wasp's nest.

DARLINGTON AND TEESDALE NATURALISTS' HELD CLUB.

The annual report for 1975 gives a general summary of the club's activities and details of the various subject Sections

Membership has continued to increase slowly and the financial position is sound. The proposed closure of the College of Education may bring back our accommodation problems. During the past few years we have had to move from one building to another. When we were offered facilities in the College of Education we thought that we were at last going to be able to settle down.

The reports on indoor meetings and field meetings show great activity within the club. An average attendance of 59 for meetings with outside speakers is something to be proud of.

ANNFIELD PLAIN AND STANLEY NATURALISTS' CLUB.

The summer outings of 1975 will long be remembered because of the marvellous weather. That is not to say that every day out was blessed by beautiful sunshine, for one of our outings, that to Croxdale Woods on September 27th, was the wettest that anyone can remember.

The spring outings were mostly by coach to such places as Keswick, Guisborough, Eggleston and Boulby. By now the weather was warming up and we had a memorable day with the wildlife of Castle Eden Dene on May 10th. Later that month we were off again by coach to Lanercost and Brampton, then later to the Fame Islands, Kirby Longsdale and the Cheviots around Town Yetholm. On July 19th a walk from Hamsterley Village to Wolsingham was just the thing for the botanists. In August it was nearly too hot for walking but visits were made to Harwood and Lordenshaw in Northumberland, to Swaledale and to Grasemere and Langdale. The last was marked by some real mountaineering over the Langdale Pikes, where some of the hardier souls even tackled Jack's Rake.

Apart from the wet outing already mentioned the season finished with a day out near Sedbergh in September and a local walk to Causey Arch, the locomotive museum at Marley Hill, Beamish Hall and back home.

Altogether this was a very successful season, one which will remain in the memories of the members for a long time.

SUNDERLAND NATURAL HISTORY SOCIETY

The Annual Report consists entirely of accounts of indoor meetings and field meetings.

The average attendance for indoor meetings has again increased. The total attendance for the twelve meetings was 586, making an average attendance of 49. The highest number present was 75, at Mr. B. Speak's talk "Watch the Birdie" and the lowest was 28, at Dr. Richardson's talk on "New Landscapes for Old", but this number was undoubtedly affected by the Roker Park cup-tie and the resulting traffic congestion.

The season started in October with Mr. R. Allison talking on "Nature from my Camera". This was followed by Mr. F. Stubbs talking about Plant Galls, then Mr. B. Speak, Mr. T. W. Wanless showing a film about the Seychelles Islands, Mr. H. G. Smithron British Canals, two ecological films on December 16th, then Mr. S. Wilks on the Return of the Seasons, the natural history of Tyne and Wear by Mr. F. Woodward, a talk on Africa, mainly about tse-tse flies by Dr. R. Barrass, then Dr. J. A. Richardson, followed by Dr. J. A. Cooke on Bracken, and lastly a film by Dr. K. McKay, portraying the lives and customs of the people of Upper Coquetdale at the turn of the century, using members of the Northumbria Wildlife Trust as actors.

Outdoor meetings have been held fairly regularly throughout the year. There have been seven full day excursions to Witton-le-Wear Nature Reserve, Malham Tarn, Washburn Valley, Stanhope, Castle Eden Dene and Teesmouth, and Ross Links.

Three evening excursions were also held but these attracted few members. These were to see Mr. Swales collection of Cacti, to Pitlington Hill and to Waldrige Fell.

NOTES AND RECORDS

NOTES

Spiders. A large cover picture of a spider on a recent copy of the Radio Times set me thinking about tales and superstitions associated with the group in general.

No creature has been more misunderstood and maligned by man. For as long as anyone can remember (Little Miss Muffet sat on a tuffet) this animal has been looked upon as both villain and hero in myth and legend. The former however, seems always to have been more common than the latter. Even modern beliefs curse the spider, "Don't step on it, or it will rain!"

Have you ever watched a spider at work? if you have, you will have discovered that they are valuable to man in acting as a control on many pestiferous insects. They seem to have insatiable appetites, for no matter how many insects end up in their webs, the spiders will find good use for them. The next time you meet up with one, stop and have a good look. There is no need to be afraid of being bitten. The chances of a spider attacking you are nil. Unlike horseflies and mosquitoes, they are not out to get you.

While it is true that all spiders, except the members of two small groups, are equipped with poison glands, only tarantulas and other tropical spiders can be harmful to man. Although there are members of these groups in our area, they are very small and their poison is in insufficient quantity to do us any harm even if their fangs did manage to penetrate our thick hides. A common mistake by the misinformed is "How can such an ugly thing produce such beautiful webs?" The ugliness stems not from the creature but from the fear of it. Modern psychology refers to the process as scape-goating and the scapegoat is the spider. Not only must it carry the burden of being the favourite prey of a number of species of birds and other animals but it must also beware of man. The spider may be one of the animals most feared by man, but man must be the creature most feared by most animals.

T. C. D.

Waxwings. From what we have heard, this has not been a very good waxwing winter. It is, therefore, worth noting that a few birds were feeding on Cotoneaster berries in the gardens of Grange Estate, Whickham, during December 1975.

L.P.Hird.

Redwings. During a visit to relatives in Darlington, in the first few days of this year, we were thrilled to see some unusual birds feeding on the lawn. Snow had fallen heavily during the night of January 2nd.

The area where the birds were feeding was free of snow, being protected by six massive yew trees. They were redwings and we counted twenty five of them. There were many fallen yew berries under the bushes. The birds appeared to appreciate these and just for "afters" they tried a little grub-digging in the lawn.

R. Pirt.

(Redwings were reported in very large flocks in several parts of our counties during January. A group of about fifty were seen in various parts of Chester-le-Street for about six weeks. Ed.).

The Scarce Prominent. As a result of the capture, by Mr. R. Henderson, of a specimen of this moth (*Odontesia carnellita* Esp.), at Chopwell in the spring of 1975 and reported in the Vasculum (Vol. 60 No. 2), I looked out the records of the moth in the Hancock Museum filing system.

Here they are:

12-5-1913; East Dipton Woods; G. T. Nicholson; two in Nicholson collection in Hancock Museum.

1922; near Corbridge; G. Nicholson; Vasculum 9, 62 (possibly refers to 1913 record)

1962-3; Riding Mill; F.W. Gardener; Vasculum 48, 15 and Entomologists' Gazette 13, 23 where he wrote; "Taken at light in my garden in most seasons recently, though only singly"

1968; April 27th; Dipton Woods; H. T. Eales at M.V. light.

In the spring of last year it was reported as taken at light by Mr. P. L. Tennant at Allerwash Hall East, Fourstones, Hexham. I did not get the exact date but I think it was April.

I took the moth myself (8 specimens) at Kincham Wood, in the Hirsell, Coldstream, v.c. 81, as follows: 5-5-56 one; 7-5-56 two; 8-5-56 four, all at M.V. light. Bolam also recorded one reared from a larva got by Mr. Haggart (of Galashiels) near Earlston, v.c. 81 in 1907.

I believe there are also records from Cumberland near Brampton in the Ent. Record 67, 10 (single specimens 30-4-52 and 27-4-54) by Major General G. F. Johnson.

The moth must be more widely present than has been realised, though it justifies its name as scarce". A. G. Long.

Nymphalis antiopa. **Camberwell Beauty.** One seen 28-8-72, in Newcastle General Hospital consultants car park, sitting on a white Renault car, by Dr. J. G. Evans (letter to "The Times" correspondence columns 29-8-72). Another was seen in the last week of September 1975 in a garden in High Heaton, Newcastle-upon-Tyne, by Mr. and Mrs. Abbott.

A. G. Long.

Larvae of *Achemntia astropos* L. and *Hyles gallii* Rott. in Northumberland. A fully grown larva of the Death's Head Hawkmoth, *Acherontia atropos* L. was brought to the Hancock Museum on 8-9-1975 from Cockle Park Experimental Station, Morpeth, Northumberland. It was found feeding on potato leaves by Mr. B. Mitchell.

A larva of the Bedstraw Hawkmoth, *Hyles gallii* Rot. was found by Capt. H. V. Green at Fell Cottage, two miles north of Haydon Bridge, Northumberland, on 9-10-1975. It was feeding on Rose Bay Willow Herb and was about three quarters grown. It duly pupated after about a week.

A. G. Long.

Depressaria umbellana **Steph.** During February some scrub clearing work was carried out at Witton-le-Wear Nature Reserve by the Conservation Trust's Conservation Corps. Most of the offending scrub consisted of dense patches of gorse. During chopping out work specimens of

Depressaria umbellana Steph. were frequently disturbed and appeared on the grass stems and other vegetation under the bushes. They were quick to disappear into the ground litter where they could resume their hibernation. This rather striking member of the "Flat Bellies" feeds, as a caterpillar, on young gorse shoots in June and July. The moth emerges in August and hibernates through the winter from early October to April when it has a short mating flight prior to egg-laying and death.

T.C.D.

RECORDS

LEPIDOPTERA-BUTTERFLIES AND MOTHS

<i>Epiblema grandaevana</i> Zeil.	66
Castle Eden Dene, Denemouth, 24-7-1972. Thought to have been extinct in Britain, where it is only known from the Durham coast and the Isle of Man.	
<i>Caloptilia betulicola</i> Her.	66
Found as a larva on Birch in 1974. Recorded as British in 1946, this is the first note of its occurrence in Durham. Castle Eden Dene.	
<i>Orthotaelia sparganella</i> Thun.	66
Imago found in Castle Eden Dene 31-6-1973. Very rare in Durham for which this appears to be the first record this century.	
<i>Acleris hastiana</i> L.	66
Imago found 17-9-1973 in Castle Eden Dene. Occurs in Western Durham but is scarce in the East	
D. Sheppard.	
<i>Ochlodes venata</i> Br. and Grey. Large Skipper	67
Summer 1974. Four specimens on scabious, Apperley Dene, Stocksfield. I collected one, checked it carefully then let it go again in the Dene as the population was so small.	
<i>Inachis io</i> L. Peacock	67
Summer 1975. One specimen, Apperley Dene, Stocksfield.	
<i>Anthocaris cardamines</i> L. Orange-tip.	67
Spring 1975. One specimen, Stocksfield.	
	Dr. O. L. Gilbert
<i>Anthocaris cardamines</i> L. Orange-Tip.	81
My son saw several specimens in May 1975 on Tweed-side below Leaderfoot Bridge, the first record for 80 years in Berwickshire.	
	A. G. Long

AVES BIRDS

<i>Calidris temminckii</i> Temminck's Stint	67
One present at a small pond between Earsdon and Backworth throughout the second half of August.	
<i>Streptopelia turtur</i> Turtle Dove.	67
Present at Dipton in June. Seen again in early August.	
	J. Parrack

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BY THE WAY

Secretaries of Societies and other contributors to the "Vasculum" are invited to send their papers for the October special edition, to the Editor before 31st August, and for the December edition notes and news by 15th November 1976. If you have not paid your subscription would you please try to remember to do so as soon as possible.

"WILDLIFE, THE LAW AND YOU"

A leaflet with the title as above has been published by the British Museum (Nat. Hist.) as part of the information service. Members of the N.N.U. should be fully aware of its contents, so just in case you do not manage to obtain a copy, here are the main points.

On 1st August 1975 the Wild Creatures and Wild Plants Act became law. This is an enormous advance on any previous similar Parliamentary legislation. Some birds and mammals have been protected by game laws since Norman times, but protection for conservation only began in 1880 with a bird protection Act of that year. Some 80 species were named then and that number has gradually increased as falling bird populations showed the need for further additions. More recently, the badger received special protection by law and you will remember our notification of that act in these pages.

The present Act names 6 animals and 21 plants that receive absolute protection. By this it means that except under licence or in very special circumstances no one may legally pick, uproot or destroy any of the listed plants or take, kill, injure, sell or offer for sale any of the protected wild creatures. In addition it is now illegal to uproot any wild plant without some special reason, and illegal to ring any bat or mark in any way any of the protected animals.

The animals listed are as follows: Greater Horseshoe Bat, Mouse-eared Bat, Sand Lizard, Smooth Snake, Natterjack Toad and Large Blue Butterfly. The plants are Alpine Gentian, Alpine Sow-thistle, Alpine Woodsia, Blue Heath, Cheddar Pink, Diapensia, Drooping Saxifrage, Ghost Orchid, Killarney Fern, Lady's Slipper, Mezereon, Military Orchid, Monkey Orchid, Oblong Woodsia, Red Helleborine (*Cephalanthera rubra* (L.) Rich.), Snowdon Lily, Spiked Speedwell, Spring Gentian, Teesdale Sandwort, Tufted Saxifrage, and Wild Gladiolus.

These lists are in addition to the badger (protected by the Badger Act of 1973) and all wild birds (Protection of Birds Act 1954-67). The Bird Protection Act lays down the principle that all wild birds, their nests and eggs are protected by law. Certain exceptions are made in respect of birds regarded as pests (for farmers and land owners on their own land) and sporting birds (again on private land).

Recently too, the wildlife societies have taken it upon themselves to draw up voluntary codes of practice with respect to wildlife in which they are particularly interested and concerned for. The first of these to appear was the "Country Code", issued by the Countryside Commission, and containing a number of points relating to the desirable behaviour of everyone using the countryside. Since then the entomologists have produced a Code for Insect Collecting, which advises much curtailment in the old methods of collecting and a greater emphasis on photography. Then a Nature Photographers' Code of Practice to advise against too much damage and disturbance whilst photographing, a Coastal Code for behaviour at the seaside, and an Outdoor Studies Code for teachers and research workers dealing with safety aspects for both man and the wildlife he is studying, have all appeared in turn.

Altogether this is an impressive list of regulations, suggestions and advice. If it is to become effective, however, it must be fully publicised, so that the next objective must be to educate both teachers and children about outdoor practices. Only in this way will the next generation be fully aware of what is expected.

ROADSIDE VERGES.

You will have noticed how the verges have blossomed forth with a greater variety of flowering plants this year, because of the curtailment of district and county council practices for mowing them. This, together with the magnificent show of hedgerow blossom has combined to make our countryside a really beautiful place to travel through. The enormous amounts of shrub and tree blossom can only be due to a combination of weather circumstances such as the hot, sunny August of last year, the mild winter and the warm spring. It is to be hoped that the verge practices will continue. In spite of the fact that it was due to a government suggestion on how to save public money in these times of economic stringency, it must have impressed the authorities concerned.

TWO WILDLIFE SUCCESS STORIES.

In these pages, during the last few years, we have constantly been noting the spread to new areas of two butterflies, the Orange-tip, (*Anthocaris cardamines* L.),

and the Wall Brown (*Pararge megera* L.). This spring has seen the spread continue and the number increase. The Orange-tip has been a particular joy for, to us, there' is no more beautiful insect to be found in our islands.

Other areas, not mentioned in the Vasculum will most certainly have been colonised by the two butterflies and records are urgently required. Please send your records to the Editor, who will be only too pleased to collate and print all the information acquired. Did you see these two butterflies during the last few weeks? If so date, time, place and numbers please.

The Wall Brown will produce a second brood in late August and September so you will have a second chance to look out for this one. It may be worth mentioning that the Peacock butterfly managed to hibernate through the winter in greater numbers than usual. It too will produce another brood in the late summer and if the weather remains reasonable all the signs would lead us to expect to see it in larger numbers than usual. Good hunting to you all.

THE SOCIETIES

NORTHERN NATURALISTS' UNION

The 143rd Field Meeting was held in the woodlands of the Stanton Estate by kind permission of the owner Mr. K. Keeley of Stantonfence House near Morpeth, on 22nd May 1976.

Led by Mr. Dunn, we followed the Fence Burn downstream to its junction with the Font Burn. The steep banks were well grown with a good mixture of trees, most of which were hardwoods. The woodland plants were in fine flower, very rich in species, and well worked by bumble bees. Within the first few yards of the walk we were able to observe the foraging of *Bombus lucorum*, *Bombus hortorum* and *Bombus lapidarius* queens. It was here, in a little side stream, that we saw three species of liverwort growing together, *Pellia*, *Morchantia* and *Conocephallum lunularia*. The trees and shrubs were assiduously beaten for insects but only the caterpillars of winter moth, common umber, and July highflyer were obtained. On the wing the (only butterfly was the Green-veined White, *Pieris napi* L.) and the only moth to be disturbed was the Brown Silver-lines, (*Lithina chlorosata* Scop.). The 7-spot ladybird and the 2-spot were quite common, especially the former, which had hibernated through the winter after a very successful season in late 1975. The Great Slug (*Limax maximus*) was found under a piece of rotting timber.

The very rich flora included *Primula vulgaris*, *Viola riviniana*, *V. reichenbachiana*, *Mercurialis perennis*, *Crepis paludosa*, *Anemone nemoralis*, *Endymion non-scripta*, *Lilium mortagon*, *Stellaria holostea*, *Cardamine hirsuta*, *Geum rivale*, *G. urbanum* and hybrids. *Geranium robertianum*, *G. sylvaticum*, and *Oxalis acetosella*.

Altogether this was a very interesting place where no great area of ground was covered, but that which we did look at was examined thoroughly.

BIRTLEY AND CHESTER-LE-STREET NATURAL HISTORY SOCIETY

Since the finish of the lecture season, outings on the first Sunday of the month have been particularly successful. In March we looked at the grounds of the Hermitage Hall, Chester-le-Street and its surrounding woodlands. The shrubs were not yet in bloom but the evergreens were quite beautiful. The woodlands, just recently felled and replanted are growing up well, unfortunately mostly conifers. A little more variety would have provided a more pleasing sight.

The woods at Homeside provided a very fine outing in April. Here, amongst other things, we came across several pools containing large numbers of frog spawn, a pleasing sight at the present time when the common frog is reputedly doing so badly in most parts of the country.

In May, a visit to Hawthorn Hive was attended by more than the usual regular band of stalwarts and here we were able to see many of the spring flowers. On the cliff top the Early Purple Orchid was just coming into bloom, whilst primroses, cowslips and the huge plants and flowers of the hybrids were all in full flower.

For the June outing a whole day was taken to visit Malham, where we walked to Gordale Scar, Janet's Foss and then back to Malham Cove in perfect weather. The flowers were beautiful, the butterflies plentiful and the views extensive.

NOTES AND RECORDS

NOTES

Observations on a Loaf-cutter Bee. On 23rd May 1976, I was aware of several bees in my greenhouse but took little notice of them as I was very busy potting-on plants which were urgently in need of a change of soil as well as a larger pot. A cursory glance and I dismissed them as a lot of misguided domestic honey bees. *Apis mellifica*. I should have known better for bees seldom do anything without having a very good reason.

Then my daughter entered the greenhouse and in about 3 minutes flat, asked me if I had seen this bee digging a hole under one of my cactus plants, a well grown specimen of *Homatacactus setipinus*. It was then that we both saw several bees gently sailing in through the greenhouse door with huge rolls of green leaf tucked up underneath them. The weight was such that they could not fly very fast and the thing that struck us was that they appeared to be almost hovering in the air, only moving forwards very slowly. Each made for a different plant pot and promptly disappeared under the plant. In every case a specimen had been chosen which was very thick, low to the soil and almost filling the pot. I decided to look into this a little further and knocked out a pot containing *Sempervivum arachnoideum*. About one inch below the soil surface we found two completed cells, one half-made and 8 or 9 old ones from last year. My guess is that the old cells contained the parents that we had been watching so carefully. The new cells were still fresh and green, mostly constructed of rose leaves but also having a few sections of white petals. Later I found that the white petals had been cut from my favourite *Odontoglossum*, an orchid which happened to be in full bloom in the greenhouse at that time. The burrow or gallery was almost horizontal and open all along one side where it had touched the contour of the plant pot. Thus we were able to see the whole construction works, as it were, through a side window. Each cell was about ¼" long by about 3/8" diameter, beautifully

constructed with several pieces of rolled rose leaf glued together, overlapping each other rather like the final tobacco leaves used on the outside of a cigar. Finally the whole cell was capped by a circular piece of rose leaf which fitted the top exactly. I examined the unfinished cell very carefully after taking it out of the gallery. It was about half full of a deep yellow sticky fluid which stank to high heaven and which I presume was a mixture of pollen and honey. No doubt the constructress laid an egg on top of this filthy mass just before capping the cell. Except for the half finished cell the rest were all replaced in the plant pot as before and the pot put back in the same place in the greenhouse. It was not more than a few minutes before the female tenant had found it and started to work again.

In the meantime, the bee working under the *Hamatococcus setispinus* was still hard at it, so we watched very carefully. After cutting the leaf section (or orchid petal section), the bee must have rolled it longitudinally at the same time, for she arrived in the greenhouse with the leaf already rolled beneath her. Each bee made for her particular pot and went straight down the hole (there was no pause on the edge of the pot) straddling the leaf to do so. After placing the leaf section in position, there always followed a period of gallery enlargement by scraping the soil backwards with a scrabbling movement of the legs. Larger pieces of grit and small pebbles which persisted in rolling back down the hole were grasped by the mandibles, the bee backed out, flew about 2 feet away from the pot, dropped the pebble and flew straight back down the hole for a second piece, which was discarded in exactly the same way. This was repeated about ten times before the bee flew off outside to seek another leaf section or to forage in flowers. When she arrived back at the pot without any leaf or petal the pollen basket could be seen to be full of pollen. This was on the terminal few segments of the underside of the abdomen and consisted of long reddish hairs. When emptying this a considerable time was spent in the pot and out of sight. Presumably the right honey and pollen mixture was being stirred up before placing it in the cell.

I tried moving the pot about 2 feet from its original position while the bee was outside. She returned to the right spot but was completely baffled. After flying round the greenhouse she would return time and again to the spot where the pot should have been. She never did find it in the new position, so I put it back again, whereupon work recommenced immediately. The effect of water was tested by watering the plant whilst the bee was in the gallery. This seemed to have no effect whatever even though large amounts of water were used. Only by putting the pot into a dish of water and allowing it to soak right up the pot did the bee emerge and fly off. She soon returned however to the correct place on the shelf.

My only reference book containing leaf-cutter bees was Step, "Bees, Wasps, Ants and Allied Insects". The description of the common species *Megachile centuncularis* did not fit my specimens at all. Step gives *M. centuncularis* as one of the smaller species of *Megachile*, 8-10mm. long. These insects were 14-16mm. long, very robust with a wide head, and slightly larger than *Apis mellifica*. Since an identification could not be accurately made, a specimen was killed and sent off to the British Museum (Nat. Hist.).

The identification by Mr. G. R. Else reads as follows: "The specimen is a female *Megachile willughbiella* (Kirby), a common bee frequently found in gardens where it sometimes nests in soil in plant pots (or otherwise in suitable linear galleries produced by wood-boring beetles and their larvae in decaying timber; perhaps also in open iron piping and other suitable niches). They are generally distributed as far north as Cumberland. Also recorded from Ayr in Scotland". It would appear from this that its distribution is more western and that we are just about at the northern limit of its range. I have recently discovered from Mr. David Shepherd of the Department of Agriculture, University of Newcastle-upon-Tyne, that he has taken three other specimens in other parts of Durham County this year. T.C.D.

Bird Notes. Although there was no influx of waxwings on the scale of the previous winter, I did hear of a small party in a garden at Westerhope in the last week of December. I was also advised of a large flock of bramblings and chaffinches accompanied by a small party of hawfinches in Harwood Forest on January 10th.

A cormorant was present at Seaton Burn Lake (Big Waters) on January 9th. Two drake goosanders were courting a female on Gosforth Park Lake on March 5th when a Water Rail was calling in the reed bed.

Willow warblers were well distributed in Gosforth Park and the adjoining area on April 26th.

Due to the cold spring swallows and swifts were slow in arriving. There were swifts flying over Morpeth on May 19th when there were swallows at Mitford.

A single sedge warbler was in song in the reed bed at Gosforth Park Lake on May 6th and on the 24th there were three, when four reed warblers were also heard. A cuckoo was catling.

Whitethroats are still few in number: one was in song near Thrum Mill on May 16th, another at Mitford on the 19th and another in Dukes Hagg Wood near Prudhoe on the 26th.

C. J. Gent; 5-6-76.

Where have all the moles gone? This is the mystery which puzzled me this spring. The animal is usually becoming more active towards the end of March and beginning of April after wintering in subterranean tunnels.

Not far from my home, I recorded three different sites last year where moles were so plentiful that altogether they worked over 3,000 square yards of land, making it look like a miniature African mud-hut village. This year, not one single mole-hill has appeared in these fields. What can have happened to them?

R. Pirt.

(Two possibilities immediately come to mind (there may be many more), first the fields may have been gone over so thoroughly last year that the food supply became exhausted, and second the winter and spring were so dry that the soil may have become too dry and hard for them to dig in. In both cases it is likely that they would migrate to more fruitful pastures with damper soil. ED.).

RECORDS

AVES BIRDS

<i>Locustella naevia</i> . Grasshopper Warbler.	66
One singing on Waldrige Fell, 8-6-76.	
<i>Coturnix coturnix</i> . Quail.	66
Calling near Pitlington, 6-6-76.	

Buteo Buteo. Buzzard 66
 One flying over Carrville near Durham City, 22-6-76

FLOWERING PLANTS AND FERNS

Saginasubulatea' (Sw.) C.Presl. Heath Pearlwort. 68
 A few plants in rock-cracks near the sea, Craster, June 1975.

P. J. Doody.

Sherardia arvensis L. Field Madder. 68
 On the bank of the rock on which is built Bemburgh Castle. June 1975.

Festuca altissima All. Tall Fescue. 67
 Occasional near Mere Burn, May 1975.

Tarilis nodosa (UGaertn. Knotted Bur-parsley. 68
 Common on the sea shore at Boulmer, June 1975

Saxifraga stellaris L. Starry Saxifrage. 66
 A few plants 200 yards upstream of the point where the B 6277 crosses Crook Burn, May 1975.

Ornithogallum umbellatum L. Star of Bethlehem 68
 About a dozen plants in long grass by the sea at Boulmer, June 1975.

Lamium hybridum Vill. Cut leaved Dead Nettle. 66
 On disturbed ground near the bus station, Spennymoor, June 1975.

Veronica scutellata L. Marsh Speedwell. 68
 By the North Tyne, in Kielder Forest, July 1975.

