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THE NATURALIST:

A
MONTHLY JOURNAL OF

Natural History for the North of England

EDITED BY

W. H. PEARSALL, D.Sc., F.L.S., and W. R. GRIST, B.Sc.,
THE UNIVERSITY, LEEDS

with the assistance as referees in special departments of

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* Deceased, 1939.

1939.

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EDITED BY

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AND

PERCY H. GRIMSHAW, I.S.O., F.R.S.E., F.R.E.S.

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[Ethel Eadon, Sheffield

RALPH CHISLETT, M.B.O.U., F.R.P.S.

President of the Yorkshire Naturalists' Union, 1939.

YORKSHIRE NATURALISTS' UNION

77th Annual Meeting, December 3rd, 1938

THE Seventy-seventh Annual Meeting was held at the Royal Institution, Hull, by kind invitation of the Hull Scientific and the Hull Geological Societies. Nineteen associated societies were represented.

The President, Dr. H. Hamshaw Thomas, F.R.S., took the Chair.

At the Meeting of General Committee it was announced that Mr. Ralph Chislett, of Rotherham, had accepted the office of President for 1939, and other officers and members of committees nominated by the Sections and Executive were elected.

The following members were added to the General Committee: Messrs. W. Buckley, E. R. Cross, R. D'O. Good, R. M. Garnett, W. Hobson, E. G. Highfield, W. K. Mattinson, W. W. Nicholas, G. A. Shaw, and W. Thurgood.

At the Annual Meeting Mr. S. D. Persy Fisher presented the Financial Statement which showed a loss of £17 on the year's work due to the expense involved in the publication of Lee's botanical records; other additional expenses had been defrayed by the kind help of Mr. R. Fowler Jones. The Secretary presented the Annual Report, pointing out the serious losses sustained by deaths and resignations and the urgent need for new members. The President spoke on 'The Quest for Primitive Flowers in the Jurassic Rocks of Yorkshire,' and he showed some fine photographs of preparations of fossils. We look forward to the publication of this address in our journal.

Following the President's Address, a *Conversazione* was held in the Albion Street Museum on the invitation of the Hull Scientific and Field Naturalists' Club and the Hull Geological Society, at which refreshments were provided for the members.

There were several special exhibits. The President, Dr. H. Hamshaw Thomas, exhibited a collection of microscope slides of fossil plants, with the aid of microscopes kindly arranged by Messrs. T. Stainforth and H. M. Foster; the brothers C. W. and E. V. Wright had arranged the more important chalk fossils from the Mortimer Collection which had been in store; the Hull Aquarium Club had several illuminated tanks containing hundreds of exotic and other fishes; Professor Hardy, of the University College, exhibited several cases illustrating his work on the migration of insects; the Botanical Department of the University College showed a collection illustrating the vegetation of Spurn Point; and Mr. A. K. Wilson had a large series of Alien Plants principally gathered on the Hull Docks, including new records; Mr. W. S. Bisat, M.Sc., showed a fine collection of fossil goniatites from the Carboniferous Rocks, a subject in which he has specialised; Mr. C. F. B. Shillito, of Brocklesby, Lincolnshire, showed several hundred small fossils which he had obtained by washing the marl beds in the Lincolnshire chalk. These consisted of sea urchins, ammonites, shark teeth and other objects, and as illustrating how a collector need not require much space, the whole of his collection mounted on microscope slides was contained in a box no larger than a cigar box.

REVIEWS AND BOOK NOTICES

At the *Turn of the Tide* by Richard Perry, pp. xvi+206, with 4 colour plates and 18 monochrome illustrations. Lindsay Drummond, Ltd., 12/6. In the past we have been very glad to publish in *The Naturalist* work by Mr. Perry and we give a hearty welcome to this very pleasing collection of his essays. To give an idea of the contents and style of the book we cannot do better than quote from the author's preface: 'I call this book *At the Turn of the Tide* because the lives of sea and

estuarine birds are ordered by the tides and the moon. I have tried to capture the spirit of the birds that dwell in almost the last wild places of English country: fresh marsh and salting, mud flat, sandbank, and sea-girt island—from the green fresh marshes and shingle beaches of East Anglia 200 miles north-west to the saltings of Solway, and from thence across the Cheviots to the tidal slakes and islands off grey Northumbria, and out to that 12-mile limit at sea beyond which the onshore fishermen venture not.' Mr. Perry is a keen and accurate observer, knows his birds in every way and at all times, and examines all his facts in the true scientific spirit. This is a book about bird-watching—and listening—and the author has the rare gift of transporting his reader to the actual scenes of his work. We feel that this will be conceded readily by all those north-country ornithologists who, with trusty binoculars, have tramped the shores of our estuaries and marshes watching the gulls, waders, and the hosts of migrants in spring and autumn. After reading Mr. Perry's stimulating pages the reviewer longs to be off once more to Solway or to Spurn and we feel quite sure that most readers will respond in a similar way. We like Mr. Perry's chapters on 'The Significance of Colour,' 'Origins of Migration,' and Appendix B which is entitled 'A New Theory of Eclipse in Drakes.' The author gave the substance of this interesting suggestion a year or two ago in our pages. Entirely appropriate pictures accompany the text. There are reproductions of paintings by Peter Scott, John Duncan, and Richard Harrison, and of photographs by W. W. Nicholas, H. N. Southern, and others.

I Know an Island, by **R. M. Lockley**, pp. 300, with 49 photo illustrations and 17 maps and diagrams. Harrap, 10/6. The name Skokholm must have been quite unknown to most naturalists eight to ten years ago, but to-day Mr. Lockley's island is spoken of among ornithologists as often as is Ravenglass, Spurn, the Bass Rock and any other classic ground. It is only ten years since Mr. Lockley leased Skokholm, and in the book under review, he describes his settlement there, and his expeditions to other islands and bird sanctuaries. His journeyings include some of the Faeroes as well as the Blaskets, off the Kerry coast, Heligoland, Fair Isle, and, of course, the islets off the Welsh coast within easy reach of Skokholm. As may be expected, the book is mainly about birds and will delight all bird-men, many of whom we know are envious of Mr. Lockley in his close contacts with avian life. In 1934 Mr. Lockley, in collaboration with Professor Julian Huxley, filmed the Gannets of Grassholm, and here we can read a most entertaining account of the whole venture. We hope Mr. Lockley will write again and again about his work with the birds and we look forward eagerly to more films of bird-life up to the standard of the famous Gannet pictures.

Australian Parrots, by **Neville W. Cayley**, pp. 332, with 11 plates in colour and 19 other illustrations. Angus and Robertson, 12/6. This is quite an exhaustive treatise on a very fascinating subject, and is very good value. The descriptions of species are very carefully drawn up and are materially assisted by the author's excellent coloured figures. There are many distribution maps, and the aviculturalist will welcome the copious aviary notes which should prove of real service.

The Observer's Book of British Wild Animals, compiled by **W. J. Stokoe**, pp. 224, with 72 illustrations, 46 of which are in colour. Warne, 2/6. We give a cordial welcome to the latest of Warne's 'Observer' books. As in others of the series, the book is a real pocket-book, is copiously illustrated, and includes all the facts which the beginner will find useful. Three classes are dealt with, namely, Mammalia, Reptilia, and Amphibia, and the treatment is adequate and up to date.

THE YORKSHIRE NATURALISTS' UNION'S SEVENTY-SEVENTH ANNUAL REPORT

(Presented at Hull on Saturday, December 3rd, 1938)

The Seventy-sixth Annual Meeting was held in the Institute of Literature and Science, Wakefield. The Annual Report was presented there and was printed as a whole in the January issue of *The Naturalist*, pp. 24-49, thanks to the generosity of Mr. R. C. Fowler Jones.

The Presidential Address on 'Soil Types and Plant Ecology in Yorkshire' was given by Dr. W. H. Pearsall, F.L.S. This is printed in *The Naturalist* on pp. 57-64.

The Presidency for 1939 has been offered to and accepted by Mr. Ralph Chislett, M.B.O.U., F.R.P.S., of Rotherham.

Field Meetings have been held in 1938 as follows : V.C. 64, Ramsgill in Upper Nidderdale on May 14th, see *The Naturalist*, pp. 233-236 ; V.C. 62, Pickering, June 4th-6th, see *The Naturalist*, pp. 237-244 ; V.C. 63, Askern, June 25th, see *The Naturalist*, pp. 266-268 ; V.C. 61, Hedon, July 16th, see *The Naturalist*, pp. 288-290 ; V.C. 65, Sedbergh, July 30th-August 1st, see *The Naturalist*, pp. 290-292 ; Fungus Foray, Hovingham, September 2nd-7th.

The Excursions for 1939 will be as follows :

May 6th. Wentbridge, S.W. Yorks., V.C. 63.

May 27th-29th. Middleton-in-Teesdale, N.W. Yorks., V.C. 65.

June 17th. Ripon, Queen Mary's Dub, Mid.W. Yorks., V.C. 64.

July 8th. Driffield, S.E. Yorks., V.C. 61.

August 5th-7th. Castleton, Eskdale, N.E. Yorks., V.C. 62.

The following changes of address have been notified during the year :

E. G. Bayford, to 16 Rockingham Street, Barnsley.

H. Britten, to Newholme, Tollers Lane, Old Coulsdon, Surrey.

J. Meikle Brown, to Carterknowle, Thorpe Lane, Robin Hood's Bay, N. Yorks.

B. Bussey, to Northcote, Harrowby Crescent, Leeds, 6.

J. A. Chadwick, to 12 Selborne Grove, Heaton, Bradford.

Miss V. Daniel, to Thale Cottage, Thornton-le-Beans, Northallerton.

W. C. Fenton, to 4 Park Drive, Heaton, Bradford.

Mrs. McGregor Phillips, to Temple Sowerby Manor, Westmorland.

Prof. W. H. Pearsall, D.Sc., F.L.S., to Bolham Hall, Retford.

A. A. Pearson, to Nutcombe House, Haslemere Road, Hindhead, Surrey.

Miss M. S. Shaw, to Woodlea, Honley, Huddersfield.

S. H. Smith, to 73 Heworth Green, York.

A. Ward, to 16 Adelaide Road, Sheffield.

T. W. Asquith Wood, to Purt-ny-chee, 33 Church Lane, Methley.

V. G. F. Zimmerman, to 65 Hempland Lane, Heworth, York.

New Members elected during the year :

Miss E. Bailey, B.Sc., Poplar Farm, Bolton Wilberforce, York.

Mr. R. B. Brown, D.Sc., Technical College, Huddersfield.

Miss R. E. Dowling, M.Sc., F.L.S., Training College, Darlington.

Miss Loie Gleadhall, 220 Padholme Road, Peterborough.

Mrs. J. Goulding, Wombledon, York.

Mr. P. D. Hartley, 85 Weetwood Lane, Leeds, 6.

Miss E. Holroyd, Field Head, Park Drive, Huddersfield.

Mr. H. Howarth, 19 Hawthorne Terrace, Alverthorpe, Wakefield.

Miss Irene M. W. Johnson, Grange View, Walton, Wakefield.

Mr. T. Kerr, 30 Becketts Park Drive, Headingley, Leeds, 6.

Miss V. Maynard, Mount Stead Cottage, Ben Rhydding.

Capt. W. S. Medicott, Partridge Hill, Goathland.
 Mr. L. E. Nicholls, Irstead, Sheepridge, Huddersfield.
 Mr. Rex Procter, 24 Queen Square, Leeds.
 Mr. G. E. Ranken, M.A., 2 West Terrace, Northallerton.
 Mr. H. P. Ripley, 10 Thornhill Road, Huddersfield.
 Mr. G. A. Shaw, 18 Leyburn Grove, Shipley.
 Miss D. Steinthal, Mount Stead Cottage, Ben Rhydding.
 Mrs. Tunbridge, B.Sc., 13 Cromer Terrace, Leeds, 2.
 Mr. Geo. Wells, 4 Hyde Park Road, Harrogate.
 Miss Alice L. Whittaker, 36 Chestnut Avenue, Wheatley Hills,
 Doncaster.

Resignations :

N. Brooke, of Huddersfield.
 J. Dougill, of Darlington.
 F. J. N. Dufty, of Skipton.
 Miss I. Ford, of Brighouse.
 J. F. Graham, of Leeds.
 A. Haley, of Wakefield.
 J. E. Hemingway, of Leeds.
 A. Raistrick, of Newcastle.
 T. B. Reynoldson, of Leeds.
 Rev. C. E. Tottenham, of East Ardsley.
 C. H. Wilson, of Scarborough.
 D. E. Wood, of Headingley.
 Berry Brow Naturalists' Society.

Obituary.—Our losses by death have been heavy during the year. We lost a Vice-President, W. Eagle Clarke, LL.D., F.R.S.E., who was President in 1906, and another ornithologist well known for his photographic work, Jasper Atkinson. The Geological Section has lost J. W. Stather and J. W. R. Punch, the Botanical Section lost another old member, Charles Waterfall, the Entomologists lost a well-known figure in Rosse Butterfield, and in Prof. T. W. Edmondson, M.A., of New York, we miss a member of long standing.

Wild Plant Conservation Board (T. Sheppard).—The reports of this Board have been received regularly and show to what a tremendous extent the Board is looking after the wild flowers of the country. Its printed reports have been forwarded to the Hon. Secretary of the Yorkshire Naturalists' Union.

British Association (T. Sheppard).—The Union's delegate reports : The meeting of the British Association this year being at Cambridge was exceedingly well attended, and nearly reached the 3,000 mark. The General Committee made an effort to form a new 'Division' (considered to be more important than a 'Section') to deal with the Social and International Relations of Science, and also that its Annual Report, instead of being in one volume, should appear quarterly, and of a larger size than the reports which have appeared for over a century. The present writer, from his experience as local secretary for Hull, suggested that on account of its requirements in the way of meeting rooms, committee rooms, rooms for general lectures, the secretariat, and hotel accommodation, were already as much as could be met only by the largest cities and towns, that so many invitations had to be declined as the places concerned could not provide this accommodation, and that the Association could not afford a further £500 for clerical assistance, which would be necessary if the scheme fructified. The speaker, however, felt he was crying in the wilderness, and Sir Richard Gregory in reply went so far as to say he would not mind if all the British Association Meetings were held in the Albert Hall, London, in future.

There were several papers which referred to Early Man, the discussions of which were entertaining to find how varied the opinions were of the

greatest authorities on the subject who were present, and spoke. Geologists were accused of not devoting sufficient attention to the geological aspects of the beds containing flints, etc., but these men apparently only failed in their inability to back up the large number of Ice Ages and interglacial periods which now so-called prehistorians seem to require to date their flints, some of which are even of doubtful human origin, and also in their inability to correlate the British beds with those on the Continent. For example, the two small pieces of the Swanscombe Skull which were described in four or five separate papers, were looked upon by the finder as earlier than Piltdown Man, and they were the bones of the skull of a woman. Sir Arthur Keith said that in his opinion they were the remains of a man's skull, of precisely similar character to the skulls of those in some of the lecture rooms, and Sir Arthur Smith Woodward stated that there was no connexion whatever between Piltdown Man and the so-called Swanscombe Man.

The Museums of Cambridge naturally received attention from the visitors, who were also entertained to a delightful garden party in the Botanic Gardens. The new Scott Memorial Museum with its relics of the Explorer was a delight, as was also the Folklore Museum.

Lord Raglan's provocative address on Survivals in Dress was particularly interesting to those of his audience who had a sense of humour.

The Naturalist (EDITORS' REPORT):—It is satisfactory to record the receipt of many varied and informative contributions to *The Naturalist*. The most assiduous of our supporters are those who supply systematic lists of species relating to their own branches of Natural History, and we have had an increased number of good articles of an ecological nature. There is a definite need for more contributions of a descriptive and more general character. Contributors sending in records are earnestly asked to give the numbers of vice-counties concerned, and where possible a near-by town.

BIOLOGY SECTION

FRESH-WATER BIOLOGY COMMITTEE

Distribution of the Fresh-water Crayfish (*Astacus pallipes*) in Yorkshire, 1938 (Sydney H. Smith, J.P., F.Z.S.).—Owing to the very wet summer and by reason of the numerous freshets down the rivers, observation has been very difficult.

RIVER YORE AND TRIBUTARIES: Fair numbers were noticed in the upper and middle reaches of the Yore, and in the tributaries in the Hawes district, also in Lake Semmerwater. There were good numbers at Copgrove in the Robert Beck.

RIVER SWALE AND TRIBUTARIES: Crayfish were reported in the tributaries, Tunstall Beck, Catterick, and Cod Beck, Thirsk, but not in the main river.

RIVER AIRE AND TRIBUTARIES: They were reported as being seen in the upper reaches above Skipton.

RIVER WHARFE AND TRIBUTARIES: Reported occasionally from Otley up to Grassington.

RIVER NIDD: On July 5th, 1938, Mr. W. T. Clarke brought a Crayfish taken in the River Nidd at Skip Bridge.

LEEDS AND LIVERPOOL CANAL: Crayfish were reported in the Skipton district.

MEANWOOD VALLEY STREAM, ADEL, LEEDS: Mr. Digby Firth reports Crayfish to be plentiful.

BRADFORD MOOR PARK POND: Mr. Malin Smith reports Crayfish to be numerous and from where he obtained supplies of this crustacean. It may possibly have been introduced here, but no evidence is adduced.

RIVER RYE: There is still no trace of Crayfish that have been introduced here.

RIVER DERWENT: Mr. S. Cooper, of York, informs me that he caught a very large Crayfish at Scoreby on October 31st, 1937. This is an unusual locality as the water is deep and the bottom muddy.

I am again indebted to Inspector R. W. Ward, of the Yorkshire Fishery Board, for his help in obtaining notes.

VERTEBRATE ZOOLOGY SECTION

MAMMALS, REPTILES, AMPHIBIANS AND FISHES

Mammalia (Miss E. Gallwey):—**CHIROPTERA**.—The Long-eared Bat continues to live in the outbuildings in Ravensknowle Park, Huddersfield, and the Pipistrelle is reported from Lupset, near Wakefield.

INSECTIVORA.—Hedgehogs are common throughout the York, Wakefield, Huddersfield, and Bolton Percy districts, and Mr. Bramley observes that this year he has not seen so many dead ones as in former years. Messrs. Smith and Zimmerman both report that these animals have been very numerous during the summer, and appear to have had a good breeding season.

Moles are everywhere reported common. Mr. Clarke says they have been very abundant in the North Riding, and exceptionally so between Scarborough and Pickering during February, 1938. An 'alarming increase' in numbers was also reported from other districts there.

The Common Shrew occurs commonly throughout the Huddersfield district, and is also reported from Woolley and other districts of Wakefield, and the Water Shrew also occurs in the latter districts. In Huddersfield it is thinly distributed and very local. A single specimen was seen in the Derwent at Forge Valley on May 13th, 1938.

CARNIVORA.—Foxes have been very numerous in the York district, and fairly common on the outside districts of Wakefield, and at Walton. A pair have reared a litter near Lepton, Huddersfield, and have done considerable damage among the game on the Whitley Estate near-by.

Weasels and Stoats occur commonly on the outskirts of Wakefield, but seem to be decreasing in Huddersfield districts. Mr. Edmondson reports an increase in Stoats, but a decrease in Weasels in Airedale and Upper Wharfedale, and suggests the latter may be due to a scarcity in mice.

A pair of very fine Otters has occurred on the Nostell Dam, some four miles out of Wakefield, for the last three summers. One pair reared a litter this season near Scotton Banks on the River Nidd, and considerable damage has been done among the fish. Mr. Zimmerman says that due to the cleaning out of the River Foss, Otters, formerly fairly numerous, have almost deserted it, but Mr. Smith reports a family party of five having been seen in the River Ouse at Rawcliffe, two miles above York, on June 13th.

The Badger has been reported frequently during the past summer at Walton, some four miles from Wakefield, and one has been seen on the Bretton Estate. Odd ones still frequent the woods at Firby, near Kirkham Abbey, Howsham, and Bramham.

'Billy,' the tame Seal which has lived about Scarborough Harbour for several years, has been there on many occasions, sometimes every day for a month or more, then perhaps absent for several weeks. He answers to his name and will take fish from the hand. He was last seen on October 7th. A half-grown specimen entered the Harbour on August 4th, covered with oil, with its eyelids gummed together and in great distress. It was caught, cleaned, fed, and released again.

CETACEA.—In September an immature Lesser Rorqual ascended the Humber and was despatched in the Trent.

On February 11th two Porpoises, each weighing about six stones, were caught by James Leaf, a fisherman, at Naburn Locks, about six miles from York. It is about eight or nine years since Porpoises were sighted so far up the river, and it is a sign that there was a good run of salmon. At Goole, lower down the river, Porpoises which have followed salmon are often shot, but it is very infrequent for them to come right up the narrow channel.

A small specimen of the Bottle-nosed Whale came up the Humber in July, and was stranded in the Trent on August 16th. It was a young male 21ft. 1½ins. in length.

RODENTIA.—The Red Squirrel's numbers have remained about the same in the North Riding during the past twelve months. It occurs at Chevet and Bretton, near Wakefield. Mr. Smith says that it is now very rare in the York district, but he has heard of one at Buttercrambe Wood.

Mr. Zimmerman saw one pair in Aldby Park in June, the only occasion on which he saw a Red Squirrel this year. In Huddersfield, however, this species is well on the increase, and a few weeks ago one was seen in the field opposite my home, just 1½ miles from the centre of the town. Mr. Booth reports a decrease in Wharfedale and in Upper Airedale.

In York Grey Squirrels are everywhere, and several can be seen any afternoon when going through the woods of Buttercrambe, Bossell, Sandburn, and Aldby Park. Mr. M. Longbottom reports having seen a Grey Squirrel in Holmhouse Wood, Bingley, on April 28th, and Mr. Booth mentions one near Bingley in June, which may be the same animal. This species is just making its appearance in Huddersfield district, and the first one from Skelmanthorpe area is now reported by Mr. F. Lawton; one pair is now residing in the Honley Woods, where the Red Squirrel is abundant. Mr. Clarke, speaking of the North Riding, says that the Grey Squirrel continues abundant, and forty freshly-killed specimens were hung upon a keeper's rack at Broxa on April 30th.

The Long-tailed Field Mouse has been very common round York this year. Mr. Mason, of Hull, says, 'I visited a certain piece of land near Brandesburton weekly from December to February and have never seen so many Field Mice before and on occasions when this land got flooded slightly and the frost came and froze the shallow water, and as one walked along making a good deal of noise breaking the thin ice, Field Mice could be seen running on the patches of ice in twos and threes from one patch of grass to another. As a result these Field Mice attracted the Short-eared Owl.' Mr. Crapnell and his colleagues report a Long-tailed Field Mouse near to White Holme Reservoir, at an altitude of 1,200 feet on August 19th. This species was very common near Scarborough in late 1937 and caused much damage to market gardeners' crops.

A few Black Rats are supposed to be occurring in the vicinity of the West Riding Mental Hospital, near Wakefield, but I have no direct evidence of this at present. I hope to have the matter verified one way or the other before the next annual report, as the next captures are to be forwarded to me for identification. In the North Riding a great decrease in the caught numbers is reported—only seven between October 1st, 1937, and October 1st, 1938. As poison has been extensively used during the year Mr. Clarke suggests that many may have died without being seen.

Brown Rats unfortunately remain common everywhere. Mr. Peck reports having caught male Brown Rats of the following weights: four at Hutton Bushel on February 2nd, 1938, weighing respectively two of 1 lb. 6½ ozs. each, one of 1 lb. 6 ozs., and one of 15 ozs. Two more caught at the same place on April 17th weighed 1 lb. 5¼ ozs., and 1 lb. 7 ozs.

Abnormal numbers of the Short-tailed Field Vole are reported from Eberston, Brompton Ings, and Hutton Bushel during the latter part of

1937 and early 1938. They constituted a plague and many Short-eared Owls congregated to feed upon them.

Mr. Bramley saw some young Hares on March 9th which appeared to be three or four weeks old.

Rabbits were very abundant during late 1937 and the spring of this year, but now their numbers seem to be considerably lower throughout Huddersfield district. Mr. Clarke, for the North Riding, says they were very abundant during 1937; in the autumn of that year they were attacked by disease and died in large numbers, especially in the Whitby district. The drought this year checked the mortality and they are now regaining their numbers. Rabbits have done well in the Hull, York, and Wakefield districts.

Reptilia (Miss E. Gallwey):—A female Grass Snake in excellent condition, type markings, measuring 34 in., was found at Pinderfields, near Wakefield, and is now in that Museum. A few Grass Snakes have been seen near Hatfield, Doncaster, including one that climbed into a hedge and then found the ditch at the far side too far a drop. Eventually it had to come down closer to the observer, when it dived into a rabbit hole.

Hatfield Moor, near Doncaster, was practically burnt out in the early spring, and no Adders have been observed there this season.

The Common Lizard is reported from the Alverthorpe and other districts of Wakefield.

A living Slow-worm, 12 in. long, was caught in Hebden Ghyll, near Grassington, on August 19th, and brought to the Bradford Museum.

Amphibia (Miss E. Gallwey):—For the past six years to my knowledge Common Toads have spawned in a particular disused dam at Woodsome Lees, near Huddersfield, but this year they failed to do so, nor did they visit the pond at all, although there was the usual amount of water in it.

Mr. Booth reports that this season there were neither Frogs nor frog-spawn in a pond at Ben Rhydding, where they spawn every year in numbers. There was the usual quantity of water. Mr. Bramley noted frog-spawn on March 13th, but in smaller quantities than the previous two years; some ponds which usually contained spawn were barren. There was also some mortality due to the drying up of ponds which were much lower than he had ever known them.

Pisces (Miss E. Gallwey):—A Greenland Shark, measuring 16 ft., was trawled near Scarborough on July 30th, and sent to the British Museum.

A Sturgeon weighing 25 lbs. was trawled near Scarborough on January 4th.

A Smooth Serranus or Comber (*Serranus cabrilla*) 9½ in. long was trawled near Scarborough on January 18th. This is the first record for Yorkshire waters, and the specimen has been sent to the British Museum.

Forty-nine Tunny were caught on rod and line near Scarborough, ranging in weight from 429 lbs. up to 736 lbs. Some were taken within four miles of the shore.

Several Red Gurnards were trawled near Scarborough during the year.

One Lesser Forkbeard, 6 in. long, at Scarborough on September 16th.

One Greater Forkbeard trawled near Scarborough on August 12th.

One Electric Ray (*Torpedo marmorata*), 20 in. long, a female, was trawled by s.t. *Ritz* near Scarborough on February 28th. It contained two perfectly formed embryos, each about 3 in. in length.

A marked Plaice, 13¾ in. long, liberated 3¼ miles north by west off Haisborough Lightship on October 5th, 1937, was caught 8 miles east by north off Scarborough Castle on January 27th to 30th, having travelled about 180 miles. Two more marked specimens landed at Scarborough

the first week in March, 1938, had been liberated off Haisborough Lightship on October 5th, 1937. One was caught 28 miles south by east off Scarborough, the other 41 miles east off Flamborough.

Common Carp, Tench, Roach, and Perch: five hundred of each were turned into the Scarborough Mere on January 21st, 1938. Also fifty more Bream on May 10th.