Galium uliginosum L. Fen Bedstraw. 66
 In a small marsh on the right bank of the Tees at Forest-in-Teesdale, August, 1975.

Scirpus sylvaticus L. Wood Club Rush 68
 One stand by the North Tyne in Kielder Forest, July 1975.

Euphorbia wralensis Fisch. Russian Spurge 66
 A large stand on the sand dunes near the golf course, Seaton Carew, August 1975.

Juncus ocutus L. Sharp Sea Rush. 66
 Frequent by the edge of the golf course at Seaton Carew, August 1975.

Mentha x niliaca var. *alopecurioides* (Hull) Briq. Great Apple Mint. 66
 Half a dozen plants, Ferryhill, September 1975. Ian Kitching

Hyoscyamus niger L. Henbane. 68
 Near Dunstanburgh

<i>Linum purpurea</i> (L.) Mill. Purple Toadflex.	68
On an old railway, near Cawledge East Park.	
<i>Veronica filiformis</i> Sm.	67,68
Near Old Ridley; Prospect Hill (Corbridge); near the Glen(Slaley); W. bank of Rede, S. of Otterburn; S. bank of Coquet near Weldon Bridge (67). Near Carham; near Thirlings (Ewart) (68).	
<i>Melampyrum pratense</i> L. Common Cow-wheat.	67,68
Belsay Park (67). Bizzle; wood on Coidgate Water (68).	
<i>Lathraea squamaria</i> L. Toothwort.	67,68
Honeycrook Burn; Whinety Dene (67). N. Bank of Coquet W. of Felton (68).	
<i>Origanum vulgare</i> L. Marjoram.	67
Old railway between Barrasford and Chollerton; N. bank of N. Tyne between Bellingham and Chariton, and between Tyne Bridge and Thorneyburn Station; S. bank of Coquet near Acklington (67).	
<i>Lamium amplexicaule</i> L. Henbit	68
Near Cornhill; near Humbleton Dene.	
<i>Scutellaria galericulata</i> L. Skull-cap.	68
Edlingham Burn; Cannonmill Bog.	
<i>Littorella uniflora</i> (L.) Aschers. Shore-weed	67
The Lake (Plenmeller)	
<i>Campanula rapunculoides</i> L. Creeping Campanula.	68
Roadside near Snableazes; Ewart Park.	
<i>Galium boreale</i> L. Northern Bedstraw.	67
N. Tyne near Barrasford; N. Bank of N. Tyne between Bellingham and Chariton; between Tyne Bridge and Thorneyburn Station; and opposite High Carritheth.	
<i>Galium mollugo</i> L. Bedstraw.	
Holy Island (presumably introduced).	

G. A. and M. Swan

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SUBSCRIPTIONS

Annual subscriptions were due last January 1st. Have you forgotten to pay yours? Many more than usual are still outstanding. If you are guilty, please send the Hon. Treasurer your cheque as soon as possible.

EDITORIAL

This year the October issue is larger than usual and consequently has cost more for printing. To offset this cost it is essential to recruit more members. We urge all our readers to do their best in this field, for it is to your own interest that the Vasculum should continue. For financial help we thank all those members who have made extra donations and especially the University of Newcastle for their timely generosity.

**THE VEGETATION OF WALDRIDGE FELL, Co. DURHAM
2. HEATHLAND, GRASSLAND & WETLAND COMMUNITIES**

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and
R. SHAW
St. Aidans College, University of Durham

Introduction

Part of the present-day vegetation of Waldridge Fell has already been described in Paper 1 of this series (WHEELER, 1975a). This considered the woodlands developed along the valley of the South Burn, the stream which provides the south east boundary of the fell. These, from the point of view of their botanical richness, constitute the most interesting portion of the site.

The bulk of the fell, which was not considered in the earlier paper, supports a rather different compass of vegetation types ranging from dry heath to poor fen * communities. They represent some of the best examples of these communities remaining in lowland County Durham and, because of this, even though they do not contain so many species uncommon in the county, they are of considerable conservational and ecological interest. They have, in fact, already been described

* the term *fen* is used in the sense of Scandinavian ecologists to refer to areas of wetland irrigated by water that has been in contact with mineral ground. In *poor fen* this water is poor in dissolved salts.

in some detail by JEFFREYS (1916) but now, sixty years later, it was considered appropriate that they should be re-examined and their status and species content reviewed.

The field work which forms the basis of this paper was carried out during the summer of 1976. Not all of the fell was examined in detail. Most attention was given to the area bounded by the road from Walldridge to Chester Moor on the east and the road to Edmondsley on the north. Within this area a number of different plant communities were recognised and floristic lists were made from several stands of each, using a 10m x 10m sample size. Outside of this area, however, only casual observations have been made.

The plant communities of the fell can be grouped into three main categories - communities of heath land, grassland and wetland. These can be usefully employed for descriptive purposes.

1. Heathland Communities

Although it is difficult to define the precise compass of the term heathland as far as its plant communities are concerned, in the present context it refers to those areas on Walldridge Fell where the vegetation contains large amounts of ericaceous dwarf shrubs, usually contributing the bulk of the plant cover. Such vegetation is developed extensively over the fell occupying most of the freely drained slopes and hill tops though generally absent from the less well drained, lower-lying parts (and also giving way to grassland in one of the most severely trampled areas). The soil developed over the sandy substratum is characteristically a podsol and over much of the area there is a thick (up to 15 cms) accumulation of mor humus.

The heath communities are maintained by frequent burning. This is not formed on any systematic basis but is usually the result of accidental firing. Nonetheless it is sufficient to ensure that as a rule part of the heath is burnt every summer, though the extent to which this occurs is obviously variable. This firing is presumably at least one of the factors that is instrumental in maintaining the heath in an essentially treeless condition. Over much of the fell there are just a few trees - mainly birch - scattered irregularly, although in a few places, especially east of the road to Chester Moor, there is considerable tree colonisation. It is readily apparent when examining the heath that it is composed of a patchwork of stands each characterised by a particular dominant species. This provided the basis on which JEFFREYS (1916) recognised several heath communities and it was employed in this survey also.

1.a Calluna Heath Table 1a

This is the most widespread vegetation of the dry heath and, like the other heath communities of the fell, is characteristically poor in species. Heather (*Calluna vulgaris*) is the dominant plant, forming a low-growing scrub of about 50-75cms high. Bushes of

various ages can be found, the oldest characteristically straggling out from their dead centres. However, in consequence of the frequency by which various parts of the heath are burnt, most of the bushes are comparatively young. The oldest are probably only about 15-20 years. When the bushes are growing at their greatest density (age usually 4-8 years) other plants can be almost completely excluded, the heather forming almost pure stands. But such pure stands are rare. Usually, for example, there are some other ericoids present. The most common of these is bilberry (*Vaccinium myrtillus*) which grows subordinate to heather with a cover typically ranging between 5-40%. Another, found much less often, is crowberry (*Empetrum nigrum*). This is sporadically scattered across the fell occurring most frequently north of the road from Walldridge to Edmondsley. Its occurrence is of some interest as Walldridge constitutes one of the two lowland sites in which the plant is known to grow in Co. Durham. (The other is a small acid fen near to Hart village).

Another species typically found growing up with the heather is bracken (*Pteridium aquilinum*) which sometimes can be subdominant. But otherwise few tall species occur in the community. Trees are conspicuously rare. The most frequent is birch (*Betula pubescens*) which is found both as seedlings and as a few scattered, more mature trees. Occasional specimens of rowan (*Sorbus aucuparia*) are also found. Gorse (*Ulex europaeus*) occurs in places, sometimes forming quite large bushes 2-3 feet tall. In some areas the bushes are much taller than this and, growing close together, produce a rather different type of vegetation (see below), though it is doubtful whether this may be regarded as any more than a variant of the more typical heath community. Another taller plant occasionally found is rosebay willowherb (*Chamaenerion angustifolium*) but this is not a typical component of *Calluna*-heath. It usually seems to indicate areas that have been burnt in the not-too-distant past.

Beneath the heather canopy are various herbaceous species, especially prominent where the cover of the dominant is broken. Characteristic herbs are *Galium saxatile* and *Potentilla erecta*. Of the grasses, the most constant is probably *Deschampsia flexuosa* which persists, if in small quantity, even in some of the densest stands of heather. However, the fescue (*Festuca ovina*) and the mat grass (*Nardus stricta*) are also common and may afford a cover of up to 40%. *Festuca ovina* is particularly prominent where pathways pass across the heath. Resistant to trampling, it is able to thrive in conditions inimical to the continued growth of heather.

Bryophytes are not very prominent. The most frequent are *Pohlia nutans* and *Hypnum cupressiforme*. The latter sometimes forms mats on the dead centres of some of the older heather bushes.

1.b Vaccinium Heath Table 1b

As JEFFREYS (1916) noted, heath dominated by the bilberry (*Vaccinium myrtillus*) is floristically very similar to that dominated by heather. He considered it independently because of the ability of bilberry to survive under a bracken cover whilst heather was unable to persist. The main distinguishing feature is the abundance of *Vaccinium*. Also such areas are often even more impoverished in species than heather-dominated stands. It has been noted that bilberry is sometimes to be found invading stands of heather that have been burnt so as to form an almost complete *Vaccinium* carpet in which *Calluna* is very much subordinate, but whether all of the *Vaccinium* dominated areas have originated in this way and whether *Calluna* will ultimately re-assert dominance is not at all clear.

1.c/d Pteridium Heath

JEFFREYS described his *Pteridetum aquilinae* as being "completely dominant over all the area on Waldridge where the subsoil is dry sand" and he mapped *Pteris* (= *Pteridium*) as covering large areas. This is no longer the case. Although bracken still occurs in large amounts, often contributing up to 20% of the cover in certain *Calluna* dominated stands, the area of *Pteridium* dominated heath is clearly less than it was then.

The community shows considerable variation in its floristics and the comments of JEFFREYS remain apposite. In a few areas, where the plant is growing most thickly, it may form almost completely pure stands (Table 1d). Where it is somewhat thinner, grasses may become important - *Deschampsia flexuosa*, *Festuca ovina* and *Holcus lanatus* have all been noted as important contributors to the lower strata of the community. *Vaccinium myrtillus* can also produce a cover of up to 50%. But *Calluna* is generally quite absent from these stands or, at the most, only present in small quantity.

In the more open community a wider variety of associates can be found (see Table 1c). Bushes of gorse (*Ulex europaeus*) and brambles (*Rubus fruticosus* agg.) are sometimes rather prominent and *Chamaenerion angustifolium* is frequently found too. This plant is mainly associated with bracken on the fell.

1.e Ulex Heath Table 1c

Stands dominated by gorse occur in several places on Waldridge, particularly in places along the eastern border of the fell. It characteristically forms a dense scrub about 2m tall, difficult of penetration and poor in associated species. The dense shade cast by the evergreen canopy is inconducive to the growth of associates and this, together with the accumulating litter of needles, means that often no plants at all can be found growing directly under the bushes - associates tend to be confined to the periphery, though both *Festuca ovina* and *Deschampsia flexuosa* have both been noted growing quite vigorously beneath a gorse canopy. *Calluna* and *Vaccinium* are often found around the edge of the bushes. *Chamaenerion*, *Pteridium* (often very tall) and brambles are all often important,

the brambles often scrambling over the gorse bushes - and birch is sometimes found as well.

1. f Mixed Heath

The types of heath vegetation described above are all defined by their dominant species. It may also be noted that in certain places on the fell no one species is exclusively dominant but several occur in approximately equal proportions. In this situation they form a mosaic with each species dominant over a restricted area rather than being completely intermingled. This 'mixed heath' vegetation emphasises the strong floristic affinities of the different heath types and reinforces the opinion that they are but rather different expressions of the same basic community-type. This was also the view of BRIDGEWATER (1970) who, in the context of his survey of heathland vegetation throughout Britain, considered the various developments of the heath at Waldrige all to represent but one community and this a rather degraded form of vegetation belonging to the **Empetrium boreale** - that is, the vegetation unit that encompasses the heaths of northern Europe.

In conclusion the comment may be made that the Waldrige heaths remain fundamentally as described by JEFFREYS and retain the same species content. The main difference seems to be that *Pteridium* dominated areas are not as widespread now as they were then.

2. Grassland Communities

In certain places on the fell the predominant heathland vegetation is replaced by communities dominated by grasses. *Calluna*, *Pteridium*, *Ulex* and *Vaccinium* occur only sporadically, though their occasional presence is indicative of the affinities that the grasslands display to the heath. Characteristically developed as a short turf, the grassland of the fell is composed of a number of species. One of the most important is the mat grass (*Nardus stricta*) which dominates large areas. Another, dominant in just a few places, is *Deschampsia flexuosa* and, following JEFFREYS, it is possible to distinguish two communities based upon these species. Other types of vegetation with *Deschampsia cespitosa* and *Molinia caerulea* as important species will be considered under wetland communities (below).

2.a *Deschampsia flexuosa* Grassland

Found in only a few places and never very extensive, sometimes forming a zone transitional between *Nardus* vegetation below and heath vegetation above. The community typically supports *Nardus* and *Festuca ovina* as important grasses. Other associates are given in Table 2a. It may be noted that this list is very similar to that given by JEFFREYS.

2.b/c *Nardus stricta* Grassland

This grassland type, described by JEFFREYS as the *Nardetum strictae*, comprises the most extensive grassland community at Waldrige. It is particularly developed on some of the damper slopes and occupies some of the shallow valleys of the Fell. In these situations the substratum is not as freely permeable as in the dry heath and there is a considerable amount of clay with the sand. The *Nardetum* is, however, also found in some of the drier places where it is frequently associated with quite large amounts of *Deschampsia flexuosa* - a species largely missing from the wetter areas. Another grass that is usually important is *Festuca ovina*. Indeed, some stands consist of little more than a sward of *Festuca ovina* and *Nardus* with very few associates, though *Galium saxatile* and *Potentilla erecta* can usually be found. Another grass frequently occurring is *Agrostis tenuis*.

A range of associates have been recorded (Table 2b) and the list given by JEFFREYS remains accurate. Ericaceous plants are represented by occasional occurrences of *Calluna* and *Vaccinium*; other grasses include *Anthoxanthum odoratum*, *Agrostis stolonifera*, *Festuca rubra*, *Holcus lanatus* and *Sieglingia decumbens*. For the edges, *Carex binervis*, *C. pallescens* and *C. pilulifera* have been recorded - none of which are very common in lowland Co. Durham,

In the wetter places *Juncus squarrosus* is often prominent and in parts *Juncus effusus* is important too, sometimes indeed being the dominant, especially where the *Nardetum* is transitional to wetland communities. In these conditions the purple moor grass (*Molinia caerulea*) occasionally occurs as well and there may be some *Polytrichum commune*. In general, however, bryophytes are not well represented in these grasslands. *Hypnum cupressiforme* is the usual species. Other associates of the wet facies are given in Table 2c.

3. Wetland Communities

In various places on the fell areas of wetland occur. They usually occupy marshy depressions situated beneath springs and seepage zones. JEFFREYS (1916) indicates their locations. Many of them are small, wet only during winter and drained by correspondingly intermittent streams though others are more permanently wet. The largest and most important wetland complex of the fell is known as Wanister Bog. This an extensive waterlogged area developed in the sump immediately east of Wanister Hill. Irrigated by seepage and run-off from the adjoining slopes it is maintained in a predominantly saturated condition for most of the year and this has allowed the accumulation of a considerable thickness of fen peat (some of which has, on occasions, been cut for local use - a practise which is now prohibited if not prevented). The fen is no longer as wet when described by JEFFREYS and in the peripheral areas the peat is rather dry. Nonetheless, some very wet areas remain in places and a range of plant communities occur.

3.a *Deschampsia cespitosa* Community Table 3a

Much of the upper part of Wanister Bog supports a wet grassland type of vegetation in which *Deschampsia cespitosa* is a particularly important component. Associates include both plants characteristic of grassland and of wetland. Typical grassland plants include *Agrostis stolonifera*, *Anthoxanthum odoratum*, *Festuca rubra*, *Holcus lanatus* and *Poa trivialis*. Typical wetland plants are *Angelica sylvestris*, *Carex nigra*, *C. panicea*, *Hydrocotyle vulgaris*, *Viola palustris* etc. The vegetation is by no means uniform. In drier areas, around the edges as well as on elevated parts within the bog, a rather different vegetation occurs with *Anthoxanthum odoratum* and *Festuca arundinacea* making a more important contribution and with *Deschampsia flexuosa* and *Galium saxatile* coming in in places. Also in the mire itself there is variation in the prominent species. Thus in some places *Carex nigra*, is particularly important whereas in others it is rather scarce. Mosses are not common. There is *Acrocladium cuspidatum* - one of the commonest mosses of wet grassland in Britain.- and some *Sphagnum*, apparently mainly *S. recurvum*. A full list of species is in Table 3a. Of interest is the occurrence of *Dryopteris dilatata* outside of a woodland community and of *Narthecium ossifragum* - a rare plant in Durham.

This same type of vegetation is also found, usually rather poorly developed, in some of the watercourses that drain the bog. Interestingly, it was not described by JEFFREYS. He recognised a community dominated by *Carex goodenowii* (= *C. nigra*) from the top end of the bog which has evident floristic similarities with some of the present *Carex nigra* dominated areas but clearly the present vegetation is rather different from this. In the absence of detailed maps of the former plant cover and speculation upon the origin of the present community is of uncertain value, but it is at least possible that this *Deschampsia* vegetation may have developed in response to a gradual drying-out of the mire.

3.b *Equisetum fluviatile* - *Eriophorum angustifolium* Community

In contrast to the *Deschampsia* community, the community occupying the wettest part of Wanister Bog is readily identifiable with that described by JEFFREYS, though presumably now of reduced extent.

When it is in flower the most conspicuous component of this community is undoubtedly the common cottongrass (*Eriophorum angustifolium*), a plant which nowadays is not at all common in eastern Durham. With it are large amounts of the water horsetail (*Equisetum fluviatile*) and the bogbean (*Menyanthes trifoliata*). Sedges are well represented by two tussocks of *Carex paniculata*, some quantity of *Carex nigra* and a smaller amount of the star sedge *Carex echinata*= *C. stellulata* of JEFFREYS). For other species, see Table 31:1. They include all of the species recorded by JEFFREYS from this community with the exception of his *Potamogeton plantagineus*. This is a synonym for the fen pondweed (*Potamogeton coloratus*), but this is an unlikely species to have occurred in such a habitat. The similar *Potamogeton polygonifolius*

occurs in one small area, where there is a more or less permanent pool, and it is probable that this is what this early record referred to.

The mosses of the community are of interest. Two common species are *Acrocladium cuspidatum* and *Drepanocladus fluitans*. There is also a small amount of *Acrocladium giganteum* - a moss which probably has very few other sites in the county. Particularly in the region where the drier ground adjoins this community there is a rich development of *Sphagna* and four species have been recorded.

3.c *Molinia caerulea* Community Table 3c

Areas of wetland dominated by the purple moor grass (*Molinia caerulea*) are not widespread at Waldrige. The main locality is around the outlet of Wanister Bog, though there are also others including a small wet depression draining down into the South Burn from below Nettlesworth Hill, JEFFREYS also recorded a **Molinietum** from the north slopes of the fell overlooking the Cong Burn. This mire is of additional interest in supporting a large population of *Narthecium ossifragum*.

In this community *Molinia* is very much the dominant plant, though **other grasses are also abundant** - *Anthoxanthum odoratum*, *Agrostis stolonitera*, *Deschampsia cespitosa*, *Holcus lanatus*. There is a rather rich assemblage of associates, some apparently particularly characteristic of the **Molinietum** - *Galium uliginosum*, *Luzula multiflora* and *Succisa pratensis*. Various *Sphagna* occur. In the small depression S.E. of Nettlesworth hill situated amongst heathland there is a smaller floristic complement but this includes a number of heath species. Both *Empetrum nigrum* and *Erica teralix* occur here. Again *Sphagna* are well developed.

3.d *Salix* Thicket Table 3d

In the **Molinietum** below the outlet of Wanister Bog there is some invasion by bushes of *Salix caprea* and *S. cinerea*. Joining onto this and extending westwards along the depression which forms the lower limit to the southern slopes of Wanister Hill is a belt of willow thicket. This is mainly composed of bushes of *Salix caprea* and *S. cinerea* which, together with a few trees of holly, birch and rowan, form a rather dense thicket. The ground flora is poorly developed and includes just a few species. Although in a depression the substratum is not badly drained and species such as *Deschampsia flexuosa* and *Pteridium* are found.

The thickets are not mentioned by JEFFREYS and are only 13 years old, having appeared in 1964 after a disastrous fire in 1963 which burnt out the peat at the base of the *Molinia caerulea* tufts.

3.e *Juncus acutiflorus* Community Table 3e

Mention may also be made of a vegetation-type dominated by the sharp-flowered

rush (*Juncus acutiflorus*). This is only fragmentarily developed, occupying parts of the streams that drain Wanister Bog. Most of the species present are those of the *Deschampsia cespitosa* community through which the streams pass. JEFFREYS also described a stream community dominated by *Juncus acutiflorus*, but some of the species he recorded are not found in this situation today-e.g. *Carex flava* (= *C. demissa*?) *C. echinata*, *Eriophorum angustifolium*. He also recorded *Juncus obtusitoliis*. (= *J. subnodulosus*). This rush is rare in Co. Durham which is near to its northern limit of distribution in Britain. It occurs in some quantity at Hell Kettles (WHEELER & WHITTON, 1971) and also in flushes on the Magnesian limestone sea cliffs at Blackhall Rocks (NZ47.38). It has previously been recorded from a small flushed area near to Sprucely Farm (GRAHAM et al., 1972) but it appears no longer to be there, though it persists in small quantity at the nearby Hardwick Hall. All these sites are associated with calcareous groundwater derived from the Magnesian limestone with a pH of 6.5-8.0. Such alkaline conditions are characteristic of most of the other fens in which this rush is found in England and Wales (RICHARDS & CLAPHAM, 1941; WHEELER, 1975 b) and it would seem that the habitat at Waldridge (pH 5.0-6.0.) is not altogether a likely one for this rush and, in the absence of any confirmatory record raise the possibility that it may have been misidentified.

3.f *Epilobium hirsutum* - *Filipendula* Community Table 3f

Beneath the shale heap on the eastern edge of the fell is another marshy area which supports a quite different community. Much of it is occupied by a tall and dense growth of the great willowherb (*Epilobium hirsutum*) and the meadowsweet (*Filipendula ulmaria*) with very few other species. Further from the centre of the marsh, whilst both of these plants remain important, a number of other species also come in, with *Juncus inflexus* becoming important. The species list is similar to that given by JEFFREYS.

3.g Other Wet Areas

In addition to these main areas of wetland elsewhere on the fell there are various wet patches which will not be described here. Mostly dry during the summer they are dominated by *Juncus effusus* and support but few associates. There are also a few artificial pools, again usually with much *J. effusus*. One pond along the west side of the fell has, in addition to the soft rush, *Glyceria fluitans*, *Lemna minor* and *Potamogeton natans*.

It remains only to mention one other wet area which was described by JEFFREYS but which now, unfortunately, is no longer extant. This was a small mire near the road to Chester Moor which was dominated by *Carex nigra* and apparently supported a number of species which no longer occur on the fell: *Anagallis tenella*, *Carex pulicaris* and *Pinguicula vulgaris*. *Juncus subnodulosus* was also recorded. *Pinguicula* was also known from at least one other place, but it has been eradicated by collecting. With these exceptions, however, all of the wetland species recorded by JEFFREYS remain on the fell and it is evident that many of the plant communities still largely conform to his earlier descriptions.

Appendix

THE RUBI OF WALDRIDGE FELL

In this survey of the fell no attempt has been made to distinguish the species of *Rubus fruticosus* - only the aggregate has been recognised. A number of species have, however, been recorded from the fell and the following list has been kindly made available by G. G. Graham.

- Rubus adenanthoides*
- R. anisacanthos*
- R. dasphyllus*
- R. lindbergii*
- R. polyanthemus*
- R. scissus*
- R. selmeri*
- R. taeniarum*
- R. vestitus*

Rosa coriifolia has also been recorded.

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Table 1

Species lists for the heath land communities

	A	B	C	D	E
<i>Betula pubescens</i>	r	vr	-	-	-
<i>Rubus fruticosus</i> agg.	r	-	If	-	a-lsd
<i>Ulex europaeus</i>	r	-	o	-	DOM
<i>Agrostis stolonifera</i>	r	-	-	-	-
<i>A. tenuis</i>	r	-	-	-	o
<i>Anthoxanthum odoratum</i>	r	-	r	-	r
<i>Calluna vulgaris</i>	DOM	-	o	-	f
<i>Carex pilulifera</i>	vr	-	-	-	-
<i>Chamaenerion angustifolium</i>	r	-	f	-	f-la
<i>Dactylis glomerata</i>	-	-	r	-	-
<i>Deschampsia cespitosa</i>	r	-	r	-	r
<i>D. flexuosa</i>	f	a	a	r	o
<i>Digitalis purpurea</i>	r	-	-	-	-
<i>Empetrum nigrum</i>	If	vr	-	-	-
<i>Erica cinerea</i>	occ	-	-	-	-
<i>Festuca ovina</i>	f	a	a	-	f
<i>F. rubra</i>	o	-	-	-	-
<i>Galium saxatile</i>	f	r	o	r	o
<i>Holcus lanatus</i>	o	-	o	-	o
<i>Nardus stricta</i>	a	f	f	-	o
<i>Potentilla erecta</i>	f	-	f	-	vr
<i>Pteridium aquilinum</i>	a	f-la	DOM	DOM	a-lsd
<i>Vaccinium myrtillus</i>	a	DOM	a-lsd	f	r
<i>Campylopus flexuosus</i>	o	-	o	-	-o
<i>Fumaria hygrometrica</i>	-	f	-	r	-
<i>Hypnum cupressiforme</i>	f	o	o	-	r
<i>Plagiothecium silvaticum</i>	o	-	-	-	-
<i>Pleurozium schreberi</i>	o	r	-	-	-
<i>Pohlia nutans</i>	a	a	f	r	r

A: *Calluna* dominated heathB: *Vaccinium* dominated heathC: *Pteridium* dominated heathD: *Pteridium* dominated heath [species-poor]E: *Ulex* dominated heath

Table 2
Species lists for the grassland communities

	A	B	C
<i>Betula pubescens</i>	r	-	-
<i>Rubus fruticosus</i>	r	-	-
<i>Ulex europaeus</i>	-	r	-
<i>Agrostis stolonifera</i>	-	o	o
<i>A. tenuis</i>	o	f	-
<i>Anthoxanthum odoratum</i>	o	o	o
<i>Calluna vulgaris</i>	r	o	-
<i>Carex binervis</i>	-	r	r
<i>C. pallescens</i>	-	-	r
<i>C. pilulifera</i>	-	-	r
<i>Campanula rotunditolia</i>	r	r	-
<i>Chamaenerion angustifolium</i>	-	r	-
<i>Deschampsia cespitosa</i>	-	-	r
<i>D. flexuosa</i>	DOM	f	r
<i>Digitalis purpurea</i>	r	-	-
<i>Erica cinerea</i>	r	-	-
<i>Festuca ovina</i>	f	a	f
<i>F. rubra</i>	o	-	r
<i>Galium saxatile</i>	o	f	f
<i>Holcus lanatus</i>	-	o	-
<i>Hieracium sp.</i>	-	r	r
<i>Juncus effusus</i>	-	-	f-lsd
<i>J. squarrosus</i>	-	-	la
<i>Lathyrus montanus</i>	-	-	r
<i>Luzula campestris</i>	-	-	r
<i>Molinia caerulea</i>	-	-	If
<i>Nardus stricta</i>	f	DOM	a-sd
<i>Plantago lanceolata</i>	-	-	vr
<i>Potentilla erecta</i>	o	f	f
<i>Pteridium aquilinum</i>	r	o	-
<i>Rumex acetosa</i>	-	o	-
<i>R. acetosella</i>	r	-	-
<i>Sieglingia decumbens</i>	-	r	r
<i>Teucrium scorodonia</i>	r	-	-
<i>Vaccinium myrtillus</i>	r	o	-
<i>Hypnum cupressiforme</i>	-	-	f
<i>Pohlia nutans</i>	r	r	r
<i>Polytrichum commune</i>	-	-	o
<i>Polytrichum formosum</i>	r	-	-

A: *Deschampsia flexuosa* dominated grassland

B: *Nardus* dominated grassland - dry facies

C: *Nardus* dominated grassland - wet facies

o

Table 3

Species lists for the wetland communities

	A	B	C	D	E	F
<i>Betula pubescens</i>	-	-	r	0	-	-
<i>Ilex aquifolia</i>	-	-	-	r	-	-
<i>Salix caprea</i>	-	-	-	a	-	-
<i>Salix cinerea</i>	-	-	-	f	-	-
<i>Sorbus aucuparia</i>	-	-	r	r	-	-
<i>Rubus rruticosos</i> agg.	0	-	-	a	-	-
<i>Ulex europaeus</i>	-	-	r	-	-	-
<i>Achillea ptarmica</i>	r	-	-	-	r	-
<i>Agrostis stolonifera</i>	0	0	r	-	-	-
<i>Angelica sylvestris</i>	0	-	-	-	0	-
<i>Anhoxanthum odoratum</i>	0	-	0	r	-	-
<i>Athyrium felix-femina</i>	vr	-	-	-	-	-
<i>Calluna vulgaris</i>	-	-	r-If	-	-	-
<i>Cardamine pratensis</i>	r	r	-	-	-	r
<i>Carex echinata</i>	-	f	r	-	-	-
<i>C. nigra</i>	f	f	0	-	-	r
<i>C. panicea</i>	r	r	0	-	-	-
<i>C. paniculata</i>	-	r	-	-	-	-
<i>Chamaenerion angustifolium</i>	r	-	-	0	r	-
<i>Cirsium palustre</i>	0	-	0	r	0	0
<i>Dactylorhiza fuchsii</i>	-	r	r	-	-	-
<i>Deschampsia cespitosa</i>	a-d	-	0	r	-	r
<i>D. flexuosa</i>	0	-	r	0	f	r
<i>Dryopteris dilatata</i>	If	-	vr	-	-	-
<i>D. felix-mas</i>	-	-	r	-	-	-
<i>Empetrum nigrum</i>	-	-	r	-	-	-
<i>Epilobium hirsutum</i>	-	-	-	-	-	DOM
<i>E. palustre</i>	0	r	-	-	-	-
<i>Equisetum fluviatile</i>	0	a	-	-	0	-
<i>E. palustre</i>	0	-	0	-	-	0
<i>Erica tetralix</i>	-	-	r	-	-	-
<i>Eriophorum angustifolium</i>	-	f	-	-	-	-
<i>Eupatorium cannabinum</i>	If	-	-	-	-	0
<i>Festuca arundinacea</i>	r	-	r	-	-	-
<i>F. pratensis</i>	-	-	r	-	-	-
<i>F. rubra</i>	f	-	-	-	-	-
<i>Filipendula ulmaria</i>	-	-	-	-	-	a-Id
<i>Galium palustre</i>	r	0	-	-	-	-
<i>G. saxatile</i>	0	-	-	-	-	-
<i>G. uliginosum</i>	-	-	r	-	-	-
<i>Holcus lanatus</i>	f	0	0	0	0	0
<i>Hydrocotyle vulgaris</i>	0	0	0	f	f	-
<i>Juncus acutiflorus</i>	f	f	-	-	a-Id	-
<i>J. articulatus</i>	-	-	-	-	-	-

<i>Juncus bulbosus</i>	r	-	-	-	-	-
<i>J. conglomeratus</i>	o	-	o	-	-	-
<i>J. effusus</i>	f	-	f	-	f	-
<i>J. inflexus</i>	-	-	-	-	-	/f
<i>Leontodon autumnalis</i>	-	-	r	-	-	-
<i>Lotus uliginosus</i>	o	-	-	-	o	-
<i>Lucula multiflora</i>	o	-	o	-	-	-
<i>Mentha aquatica</i>	-	-	-	-	o	-
<i>Myanthes trifoliata</i>	If	a	r	-	-	-
<i>Molinia caerulea</i>	r	-	DOM	-	-	-
<i>Narthecium ossifragum</i>	r	-	-	-	-	-
<i>Poa trivialis</i>	o	-	-	-	-	o
<i>Potentilla erecta</i>	o	-	o	-	o	-
<i>Pteridium aquilinum</i>	-	-	If	-	-	o
<i>Ranunculus acris</i>	f	-	-	-	-	-
<i>R. flammula</i>	o	f	-	-	r	-
<i>R. repens</i>	r	-	-	-	-	o
<i>Rumex acetosa</i>	o	-	o	-	-	-
<i>Stellaria media</i>	-	-	-	r	-	-
<i>Succisa pratensis</i>	-	-	f	-	-	-
<i>Taraxacum sp.</i>	r	-	-	-	-	-
<i>Urtica dioica</i>	-	-	-	o	-	-
<i>Vaccinium myrtillus</i>	-	-	o	-	-	-
<i>Valeriano officinalis</i>	vr	-	-	-	o	o
<i>Viola palustris</i>	f	-	o	-	-	-
<i>Acrocladium cuspidatum</i>	r	o	-	-	o	-
<i>A. giganteum</i>	-	r	-	-	-	-
<i>Brachythecium rutabulum</i>	r	-	-	-	-	r
<i>Dicranella heteromalla</i>	-	-	-	r	-	-
<i>Drepanocladus fluitans</i>	-	o	-	-	-	-
<i>Pohlia nutans</i>	-	-	-	o	-	-
<i>Polytrichum commune</i>	-	-	o-la	o	-	-
<i>Sphagnum fimbriatum</i>	-	-	o	-	-	-
<i>S. palustre</i>	-	-	o	-	-	-
<i>S. plumulosum</i>	-	f	-	-	-	-
<i>S. recurvum</i>	o	r	o	-	-	-
<i>S. squarrosum</i>	-	f	-	-	-	-
<i>S. subsecundum</i>	-	o	f	-	-	-

A: *Deschampsia cespitosa* community

B: *Equisetum fluviatile* - *Eriophorum angustifolium* community

C: *Molinia caerulea* community

D: *Salix* thicket

E: *Juncus acutiflorus* community

F: *Epibobium hirsutum* - *Filipendula* community

Some Observations Of The Tectonic Effect On The Rocks and Minerals Of The Derwent Valley

GEORGE EVANS

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The Derwent Valley is approximately twenty miles by seven and is situated on the north-western boundary of the County of Durham. It is a long narrow valley open to the north-east. It is drained by the River Derwent and its tributaries, the Beldon, Nookton, Boltsburn, Burnhope, Hisehope, Horseleyhope, Shotley Field and Pont Burns, also many other smaller streams. The general dip is to the south-east.

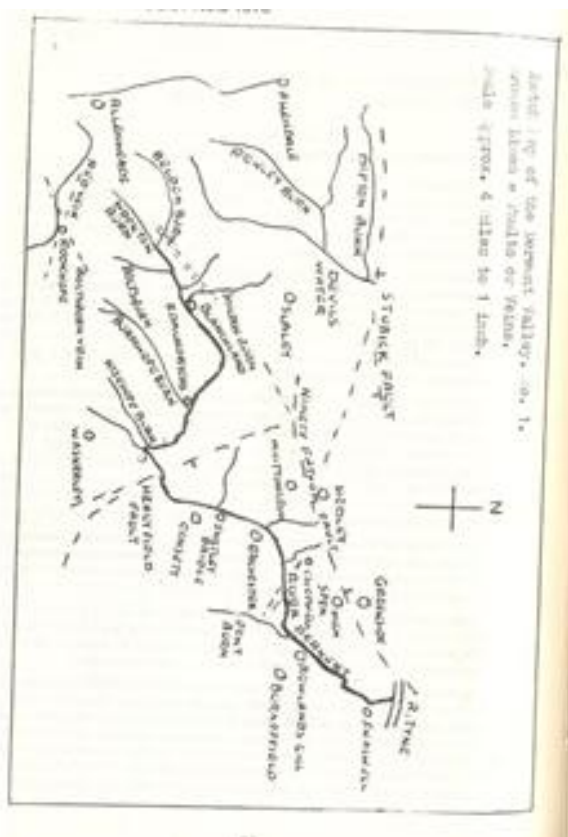
The bed-rock is covered by a varying thickness of drift which is greatest in the lower part of the valley. At Derwenthaugh near the River Derwent's confluence with the River Tyne, a series of 12 bore-holes were put down about 1906 and proved a thickness of drift varying from 115 to 150 feet. This proves that the buried valley is at least 140 feet below sea level. At Medomsley the thickness of drift passed through in the sinking of the Isabella shaft was 27 feet 7 inches. The thickness of drift in the mid-part of the valley of the Derwent varies from 20 to as much as 60 feet.

Most of the coal seams of the Durham Coalfield outcrop on the hillsides between Pontop Pike and Shotley Bridge. These in descending order are as follows:- Shield Row, Five-quarter, Brass Thill, Hutton (Maudlin and Low Main of East Durham), Main Coal (East Durham Hutton), Towneley or Harvey seam, Tilley Top and Bottom Busty, Three-quarter, Brockwell, Victoria and Marshall Green seams. The Marshall Green has only been worked on a small scale in Durham. Below the Marshall Green is an iron-stone seam named the German Bands. This was worked from the 17th to 19th centuries by German families of cutlers and sword makers from its outcrop on the northern slope of the valley.

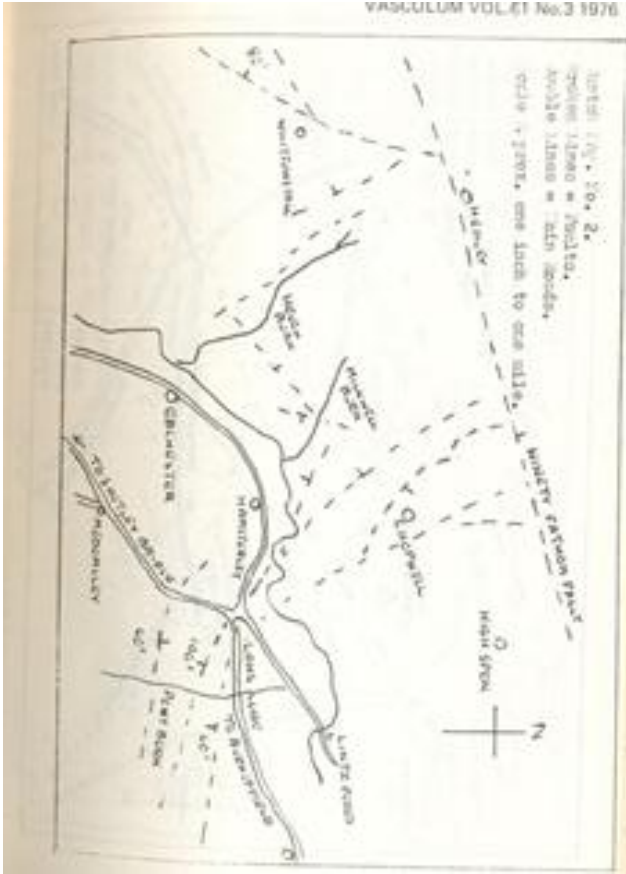
The river bed at Shotley Bridge is composed of Millstone Grit sandstones which were at one time quarried for the making of millstones. Below these, bore-holes have proved the Fell Top and Great limestones. Shafts sunk near Blanchland have also proved the Limestone Series down to the Four Fathom Limestone.

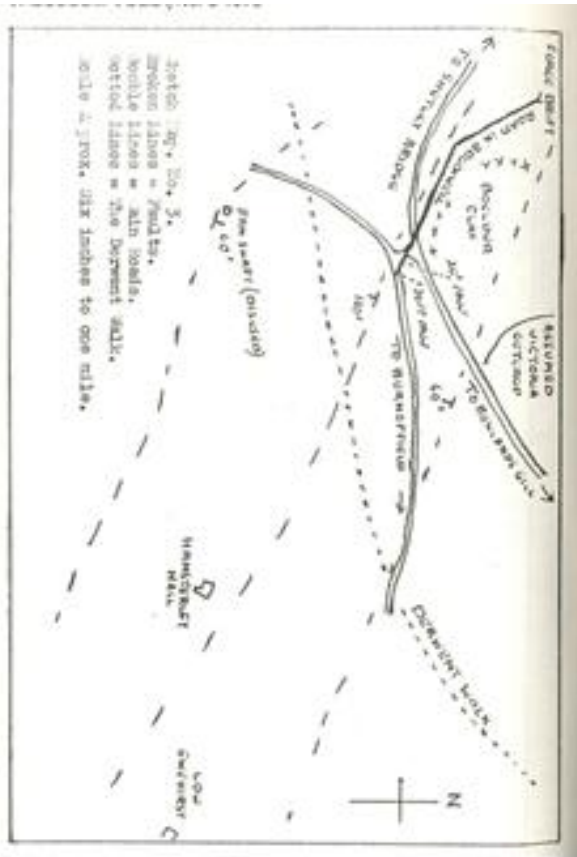
Having worked in the coal mines of the Derwent Valley all of my working life I have been able to observe at close quarters underground, beneath and in the boulder clay, large areas of the strata down to the Marshall Green Seam. Below this the strata of the upper part of the Limestone Series can be seen exposed in the upper part of the valley.

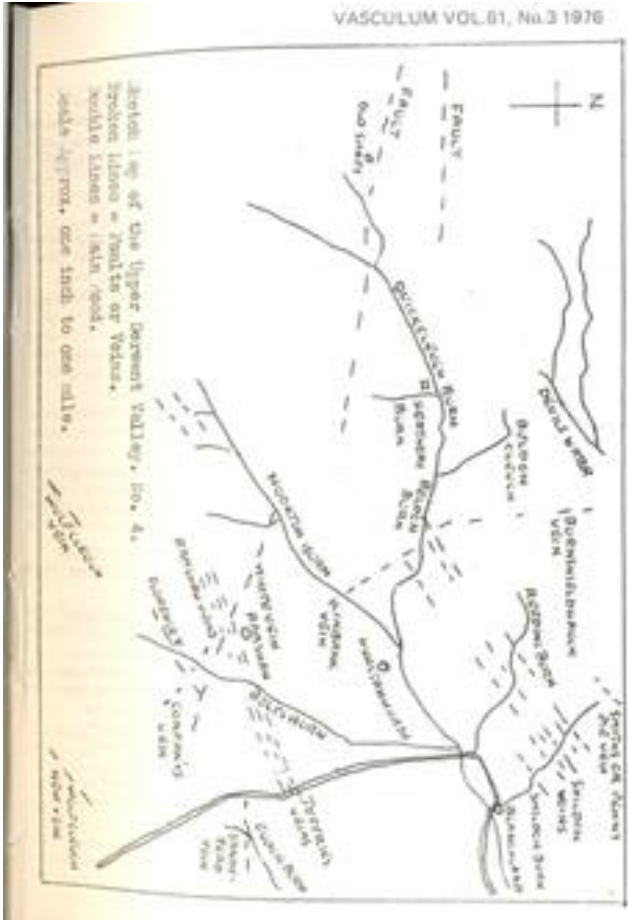
In and around the Derwent Valley large numbers of faults have been proved but, unlike the faults or veins of the so-called Lead Measures, very few of them have been named. Most of these faults are of small throw or displacement, and in my opinion the small faults created greater problems to the mining engineer. For instance a fault with a throw of about 50 feet could often be of great benefit by making it easier to plan districts in another seam through the fault. But when working a coal face 100 to 200 yards long which reaches a 6 feet fault, this could mean having to re-win the coal face or grade the



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Section 1 of the Upper Berrent Valley, No. 4.
 Section shown = fault or valley.
 Section shown = main road.
 Section shown, one inch to one mile.

fault to enable the machines to travel across the face, a costly operation. Therefore, faults or hitches as they are usually called were often a nuisance to mine management.

There seems no doubt that the coal seams of the Durham Coalfield were laid down in peat swamps and that at one time they extended right over what is now called the Pennines to the Cumberland Coalfield.

The rise of the coal seams towards the Pennines shows the effect of earth movements which started in late Carboniferous times. If we take the Brockwell seam as a horizon we find that it is approx. 280 feet below the River Tyne at Scotswood Bridge. As we go up the Derwent Valley we find that the seam outcrops before we reach Rowlands Gill, but at Blackhall Mill the seam is approx. 22 feet below the River Derwent. Therefore, something must have happened to change the expected position of this seam. This is due to the presence of two faults near the Longclose crossroads as shown on sketch maps one, two and three.

At the east end of Ebchester village the seam again outcrops on the hillside, north of the main road opposite the telephone exchange. From this point the rise of the seam or we could call it the strata is more consistent, the outcrops being as follows: near the escape route on Ebchester Bank, the railway cutting near Queen's road Blackhill (now filled in.) Hownes Gill, Rowley Farm (outlier) and Mount Pleasant also an outlier.

At Mount Pleasant the outcrop is approx. 900 feet above sea level and is on the edge of the coalfield. At Tow Law the Brockwell seam (Main Coal) outcrop is near the village, and on Wolsingham Bank the strata can be followed through the Millstone Grit Series to the Fell Top Limestone near Wolsingham village.

This proves a definite uplift of the strata towards the Pennines. There is also some evidence to suggest that at one time the Permian also extended right across the Pennines.

What effect did the uplift of the Pennines have on the rocks and minerals of the Derwent Valley? First, the uplift must have been gradual over a period of many millions of years. Too rapid an uplift would have had a far greater tectonic effect on the strata. Secondly, breaks in the strata occurred and caused what are now the faults, hitches or veins. Thirdly, where the strata was fairly soft as in the Coal Measures, the erosion of the strata on the rise side of the fault could be equal to the uplift of the strata. Fourthly, the strata on the dip side of the break usually dips to a rise fault and on the rise side of the break the strata usually rises to a dip fault. Observant miners were quick to notice this peculiarity so that it became a common saying among miners that when approaching a fault the coal seam dips to a rise fault and rises to a dip fault. This knowledge was used as a guide to find the coal seam again at the other side of the fault. This does not apply to over-lap faults.

There are hundreds of faults in the strata of the Derwent Valley, most of them of small throw. I have examined strata very closely and traced faults so small as to show a clear dislocation as small as half an inch.

The largest fault to affect the strata of the Derwent Valley is the so called Ninety Fathom Dyke which, to be correct is not a dyke but a fault. This fault runs from Cullercoats to Gosforth where the dislocation at Gosforth Colliery was proved to be 1000 feet dip throw to the north. Then with diminishing throw it crosses the Tyne near Stella Power Station, passes between High Spen and Greenside, then continues to Kiln Pit Hill and Minsteracres where it tails out.

The Stublic Fault seems to be a continuation of the Ninety Fathom Fault, en echelen, at Thornborough near Corbridge where it commences. It continues with increasing throw to Castle Carrock near Brampton where it joins up with the Pennine Fault.

The Stublic Fault splits into two separate faults about four miles west of Hexham. The southern branch runs for about five miles to the east then swings to the south-east. It seems to tail out about two miles north of Whittonstall. It is possible that this fault could join up with a branch of the Ninety Fathom Fault which leaves the Ninety Fathom Fault near Hedley and runs in a south-westerly direction to near Carterway Heads where it seems to tail out.

Another fault named the Healyfield Fault branches off from the south - west branch of the Ninety Fathom between Whittonstall and Carterway Heads and runs in a south-easterly direction across the Derwent Valley. It crosses the River Derwent approx. one mile upstream from Allensford Bridge where the throw is 152 feet to the east. It then continues to Healyfield where ore minerals were once mined. It then runs towards Wheatley Grange some $3\frac{1}{2}$ miles north of Wolsingham. A branch from this fault named the GreatSpar Dyke runs across to the Lanchester Valley. From a branch of this fault witherite was until recently mined at Burnhope.

The effect of the displacement of the Healyfield Fault brings Coal Measure strata against Millstone Grit over most of its course.

What is remarkable is that both the Ninety Fathom and Stublic faults split into two faults before tailing out and the Healyfield Fault starting near this tail out. Therefore we have the end of five faults within a few miles of each other.

On sketch map No.2 you will note other faults running towards the Ninety Fathom between Whittonstall and the Chopwell area. These seem to be secondary faults caused by the uplift of the major faults.

It is possible that there could have been some sliding movement along the line of the Ninety Fathom Fault and the Stublic Fault caused by tremendous pressure from the north-east. This could also have caused the splitting and separation of the two faults. What could be some evidence for this is that when working near the Ninety Fathom Fault about 1928, a short distance south west of Greenside I noticed that the Bottom Busty seam when approaching the fault became very hard to work and the cleat of the coal was turned around about ninety degrees. Coal hewers who received extra payment according to how they worked (with or against the cleat) found they were being paid bord price for working headings and heading price for working bords. Only a sliding movement with pressure along the fault could account for this change around of the cleat.

I have noticed that certain areas of the valley have numerous faults mostly of small throw. These are usually called a "nest of hitches" and are very much disliked by colliery rmanagers and workmen in the coal mines. These so called "nests of hitches" are a boon to the metaliferous mines which depend on the fissures of the faults in which the mineral ores are found. Some of these areas in the Coal Measure strata of the valley are:- Low Ewehirst near Dipton, the bottom of Medomsley Bank and several others. In the Limestone Group are:- Feldon on the Burnhope Burn near Edmundbyers, Shildon near Blanchland and Harnshaw near Hunstanworth. Of these I will describe one area in the Coal Measures and the Shildon and Ramshaw areas of the so-called Lead Measures.

Two fairly large faults run between Dipton and Chopwell and cross the Shotley Bridge, Rowlands Gill main road near the Longclose cross-roads. One of these faults passes between the No. 1 and 3 shafts at Chopwell and was partly the reason why the No. 3 shaft was sunk.

At the beginning of 1939 I was put in charge of a drift mine of the Hamsterley Coal Co. to work the Brockwell seam between the two faults in the Longclose area. The drift was started near the old Derwentcote forge south of the River Derwent at the outcrop of the Brockwell seam.

The main road in the coal seam was driven approx. south and rising with the coal seam at about two inches to the yard towards the 100 feet fault which was reckoned to have a dip throw to the south of 80 feet. After passing under the Bairns Gill, boulder clay was met which washed out the coal seam, but the seggar clay beneath was still intact. This washout was the pre-glacial course of the Bairns and Owlet gills. Due to the washout the fault was not reached. A south-east cross-cut was turned off to run parallel with the fault towards a bore-hole which had been put down on the north side of the fault near the bottom of Medomsley Bank. This bore-hole had proved several coal seams. The seam was soon recovered through the wash-out and was expected to run level right up to the bore-hole. Instead of being level the seam was rising, therefore another fault was suspected. This when reached proved to be a dip fault with a 20 feet throw to the south-east at approx. right angles to the 100 feet fault. Due to this fault the face of the roadway was now at strata about mid-way between two coal seams, therefore, two stone drifts were started, one to the Three-quarter seam and the other on the line of the main roadway to the Brockwell seam. When the Brockwell was reached the 100 feet fault was found to be only 15 yards from the main roadway. I found that the seam did not end at the fault but continued down the hade of the fault at a steep angle and was still full thickness when stopped at 12 feet down. A level drift was then put through the fault and soon reached the Top Busty seam, this being level with the Brockwell at the fault. The Top Busty was found to be dipping at about seven inches to the yard before levelling out. The Brockwell seam on the other side was rising away from the fault at about four inches to the yard. At approx. 70 yards boulder clay was reached which was probably the pre-glacial course of the Hagg Burn.

I now suspected that the 100 feet fault at this point was not a normal fault but a kind of loop fault and was determined to prove this. The south-west roadway in

the Brockwell seam was continued on the same course and at 60 yards met a rise fault of four feet throw. Three yards from this a dip fault of four and a half feet throw was met. At a distance of approx. 100 yards from the 20 feet fault another fault was contacted which was eventually proved to have a 30 feet dip throw and running at right-angles to the 100 feet fault. A drift was put up to the Three-quarter seam through the 30 feet fault. When the 100 feet fault was contacted in this seam I found the fault to be a normal fault. For further proof I decided to put a staple shaft up to the Bottom Busty seam. When reached the roof conditions were deplorable, and in consideration for the safety of the workmen I stopped it before contacting the fault. The seam being practically level I was satisfied that the fault would be normal.