A great increase in Gudgeon has been noticed of late in the Leeds-Liverpool canal.

One Chub weighing 6 lbs. 1 oz. was caught at Yedingham by Mr. F. Speight in the middle of September.

In *The Naturalist*, No. 973, February, 1938, p. 73, Mr. Booth records more Salmon in the Ribble in November, 1937, than for several years. One was embedded in the mesh of a water grill at King's Mill, Settle, on November 5th, weighing 13 lbs., and measuring 3 ft. long.

A Trout weighing 3 lbs. 6 ozs. was caught in the River Aire at Snaygill, Skipton, in June by Mr. Bernard Shaw, which was considered to be of exceptional size for that district.

Nineteen specimens of the Twait Shad were seen during the year, all trawled near Scarborough.

One Allis Shad was trawled at Scarborough on January 31st, one on March 17th, also one at Whitby on August 9th.

Large numbers of Elvers were passing through the Naburn Fish Pass on April 28th. As they were only 71 mm. (about 2¾ in.) in length, Mr. Smith sent specimens to South Kensington for confirmation of identity. An Eel measuring 40 in. long was caught in the Leeds-Liverpool Canal on Wednesday, August 3rd, about midway between Silsden and Ribblesden. It had been injured by the screw of a passing barge. It was suggested that the Eel had crossed the top of the Aire-Wharfe watershed twixt Silsden and Ribblesden, but Mr. Smith thinks this unlikely as this would necessitate the Eel's climbing 1,150 feet in 3 miles. However, elvers are very persistent, and he suggests that this Eel may have got in by way of the west coast streams, crossing by stream, ditch, and grassland.

One Short Sunfish measuring 2 ft. 4 in. in length, and in breadth, from tip to tip of dorsal and anal fins, 3 ft. 11 in., caught in Scarborough Harbour on July 29th.

My sincere thanks are due to Mr. W. J. Clarke, of Scarborough, for the North Riding reports, and to Messrs. S. H. Smith (York), M. Longbottom (Bradford), R. Chislett (Rotherham), S. Edmondson (Utley), F. Lawton (Skelmanthorpe), W. Greaves (Halifax), C. W. Mason (Hull), W. G. Bramley (Bolton Percy), V. G. F. Zimmerman (York), C. F. Procter (Hull), R. Butterfield (Keighley), H. B. Booth (Ben Rhydding), and R. W. Gelsthorpe (Wakefield), who have all co-operated in making this report possible.

STRAY NOTES.—Mr. W. Greaves, of Halifax, writes:—'On our visits to the White Holm Reservoir on Langfield Moor, Blackstone Edge, we have a mile long catchwater drain to traverse. It cuts off the top of the moor from the bottom. Every year in September we find bodies of mammals in it, though about 1,200 ft. altitude. We have retrieved Field Vole, Bank Vole, Wood Mouse, Common Shrew, Lesser Shrew, and Weasel in the past years, and in company with some of the above a Mole this year.

'It is not a rare thing to find half a dozen creatures in at a time, all dead, as there is no escape; the sides and bottom are made of concrete. It looks as if there is a movement from the top of the moor downwards at this time of year, and that the creatures fall into the drain.' However, it seems there should also be a corresponding death trap in the spring for their return to the higher ground. This remains to be checked.

On January 5th, 1938, Mr. A. Beighton, of Skelmanthorpe, sent me a guinea pig which he had found in an old by-lane there. He reported that

they lived in colonies, and in burrows. They are nocturnal, and marshy ground is near at hand. Some of the burrows are situated on fairly high ground. Thus apparently some have escaped from captivity and are able to live and breed in their wild habitat. Colour has reverted to the type.

Aves—WEST RIDING (H. B. Booth):—We had exceptionally fine, dry weather throughout March, April, and until late in May, but it did not noticeably affect the birds or their nesting, except delaying it in a few cases.

Far more harmful were the disastrous fires on Hatfield Moor, near Doncaster, in April and May (one of which was still smoldering in July), and nests of Mallard, Teal, Partridge, Pheasant, Long-eared Owl, Curlew, and other species were destroyed and in some cases the birds were killed (R. Chislett).

HERONS.—There were 25 nests at Gargrave (April 10th and 24th), 24 in Oaks, and one in a larch (W. F. Fearnley). This is a decrease of ten nests on last year, but is offset by increases elsewhere. At Harewood Park, there were 17 nests on April 24th, all in tall beeches. At Healaugh, 26 nests, 16 were in oaks, 5 in ashes, 4 in spruce, and one in a larch. On April 10th all the nests contained young, the head gamekeeper said that one clutch had hatched on March 27th (K. Wheeler). Hubberholme: on May 1st and 22nd there were 5 nests this year, all in tall, dense spruces. Bolton-in-Bowland: Miss D. Steinthal kindly investigated this site for me on May 5th. Besides the single nest in Admiral Wood, 4 pairs had returned and nested at their old site in Park House Ghyll; probably coming from the Gargrave heronry, thus making the number of Herons nests in the West Riding exactly the same as in 1937, viz. 78. For many years I have wondered why the heronry at Hubberholme was dwindling in the number of nests. They were strictly protected and welcomed by the late Lady of the Manor, Miss Stanfield, who died this year, and they are the most difficult Herons nests to see that I have ever known. But I have come to the conclusion that it is because of the great distance they have to travel for food for their young, and the hands of the river-watcher at Kettlewell and head woodman at Grassington are always against them.

ROOKS.—Miss Dorothy Clough again kindly counted the Rooks nests in the Steeton rookeries on April 10th, as 313 nests, viz. 165 around Steeton Hall and 148 in Shrogg's Wood, again a slight decrease. There is still no Rook's nest in the neighbourhood of Ilkley, where formerly they nested in numbers.

Two pairs of Oystercatchers nested on shingle on the River Aire at Gargrave this year, one of the nests was robbed (F. J. N. Dufty). It appears as though this species is becoming a regular nester in the West Riding, as Mr. A. Clark, in *British Birds* (XXXII, p. 85), reports that two pairs nested this year on the Ribble near Settle, which is only ten miles from Gargrave. The same writer, in the same journal (p. 126) states that there was a nest with eggs of the Ringed Plover at the same place. On May 29th we saw a pair of Ringed Plovers at Malham Tarn in company with two pairs of Common Sandpipers. On July 3rd, at exactly the same place, I put up six Ringed Plovers, which I hoped were a pair, and four young ones. But they rose into a strong head wind, before I could get my glasses on to them, and flew right across the Tarn. I could not see any difference in the six birds, either in colour, size, or flight; but by the long strong flight they made against a powerful and adverse wind, I think they must all have been adult birds.

A Harrier has been about the moors around Bolton Abbey all the summer. The new Duke of Devonshire has given orders that it must not be shot, and his gamekeepers are not too pleased about it; although up to now it has not done any known harm to the grouse (Rev. C. F. Tomlinson). The keepers say it is a Hen Harrier, but it is more probable that it is Montagu's and possible that a pair may be nesting somewhere on the higher moors.

A new Starling 'roost' has been formed in a small plantation between Beamsley Beacon and Kex Beck, near Bolton Abbey, and thousands of birds are assembling nightly (Rev. C.F.T.). These Starlings partially disappeared after the night of October 21st (H.B.B.).

PEREGRINE FALCON.—In one eyrie that is looked after by the Y.N.U. three young birds got safely away; it is believed that another eyrie successfully nested.

GULLS.—A few mature Lesser Black-backed Gulls hang about our moors throughout the nesting season, and doubtless there have been stray nests on some of remote and little-visited moors ever since they were expelled from Malham Tarn. Mr. W. Greaves informs me that Lord Savile's head gamekeeper, of Walshaw, assures him that a few pairs laid eggs high up on the hills above Hebden Bridge, on the moor at a point between Crow Hill and Alcomden Stones. As a census of Black-headed Gulls is being taken, I will leave that species with but two remarks. Although these birds have greatly decreased in numbers in the nesting season from 15 to 20 years ago, many more spend the winter here than formerly. Mr. W. J. Forrest three times visited the Pinhaw site on Elslack Moor. The last time was in the first week in July, and although the gamekeeper said the Gulls had not nested there this year, he saw 14 adult birds and four young birds that could not fly. The swamp was then so flooded that he was not able to examine it properly.

STRAY NOTES.—A supposed Golden Eagle being mobbed by a Gull at Arncliffe was reported in the press in September, would be more likely to be a Common Buzzard. A pair of Stonechats (a rare nester in the West Riding) successfully reared a brood on an Airedale Moor (M. Malone). A Twite's nest contained five eggs on May 22nd on the moor edge at Ben Rhydding. Unfortunately it was on a spot much frequented by visitors, children, and dogs, and the birds deserted the eggs before they hatched. This is the first Twite's nest that I have known in Wharfedale for about twenty years, when a few pairs nested annually just below the 'Rocky Valley' at Ilkley.

A pair of Canada Geese nested at Fairburn and hatched five goslings (R.C.).

Mr. R. Butterfield reports that a Water Rail was killed by flying against overhead wires near Keighley. Also that a pair of Woodcock nested on the Keighley Golf Course, at Riddlesden. Very shortly after hatching the young birds were taken away, presumably by their parents. He also reports that he has seen ten small parties of Goldfinches feeding on knapweed near Keighley during last winter.

A nest of Black Grouse with 8 eggs was found near 'The Uplands' on Bingley Moor towards the end of May. One egg was taken as they were rather on the small side; but it was afterwards verified by the Rev. F. C. R. Jourdain (M. Longbottom). (It is probable that they would be unfertile as the Blackcock rarely ventures on to the open moor. H.B.B.) Black Game were reported near Arncliffe in Littondale. The Little Owl again nested near Luddenden Foot, close to the place it occupied a year ago (W.G.).

A Garganey drake was seen in the south of the Riding on April 22nd (*Naturalist*, p. 208) and two were seen at Fairburn on June 18th by Messrs. Crapnell and Edwards.

A Quail was reported shot at Oakenshaw, near Bradford, on September 12th (W. Swain). A Dunlin's nest with four eggs was seen on May 29th on a moor in Upper Airedale.

Mr. Chislett reports that 2 Nuthatches were seen going into, and coming out of, a hole in a wood near Sheffield; and that Tree Sparrows were incubating on May 15th, and they were feeding second broods on July 9th. He also regretfully states that Nightingales were even scarcer in the south of the Riding than usual.

I have reported about Great Crested Grebes in *The Naturalist*, p. 231.

A Western Little Bustard (*Otis tetrax tetrax*), a new Yorkshire and British bird, shot at Wadworth, near Doncaster, in December, 1932 (see *The Naturalist*, 1938, pp. 143-4).

A Black-throated Diver was shot at Leeming Reservoir on February 23rd and is now in the Cartwright Hall Museum, Bradford (*The Naturalist*, 1938, p. 144).

Mr. A. Gilpin reports that on March 5th the following birds were on Eccup Reservoir: 40 Goosanders, 12 of which were adult males; 20 each of Shovelers, Wigeon, and Tufted Ducks; a ♂ and ♀ Goldeneye; about 300 Mallard; 2 Great Crested Grebes; and large numbers of Herring and Black-headed Gulls.

Our Halifax friends, Messrs. V. S. Crapnell, G. R. Edwards, H. Foster, W. Greaves, and E. Watson have watched the reservoirs and sewerage works in the Halifax district with the following good results.

AT WHITE HOLME RESERVOIR.—A Red-necked Grebe (January 12th), 6 Common Scoters (July 3rd), 2 Turnstones (July 31st), 2 Green Sandpipers (August 4th), 3 Shovelers (August 9th), a Greenshank and 2 Common Scoters (August 10th), a Grey Plover and a Ringed Plover (August 12th), 1 Greenshank (August 16th), 10 Turnstones, 7 Ringed Plovers, and a Short-eared Owl (August 19th), 6 Turnstones and 6 Ringed Plovers (August 20th and 21st), and a Common or Arctic Tern on the latter date. One Heron and 1 Shoveler (August 26th), 2 Turnstones, 1 Ringed Plover and 3 Common Gulls (August 27th), 5 Curlew Sandpipers (September 10th), 2 Grey Plovers (September 16th), 1 Greenland Wheatear and 1 Grey Plover (September 25th).

AT RINGSTONE EDGE RESERVOIR.—One Shelduck (January 23rd), 3 Ringed Plovers (May 14th), and 2 Common Scoters (July 3rd).

AT BLACKSTONE EDGE RESERVOIR.—One Sanderling and 1 Ringed Plover (June 7th), and 8 Common Scoters (July 3rd).

AT GORPLE UPPER RESERVOIR.—Two Sanderlings on May 15th.

AT WITHENS RESERVOIR.—A number of Common Scoters (July 3rd), 1 Green Sandpiper (August 21st), 1 Grey Plover and 7 Common Gulls (September 17th).

AT ELLAND SEWERAGE WORKS.—Two immature Shelducks and 1 Green Sandpiper (August 23rd), a Black Tern, a Ruff, 2 Shelducks, and 2 Ringed Plovers (August 24th and 25th). A Ruff and Reeve, 2 Green Sandpipers and 1 Greenshank (August 27th and 28th), 1 Knot, 1 Ruff, and 1 Greenshank (September 1st), and 1 Greenshank (September 3rd and 13th).

AT HIGH ROYD SEWERAGE WORKS.—One immature Shelduck (June 3rd), 1 Greenshank and 1 Green Sandpiper (August 28th), and 1 Greenshank (September 2nd). A Ruff was seen at Elland on October 9th.

NORTH RIDING (W. J. Clarke, F.Z.S.):—The year has been a good one for birds, and a number of species have shown an increase in the North Riding. Among these are Redwings and Fieldfares, which were very numerous, one of the latter species being seen near Goathland as late as June 29th. In the early part of the year an exceptional number of Lapwings were on the land between Scarborough and Pickering in many thousands. Spotted Flycatchers, Redstarts, Turtle Doves, Goldfinches, Landrails, Magpies, Kittiwake, Greenfinches, and Green Sandpipers have all been more abundant than usual. House Martins have shown a very considerable increase; on August 14th the writer saw not less than 500 flying over the Scarborough Mere, and many old nesting sites have been re-occupied.

Certain species however have shown a diminution in numbers. Afforestation on the moors near Scarborough has driven away the Red Grouse, and only four have been seen during the year on that side of the moor in a place not yet planted. These birds, although more numerous on the Whitby side of the moors, have done badly this year, the drought in April and May having a disastrous effect on the young. Other species

less numerous during the year are Brambling, Golden Plover, Curlew, Sandpiper, Pied Flycatcher, of which only a single breeding pair has been noted this year, Common and Yellow Buntings. It is feared that the Stone Curlew has not nested in its usual haunts, although one was heard calling on April 12th and a single bird was seen on May 3rd and 31st.

Hooded Crows have been very scarce for some years past, but 25 were seen near Scarborough Racecourse, and one at Wykeham on March 12th. Another was seen at Throxenby on June 14th.

Rooks had a bad nesting season; many young ones died in the nest or soon after leaving, possibly because the ground was too dry and hard for the parents to obtain sufficient food.

Two Hawfinches were seen at Stainton Dale on January 28th, 1938.

A flock of 80 to 100 Siskins was seen at Ellerburn during the first week in November, 1937. A further party of 20 noticed at Thornton Dale about the same time was possibly part of the same flock.

Young House Sparrows able to feed themselves, although still accepting offerings from their mother, were on the wing on April 30th.

Two Crossbills were seen in Raincliffe Wood on July 4th, 1938.

Eight Snow Buntings were seen on the Scarborough Castle Hill on November 2nd, 1938, two more were reported on November 8th, and a single bird at Goathland Moors on December 27th.

A Yellow Wagtail was seen at the Scarborough Mere on May 17th, and two at Whitby during May.

Three Water Pipits were seen at Pickering on various dates between February 11th and April 1st, 1938, by R. M. Garnett.

The Nuthatch, which has been seen at Sleights during the last five or six years is still without a mate.

A pair of Willow Tits nested successfully at Thornton Dale during April and May, 1938. The species was seen by R. M. Garnett in several different localities.

Several Waxwings were reported at Runswick Bay and Goathland between January 10th and February 6th.

A Grasshopper Warbler was heard near Scarborough on May 31st, 1938.

A female Black Redstart was on the Scarborough Castle Hill on October 27th, 1937. Another female was seen near Levisham on March 26th, 1938.

A Robin with brown head and back, red breast, otherwise all white, lived for several weeks at Newby during the latter part of 1937.

A pair of Stonechats were feeding fully-fledged young near Scarborough on May 5th. This species is reported as now common in the Whitby district.

The scarcity of Whinchats continues. Two pairs were seen near Scalby in May but there was no evidence of nesting.

Short-eared Owls gathered in considerable numbers in late 1937 and early 1938 at Eberston, Brompton, and Hutton Bushel, where a plague of field voles prevailed at that time.

A Little Owl was found in a dried-up condition on a keeper's rack at Allerston on May 1st, 1938. Another, a freshly killed specimen was upon another rack near Wykeham on July 9th, 1938.

A Hen Harrier, either a female or immature male, was seen on many occasions near Thornton le Dale by R. M. Garnett. An adult male was seen on February 13th near Pickering by R. M. Garnett and W. S. Medlicott.

Montagu's Harriers nested on the moors at a place within 50 yards of where the nest was situated last year, and reared four young ones. One was seen at Cockmoor on May 16th, 1938, and another at Egton Bridge in March and September, 1938.

A pair of Merlins nested near Biller Howe, the nest containing four eggs, on June 11th, 1938.

Kestrels show a decrease in the district probably owing to an increase in the activities of gamekeepers. Seven were seen on a keeper's rack at Hay Brow on August 31st, while seven more were displayed on another rack near Wykeham on September 2nd. The destruction of these useful birds is to be deplored. Nine Brown Owls were also found on a keeper's rack at Hackness on April 20th. In this case a prosecution was instituted which was dismissed by the magistrates, although the killing of the birds was admitted. The illegal pole trap is still in use in several places in the Riding.

Shags have been less common during the winter, the only specimens reported being two in Scarborough Harbour on January 26th, 1938.

Mallards nested commonly in the district. One pair built a nest in the lily pond in the Ramsdale Valley in the centre of Scarborough, but when four eggs had been laid the nest was robbed, being within easy reach of the public footpath.

Many Tufted Ducks visited the fishpond in the Ramsdale Valley in small parties of six or eight at a time, coming and going constantly.

Three Goosanders, all females, were seen at the Scarborough Mere on December 31st, 1937. One on January 13th, four on January 25th (at the same place), and one at Egton Bridge in January.

A Bittern was obtained at Seamer on January 13th, 1938, and is now in the Ayton School Museum. Green Sandpipers have been seen at various places on several occasions. Two were seen at Everley on August 6th, 1938, and one at Roxby Moor in the same month. Several wintered near Pickering, most seen together being four, from October, 1937, to March, 1938. Six were seen near the same place on July 22nd. Two were noticed at Jugger Howe Beck on August 11th, and another on Scalby Cut on July 30th. Two were on the Derwent at Wrench Green on August 1st, and two at Scalby Beck on July 30th.

A Whimbrel was seen at Egton Bridge in June, 1938, and another was shot at Roxby Moor in August.

A pair of Herring Gulls nested and reared three young ones on the roof of the Whitby Urban District Council Chamber.

An immature Glaucous Gull was seen in Whitby Harbour in February, 1938.

Black-headed Gulls were not nearly so numerous at Foul Syke and appeared to have been much disturbed. About 20 pairs took up their residence at May Moss.

An immature Great Skua was picked up disabled on the moors near Goathland in 1938.

An immature Iceland Gull was seen in the harbour at Scarborough on April 13th and 14th, 1938.

A Storm Petrel was caught alive on the East Pier at Scarborough, exhausted after a strong S.W. wind, on October 30th, 1937. It was afterwards released.

Many Fulmars had reached the Castle Cliff at Scarborough by December 31st, 1937, and they were numerous there during the summer.

A pair of Water Rails nested near Scalby and reared six young ones. This is the third year they have bred at the same place.

Landrails arrived at Newby on April 8th, and two pairs remained there during the summer. One was picked up at Scarborough on September 4th, having flown into a wire and scalped itself. The skin was drawn into position and kept there by adhesive plaster, and the bird was eventually released apparently little worse for its injury. Landrails were also heard at Scalby Lodge in July, at Ebberston and Burniston. In the Whitby area it has remained scarce.

Heavy floods in early June destroyed nearly all the Waterhens' nests on the Derwent.

A pair of Ring Doves nested in a tree in the main street of Thornton le Dale, and reared three broods in the same nest, the last pair of young

birds leaving the nest on November 5th, 1937. There is a nest in the same tree this year.

A pair of Red-legged Partridges with eight to ten chicks were seen near Scalby on June 29th.

An adult female Quail was picked up dead in a Scarborough street on July 1st, 1938.

Mr. V. G. F. Zimmerman reports:—'During July and August I spent several days on the coast between Hornsea and Ravenscar, and was astonished at the large increase in Cormorants, Herring Gulls, and Kittiwakes, but was under the impression there were not so many Razor-bills, Puffins, or Guillemots.

'Early in July I saw a Black Guillemot on Bempton Cliffs on several occasions, and on July 24th I watched a pair of Black Guillemots feeding two young ones. I had the pleasure of watching them for two hours.'

The recorder gratefully acknowledges the assistance of Messrs. A. S. Frank, V. G. F. Zimmerman, H. H. Farwig, R. M. Garnett, W. S. Medlicott, T. N. Roberts, F. Snowdon, R. Chislett, and E. A. Wallis, all of whom have contributed notes of great value.

EAST RIDING (C. W. Mason):—One of the striking features of the last nesting season was the late arrival of some of our spring migrants. Sand Martin first seen at South Cave, April 23rd; Cuckoo first seen at Hornsea, May 8th; Cuckoo first seen at South Cave, May 10th; Swallow first seen at Hornsea, May 11th; Swift first seen at Hull, May 16th; Nightingale (in full song) at Cottingham, May 16th; Swallow first seen at Spurn, April 6th; Lesser Tern first seen at Spurn, April 28th.

Short-eared Owls were numerous at Brandesburton last winter, due to the large number of field mice in the district and the following observations were made.

1937—December 11th, 6; December 18th, 5. 1938—January 1st, 6 (and many field mice); January 8th, 3; January 22nd, 4; January 29th, 2; February 12th, 4; February 26th, 2.

They were also numerous along the Humber shore, Wolds, and the Vale of Pickering, the most seen here were three on January 26th (R.M.G.).

Goosander. One (a red-headed bird) at Castle Howard on December 12th (R.M.G.).

Black Tern. Two in autumn plumage were flying lazily on the lake at Castle Howard on August 7th. There was at this time much sea fog on the East Coast (R.M.G.).

BEMPTON.

Peregrine has nested this year, but the two young died.

Gannet. Two pair of birds have been at the cliffs and one pair nested. The young was seen on July 12th by Mr. R. M. Garnett.

Fulmar Petrel. Over 100 pair were counted on one visit (C.P.).

Tree Sparrow. A pair nested in the face of the cliff at Flamborough, and on June 9th one of the adults was seen entering the hole with food. It seems an unusual site, but such have been previously recorded (*Handbook of British Birds*) (R.M.G.).

Willow Tit. An adult and a young bird were seen among brambles on Flamborough Head on August 24th and must have been on passage (R.M.G.).

Black Redstart. A female was seen near Flamborough Lighthouse on October 29th (R.M.G.).

HORNSEA.

Heron. 24 occupied nests were counted this season.

Great Crested Grebe. Only 8 pair have been seen, and 10 young counted.

Peregrine. A bird was seen from June 11th to 18th.

Kingfisher. 2 nests.

Woodcock. A nest with 5 eggs hatched out.

Goldfinch. 8 pair nested.

Long-tailed Tit. 5 pair nested.

Cormorant. A good many were on the Mere all the year round.

SPURN.

Oystercatcher. A nest of 4 eggs was found on June 4th.

Barred Warber. One was found at Kilnsea on August 21st. It resembled three others seen in Norfolk in previous years, and like those was probably a bird of the year. It was also seen on September 9th (R.M.G.).

An immature or female Red-breasted Flycatcher was seen at Spurn on September 24th (G.R.E.).

Ringed Plover. From June 15th to 18th, 17 nests were found at the point. From May 7th to July 5th, 15 nests were found at Kilnsea.

Lesser Tern. From June 4th to July 15th, 61 nests were found at the point. From May 13th to July 3rd, 37 nests were found at Kilnsea.

York District (Sydney H. Smith, J.P., F.Z.S.) :—The year has been marked by curiously abnormal weather, which in turn affected local bird life in various ways. February of 'fill dyke fame' was dry and free from frost and snow. March was dry and marked by gales of wind, whilst April was distinguished by many night frosts, the 28th providing the first rain for about two months. May was cold and dry, with night frosts, the drought again breaking in heavy rain on the 28th, causing rivers and streams to flood.

The summer was cold and generally wet, hence one is not surprised at the comparative scarcity of migrant species and a further decline in numbers of several others which have been under observation. There is, however, an apparent increase in the numbers of Goldfinches, Bullfinches, Lesser Redpolls, Reed Buntings, Lesser Whitethroats, Rooks, Carrion Crows, Magpies, Jays, Tawny Owls, and Moorhens.

Early in the year Skipwith Common was swept by fire, consequently the Black-headed Gull colony vacated their usual nesting ponds to populate the Horse Shoe Lake, where they bred successfully.

On May 13th a pair of Black-headed Gulls started carrying nesting material to a small islet in the lake at 'Willowsyde,' Elmfield, York, and for three weeks it was expected they would settle, but the passing traffic proved too much for them and they left the place, and have not since been seen.

Mallard and Teal Ducks nested at Skipwith and Strensall, and a few pairs of Shovellers were seen at Skipwith, and on July 2nd a Pintail Duck with young was observed, but the family were too elusive to be counted.

At the same well-known bird haunt a few pairs of Snipe and Redshanks bred. Perhaps the unusual dryness of the Common and the moor fires account for comparative scarcity. Only one pair of Nightjars occupied the haunt where the keeper, J. Morris, says a dozen pairs annually nested. Another pair was located near the brickyard, Dringhouses, York, and on July 8th a pair of Nightjars were seen at Sand Hutton old gravel pit, and one pair at Buttercrambe. The species is becoming rare in this district, and it is difficult to ascribe a reason.

Many of the Heron woods around York have been cut down and the birds driven off. Herons fly over York occasionally, and one visited the lake at Elmfield early one August morning, and after taking a few small fish (probably roach) went safely away. Another came to grief in the night gale of June 29th, and falling in the Deanery grounds was cared for until July 3rd when The Very Reverend Dean of York kindly helped me to take the bird over to Skipwith Common and liberate it in a suitable place.

At Castle Howard one pair of Great Crested Grebes arrived late in February still in winter dress. Later they were seen in full breeding

plumage, but were not known to nest. Another pair was observed on Leetham's pond, Dringhouses, on March 11th. A pair was also seen on the Brickyard pond at Dringhouses on April 15th, and a third pair on Hepper's pond on April 24th. All these Grebes were kept under observation until June, but owing to constant disturbance they ultimately departed and no nesting has been recorded.

Landrails or Corncrakes have again proved to be very scarce, and I have not seen or heard one myself. My helpers report that one was heard on Clifton Ings on May 5th, and others at Fulford, Naburn, Poppleton, and Kirk Hammerton, and in all cases favoured water meadows and uncut grass fields as their haunt. I trust the special inquiry now in progress as to the status of the Landrail in Great Britain will elucidate the mystery of the great decrease in numbers of this interesting summer visitor.

On March 11th two pairs of Pochards were seen on Leetham's pond, Dringhouses, but I have no knowledge of their nesting. In the grounds of 'Aldersyde' a pair of Gold Crests successfully reared their brood, and not far away at Askham Bogs, a pair of Grasshopper Warblers are thought to have had a nest near to the place where one was found last year. A Grasshopper Warbler was heard at Terrington on May 1st, and incidentally, although outside my district, I heard of a pair being seen at Hole of Horcum, near Pickering, on July 9th.

An unusual bird in the York district is the Nuthatch, one being seen at Everingham Park on June 18th, where it may have been nesting. The species has previously been recorded as nesting at Aldby Park, ten miles north-east from York.

On October 3rd I was asked to identify a large bird that had fallen in the walled garden of the 'Fox Inn,' Nether Poppleton, three miles west from York. It proved to be a Gannet in immature (black and speckled with white) plumage, and did not appear to be damaged in any way, and readily accepted food, fresh herrings, roach, etc. In the evening of October 8th this Gannet was released at low tide on the North side in Scarborough Bay and went away quite safely; and it is hoped that it will not be molested should it stay in the neighbourhood.

Some of the winter-visiting Fieldfares stayed on in this district much later than usual, and a large flock was seen at Strensall on April 30th.

Hooded Crows, once very common winter visitors, are extremely rare, and I did not see one during the winter of 1937-38.

I am indebted to Messrs. V. G. F. Zimmerman, A. W. Ping, E. Wilfred Taylor, H. Shorney, and A. Smith for many useful notes included in this report.

ARRIVAL OF MIGRANT SPECIES, 1938.

CHIFF CHAFF ...	...	Askham Bogs, March 29th; Stillington Wood, April 4th; Strensall, April 6th.
WILLOW WARBLER ...	...	York, April 3rd; 'Aldersyde,' April 17th.
SWALLOW ...	...	York, April 10th; High Catton, April 22nd; 'Aldersyde,' April 26th. (A nest of young Swallows near York on September 14th).
CUCKOO... ..	...	York, April 10th; High Catton, April 19th; Acomb, April 25th; Whenby, April 28th; Huntington, April 30th.
WHITETHROAT ...	...	Huntington, April 16th.
SANDMARTIN ...	...	High Catton, April 22nd; Huntington, April 24th; large numbers at Heslington, May 30th.
LESSER WHITETHROAT		Huby, April 23rd; Huntington, April 26th.
BLACKCAP WARBLER ...		Huby, April 23rd.
SEDGE WARBLER ...		Huntington, April 24th; York, May 8th.

TURTLE DOVE	...	Huntington Wood, April 24th.
GARDEN WARBLER	...	Huntington Wood, April 26th.
GRASSHOPPER WARBLER	...	Terrington, May 1st.
REED WARBLER	...	Castle Howard, May 1st.
TREE PIPIT	...	Strensall, May 1st.
HOUSE MARTIN	...	Strensall, May 1st; High Catton, May 5th; Kirkham, May 15th.
LANDRAIL	...	York, May 6th.
SWIFT	...	Heslington, May 14th; York, May 20th.
NIGHT JAR	...	Wheldrake, May 20th.

WILD BIRDS AND EGGS PROTECTION COMMITTEE

List of Subscribers, 1938

	£	s.	d.		£	s.	d.
Ald. A. Hirst	3	0	0	Mr. W. G. Birch	0	10	0
Mr. H. B. Booth	2	0	0	Mr. B. Bussey	0	10	0
Mr. R. Cattley	1	1	0	Miss K. P. Yeoman	0	10	0
Mr. T. W. Waddington	1	1	0	Miss C. Edmondson	0	10	0
Mr. A. Ward	1	1	0	Mrs. Binns	0	10	0
The Duke of Devonshire	1	1	0	Mrs. B. Ewing	0	10	0
Mr. W. Nicholas	1	0	0	Mr. Bennett	0	10	0
Mr. W. Bramley	2	0	0	Mr. B. Linney	0	7	6
York F.N. Society	1	0	0	Scarborough F.N. Soc.	0	5	0
Mr. J. W. Dent	1	0	0	Mr. G. W. Roome	0	5	0
Mr. R. M. Garnett	1	0	0	Mr. W. E. L. Wattam	0	5	0
Mr. L. Brigg	1	0	0	Mr. R. Butterfield	0	5	0
Mr. R. Chislett	1	0	0	Mr. F. N. Roberts	0	5	0
Sir Harry Smith	1	0	0	Mr. G. R. Dooks	0	5	0
Miss S. Waterhouse	1	0	0	Mr. B. Linney	0	5	0
Mr. F. Edmondson	1	0	0	Mrs. Moorhouse	0	2	6
Mr. E. B. Gibson	0	10	6	Mrs. A. Stell	0	5	0
Mr. H. J. Behrens	0	10	6	Mr. A. W. Bradbury	0	5	0
Mr. W. P. Winter	0	10	6	Mr. W. H. Forrest	0	5	0
Mr. C. W. Mason	0	10	6	Mr. A. E. Greaves	0	2	6
Mr. C. F. Procter	0	10	6	Mr. J. H. Lumb	0	2	6
Mr. E. W. Taylor	0	10	6	Mr. J. R. Artley	0	2	6
Mr. S. H. Smith	1	0	0	Mr. E. Hughes	0	2	6
Mr. A. H. Lumby	0	10	0	Mrs. Robson	0	2	6
Mr. J. J. Brigg	0	10	0	Mr. T. H. Dick	0	2	6
Mr. J. T. Taylor	0	10	0	Mr. O. Darneley	0	2	6
Mr. W. J. Clarke	0	10	0				
Mr. E. W. Jackson	0	10	0				
Mr. V. G. Zimmerman	0	10	0				
					£34	14	6

Preliminary Balance Sheet, Season 1938.

INCOME.	£	s.	d.	EXPENDITURE.	£	s.	d.
Subscription as per list	34	14	6	Watchers and Insurance	30	7	0
Balance from last year	65	13	9	Postages, Registered Envelopes, etc.	1	10	0
				Cheque Book	0	5	0
				Bird Watchers' Guild	0	5	0
				Balance at Bank	68	1	3
	£100	8	3		£100	8	3

Wild Birds and Eggs Protection Acts Committee (Ralph Chislett) :—Payments have been made from the Committee's funds for the watching of the breeding grounds, and for the preservation of the

Peregrine Falcon, the Montagu's Harrier, the Stone Curlew, the Heron, the Little Tern, etc.; the three first-named are very rare in the county. Watchers were employed at Hornsea Mere and at Spurn throughout the nesting season. The status for the year for each of the several species preserved is included in the published reports of the Recorders for the different Ridings.

Three members of the Committee attended a meeting of the Bempton climbers and explained the Committee's objects. It is believed the birds will benefit.

The Gannet has been added to the list of birds protected throughout the year in the East Riding on representations made by C. F. Procter on behalf of the Committee. A pair of Gannets bred successfully.

A prosecution followed the destruction of nine Tawny Owls in the East Riding as reported in *The Naturalist* (August, 1938, p. 226).

A case of shooting protected birds at Bempton has been investigated with the aid of the Police; but due warning having been given full publicity in the district concerned, the Committee decided not to press the case to prosecution this time.

CONCHOLOGICAL SECTION

Report for 1938 (Mrs. E. M. Morehouse):—From time to time during the present year reports on Conchological records have appeared in *The Naturalist*. Therefore it would be a waste of time and space to repeat these.

May 7th. Mr. J. C. North had the good fortune to find a sinistral form of *Limnæa pereger* Müll in the River Wharfe at Woodhall Bridge. This specimen was a juvenile, but worthy of note.

Mr. R. J. Flintoff forwarded to me a slug he had received from Mr. John L. Forrest, Eversfield, Goathland. It was *Limax maximus* v. *maculata* Picard. The animal was quite beautiful, having a body and foot, buff in colour, maculated with black, the head being a dusky pink with dark markings.

Miss Ida Duffy took a very fine *Bithynia tentaculata* L. at Park Drain, June 23rd, 1937. It measured 15×8 mm. and was in perfect condition. This record should have been included in the report a year ago, but due to an oversight of the writer it was forgotten.

Mr. C. F. Sweetman's list of 23 molluscs and 3 slugs should appear in our journal before the Annual Report, but tribute ought to be paid to such an achievement considering the difficulties which are encountered in the Hole of Horcum, chiefly in this instance to the prevailing winds. I have remarked before that molluscs do not like wind and take cover from it where shelter is possible.

In September the Y.C.S. visited Agbrigg. In addition to a few other fresh-water molluscs, *Spherium rivicola* Leach and two malformed *Dreissensia polymorpha* Pallas. were taken. *Spherium rivicola* Leach is always a good 'find.' Another habitat for this species is the River Foss at York.

In conclusion the year has been fairly good for collecting; there is a gradual improvement since the years of drought.

ENTOMOLOGICAL SECTION

Hemiptera (J. M. Brown):—Two papers dealing with captures made in 1937 have appeared in *The Naturalist* for 1938, one by H. Britten giving additional records for the Whitby district, p. 129, and one by the recorder dealing with the Robin Hood's Bay area, p. 201. For the present season I have few interesting insects to report, and judging from my own observations, it has not been a very satisfactory year.

Heteroptera (J. M. Brown) :—

Taphropeltus contractus H.S. occurred at Ravenscar, 13/6/38, having previously been taken only at Spurn.

Pithanus mærkeli H.S. Ringinglow (Sheffield), 15/8/38, and Robin Hood's Bay, 5/7/38.

Corixa punctata Ill. (*geoffroyi* Lch.), *Sigara sahlbergi* Fieb. and *S. nigrolineata* Fieb. Ecclesall Wood, Sheffield, 20/4/38.

Micronecta minutissima L. Robin Hood's Bay, 26/4/38.

Homoptera (J. M. Brown) :—

Doratura stylata Boh. and *Deltocephalus confinis* Dahlb. (*thenii* Edw.) occurred in grass, Whiston, 31/7/38.

Macrostelus (Cicadula) dahlbomi Zett. Robin Hood's Bay, 21/6/38, previously taken only in Forge Valley.

Delphacodes pellucida Edw., *D. discolor* Boh., and *D. forcipata* Boh. Robin Hood's Bay, 2/5/38, 24/6/38, and 3/7/38 respectively.

Stiroma albomarginata Curt., *S. pteridis* Boh., and *S. affinis* Fieb. Robin Hood's Bay, 21/6/38, 2/7/38, and 2/6/38 respectively.

Coccidae (J. M. Brown) :—

Newsteadia floccosa DeG. Plentiful, Ecclesall Wood, 16/2/38 and 3/3/38, Wyming Brook, 7/3/38.

Orthezia cataphracta Sh. At grass roots, Wyming Brook (Sheffield), 7/3/38-11/4/38.

Neuroptera (J. M. Brown) :—

Osmylus fulvicephalus Scop. was again observed in flight in Ecclesall Wood, 22/7/38, and larvæ were noted by several streams near Sheffield, March-April.

Hemerobius marginatus Steph. Robin Hood's Bay, 5/7/38.

Kimminsia (Boriomyia) subnebulosa Steph. Ecclesall, Sheffield, 16/5/38.

Chrysopa ventralis Curt. Askern, 25/6/38 (E. G. Bayford), Robin Hood's Bay, 24/6/38.

C. ventralis f. *prasina* Burm. Robin Hood's Bay, 4/7/38.

Nathanica capitata Fabr. again occurred in several localities near Robin Hood's Bay, 14/6/38, 26/6/38, 4/7/38.

Boreus hyemalis L. occurred in Ecclesall Wood (*Naturalist*, 1938, p. 82).

Plecoptera (J. M. Brown) :—A few occurrences may be noted, although no additions can be made to the county list.

Perlodes mortoni Klap. Wyming Brook (Sheffield), 11/4/38, Robin Hood's Bay, 26/4/38.

Capnia nigra Pict. again occurred by Limb Brook, Ecclesall Wood, 31/1/38, 14/2/38.

Leuctra hippopus Kmpy. and *L. inermis* Kmpy. Wyming Brook, 11/4/38.

L. fusciventris Steph. A very early occurrence by Limb Brook, 18/1/38.

Nemoura cambrica Steph. and *N. avicularis* Mort. Robin Hood's Bay, 26/4/38.

Psocoptera and Orthoptera. Nothing of interest to report.

Odonata (Chris. A. Cheetham) :—Dragonflies were in smaller numbers than normal at Austwick Moss, especially the smaller species of Agrionidæ. The large *Æschna juncea* L. seemed about normal, but the other two common species here, *Sympetrum scoticum* Don. and *Pyrrosoma nymphula* Kirby, were in less numbers than usual. I found *Sympetrum striolatum* Charp. at Thieves Moss and on Sulber at 1,200 feet O.D. on September 21st. This species is better known in the south of the county and the late date and altitude are interesting. Mr. E. G. Bayford reported *Æschna juncea* L. at Barnsley in the Market Place; this species is uncommon in the south of the county where *Æ. cyanea* Mull. is the common species. At the Pickering meeting *Calopteryx virgo* L. was caught at Haugh Rigg.

Ephemeroptera (J. R. Dibb):—No special activities upon Ephemeroptera have been evidenced this year, and for the records published we have mainly to thank Mr. J. M. Brown, who has regularly reported his captures taken upon our various excursions.

Apparently the year has been almost a normal one with numbers being perhaps under-average for our district.

As it is over a decade since a Yorkshire list of May-flies was published (by Percival and Whitehead) the records have been co-ordinated with a view to issuing a revised list of Yorkshire species and their stations. To make this as comprehensive as possible I should appreciate it if any records not published or previously sent to me were now communicated.

Diptera (Chris. A. Cheetham):—The weather conditions caused a scarcity of all species of diptera and the very wet weekends which coincided with the meetings in Upper Nidderdale, Hedon, and Sedbergh helped to make collecting a dismal task. A bright spot came during the long drought which dried up Austwick Moss in a way that I have not known previously, giving access to places which are normally too wet to visit. Here I found the Tipulid mentioned on page 277 of *The Naturalist*, *Prionocera subserricornis* Ztt. Two specimens had been found among collections in the British Museum, but this was the first time it had been recognised when captured, fortunately it occurred in fair numbers for a few weeks. Dr. Edwards, who came to see this was delighted to get an addition to the British list of midges in *Lasiodiamesa sphagnicola* Kief.; this is noted in the same article. Another species, *Idioptera fasciata* L. was to be had on this same wet area in fair numbers, and this species I had only previously found in an odd place and in small numbers. I also got a specimen of *Triogma trisulcata* Schum. near at hand. I only have one previous capture of this at Thieves Moss some three or four miles away.

The best result came from the Whitsuntide meeting at Pickering, where some ten species were added to the county list. Further visits to the wooded hollows around Haugh Rigg would certainly repay a dipterist.

Coleoptera (W. J. Fordham):—The year 1938 has been a poor one for beetles, but taking into consideration insects captured in previous years, which have not been recorded, a fair list has been compiled and will be published later in *The Naturalist*. Several noteworthy beetles were taken on the Pickering, Askern, and Hedon excursions.

Eight species new to the county have been added during the year. Mr. Bayford adds *Sericoderus lateralis* (Gyll.) on a specimen bred at Barnsley in 1916, from a pupa on a banana, and *Hylotrupes bajulus* (L.), bred at Barnsley and Keighley, from wood, probably imported. Mr. Barnes adds *Chrysomela menthastris* (Suff.), from Askern, from which place Messrs. Dibb and Hincks add *Silis ruficollis* (F.), *Psylliodes dulcamaræ* (Koch.), *Dorytomus dejeani* (Est.), *Dasytes plumbeus* (Ml.), which later also occurred to Mr. Walsh at Pickering. Mr. H. Britten records *Pogonochærus fasciculatus* (D.G.) from Sleights, and Mr. Walsh the same species from Raincliffe Woods. Other species recorded include:

Mr. WALSH: *Endomychus coccineus* (L.), Raincliffe Woods; *Carabus glabratus* (Pk.), Cross Cliff; *Rhagium bifasciatum* (F.) ab. *bicolor* (Ol.), Cross Cliff.

Mr. W. D. HINCKS: *Antherophagus pallens* (Gyll.), Leeds.

Mr. A. SMITH: *Clytus mysticus* (L.), York district; *Lyctus brunneus* (S.), York district; *Dorcus parallelipedus* (L.), York district; *Anisosticta 19-punctata* (L.), York district.

Mr. P. D. HARTLEY: *Sphærites glabratus* from Appletreewick and *Clytus mysticus* from Skipwith.

Lepidoptera (Mr. Rosse Butterfield):—The spring and summer months did not prove even as favourable for Lepidoptera as the corresponding seasons last year.

Mr. E. G. Bayford reports the abundance in South Yorkshire of the Small Copper, *Chrysophanus phlaeus*, and that he has seen it in more localities than ever before. It is the experience of observers that the butterfly has increased generally of late years in the county. This year in the Keighley district the late broods only—in August and September—were seen. The Brown Argus, *Lycæna astrarche*, was fairly plentiful in Bastow Wood, and was seen in other parts of Upper Wharfedale.

This and last year the Rev. F. Goodwin Britton and Mrs. Britton have spent some time profitably investigating the woodlands in Upper Wharfedale, especially Bastow Wood, and the undermentioned records or observations refer to this wood, unless otherwise stated.

A large series of the Scalloped Hazel, *Gonodontis bidentata*, bred from larvæ, show considerable melanic variation; one bred from a larva from near Addingham is darker than that figured in Mr. Britton's copy of South's work, plate 114, Fig. 3, Vol. 2. A series of the Peppered moth, *Pachys betularia*, also bred from larvæ, all proved to be the dark form, *doubledayaria*. Thus melanism is progressing in this wood, well away from the nearest industrial centre, at an elevation of about 900 feet. O.D., Vice County 64.

Among larvæ obtained by Mr. Britton are: Swallow Prominent, *Pheosia tremula* (1), this species is unrecorded for the county; Pebble Hook-tip, *Drepana falcataria* (1); The Miller, *Acronycta leporina* (1); Nut-tree Tussock, *Demas coryli* (2); and larvæ of *Cidaria miata*. (The latter species was attracted by light at Grassington in November last.) Four specimens of *Coremia unidentaria* were caught at large in the wood.

The Elephant Hawk moth (*elpenor*) continues to spread, probably as a result of the spread of the French willow herb, a food plant of its larvæ, and the moth or its larvæ have been found at Addingham, Hebden Bridge, Brighouse, and Worth Valley. Mr. E. Dearing reports that the Buff-tip is colonising the Elland district.

The Bracken moth, *Panagra petrarvia*, is steadily increasing in many parts, and one result of the increase of the bracken is the displacement of bilberry and other heath plants which form the food of the larvæ of a much greater number of Lepidoptera than the bracken.

Another species which is colonising, possibly temporarily, is the Six-spot Burnet, reported by Mr. Maurice Longbottom from two localities near Bingley. The vegetation on a site previously reported near Riddlesden, where a colony was established, was burnt during the past dry spring.

Mr. E. Dearing, who has bred from a larva of *Abraxus gyoassularia*, a female ab. *lacticolæ*, reports *Plusia festuæ* from Halifax district, and the Rev. F. Goodwin Britton bred *P. moneta* from larvæ found on Monkshood in his garden at Addingham. The small Quaker moth is reported from Halifax district by Mr. D. Coton, and Mr. M. Longbottom found larvæ of *Cucullia verbasci* on figwort near Bingley.

The following Wainscot moths, from Strensall, were exhibited by Mr. A. Smith, of York, at the Annual Meeting of the Entomological Section: *Nonagria dissoluta*, *Senta maritima*, and *Calamia phragmitidis*.

There are no records of outstanding immigrations of either butterflies or moths.

Hymenoptera (Mr. Rosse Butterfield):—Very few Aculeates visited fruit blossom during the past dry spring. The drought continued in May, and as compared with previous years there was a poor show of dandelion bloom, usually very attractive. Even *Andrena trimmerana*, the dominant May species, appeared in limited numbers. A few were in evidence in June, together with its inquiline, *Nomada marshamella*, and this almost equalled in number its host. *Halictus atricornis*, a hardy West Riding species, was not uncommon, and *H. tumulorum* frequented my garden. Two or three well-known burrowing sites of *Andrena cineraria* were

visited. Social wasps were retarded by the spring conditions, and not until August and September became populous. In the Silsden district a female *Vespa austriaca* occurred.

A female *Sirex cyaneus*, newly emerged, was brought to Mr. M. Longbottom, Cartwright Memorial Hall, Bradford, on July 5th, 1938. It was from a pine board which contained also larvæ and pupæ.

BOTANICAL SECTION

(Chris. A. Cheetham) : The weather vagaries of the year are the theme which all our correspondents dwell on, and conditions seem to have varied little from Huddersfield to Goathland or from Scarborough to Conway. Generally speaking, the results agree, though there are one or two differences. Crab apple, for instance, is reported very poor from Conway and Scarborough, but at Huddersfield very good ; I have seen trees laden near Hovingham, Cartmel, and intermediate places, though a great many trees are bare. In the same way one has seen occasional orchards with well-fruited apple trees, though not very many. A great many Hawthorns have no fruit, but here and there the trees are laden, and these are often on the hills in exposed situations. The Ash trees are mostly barren, but occasionally one sees fruits and here and there an odd tree laden with the pale yellow-green bunches of 'keys.' At Austwick the Mountain Ash had few fruits, which the birds soon cleared off, but in the Goathland district Mr. Flintoff reports the crop as good, and what I saw there I should have said were very good indeed. The long drought in the growing period and the later rains induced a great deal of secondary or late growth, and many trees had a spring-like appearance in July and August ; many species of plants had a second flowering period, others missed at their normal time and then flowered much later. I noticed a limestone hill-top where the Rock Roses came into flower in September, and odd plants of the Mealy Primrose are still flowering in October. After the late hay crop plants like Umbellifers and the Hairy Hawkbit made a display of bloom in these fields such as is generally seen before the hay is cut. Few of the wild orchids flowered in normal quantity, and Miss Rob states that the wild mints were much later coming into bloom this year than is usual. All agree that the spring flowers were much earlier than usual, the Purple Saxifrage was opening its blooms on February 25th, and the Hawthorn was in flower by the middle of May. The year must be put down as a bad one for fruits of almost all trees and shrubs, the only possible exceptions are Beech, Hazel, Wild Rose, Bramble, Bilberry, and perhaps Hawthorn and Elder. The behaviour of two garden shrubs, Lilac and Laburnum, has been curious. Miss C. Johnson says Lilac flowered well and retained the bloom for three weeks instead of dying quickly, and then after flowering the leaves had a wilted appearance, they were limp and started to roll inwards at their edges. The Laburnum was full of flower buds and promised a fine display, but most of the sprays fell off with the buds unopened.

Wilting was noticed in many places and on different species, and the drought, frosts, and cold dry winds were severally blamed for this trouble. Among curious growth effects the Lupin was noted as elongating the flowering stalk and bearing a new set of leaves above the old flowers. It was noticed that the Holly shed its leaves in a far greater measure than usual and in mid-March many Holly bushes were almost denuded and looked like dying plants, this was very noticeable in the upper parts of Wharfedale and Wensleydale as well as on the road sides around Settle and Bentham.

The weather conditions are perhaps best summed up by Mr. A. Wilson, who writes from Conway as follows : The past season has been a remarkable one and its effect on vegetation very marked. The winter was

mild, and was followed in March by unprecedented warmth, the mean temperature of the month at most places in the North of England and North Wales, being from 6° to 9° above the average. There were very few frosty nights, and during the day the thermometer rose to 60° and over on many occasions. As a result vegetation became abnormally advanced. Then followed about six weeks of drought with many night frosts. Vegetation received a severe check, and notwithstanding much sunshine, made very slow progress. The injury was due not so much to the severity of the frost, which has often been more severe in April, but to the fact that vegetation was so forward and not in a condition to withstand the cold. June and July were cool and mostly wet and the early promise of a good season was not fulfilled. The summer as a whole may be described as poor.

In North Wales the crop of apples and plums, except in places near the sea coast where there was little or no frost, is very poor, and the same remark applies to the wild fruits, crabs, and sloes. Hazel nuts are fairly abundant in sheltered places, but acorns are generally few. There was a large crop of fruit on the Wych Elm. As regards secondary growth, the writer never saw such a large amount on the Oaks as presented itself at the beginning of August, many trees being covered with fresh green characteristic of early June.

Mr. E. G. Highfield writing from Pickering says: The early part of 1938 was abnormally dry; from the beginning of February to the 12th May there was less than half an inch of rainfall. All the spring flowers were very early; Green Hellebore and *Omphalodes verna* were in flower before the end of February, and I got Gagea and Toothwort in the first week in March. On March 1st I gathered on one walk Primrose, Wood Anemone, Sweet Violet, Moschatel, Ground Ivy, and Pink Dead Nettle. Wild Daffodils were in bloom about the middle of the month and were practically over by Easter.

During April there was a lag in blossom owing to the state of drought. All flowers faded quickly and set very little seed, Cowslips and early Purple Orchid were very impoverished and short in stalk. The marshes were dried up in April and Marsh Marigold and Bog Bean scarcely bloomed at all. They have made up for it by vigorous growth during the wet summer; in one place I found Marsh Marigold in flower in August.

The early flowering orchids were badly hit by the drought, especially in dry situations such as quarries. The Early Purple, Green Wing, Fly, and Butterfly produced very poor blooms, and in many cases failed altogether; those growing in woods, however, where there is plenty of leaf mould, did better. The wet season that came after the middle of May saved the later-flowering orchids. Spotted and Fragrant Orchids were very luxuriant, Bee Orchids were more plentiful than usual, and I have never before seen *Epipactis palustris* so plentiful or so fine as it was in July.

Other late marsh flowers have done well, such as Marsh Gentian, Grass of Parnassus, Bog Asphodel, and Marsh Cinquefoil.

Most trees and shrubs were well in leaf and ready to flower before the end of April. The blossom would have been abundant, but it was held in check by the drought, and keen frosts early in May put the finishing touch to it, so that the blossom was shed unopened. In consequence there is very little orchard fruit this year and most of the wild trees are in the same barren condition.

As a result of losing their blossom and having no seed and fruit to mature, the trees have produced very vigorous vegetative growth, so this year's twigs are quite abnormally long. In many cases secondary growth has occurred and the axillary buds have opened and produced new twigs. This strong vegetative growth, however, is not likely to produce abundant blossom for next year.

Shrubs, bearing their blossom on the new wood, were not affected by the spring drought. The Roses and Brambles have flowered abundantly. It would seem that drought is no menace to the really hardy plants; Dandelion bloomed and seeded profusely at the driest time of the year, and Willowherb and Ragwort have made splendid shows.