Between the 20 and 30 feet faults I decided to prove the 100 feet fault again, but this time in the Three-quarter seam. On contacting it I found that again the seam followed the hade of the fault and at 12 feet down the seam was still full thickness. On going level through the fault, the Harvey (Towneley) seam was found to be level with the Three-quarter seam but with a very friable roof.

At a later date when working the Three-quarter seam on the south side of the 100 feet fault a drift was put up to the Brockwell on the north side of the fault and the dip side of the 30 feet fault. At this point the fault was normal. As a matter of interest I arranged for a short drift to be put through the 100 feet fault from the Three-quarter seam and proved the Victoria seam to be level with the Three-quarter. It is from the levels of the seams in the Longclose area that I calculated the fault as having a 100 feet throw and therefore named it the 100 feet fault. I have come across another example of a loop fault at Hamsterley Colliery in the Derwent Colliery royalty. Several seams were shown on plans with a 10 feet fault. On approaching this fault in the Tilley seam, the seam did not run out but kept its full thickness, but rising in the form of a loop instead of the fault expected.

There is nothing new in this change from a normal fault to a loop fault or the other way round. This was also noted by T.O. Robson in 1886 at Redheugh Colliery and subsequently described in a paper to the Mining Institute in 1889 (see transactions).

My conclusions are that the 100 feet fault is only a loop fault in the area between the 20 feet and 30 feet faults, and these two faults must have had some effect in causing the strata to partially bend before breaking. I would have liked to have proved the whole length of the hade of the fault to see if the seam continued right through but this would have been a very expensive experiment. I am grateful to the late Mr. W.C. Longstaff, former agent and manager of the Hamsterley Coal Company for allowing me a free hand for proving this fault and also many other faults and sandstone washouts.

There are also many other faults in the Derwent Valley, too numerous to deal with in any detail. Three important faults run along the slope of Pontop Pike between South Medomsley and East Castle and form a sort of trough. It is in this trough that the last coal resources of the Eden Colliery are now being worked. Another fault of very little importance is the Villa Real Fault between Leadgate and Blackhill.

The greatest pressure of earth movements causing uplift of the strata seems to have been at the domes such as the Derbyshire Dome, the Teesdale Dome, the Askrigg Block and the Alston Block, all areas of high mineralization. Small secondary faults or cracks in the

strata would tend to radiate from the domes and create ideal conditions for the later deposition of minerals into the fissures of the faults. The flats (often the richest place for ore minerals) which adjoin the faults could have been formed by bed separation at the time of the uplift. Bed separation by man made earth movements on a small scale is well known to coal mining engineers. Limestone strata or hard beds of gritstone are the ideal conditions for creating semi-permanent openings at the faults. These are necessary for mineral deposition and crystal formation.

Whatever the answer is as to how the minerals were deposited in the veins, I do not think it will be solved in the metaliferous mines, but in the laboratories with large numbers of experiments in the deposition of minerals by electrolysis with terrestrial electricity. This seems to be the only explanation to account for the pattern or plating of the minerals lining the veins which is well known to metaliferous miners. This plating effect common to the lead mines is a well known feature of the mineral deposits and is also a well known feature of the mineral deposits around the granite in Cornwall.

How does this affect the faults in the Derwent Valley? First, there are no workable deposits of ore minerals in the faults of the Coal Measures in the valley. Secondly, the first sign of mineralization is where the uplift of the Healyfield Fault brings to or near the surface the Fell Top Limestone. Thirdly, the tendency is for the mineralization to increase the 'nearer we get to the Alston Block. To deal with this problem any further would be outside the scope of this work.

The richest ore deposits of the valley are in the neighbourhood of Blanchland and Hunstanworth but small areas on the Healyfield Fault and on a small nest of veins in the Burnhope area near Edmundbyers have been worked with little success. The Silvertongue and Middle veins were worked at the Sneep, a large meander of the Derwent near Muggleswick.

At Shildon near Blanchland a string of veins all run in a north-easterly direction from the Shildon Burn, then across the Reeding Burn to the Beldon Burn. These are named as:- Andrew's, Gin 0' The Wood, Sluice, Garden, Shildon, Old Shildon, Fell Grove and Standalone veins. These veins all cross the Shildon Burn between the car park at Blanchland and Pennie Pie Farm. On the Shildon Vein a shaft was sunk 715 feet, starting just above the Grindstone Sill. The workings ended at the top of the Great Limestone near Shildon Farm.

Two shafts, one named the drawing shaft can be seen on the Beldon Burn. They were sunk to a depth of 360 feet, starting about 30 feet above the base of the Low Grit Sill and finishing near the base of the Great Limestone. (I do not know of any place in the Derwent Valley where the Great Limestone outcrops to the surface). The output from these mines was never very large.

The most important veins to be worked in the Upper Derwent Valley are the Ramshaw veins. This area is truly a nest of faults in which the mining of ore minerals has covered many years.

A string of veins running in a north-east direction are:- Jeffries North, South and Middle veins also Ramshaw North, South and Middle veins. These veins were worked from the now disused Jeffries shafts. Whiteheaps fluorspar mine owned by the British Steel Corporation is still in operation for the mining of fluorspar for use as a flux in the steel making industry. The principal veins are:- Red or Hunstanworth Vein, Shield or Company's Vein and Ferneygill Vein all running in a north-easterly direction. The White Vein running in a south east direction varies from 10 to 20 feet wide and has never been a good producer of galena. The fluorspar content of the vein is mostly of a coarse nature and purple in colour.

There are scores of other veins which have been tried and named in the upper Derwent Valley but with little success. Most of the veins described and some others are shown on sketch map No. 4.

From this short description of the faults, rocks and minerals of the Derwent Valley it can be seen that there is plenty of scope for study. The glacial deposits as proved in the coal mines are also a good subject and the presence of sandstone washouts of the surface of the district or even the coalfield during the formation of the coal seams,

A NATURAL HISTORY OF TUNSTALL HILLS, NEAR SUNDERLAND

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1. Introduction

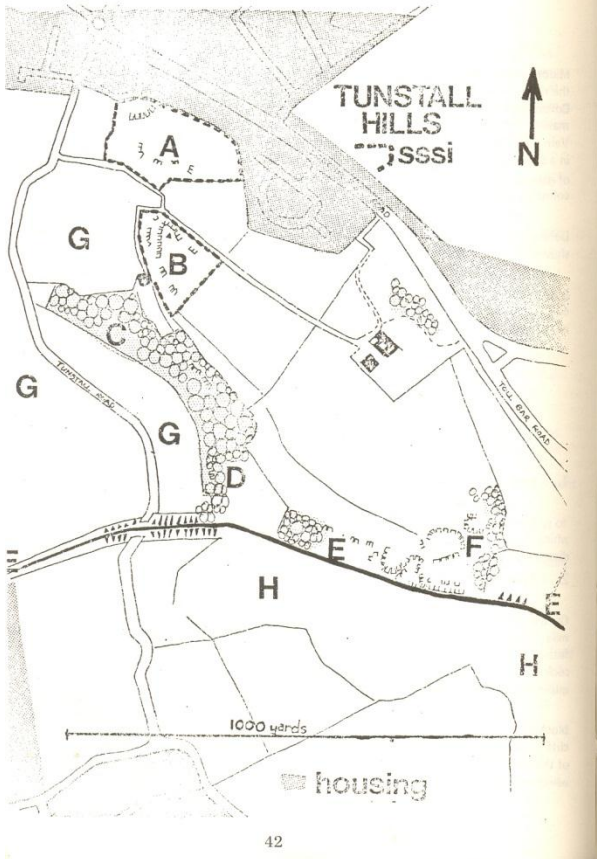
This paper is the result of studies made over a four year period. It is intended to present some observations about the geography, geology and ecology of an area which is under pressure from surrounding urban developments. Part of the area discussed (Maiden Paps) has been designated a Site of Special Scientific Interest.

2. Geographical Features

The Tunstall Hills are situated two miles to the south of Sunderland Town Centre. They form a plateau at roughly 300 feet which extends for about half a mile towards the northern most limit where it reaches a height of 367 feet. This feature is known locally as Maiden Paps. Thin drift covers most of the area with rock outcrops being found on the highest points and surrounding slopes. In places quarrying has helped to extend these features.

The south face of the hills forms one side of a late glacial spillway now blocked by the Ryhope pit heap. To the north the very steep faces represent a sea cliff fronted by a former interglacial sea bed, now a plateau at 200 feet. The floor of the valley known as Tunstall Hope consists of alluvium overlying laminated clays which may be of lacustrine origin.

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3. Geology

The reef knolls of the Permian reach their greatest development in this area, forming distinct features in the landscape. The reef of which Tunstall Hills forms a part extends from Hartlepool to Downhill near Boldon. It reaches a depth of 90 metres and may be up to up to 1.6 kilometres in width. Tunstall and neighbouring Humbleton Hills metres are the classic localities for reef fossils. Since quarrying ceased the exposures have steadily declined in quality. A complete list of reef fossils may be found in Trechman 1945.

4 Vegetation

The Maiden Paps, parts of Tunstall Hope, the mineral railway embankments and cuttings all possess a vegetation which may be described as limestone grassland. Between these areas the species composition may vary. Indeed small changes can occur within an area of limestone grass an demonstrating the remarkable sensitivity of plant communities to their environment. Some of the factors which induce such variety will be mentioned with the description of the vegetation.

4.1 Maiden Paps (North) See map- Area A

There is a thin covering of drift on the gently rounded top of this promontory. The surrounding slopes have numerous small limestone outcrops. Rock rose, *Helianthemum chamaecistus* thrives in this location and may form extensive 'mats'. The thin soils of the slopes carry a variety of grassland types.

On the eastern faces the characteristic *Sesleria caerulea* occurs forming a turf with *Briza media*, *Helicotrichon pratense* and *Koeleria cristata*, with such herbs as *Plantago media*, *Scabiosa columbaria*, *Centaurea scabiosa* and *Anthyllis vulneraria*. The rare *Linum anglicum* may also be found at what is probably its northernmost limit in Britain. The inconspicuous Frog Orchid, *Ceologlossum viride* flourishes while the Twayblade, *Listera ovata* and the Purple Milk Vetch, *Astragalus danicus* have not been seen for some years. The *Sesleria/Briza* turf gradually merges with *Bromus erectus* on the north and western slopes, forming what is probably a unique association. In places the *Bromus erectus* forms a continuous cover but is never as rich in herb species as the *Sesleria* turf.

4.2 Maiden Paps (South) See map- Area B

On the quarried faces *Sesleria caerulea* is the most common species, *Sedum acre* and *Plantago maritima* occur where some shelter is offered. Around the outcrops on the western slopes a greater variety of herbs may be found; these include *Galium verum*, *Thalictrum minus*, *Poterium sanguisorba*, *Helianthemum chamaecistus* and *Plantago media*. Scrub has invaded these slopes mainly gorse, *Ulex europaeus* and Hawthorn, *Crataegus monogyna*. The scrub is regularly destroyed by fire, and recolonised by tall herbs such as *Artemisia vulgaris*, *Cirsium arvense* and *Chamaenerion angustifolium* to form persistent almost pure stands. Grassland fungi are well represented on the Maiden Paps with *Hygrophorus sp.* of note. See appendix B.

4.3 Tunstall Hope Woodland See map- Area C

Parts are almost most mature mainly Ash, *Fraxinus excelsior* with some Sycamore, *Acer pseudoplatanus* and an understorey of elder, *Sambucus nigra*. Hawthorn forms dense stands on areas with leached soils. Recently recolonised areas around the mature woodland

still retain parts of the original grassland with *Sesleria caerulea* and *Hypericum montanum* surviving under a canopy of bushes. On the rock outcrops in the mature woodland a variety of herbs find refuge. *Arabis hirsuta*, *Primula veris*, *Potentilla sterilis*, *Thalictrum minus*, *Areneria serpyllifolia* and *Sesleria caerulea* all occur in such locations. Woodland herbs are well represented with *Viola riviniana*, *Conium maculatum*, *Mercurialis perennis*, *Arum maculatum*, *Agropyron caninum*, *Orchis maculata* and *Moehringia trinervia*.

4. 4 Bushgrass Grassland See map - Area D

On the steep slopes surrounding the southern edge of the woodland bushgrass *Calamagrostis epigejos* occurs. It is found growing almost to the exclusion of other species. Even scrub seems reluctant to occupy this area though it flourishes elsewhere in similar situations.

4. 5 Mineral railway cuttings and embankments See map - Area E

Fire, exposure and poor soils combine to provide very difficult conditions for growth. Despite this or because these conditions prevail this area is extremely rich in herb species. To the east there is a patchwork of monocultures, with grasses often completely absent. *Agrostis tenuis* with *Festuca arundinacea* and *Dactylis glomerata* are the principle grass species. Moving west *Sesleria caerulea* is found with *Sieglingia decumbens*, a typical moorland plant. On the steep slopes following the crags *Sieglingia decumbens* occurs with *Carex flacca* and herb species such as *Clinopodium vulgare*, *Betonica officinalis* with hemiparasites *Odontites verna ssp. verna* and *Rhinanthus minor*.

The extreme western section of this slope is covered by regenerating woodland which gradually merges into scrub, providing a good illustration of the succession from grassland to mature woodland. The herbs in the grassland around this scrub have a distinct woodland composition with the common *Mercurialis perennis*, *Brachypodium sylvaticum* and *Orchis maculata*. The rare *Polygonatum multiflorum* becomes abundant and an unusual, decumbent form of *Tamus communis* is common here.

4.6 Quarries See map - Area F

The large south facing quarry and its much smaller eastern neighbour are quite distinct in terms of their vegetation. The former is south facing and thus receives a great deal of sunlight. It contains a shallow soil overlying limestone rubble which retains little moisture. *Briza media* is tolerant of these conditions and where small mounds give shelter *Carex flacca* may be found with *Dactylorhiza fuchsii*, *Viola hirta* and *Gentianella amarella*. Some species often become locally dominant, for example hybrid swarms of *Rhinanthus minor X stenophyllus*. On deeper soils *Agrostis tenuis* and *Festuca arundinacea* replace the *Briza media*. Fire prevents gorse from occupying the quarry floor and hawthorn is restricted to sheltered positions. Grazing by rabbits may also be a factor in restricting the spread of this plant as it thrives outside the confines of the quarry. The small quarry retains some moisture encouraging a more luxuriant growth. Here *Festuca arundinacea* and *Calamagrostis epigeios* occur with such herbs as *Scrophularia nodosa*, *Hypericum pulchrum*, *Leontodon hispidus*, *Linum catharticum*, *Silene vulgaris* and *Viola hirta*. The shelter offered by this east facing quarry has given rise to a vigorous growth of shrubs which has in turn reduced the area of grassland.

4. 7 Valley Floor and Arable Land See map - Area G

Attempts to drain this field appear to have failed, though future proposals by

the Local Authority include a drainage scheme. For the time being however the interesting flora has been left relatively undisturbed. Plants include the rare *Dactylorhiza purpurella* with the commoner *Cardamine pratensis*, *Filipendula ulmaria*, *Luzula campestris*, *Carex hirta* and *Deschampsia cespitosa*. The nearby arable land contains many 'weeds' most of which are becoming rare. *Silene noctiflora* still occurs with many old records for *Legousia hybrida*.

4. 8 Colliery Site See map- Area H

This was once a coastal dene and hopefully it will be restored to something approaching that when a proposed landscaping scheme gets underway. At present it is of interest for its ballast aliens and 'casuals' numbering among them *Heracleum mantegazzianum* with crucifers such as *Sisymbrium altissimum*, *Sisymbrium officinale* and *Diploluxis tenuifolia*. This area has a number of limestone outcrops and caves. These sites with their rich herb flora support a growing colony of the wall brown butterfly, *Pararge megera*.

5. Animals and Birds

There are numerous hares, rabbits and small rodents, carnivores such as weasels and stoats appear uncommon despite a plentiful supply of food. The woodland supports a colony of badgers and there is evidence of successful breeding. Foxes are common and have bred in a disused badger sett

Predatory birds have been successful with kestrels, magpies, tawny and little owls breeding in the area, together with winter visits from long-eared owls often in parties of six or more. For other birds see Appendix 6.

6. Conclusion and Recommendations

This area should become a nature reserve with facilities for study for school-children, students and local natural history groups. A simple nature trail has been established and used successfully by some local schools. As a community asset for educational recreational purposes this area has considerable potential and should not be subject to uninformed planning. Controlled burning may be necessary to control scrub and maintain the variety of herbs. Areas which are popular with visitors are subject to rubbish dumping, turf stealing and motorbike scrambling. Where these become excessive damage may be done, therefore control measures should be introduced i.e. through siting of car parks and footpaths. Footpaths tend to alter their position over a period of time, this is generally beneficial though at present there are more footpaths than necessary. Shooting must be discouraged together with picking of flowers. The area has a large number of plant species many of which are rare; any irresponsible collecting will cause extinctions. Regular monitoring should be local carried out by competent ecologists, together with officials of the local authority.

This area is unique and presents a wonderful opportunity for a wild life conservation exercise within a built up area.

Acknowledgements

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**APPENDIX 1 : PTERIDOPHYTA AND
 ANGIOSPERMAE**

Sequence to follow the checklist of J. E. DANDY

PTERIDOPHYTA

EQUISETACEAE

Equisetum arvense

DENNSTAEDTIACEAE

Pteridium aquilinum

ASPIDIACEAE

Dryopteris filix-mas

D. dilatata

ANGIOSPERMAE

RANUNCULACEAE

Ranunculus acris

R. repens

R. bulbosus

R. ficaria ssp. ficaria

Thalictrum minus

PAPAVERACEAE

Papaver rhoeas

P. dubium

FUMARIACEAE

Fumaria officinalis

CRUCIFERAE

Brassica napus

B. rapa vat. campestris

Sinapis arvensis

Raphanus raphanistrum

Cardaria draba ssp. drabo

Capsella bursa-pastoris

Cardamine pratensis ssp. pratensis

Barbarea vulgaris

Arabis hirsuta

Hesperis matronalis

Sisymbrium officina/e

S. altissimum

Diplotaxis tenuitolia

D. muralis

Cheiranthus cheiri

RESEDACEAE

Reseda luteola

R. lutea

VIOLACEAE

Viola odorata

V. hirta

V. riviniana

V. arvensis

POLYGALACEAE

Polygala vulgaris

GUTTIFERAE

Hypericum androsaemum

H. perforatum

H. tetrapterum

H. pulchrum

H. montanum

CISTACEAE

Helianthemum chamaecisus

CARYOPHYLLACEAE

Silene vulgaris ssp. *vulgaris**S. noctiflora**S. dioica**S. alba**Cerastium arvense**C. holosteoides**C. glomeratum**Stellaria media**Sagina procumbens**Moehringia trinervia**Arenoria serpyllifolia* ssp. *serpyllifolia**A. serpyllifolia* ssp. *leptocladus*

CHENOPODIACEAE

*Chenopodium bonus - henricus**C. album* agg.*C. rubrum*

MALVACEAE

Malva sylvestris

LINACEAE

*Linum anqlicum**L. catharticum*

GERANIACEAE

*Geranium robertianum**G. dissectum*

BALSAMINACEAE

Impatiens glandulifera

ACERACEAE

Acer pseudoplatanus

AQUIFOLIACEAE

Ilex aquifolium

LEGUMINOSEAE

*Ulex europaeus**Sarothamnus scoparius**Ononis repens**Medicago lupulina**M. sativa**Melilotus altissima**M. officinalis**M. alba**M. indica**Trifolium repens**T. dubium**T. pratense**T. hybridum**Anthyllis vulneraria**Lotus comiculatus**Astragalus danicus**Vicia hirsuta* .*V. cracca**V. sepium**V. sativa* ssp. *angustifolia**V. sativa* ssp. *segetalis*

ROSACEAE

*Filipendula ulmaria**Rubus idaeus**R. caesius**R. truticosus**Potentilla sterilis**P. anserina**P. reptans**Fragaria vesca**Geum urbanum**Agrimonia eupatoria**Sanguisorba officinalis**S. minor**Rosa pimpinellifolia**R. canina* agg.*R. canina* var. *lutetiana**R. canina* var. *flexibilis**R. canina* var. *lutetiana* f. *lasiostylis**R. coriitolia* agg.*R. coriitolia* var. *subqlabra* f. *implexa**Cotoneaster horizontalis**Crataegus monogyna**Sorbus aucuparia**S. intermedia*

CRASSULACEAE

Sedum acre

PARNASSIACEAE

Parnassia palustris (E?)

THYMELAEACEAE

Daphne mezereum (E?)

ONAGRACEAE

*Epilobium montanum**E. hirsutum**E. angustifolium*

ARALIACEAE

Hedera helix

UMBELLIFERAE

*Sanicula europaea**Chaerophyllum temulentum**Anthriscus sylvestris**Torilis japonica**Conium maculatum**Conopodium majus**Pimpinella saxifraga**Aegopodium podagraria**Aethusa cynapium**Pastinaca sativa**Heracleum sphondylium**H. mantegazzianum*

EUPHORBIACEAE

*Mercurialis perennis**Euphorbia helioscopia**E. peplus*

POLYGONACEAE

Polygonum aviculare agg.*P. persicaria**P. convolvulus**Rumex acetosella**R. acetosa**R. crispus**R. obtusifolius*

URTICACEAE

*Urtica urens**U. dioica*

SALICACEAE

*Populus canescens**Salix caprea**S. fragilis*

BETULACEAE

Betula pendula

PRIMULACEAE

Primula veris

OLEACEAE

Fraxinus excelsior

GENTIANACEAE

*Centaureum erythraea**Gentianaella amarella*

BORAGINACEAE

Myosotis discolor

CONVOLVULACEAE

*Convolvulus arvensis**Calystegia sylvatica*

SOLANACEAE

*Solanum dulcamara**Verbascum thapsus**Cymbalaria muralis**Scrophularia nodosa**Veronica montana**V. chamaedrys**V. hederifolia**V. persica**Rhinanthus minor**R. minor* ssp. *minor**R. minor* ssp. *stenophyllus**Euphrasia officinalis* agg.*Odontites verna* ssp. *verna*

LABIATAE

*Mentha arvensis**Thymus drucei**Clinopodium vulgare**Prunella vulgaris**Betonica officinalis**Stachys sylvatica**Ballota nigra**Lamium amplexicaule**Lamium purpureum**L. album**Galeopsis tetrahit* agg.*Glechoma hederacea*

- Teucrium scorodonia*
Ajuga reptans
 PLANTAGINACEAE
Plantago major
P. media
P. lanceolata
P. maritima
 CAMPANULACEAE
Campanula rotundifolia
Legousia hybrida (E?)
 RUBIACEAE
Cruciata leavipes
Galium verurn
G. aparine
 CAPRIFOLIACEAE
Sambucus nigra
Viburnum opulus
Lonicera periclymenum
Leycesteria formosa
 VALE R IANACEAE
Knautia arvensis
Scabiosa columbaria
 COMPOSITAE
Senecio jacobaea
S. erucltolius
S. viscosus
S. vulgaris
S. vulgaris ssp. vulgaris
f. ligulatus
Tussilago farfara
Bellis perennis
Eupatorium cannabinum
Achillea millefolium
A. ptarmica
Tripleurospermum maritimum ssp. Maritimurn
T maritimum ssp. inodorum
Matricaria matricarioides
Chrysanthemum segetum (E?)
C. leucanthemum
C. vulgare
C. parthenium
Artemesia vulgaris
Carlina vulgaris
Arctium minus agg.
Carduus nutans
C. acanthoides
Cirsium vulgare
C. arvense
Centaurea scabiosa
C. nigra
Serratula tinctoria
Lapsana communis
Hypochoeris radicata
Leontodon autumnalis
L. hispidus
L. taraxacoides
Picris echioides
Tragopogon pratensis ssp. minor
Sonchus arvensis
S. oleraceus
S. asper
Hieracium vagum
H. perpropinquum
Pilosella officinarum ssp. nigrescens
Crepis aapillaris
Taraxacum officinale agg.
 LILIACEAE
Polygonatum multiflorum
Endymion non - scriptus
 JUNCACEAE
Juncus effusus
J. conglomeratus
Luzula campestris
 DIOSCOREACEAE
Tamus communis
 ORCHIDACEAE
Listera ovata (E?)
Coeloglossum viride

Gymnadenia conopsea
Orchis mascula
Dactylorhiza fuchsii
D. purpurella
D. fuchsii x *Gymnadenia conopsea*
 ARACEAE
Arum maculatum
 CYPERACEAE
Carex panicea
C. flacca
C. hirta
C. nigra
 GRAMINEAE
Sieglingia decumbens
Festuca pratensis
F. arundinacea
F. gigantea
F. rubra agg.
F. ovina ssp. *ovina*
F. ovina ssp. *tenuifolia*
Lolium perenne ssp. *perenne*
Poa annua
P. pratensis agg.
pratensis ssp. *irrigata*
 (*Poa subcaerulea*)
trivialis
Dactylis qtoomerata
Cynosurus cristatus
Briza media
Sesleria caerulea
Bromus erectus (*Zerna erecta*)
B. ramosus (*Zerna ramosus*)
B. sterilis (*Anisantha sterilis*)
B. mollis agg.
Brachypodium sylvaticum
Agropyron caninum
A. repens
Hordeum murinum
Koeleria cristata
Trisetum flavescens

Helictotrichon pratense
H. pubescens
Arrhenatherum elatius
Holcus lanatus
H. mollis
Deschampsia cespitosa
Calamagrostis epigejos
Agrostis tenuis
A. stolonifera
Phleum bertolonii
P. pratense
Alopecurus pratensis
A. geniculatus
Milium effusum
Anthoxanthum odoratum
APPENDIX 2 : BRYOPHYTES
Amblystegium serpens
Barbula convoluta
Funaria hygrometrica
Brachythecium velutinum
Bryum capillare
Eurynchium swartzii
Eurynchium murale
Camptothecium sericeum
Ceratodon purpureus
Hypnum cupressiforme
Weissia controversa
Mnium congirostrum
Mnium hornum
Mnium punctatum
Lophocolea bidentata
Pellia fabbroniana
Polytrichum sp.