Dr. W. A. Sledge says: The year has been the poorest I can remember for the Marsh Orchids, no *purpurella* hybrids were seen at Wharfe Wood, Austwick, in late June, and in the Whitby district two stations to which I was directed by Mr. H. Britten as being rich in Marsh Orchids failed to produce a single plant. At Askham Bog, too, in a corner, where *Orchis incarnata* is normally plentiful, not one single plant was to be found. Mr. P. M. Hall and I spent two days in Yorkshire in early July searching for Marsh Orchids but did not see a single specimen of *O. incarnata*. In Scotland, on the other hand, Marsh Orchids were plentiful. I am not sure how far this applies to other orchids, though I did notice a similar scarcity of Bee Orchids in a locality where we can usually find a score or more of plants. This year only one flowering plant was observed.

Mr. E. R. Cross says: The district around Scarborough suffered severely during the early part of the year with the phenomenal drought. For many weeks we had no rain, and the bloom on plum and apple trees was cut off with the cold winds and late frosts. As a result apples are scarce and there are very few plums.

Crab apples, which as a rule are exceedingly abundant in the district, are almost absent. The late wild fruits have not suffered to such an extent, and the crops of blaeberrries on the moors have been abundant, and the same may be said of brambles.

The spring flowering orchids were very scarce, and places where the Bird's Nest Orchid was usually abundant were almost without.

The Burnt Tip was again found at Brompton, but in no other locality near here.

Epipactis ensifolia was very rare and has not increased during the last twenty years. On the other hand, the two Butterfly orchids were abundant. The same may be said of the Fly and the Bee.

For the first time in many years the hay and corn harvest were ready together, and many fields of hay have been led after the wheat has been harvested. Crops generally are excellent.

The May Lily, which has been in a very poor condition for many years on account of being smothered with the fallen leaves of Larch, had no blooms this year and looked like dying. The Larch was planted 45 years ago and appeared to be slowly killing the plant.

We have now secured the goodwill of the owners of the land, who are cutting the Larch down at once, and have agreed to plant the area with Oak and Ash, so that we are looking forward to a healthy recovery of this most interesting plant.

Mr. W. E. L. Wattam writing from Huddersfield says: The drought period extending from the commencement of February to May 27th, 1938, was the responsible agent in reducing the fruitage yield by trees in general. On June 27th and 28th a continuous gale of wind and rain did much damage to tree fruits and garden crops.

Pear and apple trees blossomed profusely, but frosts and lack of fertilisation played havoc with the promised crops. Sycamore, Ash, Birch, Wild Cherry, and Horse Chestnut also gave lavish blossom displays, but the lack of moisture and frost made a heavy toll upon the maturing of their fruits. The only outstanding fruit crops are those of Elder, Alder, and Hawthorn, but the latter nothing like so heavy as in the past three years. During April ground vegetation, which was greatly dwarfed, was badly seared by frost and scorched by sunshine, and the foliage of all plants was wilted badly. Retardation was the more pronounced in respect of garden crops. As an instance, seeds of carrot, beet, and lettuce

planted May 7th did not germinate until June 2nd. Coltsfoot was in blossom on January 9th. Hazel, Broad-leaved Elm, and Alder on February 5th. The display of spring blossom was of brief duration. Wild Hyacinth was excellent, but the ultimate seed production was very poor. The drought conditions had a great effect upon the Cotton Grass (*Eriophorum vaginatum*) areas of our local moorlands. At the close of June it was noted that the fruits were nothing like so abundant as in a normal season, the majority being small in size. An examination subsequently made of three hundred selected fruits yielded only thirty-five mature seeds!

Mr. A. Malins Smith reports on the Shipley District: The fruiting of 1938 has been on the whole very poor. Even in poor years there are sometimes exceptional species with good crops, but this year all are poor. Perhaps the tree which comes nearest to having a moderate crop is the Beech. As I have reported before, there are certain Beech trees which are physiologically female, and most of these this year have a thin crop. The Ash, too, shows an occasional tree with a half-crop, though the majority are barren. The Oak has a still smaller percentage of trees with acorns, and those with a good crop are rarities indeed. The Sycamore has again had a poor year, though there is not the complete absence of fruit which was reported last year. The Hawthorn has been very poor also. The crab apple and the orchard apples of the district both show the same feature; an occasional tree with a good crop, the majority barren. The Bramble and the Elder both have much less than their usual abundant crops, and this remark applies to the Wild Roses also, though our few bushes of the Downy Rose are much better than either the Dog Rose or the Field Rose in their crop of hips. The Raspberry has a fair crop. The following other plants have small crops: Mountain Ash, Honeysuckle, Woody Nightshade, Guelder Rose, Bilberry, and Cranberry; and the following none at all: Holly, Hazel, Sloe, and Maple.

One or two trees of Lime and Hornbeam have fruit. That steady bearer, the Alder, has only a small crop.

The general poverty of fruit must, I think, be correlated with the long drought of spring accompanied as it was by frequent frosts. Those few trees which show good crops probably owe this to some accident of position which mitigated the severity of the effect of frosts.

Botanical Records Committee (W. A. Sledge): WEST RIDING.—The Union's excursion to Askern in June yielded several noteworthy species, of which *Calamagrostis lanceolata* Roth. and *Carex Pseudo-Cyperus* L. were the most important. The former species does not stand on record for Shirley Pool in Lees' *Flora*, while the sedge is referred to as probably extinct there. Miss Rob has recently published a note in *The Naturalist* on the occurrence of *Myosotis brevifolia* C. E. Salm., at Blubberhouses; an addition to V.C. 64. She also discovered a sedge at Fewston which has been identified by Mr. Nelmes as *C. leporina* L. var. *monostachya* Peterm. and another from Ripon as *C. fulva* × *lepidocarpa*. Both are new to the county. Other records of interest are *Andromeda Polifolia* L. from Soyland Moor and *Catabrosa aquatica* (L.) Beauv. from Ripon. The *Andromeda* has long been known to some Halifax naturalists, but the patch which was shown to me appears to be the only remaining station known for this decreasing species in the Halifax area.

NORTH RIDING.—Miss Rob has several interesting records, of which *Crepis biennis* L. from Topcliffe, *Stachys ambigua* Sm. from West Burton, *Catabrosa aquatica* (L.) Beauv. from Pickering, *Mercurialis annua* L. from Catton, *Carex paniculata* L. var. *simplex* Peterm. from Castle Howard, and *Carex axillaris* Good. from Bedale are the best. The last named is an interesting confirmatory record for an old station given in Baker's *North Yorkshire*. Mr. Malins Smith records *Juncus subnodulosus*

Schrank. from Thornton Dale. As already recorded in the report of the Y.N.U. excursion to Sedbergh, *Malaxis paludosa* (L.) Sw. was seen on Frostrow Fell and *Circea alpina* L. at Rawthey Bridge. The latter record was particularly gratifying as confirming the presence in the county of a species which has been often confused with *C. intermedia* Ehrh.

EAST RIDING.—Chief interest in the botanical results of the Union's excursion to Hedon in July centres round the persistence of *Bupleurum tenuissimum* L. in its only native Yorkshire station. Mr. A. K. Wilson records *Myosotis sylvatica* (Ehrh.) Hoffm. from Willerby chalk pits, *Carex fulva* Host. from Newbald Springs, *Orchis Fuchsii* × *latifolia* from Newbald, and *O. Fuchsii* × *praetervisita* from Broomfleet. Mr. P. M. Hall and I gathered *Apera interrupta* (L.) Reichb. in a sand pit at Flixton in July. This rare grass was first collected in the same locality by A. I. Burnley and E. C. Horrell in 1916, but the record is not included in recent works on topographical botany. There does not appear to be any reason why the species should be considered adventive at Flixton as the habitat corresponds closely with those in which it occurs in East Anglia. Its acceptance as a native would considerably extend the range of the species in Britain. A close examination of the sandy ground to the east and west of Flixton should be made by local botanists to ascertain the exact distribution of the plant. Other species associated with the *Apera* were *Erodium cicutarium* L'Herit., *Viola lepida* Jord., *Trifolium striatum* L. and *Chaerophyllum Anthriscus* (L.) Schinz and Thell.

ALIENS.—Mr. Wilson records the following aliens from the Hull district: *Brassica arvensis* Kuntze var. *orientalis* (L.) Aschers., *Artemisia macrantha* Ledeb., and *Phacelia ciliata* Benth. from King George Dock; *Sisymbrium pyrenaicum* (L.) Vill. from Anlaby Common; *Medicago sylvestris* Fries. and *Chenopodium leptophyllum* (Nutt.) Brit. and Br. from Hessele; *Cephalaria elata* (Hornem) Schrad. from Brough; and *Solidago canadensis* L. from Bishop Burton. Miss Rob draws attention to the persistence of *Cuscuta suaveolens* Ser. on clover at Catton where it was first noticed some years ago.

Bryological Section (F. E. Milsom): One must, I am afraid, commence by echoing the rather gloomy beginning of last year's report—that this has not been an ideal year for collecting, at least as far as the Union's official meetings were concerned. Most of the excursions were spoilt by wet, and although the Pickering meeting was an exception, this area had been so well worked in the past that little new was expected or obtained. The Needlehouse Gill visit was a 'wash-out,' but an opportunity occurred recently for another visit, and it is hoped to publish the results shortly.

Among interesting species gathered this year may be mentioned *Bryum concinnatum* Spruce. Search had been made for many years among the small forms of *Bryum filiforme* which occur frequently in the limestone districts of Yorkshire, and a gathering was obtained in Kingsdale which corresponds to the description of *B. concinnatum* in Dixon's *Handbook*. It is somewhat doubtful if true *B. concinnatum* occurs in Britain, but the Kingsdale moss corresponds to that generally accepted.

In the annual report for two years ago was mentioned *Moerckia Blyttii* (Moerck) Brockm. in Teesdale. There seems some probability now that the plant is really *M. Flotowiana* (Nees) Schiffn., as the latter has been found in fair quantity in the neighbourhood, and the original identification was made on only a scrap of material. The occurrence of *M. Flotowiana* inland is interesting, as it has been found very rarely in similar situations in Yorkshire.

It is encouraging to notice the continuance of papers in *The Naturalist* of an ecological or distributional nature. It is considered that there

are many interesting problems awaiting solution concerned with the ecology of bryophytes, and, in fact, perhaps the value of bryophytes as indicator plants in general ecological work is not yet fully appreciated. Certainly the distribution of mosses is not wholly accounted for by the few reasons generally given, and the matter is mentioned here in the hope of attracting more members to this class of work.

Ecological Committee (Miss D. Hilary) : Members of the Committee have been present at most of the meetings of the Union, and, in addition, a field meeting took place on September 17th to visit the plots on Moughton Fell.

The original plots were carefully surveyed and changes in vegetation noted. On the whole these changes are only slight, but in several cases the degeneration of the juniper has progressed still further. Many examples of the leaf spot fungus, *Lophodermia*, were found, as were also the detached green twigs which have been so often noted and which are thought to be the work of goats.

The plot, which was bared in 1932, was seen to have passed through various stages in colonisation which will be fully reported on at a later stage. There is no sign of any juniper seedling on this plot. Not a single new juniper seedling was seen this year, and of the five seen last year only one remains and that is protected by wire netting from the attacks of animals. It is hoped shortly to have another plot bared on the shallow soil, the one previously bared being on deeper soil in the juniper valley. This year five new plots were started. These are intended to test the effect of adding fertilisers containing nitrogen and phosphorus to junipers in various stages of growth and vigour. In some cases one of these fertilisers was added, in other cases both.

The following account of the work on the ecology of the Hole of Horcum has been furnished by Mr. R. J. Flintoff :

(1) It has been shown that both *Cornus* and *Pteris* have increased during the last twenty years and are now living happily together. Places have been found where the growth of *Pteris* is so dense that it has destroyed all other plants except *Cornus*.

(2) The Hole of Horcum has been divided into four sections and an account of the plant communities in each has been given.

(3) It has been shown that the Ring Ouzel feeds eagerly on the fruits of *Cornus*.

(4) The seeds of *Cornus* have been seen in the excreta of the Ring Ouzel.

(5) The germination of such seeds has been observed and the seedlings from them recognised.

(6) It has been demonstrated that the Ring Ouzel is at the present time distributing *Cornus*, not only about the *Cornus* area, but in more remote parts of the district.

(7) Three sections of the area have been staked out, which can be studied in years to come and the results compared with their present condition.

(8) It is the opinion of Mr. Flintoff that *Cornus* at the Hole of Horcum is not a relic of the Ice Age, but has been introduced by the Ring Ouzel.

The Ecological Committee welcomes this addition to the various pieces of ecological work being done in the county and hopes to receive further reports on the work.

From Huddersfield Dr. Grainger reports that the investigations into the ecology of the larger fungi have been continued, and also that an arable land survey of the Huddersfield district in connection with the Geography Panel of the Huddersfield Branch of the National Union of Teachers has been going on.

The various pieces of ecological work summarised in the Committee's present annual report show that botanical ecology in the county is making good progress.

Mycological (Miss J. Grainger):—The Fungus Foray was held at Hovingham from September 2nd to 6th. The Chairman, Mr. W. G. Bramley, read a paper on Myxomycetes. Dr. Grainger was nominated as Chairman and Miss J. Grainger as Secretary for the ensuing year. With these exceptions, the personnel of the Committee was unaltered except for one or two resignations and the addition of Miss Johnson and Mrs. Thompson to the members of the Committee.

During the year members of the Mycological Committee have been indebted to Mr. T. Petch, B.A., B.Sc., for reprints of his critical studies, 'British Hypocreales' and 'Hypoxylon.' The former is a very helpful manual of the genus, and the study was undertaken at the instigation of this Committee.

Further studies from the same pen, namely, 'Xylaria' and 'Pure Cultures,' were read at the Hovingham Foray, but, unfortunately, Mr. Petch was prevented by illness from being present. The paper on Xylaria clarified the taxonomic position of this group, and stimulated members to search for the lesser-known Xylariae. This had the happy result of extending the known distribution of *X. carpophila*, a species which is probably fairly common on fallen beech mast.

An annotated list of Epping Forest Fungi, by Mr. A. A. Pearson, of interest beyond the territory indicated by its title, has also been published in the *Essex Naturalist*. Mr. Pearson has, in addition, a paper on 'Some Noteworthy British Agariceae,' published in *The Transactions of the British Mycological Society*.

The Yorkshire Catalogue of Fungi continues to be issued to interested members of the Union and a list of additions is in preparation. Mr. R. C. Fowler Jones has again generously undertaken to ensure that sufficient copies will be available for all members who desire to bring the volume up to date.

Mr. W. G. Bramley writes that Uredines have not been plentiful. *Puccinia graminis* has not been found this year, and his infection experiments have been a failure.

In the Huddersfield district periodical fortnightly records are being undertaken in certain woods in order to obtain a more exact knowledge of fungal periodicity. Ecological work on the distribution of certain species, in relation to the reaction of the substrate, is proceeding, and results will be published in due course.

New records for 1938 include:

H.=Hovingham.

P.=Pickering.

NEW TO COUNTY—

- Leptosphaeria derasa* (B. et Br.) Auersw. On Ragwort stems, P.
- L. libandtis* (Fckl.) Niess. On Angelica stems, P.
- Eutype flavo-virens* (Fr.) Tul. P.
- Thridaria rubronotata* (B. et Br.) Lacc., P.
- Collybia atrata* Fr. P.
- Phoma mirbelli* (Fr.) Lacc. On Box leaves, H.

NEW TO VICE COUNTY 62.

- Trichia lutescens* Lister. P.
- Puccinia Cirsii* Lasch. H.
- P. Conii* Fckl. H.
- P. Holcina* Erikss. H.
- P. simplex* Er. et Henn. H.
- Collybia longipes* (Bull.) Berk. H.
- Oidium alphioides* (Griff. et Maubl.). H.

INCOME & EXPENDITURE ACCOUNT
Year ending October 15, 1938.

INCOME.		EXPENDITURE.	
	£ s. d.	£ s. d.	£ s. d.
Members'			
Subscriptions, Arrears	21 5 0	Secretary's Stationery ...	1 14 6
Current	44 0 6	Secretary's Cash Expenses ...	12 16 6
Advance	0 15 0	Excursion Circulars ...	40 6 0
		Members' Cards ...	11 7 6
	66 0 6	Annual Report ...	2 10 0
Levies from Affiliated Societies, Arrears	4 5 1	Renting Rooms, etc., for Sectional Meetings ...	0 10 10
Current	8 14 11	Treasurer's Stationery ...	1 11 0
	13 0 0	Treasurer's Cash Expenses ...	2 2 6
Interest on—		Bank Charges ...	0 11 1
£200 4% Consols ...	8 0 0		
£170 16s. 9d. 4½% Conversion	7 13 8	<i>Naturalist</i> —	
Booth Fund, £100 3½% Conversion	3 10 0	<i>Naturalist</i> to Members	129 6 9
Cheeseman Fund £100 3½% War Loan	3 10 0	<i>Naturalist</i> Exchanges	5 12 6
		Binding ...	0 16 10
<i>Naturalist</i> —		Extra Illustrations	1 15 6
Subscriptions, Arrears	40 10 0	Extra Pages ...	47 15 9
Current	82 10 0	Editor's Cash Expenses	10 1 9
Advance	1 0 0		195 9 1
	124 0 0		
Special Donations ...	11 1 0		
Leeds Naturalists for extra pages ...	5 7 9		
Discounts ...	1 4 5		
Balance of Expenditure over Income	25 11 8		
	£268 19 0		£268 19 0

BALANCE SHEET, October 15, 1938.

LIABILITIES.		ASSETS.	
	£ s. d.		£ s. d.
Balance due to Editors ...	0 4 5	Cash in hands of Treasurer ...	11 13 1
Life Members ...	404 5 0	Cash at Bank ...	84 17 3
Booth Fund ...	100 0 0	£200 4% Consols ...	200 0 0
Cheeseman Fund ...	100 0 0	£100 3½% Conversion ...	100 0 0
Subscriptions paid in advance ...	1 15 0	£170 16s. 9d. 4½% Conversion ...	170 16 9
Balance of Assets over Liabilities ...	116 2 8	£100 3½% War Loan ...	100 0 0
		Subscriptions unpaid ...	83 0 0
		Written off ...	28 0 0
			55 0 0
S. D. PERSY FISHER, Hon. Treasurer.	£722 7 1	Examined and found correct, 26th October, 1938.	£722 7 1
		W. D. HINCKS.	
		JOHN R. DIBB.	

REVIEWS AND BOOK NOTICES

Shakespeare and the Birds. A Book of Drawings, by Persis Kirmse, pp. vi+58. Methuen, 6/-. This is a new series of 56 drawings by Miss Kirmse—and all of them are of birds. Most of them are of a very high order and the artist has given us something characteristic about each species delineated. In one or two cases we think the picture is overcrowded. The drawing on page 4 has three Dippers and two Grey Wagtails in a restricted area, and there are others where birds are grouped as they never would be in nature. Each drawing is accompanied by a quotation from Shakespeare. A good sample is to be found on page 18 depicting a Heron contemplating a frog, the quotation being 'Is this a dagger which I see before me?'

The Common House-fly, The Crane-fly, and The Frog-hopper, by W. H. S. Cheavin. These are reprints of four articles originally appearing in *The Microscope*, Vol. 1, Nos. 1-4 (August-November, 1937),

under the general title 'The Microscope and Entomology.' As the author states 'he will endeavour to describe the different types of insect life in an elementary manner and give short hints on the methods of mounting, along with brief details of the parts mentioned.' This ambitious object the author has carried out in a fairly successful manner and has illustrated the very brief accounts by means of a number of quite good and useful photomicrographs showing a few of the features studied. We are of opinion that in some cases clear line drawings would have been more effective, but perhaps that would not have been in accord with the object of the series. While the articles on the whole are of an interesting nature, there occur here and there statements with which we can hardly agree, such as for example, 'the spiracles are the insect's lungs,' or that the compound eyes are 'made up of innumerable openings known as facets,' and is it quite correct to say of the Crane-fly that 'the female when egg laying places the body in a vertical position with the abdomen *upwards*'?

Varieties of British Butterflies, by F. W. Frohawk, pp. 200, including 48 colour plates by the author. Ward, Lock & Co., 1938, £2/2/-. This beautiful volume, the sub-title of which is 'A Selection of Rare and Interesting Specimens of Aberrations,' may be regarded as supplementary to the same author's previous volumes, *The Natural History of British Butterflies* and *The Complete Book of British Butterflies*, and is one which any entomologist who is interested in our butterflies will desire to possess. As in the two other volumes mentioned, the outstanding feature is the coloured plates, and the present book is essentially a picture book. The 48 coloured plates are artistically of great beauty, are excellently reproduced, and give faithful representations of a large number of insects showing remarkable aberrations, all of which are of exceptional interest. Among such a wealth of unique specimens it is very difficult to select any one of outstanding interest, but perhaps the last Plate (No. 48), illustrating an aberrant form of *Gonepteryx rhamni* deserves mention. It is to be noted that no Yorkshire insects are illustrated, most of the specimens having been captured in the south. While most of the letterpress briefly describes the types of aberration most frequently occurring in the species figured, there is a short introduction, including a very brief account of the occurrence and causes of aberrations in butterflies. According to the author, the chief cause of this is climatic, such as great changes in temperature, or sudden extremes of light, in addition to shock caused by concussion and sudden noise, especially during the time of change from larva to pupa. It is of interest to note that while occasional instances of aberration occur sporadically, special eruptions of this phenomenon have occurred on three occasions, these being during particularly hot summers which followed severe winters; and further that while occasional cases turn up here and there, certain localities seem particularly favoured in an extraordinary manner. It is also to be noted that gynandromorphism occurs most frequently among the Blues and seldom among the Whites. Finally one can only congratulate both the artist-author and his publisher on the production of this most interesting and beautiful book.—(J.M.B.).

Grass-root Jungles, by Edwin Way Teale, pp. xii + 234, illustrated with 130 photographs by the author. Putnam, 15/-. In a very fascinating manner the author of this unusual book shows how anyone armed with a cheap lens may become an explorer among the haunts of insects which may be encountered in one's own garden. The opening paragraph states the case accurately: 'At our very feet, often unnoticed in the rush of daily events, is the wonder-world of the insects. Among the tangled weeds of the roadside or in the grass-root jungles of your own backyard, you encounter strange and incredible forms of life.' Then

later we read : ' Nine-tenths of all the living creatures on the face of the earth are insects. In one suburban backyard . . . found more than 1,000 different members of this vast family. Five hundred species of insects inhabit apple trees alone.' Mr. Teale has a very engaging style, he is strictly accurate, and accompanies his text with scores of beautiful photographic illustrations. Most of these are very much out of the ordinary, but Mr. Teale explains his methods in some detail in a special chapter on insect photography. He believes in using an ordinary type of camera with a focusing screen and double extension. By using lenses of appropriate focal length he obtains almost photomicrographic effects which provide most valuable records. His book should prove very inspiring to entomologists with a turn for photography.

NEWS FROM THE MAGAZINES

The Entomologist for November contains ' *Pyrausta nubialis* Hubner (Lep. Pyralidae) in South Essex,' by H. C. Huggins ; ' Notes on Dragonflies in 1937,' by H. G. Attlee ; ' On the Racial Variability of *Erebia melancholica* H.S.,' by B. C. S. Warren ; ' An Ergatandromorph of *Myrmica laevinodis* Nyl. and the list of Gynandromorphs, etc., brought up to date (Hym. Formicidae),' by H. Donisthorpe ; ' Microlepidoptera from Ireland,' by B. P. Beirne ; ' On the Types of *Adelpha* (Lep. Nymphalidae) in the Collection of the British Museum,' by A. Hall, and numerous notes and observations.

The Entomologist's Monthly Magazine for November contains ' Some Homoptera New to the British List (with figures),' by W. E. China ; ' The Aquatic Coleoptera of the Environs of Pannal Ash, near Harrogate, Part I, Hydradephaga,' by R. R. U. Kaufmann ; ' A New Species of the Sphecid genus *Diodontus* Occurring in Britain,' by G. M. Spooner (*Diodontus insidiosus* Spooner from Surrey, Kent, Middlesex, Sussex, Hants., Dorset, and Jersey) ; ' Some More New or Little-known British Sawflies. Hymenoptera Symphyta III,' by R. B. Benson (*Urocerus cedrorum*, from Kent, *Aprosthemella melanura*, New Forest, *Emphythus coryli*, Surrey on hazel, *Pontania purpureae*, Worcestershire, Herts., Bucks., Yorks., Durham, Hants., Cumberland, Northumberland, Roxburghshire, and Dumfries) ; and ' A Preliminary List of the Coleoptera of Windsor Forest,' by H. Donisthorpe and a few shorter notes.

The Transactions of the Society for British Entomology, Volume 5, Parts 5 to 9, were published on the 9th of November. They comprise Part 5, ' Coleoptera associated with Cultivated Fruits,' by A. M. Masee. Part 6, ' The Description of the Puparia of 14 British Species of Sphaeroceridae (Borboridae, Diptera),' by W. H. Goddard. Part 7, ' The British Species of *Micronecta* (Corixidae, Hemipt.),' by G. A. Walton (with 5 plates). *M. poweri*, Yorkshire, Scalby Beck, and Dent, Derby, R. Dove, Cumberland, R. Eden, Westmorland, R. Irthing, and Brothers Water, *M. scholtzii*, Notts. Part 8, ' The Comma Butterfly *Polygonia c-album* (Linn.) ; Its Decadence and Revival as a British Insect,' by J. J. Walker, and Part 9, ' Preliminary Note on the Relations between Grasshoppers and the Recolonisation of Denuded Heath and Moorland Vegetation,' by L. A. Harvey.

In *The Microscope* (Vol. 2, Nos. 6 and 7, July and August, 1938) W. H. S. Cheavin writes on ' Crystals and Crystoliths found in Plant Cells.' The different types of calcium oxalate crystals are described and illustrated by photomicrographs and the chemical and biological aspects of their deposition discussed. The crystoliths of calcium carbonate occurring in leaves of *Ficus* are similarly illustrated and the reactions involved in their formation and readsorption described. In the same journal (Vol. 2, No. 3) Rutland Lodge gives an illustrated account of the structure and functions of lenticels.

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TWO MEETINGS will be held in the Library and Chapter Hall of the Church Institute, Albion Place, Leeds, on Saturday, February 11th, 1939, at 3-15 p.m. and 6-30 p.m.

An address will be given on :

'The Investigation of the Status of the Anatidae,' by H. Tetley, Esq. of the Wildfowl Enquiry Committee.

The following papers will be read :

'Yorkshire Sea Birds : A Survey,' by C. F. Procter, Esq.

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A KEY TO THE BRITISH BATS

T. C. S. MORRISON-SCOTT

Department of Zoology, British Museum (Natural History)

THERE is still much to be learnt about the distribution of the twelve British bats, and the reason for our lack of knowledge is the difficulty which non-experts experience in identifying bats without comparative material.

Barrett-Hamilton (*A History of British Mammals*, 1911, pp. 46-47) gives a key to the external characters and to the skulls, but he arranges his key as a 'natural key,' keeping the members of each genus together, and this system creates extra difficulties with the result that the key based on external

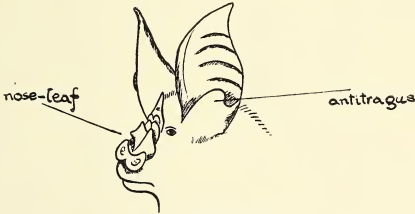


Fig. 1. Horseshoe Bat.

characters is of little use, even to the expert. As for the key based on skull characters, this is not at all easy to use for those unacquainted with the teeth of mammals.