APPENDIX 5: LICHENS

Caloplaca aurantia
C. heppiana
C. citrina
Candelariella vitellina
Collema crispum
Lecanora conizaeoides
L. dispersa
L. crenulata
L. calcarea
Lepraria mcana
L. membranacea
Physcia adscendens.
P. caesia
P. orbicularis
Rinodina subexigua
Verrucaria nigrescens
V. sphinctrina
Xanthoria parietina
Cladonia sp.

APPENDIX 4: FUNGI

Agaricus campestris
Marasmius oreades
Siropharia semiglobater
Conocybe tenera

Panaeolus rickonii
Nolanea sericea
Agrophorus psittacinus
A.conicus
Clitocybe dealbata
Collybia dryophila
Lepista saeva
Bovista nigrescens
Lycoperdon depressum
Inocybe sp.
Auricularia auricula
Diatrype disciformis
Trametes versicolor
Lepidota procera
Coprinus plicatilis
C. comatus

APPENDIX 5: INSECTS

BUTTERFLIES

Meadow Brown
 Wall Brown
 Small tortoiseshell
 Red Admiral
 Common Blue
 Large White
 Small White
 Green veined White
 Small copper
 Orange tip
 Small heath
 Large Skipper

MOTHS

Yellow shell
 Shaded broad bar
 Magpie

Maniola jurtina
Pararge megera
Aglais urticae
Vanessa atalanta
Polyommatus icarus
Pieris brassicae
P. rapae
P. napi
Lycena phlaeas
Anthocharis cardamines
Coenonympha pamphilus
Erynnis taqes

Euphyia bilineata
Ortholita chenopodiata
Abraxus grossularitutu

Large yellow underwing
Six-spot Burnet
Brimstone

Noctua pronuba
Zygaena filipendulae
Opisthoqrapts luteolata

APPENDIX 6 : BIRDS

a) Winter Migrants

Coal tit
Redwing
Snipe
Wheatear
Fieldfare
Carrion Crow

Marsh tit
Great spotted Woodpecker
Snow bunting
Lapwing
Long eared owl

b) Residents and Summer Visitors

Blackcap
Pied flycatcher
Chaffinch
Goldfinch
Blue tit
House sparrow
Wren
Wood Warbler
Meadow Pipit
Collared dove
House Martin
Swallow
Brambling
Partridge
Mistle Thrush
Willow Warbler
Kestrel
Starling
LongTailed tit
Robin
Jackdaw
Whitethroat

Spotted flycatcher
Greenfinch
Bullfinch
Great tit
Tree sparrow
Magpie
Dunnock
Chiff Chaff
Skylark
Wood pigeon
Swift
Linnet
Yellow hammer
Song Thrush
Blackbird
Reed Bunting
Tawny owl
Pied Wagtail
Tree Pipit
Rook
Barnowl

**THE LEPIDOPTERA OF CASTLE EDEN DENE AN HISTORICAL AND CURRENT
REVIEW**

D. A. SHEPPARD, Department of Agricultural Biology, University of Newcastle Upon Tyne
and

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Castle Eden Dene Local Nature Reserve, the largest of the valleys on the Durham Coast, stretches almost six kilometres from between Horden and Blackhall in the east to Wingate in the west, and forms the southern boundary of Peterlee. The whole of the reserve is part of Peterlee, one major side valley stretching north into the centre of the new town.

Designated as a Local Nature Reserve in 1954, the Dene has been a place of great attraction to both 'specialist and non-specialist visitors for a great number of years, current management policy being aimed at conserving the rich and varied flora and fauna by the modification of the woodland structure whilst encouraging the public at large to make full use of the many footpaths which thread their way through the area.

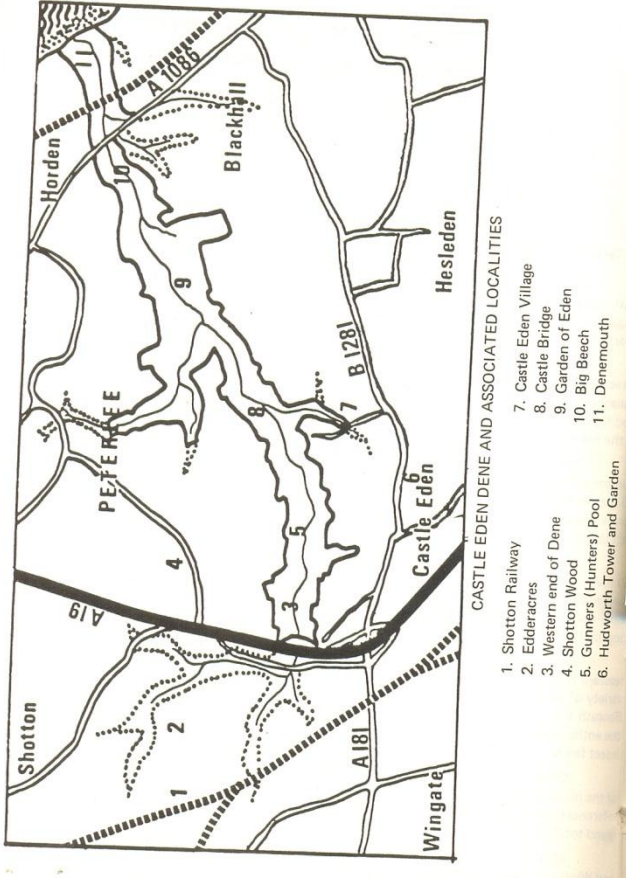
The magnesian limestone, which underlies the whole of the area, is exposed in a number of sites in the Dene, some exposures being in the form of near vertical cliffs approaching 30 metres in height. Overlaying the limestone is a deep layer of very variable boulder clay which forms the surface of the greater part of the Dene. Thus soils, drainage and, consequently vegetation are extremely varied, providing a great diversity of habitats.

As a rule the bed of Castle Eden Burn, the stream which drains the area, is at least 50 metres lower than the surrounding fields and this depth, coupled with the narrow width of the valley gives rise to great variations in the amount of available light and in temperature, some valley floor areas being affected by extended periods of continuous frost whilst the sloping sides are frost free.

The vegetation of the Dene varies from open, grassy slopes and valley floor at the seaward end, through mixed hardwoods to stands of coniferous trees, and includes a great variety of indigenous species such as oak, ash, elm, alder, yew, willows, hazel, rose, birch etc. Beneath this tree canopy is found a wealth of both flowering and non-flowering plant life, the entire plant community providing a great range of habitats for an extremely interesting insect fauna.

Since 1972 a survey of the lepidoptera has been undertaken as part of a general survey of the insect fauna of the Dene. This survey has so far produced 305 species, whilst literature references to captures and observations, and specimens in local museum collections, bring the grand total up to 448 species recorded from the area.

Most of the collecting has taken place from June to September, thus early Spring and Winter species are under-recorded. Apart from a few fortunate finds collecting has been carried out by netting under a mercury vapour lamp suspended over a white sheet laid on the ground.



This part of the list includes the super-families Hesperoidea, Papilionoidea, Bombycoidea, Geometroidea, Sphingoidea, Notodontoidea and Noctuoidea. The nomenclature is that of Kloet and Hincks (1972).

Each entry in the list is in the following order :-

Historical information from literature and museums.

County status information which was kindly supplied by T. C. Dunn, Esq.

Current Dene status.

In the historical information reference is sometimes made to localities outside the boundary of Castle Eden Dene Local Nature Reserve because at the time when those records were made, those localities were included in, or were immediately adjacent to, extensions of the Dene woodland. (See map).

HESPEROIDEA

HESPERIDAE

Ochlodes venata faunus (Turati, 1905) Large Skipper

Ornsby (1846) Listed, Wailes (1863) Near the coast 27.vi.1860 Wingate and Robson (1905) One of the last two known captures, 1860 Anon (1969) Denemouth 12.vii.1969.

Found in all suitable localities in Durham, although here it only occurs at Denemouth.

Erynnis tages tages (Linnaeus, 1758) Dingy Skipper

Wailes (1833) Listed, Ornsby (1846) Listed, Perkins (1859) Noted. Found in all suitable localities in Durham. Here it only occurs at Denemouth.

PAPILIONOIDEA

PIERIDAE

Colias croceus (Geoffroy in Fourcroy, 1785) Clouded Yellow

Ornsby (1846) Recorded by T. J. Bunoey, Denemouth, Bold (1860b) Recorded by Backhouse, 1858.

Hooppell (1880) Recorded by Grace, 25.vi.1878 'between Hunter's Pool and the coast'

An immigrant, it occurs occasionally in Durham. Not found.

Pieris brassicae (Linnaeus, 1758) Large White

Anon (1969) Denemouth 12.vii.1969.

Generally decreasing in number in Durham, individuals have been noted throughout the Dene.

Pieris rapae (Linnaeus, 1758) Small White

Anon (1969) Denemouth 12.vii.1969 As in P. Brassicae.

Pieris napi sabellicae (Stephens; 1827) Green-Veined White
 Anon (1957) Denemouth 6.vii.1957
 Found in the more open areas of the Dene.

Anthocharis cardamines britannica (Verity, 1908) Orange Tip
 Wailes (1863) Denemouth 27.vi.1861
 Local in Durham, it occurs throughout the Dene.

LYCAENIDAE

Lycaena phleas eleus (Fabricius, 1798) Small Copper
 Local throughout Durham, only noted from Denemouth.

Cupido minimus (Fuessly, 1775) Small Blue
 Wailes (1833) 1832 or 3, Ornsby (1846) Listed.
 No longer found in Durham.

Aricia artaxerxes salmacis (Stephens 1831) Brown Argus
 Stephens (1831) Recorded by Wailes. Wailes (1833) Confined to Denemouth, only stragglers occurring up to half a mile inland. Ornsby (1846) Listed. South (1890) (3) 12.viii.1888. Maddison (1890) 'not more than 100 yards from the sea'. Robson (1902) 'in several places in Castle Eden Dene, particularly at the Shotton end of Gunner's Pool'. Walker (1907) Specimens exist in the Dale-collection, Oxford University Museum, from the Dene labelled 'Var Allous'

Sunderland Museum coil. (2) 'Castle Eden Dene' 1896; J. Dowsey 'Castle Eden vi-vii, 1912,13 14. See Selman, Luff and Monck (1973) for current Dene Status. Local throughout Durham, three colonies have been found in the Dene.

Polyommatus icarus icarus(Rottemburg, 1775) Common Blue
 Wailes (1863) Denemouth 27.vi.1861, Anon (1957) Denemouth 6.vii.1957 Anon (1969) Denemouth 12.vii.1969, Sunderland Museum Coll. (1) 'Shotton R.'way' 13.vi.1909; (1) 'Castle Eden Garden' 4.vii.1908, Nicholson Coll., Hancock Museum (4) 'Castle Eden' 1922
 Occurs throughout Durham, but only noted, here, from Denemouth and in the Western End.

Celastrina argiolus britanna (Verity, 1919) Holly Blue
 Ornsby (1846) May
 Not see in Durham since the early 1950's

NYMPHALIDAE

Vanessa atalanta (Linnaeus, 1758) Red Admiral
 Anon (1957) Denemouth 6.vii.1957
 A regular immigrant, it has been seen in the Western End (1974) and at Castle Bridge (1975).

Cynthia cardui (Linnaeus, 1758) Painted Lady
 An immigrant, less regular than *V. atalanta*, it was caught at Denemouth in 1972

- Aglais urticae* (Linnaeus, 1758) Small Tortoiseshell
Anon (1957) Denemouth 6.vii.1957
Found throughout Durham. Commonly seen in suitable parts of the Dene.
- Nymphalis antopa* (Linnaeus, 1758) Camberwell Beauty
Kell (1860) Recorded by E. Mounsey 15.ix.1858; Bold (1860b) Noted. Bold (1877)
Specimen sent to Mr. Raine in 1872. Backhouse (1877)
E. Mounsey 'four or five years since'. (This note was written 18.i.1873. However, Bold's journal for 21.ix.1858 mentions one caught by Backhouse himself). Robson (1902) Note in J. Sang's diary for 29.viii.1858 'seen by Keeper at Castle Eden Dene.' Recorded by Barron 8.ii.1869. Wingate and Robson (1905) 'On 8th February, 1869, a specimen was taken near Castle Eden, by Mr. Barron a wood man, who was burning some undergrowth, among which the insect had evidently retired for hibernation. It was much worn, but was evidently hibernating'.
Never common in Durham, it has been very rare since 1900. Not seen.
- Inachis io* (Linnaeus, 1758) Peacock
Spreading in the South eastern parts of Durham. One specimen was caught here on 1.xii.1971 by J. Roe.
- Polygonia c-album* (Linnaeus, 1758) Comma
Ornsby (1846) Listed, Perkins (1859) Noted, Robson (1902) Common in the Dene 'thirty years ago', Noted by J. Sang, W. Backhouse and Eales, Wingate and Robson (1905) Common in the Dene 'fifty years ago'. (An entry in T. Bold's journal, dated 27.ii.1858, reads 'A colliery looking man called today with specimens of Vanessa comma. He tells me that he took about 150 specimens of it in Castle Eden Dene during 1856, and near 20 in 1857. Forgot to ask his name'.)
Not seen in Durham this century.
- Boloria euphrosyne* (Linnaeus, 1758) Pearl-Bordered Fritillary
Ornsby (1846) Listed, Wailes (1863) Near the coast 27.vi.1861, Robson (1902) Abundant in 1858 'above the waterfall'. Wingate and Robson (1905) Disappeared in the 1860's.
One of the rarest British butterflies, it has not been found in Durham for 10 years.
- Argynnis aglaia* (Linnaeus, 1758) Dark Green Fritillary
Ornsby (1846) Listed. Robson (1902) According to G. Wailes, it was found here by W. Backhouse. Wingate and Robson (1905) Noted. Widespread, but not common, in the county, it has been found in the Dene.
- Argynnis paphia* (Linnaeus, 1758) Silver-washed Fritillary
Ornsby (1846) Listed. Robson (1902) Never caught it here but saw specimens dated 1855.
Not found in Durham this century.

Euphydryas aurinia aurinia (Rottemburg, 1775) Marsh Fritillary

Ornsby (1846) Listed. Robson (1902) Noted.

Not noted from Durham in recent years.

SATYRIDAE

Pararge aegeria tircis, (Butler, 1867) Speckled Wood

Robson (1902) Recorded by Backhouse. Not found in the County since the 1850's

Lasiommata megera (Linnaeus, 1767) Wall

(1863) Denemouth 27.vi.1861.

Increasingly common throughout Durham. Found here both in the Western End and at Denemouth.

Erebia ephiphron mnemon, (Haworth 1812) Mountain RingletWailles (1833b) Considers the old records of this species to be misidentifications of small *E. aethiops*.

No reliable records from Durham.

Erebia aethiops aethiops (Esper, 1777) Scotch Argus

Wailles (1833a) Only known English locality 'in abundance,' on dry exposed grassy

spotsnearly opposite the mansion.....'; Ornsby (1846)

Listed. Wilson (1859) Noted. Merryweather (1865) Recorded in 1864. Tristram (1894) 'almost extinct'. Robson (1902) Abundant in 1901 'in all open grassy places down almost to sea level at the mouth of the Dene. Its range extends westward as far as the Dene runs'; Wingate and Robson (1905) Suggest that the British type specimens came from Castle Eden Dene.

Died out in Durham in the early 1900's

Hipparchia semele semele (Linnaeus, 1758) Grayling

Wailles (1833a) 1831 or 2. Ornsby (1846) Denemouth. Robson (1902) J. Sang and W. Backhouse found it here.

No longer occurs in Durham.

Pyronia tithonus britanniae (Verity, 1914) Gatekeeper

Wailles (1833a) Noted. Ornsby (1846) Listed. Hobson (1902) Recorded by Backhouse.

Found in Southern Durham, it has not been seen in the Dene.

Maniola jurtina insularis, Thornsom. 1969) Meadow Brown

Anon (1957) Denemouth 6.vii.1957. Anon (1969) Denemouth 12.vii.1969

Occurs everywhere, throughout Durham. Found throughout the Dene, especially in the open areas.

Coenonympha pamphilus pomphilus (Linnaeus, 1758) Small Heath

Anon (1969) Denemouth 12.vii.1969

Found throughout Durham, but only noted from the Denemouth.

Aphantopus hyperantus (Linnaeus, 1758) Ringlet

Robson (1902) Last seen in Castle Eden Dene in 1860.

Only one colony known in Durham, it has not been found in the Dene.

BOMBYCOIDEA

LASIOCAMPIDAE

Poecilocampa populi, (Linnaeus, 1758) December Moth

Robson (1902) Noted.

Only recorded from the Western End. Very common in the county.

Macrothylacia rubi, (Linnaeus, 1758) Fox Moth

Robson (1902) L.S. Bradley noted 'a few at Castle Eden' Common on the moors, it has not been found in the Dene.

Philudoria potatoaria, (Linnaeus 1758) Drinker Moth

More abundant in Coastal Durham than inland-it is found throughout the Dene.

Phylodesma ilicifolia, (Linnaeus, 1758) Small Lappet

Robson (1902), and Wingate and Robson (1905) record the saga of the only Durham specimen. This was in Dr. Wheeler's collection, and was purchased by Mr. E. R. Banks when his collection was auctioned on July 10th 1895. (see Hall, 1895). The label on the specimen, in Dr. Wheeler's handwriting, reads, 'Castle Eden; J. Sang'. The pin and the setting, however, were similar to those known to have come from Cannock Chase collectors. Wheeler was certain that the specimen came directly from Sang. However, Sang was only known to possess one specimen and this was bought by Tugwell when his collection was sold in June 1882. If Sang had possessed duplicates of such a rare species, it would certainly have been known. It seems likely, therefore, that there was some misunderstanding and that Dr. Wheeler's specimen bore an incorrect label. The food plant, *Vaccinium*, does not occur in Coastal Durham and the nearest locality for the insect is in Southern Yorkshire.

There are no other Durham records.

GEOMETROIDEA

DREPANIDAE

Falcaria lacertinario. (Linnaeus, 1758) Scalloped Hook-tip

Robson (1902) Noted.

No recent records from Durham.

Drepana falcataria, (Linnaeus, 1758) Pebble hook-tip

Robson (1902) Recorded by H. T. Robson.

Occurring throughout Durham, it has been found in three widely separated areas in the Dene,

THYATIRIDAE

- Thyatira batis*, (Linnaeus, 1758) Peach Blossom
 Robson (1902) Recorded by J. J. Wilson 1859.
 Widespread, but never common in Durham, it occurs throughout the Dene, except on the sea-cliffs.
- Ochropacha duplaris*, (Linnaeus, 1761) Common Lutestring
 Wailes (1833a) Listed.
 Two specimens caught in 1973. Common in Durham.
- Achyla flavicornis galbanus*, (Tutt, 1891) Yellow Horned
 Robson (1902) 'common in Edder Acres'.
 Now more common in the West of Durham, it has been found in the Western End of the Dene.

GEOMETRIDAE

- Alsophi'a aescularia*, (Denis and Schiffermuller, 1775) March Moth
 Widespread in the county, it has only been found in the Western End of the Dene.
- Pseudoterna pruinata atropunctaria* (Walker, 1863) Grass Emerald
 Wailes-(1833a) Listed.
 Widespread in Durham, but not found in the Dene.
- Geometra papilionaria*, (Linnaeus, 1758) Large Emerald
 Widespread, but not common in Durham, it occurs in several areas of the Dene.
- Scopula immutata*, (Linnaeus, 1758) Lesser Cream Wave.
 Found-all over Durham, it has once been caught in the Dene.
- Idaea biselata*, (Hufnagel, 1767) Small fan-footed Wave.
 Occurs throughout the county and the Dene.
- Idaea dimidiata*, (Hufnagel, 1767) Single dotted wave
 Widespread in the county, it is the least common of the three *Idaeas* in the Dene.
- Idaea aversata*, (Linnaeus, 1758) Riband Wave
 Trechmann Coll. Sunderland Museum (1) 'Castle Eden Dene' 24.vii.1909
 Found throughout the county and the Dene.
- Xanthorhoe montanata*, (Denis and Schiffermuller, 1775) Silver Ground Carpet
 Wailes (1863) 27.vi.1861, between Gunner's Pool and the coast. Trechmann Coll. Sunderland Museum (1) 'Garden' 19.vi.1909
 Abundant all over Durham and throughout the Dene.

- Xanthorhoe fuluctuata fuluctuata*, (Linnaeus, 1758) Garden Carpet
 Trechmann Coll. Sunderland Museum (2) 'Shotton Wood' 6.vi.1909; (1) 'Garden' 13.viii.1909.
 Widespread in Durham, it has been found in two areas of the Dene.
- Scotopteryx chenopodiata*, (Linnaeus, 1758) Shaded Broad Bar
 Trechmann Coll. Sunderland Museum (4) 'Shorten R'way' 7.viii.1909. Abundant everywhere in Durham including the Dene.
- Epirrhoe alternata*, (Muller, O. F., 1764) Common Carpet
 Trechmann Coll. Sunderland Museum (1) 'C. Eden Dene' 24.vii.1909 Abundant in all parts of Durham and the Dene.
- Campogramma bilineata*, (Linnaeus, 1758) Yellow Shell
 Trechmann Coll. Sunderland Museum (1) 'Garden' 29.vii.1909 Anon (1969) Denemouth 12.vii.1969.
 Occurs throughout the county and the Dene.
- Anticlea badiata*, (Denis and Schiffermuller, 1775) Shoulder Stripe
 Widespread in Durham, it has only been found in one locality in the Dene.
- Anticlea derivata*, (Denis and Schiffermuller, 1775) Streamer
 Common wherever it occurs, it has been found throughout the Dene.
- Mesoleuca albicillata*, (Linnaeus, 1758) Beautiful Carpet
 Wailes (1833a) Listed
 Widespread in Durham, but never common. We have only twice caught it in the Dene, 1971 and 1975.
- Lampropteryx suffumota*, (Denis and Schiffermuller, 1775) Water Carpet
 More abundant in the west of the county, it occurs throughout the Dene.
- Cosmorhoe ocellata*, (Linnaeus, 1758) Purple Bar
 Trechmann Coll. Sunderland Museum (1) 'Shotton Wd' 18.vii.1909 More abundant on the moors, it is found throughout the Dene.
- Eulithis prunata*, (Linnaeus, 1758) The Phoenix
 Widespread in Durham, it is found in the densely wooded areas of the Dene.
- Eulithis testata*, (Linnaeus, 1761) Chevron
 Found throughout Durham, it has only once been caught in the Dene.
- Eulithis mellinata*, (Fabricius, 1787) Spinach
 More abundant in the west of the county, it has only been found at one locality in the Dene.
- Eulithis pyraliata*, (Denis and Schiffermuller, 1775) Barred Straw
 Found throughout Durham, it has occurred in the western end of the Dene.

- Ecliptopera silaceata*, (Denis and Schiffermuller, 1775) Small Phoenix
Widespread in Durham, it has occurred throughout the Dene, except on the sea cliffs.
- Chloroclysta citrata*, (Linnaeus, 1761) Dark Marbled Carpet
Abundant everywhere in Durham, including the Dene.
- Chloroclysta truncata*, (Hufnagel, 1767) Common Marbled Carpet
Trechmann Coll. Sunderland Museum (3) 'Garden' 21.vii.1909; 28.vii.1909;
5.x.1912.
Widespread in Durham, it is less common than *C. citrata* although occurring throughout the Dene.
- Cidaria fulvata*, (Forster, 1771) Barred Yellow
Trechmann Coll. Sunderland Museum (1) 'Garden' 11.vii.1909 Widespread in Durham, it occurs throughout the Dene.
- Plemyria rubiginata rubiginata*, (Denis and Schiffermuller, 1775) Blue Bordered Carpet
Robson (1902) Gardner, 1891
Common in Durham, it has not been found in the Dene.
- Thera firmata*, (Hubner, 1819-22) Pine Carpet
Widespread, but not as common as the two following species. It has been found in two areas of the Dene.
- Thera obeliscata*, (Hubner, 1787) Grey Pine Carpet
Trechmann Coll. Sunderland Museum (3) 'Shotton Wood' 13.vi.1909; (3) 'Shotton Wood' 20.vi.1909.
Occurs everywhere in the county and in all coniferous areas of the Dene.
- Thera variata*, (Denis and Schiffermuller, 1775) Spruce Carpet
Robson (1902) does not separate this from the preceding species, but says 'I have taken it freely in Castle Eden Dene in years gone bye'.
Occurs almost everywhere in the county but not found in the Dene
- Thera cognata*, (Thunberg, 1792) Chestnut Coloured Carpet
By Stephens (1827 - 1837) 'Taken at Castle Eden Dean in June by G. Wailes, Esq., to whom I am indebted for specimens'. Robson (1902) Recorded by Wailes vi. 1834
No recent records from the county.
- Thera juniperata*, (Linnaeus, 1758) Juniper Carpet
Wailes (1833a) 'We took this very rare moth this season, in some plenty amongst the junipers'.
No recent Durham records.
- Electrophaes corylata*, (Thunberg, 1792) Broken Barred Carpet
Trechmann Coll. Sunderland Museum (2) 'Shotton Wood' 6.vi.1909; (1) 'Shotton Wood' 20.vi.1909; (1) 'Shotton' 11.vii.1909.
Widespread, but not common in Durham it occurs sparingly throughout the Dene.