The following key has been designed for use by one who has never previously handled a bat; there is no need to examine the teeth.

KEY TO THE BRITISH BATS.¹

- | | | | | | | |
|---|-----|-----|-----|-----|-----|---------|
| 1. Nose bears 'nose-leaf' (see fig. 1); tragus absent (<i>the tragus is a separate earlet within the ear and should not be confused with the antitragus which is an extension of the lower border of the ear and well developed in the Horseshoe Bats, cf. figs. 1 and 2</i>) | ... | ... | ... | ... | ... | (11) |
| Ordinary nose; tragus present | ... | ... | ... | ... | ... | (2) |
| 2. Tragus broadest at end (see fig. 2a) | ... | ... | ... | ... | ... | (3) |
| Tragus elongated and broadest at middle or base (see figs. 2b and 2c) | ... | ... | ... | ... | ... | (4) |
| 3. Wing-span (from tip to tip of outstretched wings) 353-387 mm. (13.9-15.2 in.); forearm (see fig. 3) 49-54 mm. (1.93-2.12 in.) | ... | ... | ... | ... | ... | NOCTULE |

¹ The wing-span measurements should be taken as a rough guide only: different observers' results are apt to vary, and moreover many of these measurements have been taken from specimens in alcohol, which are often too stiff to be fully expanded. The length of the forearm is a much more reliable guide. It should be noted that females are nearly always slightly larger than males. Juvenile specimens may be recognised by the fact that the finger joints appear to be complex instead of just a simple joint as in the adults.

- Wing-span 289-318 mm. (11.4-12.5 in.); forearm 38.5-44.5 mm. (1.52-1.75 in.) LEISLER'S
4. Bases of ears joined together on top of head; nostrils opening upwards (5)
Ears not joined together; nostrils opening forwards (6)
5. Huge ears, 34-38 mm. (1.34-1.50 in.) long; fur on back grey-brown LONG-EARED
Ears moderate, 13-16 mm. (0.51-0.63 in.) long; fur on back almost black, but with a slight yellowish tinge BARBASTELLE
6. Wing-span 348-381 mm. (13.7-15.0 in.); forearm 49-54 mm. (1.93-2.12 in.) Tail projects about $\frac{1}{4}$ in. beyond the tail membrane SEROTINE
Wing-span less than 320 mm. (12 $\frac{1}{2}$ in.); forearm 45 mm. (1 $\frac{3}{4}$ in.) or under (7)

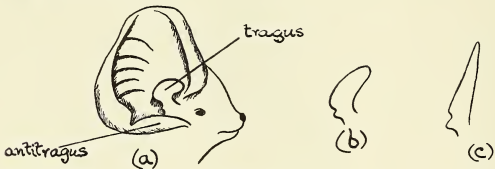


Fig. 11.

Showing the tragus in (a) Noctule (b) Pipistrelle and (c) Whiskered Bat.

7. Post-calcarial lobe present (*see fig. 3*); wing-span 203-232 mm. (8.0-9.1 in.); forearm 27.5-31.3 mm. (1.08-1.23 in.) PIPISTRELLE (8)
No post-calcarial lobe (8)
8. Tail membrane fringed with short hairs (*see fig. 4*) NATTERER'S
Tail membrane not fringed (9)
9. Ears long, when laid forward extend about 13 mm. ($\frac{1}{2}$ in.) beyond the tip of the nose BECHSTEIN'S
Ears moderate, when laid forward extend about 3 mm. ($\frac{1}{8}$ in.) beyond the tip of the nose (10)
10. The middle finger has the second and third joints (*see fig. 3*) equal to each other in length; the calcar (*see fig. 3*) extends half-way from the heel to the tail; the foot is half as long as the shin-bone WHISKERED
The middle finger has the second joint longer than the third; the calcar extends two-thirds of the way from the heel to the tail; the foot is more than half as long as the shin-bone DAUBENTON'S
11. Wing-span (*from tip to tip of outstretched wings*) 330-355 mm. (13.0-14.0 in.); forearm (*see fig. 3*) 51 mm. (2.0 in.) or over GREATER HORSESHOE
Wing-span 254 mm. (10.0 in.) or under; forearm 39 mm. (1.54 in.) or under LESSER HORSESHOE

The following notes are intended to supplement the key. The distributions given are *rough*; as mentioned above these are by no means perfectly known. It may be useful to remember that there are three large bats: the Noctule, Serotine,

and Greater Horseshoe. The other nine species are distinctly smaller.

NOCTULE or Great Bat (*Nyctalus noctula* Schreber). Common in England from Yorkshire south and in Wales. Rare north of Yorkshire. Absent from Ireland. Likes wooded districts. Flight high, straight, and fast, resembling that of the Swift.

Forearm : 49-54 mm. (1.93-2.12 in.).

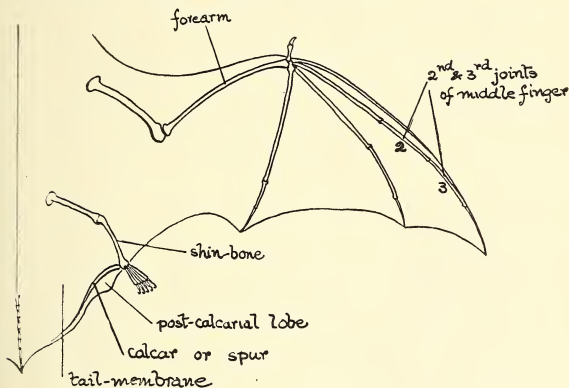


Fig. III.

LEISLER'S or Hairy-armed Bat (*Nyctalus leisleri* Kuhl). Fairly common in eastern Ireland but rare in the rest of the British Isles. There are records from West Yorkshire, Cheshire, and the Avon Valley in Warwickshire, Worcestershire, and Gloucestershire. Flight usually high and very like that of the Noctule.

Forearm : 38.5-44.5 mm. (1.5-1.75 in.).

PIPISTRELLE (*Pipistrellus pipistrellus* Schreber). The commonest bat, found everywhere in the British Isles. Flies up and down a restricted beat, usually at a height of 15-20 ft.

Forearm : 27.5-31.25 mm. (1.08-1.23 in.), the smallest British bat.

SEROTINE (*Vespertilio serotinus* Schreber). Found in the south of England; fairly common in the south-east. Rare north of the Thames. Not in Ireland. Appears as large as the Noctule in flight but can be distinguished by the broader wings; as a rule does not fly higher than the tops of tall trees. Flies early in the evening in spite of its name.

Forearm : 49-54 mm. (1.93-2.12 in.).

DAUBENTON'S or Water Bat (*Myotis daubentoni* Kuhl). Found in England, Scotland, and Wales wherever there is the right combination of water and woods. Not so well known in Ireland. Flies very close over the water, the wings having a very short, rapid stroke, more like a vibration.

Forearm : 33-39 mm. (1.3-1.53 in.).

WHISKERED Bat (*Myotis mystacinus* Kuhl). Common in England (save East Anglia where it is not known); not so common in Wales, Ireland, and Scotland. Likes woods. Often out in daylight—probably more often than any other British bat. Cannot be distinguished from the Pipistrelle on the wing.

Forearm : 32-37 mm. (1.25-1.46 in.).

BECHSTEIN'S Bat (*Myotis bechsteini* Kuhl). The rarest British bat; not known from Ireland, Scotland, or Wales; in England only a few records in the south.

Forearm : 39-43 mm. (1.54-1.7 in.).

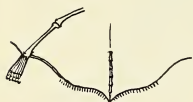


Fig. IV.

Tail-membrane of Natterer's Bat showing the hair-fringe.

NATTERER'S Bat (*Myotis nattereri* Kuhl). Fairly common in Ireland and in Wales and in the west of England. Absent from Scotland.

Forearm : 36-42.5 mm. (1.42-1.67 in.).

LONG-EARED Bat (*Plecotus auritus* L.). Found almost everywhere in the British Isles and in some localities as common as the Pipistrelle. The long ears are directed forward in flight; at rest they are tucked under the arms and the projecting tragus give the bat the appearance of having short, slender ears. Often found among trees; the prey is snatched off branches as the bat flies past.

Forearm : 35-40.5 mm. (1.38-1.6 in.).

BARBASTELLE (*Barbastellus barbastellus* Schreber). Found in the southern half of England, but common only in the southernmost counties. One Welsh record. Unknown in Scotland and Ireland. Has a flapping flight.

Forearm : 36-41 mm. (1.42-1.61 in.).

GREATER HORSESHOE Bat (*Rhinolophus ferrum-equinum* Schreber). Found in southern England (chiefly in the west) and in South Wales. Absent from Scotland and Ireland. Fond of caves. Wings broad and flight butterfly-like.

Forearm : 51-55.5 mm. (2-2.19 in.).

LESSER HORSESHOE Bat (*Rhinolophus hipposideros* Bechstein). Fairly common in southern England and west of the Midlands as far as Ripon in Yorkshire, also in Wales. In Ireland only in the west. Absent from Scotland. Fond of caves. Flight similar to that of the Greater Horseshoe.

Forearm : 34.4-39 mm. (1.35-1.54 in.)

BIRDS AT SPURN, AUTUMN, 1938

RALPH CHISLETT, M.B.O.U., F.R.P.S.

THE visits paid to Spurn Point from time to time by Yorkshire ornithologists (mainly from the West Riding) have been principally directed of recent years to the extension of personal knowledge of species. And, indeed, such is very necessary before any co-ordinated team-work can be undertaken with confidence, such as can give even partial expression to the facts of migration at Spurn in any season.

In 1938, between July 25th and November 2nd, there have been competent field ornithologists present on the Spurn Peninsula on twenty-six days. In practically every case the whole day has been given up solely to bird observation. Notes have been made of every species seen, and subsequently have been tabulated in the 'Spurn note-book' and 'roll-call,' thoughtfully provided by Mr. R. M. Garnett, using his abbreviations. The combined result is by no means sufficient material upon which to base anything like a complete picture, or series of pictures, of the season's events at Spurn. There is no doubt that species of interest were missed even on the twenty-six days—one cannot be at both ends of the promontory at once, neither can one search groups of buckthorn bushes for resting *passeres* and at the same time observe ducks or waders on the shore or mud. Nevertheless, the general picture presented is fairly comprehensive, and contains occurrences, some of which may be only unusual for lack of such concentrated team-work hitherto. It is certain that the material collected will be valuable for comparative purposes in future years. For this reason I have included also a few notes of birds infrequently observed during the last few years. Future collaboration is invited from anyone interested.

The following have collaborated with the records they made on the dates stated: R. M. Garnett (July 24th-25th, August 20th-21st, September 5th-10th, November 2nd); G. R. Edwards, E. H. Gillham, G. D. Elcome, and G. E. Manser (September 24th to October 1st); V. S. Crapnell and H. Foster (September 6th and 9th); R. and A. L. Chislett (August 21st, September 9th, 18th-23rd); C. G. des Forges and R. Chislett (October 28th and 29th).

The notes published in the *Naturalist* for December, 1938, by G. Ainsworth and J. Lord have been referred to.

CORVIDÆ. No Hooded Crows were seen until October 28th, when a number flew low above the receding tide. Two were seen on November 2nd. Carrion Crows could be seen on most days, the largest number being a party of twelve on September 21st. Rooks frequented the adjoining fields in fluctuating numbers. Jackdaws were only noted on September 24th, but

a bird came down the chimney of Mr. Mills (assistant light-keeper) on October 21st and 22nd. One or other of the pair of Magpies resident near to the cottage usually showed itself.

STURNIDÆ. Starlings were usually present, but were difficult to determine as passing or local parties. The species was most numerous at the end of October and in early November. The Rose-coloured Pastor (*Pastor roseus*) is a casual species anywhere—one was seen on August 17th, 1937 (R.C.).

FRINGILLIDÆ. More Common Linnets were seen than any other passerine species. Clumps of buckthorn were often full of them, and parties, large and small, sometimes as many as 100-150 birds, passed along the peninsula. Sometimes parties passed in the reverse direction (*i.e.* from the lighthouse). The species breeds locally and was recorded from July 25th onward, and at no time was it scarce. One Greenfinch occurred on September 18th, five on September 27th, and odd birds on October 28th and 29th, when odd Chaffinches were also seen. A Chaffinch occurred on September 30th and on October 29th. A mixed flock of Bramblings and Chaffinches was seen on October 23rd (see *Naturalist*, December, 1938). A few Lesser Redpolls appeared on September 29th and October 1st.

EMBERIZA. Throughout the period Reed Buntings could usually be disturbed from the bushes, six being the most seen in one day. Corn Buntings were breeding in July-August at no great distance, but were only seen along the peninsula on October 1st when a party numbered thirty-five (G.R.E.). Odd Yellow Buntings appeared on September 24th and 29th, and one Snow Bunting on October 28th (R.C.).

ALAUDIDÆ. Skylarks, a common resident species, were present in only small numbers during August and early September; then numbers increased and on September 29th-October 1st, flocks were seen numbering fifty birds. Many birds were passing southwards on October 23rd (see *Naturalist*, December, 1938).

SHORE LARK (*Eremophila alpestris flava*). None seen in 1938. One seen in winter plumage on October 14th, 1937, on the east side of the dunes, below which it fed on black insects (C.G. des F.).

MOTACILLIDÆ. Meadow Pipits breed locally. I have seen the nest with eggs at Spurn in July, but few were seen until the middle of September, after which the species became numerous and many parties passed. At the end of October the species were scarce again. Rock Pipits were only recorded on September 29th and November 2nd. Wagtails occurred casually; the Yellow on September 9th and 19th; the Pied on August 21st, September 25th, 29th, and October 1st.

PARIDÆ. Blue Tits and Great Tits were of casual occurrence in the bushes from September 19th to the end of the

month, and on October 28th. Goldcrests were seen on September 5th, and on several days at the end of September, and again on October 23rd, 28th, and 29th. On the night of October 1st there were many about the lantern (E. Mills, per G.R.E.). A Firecrest was identified on October 23rd (see *Naturalist*, December, 1938).

LANIIDÆ. A Great Grey Shrike was seen on October 23rd (see *Naturalist*, December, 1938, G. Ainsworth and J. Lord).

MUSCICAPIDÆ. Pied Flycatchers occurred in the bushes and in the cottage garden from September 5th, the last being seen on September 27th. An immature (or female) Red-breasted Flycatcher (*Muscicapa p. parva*) was seen on September 24th by G.R.E., who noted at once it was a flycatcher, 'tail black in centre and terminal band, with white on either side; breast warm buff on sides, light in centre, flanks and belly white.' A Spotted Flycatcher was seen on September 6th and 25th.

SYLVIIDÆ. A Chiff-chaff was heard to sing on September 20th and single birds were seen on several days during the month. Willow Warblers were seen in small numbers towards the end of the month. A Wood Warbler was identified on August 27th. A Barred Warbler (*Sylvia nisoria*) was first noticed by R.M.G. on August 21st; on September 7th, 8th, and 9th it was seen again. On the last date R.M.G. and R.C. were in doubt if there were not two birds, and on September 10th, R.M.G. saw two birds together. 'When preening in bright sunshine it appeared that each feather of breast and flanks was edged darker grey. The ear coverts were uniform with the crown, not dark as in Lesser Whitethroat. The outer tail-feathers were white. The bill was horn-grey and the eye dark. It chased away a Garden Warbler which was attempting to pull buckthorn berries near-by and looked larger' (R.M.G.). The Barred Warbler swallowed the buckthorn berries whole. The bird looked very grey, with long tail and shrike-like flight, and was larger than any resident British warbler. Single Garden Warblers occurred on several days in early September, and single Blackcaps on three days at the end of the month. Common Whitethroats occurred several times in early and late September. One Lesser Whitethroat was seen on August 27th (G.R.E.).

TURDIDÆ. No Fieldfares or Redwings were seen before October 1st. On October 23rd many Redwings were seen (*Naturalist*, December, 1938), and on October 29th small mixed parties flew high along the promontory, and a few birds were in the bushes. Odd Song Thrushes were usually about the bushes, also Blackbirds. On October 28th and 29th Blackbirds were numerous everywhere in the bushes, six being seen in one group.

ŒNANTHE. Wheatears were in smaller numbers than in previous years, but a few could be seen about the rails throughout August and September. The species was absent October 28th-November 2nd. Single Greenland Wheatears were seen on September 7th and 30th.

SAXICOLA. Whinchats were most in evidence during the early part of September. Conversely, more Stonechats were present in late September and early October, and one was seen on October 29th.

PHŒNICURUS. Common Redstarts could almost always be seen at the same time as Pied Flycatchers and the species appear to migrate together. Black Redstart—two seen October 23rd (see *Naturalist*, December, 1938), and one was seen on October 11th, 1936 (G.R.E.)

ERITHACUS. Robins were scarce and seldom seen until October 28th and 29th, when there were numbers in the buckthorn bushes.

PRUNELLA. A Hedge Sparrow could be disturbed from the bushes on most days.

TROGLODYTES. Common Wrens were seen and heard occasionally throughout the autumn, but only on October 28th and 29th were they numerous.

HIRUNDINIDÆ. Migrating Sand Martins were seen on September 6th. Swallows were passing south in parties on August 21st and throughout September, the last being recorded on October 23rd.

APUS. Swifts were passing south on July 25th and a few were still passing on August 21st.

JYNX. A Wryneck was seen in the bushes on September 8th (R.M.G.).

CUCULUS. Juvenile Cuckoos were scarcer than in previous years and the only records are on August 21st and September 2nd.

STRIGIDÆ. A Short-eared Owl was seen on August 21st; others on October 23rd, 28th, and 29th.

FALCONIDÆ. A Kestrel could be seen on most days, and on September 30th and October 1st there were several. Single Merlins were seen on September 21st, 25th, and October 28th.

ARDIDÆ. Herons, although often seen about the dykes inland, were seldom near to the promontory. Two were feeding on the mud at the edge of the tide on September 19th, and odd birds on four other days.

TADORNA. As breeders down the estuary side, Shelducks were surprisingly scarce along the Point. Parties were seen on July 25th, August 21st, and September 5th.

ANAS. Only three Mallard were seen during the period. A few Common Teal were present in late September. The few Wigeen seen occasionally from early September onwards had

become a flock of sixty by October 28th and had further increased by November 2nd.

NYROCA. A Scaup Drake was seen on September 29th and October 1st, and two Scaup Ducks on October 28th.

OIDEZIA. The first Common Scoter occurred on September 21st; parties of five and seven were seen on September 25th and 27th, and fourteen on October 1st. On November 2nd there was one duck.

STEGANOPODES. Cormorants were very occasional, but five were seen on October 1st. Gannets were identified at sea on August 21st, September 8th, and October 1st.

TUBINARES. A Storm Petrel was caught at the lantern on October 28th and released on the 29th by E. Mills (G. Manser).

COLYMBIDÆ. Four Divers passed at sea on October 1st, and another was seen on November 2nd. None came in to be identified like the four Great Northern Divers recorded by G.R.E. on October 10th and 11th of 1936.

COLUMBIDÆ. Doves passing were mainly homing pigeons. Stockdoves were recorded on September 9th and October 1st. A Turtle Dove was seen on September 7th and a Ring Dove on September 30th.

CHARADRIIDÆ. Ringed Plovers breed locally in some numbers and could generally be seen. Lapwings fluctuated considerably, but parties were never so many along the promontory as in the adjoining fields. A flock flew in from the sea at a good height on October 29th. Golden Plovers were irregular and generally few in numbers, but flocks of about 100 birds were seen on September 27th and on November 2nd. A few Grey Plover could usually be seen in the general flocks of waders at high tide, and in August some were in breeding plumage; by October they had become very grey and white. Turnstones were generally scattered thinly, in small parties, along-shore at high tide. Oystercatchers usually numbered four or eight, and were probably the local breeders with their surviving progeny. The large flocks of waders of high tide were as usual composed largely of Knots, of which the proportionate numbers increased as autumn proceeded; of Common Redshanks to the number sometimes of 200 birds, of large numbers of Dunlins which decreased slightly as the Knots increased, with occasionally a few Sanderlings—a species that was in smaller numbers this year than usual. Purple Sandpipers were only seen on October 28th (a very tame bird) and on November 2nd (two) as against the 'strings' that 'flew continually' on October 10th-11th, 1936 (G.R.E.); but the species is generally more of an habitué of rock pools. A party of eleven very tame Curlew-Sandpipers were watched from close quarters on September 22nd, some of them still showing traces of ruddy breeding plumage (R. and A.L.C.).

The call notes of two Spotted Redshanks drew my attention to them on September 22nd. Odd Greenshanks were seen on August 21st and September 22nd.

Bar-tailed Godwits were seen from mid-August and fluctuated, the largest party (thirty) occurring on September 30th. A small party was generally attached to the general flock of high tide, and odd birds fed on the mud flats. Odd Black-tailed Godwits were seen on August 21st, September 5th (two birds), and 22nd.

The Common Curlew, after being scarce in August, became numerous in early September, but had become scarce again by the middle of the month, but small parties continued to be seen until November. Whinbrels were never numerous, the largest party being seven on September 18th and 19th. An odd Common Snipe was seen on September 6th. A Woodcock was reported by Mr. Clubley (lessee of the shooting rights) a few days prior to October 28th.

LARIDÆ. STERNA. The local breeding Tern (*minuta*) was seen on July 25th (three birds), but not on August 21st. Sandwich Terns, often with flying young, were both visible and audible in July and August, but only odd birds in the early half of September. Of Common (possibly Arctic) Terns, six, on September 18th, was the largest number seen, and four birds passed on September 30th.

LARUS. The Greater Black-backed Gull was generally the most conspicuous from mid-August until late September. In late October only a few were seen. Lesser Black-backed Gulls were only seen occasionally, which also applies to the Herring Gull, although a fair number of the latter were present on September 24th. Common Gulls fluctuated, being numerous as early as July 25th, and on September 24th; the species was usually scarce on days between those dates and afterwards. The Black-headed Gull fluctuated similarly with July 25th and August 21st as the 'numerous' days.

GLAUCOUS GULL. An immature bird was seen on November 2nd (R.M.G.).

STERCORARIUS. Four Arctic Skuas were seen on September 27th (G.R.E.).

ALCIDÆ. One Common Guillemot was seen on August 21st, and a Razorbill on October 1st.

GALLI. Common Partridges were disturbed from time to time, and a covey of fifteen or more Red-legged Partridges was seen occasionally. Two birds I thought to be female Red Grouse flew past me from some trailing brambles on September 19th, and in a hollow amid the brambles was a collection of unmistakable typical, curved, elongated droppings. Two Grouse were said by Mr. Smith, of the Bungalow, to have been present about the peninsula all summer.

THE QUEST FOR THE PRIMITIVE FLOWER

H. HAMSHAW THOMAS, Sc.D., F.R.S.

Presidential Address to the Yorkshire Naturalists' Union, delivered at Hull,
December 3rd, 1938

THE problem of the origin of the flowering plants is a fundamental one affecting many branches of natural history. These plants make up the bulk of the vegetation around us and they furnish food directly or indirectly for man and the higher animals as well as for many insects. Life on the earth could scarcely have become what it is without this group of organisms.

Every field naturalist has noticed the varied forms of flowers and there can be few who have never asked what was the beginning of all these varied forms—where, when, and

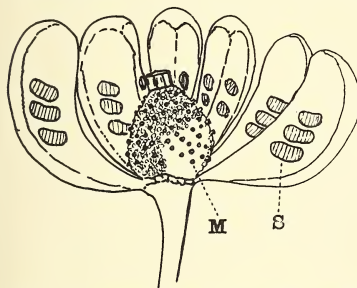


Fig. 1. *Williamsoniella coronata*. Jurassic, Cayton Bay, X2.

S, Large compound synangia containing pollen.
M, Projecting micropyles of the gymnospermous ovules.

how did they originate? Most are now prepared to accept the view that they sprang from simpler types by a process of evolution. The study of the fossil record alone leaves no ground for doubting the fact of evolution even if we are not sure of the means by which it has proceeded. The acceptance of evolution implies that many, if not all, of our flowering plants are related to each other by

descent, and so the problem arises as to the nature of the ancestors from which they have descended. Furthermore, since the possession of flowers is one of the chief characters of the group, we want to know what the primitive flowers looked like.

But the fact is that we don't yet know the answers to these questions. We are only just beginning to collect and correlate evidence in a truly scientific way. We hope that some day we shall be successful in our quest, but we have a long way still to go.

Some people may be surprised when I say that we don't know what the earliest flowers were like, for they may have obtained a different impression from text-books of botany and plant biology. There it is commonly stated that a flower is a shoot or the termination of a shoot whose leaves are specially modified in different ways. The upper or inner leaves produce

the reproductive cells, while the lower or outer ones serve to protect the flower bud and usually to render the flower conspicuous. We may naturally infer from this statement that since the flower consists of modified leaves, the primitive flowers should have been composed of much less modified leaves, but it is remarkable that none of the many authors who have repeated this statement have given explicit reasons, and very few have explained what they thought primitive flowers looked like. There is, of course, scarcely any reason for the uninstructed to think that stamens are really modified leaves, apart from the knowledge that in some 'double flowers' the stamens are replaced by petal-like structures. The instructed generally believe such statements because they have been told that they are true, and suppose that their teachers have good reasons for their statements.

If we attempt to seek out the basis for what may be called the classical view of floral morphology, the strobilar theory, we have to go back to the eighteenth century when it originated. At that time the separate creation of each form by Divine agency was unquestioned and there was no suggestion of one form being derived by modification from another. Linneus and his followers had made men aware of the great diversity of plants and animals, and as a kind of reaction, the so-called Nature-Philosophy, which stressed the unity of all created things, had arisen in Central Europe.

The great poet-philosopher Goethe was one of those who found the work of Linneus displeasing. During brief intervals in an unusually busy life he turned from his other varied pursuits to the study of nature and especially to the comparative study of the forms of plants and animals. He tried, like the other nature philosophers, to find by intuition and contemplation what may be termed the plan of creation.

Goethe enunciated the principle of what he called normal metamorphosis. He regarded all plants as having three parts, roots, stems, and leaves. All the lateral organs on the stems were considered to be leaves which changed their form as the flower was approached, becoming expanded to form the petals, contracted to form the stamens, and again somewhat expanded to form the carpels or seed vessels. These form changes were described as metamorphoses, and it is important for us to understand what was implied by this term. Goethe used it to signify a change which was purely subjective in its nature. It meant a modification of form such as we might recognise to-day when looking at the instruments in an orchestra. We should not hesitate to describe the viola as a modified violin, the bassoon as a modified clarinet, but this change of form both in its inception and perception is inseparable from the human intelligence. Such changes are not

objective, they are appreciated intuitively and they do not require to be established by the production of evidence.

Goethe, Oken, and others put forward similar views for



Fig. II. Flower-like groups of microsporangia and pollen-bearing organs. All about twice natural size.