- Colostygia multistrigaria*, (Haworth, 1809) Mottled Grey
Robson (1902) Recorded by Brady.
Very common in Durham, it has not been found in the Dene.
- Colostygia pectinataria*, (Knoch, 1781) Green Carpet
Occurs everywhere in Durham, and throughout the Dene.
- Hydriomena furcata*, (Thunberg, 1184) July Highflyer
Trechmann Coll. Sunderland Museum 'Cas. Eden' viii. 1899 Widespread in Durham, it is common throughout the Dene.
- Hydriomena impluviata*, (Denis and Schiffermuller, 1775) May Highflyer
Robson (1902) occasionally - Robson'. Wingate and Robson (1905) Noted. Local in Durham, it has not been found in the Dene.
- Epirrita dilutata*, (Denis and Schiffermuller, 1775) November Moth
Trechmann Coll. Sunderland Museum (1) 'Castle Eden: 1.x.1896 Recorded from only two areas in the Dene. Very common in the county:
- Epirrita christyi*, (Alien, 1906) Pale November Moth
Occurs throughout Durham and found in two areas in the Dene.
- Epirrita autumnata*, (Borkhausen, 1794) Autumnal
Trechmann Coll. Sunderland Museum (1) 'Shotton Wood' 6. x. 1912 Found throughout Durham, but only known from one area in the Dene.
- Operophtera brumata*, (Linnaeus, 1758) Winter Moth
Trechmann Coll. Sunderland Museum (1881) 'C. Eden' 1896
Only recorded from the western end of the Dene. Very common in the county
- Operophtera fagata*, (Scharfenberg, 1805) Northern Winter Moth
Widespread in Durham, but only recorded from the western end of the Dene.
- Perizoma taeniatum*, (Stephens 1831) Barred Carpet
Wailes (1833a) as '*Emmelesia ericitata*' (see Wailes 1833b). 'The only specimen which has occurred hereabout. I met with in a damp part of the dean on our last visit'. Hodgkinson (1895) Recorded by J.C. Dale, 1825. Robson (1902) First taken by J. C. Dale. Found some years later by Mr. G. Wailes who found a small light coloured moth flying in great abundance in all parts of the Dene. He concluded it was *albulata*, and without examining them he boxed one or two only. On reaching home he found they were this rare species. He returned to the Dene next day, and many times subsequently but never saw another'. Wingate and Robson (1905) 'Hundreds of collectors have been since, but no one has taken it there again'. Castle Eden Dene is the only known Durham locality, but so far, we also have failed to find it here.

- Peroroma attinitatum*, (Stephens, 1831) Rivulet
 Robson (19.02) 'We find it regularly but never abundantly in Castle Eden Dene'.
 Found throughout Durham, it is common in the Dene.
- Perizoma alchemillata*, (Linnaeus, 1758) Small Rivulet.
 Robson (1902) 'Castle Edennot so plentifully as its larger relation'.
 Widespread in the county and found throughout the Dene.
- Perizoma minorata ericetata* (Stephens, 1831) Health Rivulet
 Wailes (1833a) Recorded in error for *P. taeniatum*. (see Wailes 1833b)
 Widespread, where heather grows, it has not been found in the Dene.
- Perizoma albulata*, (Denis and Schiffermuller, 1775) Grass Rivulet
 Trechmann Coil. Sunderland Museum. (2) 'Shotton Wood' 6.vi.1909; (1)
 'Shotton Wood'13.vi.1909
 Widespread in the county, it occurs sparingly throughout the Dene.
- Perizoma tlavotasciata*, (Thunberg, 1792) Sandy Carpet
 Found all over Durham, but only occurs in the western end of the Dene.
- Perizoma didymata*, (Linnaeus, 1758) Twin Spot Carpet.
 Wailes (1863) 27.vi.1861 Between Gunner's Pooi and the coast. Trechmann
 Coll. Sunderland Museum (2) 'Cas .. Eden' viii.1899; (1) 'Cas. Eden' ix. 1899; (1)
 'C. Eden Dene' 24.vii.1909; (1) 'C. Eden 24.vii.1909; (1) 'Garden'
 3.viii.1909; (1) 'Shotton Wd' 7.viii.1909.
 Abundant everywhere in Durham and the Dene.
- Eupithecia tenuiata*, (Hubner, 1809-13) Slender Pug
 Robson (1902) Recorded by Sang 12.viii.1855, 8.viii.1858
 Common in the west of the County, this is the first record of its occurrence near
 the coast.
- Eupithecia pulchellata*, (Stephens, 1831) Foxglove Pug
 Abundant in Durham, it has been found near the village.
- Eupithecia satyrata*, [Hubner, 1809 - 13) Satyr Pug
 Stainton (1895) Noted. Morris (1871) Noted. Robson (1902) Noted. Locally
 plentiful in the county, but not found in the Dene.
- Eupithecia absinthiata*, (Clerck, 1759) Wormwood Pug
 Widespread in Durham, it has only been found in the western end of the Dene.
- Eupithecia vulgata vulgata*, (Haworth, 1809) Common Pug
 Abundant throughout the county, it has only been taken at Castle Bridge.
- Eupithecia tripunctaria* (Herrich -Schaffer, 1852) White-Spotted Pug
 Fairly common all over the county, it has only been found at Castle Bridge.

- Eupithecia subfuscata*, (Haworth, 1809) Grey Pug
Fairly common in Durham, it has been found throughout the Dene.
- Eupithecia icterata subfulvata*, (Haworth 1809) Tawny Speckled Pug
Abundant throughout the county and the Dene.
- Eupithecia succenturiata*, [Linnaeus 1758) Bordered Pug
Abundant in Durham it has been found at Denemouth.
- Eupithecia indigata*, (Hubner 1809 - 13) Ochreous Pug
Robson (1902) Gardner, Edderacres.
Very common in the county, but not found in the Dene.
- Eupithecia abbreviata* (Stephens, 1831) Brindled Pug
One of the commonest pugs, it has been found in two areas in the Dene.
- Eupithecia pusillata pusillata*, (Denis and Schiffermuller, 1775) Juniper Pug
Robson (1902) 'The Manual [Stainton, 1859) gives Newcastle as a habitat for this species, but I believe the specimens referred to were taken in Castle Eden Dene, at the Shotton end of which as well as the mouth, the insect occurs in some numbers'.
Found where juniper still grows in the county. Not found in the Dene.
- Eupithecia loricata*, (Freyer, 1842) Larch Pug
Common where larch grows in the county, it occurs in all suitable areas in the Dene.
- Eupithecia tanillaria* (Boisduval, 1840) Dwarf Pug
Spreading rapidly in the last 20 years, it has been taken at Castle Bridge.
- Chloroclystis rectangulata* (Linnaeus, 1758) Green Pug
Widespread in Durham, it occurs in the Dene, near the village.
- Aplocera plagiata*, (Linnaeus, 1758) Treble Bar
Wailes (1833a) Listed.
Very common in the county, it has not been found in the Dene.
- Odezia atrata* (Linnaeus, 1758) Chimney Sweeper
Trechmann Coll. Sunderland Museum (2) 'Garden' 15.vi.1909 and 27.vi.1909
Occasionally seen in the Dene, although never caught. It occurs all round the outside. Widespread in Durham.
- Discoloxia bolmeri* (Curtis 1832) Blomer's Rivulet
Wailes (1833a) 'The first notice I had of this beautiful moth was from my friend Mr. Dale, who casually mentioned his having received a drawing of it from Captain Blomer who bred it from the pupa in the spring of 1831. In July I met with half a dozen specimens at Castle Eden, which, however ,

Captain Blomer did not appear to recognise, when I had the pleasure of seeing him last September; and Mr. Curtis in November, shewed me a drawing, made from a specimen I sent Mr. Sparshall, and first intimated it was quite new. It will appear in one of his early numbers. I succeeded in taking about twenty specimens this season....' Stainton (1859) Noted. Wailes (1863) 27.vi.1861. Between Gunner's Pool and the coast, Stated that it was first discovered by Wailes in July 1831. Merryweather (1865) recorded in 1864. Robson (1902) corrects Wailes (1863). stating that Captain Blomer caught it first, and that it 'is still plentiful in Castle Eden Dene, where I took several.in 1869. Mr. Sang records it in his diary as being taken at Castle Eden from 3rd to 21st July; I have taken it as early as 18th June. Wingate and Robson (1905) 'was first taken in Castle Eden Dene, in July 1831. It may still be found there : Carter (1938) 9.vii.1938. Fresh male. Castle Eden Dene is the type locality and the only Durham locality. It is found throughout the Dene, except on the sea cliffs,

Trichopteryx carpinata (Borkhausen 1794) Early Tooth-Striped.

Robson (1902) 'I have taken it rather freely in Castle Eden Dene,Wingate and Robson (1905) Noted.

More abundant in the west of the county, it has not been found in the Dene.

Abraxas grossulariata (Linnaeus, 1758) Magpie Moth

Trechmann Coll. Sunderland Museum (2) 'Castle Eden' viii.1899.

Widespread in Durham and found throughout the Dene.

Abraxas sylvata (Scopoli 1763) Clouded Magpie

Wailes (1833a) Noted. Wailes (1863) 27.vi.1861 Between Gunner's Pool and the coast. 'approaching *ab. pantaria* of S. France'. Wingate and Robson (1905)

'one specimen was taken in Castle Eden Dene of an unusually pale character'.
Gent

(1957) 20.x.1957

Widespread in Durham, particularly in the east, it occurs throughout the Dene.

Lomaspilis marginata (Linnaeus, 1758) Clouded Border

Perkins (1859) Noted.

Occurs everywhere in Durham and is abundant in the Dene.

Semiothisa liturata (Clerck, 1759) Tawny-barred Angle

Robson (1902) Edderacres.

Widespread, but never common in Durham, it has only been found at Castle Bridge.

Semiothisa clathrata (Linnaeus, 1758) Latticed Heath

Trechmann Coll. Sunderland Museum (2) 'Shotton R'way' 6.vi.1909; (3) 'Shotton R'way' 13.vi.1909. Anon (1969) Denemouth 12.vii.1969

Occurs everywhere in Durham and is abundant in the Dene.

- Semiothiso wauaria* (Linnaeus, 1758) V-moth
Widespread, but never common in Durham, it has been found in three separate areas of the Dene.
- Petrophora chlorosata* (Scopoli, 1763) Brown Silver Lines
Occurs throughout the county, but has only been taken in the western end of the Dene.
- Opisthograptis luteolata* (Linnaeus, 1758) Brimstone
Trechmann Coll. Sunderland Museum (1) 'C. Eden Dene' 24.vii.1909 Abundant in all parts of Durham and in the Dene.
- Epione repandaria* (Hufnagel, 1767) Bordered Beauty
Wailles (1833a) Listed as '*Alcis repandaria*'. This is presumably *Alcis repandata* (Linnaeus, 1758).
No definite records from the county, it has not been found in the Dene.
- Apeira syringaria* (Linnaeus, 1758) Lilac Beauty
Widespread, but not common in Durham, it has been found in three areas in the Dene.
- Odontopera bidentata* (Clerck, 1759) Scalloped Hazel
Trechmann Coll. Sunderland Museum (1) 'Shotton Wood, 6.vi.1909; (2) 'Shotton Wood' 13.vi.1909; (1) 'Shotton Wood' 30.v.1910
Widespread in Durham, and found throughout the Dene.
- Selenia dentaria* (Fabricius, 1775) Early Thorn
Trechmann Coll. Sunderland Museum 'Shotton, larva Aug. '90, Birch'. Abundant everywhere in Durham, and found throughout the Dene.
- Cracallis elinguaris* (Linnaeus 1758) Scalloped Oak
Trechmann Coll. Sunderland Museum 'Sitting on Primrose Leaf, Hudworth Tower'. 17.ix.1899.
Occurs in all parts of Durham and has been found throughout the Dene
- Ourapteryx sambucaria* (Linnaeus, 1758) Swallowtail Moth
Widespread in Durham, it occurs throughout the Dene.
- Apocheima pilosaria* (Denis and Schiffmuller, 1775) Pale Brindled Beauty
Widespread in Durham, it has only been found in two areas in the Dene.
- Biston betularia* (Linnaeus, 1758) Peppered Moth
Robson (1902) 'Mr. C. Trechmann, jun., found a black one in. Castle Eden Dene'.
Trechmann Coll. Sunderland Museum 'Castle Eden' vi.1897 (*ab carbonaria*.)
Widespread in Durham, only *ab carbonaria* has been found here.

- Agriopsis aurantiaria* (Hubner, 1796 - 99) Scarce Umber
Widespread in the county, it occurs in the western end of the Dene.
- Agriopsis marginaria* (Fabricius, 1777) Dotted Border
Trechmann Coll. Sunderland Museum. (2) 'Castle Eden' 7.iii.1897; (3) 'Castle Eden' 20.iii.1909; (1) 'C. Eden' 1.iii.1912; (1) 'C. Eden' 7.iii.1912; (1) 'C. Eden' 8.iii.1912
Common in the county, it has not been found in the Dene.
- Erannis defolaria* (Clerck, 1759) Mottled Umber
It has been found in two parts of the Dene. Very common in Durham.
- Peribatodes rhomboidaria* (Denis and Schiffermuller, 1775) Willow Beauty
Harrison (1950) 'melanic forms' 8.viii.1950
Widespread in Durham and abundant throughout the Dene.
- Alcis repandata* (Linnaeus, 1758) Mottled Beauty
Wailles (1833a) Lists '*Alcis repondaria*' and '*Alcis conversaria*-Mr. Currie was fortunate enough to meet with single specimens both years'. Robson (1902) *ab. conversaria* Recorded by Rev. J. G. Robinson, 22.viii.1885. Trechmann Coll. Sunderland Museum. 'Shotton Wd' 18.vii.1909.
Found all over Durham and extremely abundant - in various shades of grey - in all parts of the Dene.
- Serraca punctinalis* (Scopoli, 1763) Pale Oak Beauty
Robson (1902) Recorded by J. Wilson. Robson says that this must have been *Ectropis erepuseularia*
Not common in Durham, it has only been caught twice in the Dene, both times at Castle Bridge.
- Cleorodes lichenaria* (Hufnagel 1767) Brussels Lace
Wailles (1833a) Listed Occurs in western Durham where lichen growth is thick. It has not been found in the Dene.
- Ectropis bistortata* (Goeze, 1781) The Engrailed
Trechmann Coll. Sunderland Museum (1) 'Castle Eden Dene' v.1896; (1) 'Shotton Wood' 6.vi.1909; (1) 'Shotton Wood' 13.vi.1909; (1) 'C. E. Dene' 22.v.1910
Widespread in Durham, it occurs sparingly throughout the Dene.
- Ectropis crepuscularia* (Denis and Schiffermuller, 1775) Small Engrailed
Ornsby (1846) 'Castle Eden Dene, May'. Robson (1902) 'abundant in Castle Eden'. Wingate and Robson (1905) Noted.
This has only been caught in the 'Garden of Eden', Common in the county.

- Bupalus piniaria* (Linnaeus, 1758) Bordered White
 Robson (1902) 'most abundantly in an offshoot of Castle Eden Dene near Shotton, where it is a pretty sight to see the males on the wing on a fine sunny morning'. Trechmann Coll. Sunderland Museum. (1) 'Shotton Wood' 6.vi.1909; (1) 'Shotton Wood' 13.vi.1909; (2) 'Shotton Wood' 20.vi.1909.
 Widespread in Durham, it occurs in all the Pine plantations in the Dene.
- Cabera pusaria* (Linnaeus, 1758) Common White Wave
 Occurs throughout Durham and is abundant in the Dene.
- Cabera exanthemata* (Scopoli, 1763) Common Wave
 Just as abundant and widespread as *C. pusaria*
- Lomographa temerata* (Denis and Schiffermuller, 1775) Clouded Silver
 Rare in Durham, it has only once been caught in the Dene, at Castle Bridge.
- Campaea margaritata* (Linnaeus, 1767) Light Emerald
 Wailes (1833a) Noted. South (1890) 'one poor specimen' 12.viii.1888, Trechmann Coll. Sunderland Museum (3) 'Shotton Wd', 18.vii.1909.
 Widespread in Durham, it is abundant in all parts of the Dene.
- Hylaea fasclarla* (Linnaeus, 1758) Barred Red
 Robson (1902) 'sparingly-at Edder Acres' Wingate and Robson (1905) Edder Acres.
 More abundant in the west of Durham, it occurs in the conifer plantations in the western end of the Dene.
- Gnophos obscuratus* (Denis and Schiffermuller, 1775) Annulet
 Robson (1902) Recorded by Corder.
 Occurs locally on the Durham coast, it has only been found on the sea cliffs at Denemouth.

SPHINGOIDEA

SPHINGIDAE

- Agrius convolvuli* (Linnaeus, 1758) Convolvulus Hawk
 Sunderland Museum CoII. 'Robinson's Garden Castle Eden' 23.viii.1901
 An immigrant, it is occasionally found in Durham. It has not been found in Dene.
- Laothoe populi* (Linnaeus 1758) Poplar Hawk
 The commonest and most widespread Hawk in Durham, it has been found in most areas west of the Garden of Eden.

Hyles gallii (Rottemburg, 1775) Bedstraw Hawk

Dunn (1973) '26.vii.1973 A female captured whilst sitting on a shed door at Peterlee' Brought to W. Monck. Now in Sheppard's collection. Peterlee is on the north side of the Dene. This record is included as our most notable 'near-miss'.
A rare immigrant in Durham.

Deilephila elpenor (Linnaeus, 1758) Elephant Hawk

This has become more abundant in Durham over the past few years, it was twice caught in 1974, at both ends of the Dene.

NOTODONTOIDEA

NOTODONTIDAE

Cerura vinula (Linnaeus, 1758) Puss Moth

Ornsby (1846) Listed. Trechmann Coll. Sunderland Museum 'Castle Eden on paling of garden' 30.v.1898, emerged 2.vi.1898.
Widespread in Durham, it has been found, as larvae, throughout the Dene.

Harpyia furcula (Clerck, 1759) Sallow Kitten

Trechmann Coli. Sunderland Museum 'larva found Castle Eden Dene 1895?'
Reared by J. Gardner. Robson's Nat. Hist, Transact. pg. 87.' Robson (1902) 'Mr. C. Trechmann, Jun., has found the larva at Castle Eden.'
Never common in Durham, two specimens were caught in 1974 in the Garden of Eden.

Notodonta dromedarius (Linnaeus, 1767) Iron Prominent

Hobson (1902) Recorded by C. Trechmann Jun., 1897. Trechmann Coll. Sunderland Museum 'Shotton dene - young larva' 18.19.viii.1899
Widespread, but never particularly common in Durham, we have only found it in the western end of the Dene.

Eligmodonta ziczac (Linnaeus 1758) Pebble Prominent

Robson (1902) Recorded by 'C. Trechmann Jnr., from Castle Eden.'
More common in the west of the county, it has only been caught in the Garden of Eden.

Pheosia gnoma (Fabricius, 1777) Lesser Swallow Prominent

Robson (1902) 'sparingly in Castle Eden' and 'Mr. Gardner has also met with it at Edder Acres.'
Widespread in Durham, it has been found from the Garden of Eden westwards.

Pheosia tremolo (Clerck, 1759) Swallow Prominent

Robson (1902) 'Mr. Gardner has also met with it at Edder Acres, always in the larva state.'
Very common in the county, it has not been found in the Dene.

- Philodon capucina* (Linnaeus, 1758) Coxcomb Prominent
Wailes (1833a) Listed. Trechmann Coll. Sunderland Museum. 'Young larva
Shotton Dene.' 13.viii.1899
The most abundant Prominent in Durham, it occurs throughout the Dene.
- Diloba caeruleocephala* (Linnaeus, 1785) Figure of Eight
Widespread, but not common, in Durham, it has been found near the village.

NOCTUOIDEA

LYMANTRIIDAE

- Orgyia antiquo* (Linnaeus, 1758) Vapourer
Ornsby (1846) Listed.
Becoming rare in Durham, it has not been found in the Dene.
- Dasychira fusciflora* (Linnaeus, 1758) Dark Tussock
Wailes (1833a) Listed
Occurs in moorland areas, it has not been found in the Dene.

ARCTIIDAE

- Parasemia plantaginis* (Linnaeus, 1758) Wood Tiger
Wailes (1833a) Listed. Ornsby (1846) "On the sea banks near Castle Eden."
Found on the moors, it has not been noted from the Dene.
- Arctia caja* (Linnaeus, 1758) Garden Tiger
Abundant in Durham, it has only been found at Denemouth.
- Spilosoma lubricipeda* (Linnaeus, 1758) White Ermine
Widespread in Durham, it has only been found west of the village.
- Spilosoma luteum* (Hufnagel, 1766) Buff Ermine
As abundant and widespread as *A. lubricipeda*, it is thinly distributed throughout
the Dene.
- Diaphora mendica* (Clerck, 1759) Muslin Moth
Robson (1902) Noted.
Common in Durham it has not been found in the Dene.
- Phragmatobia fuliginosa* (Linnaeus, 1758) Ruby Tiger
Ornsby (1846) Listed ,
Widespread in Durham, it has not been found in the Dene.

NOLIDAE

- Nota confusalis* (Herrich-Schäffer, 1847) Least Black Arches
Perkins (1859) Noted. Robson (1902) 'not common in Castle Eden.' Common in
woodlands, two were found at Castle Bridge in 1974.

NOCTUIDAE

- Euxoa tritici* (Linnaeus, 1761) White Line Dart.
Common along the Durham coast. One specimen was found at Denemouth in 1973.
- Euxoa nigricans* (Linnaeus, 1761) Garden Dart
Widespread but not common in Durham. It has only been found at Denemouth.
- Agrotis exclamationis* (Linnaeus, 1758) Heart and Dart
Abundant throughout the county, it has been found in all areas of the Dene.
- Agrotis ipsilon* (Hufnagel, 1766) Dark Sword-grass.
Widespread and abundant in some years in Durham, it has only been recorded from 'Big Beech.'
- Ochropleura plecta* (Linnaeus 1761) Flame Shoulder.
Wales (1833a) Listed.
Widespread in Durham, it is found throughout the Dene.
- Noctua pronuba* (Linnaeus, 1758) Large Yellow Underwing
Sunderland Museum Coll. 'Castle Eden' viii.1899. Widespread and excessively abundant everywhere, it occurs in very high numbers throughout the Dene.
- Noctua comes* (Hubner, 1809 - 13) Lesser Yellow Underwing.
Found all over the county, it occurs throughout the Dene.
- Noctua fimbriata* (Schreber, 1759) Broad-bordered Yellow Underwing.
Never common in Durham it has been found in two separate areas in the Dene.
- Noctua janthina* (Denis and Schiffermuller, 1775) Lesser Broad Border
Widespread in Durham, it is common throughout the Dene.
- Spaelotis ravida* Denis and Schiffermuller, 1775) Stout Dart.
Robson (1902) Recorded by Sang vii. 1855
Found on the Durham coast, it has only been caught in the Garden of Eden.
- Graphiphora augur* (Fabricius, 1775) Double Dart
Wales (1833a) Listed.
Widespread in the County, it is found throughout the Dene.
- Paradiarsia glareosa* (Esper, 1788) Autumnal Rustic
Found everywhere in Durham, it occurs in all areas except Denemouth.
- Diarsia mendica* (Fabricius, 1775) Ingraided Clay.
Wales (1833a) Listed. Trechmann Coll. Sunderland Museum (2) 'House' 10.vii.1909 'C. Eden House' 18.vii.1909
Widespread in Durham, it occurs throughout the Dene.
- Diarsia dahlia* (Huhner, 1809-13) Barred Chestnut
Never common in Durham, it has been found near the village.

- Diarsia brunnea* (Denis and Schiffermuller, 1775) Purple Clay
 Wailes (1833a) Listed. Robson (1902) 'at the edge of a small plantation near Castle Eden' and Sang 'Castle Eden Dene.'
 Never common in Durham, it occurs frequently in all areas except Denemouth.
- Diarsia rubi* (Vieweg, 1790) Small Square Spot.
 Abundant In the county, it is found throughout the Dene.
- Xestia e-nigrum* (Linnaeus, 1758) Setaceous Hebrew Character
 Wailes (1833a) Listed. Widespread in Durham, it is found throughout the Dene .
- Xestia triangulum* (Hufnagel, 1766) Double Square Spot
 Widespread in Durham, it is found in all areas of the Dene.
- Xestia baja* (Denis and Schiffermuller, 1775) Dotted Clay
 More abundant in moorland areas, it is found throughout the Dene.
- Xestia sexstrigata* (Haworth, 1809) Six-striped Rustic
 Widespread in Durham it is found throughout the Dene.
- Xestia xanthographa* (Denis and Schiffermuller, 1775) Square Spot Rustic
 Trechmann Coll. Sunderland Museum 'Garden' 12.viii.1909.
 Common all over Durham, being a grass land species It has only been found near the village and at Denemouth.
- Naenia typica* (Linnaeus, 1758) Gothic.
 Widespread in Durham, it has been caught throughout the Dene, except at Denemouth.
- Eurois occulta* [Linnaeus, 1758) Great Brocade.
 Robson (1902) 'Mr. C. Trechmann Junr., however, found one on the trunk of a fir tree at Castle Eden in 1897' Trechmann Coll. Sunderland Museum 'on Fir tree Shotton way bank' 7.viii.1897
 An occasional visitor to Durham, it has not been found in the Dene.
- Anaplectoides prasina* (Denis and Schiffermuller, 1775) Green Arches.
 Wailes (1833a) Listed. Robson (1902) Recorded by Sang 1853
 More abundant in the west of the county, it has been found In all areas except Denemouth.
- Hada nana* (Hufnagel, 1766) Shears
 Wailes (1833a) Listed.
 Common in Durham, it has not been found in the Dene.
- Polio nebuloso* (Hufnagel, 1766) Grey Arches Robson (1902) Noted.
 No recent records from Durham, it has not been found in the Dene.
- Mamestra brassicae* (Linnaeus, 1758) Cabbage Moth
 Widespread in Durham, it has only occurred near the Village.