- A. *Hedeia* ; B, C, *Yarravia*, from Upper Silurian.
 D. *Aneurophyton* ; E, *Protopteridium*, from Middle Devonian.
 F. *Telangium bifidum* ; G, *Schuetzia bennieana*, from Lower Carboniferous.
 H. *Telangium scotti* ; I, *Crossothea hoeninghausi*.
 J. *Aulacotheca* ; K, *Potonia*, from Upper Carboniferous.
 L. *Pteruchus*, from Middle Triassic.
 M. *Caytonanthus arberti*, from Middle Jurassic, Yorkshire.

animal skeletons, which, including the head, were regarded as made up of modified vertebrae. This again did not imply that animals had existed without heads, but it gave the central pattern around which all animals had been created.

Goethe's philosophical speculations provided a considerable incentive leading to the comparative study of plant form. They found their way into the text books of botany where they have remained ever since. They prepared the way for the theory of evolution, and Darwin naturally utilised this universally accepted concept of flowers being modified leaves as evidence for his ideas. But in so doing he gave an objective meaning to the term metamorphosis, the idea of the change in form from the leaf to the petal and from the petal to the stamen henceforth came to be understood as an actual and historical series of events and not merely as a mental process. Darwin's successors have accepted this interpretation without troubling to enquire whether Goethe's generalisation could be given this objective meaning or producing any evidence that the supposed change was one that had actually taken place.

In all studies affected by this question the *deductive* method of reasoning has been followed. The truth of the view has been assumed, and the facts have been forced as far as possible to fit. Those facts which oppose the theory are set on one side as having no significance, those which appear to support it are given special prominence; palæobotanists have searched for forms such as the theory would indicate as primitive, and finding none they have assumed that this was due to the imperfection of the geological record.

At present the position seems to be that there is not a single piece of direct or indisputable evidence that flowers have evolved from buds resembling vegetative buds or composed of an axis bearing fertile leaf-like organ. There is nothing to show that primitive stamens were ever like leaves or that carpels were originally leaf-like structures with marginal ovules which have become inrolled. Even the petals are more probably derived from stamens that have become sterile than from leaf-like structures. But yet the eighteenth-century theory is handed on from one generation to another through the sheer weight of authority as in the past was the medieval belief that the earth was the centre of the universe.

The first step towards real knowledge is the recognition of our ignorance. Since we know nothing of the ancestors of the flowering plants, we must commence an impartial investigation of all the facts which might furnish clues. Obviously the fossil evidence would be the most direct if it were obtainable. There is a good deal of information available from the record of the rocks, but in the past much of it has been set aside as being incompatible with the accepted ideas of floral evolution. Samples of the earth's vegetation have come down to us from various periods during the Tertiary epoch which show that the essential features of floral structure have changed very little during the last 60 millions of years.

The flora of the London Clay can be compared with that of a present-day estuary in the Eastern Tropics, for many fruits and seeds are found in it which are well preserved and can be matched very closely with those of living trees. The remains of leaves, wood, and pollen grains found in other places confirm the identifications of these fruits and seeds. We thus have sure knowledge that certain plants are very old. The Upper Cretaceous rocks of North America and of Czechoslovakia likewise contain remains which show us that certain modern genera, being some 90 million years old, must be relatively primitive.

Passing downwards to the Lower Cretaceous, we find a marked change in the character of our floral samples. Most of the species in them belong to the gymnosperms and lower plants, the remains of flowering plants are few and rare. This suggests that the flowering plants had not yet become dominant in the world's floras, but we ought not to conclude that they had just previously originated from ferns or green algæ. The rate of evolution of many plants is known to have been very slow in major structural features, which forces us to believe that forms closely similar to the angiosperms in many respects must have existed for a long period prior to the Cretaceous. Probably the sudden apparent rise to dominance was favoured by the contemporary evolution of birds and insects about the same time. Certain finds in the older rocks justify the view that the flowering plants go back to much older times. Many years ago Sir Albert Seward described a Jurassic leaf of the dicotyledonous type from the Stonesfield Slate. A poorly preserved leaf from the Solenhofen sandstone seems to belong to the same group, while recently pollen grains found by Dr. Simson in Scotland and a few examples which I have extracted from the thin Jurassic coals in Yorkshire support the same idea. A short time ago I examined some fossils from the Middle Triassic rocks of South Africa which appear to be the remains of inflorescences superficially similar to those of some modern flowers, and though they show no details of stamens or carpels, they provide a link between modern forms and certain Upper Carboniferous types.

For such reasons it seemed possible that the rich floras of the Yorkshire Estuarine rocks might contain evidence bearing on the pre-cretaceous ancestors of the flowering plants.

One of the earlier subjects of my studies in this field was the flower-like reproductive structures of the plants called the Bennettitales, a group with Cycadean leaves now entirely extinct. It had previously been suggested by Arber and Parkin that the angiosperms may have descended from a bennettitalean stock, but all subsequent discoveries have shown that the Mesozoic flower-like organs of these plants

differed in fundamental characters very widely from the modern flowering plants. All were definitely gymnospermous, they showed no approach to the closed ovary, but their ovules and seeds were crowded together on a head with sterile structures, the interseminal scales, which seem to have originated from aborted ovules. The micropyles of the fertile ovules projected above the surface of the mass and they must have received their pollen grains directly. (See Fig. 1).

The pollen of these plants was produced in small bean-shaped synangia or compound sporangia divided up by a number of transverse partitions. These synangia are absolutely different in structure from the very uniform anthers of the flowering plants, and the idea that they could have become transformed into anthers in a comparatively short time is at variance with what we know from the fossil record about the history of plant form. Moreover the actual changes seem to have been from the simpler types of sporangiophores towards the pinnately branched types. The leaves of the Bennettitales were all cycadean in character and never approach the dicotyledonous type.

But the group has nevertheless much biological interest when compared with the flowering plants, and shows what may be thought to be parallels to the development of flowers. For example we find the reproductive structures concentrated at the tip of a slender fertile stalk, which in some forms bore no leaves, but in others produced a number of structures like the involucre bracts of the daisy. Some of the flowers were unisexual, producing ovules or pollen only, while others were bisexual having a circle or whorl of pollen bearing organs below and around the ovules. The Bennettitales may well have sprung from the same stock as the angiosperms, but diverged from them in structure at an early date.

While the group just mentioned gives us very little real help in our problem, another group of extinct plants, which occurs in the same strata and is commonly found near Gristhorpe Point, in Cayton Bay, is somewhat more suggestive.

The forms which I have named the Caytoniales possessed several of the characteristic features of angiosperms though differing in others very considerably from them. They were probably trees or shrubs, their stems are unknown, but their leaves were compound and had usually four leaflets with a simple reticulate venation. But there were no fine veinlets inside the meshes of the network.

The reproductive structures were borne on organs branched on one plane and have therefore been described as sporophylls; perhaps they ought to have been called inflorescences. The pollen grains with characteristic air sacs were formed in anthers, precisely similar so far as we know to the anthers of

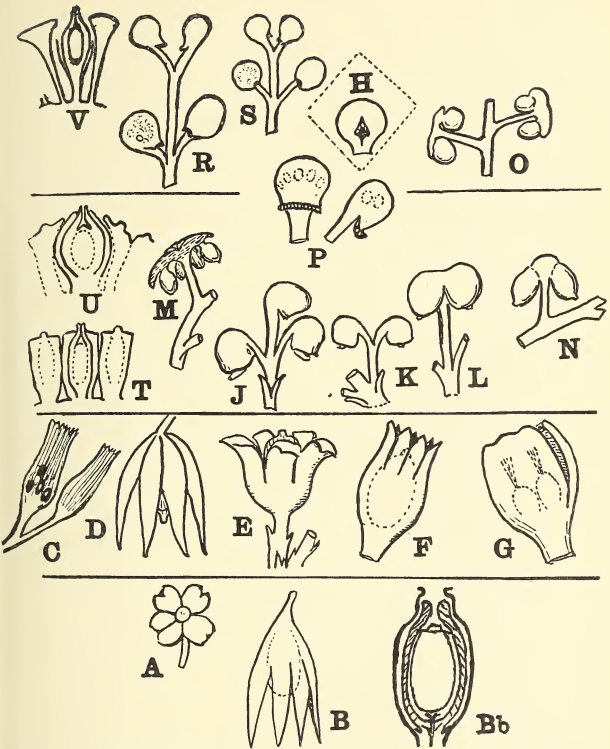


Fig. 3. Seed-bearing structures arranged chronologically to show cupule evolution.

UPPER DEVONIAN AND LOWER CARBONIFEROUS. A, 'Telangium' bifidum after Kidston. B, ? Archaeopteris after Arnold. Bb, Sphaerostoma after Benson.

UPPER CARBONIFEROUS. C, Calathiops Bernhardti after Benson. D, Sphenopteris striata after Bertrاند. E, Lagenostoma Lomaxi. F, Lagenostoma Sinclairi after Arber. G, Gnetopsis elliptica.

TRIASSIC. J, Pilophorosperma granulatum. K, P. gracile. L, P. geminatum. N, Nilssonia, incisoserrata. M, Lepidopteris. P, Caytonia Thomasi after Harris. T, Williamsonia Wettsteini. U, Vardekloeftia after Harris.

JURASSIC. O, Beania gracilis, probably an early cycadean form. R, Gristhorpia Nathorstii with closed ovary and large stigma. S, Caytonia Sewardi, closed ovary and small stigma. V, Dennettites, and Williamsonia with much reduced cupule. H, Hypothetical early angiospermic carpel formed from two consescent cupules with lateral stigma.

All figures diagrammatic and not drawn to scale.

flowering plants and having four longitudinal pollen sacs. The anthers had very short filaments and grew in small tufts on the ends of the fertile branches, (Fig. 2, M). These tufts may be regarded as male flowers. When we turn to the seed-bearing structures we find them very unlike the flowering plant in appearance, but the ovules were nevertheless formed in closed ovaries provided with a stigma. They were consequently real angiosperms. The ovaries terminated branches, (Fig. 3, R.S.) as did the seeds of the palæozoic and mesozoic pteridosperms; there were, however, many ovules in each ovary, and after fertilisation many seeds with hard coats, also showing pteridosperm resemblances.

The ovary wall was a hood-like structure, the stigma was formed by a small flange near the stalk. Many ovaries were examined by chemical treatment, they never have any mud inside them, nor are the characteristic pollen grains found in the micropyles of the ovules or seeds. On the other hand, the coats of these grains are found adhering to the papillate surface of the stigmas.

It is of considerable interest to know that Prof. Harris found the remains of similar plants in the Triassic rocks of Greenland (Fig. 3, P). They were several million years older than my Yorkshire plants and they had not yet become angiosperms. The stigmas mentioned above were represented by a broad flap, which must have been open at the time of pollination, for about half of the ovules and seeds which were cleared had pollen grains lodging in their micropyles.

Now when I was studying the Yorkshire forms more than a hundred seeds were cleared and examined, but none of them shewed any pollen in their apices. It is not unreasonable to conclude that during the Liassic period this group of plants developed the angiospermic habit; instead of the pollen being carried up into the ovules and germinating in the micropyles, it was caught on the stigmas and germinated there, forming pollen tubes which travelled up into the ovules in the way seen in modern flowers.

The ovary wall in this Mesozoic group cannot be described as an inrolled or tubular leaf. At first sight it appears to have no counterpart in the flowering plants, but, on the other hand, it is connected by a complete series of forms with the structures found in Palæozoic seeds which are called cupules (*c.f.* Fig. 3).

Even though the Caytoniales had closed ovaries and four chambered anthers, I think it is a mistake to regard them as the ancestors of the flowering plants. But they do furnish us with grounds for suggesting the possibility that the flowering plants have evolved from that large Palæozoic group, the Pteridosperms, from which both the Bennettitales and the Caytoniales seem to have descended.

We can carry on our quest for the primitive flowers among the plants of the past in a different way. Instead of trying to trace history backwards, we can commence by considering the reproductive structures of the earliest known land plants, and, setting aside all preconceptions, we can follow the changes in the form and arrangement of these organs as we pass from one period to the next, finally reaching the plants living to-day. This is a much safer method of attacking our problem because it largely eliminates the personal bias of the investigator.

Among the first known land plants which come from the Upper Silurian period, there were terminal bunches of elongated sporangia produced in whorls or in other ways (Fig 2, A.-C.). It is very significant that about 400 million years ago land plants produced structures which have some features common to present-day flowers, and which could not have been derived from fertile leaves. The Middle Devonian plants, *Aneurophyton* and *Protopteridium*, which may well have been the forerunners of the Pteridosperms and seed-bearing plants, again show terminal tassels of spore (or pollen) bearing structures (Fig. 2, D.E.) similar in size to the anthers of some flowers. Passing to the Lower Carboniferous, we have good evidence of the existence of seed plants of varied types, and of terminal pollen-bearing flowers with a radial construction (Fig. 2, F.G.). They seem to show the beginnings of differentiation which was carried further in Upper Carboniferous times. *Crossotheca* from the British Coal Measures probably represents the central type at this time, like the earlier forms it had terminal whorls of pollen producing structures borne on a slightly expanded receptacle at the tip of a stalk (Fig. 2, I.). Under the influence of the old concepts of morphology these flowers have usually been described as fertile pinnæ bearing marginal sporangia, and this description has completely obscured their similarity to both earlier and later forms. The careful studies made by Kidston and others show that it is more likely that they were flowers and not pinnæ.

At the same period seed plants existed in which the individual sporangia of the terminal whorls seem to have become united into large cylindrical or awl shaped structures (Fig. 2, J.) very different from anything that has subsequently been found. This tendency may well have led to the extinction of the group in which it occurred. Another type, known from the Carboniferous of Yorkshire, *Potoniea* (Fig. 2, K.), produced its pollen in flowers very similar in general form to the male flowers of the modern Poplars. This type has a counterpart in a Triassic plant from South Africa (Fig. 2, L.), and the whole series suggests that the anther tassels of the Jurassic *Caytoniales* (Fig. 2, M.) may also be regarded as male flowers, though they had no perianth or swollen receptacle.

The sequence of seed-bearing structures can be studied in the same way. Here, however, our information only starts in the Upper Devonian, and at first sight does not seem to bear so directly on the origin of the flowering plant carpels. All the Palæozoic seed plants with large leaves that we know about bore their seeds at the tips of short branches, and these seeds were more or less enclosed in an envelope called the cupule (Fig. 3, A.-G.), which was sometimes composed of free segments, but was often a sac-like structure open only at the top. One or more seeds were contained within it, and as far as we know the pollen grains could always reach them directly. In the Triassic period we find similar structures but with the cupular envelopes recurved (Fig. 3, J. K.), and sometimes terminal pairs of cupules show signs of partial fusion (Fig. 3, L.). We have already seen how the angiospermous condition of the Caytoniales may have arisen in structures such as these, and it does not require any stupendous assumption or distortion of the facts to envisage the angiospermic habit arising in a similar way in the cupulate seeds of other Pteridosperms. If we knew more about the details of the structure and development of the carpels of modern angiosperms, and especially of those which because of their fossil record or the primitive character of their wood must be old types, we should be in a position to say whether this fossil sequence had any significance. But botanists have seldom troubled to investigate those structures which seemed out of harmony with the accepted theory. We can say with some certainty that nothing in the fossil record accords with the view of the carpel as an entire leaf with marginal ovules which has become rolled up.

There remains the problem of the origin of the bisexual flowers which are so common among the flowering plants. The fossil record has little to contribute to this problem apart from the probability that the earlier seed plants bore their seeds and pollen on separate shoots. The Yorkshire *Williamsoniella* (Fig. 1) from the Middle Estuarine Series is the earliest known seed plant with a bisexual floral structure, but other members of the Bennettitales almost certainly had unisexual flowers. Little progress can be made in this direction until we have more knowledge of the physiological nature of sex and of the factors which govern the production of male or female structures in plants.

In conclusion it may be observed that while palæobotany does not provide a solution of the problem of the primitive flower, it provides much evidence bearing on the problem. This must not be used as a basis for a new series of deductions, but it should be correlated with all the evidence available or obtainable from the study of modern plants. It is only by correlation and inductive reasoning that we can hope to

discover the truth, and it will be a long time before this is accomplished. In the meantime it is quite possible that further fossil evidence may be discovered that will greatly alter the aspect of the problem. The preservation and distribution of fossil plants is such that no deposit can be safely considered to have yielded up all its secrets. Continuous collecting always provides some new forms, and members of the Yorkshire Naturalists' Union must see that they continue the quest which has formed the subject of this lecture, in the Jurassic rocks of their county.

RECORDS



Stork photographed at Great Ayton by Mr. R. S. Williamson.
(see *The Naturalist*, December, 1938, page 327).

TERATOCORIS VIRIDIS D. AND S. IN YORKSHIRE

ACCORDING to Butler (*Biology of the British Hemiptera-Heteroptera*, p. 367), this species has been taken in several localities in Scotland and once in Ireland, but omitting a doubtful record for Lincolnshire not yet in England. While sweeping the damp vegetation bordering Semerwater (Yorks., V.C. 65) on August 2nd, 1934, I obtained several specimens of this species, including males and females, along with the more common *T. saundersi* D. and S. The material has recently been submitted to Mr. W. E. China, who has been good enough to verify my identification.—JAMES M. BROWN.

REVIEWS AND BOOK NOTICES

Wild Animals in Britain, by **Frances Pitt**, pp. viii+120, with over 100 illustrations. Batsford, 8/6. We are glad to welcome another book by Miss Pitt, who always writes with authority. Here we have practically a complete and delightfully-written guide to the mammals of Britain. In common with all Miss Pitt's writings, the value of this work is enormously enhanced by the fact that so much of it is a record of personal observations and experience. The illustrations are of a very high order and are the work of some of the finest nature photographers living, including, of course, the author herself. The printing and binding are well up to Messrs. Batsford's well-known high standard.

An Introduction to Botany, by **J. H. Priestley and Lorna I. Scott**. Longmans, Green & Co., Ltd., 17/6. Although this book was written primarily for first year university students, it can be thoroughly recommended to all teachers of botany and will be particularly useful for Higher School Certificate work. It is based on actual teaching methods carried out with success in the Botany Department of the University of Leeds for some years and contains many valuable practical hints. The first 170 pages are devoted to a study of plant morphology—an unusually large section for a book of this type, but the writers believe that microscopic work should be preceded by a study of external features as a training in accurate observation. A special point is made of the value of dissection of such structures as bulbs and buds. Before introducing any anatomy a clear description of the microscope and how to use it to the best advantage is given. The chapters dealing with the anatomy of the leaf, stems, and root are particularly good, and the importance of students getting a three-dimensional conception of the structures examined microscopically is stressed. Emphasis is laid on the importance of development in interpreting features of form and structure as opposed to teleological explanations found in earlier textbooks, and it is made apparent that particularly in plant physiology there are many unsolved problems awaiting the attention of the research worker. Except for about thirty pages, giving very abbreviated life histories of algæ, mosses, ferns, and gymnosperms, the book deals exclusively with angiosperms. There are 169 admirable original illustrations, most of which have been drawn by Miss Malins. They are clear and very much to the point, showing what can be done when there is sympathetic collaboration between authors and illustrator. We wish this new *Introduction to Botany* the success it deserves.

Wild Country, by **F. Fraser Darling**, pp. viii+104, with 82 photographic illustrations. Cambridge University Press, 10/6. This book is a well-written and expanded diary dealing with the author's observations on wild life in the Highlands and the West of Scotland. Dr. Fraser Darling is a trained observer and a biologist of some repute and he has now put together a number of excellent photographs with appropriate comments and views. He ranges from scenery to plants and animals, the larger parts of the book being devoted to birds. All the photographs were taken with a miniature camera—a Leica—which has enabled the author to use the ultra-fast extra fine-grain film available for such cameras. His notes on photography should prove useful to the naturalist, who obviously need no longer carry a heavy reflex or stand camera.

The Entomologist's Record for December contains 'Lepidoptera at Uvernet, Basses-Alpes from 29th July to 8th September, 1937,' by W. Fassnidge; 'Continuous Breeding,' by H. B. D. Kettlewell; 'Heresy Most Foul,' by an old moth hunter; several collecting notes and supplements; 'The British Noctuæ and their Varieties,' by H. J. Turner; and 'Butterfly Races and Zygænae of Macedonia,' by R. Verity (with coloured plate).

YORKSHIRE COLEOPTERA IN 1938

W. J. FORDHAM, M.R.C.S., L.R.C.P., D.P.H.

THE year 1938 has not been a very good season for beetles, yet as often happens in a poor season several outstanding species have been taken, notably *Silis ruficollis*, *Pogonocherus fasciculatus* and *Dorytomus dejeani*. Various captures from previous years not yet recorded have been added to swell the list, especially those for the last three or four years made by Mr. R. R. U. Kaufmann, of Pannal Ash College, near Harrogate.

Beetles were taken on the excursions of the Y.N.U. to Askern, Pickering, and Hedon, the Askern meeting being especially noticeable for its good species.

Several notes have appeared in the *Naturalist* during the year, and in the *Entomologists' Monthly Magazine* will be found ' *Monochamus sutor* L. in S.W. Yorks,' by E. G. Bayford (September, 1938, 209), and ' The Aquatic Coleoptera of the Environs of Pannal Ash near Harrogate. Part I, Hydradephaga,' by R. R. U. Kaufmann (November, 1938, 245-249).

Eight species new to the county are listed and several vice-county additions are marked with an asterisk.

The captors' names are as follows :

M.D.B.	M. D. Barnes, Huddersfield.
E.G.B.	E. G. Bayford, Barnsley.
H.B.	H. Britten, late of Whitby.
J.R.D.	J. R. Dibb, Leeds.
P.D.H.	P. D. Hartley, Leeds.
W.D.H.	W. D. Hincks, Leeds.
R.R.U.K.	R. R. U. Kaufmann, Pannal Ash, Harrogate.
E.J.P.	Rev. E. J. Pearce, Mirfield.
A.S.	A. Smith, York.
G.B.W.	G. B. Walsh, Scarborough.

The following species are new to Yorkshire :

Sevicoderus lateralis Gyll. Barnsley, bred from a pupa on a banana, 8/11/16 (E.G.B.) A local species found in vegetable refuse fungi, cut grass, bones and haystack refuse. Common in the London district, occurs in Lincolnshire and Derbyshire, and is widely distributed in Ireland.

Silis ruficollis F. Askern, 25/6/38 (W.D.H.), (J.R.D.); also taken at Shirley Pool by J.R.D. A fen species not taken hitherto north of Norfolk. Occurs in Ireland. Very rare.

Dasytes plumbeus Ml. Askern, 25/6/38 (W.D.H.), Pickering, 4/6/38 (G.B.W.) Taken by beating shrubs and sweeping herbage. Previous furthest north Chester. Also occurs in Lincolnshire and Sherwood Forest.

Hylotrupes bajulus L. Riddlesden, Keighley, 9/37 (R. Butterfield) in three-ply wood; Barnsley (E.G.B.), retarded development. See *The Naturalist*, 1938, 73, 254. A southern species obviously introduced. Furthest north Norfolk. Occurs in Ireland.

- Pogonochaerus fasciculatus* D.G. Sleights, 29/9/37 (H.B.) A Scottish species occurring on Scots pine. Also recorded from Durham and Lincolnshire.
- Chrysomela menthastris* Su. Askern, 25/6/38 (M.D.B.) Widely distributed in the British Isles but not common. Occurs on *Tanacetum* and *Mentha aquatica*. Recorded from Derbyshire and Lincolnshire, and from Cumberland by Stephens.
- Psylliodes dulcamaræ* Kh. Askern, 25/6/38 (J.R.D.), (W.D.H.) A local species but not uncommon where it occurs on *Solanum dulcamara*. Widely distributed in Britain.
- Dorytomus dejeani* Fst. Askern, 25/6/38 (W.D.H.) A rare species found on aspens and sallows. Recorded from Cumberland, Lancashire, and Cheshire and Northumberland.

The following species are new to vice-counties or are additions to the known range :

- Canal near Ripon (64) (E.J.P.), 9/4/38.
- | | |
|---------------------------------|-----------------------------|
| <i>Haliplus flavicollis</i> St. | <i>Haliplus obliquus</i> F. |
| <i>H. lineolatus</i> Man. | <i>H. immaculatus</i> Gerh. |
| <i>H. wehnckeii</i> Gerh. | |
- Grassy pools between Wilton and Guisborough (62), 14/4/38 (E.J.P.).
- | | |
|------------------------------|------------------------------------|
| <i>Haliplus confinis</i> St. | <i>Hydroporus lepidus</i> Ol. |
| <i>H. immaculatus</i> Gerh. | <i>Dytiscus semisulcatus</i> Müll. |
| <i>H. wehnckeii</i> Gerh. | |
| <i>H. obliquus</i> F. | |
- Reservoir, Wentworth Plantation, Guisborough Moor (62), 14/4/38 (E.J.P.).
- | | |
|-----------------------------------|-------------------------------|
| <i>Haliplus immaculatus</i> Gerh. | <i>Hydroporus lepidus</i> Ol. |
|-----------------------------------|-------------------------------|
- Bishop Dike, near Cawood (64) (E.J.P.), 26/5/38.
- | | |
|-----------------------------------|---------------------------------|
| <i>Haliplus obliquus</i> F. | <i>Haliplus lineolatus</i> Man. |
| <i>H. laminatus</i> Schal. | <i>H. flavicollis</i> St. |
| <i>H. fluviatilis</i> Aub. (64).* | <i>Agabus didymus</i> Ol. |
| <i>H. wehnckeii</i> Gerh. | |
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- Carabus glabratus* Pk. Cross Cliff near Pickering. (62), 6/38, S. Rowntree. (G.B.W.)
- C. violaceus* L. ab. *exasperatus* Df. Pannal Ash. VIII (R.R.U.K.)
- C. nitens* L. Moors above Farndale. (62), 12/3/38 (M.D.B.) Hole of Horcum (62), 4/6/38, C. A. Cheetham (G.B.W.). Strensall Common (62), 6/6/38 (P.D.H.)
- Notiophilus substriatus* Wat. Burn Bridge, Harrogate (64). IX, one by sweeping (R.R.U.K.)
- Nebria iberica* Ol. Pickering (62), 4/6/38 (G.B.W.)
- Calathus piceus* Mm. Pannal Ash (64) IV, one (R.R.U.K.)
- Læmostenus terricola* Hb. Pannal Ash. III, VI, IX. Stones, carrion traps (R.R.U.K.)
- Bembidion harpaloides* Se. Birk Crag (64), IV (R.R.U.K.)
- B. redtenbacheri* K.D. Little Don Valley above Langsett Reservoir (63). 6/7/35 (M.D.B.)
- *64. *B. stephensi* C. Pannal Ash. IV, VIII, common in companies on ploughed land (R.R.U.K.)
- Dromius agilis* F. Pannal Ash. VII, XI, not uncommon (R.R.U.K.)
- *63. *Haliplus wehnckeii* Gerh. Askern, 25/6/38 (E.J.P.)
- H. immaculatus* Gerh. Askern, 25/6/38 (E.J.P.)
- Bidessus geminus* F. Reservoir, Blackburn Valley, near Huddersfield (63), 27/6/37 (M.D.B.)

- Hygrotus decoratus* Gy. River Crimple (64). VI (R.R.U.K.)
Coelambus parallelogrammus Ahr. Hedon (61), 16/7/38 (W.D.H.)
C. impressopunctatus Sl. Hedon (61), 16/7/38 (W.D.H.)
Hydroporus angustatus St. Hedon (61), 16/7/38 (W.D.H.)
H. striola Gyll. Pannal Ash, VI, X, ponds (R.R.U.K.)
H. memnonius Nc. Hedon, 16/7/38 (W.D.H.)
H. nigrita F. Pannal Ash, III, VI, IX, X. Clark Beck (64), VII, very common swampy ponds and slow waters (R.R.U.K.)
H. discretus Fair. Pannal Ash, V, X, very uncommon in small swampy pond (R.R.U.K.)
Agabus paludosus F. Pannal Ash, IV. Clark Beck, VII, slow waters (R.R.U.K.)
A. congener Tb. Panna Ash, IV. Clark Beck, VI, VII, hides in mud; a rare Arctic species (R.R.U.K.)
A. arcticus Pk. Cupwith Reservoir, near Huddersfield (63), common 1/3/38 (M.D.B.)
Orectochilus villosus Ml. Pannal Ash, VII; River Crimple, VI, under mossy stones in shallow stream (R.R.U.K.)
Hydrobius fuscipes L. ab *subrotundatus* S. Pannal Ash, one, IV (R.R.U.K.)
*64. *Megemphleurus porculus* Bd. Pannal Ash, IV, VI, ponds, uncommon (R.R.U.K.)
Cercyon lugubris Ol. Pannal Ash, IV (R.R.U.K.)
Sphærites glabratus F. Barden Moor, near Appletreewick (64), 1/5/38 (P.D.H.)
Anisosticta 19-punctata L. Everingham (61) on reeds, 7/38, (A.S.), Bubwith, 18/8/25 (W.J.F.)
Cerylon histeroides F. Askern, 25/6/38 (W.D.H.)
*63. *C. ferrugineum* Steph. Askern, 25/6/38 (J.R.D.)
Soronia grisea L. Beneath Ash bark, Brockdale Woods, Wentbridge (63), 6/3/38 (M.D.B.)
*63. *Ctesias serra* F. Buttercrambe Woods, 13/6/36 (M.D.B.)
Dorcus parallelipedus L. Everingham, old ash log, 7/38 (A.S.)
Aphodius constans Df. Pannal Ash, IV. Common in cow dung (R.R.U.K.)
A. conspurcatus L. Pannal Ash, III, XII (R.R.U.K.)
Melasis buprestoides L. Askern, 25/6/38 (W.D.H.), (J.R.D.), (P.D.H.)
Limonium æruginosus Ol. Panna Ash, V, VI, sweeping (R.R.U.K.)
Agriotes acuminatus S. Pannal Ash, VI, common, sweeping (R.R.U.K.)
Corymbites pectinicornis L. Pannal Ash, VI (R.R.U.K.)
*62. *C. sjælandicus* Ml. Pickering, 4/6/38 (G.B.W.)
Metacantharis hæmorrhoidalis F. Pannal Ash, VI, uncommon (R.R.U.K.)
Malachius viridis F. Pannal Ash, VI, one in field (R.R.U.K.). Only on record from Selby and Escrick.
Grynobius excavatus Kl. Pannal Ash, V, one (R.R.U.K.)
*64. *Lyctus brunneus* S. York, oak floor, 6/38 (A.S.)
Cis bidentatus Ol. Pannal Ash, tree fungi, XI (R.R.U.K.)
Anaglyptus mysticus L. Skipwith Common (61), 5/6/38 (P.D.H.), Haxby (62), 9/38 (A.S.)
Rhagium bifasciatum F. ab *bicolor* Ol. Pickering, 4/6/38 (G.B.W.); ab *infasciatum* Pic. Pannal Ash, rotten pine log, V, (R.R.U.K.)
Stenochorus meridianus Pz. Pickering, 4/6/38 (G.B.W.)
Leptura maculata Pod. abs *binotata* Muls. and *undulata* Ol. Askern, 25/6/38 (E.G.B.)
Alosterna tabacicolor DG. Pannal Ash, V, VI, hawthorn (R.R.U.K.), Riccaldale (62), sweeping *Salvia verbenaca*, 29/5/38 (M.D.B.)
Leioptus nebulosus L. Pannal Ash, VI (R.R.U.K.)
Pogonochærus hispidus L. Oldstead, Coxwold (62), 8/38 (A.S.)
Clythra 4-punctata L. Riccaldale. On fence, 15/5/38 (M.D.B.)

- *63. *Galerucella nymphaeae* L. Askern, 25/6/38 (W.D.H.)
 *63. *Psylliodes affinis* Pk. Askern, 25/6/38 (W.D.H.), (J.R.D.)
Hypophloeus bicolor Ol. Askern, 25/6/38 (M.D.B.)
Rhynchites longiceps Th. Askern, 25/6/38 (W.D.H.)
R. mannerheimi Hu. Pickering, 4/6/38 (G.B.W.)
 *63. *Phytonomus arator* L. Askern, W, 25/6/38 (M.D.B.)
 *63. *Dorytomus melanophthalmus* Pk. Askern, 25/6/38 (W.D.H.)
Orobites cyaneus L. Pickering, 4/6/38 (G.B.W.)
Poophagus sisymbrii F. Keld Head, Pickering, on watercress, 4/6/38
 (G.B.W.)
Ceuthorrhynchus litura F. Wass (62), thistles, W, 2/8/34 (M.D.B.)
 *63. *Rhinoncus perpendicularis* Rc. Askern, 25/6/38 (W.D.H.)
 *62. *Balaninus villosus* F. Pickering, 4/6/38 (G.B.W.)
 *63. *Magdalis cerasi* L. Ryhill (63), sweeping hawthorn, 13/6/35
 (M.D.B.)
 *63. *Scolytus intricatus* Rz. Askern, 25/6/38 (M.D.B.)

NEWS FROM THE MAGAZINES

Early in 1938 a new series of the popular scientific journal *Discovery*, was commenced under the auspices of the Cambridge University Press. The editor is Mr. C. P. Snow and the annual subscription is 12/6 post free. The subjects dealt with in *Discovery* cover the widest range and the November number contained, among others, articles on 'The People of Tristan da Cunha,' 'Safe Landing in Fog,' 'Telescope Mirrors,' 'Excavations at Lachish,' and 'An Island Metropolis'—the last being a vivid account of the bird population of North Rona by Dr. F. F. Darling. The journal is extremely well illustrated, very readable and authoritative. It can be strongly recommended to naturalists in that it presents a clear résumé of up-to-date scientific news.

The Entomologist for December contains 'The Rhopalocera of the Islands of Rhum, Eigg, Muck, Eilann nan Each, and Heisker (Inner Hebrides) and of Harris, North Uist, South Uist, Eriskay, Taransay, and the Monach Islands (Outer Hebrides),' by J. W. H. Harrison; 'Some Observations on *Sphinx ligustri*,' by L. G. Hulls; 'A Note on the Tillyardian notation of the anal nerve in Odonata,' by Lt.-Col. F. C. Fraser; 'New Genera and Species of Mallophaga,' by T. Clay and Col. R. Meinertzhagen; 'Bees from St. Vincent, British West Indies,' by T. D. A. Cockerell; 'On the types of *Adelpha* (Lep. Nymphalidæ) in the Collection of the British Museum,' by A. Hall; and several notes and observations.

The Entomologist's Monthly Magazine for December contains 'A Preliminary List of the Coleoptera of Windsor Forest,' by H. Donisthorpe; 'New Myrmecophilous Staphylinidæ (Col.) from East Africa,' by M. Cameron; 'A Water Bug New to Great Britain, *Hydrometra gracilentia* Horvath,' by G. A. Walton (Barton Broad, Norfolk); 'Observations Concerning Aculeate Hymenoptera,' by J. A. Reid; 'The Parasites of British Birds and Mammals.—XXI Additions and Corrections to Previous Contributions,' by G. B. Thompson; and several shorter notes.

The Entomologist for January contains 'Some Tortrices from East Tyrone,' by T. Greer; 'Butterflies in the Alps, 1937 and 1938,' by R. F. Bretherton; 'Migration Records, 1938,' by Capt T. Dannreuther; (*Acherontia atropos*. June 5th, one found in a trawler near Flamborough Head and another at Sedbergh. Later in June, Barnborough, Yorks. *Nymphalis antiopa* Heighington, Durham. August 25th, *Oeonistis quadra* at light, Grange-over-Sands); 'The Bouck collection sale.' by W. Rait-Smith and numerous notes and observations.

THE VEGETATION OF YORKSHIRE AND
SUPPLEMENT TO THE FLORAS OF THE COUNTY

(Continued from page 324, Nov, 1938)

Hieracium serratifrons Almq.

var. *Stenstroemii* Dahlst. Uldale, Rawtheydale, J.F.P.; Twistleton Scars (Linton); Thornton Force, Moughton, Cam Glen, Ribblehead, Hesletine Gill, Kettlewell (Ley list).

var. *caliginosum* Dahlst. (*H. cinderella* Ley). Ley's list gives Dentdale, Chapel-le-Dale, Ingleborough, Crummock, Buckden and Kettlewell.

H. crebridens Dahlst.

Ingleton Scars generally, Catterick, and Birkwith, Hesletine and Cray, all Ley's list; Skirethorns and Malham, J.C.; Vicarage Bridge, Chapel-le-Dale, and Winch Bridge, Herb. Hanbury; Aysgarth Force, J. A. Wheldon (Williams); Buttertubs Pass!

H. rubiginosum Hanb. (**H. vulgatum** var. *rubescens* Backh).

West Yorkshire (Linton); Giggleswick and Gordale, J. Backhouse; Malham, J.C.; Penyghent, Ingleborough, Hesletine and Park Gill, Kettlewell; Ley's list.

var. *holophyllum*, W.R.L.; riverside rocks Dentdale, Cowside Beck, Arncliffe, and Park Gill, Kettlewell (Ley list); Linton bank of River Wharfe in quantity, J.C.

H. platyphyllum Ley.

West Yorkshire (Linton); Heseltine Gill, Ley.

H. rivale Hanb.

Chapel-de-Dale and Beezley Falls, Ley list.

H. petrocharis E. F. Linton.

West Yorkshire (Linton); Kettlewell, bank of brook by river above Gaunt's plantation, S. Margerison, *teste* Ley; Skirethorns-Kilnsey, J.C. spn.!

H. cymbifolium Purchas.

All the scars about south and west base of Ingleborough, gills of Beezley, and Chapel-de-Dale, Moughton and Feizor, Heseltine Gill and Arncliffe scars, Great Whernside and Cray Gill, Buckden, all Ley list; Grassington and Gordale, J.C.

H. sagittatum Lind.

var. *philanthrax* Dahlst. Grassy banks in the gills, not open scar ledges; Jingle Pot; Hb. Hanb.; Heseltine Gill! (W.R.L.); Gayle Beck! (W.R.L.); Ley gives Chapel-de-Dale, Ribblehead, Park and Cole Gill, Kettlewell and Buckden.

var. *lanuginosum* Lönnr. Amerdale, Hesletine Gill, W.R.L.; scars, Kettlewell and Grassington (Ley list); Giggleswick and Smearsett, Misses Thompson!; Yoredale at Hestholme Bridge! also in Swale about Keld and Calvey!

Hieracium. caesium Fries.

Linton gives Ribbleshead and elsewhere in West Yorkshire.
 var. *rhomboides* (Stenstr.) W.R.L. High Force and Holwick, Linton and Salmon, 1892; Gunnerside and Downholme, 'Red' scars! Twistleton Scar; Hb. Hanbury, Ley list; Jackwood, Penhill (Percival)!; Buckden and Ribbleshead; Linton and Ley; Cam scars!

H. caesio-murorum Lindeb.

Linton gives Settle for this; Ley gives Chapel-de-Dale scars, rising Ingleborough; Moughton (Miss Thompson, *teste* Elfstrand) and Cautley Spout. In a narrow gorge below Malham Cove, A.E.B.!

H. euprepes Hanb.

Only on the Trap Dyke rocks of Cronkley to Holwick Cliffs!

var. *clivicolum* Hanb.; Keld Head, Linton and Ley; Ingleborough, Ley; Buckden, T. A. Cotton (Ley list).

var. *glabratum* Linton; Feizor Scar and railway bank, Horton, also Hesleton Gill and Buckden (Ley list).

H. orarium Lindeb.

J. Cryer has a record *sub. nom.* '*scanicum*' (*Nat.*, 1910 82) testified to by Ley for Scarborough 'West of Newby.'

var. *ravusculum* Williams; Bolton Abbey, 1894, H. J. Riddelsdell (*Journ. Bot.* 1902); Howgill, 1894, A. Wilson, *teste* F.J.H.

H. scanicum Dahlst.

var. *anglorum* Ley. Ley's gives Thornton and Beezley glens, Ingleton and Twistleton scars; Cryer in *Nat.*, 1909, adds Grassington and Skirethorns and near Leeds.

H. conspersum Dahlst.

Ribbleshead and Clapham; J.C., *teste* Ley.

H. dissimile Lindeb.

Rawthey below Sedbergh, *teste* E. F. Linton (Ley list).

var. *porrigens* Almq., Sp. Lint. Hier., Uldale waterfall, Baughfell, J.F.P., 5/8/02, *teste* E. F. Linton.

H. vulgatum Fr.

Wide-spread. var. *sejunctum* W.R.L. In great sheets on the rail-bank at Thorner, A. E. Bradley, *teste* E. F. Linton.

var. *subfasciculare* W.R.L.; Hillside above Chapel-le-Dale (Ley list); Riverside, Shipley, J.C.

var. *subravusculum* W.R.L. Frequent in West Yorkshire (Lint. Hier.).

var. *maculatum* Sm. West Yorkshire (Linton); Keld Head (Ley); Kison and Calvey over Reeth!; Ingleborough and Ingleton scars (Ley list); Giggleswick (Hanbury); Settle Scars (Whitwell!).

Hieracium sciaphilum Uechtr.

Sedbergh (Handley); Dentdale (Ley); How Gill, A. Wilson, *teste* F.J.H. 'type'; Clapham, Ribbleshead, Skirethorns, Malham, Bradford, Baildon, Newlay (J.C., *Nat.*, 1910, 82), Shadwell ! Brighouse, and Tag Lock ! Wharnccliffe Woods, H.H.C., *Nat.*, 1903.

var. *strumosum* Ley; Appletreewick, Grassington, and Arthington, J.C. in *Nat.*, 1909, 143, and 1910, 82.

var. *transiens* Ley; Chapel-le-Dale and Cowbeck, near Settle, Ley list; Cryer in *Nat.*, 1910, adds as testified by Ley: Gordale to Malham, Skirethorns, Appletreewick, Grassington, Milcar Hill, Lowmoor, and Shipley, and west of Newby, near Scarborough.

H. cacuminatum Dahlst.

Near Leeds, J. Cryer, *Nat.*, 1909, and Grassington neighbourhood, also at Newby, Scarborough, *Nat.*, 1910; Ley gives Teesdale, Hb. Hanbury and Astolat, Settle, Miss Thompson, 1888, 1890 !

H. septentrionale Arv.-Touv.

Beezley Glen, Ingleton, 1902, Ley list.

H. diaphanoides Lindeb.

Teesdale and Settle (Linton); Arncliffe and Kettlewell ! Ley list; Calverley Woods, J.C., *Nat.*, 1910; Walkley Quarry near Sheffield, A.E.B., *teste* Ley.

H. diaphanum Fr.

Ingleton, Beezley Glen, Chapel-de-Dale, Dentdale (Oliver) ! by Rawthey above Sedbergh and Wharfe above Hubberholme to Outershaw Gill !

var. *praestans* W.R.L. Keld Head Scar, Ingleton and Dentdale (Linton).

var. *glaucovirens* Lint. Hier. 70; Dentdale and Great Blake Gill !

H. Dewari Bosw.-Syme.

Gills from Ribbleshead to Ingleton. Heseltine and once at Bolton Strid !

H. prenanthoides Vill.

Stainforth Force ! and Stackhouse (Tatham and Misses Thompson); Ribble below Linn Gill (Ley); Chapel-le-Dale (Ley list); Malham Tarn to Cove, A. Wilson, *teste* J.F.H.; Widdale, Cotterdale and Riggs tributary stream junctions down to Eastholme Bridge (Percival); Hackfall ! West Stonesdale and Ivelet Gorge, from Keld to Muker ! Buckden to Kettlewell, A.W., *teste* F.J.H.; Hesletine Gill and Spale Bourne as far as Barden !

Hieracium strictum Fr.

Rare but does occur in West Yorkshire (Linton). My Malham gathering recorded as *H. crocatum* is certified as var. *angustum* Lindeb. and Miss Thompson's from the same one and only colony in the 'Cove' as var. *opisanthum* Dahlst. by Elfstrand. The other form var. *subcrocatum* Linton is apparently restricted to the Lune near Sedbergh (A. Wilson), but I am sure it also occurs in both Yorkshire and Durham at Winch Bridge and at Aisgill Force, Gayle.

H. gothicum Fr.

West Yorkshire (Linton); Scars and riverside rocks, not common (Ley); Black Force, Howgill Slate, A. Wilson, *teste* Hanb.; Beezley Glen and Braida Garth Scar (Ley list); Ingleborough at 1,150 ft., T. A. Cotton; above Buckden, A. Ley; Stainforth and Allermere, Hb. P. and F. Thompson!; near Shipley, J.C.; said to have been seen by Ley.

H. sparsifolium Lindeb.

var. *placerophyllum* Dahlst. Gayle Beck, near Hawes!; J. Percival as *H. crocatum* in *North Yorkshire Flora*; Dentdale, Chapel-le-Dale, and Ribbleshead (Ley list); near Buckden and Grassington, J.C., *Nat.*, 1909.

var. *grandescens* Dahlst. Rawthey above Sedbergh (Ley list); Grassington, J.C., *Nat.*, 1910.

H. tridentatum Fr.

Langwith, near York, Hb. Backhouse, Ley list (and I think the north-east 'jungle' of Askham bog!).

var. *acrifolium* Dahlst. Bushey fields on river banks, Yorkshire (Ley); Stainforth Force (still—since 1858) spns. with smaller heads, Hb. P. and F. Thompson, 1887; Grassington, Netherside to Ghaistrills, J.C., *Nat.*, 1909.

var. *decipiens* A. Ley. Ley referred all my Upper Wensleydale gathering to this though he only cited Hardraw Force. Also all J. Handley's from Lune banks, Sedbergh, Swale banks above Gunnerside, 1906! Whitsundale, near Hudswell! and on Kirby Hill, Ravensworth (Baker, *North Yorkshire* under *H. rigidum*).

H. rigidum Hartm.

Upper Tees from Cronkley to Lonton! Swale river bank and rough ground above Reeth to Keld, Yore from Cotterdale and Fossdale to Aysgarth, by Ribble in Bowland gorge! and Wharfe from Kettlewell (Cotton) to Bolton.

var. *Friesii* Dahlst. Ingleborough, T. A. Cotton, Hb. E. F. Linton; between Burnsall and Barden, J.C., *Nat.*, 1910.

var. *vel* Forma *hibernicum* Hanb. Upper Wharfe, T. A. Cotton.

var. *trichocaulon* Dahlst. Howgill, Sedbergh, A.W., *teste* Ley; West of Newby, Scarborough, J.C.

var. *scabrescens* Dahlst. Chapel-de-Dale and Hesletine Gill (Ley list).

var. *calcaricolum* Hanb. The Upper Wharfedale plant of T. A. Cotton? Grassington neighbourhood, J.C., *Nat.*, 1909.

Hieracium corymbosum Fr.

'Yorkshire, rare,' Ley, chiefly as var. *salicifolium* by his records. The earlier ones in North Yorkshire not having sufficiently separated it from Backhouse's *H. rigidum*. Sedbergh, 1887, Handley spns. and A.W., 1894, same place, *teste* Ley.

var. *salicifolium* Lindeb. also between the Lune bridges, Handley spns.; Appersett and Mossdale, T. A. Cotton, *teste* Ley; Gunnerside and lower!; Holwick and Winch Bridge!

var. *pyncotrichum* Dahlst. Gayle Beck, Hawes; Lees and Percival, 1886, is allowed by Linton, but Ley allocates it to *H. sparsifolium* var. (q.v.).

H. auratum Fr.

Yorkshire, rare (Ley); Teesdale, J. A. Wheldon (Linton); Chapel-le-Dale and West Hesleden Gill (Ley list).

H. crocatum Fr.

West Yorkshire, Linton; Tatham's Attermire, Malham and Gordale locs. of Flora were '*strictum*' in part and need confirmation; Chapel-le-Dale—Ribblehead, A. Ley!; Midnight Woods, Ingleby Greenhow, Cleveland (Baker).

H. boreale Fr.

Very general in Yorkshire.

var. *rigens* Jord. West Yorkshire, Linton; Wigglesworth and Tosside! to Newton-in-Bowland, J.F.P.! Jordan's split *quercetorum* occurs by the Wharfe at Castley; in Swaledale to 1,200 ft. above Gunnerside, Cotterdale in Yore to 1,100 ft., Percival! and on heaths of the lowland.

H. umbellatum L.

Mostly in the east and on littoral sand heath where such remains; from Lowgill to below Sedbergh, J. Handley; In the East Riding besides Heslington, Pocklington and Driffild, I have seen it near Skipwith and Market Weighton. The western Lime form is I think var. *monticola* Arv.-Touv., and that about Finningley and Bawtry may be var. *linariifolium* Wallr., whilst that of the sandy thicket at Askham Bog may be var. *coronopifolium* Fr.

OBS.—In his MS. Dr. Lees is very uncertain about the value of many of the species and varieties he gives of the Hieracium group and students of this genus are advised to

consult his MS. which is to be seen at the Leeds Reference Library.—C.A.C.

Hypochoeris radicata L.

H. glabra L.

Since 1887, when I rejected it for the western half of York, it has been found and verified in many stations from Malton south to Doncaster. Farnley in old turf near Lawns House, A. H. Pawson. Sandy roadside between Finningley and Rossington. These, as the Allerthorpe and Rillington plants, were var. *erostris* Coss et Germ., whilst the Spurn Point plant turned up in 1910 by C. Waterfall at the Y.N.U. meeting was the beak-fruited *Balbisi* Loisel, the more likely natural but less common growth.

Leontodon hispidus L.

L. autumnalis L.

L. nudicaulis (L.) Banks. (*Thrinchia hirta* Rth.).

Commoner and spreading wider in West Yorks., to 900 ft. !

Taraxacum vulgare (Lam) Schrank.

var. *erythrospermum* Andrz. Confined with us to the limestone.

var. *palustre* DC. Not rare on all our wet western moorlands.

Lactuca virosa L.

Some further localities are Womersley, *Nat.*, 1888, p. 301; Tanfield, W. Foggitt !; Askern to Fenwick, Y.N.U. Excursion, *Nat.*, 1926, p. 221.

L. muralis Fresen.

Prenanthes purpurea L.

Alien, well established in the wild rock garden, Elmete Hall.

Sonchus arvensis L.

var. *glabrescens* Hall. Warped soils on border of Goole Waste and west of junction of Trent with Ouse.

var. *angustifolius* Mey. *vel paludosus* Bagnet. Hunsworth, Lowmoor, 1910, Canon W. Fowler.

S. asper Hill.

S. oleraceus L.

S. tenerrimus L.

Ballast alien seen at Cawood.

(To be continued)

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The NATURALIST

A MONTHLY
ILLUSTRATED JOURNAL

PRINCIPALLY FOR THE NORTH OF ENGLAND

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Yorkshire Naturalists' Union

WHITSUNTIDE EXCURSION

MAY 27th—29th, 1939.

The headquarters for the above excursion has been fixed at The High Force Hotel, Middleton-in-Teesdale, Co. Durham. There is ample accommodation here for a good gathering, but in view of the immense popularity of this district at holiday periods, it is essential that all who intend being present at this excursion should *book their rooms early*; bookings are already being made from other quarters. It would also assist the proprietor in allocating accommodation if members who are prepared to share rooms would kindly say so. The cooking, attention, and conditions are excellent. Prices range from 9/- to 12/6 per day, according to rooms. The popularity referred to above does not extend to the ground it is hoped to cover on this excursion.

ORNITHOLOGY OF THE LIVERPOOL AREA, 1938

ERIC HARDY, F.Z.S.

THESE notes, covering 1938 in South-west Lancashire and West Cheshire, are intended as a guide for field workers as well as a continuation of the annual series compiled in past issues. They exclude purely local bird events of temporary interest, which can be found in my Saturday 'Local Nature Notes' feature of the *Liverpool Echo*. It is also worth recording that at the end of the year a new local society, the Merseyside Branch of the British Empire Naturalists' Association, was founded and has begun work in the area, including active bird study; its elected officials for 1939 are: Hon. President, Mr. J. W. Nixon (Ribble Valley representative of the British Empire Naturalists' Association and Hon. Secretary of the Blackburn Naturalists' Field Club); Chairman, Dr. J. C. P. Miller, F.R.A.S., Lecturer in Applied Mathematics at Liverpool University; Hon. Organising Secretary, Eric Hardy, F.Z.S.

ROOK.—Remarkable decline at Woolton Wood, Liverpool's largest rookery; I counted 60 nests compared to last year's record total of 242. My counts at other local rookeries showed the usual fluctuations without any relation to this.

CARRION-CROW.—Steadily gaining a footing in South-west Lancashire. A pair nested in the heronry wood at Ince Blundell in April, and I found one at Fazakerley Sewage Farm in December.

JAY.—The first I have ever seen in Knowsley Park in a plantation, December 17th, but some nested near Rainford in the summer.

STARLING.—The big roost at Asholt, Bickerstaffe, in the winter, 1937-38, was not occupied on my visits in the winter, 1938-39.

HOUSE SPARROW.—The Rev. H. D. Ford, vice-president, Carlisle Natural History Society, told me how his bird studies in Sefton and Calderstones Parks, Liverpool, showed that through the increasing popularity of bird-feeding by the public, these were increasing at the expense of other and more useful birds, although tits and thrushes were holding their own. Albino, Fazakerley Sewage Farm. In *The Field*, April 9th, I had a paper on some detailed studies of sparrow movements in Liverpool.

BULLFINCH.—Slowly increasing. Three pairs nested at Greenbank, inside the city, where a colony regularly inhabits the gardens, and I found others nesting at Little Crosby Hall, Irby, and Dibbinsdale.

GOLDFINCH.—A pair nested near Raby, and I was able to show them to a meeting of the bird club of the Wirral County School, July 19th. I was told of some near Barnston the previous winter.

MAR 11 1939

CHAFFINCH.—For the B.T.O. song survey I noted this song on 145 days in my area—only one day in autumn.

SISKIN.—Mrs. W. E. Smith (B.E.N.A.) told me she saw one near Willaston (Wirral) in January.

CROSSBILL.—A dead cock picked up in a Wallasey garden in August and sent to Liverpool Museum was most likely an escaped cage bird, as it was too far from any likely haunt of wild birds.

TREE SPARROW.—Mr. Seth Lewis, of Sherdley Hall, St. Helens, tells me this is steadily increasing in their grounds.

GIRL BUNTING.—Miss M. and Miss A. Tunncliffe, of the B.E.N.A., tell me they spent some time watching a pair with yellow hammers on Kirkby Moss, October 29th, and have no doubt about the identification.