- Ceramica pisi* (Linnaeus, 1758) Broom Moth
Widespread in the county, it has been caught near Gunner's Pool.
- Lacanobia thalassina* (Hufnagel, 1766) Pale Shouldered Brocade.
Widespread in Durham, it has been found throughout the Dene.
- Lacanobia oleracea* (Linnaeus, 1758) Bright line Brown eye
Widespread in the county and found in all areas of the Dene.
- Hadena rivularis* (Fabricius, 1775) Campion
Robson (1902) Recorded by Sang.
Common in the county, it has not been found in the Dene.
- Hadena perplexa perplexa* (Denis and Schiffmuller, 1775) Tawny Shears
Trechmann Coll. Sunderland Museum 'C. Eden' vii.1896
Increasing throughout Durham, it has been found near the village and at Denemouth
- Hadena confusa* (Hufnagel, 1766) Marbled Coronet
Trechmann Coll. Sunderland Museum 'Shotton Wood' 20.vi.1909 'Shotton Wd on Fir' 6.vii.1909
Widespread, but not abundant in Durham, it has not been found in the Dene.
- Hadena bicruris* (Hufnagel, 1766) Lychnis
Decreasing in Durham, it has only been found at Denemouth.
- Cerapteryx graminis* (Linnaeus, 1758) Antler Moth
Wailes (1833a) 'have generally met with a specimen or two of this moth on the wing, in" the day-time, in the dean.' Ornsby (1846) Listed. Trechmann Coll. Sunderland Museum 'C. Eden Garden' 4.viii-1909 and 12.viii.1909
Abundant all over Durham, it is a grassland species and usually found near the village. One specimen has been caught at Castle Bridge.
- Panolis flammea* (Denis and Schiffmuller, 1775) Pine Beauty
Trechmann Coll. Sunderland Museum. 'Shotton Wood in fir' 17.iv.1909 Widespread in Durham, it has not been found in the Dene.
- Orthosia cruda* (Denis and Schiffmuller, 1775) Small Quaker
Local in the county, it has been found at Garden of Eden
- Orthosia stabills* (Denis and Schiffmuller, 1775) Common Quaker
Widespread in Durham, it has been taken between Castle Bridge and the Garden of Eden.
- Orthosia incerta* (Hufnagel, 1766) Clouded Drab
Trechmann Coll. Sunderland Museum. 'C. Eden' 20.v.1909 Widespread in Durham, it has been found throughout the Dene.
- Orthosia gothica* (Linnaeus, 1758) Hebrew Character
Trechmann Coll. Sunderland Museum. 'C. Eden' 20.v.1909 30.iii.1910
Found throughout Durham, it has occurred in all areas of the Dene except Denemouth.

- Mythimna conigera* (Denis and Schiffermüller 1775) Brown Line Bright Eye
Widespread in the county, it is found in all areas of the Dene.
- Mythimna ferrago* (Fabricius, 1781) Clay
Found all over Durham and throughout the Dene.
- Mythimna impure* (Hubner 1803-8) Smoky Wainscot
Widespread in Durham, it is abundant in the Dene.
- Mythimna pallens* (Linnaeus, 1758) Common Wainscot
Widespread in Durham, it is as common as *M. impure*,
- Mythimna comma* (Linnaeus, 1761) Shoulder-Striped Wainscot
Wailes (1833a) Listed.
The least abundant of the common Wainscots in Durham, it has only been found at Denemouth.
- Cucullia umbratica* (Linnaeus, 1758) The Shark
Trechmann Coll. Sunderland Museum 'C. Eden' 1900.
Widespread, but never common in Durham. One specimen was caught in the Western End in 1974.
- Brachylomia viminalis* (Fabricius, 1775) Minor Shoulder Knot
More abundant on the moors, it has been found in the wooded parts of the Dene,
- Dasypolia templi* (Thunberg, 1792) Brindled Ochre
Trechmann Coll. Sunderland Museum 'C. Eden' Autumn 1909 Occurs in western Durham, it has not been found in the Dene.
- Xylena vetusta* (Hubner, 1809-13) Red Sword Grass
Widespread in Durham, one was caught at 'Big Beech' in 1974
- Allophyes oxvicanthae* (Linnaeus, 1758) Green Brindled Crescent
Trechmann Coll. Sunderland Museum. 'C. Eden' 1.x.1896 Widespread in the county and found throughout the Dene.
- Dichonia aprilina* (Linnaeus, 1758) Merveille du Jour.
Quite common in Durham, one was caught near the village.
- Conistra vaccinii* (Linnaeus, 1761) The Chestnut
Widespread in Durham, one has been caught at Castle Bridge
- Antitype chi* (Linnaeus, 1761) Grey Chi
Robson (1891) 'I never took anything but the type there, and very few at the'
Robson (1902) Recorded by C. Trechmann, Jnr., Var olivacea Stephens, 1831.
1897. Trechmann Coll. Sunderland Museum. "Cas. eden' 18.viii.1899 'On Wall Hudworth Tower C. Eden' 20.viii.1899
Quite common in the county, it has not been found in the Dene.

- Eupsilia transversa* (Hufnagel, 1766) Satellite
Widespread, but not common, in Durham, it has only been found twice in different areas of the Dene.
- Agrochola circumcellaris* (Hufnagel, 1766) Brick
Widespread in the county, it has been found in the western part of the Dene.
- Agrochola macilenta* (Hubner, 1808-09) Yellow-Line Quaker
Found all over Durham, it occurs in the Western end of the Dene.
- Agrochola helvola* (Linnaeus 1758) Flounced Chestnut
Widespread, but not common, in Durham, it occurs throughout the Dene.
- Agrochola litura* (Linnaeus, 1761) Brown Spot Pinion
Widespread in the county, it has been found in the western end of the Dene.
- Agrochola lychmidis* (Denis and Schiffermuller, 1775) Beaded Chestnut
Although Durham is near its British Northern Limit, it is common and has been found throughout the Dene, except at Denemouth.
- Xanthia citrigo* (Linnaeus, 1758) Orange Sallow
Generally uncommon in Durham, it has been caught near the village
- Xanthia togata* (Esper 1788) Pink-barred Sallow
Widespread in the county, it has been found throughout the Dene especially in the Western end.
- Xanthia icteritia* (Hufnagel, 1766) Sallow
Abundant all over Durham, it has occurred in the Western end of the Dene.
- Acronicta psi* (Linnaeus, 1758) Grey Dagger
Abundant all over the county, it occurs throughout the Dene, except at the coast.
- Cryphia domestica* (Hufnagel, 1766) Marbled Beauty
Common, where it occurs, it has once been caught in the Western end of the Dene.
- Amphipyra tragopoginis* (Clerck, 1759) Mouse
Trechmann Coll. Sunderland Museum 'Cas. Eden. viii.1899 Widespread in Durham, it has been found throughout the Dene.
- Rusina ferruginea* (Esper, 1785) Brown Rustic
Trechmann Coll. Sunderland Museum. 'in House C. Ed.' 19.iv.1909 Widespread in the county and found throughout the Dene.
- Thalpophila matura* (Hufnagel, 1766) Straw Underwing
Widespread, but not common, in Durham; it has been found near the village and at Denemouth.
- Euplexia tucipara* (Linnaeus, 1758) Small Angle Shades
Wales (1833a) Listed. Robson (1902) Noted.
Found all over Durham it occurs throughout the Dene

- Phlogophora mellculosa* (Linnaeus, 1758) Angle Shades
One found on the sea cliffs in 1974, Common in Durham.
- Cosmia trapezina* (Linnaeus, 1758) Dun Bar
Trechmann Coll. Sunderland Museum 'Cas. Eden' 2.ix.1899; 'C. Eden' 6.ix.1899.
Widespread in the county, it has been caught in all parts of the Dene except at the coast.
- Apamea monoglypa* (Hufnagel, 1766) Dark Arches
Trechmann Coll. Sunderland Museum 'Shotton Wd.' 18.vii.1309
Widespread and abundant in Durham, it has been found throughout the Dene.
- Apamea lithoxylaea* (Denis and Schiffermuller, 1775) Light Arches
Widespread in Durham, it occurs occasionally throughout the Dene.
- Apamea sublustris* (Esper, 1788) Reddish Light Arches
Wailes (1833a) 'I took a specimen flying in the evening in July, 1831; and Mr. Currie captured another this year, Both occurred at least three miles inland.'
No recent Durham records, it has not been found in the Dene.
- Apamea crenata* (Hufnagel 1766) Clouded Bordered Brindle
Trechmann Coll. Sunderland Museum 'Garden' 7.vii.1909; 'Castle Eden' 9.vi.1911
Widespread in the county it has been found throughout the Dene except at the coast.
- Apamea epomidion* (Haworth 1809) Clouded Brindle
Restricted to limestone areas and hence quite rare in Durham, it has been found at Castle Bridge and the Garden of Eden.
- Apamea remissa* (Hubner, 1808-09) Dusky Brocade
Widespread in Durham and found throughout the Dene.
- Apamea sordens* (Hufnagel, 1766) Rustic Shoulder Knot
Becoming rarer over the last decade, it has been found throughout the Dene.
- Apamea ophiogramma* (Esper, 1793) Double Lobed
Rare in Durham, one was caught at Castle Bridge.
- Oligia strigilis* (Linnaeus, 1758) Marbled Minor
Widespread in the county, it has been found throughout the Dene.
- Oligia latruncula* (Denis and Schiffermuller, 1775) Tawny Marbled Minor
Common in Durham it has only been found near the village
- Oligla fasciuncuta* (Haworth, 1809) Middle Barred Minor
Wailes (1833a) Listed.
Fairly common in Durham, it occurs throughout the Dene.

- Mesoligta Iuruncula* (Denis and Schiffermuller, 1775) Cloaked Minor
Common all over Durham, it has been found in the Garden of Eden
- Mesapamea scalis* (Linnaeus, 1758) Common Rustic
Widespread and abundant in the county, it occurs throughout the Dene.
- Photedes captiuncuta expolita* (Stainton, 1855) Least Minor
Robson (1902) 'abundantly between Hesledon and Castle Eden Dene.' Very local in Durham, it has not been found in the Dene.
- Photedes minima* (Haworth 1809) Small Dotted Buff.
Widespread in Durham, it is abundant in all parts of the Dene.
- Photedes pygmina* (Haworth, 1809) Small Wainscot
Occurs all over the county, it is abundant throughout the Dene.
- Luperina testacea* (Denis and Schiffermuller, 1775) Flounced Rustic
Trechnann Coll. Sunderland Museum 'C. Eden' ix.1899 Widespread in Durham, it has once been caught at Big Beech.
- Hydraecia micacea* (Esper, 1789) Rosy Rustic
Widespread in the county, it occurs throughout the Dene.
- Gortyna flavago* (Denis and Schiffermuller 1775) Frosted Orange
Widespread in Durham, it has occurred in all areas of the Dene, except at the coast.
- Celaena leucostigma* (Hubner 1803-08) Crescent
Not common in Durham, it has twice been found in the Dene.
- Hoplodrina blanda* (Dents and Schiffermuller 1775) Rustic
Widespread, but not common in Durham, it has only been found here, within a mile of the coast.
- Caradrina morpheus* (Hufnagel, 1766) Mottled Rustic
More common in the county than *Hoplodrina blanda*, it also has only been found within a mile of the coast.
- Panemeria tenebrata* (Scopoli 1763) Small Yellow Underwing
Robson (1902) 'Mr. H. T. Robson, took it near Castle Eden, flying on a grassy patch by the toad side.'
Not found.
- Pyrrhic umbra* (Hufnagel, 1766) Bordered Sallow
Local on the Durham coast, it has only been found from a small area of the sea cliffs.
- Bina prasinana* Linnaeus, 1758) Green Silver Lines
Robson (1902) 'most frequently at Edder Acres near Thornley colliery and the upper portion of Castle Eden Dene, which adjoins this wood.'
Widespread, but not common, in Durham, it has twice been caught in the Dene.
- Diachrysia chrysitis* (Linnaeus, 1758) Burnished Brass
Abundant in the county, it occurs throughout the Dene.

- Plusia putnami gracilis* (Lempke, 1966) New Gold Spot
 More plentiful in the west of the county, it occurs throughout the Dene.
- Autographa bractea* (Denis and Schiffermuller, 1775) Golden Spangle
 Never found in large numbers in Durham, it is found throughout the Dene.
- Autographa jota* (Linnaeus, 1758) Plain Golden Y.
 Wailes (1833a) Listed. Trechmann Coll. Sunderland Museum (2) 'Castle Eden Garden' 12.viii.1909 Gent (1957) Noted.
 Less common than *A. pulchrina*, it is abundant in all parts of the Dene.
- Autographa pulchrina* (Haworth, 1809) Beautiful Golden Y.
 Trechmann Coll. Sunderland Museum 'Garden' 21.vii.1909.
 Very common all over the county, it is abundant throughout the Dene.
- Autographa gamma* (Linnaeus 1758) Silver Y.
 A very common immigrant, it has been found in all parts of the Dene.
- Abrostola triplasia* (Linnaeus, 1758) Spectacle
 Widespread in Durham, it has only been found in the western end of the Dene.
- Callistege mi* (Clerck 1759) Mother Shipton
 Widespread in the county, it is only found, here, at the coast.
- Scoliopteryx libatrix* (Linnaeus 1758) Herald
 Widespread in the county, it has been found throughout the Dene except at Denemouth.
- Phytometra viridaria* (Clerck, 1759) Small Purple Barred
 Ornsby (1846) 'sea banks near Castle Eden'. Robson (1902) Referring to Ornsby's note: 'we find it there yet ' and 'it also occurs on the banks of the Shotton end of the Dene'.
 Very local in Durham, it has not been found in the Dene.
- Rivula sericealis* (Scopoli, 1763) Straw Dot
 Not common in Durham it has been found at both ends of the Dene.
- Hypena proboscidalis* (Linnaeus, 1758) The Snout
 Robson (1902) Listed. Robson (1905) 'regularly in Castle Eden Dene among the spindled nettles that grow under trees.' Trechmann Coll. Sunderland Museum (2) 'C. Eden Dene' 24.vii.1909; (1) 'Garden c.a.' 12.viii.1909
 Widespread in Durham, it occurs throughout the Dene.
- Polypogon nemoralis* (Fabricius, 1775) Small Fan-Foot
 Robson (1905) 'freely in Castle Eden Dene, often sitting exposed on the upperside of the low herbage.'
 Never common in Durham, it is found in all parts of the Dene.

THE GENUS *CAREX* FROM THE RIVER TEES, NORTH EAST ENGLAND

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SUMMARY

An account is given of 19 species of *Carex* found in 1975 at the immediate edge of the River Tees and its tributaries. The finding of *C. aquatilis* Wahlenb. at the edge of the Tees is noteworthy since here it is growing at its most southerly distribution in England. Data from the Tees are compared with records from other rivers within the same geographical region this suggests that the Tees has a particularly rich *Carex* flora.

INTRODUCTION

The vegetation of North-east England has been subject to quite detailed study during the past 200 years. In the flora of Northumberland and Durham (Winch, 1838), 38 species of *Carex* were recorded from the two counties, and the updated version of the same flora (Baker & Tate, 1868) contained an additional two species. In the more recent check-list of vascular plants recorded from County Durham (Graham, Sayers & Gaman, 1972) a total of 39 *Carex* spp. are listed for Durham (v.c.66) alone.

For generations, particular attention has been paid to the upper catchment of the Tees above Middleton-in-Teesdale. This region is well known by all British botanists as Upper Teesdale, the site where relics of a past widespread flora still remain (see for example Pigott, 1956, Bradshaw, 1976). The bankside *Carex* flora is therefore relatively well known from this region of the Tees, but the rest of the river has received scant attention.

During 1929-33, Butcher carried out quite detailed studies of the River Tees (Butcher, 1933, Butcher, Longwell & Pentelow, 1937). Stretches of the river between the now drowned Weel of the Tees and the tidal river at Yarm were surveyed, but no mention was made of *Carex* spp. Prior to being drowned in 1971 in the formation of Cow Green Reservoir, the Weel was a slow flowing, silted stretch of river, which stretched 2.0 km upstream of the rapids above Cauldron Snout. This stretch of river was rare in Britain, for it combined slow silted conditions with an altitude of 500m. Its impending loss under Cow Green Reservoir stimulate Proctor to re-survey the area in great detail between 1967-68 (Proctor, 1971). The author found *C. rostrata*, and an un-identified species. This turned out to be *C. aquatilis* (Proctor, 1972) which was discovered in an old river-channel pond. This third published record for *C. aquatilis* in England thus appeared a year after it had been destroyed by the filling of Cow Green Reservoir.

The data presented here concerning the *Carex* flora of the River Tees were collected whilst carrying out detailed surveys of all macrophytic vegetation in the whole river from the foot of Cow Green to the estuary below Yarm (Holmes & Whitton, 1977). The Tees is an especially interesting river for study; it has recently been affected by a

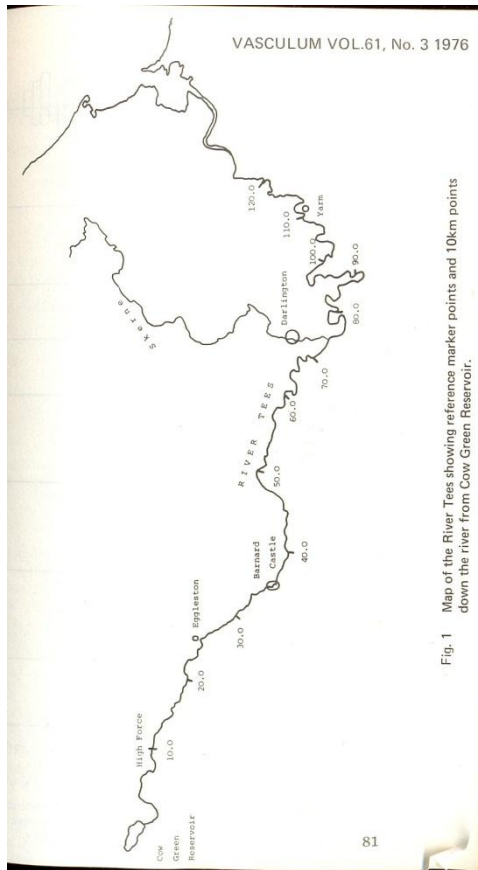
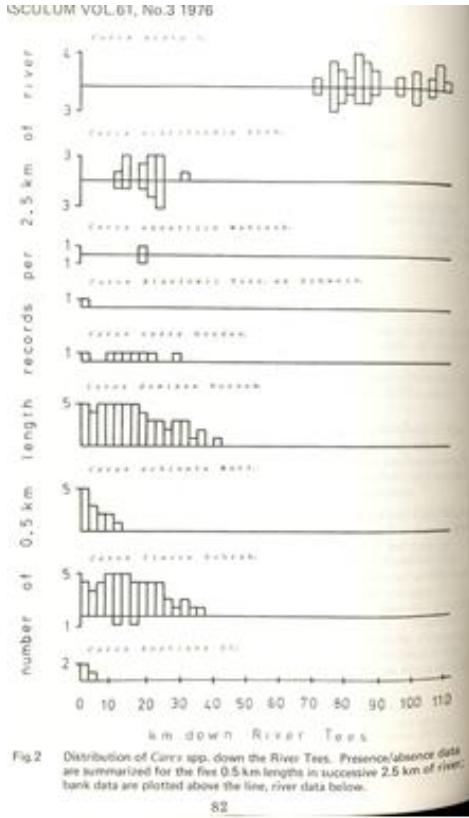


Fig. 1 Map of the River Tees showing reference marker points and 10km points down the river from Cow Green Reservoir.





major environmental change, and will again be subject to further changes in the near future. The building of Cow Green Reservoir has already had a substantial regulatory influence on the flow of the Tees. The reservoir withholds water during periods of high rainfall, and supplements the river during periods of low rainfall. As a result, the minimum flows of the river are now higher than in pre-impoundment times (Northumbrian Water Authority, 1972-74) and catastrophic flooding is likely to be reduced.

The building of Kielder Reservoir and the Water Transfer Scheme will also have quite an effect on the Tees in the future. The Water Transfer (for details see Burston & Coates, 1975) involves the building of a reservoir in the Kielder Forest with a capacity of 201,070,000 m³ (44,230 x 10⁶ gallons), the regulation of the North Tyne, abstraction of water from the Tyne at Riding Mill, and piping of Tyne water into the Wear at Stanhope, and the Tees at Eggleston. Through this one scheme, the water requirements of Tyneside, Wearside and Teesside should be satisfied well into the next century, and the need for drowning further valleys minimised.

METHOD OF SURVEY

The presence or absence of each species was determined from successive 0.5 km lengths of river from the dam wall of Cow Green Reservoir (km 0.0) to the polluted estuary below Yarm (km 112.5) in summer 1975. For details of localities and kilometre reference points, see Fig. 1. At the same time as the survey of the main river was carried out, the bottom 2.5 km of tributaries Lune, Balder, Greta, Clow and Leven were surveyed, as well as the bottom 10 km of the Skerne.

Surveys of river vegetation are often fraught with difficulties, and one constantly recurring question is where does the river end and the bank begin? An attempt has therefore been made to distinguish between records of plants for river and bank habitats. The former represent those that are more or less permanently submerged, albeit their basal parts, and the latter, those that are only periodically submerged. To make the river and bank records objective, and the data more valuable for ecological assessment, definite guidelines for defining the limits of the river have to be adhered to. *Carex* plants found within those parts of the stream bed that are submerged for at least 85% of the year were recorded as 'river' records, and those found in positions which are underwater for at least 40% but less than 85% of the year, were recorded as 'bank' records. These are the guidelines that had to be estimated in the field, yet under ideal conditions they could have been put on a quantitative basis if smaller areas had been surveyed and details of hydrology were available.

RESULTS

The 1975 survey of the River Tees-revealed that no less than 18 *Carex* spp. were present on the immediate banks of the river, and several species fringed the river with their basal parts permanently submerged. The distribution of the 18 recorded species is plotted in Fig. 2. The Figure shows the number of 0.5 km lengths; in which each species was recorded from either 'river' or 'bank' habitats within successive 2.5 km stretches of river. Reference to the Figure shows that of the 18

species recorded, all but three were confined to the upper half of the river; the exceptions being *C. acuta*, *C. acutiformis* and *C. hirta*. Only *C. acuta* was present in the lowest 45 km surveyed, and *C. nigra* had the widest distribution and was recorded in more lengths than any other species. The majority of species were recorded only from bank habitats, the exceptions being *C. acuta*, *C. acutiformis*, *C. nigra*, *C. panicea*, *C. flacca*, *C. rostrata* and *C. aquatilis*, in descending order of number of 'river' records. The surveys of tributaries in 1975 revealed that few of the species recorded from the main river were present. Of the 18 species recorded from the Tees, only six were present in the lower stretches of the tributaries. In the Skerne, however, *C. riparia* Curt. was recorded, a species not recorded from the main river.

DISCUSSION

(i) Individual species

Several species warrant individual comment since in the past they have been either severely under-recorded, or their distribution and ecology in the Tees does not entirely agree with descriptions given by other authorities.

C. acuta. In the check-list for County Durham (Graharn, Sayers & Gaman, 1972) this species was recorded as rare, with records for only two tetrads. Reference to Fig. 2 shows that it is now widespread in the Tees between Skerne Foot and Yarm where it frequently fringes the river with much of its rootstock permanently submerged. It seems unlikely that this species has suddenly spread into the river, but lack of previous records probably indicate the poor attention paid to fringe river vegetation by local botanists. The lowland distribution agrees with personal observations made for this species in other rivers in North-east England where it occurs in the Tweed, Tyne and Swale, but in less abundance than it does in the Tees.

C. aquatilis. The finding of this species on the right bank of the Tees above Middleton-in-Teesdale was of particular interest since it was suspected that the species had been lost from the Tees Basin with the drowning of the previously only known record in the Weel (Proctor, 1972). The refinding of this species, which is commonly known as the Northern Sedge, is particularly noteworthy as here in Teesdale it is at its most southerly distribution in England. There are less than half a dozen records for this species in England, although it is more widespread in Scotland.

C. acutiformis. Most accounts dealing with the distribution and ecology of *Carex* spp. (e.g. Clapham, Tutin & Warburg, 1962; Jermy & Tutin 1968) describe *C. acutiformis* as a species of slow flowing rivers, canals and ponds and as having a generally lowland distribution. In the Tees, however, it was absent from lowland slow flowing stretches (*C. acuta*), yet was present in stretches of river immediately below High Force at an altitude exceeding 300 m. Here, wherever the current velocity was reduced sufficiently for small amounts of relatively fine silt to accumulate at the edge of the river, *C. acutiformis* was invariably found. This is a habitat infrequently described for this species, although the phenomenon is by no means restricted to the Tees. Surveys of the Tweed and its tributaries (Holmes, 1975) reveal that in the Teviot, the largest tributary of the Tweed, *C. acutiformis* was also confined to more upstream localities of the same character as described from the Tees. The same is also true for the N. Tyne and Tyne.

C. bigelowii. This is a species of high ground and with only one pre-1930 record for Co. Durham. Its presence in the vicinity of Cauldron Snout in 1975 means that fears for its possible extinction in the County expressed by Graham Sayers & Gaman (1972) were unwarranted.

C. hirta var. *sublaevis*. All material collected from the river banks was typical of the variety on account of their exceptionally long pointed male glumes with excurrent midribs and reduced pubescence of leaves and stems. Jermy & Tutin (1968) describe the variety as typical of more damp habitats than the type material, a habitat description confirmed by its distribution in Teesdale.

(ii) General discussion

A total of 39 *Carex* spp. have been listed for Co. Durham (Graham, Sayers & Gaman, 1972). Included in this total are *C. aquatilis*, the destroyed plants of the Weel, *C. divulsa*, a mistake in the Winch herbarium discovered by Baker and Tate (1868) *C. elata*, one pre - 1930 record but now feared extinct, and *C. paupercula*, present in Upper Teesdale but not present within v.c. 66. Therefore, 35 genuine records now exist for *Carex* spp. in Durham, and more than half (19 species) can be found on the banks of the Tees and Skerne. Only the record for *C. aquatilis* is not included in the Durham records since it was discovered on the right, and therefore, Yorkshire bank of the river. A remarkably high proportion of species from this genus thus appear in a single broad habitat, the banksides of a single river system.

Personal observations have been made on all the largest rivers of North-east England and South-east Scotland between 1972-76. The river systems surveyed include- the Tweed (Holmes, 1975), Tyne (Holmes *et al.*, 1972 and unpublished), Wear (unpublished), Tees (Holmes & Whitton, 1977) and Swale (unpublished). All surveys have been based on the standard recording of presence or absence of species in 0.5 km lengths of river.

The *Carex* spp. recorded from the above rivers are listed in Table 1, Reference to the Table reveals that *C. hirta* and *C. nigra* are the most widespread species. The most striking feature of the Table, however, is the species diversity of the Tees in comparison with the other rivers. There are several factors which could account for this, but it is not possible to say which are most influential.

(a) The survey of the Tees was carried out when more experience of the genus *Carex* had been gained. The survey of the Tweed was carried out with little experience for this group, and late in the season when many plants had lost their fruits. Only, when comparing the *Carex* flora of the Tees and Tweed can this factor be regarded as significant.

(b) The Tees and Tweed have been more thoroughly surveyed than the other rivers, both rivers being surveyed from source to mouth. The large number of 0.5 km lengths surveyed produced greater habitat variety, and thus enhanced the chances of finding more species. Comparing the species lists of the Tees and Tweed does not suggest that this is the major cause for the larger number of records for the former river.

(c) Upper Teesdale is famous for its varied and rich vegetation, the streams and rivers which flow through it providing ideal natural dispersal. Seeds carried into the Tees may become deposited at the edge of the river, germinate, and colonize in suitable habitats.

(d) The survey of the Tees spanned a vertical drop of nearly 500 m from Cow Green to almost sea level below Yarm. The highest point surveyed on the other rivers was 340 m on the Tweed. Many species recorded from the Tees were confined to the upper 25 km (Fig. 2.), suggesting that if surveys on the other rivers had been continued into headstreams at higher altitudes, some of these species may have been found.

(e) It is possible that the regulation of the Tees resulting from Cow Green Reservoir has increased the *Carex* flora in recent years. The lack of severe flooding results in less scouring and greater bank stability. However, it is unlikely that in five years this could have accounted for a mass invasion of new species on the scale of which they now occur.

It is clear that the Tees has a rich *Carex* flora that has gone relatively un-noticed for decades. Many of the stretches of river from where they were found represent new records for each tetrad, and thus more 'dots' for the *Atlas of the British Flora* (Perring & Waiters, 1976). Since so many species remain after the river has been affected by regulation, there is little to suggest that any future environmental changes, such as the Water Transfer Scheme, will have a detrimental effect upon them. It is impossible to say why the Tees appears to have such a rich *Carex* flora, but it should be borne in mind that very detailed study of the upper parts of neighbouring Rivers Wharfe and South Tyne, may reveal similar species lists.

ACKNOWLEDGMENTS

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Table 1. Comparison of Tees *Carex* flora with that found for Tweed, Tyne, Wear and Swale (* indicates presence of species).

River system	TWEED	TYNE	WEAR	TEES	SWALE
Year(s) of survey	1971-74	1972-76	1976	1975	1976
Extent of survey	complete for Tweed and Teviot selected lengths on another 11 tributaries	detailed selected sites on N. Tyne and main river	four 0.5 km lengths every 10 km down main river only	complete for main river and bottom of six tributaries	selected sites on main river only
Number of lengths surveyed	570	70	40	271	56
<i>C acuta</i>	*	*		*	*
<i>C acuttormis</i>	*	*		*	
<i>C aquatilis</i>				*	
<i>C bigelowii</i>				*	
<i>C curta</i>				*	
<i>C demissa</i>		*		*	
<i>C echinata</i>				*	
<i>C flacca</i>				*	
<i>C hostiana</i>				*	
<i>C hirta</i> (Inc. var.)	*	*	*	*	*
<i>C lepidocarpa</i>		*		*	
<i>C nigra</i>	*	*	*	*	*
<i>C ovalis</i>				*	*
<i>C pallescens</i>				*	
<i>C panicea</i>				*	*
<i>C paniculata</i>	*				
<i>C pulicaris</i>				*	
<i>C remota</i>		*		*	
<i>C riparia</i>	*			*	
<i>C. rostrata</i>	*	*			

THE VASCULUM

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Edited by
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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 1977.

SHOOTING

Under the present laws, it is not only a crime to shoot any sort of firearm (including air gun and air pistol) within 50 feet (about 17 paces) of any public highway, road, footpath or park, but a greater crime to shoot any protected bird or animal (and even those which are unprotected, and there are very few in this category now, may not be shot without special permission).

In spite of these restrictions, the frequency with which we come across irresponsible youths carrying guns in the countryside seems to be on the increase. Either it is a symptom of the violence of our time or a result of these people having too much money to spare. We have watched young people at Chester-le-Street shooting at bottles and tins but have never seen any of our wild creatures attacked. Without doubt, this does occur. A few years ago we had the misfortune to see a wood pigeon which was alive but unable to fly, floating on the surface of the River Wear. After a terrible struggle it managed to paddle to the opposite bank, but it could not have lived for very long afterwards. On this occasion the police were informed and while they thanked us for the information, that was the last we heard of the affair.

A few days ago, we had a distressing letter from Mr. Pirt about the discovery of a dead long-eared owl by a Medomsley schoolboy. The bird, a fine juvenile specimen, was taken to school where the teachers took the opportunity to make all the pupils of the school fully aware of what had happened and the present laws concerning such an incident. On examination it was found that an air gun pellet had entered one of the bird's eyes and lodged in its brain. We hope that Mr. Pirt and the authorities are successful in their hunt for the culprit.

SPOT THE FROG

We have the following account from Tim Pettigrew of a project organised by local museums.

Last Spring the Natural History Curators Group of museums in the NorthEast launched a campaign (Spot the Frog) to determine the present status and

distribution of amphibia in the counties of Northumberland, Tyne and Wear, Durham and Cleveland. The museums acting as recording centres were the Dorman Museum, Middlesbrough; the Gray Art Gallery and Museum, Hartlepool; the Hancock Museum, Newcastle-upon-Tyne and Sunderland Museum. At the end of the campaign in July records of 417 sightings from 334 habitats had been received (see below). An analysis of the results will be published next October in the *Vasculum*. Next year it is hoped to mount a similar campaign, a possible subject being the distribution and status of squirrels in the North-East.

Results of the Survey Spring Summer 1976:

No. of records received 417; Habitats named 334; frog habitats 275; newt habitats 81; no. of smooth newts 25; crested newts 2; palmate newts 4; unspecified newts 30.

OTTERS

In the recent issue of *Conservation Review* the status of the Otter in Britain is discussed in some detail by Paul Chanin, who is currently carrying out a research project on their distribution.

Any countryman will tell you that the numbers of otters in our rivers have fallen drastically during the last 50 years. Indeed, we know one keeper who has been assiduously guarding the otter habitats under his control for a considerable number of years. Recent investigations have shown that the decline occurred most suddenly between the years 1957 and 1967. Why this should have been so is quite unknown and since it had already happened before it was fully realised, it is unlikely that we shall ever be certain of the true reasons. The work going on at present is an attempt to elucidate the limiting factors to their distribution now. When these become fully understood then it might be possible to take some appropriate remedial action. It would appear that urbanisation, industrialisation and disturbance of habitats have all been partly responsible for such pollution of rivers and streams as to drive the animal away from the estuaries of our rivers altogether. The further invasion of people into more rural areas for the purpose of recreation such as picnicking, walking, canoeing and fishing have had similar although perhaps not quite such drastic effects. Thus the otter has been driven further and further inland to the upper reaches of our streams where its food is not so plentiful and where only a limited number of families can find a living. Because of their increasing rarity the Council of the N.N.U. reacted vigorously in concert with a number of other countryside associations last year, to the proposed meeting of otter hounds in Durham County. In the event the meeting did not take place. We still do not know the full story behind the cancellation, but it is just possible that our combined protests had the desired effect.

The investigations continue and although much valuable information has already been obtained, many more helpers are required. No special knowledge is necessary and if any member reading these notes would be prepared to give up a little of his spare time looking for signs of otters on our rivers and streams and at the same time help to conserve the otter, please write to Paul Chanin, Dept. of Biological Sciences, Prince of Wales Road, Exeter, who will be pleased to send the detailed instructions.

THE SOCIETIES

NORTHERN NATURALISTS' UNION

The 143rd Field Meeting was held at Knitsley Fell and Shipley Moss on July 3rd 1976, when about 30 members and friends enjoyed the lovely sunshine. Mr. Fred Stubbs led the party over the old ganister quarry area to the quarry pond and the Forestry Commission's Plantation just to the north.

The weather was ideal for flying insects. Heathland moths included *Syngrapha interrogationis* L. (Scarce Silver Y) and *Lycophotia porphyrea* Schiff. (True Lover's Knot). Much in evidence were *Zygaena loniceræ* Scheven (Narrow-bordered 5-spot Burnet), and the butterflies *Ochlodes venata* B. & G. (Large Skipper), *Polyommatus icarus* Rott. (Common Blue) and *Coenonympha pamphilus* L. (Small Heath). It was particularly pleasing to see several *Boloria selene* Schiff. (Small Pearl-bordered Fritillary), in an area where its foodplant, Marsh Violet, was abundant. This was a new site for the county distribution map of this insect.

The pool shimmered with an abundance of demoiselles, while other dragonflies were also active. A mating pair of blue demoiselles was seen, and the male followed up by standing guard on a stem while the female dived several inches below the water surface to lay her eggs on the submerged herbage.

Soil conditions were predominantly acid, but parts showed an alkaline tendency, with such plants as *Briza media* L. (Quaking Grass), *Linum catharticum* L. (Purging Flax) and *Lotus comiculatus* L. (Birdsfoot Trefoil); *Genista anglica* L. (Petty Whin) was in the seeding stage. Three club-mosses were seen *Lycopodium clavatum* L. was already well known in the area, and *L selago* L. had recently been recorded for the first time here. The discovery of *L alpinum* L., on two banks, was quite unexpected, the species having been recorded only once in the county, at Widdybank Fell, since 1930.

Bird life was quiet (the excessive heat?), but Dan Mold recorded curlew, black-headed gull, wood pigeon, swift, green woodpecker, skylark, swallow, house martin, meadow pipit, pied wagtail, wren, goldcrest, blackbird, blue tit, yellow hammer, chaffinch, redpoll, magpie, jackdaw and rook.

The 145th Field Meeting on 11th September which was intended to be a walk along the old Ainwick to Wooler railway was a complete washout. This was the first full weekend of the great rains which caused flooding and much havoc after the long drought of the summer. It is intended to try this again in 1977.

The junior outing on September 18th, to look for fungi in Hollingside Woods, was somewhat hampered by a dearth of fungi due to the long hot spell. However, the following species were noted: *Heterobasidium annosum*, *Stereum hirsutum*, *Stereum rugosum*, *Seteroderma aurantium*, *Hypholoma fasciculare*, *Paxillus involutus*, *Boletus chrysenteron*, *Phallus impudicus*, *Collybia peronata*, *Collybia confluens*, *Mycena pelianthina*, *Pleurotus dryinus* and *Pluteus cervinus*. Surprisingly species of *Russula* and *Lactarius* were completely missing this year.

By way of a bonus we were surprised but very pleased to see two roe deer.

The Ninth Harrison Memorial Lecture was given at the Gray Art Gallery and Museum, at the kind invitation of the Hartlepool Natural History Society, on 30th October 1976. The lecture was delivered by Dr. W.A. Sledge of Leeds on "Problems of Geographical Distribution".

The early part of the lecture was concerned with the global distribution of plants, drawing a distinction between those endemics of limited range such as *Minuartia stricta* (Sw.) Hiern. of Upper Teesdale, and those of more world wide distribution such as Bracken. This was one problem only of several that were cited.

The usual mechanics of dispersal were mentioned, for example, air, water, animals, explosive structures, etc., and the point was made that none of these factors could explain even a part of the discontinuous distribution of species seen today.

Wegener's Theory of Drift was then explained and the lecturer concluded by cleverly showing how this could explain practically all of our existing problems of Plant Geography. The discussion was particularly apposite as the late Professor J. W. Heslop Harrison was a great believer in Wegener's Theory throughout his lifetime.

The splendid tea was provided, free of charge, by the members of the host society and our thanks must go to them for such a generous meal. During teatime there was much discussion between members about the outdoor wonders of the long hot summer and the items exhibited at the back of the lecture room. These consisted of information and live pupae of Privet Hawkmoths by Mrs. V. Cromarty, stuffed specimens of Kingfisher and Weasel from the museum collection, examples of Hartlepool N.H.S. newsletter "The Spine" and a number of the more unusual and very large immigrant insects that had arrived in our area during this remarkable year.

Meanwhile Mrs. Burnip and Mrs. Mulliner busily sold Trust Goods to the tune of £52.99, and a collection to help towards the printing of the Vasculum realised £8.40.

ANNFIELD PLAIN AND DISTRICT NATURALISTS' CLUB

In spite of his disabilities, Mr. Fred Wade continues to send notes of the activities of the club of which he was so fond.

There were nine long outings during the spring and summer, all of which were blessed with lovely weather. On April 24th Mr. Puckering led a strong party over an easy-going ten mile walk across country between Newhouses and Barrasford, whilst the less mobile members spent the afternoon at Wallington Hall.

Near Cold Crag Reservoir the walkers were fortunate in coming across a roe deer and in being able to observe Canada and Greylag geese on the water. Although cool, the spring flowers were fully out in the woods and a large list was compiled.

On May 8th Mr. Wales led the outing from Castleside via Coombe Bridges to Edmundbyers, when every bit of wildlife seemed to have come to life in the hot sunshine. A two feet long adder was encountered at one spot, and other fauna noted were hare, weasel, frog, tiger beetles, tortoiseshell butterflies, oak eggar caterpillars and a cocoon of the Emperor moth.

On May 22nd Miss D. Robinson led the members from Muker to Keld. Again the countryside was a delight with gorse and many other trees and shrubs in

full bloom. Of particular note were the mountain pansies in such great variety of colour, early purple orchids and Solomon's Seal. One junior submitted a list of thirty four plants in flower. Many birds and mammals were also seen.

Mr. F. Rippon led a party up the Deerness Valley railway on June 5th as far as Esh Winning. The hawthorn blossom was at its full and so were many herbs. There were also moths and butterflies aplenty, the most noticeable being the abundant Orangetip butterfly, a beautiful sight.

Mr. Clayton took members from Akeld to Wooler via Yeavinger and Broadstruther on June 19th. We saw a small herd of wild goats at the foot of Yeavinger Bell, the valley of oaks planted by Admiral Collingwood and a host of flowering plants.

July 3rd saw us trekking from Cotherstone to Romalldkirk behind Mr. Brunskill. Here the exit of the tunnel for the Wear/Tees section of the Kielder Water Transfer Scheme was of much interest, apart from the abundant wildlife on this sweltering hot afternoon.

On July 17th Mr. Purvis led a party from Lofthouse to Palely Bridge. Meadow and water-side flowers were in abundance, so were the birds, including one which flew into the bus through the open roof vent and travelled some distance on the bus roof after being released. Also worth remembering was the peacock which strutted in front of the bus on that narrow country road.

Mr. Wales was in charge on July 31st along the cliff top between Ravenscar and Whitby. Here we witnessed swarms of ladybirds which completely covered the vegetation in places and even massed on the telegraph poles between Robin Hood's Bay and Ravenscar. In addition there was a wide variety of cliff plants and sea birds.

Mr. Wales was again the leader on August 14th between Heirmsley and Kilburn. This was another hot day with plenty of interest for naturalists. Red Admiral and Peacock butterflies provided good subjects for the camera people, as well as an unusual cluster of caterpillars on a hazel bush, a species as yet unidentified and awaiting possible results of metamorphosis in the hands of Mr. Wray.

NOTES AND RECORDS

NOTES

Butterflies in the Redworth District 1976. What can one say of this wonderful year with medium to high temperatures and constant sunshine from mid April to early September, except to confirm what everyone else has seen for himself! A wonderful year for flowers and fruits as well as for insects. One could well believe that the Officers of the Royal National Rose Society had been in consultation with the Clerk of the Weather before deciding upon 1976 as "The Year of the Rose".

Every Buddleia which flowered in August and early September must have had its scores of Small Tortoiseshells, Red Admirals and Peacocks. Even an odd Comma appeared in a local garden on August 12th. A rare visitor indeed! Only the Painted Lady among the Vanessids was reluctant to come in force, although a freshly emerged male did come to my Buddleia on August 20th. The Common Blue came back to verges and meadows and a large second brood was on the wing by August 7th a very early date. The Small Copper and Small Heath also had a large second brood and during the week August 18th to 25th the Coppers were in considerable numbers on my mint flowers. Such a hot sunny summer in conjunction with rather cool weather in Central

Europe, might well have promoted a "*Croceus*" year, but records of the Clouded Yellow in Britain are so far much below normal.

Butterflies which made progress in their numbers some years ago, were in great force. The Orange Tip was flying as early as late April and early May and was over by mid-May. In company with the many Orange Tips were the Green-veined Whites. By late June, the Meadow Brown was flying and its numbers rose to fantastic heights by the middle of July. The range of the Wall Butterfly was truly astonishing and friends have reported its presence in most parts of this area. I was pleasantly surprised to see two specimens on my lawn on August 19th.

Gardens of course were alive with the Large White butterfly, and one could expect damage to green crops from the resultant caterpillars. The cold snap of September 8th to 10th may well have ended the likelihood of much trouble. The flocks of immigrant *P. brassicae* were accompanied by Small Whites and, at times, the cabbage patches were alive with these flocks of 'whites'. An attractive visitor at this time was the Humming Bird Hawk on late flowering honeysuckle

Altogether this has been a year that may prove to have been the end for a few years, of our butterfly recession, and a year to be remembered by lepidopterists in the North-East for many years to come.

T. Jefferson.

Other Immigrant Notes from the two Counties. Altogether this must have been the most remarkable year ever for immigrant Lepidoptera. First records to arrive were of Red Admirals in late May followed by those of Humming Bird Hawk moths in early June.

Fred Stubbs's record of a Red Admiral (*Vanessa atalanta L.*) in his garden at Crook on May 28th was the earliest. Others appeared in the same place on June 14th and 17th. He also reported sightings at Witton-le-Wear Nature Reserve on June 12th and 23rd. I saw my first one at Moorhouse Nature Reserve on June 12th and this individual put in an appearance whenever the Conservation Corps worked there throughout the rest of June. There were 6 at Bishop Middleham on 24th and ones and twos were seen on the river banks at Chester-le-Street on several days during June and early July. The second brood appeared on Buddleia flowers in my garden for the first time on August 2nd and then on every single day throughout August and up to September 24th, reaching a peak of 15 on August 16th. I saw two again in Bishop Middleham Quarry when working there on September 25th. Dr. A. Long reports 2 larvae of the green form on nettles and one imago on Buddleia flowers near Wooler car park on July 24th and also 3 in his garden as late as October 10th. Miss Grace Elliot reported seeing one fly about 50 yards out to sea and then return at Scremerston on October 24th. From Mr. C. J. Gent I have the following note:

"Red Admirel butterflies have been more in evidence this year than usual.

On September 8th when most Buddleia had ceased to flower there were 5 along with a Painted Lady on a shrub with a few late blooms at West Gosforth; the first I have seen in the neighbourhood for several years. Subsequently one appeared in my own garden and another at Wideopen on September 19th, and there was one at Mitford on October 5th. On September 23rd I counted 38 in the Scottish National Trust's Malleny Garden, Balerno, near Edinburgh".

The first Humming Bird Hawk moth record was that of Dr. J. Coulson of one in his garden in Durham City on June 17th, followed by one in Mr. D. Jude's garden at High Etherley near Bishop Auckland on 22nd. On 26th one was observed in Dr. P. Doody's garden at Carrville. Mr. F. Stubbs had two at once in his garden at Crook on July 5th. There was then a gap without records until the second brood appeared with a sighting at Whickham by Mr. S. N. Thompson on September 26th and 4 altogether on Red Valerian in Vie Brown's garden at Barton in N. Yorks on September 8th.

Painted Ladies (*Cynthia cordui L.*) were not seen in such large numbers as one might expect, but apart from those already mentioned by Mr. Gent and Mr. Jefferson above, F. Stubbs had one in his garden at Crook on July 2nd, while the only others were seen by I. Findlay at Middleton-in-Teesdale. Curiously he saw them frequently and in some numbers throughout July and August.

Only at about 50-70 year intervals are we fortunate enough to live through a Camberwell Beauty year. We know of odd ones seen during the past 50 years but it is longer than that since we had such a deluge of these insects as we have had this year. Altogether 7 specimens have been

recorded in our area. They are: Sunderland, one found dead on the pavement in Fawcett Street and presented to P. Davis at Sunderland Musuem, 25-8-76 (F. Smith); Haltwhistle, one seen on Buddleia flowers, 29-8-76, (D. Bell); Brownslaw near Wooler, one seen on Buddleia flowers, 31-8-76, (Mrs. A. Holmes); Stagshaw House, near Corbridge, one caught on the lawn, 5-9-76, (Mrs. J. J. Straker); Barton, N. Yorks., one flying up and down a road in the village 5-9-76, (V. Brown); Whitley Bay, one seen on 29-9-76, (J. McConway); Newcastle-upon-Tyne, one caught inside house at 27 Highbury, 4-10-76, (Miss A. N. Coates); Durham City, one in a city garden, data and captor unknow.

These are only the individuals seen or captured. How many more must have arrived without being seen?

Another insect which puts in an appearance here only very occasionally is the Convolvulus Hawkmoth (*Agrius convolvuli* L.). The first was found on the footpath in Acorn Road in Newcastle on August 24th by Mrs. Polwarth. Others were at Wreckenton on 30th (C. Bain) Whitley Bay on a garage door on September 15th (D. Deas); Gateshead on 24th (per A. Pringle); Newbiggin by the Sea on 27th (M. Priestley); Gateshead, found dead in Nelson Street on 2nd November; Jarrow, found alive resting on a road, October 9th (Mrs. V. Dixon); and South Shields on 11th October, the subject of a newspaper report.

What amounts to almost a surfeit of immigrants is crowned by the capture, in Morpeth, of a Clifden Nonpareil Moth (*Catocala fraxini* L.) on September 21st, and taken to David Sheppard at Newcastle University. As far as I know this is the first record for this species ever to be seen in our northern counties. A wonderful season indeed!

T.C.D.

Bird Notes. A new promenade has been constructed below the Collingwood Memorial at Tynemouth in connection with coast protection, and has proved to be an ideal platform from which to observe the bird life in the Tyne estuary. On August 5th, for example, the tide was low and there was a large concentration of gulls along the foreshore and on the rocks in the estuary (the Black Middens), the following species being present - Lesser Black-backed, Herring, Common, Black-headed and Kittiwake. There were also several small parties of Arctic Terns as well as several Redshanks and Turnstones.

The 1973 census of Black-headed Gulls (F. Gribble, Bird Study Vol. 23 No. 2, June 1976) has given the population of England and Wales as between 100,000 and 110,000 pairs in 249 colonies. This represents an increase of 111% over 1958 and 177% over 1938, the increase being mainly in the south. Durham had 10 colonies with between 569 and 700 pairs and Northumberland 22 with between 6361 and 7592 pairs.

The swifts appeared to depart early, my latest record being 2 at West Denton on August 2nd. The swallows gathered in small numbers at the end of August: there were c 20 on telegraph wires at Matfen on August 22nd and c 12 beside Low Gosforth Home Farm on August 29th. My last record was 2 at Allendale on September 15th.

The crop of white beam berries in the streets at West Gosforth has been prolific this autumn and has attracted hordes of starlings, the pavements being littered with berries which had been dropped. Two mistle thrushes visited my own garden to partake of rowan berries.

On October 13th a Kestrel which I was watching hovering at Prestwick Carr on two occasions descended and flew low along the lane quartering the hawthorn hedge in a manner similar to a Sparrow Hawk.

C. J. Gent

Spreed of Orange Tip and Wall Brown Butterflies. As a direct result of an appeal for information about the movement of these two butterflies in the July Vasculum this year, many records have been sent to me showing that the two insects have done even better than expected. J. Parrack reported about 25 very large Orange Tips at Copley, (8m. N.N.E. of Barnard Castle) on 5th June, and about 6 at Staward on 13th. A male and a female were seen in a Whickham garden by Mr. S. N. Thompson on 24th May and 2nd June respectively. From the Stanley area, 2 were

seen in a wood at Quaking Houses by W. Halliday on 7th June and four by the River Wear one mile below Page Bank by L. Surtees on June 8th. Mr. J. Nesbitt reported one at Shotley Bridge during the last week in June, as well as a new colony of the Small Copper from the same place on the same day. Confirming Dr. Long's observations of last year I had a note from Mr. J. Carter at Hawick reporting several in that area on June 7th.

Concerning the Wall Brown, second brood sightings were made by Mr. J. Nesbitt of one near Ravenside Farm, Ebchester on August 12th and at least 5 during a walk between Shotley Bridge and Little Black Hedley above Allensford on 19th, right on the county border. The first records right into Northumberland come from R. T. Swinburn at Wylam in August and from Whitley Bay where J. Parrack made about 8 sightings involving at least 2 individuals in his garden on September 4th.

T.C.D

RECORDS

COLEOPTERA BEETLES

Acrocinus long imanus (L.) Harlequin Beetle 67
 One found on a ship in Swan Hunter's ship repair yard, N. Shields, possibly from a cargo of bananas, 15-5-76 R. W. Cochrane.
Carabus nitens (L.) 68
 We took this beautiful ground beetle on bare peat between Callaly and Long Crag on 3-8-76. I. & B. Wallace.

HYMENOPTERA BEES, WASPS, ANTS, Etc.

Mutilla europaea (L.) Large Velvet Ant 68
 This insect seems to be rare in the north. The British Museum staff tell me that they have a specimen from Scotland and that there are others in the Royal Scottish Museum. Seen on Callaly Crag on 13-6-76. I think this may be a new county record for Northumberland.

I. & B. Wallace.

AVES-BIRDS

Falco subbuteo, Hobby. 67
 A male near Earsdon, 19th May, and at Laverock Hall roundabout the next day, occasional in this area to mid-June.
Calidris melanotos, Pectoral Sandpiper 67
 At Wallsend Swallow Ponds, 8th 10th September at least.
Pluvialis squatarola Grey Plover 68
 Two on Holy Is., 22nd May, in full breeding plumage
Puffinus griseus, Sooty Shearwater 67
 About 70/hr. together with Great Skua at about 12/hr. moving north during a large-scale seabird off St. Mary's Island on 11th September.
Calidris minuta, Little Stint .67
 Cresswell Ponds, 18th September.
Sylvia nisoria, Barred Warbler. 68
 One trapped at Bamburgh, 18th September.
Lanius colluro, Red-backed Shrike 68
 A juvenile at Howick Haven, 18th September.

J. Parrack.