YELLOW HAMMER.—In the B.T.O. song survey, August, 1937, to August, 1938, I noted this song on 199 days.

SNOW BUNTING.—With J. S. Taylor and H. Cookson I watched a cock in spring plumage frequenting open sandy fields of young wheat, Crosby, for a few days around April 9th, a late date. Usual winter parties, Freshfield, November.

SKYLARK.—In the B.T.O. song survey I noted its song on 222 days.

? WATER PIPIT.—Among many pipits on Fazakerley Sewage Farm during the hard frost, December 23rd, I watched two which looked noticeably paler below and lighter above than meadow pipits, and more like rock pipits, and although the water pipit I have seen here once before is more of a spring or autumn straggler, I thought they were this species.

NUTHATCH.—There is no doubt about the permanency of the little Wirral colony at Dibbinsdale I mentioned in past years, and two visited the bird sanctuary of the Wirral County School, Bebington, last year. Plenty in Eaton Park, near Chester.

LONG-TAILED TITMOUSE.—Steadily increasing. Winter flocks at Croxteth Hall, Eccleston (St. Helens), Freshfield pine woods, and Thornton Manor.

WILLOW TIT.—I heard its calls distinctly in damp woods above Lymm Dam, October 28th, but bird not seen.

SONG THRUSH.—In the B.T.O. song survey I noted this song on 237 days. In the spring drought, many nests without the mud cup lining and Mr. G. A. Tyrrell told me such were quite common at Wallasey. One feeding on shells of *Succinia putris*, Sewage Farm, December frost, obtaining them from dyke-cleanings.

BLACKBIRD.—In the B.T.O. song survey I noted this song on 209 days, a young cock singing frequent scraps *sotto voce* in my garden in early mornings in autumn. In April, young in a

Hightown garden regularly took a great number of flower heads of primroses, doing much damage.

MISTLE THRUSH.—In the B.T.O. survey I noted this on 132 days, ending in late May and less frequent in winter than the song thrush.

REDSTART.—Mr. G. A. Tyrrell told me of one at Wallasey, April 27th.

REED WARBLER.—Covered for B.T.O. survey. Normally this reaches its north-west limit in Delamere Forest. A party later alleged one was heard at Wrightington Hall, Lancashire, in May, but Miss E. G. Whelan, who was with the party, did not hear it.

GRASSHOPPER WARBLER.—Mr. G. Rodinson told me of one at Moreton, May 1st. Miss E. G. Whelan told me she heard one at Wrightington Hall, May 14th, and Mr. D. Shackleton said one had frequented the Caldý corner of Wirral in summer.

GOLDCREST.—Steadily increasing and often far from pine woods outside the nesting season. Regular visitor to Merseyside suburbs, localities thus not worth recording.

PIED FLYCATCHER.—I watched a cock in Knowsley Park, June 17th.

GREEN WOODPECKER.—I disturbed one in a plantation, Knowsley Park, August 27th, and heard its call at Arley Hall, Cheshire, October 22nd.

GREAT SPOTTED WOODPECKER.—Slowly increasing. A pair nested in an alder in a playing field in busy Sefton Park, Liverpool, and with help of the park-keepers we were able to protect it and see them hatch off. There, and at nesting in birch in Childwall Wood (also in city bounds), I noticed cock brought more food to young than did hen. In winter leave these for bigger woods with more cover. I felled a birch tree used for some years at Childwall Woods, and exhibited it in a 'Countryside' room I arranged at the Associated Learned Societies' exhibition in Liverpool in October, the nest-hole being 14 in. deep, the side little more than bark thickness below the entrance, but with 2 in. of wood on the opposite side. Over a dozen short, partially-excavated holes had been made in the trunk before the final nest-hole.

LITTLE OWL.—Steadily increasing. Mr. P. Kavanagh told me of a pair nesting at Greasby (Wirral) bringing a decapitated yellow hammer to the nest; the keepers at Little Crosby Hall, Kirkby, Thornton Manor, and Halsnead Park all told me they had seen specimens this year.

BARN OWL.—October and November young are met with every year, but I found young still in a nest in the barn below West Derby cemetery in the first week of December.

DOMESTIC PIGEONS.—As in other years, I found a feral pair

nesting on the rock 'cliffs' of Hilbre 'Middle Eye,' Dee estuary.

TURTLE DOVE.—Covered for B.T.O. survey. Common nester Wirral and West Lancashire pinewoods, few but widespread in South Lancashire. Nested by Duke Street, Formby, Kirkby, Knowsley, Croxteth, Lathom, Halsnead Park. In Wirral an epidemic killed many in Burton Woods, and one I examined had died of Coccidiosis.

LITTLE AUK.—Unusual 'wreck' at end of year. Mr. W. Band told me he watched one for over half an hour swimming on New Brighton boating pool, October 18th; floated fairly high in water; dives timed to range from 25 to 36 seconds; made a good flurry of water 'aft' when swimming; occasionally flew to a fresh position 80 to 100 yds. off, rising 15 to 20 ft. in doing so, but soon came back to original position. A supposed but unverified specimen was reported to me on the Mersey off Seacombe, October 30th; Miss M. E. Pilkington (B.E.N.A.) told me of one stranded at Rainford, St. Helens, 12 miles inland, November 26th, and this later stuffed in Liverpool; Mr. G. L. Grandy (B.E.N.A.) found one at Formby Point, December 4th, and on December 11th a field meeting of the Merseyside Branch of the B.E.N.A. examined a specimen on the Freshfield tide-line. Mr. A. W. Boyd that week told me he had watched one swimming on a Cheshire mere.

RAZORBILL.—With the W.E.A. Nature Study Group (Liverpool) we picked up a fine but slightly oiled specimen left by the tide at West Kirby, November 27th; later I dissected this before my W.E.A. advanced nature study class at Liverpool University, where we found the crop empty save for a little oil, supporting our theory that some birds are poisoned by swallowing oiled water before their plumes are sufficiently clogged to hinder them.

COMMON TERN.—At 1-30 a.m., June 12th, during a night's continuous rain when I was guiding an all-night ramble of the Liverpool Naturalists' Field Club, terns were calling and feeding on the ebb tide below the Ainsdale sanctuary, although the weather made visibility nil all night. Mr. Peter Kavanagh told me of three white eggs marked with only a little rust at the small ternery at Burton on the Dee marshes; odd white eggs have been laid there the past three years.

BLACK-HEADED GULL.—Covered for a national census. Did not nest at usual colony on Abbots Moss ponds, Delamere, nor Ainsdale. Few Burton. In May I found some trying to nest Talacre, on Welsh side of Dee, but too exposed for success.

LESSER BLACK-BACKED GULL.—I saw my first spruce-looking spring migrants of the British sub-species in the Mersey estuary, March 3rd, but none was at the Simonswood Moss gullery until April. Seventy-five pairs nested at latter, most

hatching fourth week June, when young quickly take to scraggy heather to hide. I noted dor-beetles and edible crabs (probably from rubbish tip) in their food pellets in addition to list given last year.

GREATER BLACK-BACKED GULL.—Mr. J. S. Taylor told me of a few Crosby shore, August 31st. I saw one in a gull flock an unusual distance inland, at Sankey, Warrington, October 28th.

WOODCOCK.—The gamekeeper at Eaton Hall, near Chester, told me they found their first nest ever known in May; in the B.T.O. woodcock survey this was not included in the nesting localities. A photograph I took of an unusually light clutch, more like pale snipe eggs, on dry exposed bracken following a fire at Kirkby Moss, June, appeared in *The Field*, August 6th. First egg laid June 3rd, second June 4th, third June 6th, fourth June 8th. Also nested Halsnead Park, Prescot, an additional haunt. Fewer than usual visitors, winter 1938-39.

GOLDEN PLOVER.—Two hundred on Gowey Marshes, January 8th. This, with Storeton and Burton, are main winter haunts for Wirral.

GREY PLOVER.—I saw an early one, with dark underparts, Hilbre, August 8th.

LAPWING.—I saw a white one, Withnell, above Rivington, July 3rd, and a white one in a Cheshire flock, Winsford, February 14th. Mr. J. W. Nixon tells me he has photographed a white one nesting in a certain North-east Lancashire haunt.

GREENSHANK.—Mr. Brown, head gardener at Greenbank, Liverpool, told me one visited their brook, April.

GREEN SANDPIPER.—I saw five frequenting Fazakerley Sewage Farm, August 13th to September.

RUFF.—I saw five at Fazakerley Sewage Farm, February 5th, three during September, and Miss E. G. Whelan tells me she saw four there October 30th.

CURLEW SANDPIPER.—I saw one Hilbre, August 8th.

KNOT.—Mr. D. Shackleton (B.E.N.A.) told me he saw one Hilbre, July 25th.

TURNSTONE.—Mr. J. E. Taylor tells me he sees a few regularly on migration at the Alt Esty slag banks, although Hilbre is their usual haunt.

OYSTERCATCHER.—It has often been disputed whether this nests on the Dee marshes, but a keen young ornithologist I know found it nesting at Burton last year at a spot not of normal access, and from three nests he preserved one egg for verification. Mr. G. A. Tyrrell told me of a pair trying to nest at Leasowe in spring, but this is too busy a spot. The usual albino was again in the winter flocks at Hilbre.

BAR-TAILED GODWIT.—I saw buff birds at Hilbre, August 8th.

CURLEW.—I found two pairs nesting Simonswood Moss.

CORNCRAKE.—In the B.T.O. survey I found none nesting in this area, but spring migrants at Greenbank (April); one flushed frequently from a rearing field at Little Crosby Hall, May. Still nests hillsides near Mold, North Wales.

WATER RAIL.—I found one at the dam, Sherdley Hall, Rainhill, August 6th, an interesting verification of Higgins' mention of it in that area (*Proc. Lit. and Phil. Soc., Liverpool*, 1866, p. 69).

RED-LEGGED PARTRIDGE.—This nested Simonswood Moss until a few years ago, but keeper and I failed to locate any this year and probably now extinct.

PHEASANT.—A fine white cock I have known at Ormskirk Lodge, Knowsley Park, for seven years found dead this summer.

MERLIN.—I watched a pair at Childwall, January 5th, and one, Lathom Park, October 25th.

BUZZARD.—Mr. G. Rodinson told me he saw one flying north-east over Moreton with a north-east wind, May 5th.

PEREGRINE.—Mr. J. Taylor told me he watched a pair on Crosby shore, February 2nd.

GREY GEESE.—Still use Gowey Marshes behind Ship Canal at Ellesmere Port.

BARNACLE GOOSE.—Mr. Macleay, Lord Leverhulme's gamekeeper, told me that one I saw on the lake at Thornton Manor has stayed there with the Chinese geese four years now, and appeared suddenly as a ? pricked bird.

CANADA GEESE.—As Witherby has included this in his new Handbook as a British bird and asked for records, I might mention wild birds have nested for years at Knowsley Park (two pairs this year, over a dozen non-breeders) and in Liverpool at Sefton Park, fighting frequently between these waters in winter and to other city parks where they occasionally nest. Occasionally Kirkby Dam. I found two pairs with young on Eaton Hall lake, near Chester.

SWANS.—A large flight I noted over Wavertree in the night migration in mid-November may have been Bewick's, owing to an unusual crop of records later from Cheshire meres, and early in 1939 from local waters.

MALLARD.—An almost white duck hatched off two young at Knowsley Park and later in year frequented Calderstones Park lake, Liverpool.

GADWALL.—I saw a duck at Knowsley, July 30th.

PINTAIL.—The keeper told me of one on Eccleston Mere, St. Helens, in October, and I saw others on Southport marine lake, March. Many in Dee estuary in winter following the gales.

POCHARD.—I found a pair nesting at Knowsley Park rear one young. A flock of over 200 arriving there first week

October were nearly all drakes, but in November very many more ducks arrived.

TUFTED DUCK.—Covered for B.T.O. survey. I found a remarkable decline to six nesting pairs at Knowsley Park White Man's Dam and none on the Mizzy Dam (I found eighteen pairs nesting in the park last year). A pair put down on the lake at Greenbank did not nest, and a pair that tried to nest on Kirkby Dam were driven off by the swans. A pair nested Carr Mill Dam, St. Helens, and anglers told me they had nested a few years earlier. The keeper told me they nest on the ox-bow duck lake at Eaton Hall, but I saw none. An increasing visitor to Liverpool park lakes.

SCAUP.—Mr. G. L. Grandy (B.E.N.A.) saw nine off Freshfield on October 16th, and a duck on Stanley Park Lake, a very industrial Liverpool district, during December. I saw a duck, Knowsley Park, December 17th.

GOLDEN EYE.—I saw some at the Liverpool Corporation reservoirs, Roddlesworth and Withnell, November, where they are frequent in winter.

LONG-TAILED DUCK.—One West Kirby marine lake, December.

EIDER.—Mr. J. S. Taylor told me he watched a drake when in a boat off Crosby shore, September 8th. Our first Mersey Estuary record for about 30 years.

SCOTER.—Unusual numbers all along coasts early in year following many gales. Mr. J. Bolton (B.E.N.A.) told me he saw one on Eccleston Mere, St. Helens, April 17th.

RED-BREADED MERGANSER.—Now so regular in Dee Estuary in winter that no need for dates.

COOT.—Does not now nest on dam in Halsnead Park, as in B.T.O. survey, nor Thornton Manor.

HERON.—When I was at the Eaton Hall heronry, keeper said they had counted 80 nests, a record number (75 used last year). Mr. Alcock, keeper at Ince Blundell, told me he had a dozen nests occupied.

CORMORANT.—I saw one on Eaton Park lake, above Chester, May 28th. One shot Carr Mill Dam, July.

LEACH'S PETREL and STORM PETREL.—Many stranded on Lancashire and Cheshire coasts after the unusually numerous autumn and winter gales, former the more numerous; but as odd specimens of each are noted every winter, no need for dates.

? **BLACK-NECKED GREBE.**—In poor light I watched a bird which may have been this species on Lymm Dam, October 28th.

N.B.—The year saw the publication of *Feathered Folk of an Estuary*, by Mr. G. Farrar, a popular book, but with a valuable original series of Dee Estuary telephotographs of waders, and Walney Island gulls and terns.

BIRD LIFE IN VICE-COUNTY 65, 1938

No record of outstanding note has come to my notice during the current year.

Residents have been distributed much as usual and migrants on the whole have averaged out well.

After a few years lapse Wheatears have again been up to average. The regularity of their arrival is interesting. My first observations of the return of these migrants for the last five years are: 1934—April 20th, 1935—April 18th, 1936—April 23rd, 1937—April 19th, 1938—April 22nd. The same regularity has also been observed in other migrants. Yellow Wagtails have not been so plentiful this year, but the Grey Wagtail has been observed on most mountain burns. The sound of the Corncrake becomes more rare: this last summer I heard but two birds, these in Swaledale. On May 22nd, I found one in an exhausted condition. Lesser White-throats were here in force, their song being almost as common as the Willow Wren's. Nuthatches appear to have increased in numbers: I have observed them in several new localities.

I am glad to say the following have all nested within the Vice-county and successfully reared broods: Nightjar, Raven, Peregrine, Buzzard, and Short-eared Owl.

I am afraid the lowering of Lake Semmerwater is having an adverse effect on the summer and autumn bird life commonly associated with the lake. The water has receded from the majority of the reed beds along the shores, and until these growths again creep down to the water's edge the sparcity of bird life may continue. On September 15th I made a complete circuit of the lake and the only birds seen on the water were one Common Pochard and one Lesser Black-backed Gull; not a single Moorhen was either seen or heard, but Snipe were plentiful at the head of the lake (see my reports of October 29th, 1936, in *Naturalist*, January, 1937, July 15th, 1937, in *Naturalist*, August, 1937 and February 27th, 1938, in *Naturalist* July, 1938).

On August 4th a solitary immature Common Gull was seen on a pond on Grinton Moor: to my knowledge it remained there about three weeks.

MAMMALIA.—On December 2nd a fine Pine Marten was kept under observation for some time near Ellerton in Swaledale.

J. P. UTLEY.

The Entomologist for February contains 'Dr. C. J. Gahan' (obituary), by G. J. Arrow (with portrait); 'The life history of *Blastobasis lignea* Wals,' by W. Mansbridge; 'Winter and Spring Riviera butterflies, 1937-38,' by Lt.-Col. N. Eliot; 'Thec Bouck, McLachlan and Baldoock collections,' by W. Rait-Smith; '*Melitaea aureliaeformis* variety,' by L. G. Higgins, and several notes and observations.

THE BIRDS OF YORKSHIRE

RALPH CHISLETT

At the Vertebrate Sectional Meeting of the Y.N.U. on February 11th, Yorkshire ornithologists present agreed that T. H. Nelson's historical work needs to be brought up to date. Since 1906 there have been changes in the status of many species, new breeding records have become available, even new methods of research are in use. The precise form in which these summarised matters shall be published in volume form cannot yet be decided; but it must be adequate.

The material, however, is not all ready. Before the true, current status, habitats and distribution in the county of all species can be stated, some intensive field-work is needed. My present purpose is to stimulate that field-work, to enlist the necessary help.

Although there is other important work to be done, we need especially:

- (1) To work out the distribution, habitats, and approximate frequency, of every species of Yorkshire breeding bird.
- (2) To keep as constant a watch, and as careful a record as possible, of the migrant visitors at Spurn and Teesmouth (and at other places between), particularly with a view to possible connection between arrivals on the coast, and on the inland, moorland reservoirs, etc.

If we all work with the conscious aim set out in No. 1, and make our contribution in the late summer of 1939 with as complete and appropriately qualified lists of the birds breeding in our own working areas (with dates of records, etc.), as we have been able to make; when the results have been tabulated, we shall know what areas and species to concentrate upon for 1940. And after that year we should have the information required. I find it too much to hope that we can have it all in 1939. Special attention is drawn to the following species: Barn, Little, and Short-Eared Owls, Lesser-Spotted Woodpecker, Nightjar, Tarte, Hawfinch, Tree Sparrow, Lesser Redpoll, Corn Bunting, Willow Tit, and Marsh Tit, Red-backed Shrike, Lesser Whitethroat, Pied Flycatcher, Nightingale, Wheatear, Stonechat, Duvlin, Woodcock, Turtle Dove, Corncrake, and the breeding Ducks.

The information required under No. 2 can only be obtained by such careful day-to-day records as were attempted at Spurn in 1938; and again I feel that two years' work is needed. With a view to planning such for the best total effect, I should be glad to hear, well in advance, of dates of proposed visits to Spurn, Teesmouth, etc. Dates of my

own visits will be chosen to fill in periods likely to be otherwise blank, if there are such.

Lists for districts, and information in other forms, sent to me, bearing on either of these large problems, or likely to be helpful towards the desired consummation, will be filed and tabulated. The more important records of 1939 should also be sent to the Union's Recorders for the three Ridings and the York district, for inclusion in their annual autumnal reports, making such reports even more valuable than usual.

Names of precise localities will not be published if there is any objection. Anonymity of areas in which rarities occur will be preserved. For some species (say) 'North Riding' will be sufficient for publication. But the distribution of many of the common species it is hoped to get mapped out in greater detail.

Due acknowledgement will be made for all help given. Communications may be addressed to the Editors of *The Naturalist*, or to me at 42 Broom Crescent, Rotherham.

The Feathered Folk of an Estuary, by Guy B. Farrar, pp. xii+152, with 31 photographic illustrations. *Country Life*, 10/6. In spite of the ever-growing output of books about birds, the volume under review can be regarded as most exceptional and well worth a special note of commendation. Mr. Farrar writes about the birds of the Dee estuary, and he writes well. The particular appeal of his book to most ornithologists and nature photographers will lie, we think, in the special method he has developed with such success. He finds out, by careful observation of tide-tables, high-water marks, and so on, suitable sites for erection of hides just beyond the limit of the next high tide. He has further ascertained that the points chosen are those where Waders and other estuary frequenters are likely to congregate as the tide comes in. He may have to wait in his hide for two or three hours, but he has had his reward in the wonderful photos of Oyster Catchers, Dunlin, Curlews, Godwits, and so on, in flight or strung out along the beach, as we see them from afar with our binoculars. He uses a 3½ in. × 2½ in. Reflex camera with a 12-in. telephoto lens, and we predict for him a host of willing followers in the employment of such a valuable method of securing bird portraits out of the breeding season.

Elephants in Africa, by Frank Melland, pp. xvi+186, with 12 full-page drawings by Stuart Tresilian. *Country Life*, 10/6. All who would know the exact position of the elephant in Africa to-day should read this book. Mr. Melland is especially qualified to deal with the subject, and he has performed the task with great thoroughness, and what he has written carries conviction in every line. For many years he served in Rhodesia, and before his retirement he was a well-known hunter of African animals, while recently he has made a name for his writings and broadcast talks on Africa. It would be difficult, in a short review, to do justice to a book of such encyclopædic character, but all naturalists will be glad to hear that the elephant is at present in no danger of extinction, thanks to African game laws and to the numerous game reserves. Sir Samuel Baker once wrote: 'The elephant stands entirely apart from all other animals. . . Its peculiarities interest mankind more than any smaller animal.' This quotation, which appears among others at the beginning of Mr. Melland's thrilling and fascinating book, might almost be regarded as the author's chosen text.

JUBILEE OF THE HULL GEOLOGICAL SOCIETY

FIFTY years geological investigation in East Yorkshire were recalled on December 2nd last, when the Hull Geological Society celebrated the Jubilee of its foundation. This body of amateur geologists, stimulated in its early days by Lamplugh and Kendall, can look back with satisfaction to the way it has maintained the spirit of inquiry and the comradeship fostered by those two stalwarts of Yorkshire Geology. The society has been fortunate in this first half century to have at its disposal the enthusiasm and wise guidance of J. W. Stather, the careful watchfulness of W. H. Crofts, the acumen of F. F. Walton and especially the unbounding energy and vigour of T. Sheppard. All geologists and naturalists who gathered at the Broadway Hotel, Hull, on December 2nd at the Jubilee Dinner were glad to see Mr. Sheppard again in the Presidential Chair.

About 60 members of the society and their guests were present, the latter including Sir Albert and Lady Seward, Mr. and Mrs. James Downs, Principal J. H. Nicholson, Dr. H. Hamshaw Thomas, Mr. W. S. Bisat, and Dr. H. C. Versey.

In wishing good fortune to the Hull Society, Sir Albert Seward emphasised the great value to the science of geology of non-academic amateur geologists who gained unrivalled practical experience of their own areas. He said that he always had a high opinion of geological societies, because geology was his first introduction to nature in a more serious sense and through geology he eventually came to take up botany.

"I have always felt very strongly that there is no other branch of science which is better adapted for awakening interest on the part of young or old in the wonders of science and I have always regretted that it is not encouraged more in schools," he said.

"I don't mean as a regular subject of the curriculum, but as a hobby to be taken up out of school. It is an easy subject for amateurs to follow, and that is the reason I regret that more young people do not attend geological societies and do not realise at an earlier age the value of geological study. The Book of Nature is open for all of us to read and the pages of the geological chapter are as easy to read."

Sir Albert went on to pay a tribute to the work of Mr. Sheppard as a Museum organiser and suggested that he should write his reminiscences and tell the world how he managed to procure so many valuable specimens. The book might be used as a text-book for the moral guidance of the young.

In proposing the toast of the visitors, Mr. A. Charlesworth stressed the happy comradeship which existed in the Hull Society. In reply Dr. Hamshaw Thomas said that as a stranger

coming into the Riding for the first time to study its fossils, he had immediately realised that the Society was a living and vital factor in geological research whose members were always ready to give help and information to others.

Mr. W. S. Bisat, representing the Yorkshire Geological Society, also replied, pointing out that the Hull Society gave the lie to a recent statement by a prominent geologist that amateurs are almost "extinct monsters." Although many veterans of the society had passed away, the society could take heart from the Yorkshire Geological Society which had just reached its hundredth birthday.

Dr. Versey proposed the health of the President in prose and rhyme and Mr. Sheppard in thanking the company for their support showed how the collecting instinct should be fostered in young people, how his own career in geology had begun in this way and that he had had such an instinct ever since.

Messages of congratulation to the Hull Geological Society on its 50 years of successful work were read by Mr. C. Green (secretary of the society); from the Geological Society of London; from Dr. E. B. Bailey, director of the Geological Survey and Museum (who wrote: "I am glad to think that Lamplugh, who afterwards played so big a part in survey life, was one of your founders"); from the President, Council and Members of the Leeds Geological Association; from Professor Albert Gilligan; and from the Yorkshire Geological Society.

FIELD NOTES

Pied Rook near Barnsley—A short time ago a Pied Rook was shot at Mapplewell. The white markings were fairly well distributed, but more conspicuous on the shoulders and above the base of the tail, the middle of the breast and the outer edges of the wings. It was densely populated with biting lice (*Mallophaga*), two of the three species listed by Denny as being attached to the rook being noted.—E. G. BAYFORD.

The Little Owl in Upper Wharfedale.—This bird makes but little progress in its advance into Upper Wharfedale. One was shot in Denton Park, Ben Rhydding, in March, 1936 (*antea* 1937, p. 18). Another was shot six miles further up the valley at Beamsley on December 1st. Both the above were believed to be single birds. A friend told me that he had heard what he believed to be a Little Owl calling several times on the Myddleton side of Ilkley in the summer. I spent several hours near to the place indicated on different evenings, but could neither see nor hear one.—H. B. BOOTH.

AUSTWICK MOSS IN LATE OCTOBER

CHRIS. A CHEETHAM.

WET marshy tracts such as Austwick Moss do not appear to have many attractions at the end of October. However, 1938 has been a year of contrasts in weather conditions, drought when we looked for rain in the early months, a dull damp summer-time and then the wettest October for many years, so the conditions to be seen in any district are worth recording. In the fields on the way to Austwick Moss, flocks of birds were seen, Herring gulls which have taken the place of the Black-Headed Gulls of Spring and Summer, Golden Plovers and Peewits, Starlings and Curlews. On the sides of the Moss road a few Autumn tints were seen on Brambles which still had plenty of Blackberries on them, the wild Raspberries in this lane ripened at the normal time but the Blackberries were very late. The Meadow Cranesbill leaves had not the usual amount of striking colour except on a few odd leaves, and a strange sight was a wild strawberry with ripe fruit and flower, in a shallow ditch usually dry but which carried flood water a week or so earlier, a covering of green alga was drying into white tissue. How this *Zygnema* and attendant diatoms multiplied to this amount in so short a time is hard to explain. The only Crane-fly seen in the hedgerows was *Tipula Pagana* Mg., a species which has wingless females and is usually abundant in Autumn. At the edge of the Moss a few drone flies, *Eristalis tenax* L. were on the remaining flowers of the Knapweed, Ragwort, and Devil's bit Scabious, and some of the smaller Crane-flies were resting on the vegetation; these included *Dicranomyia autumnalis* Staeg., *Erioptera diuturna* (Walk) Edw., and *Trichocera regelationis* L. Among the trees a few mosquitoes, *Theobaldia annulata* Schrank. were caught, and at the edge of this scrub on the Moss a few individuals of *Dixa æstivalis* Mg. were netted; here there is a tall growth of Bog Myrtle and on moving through this, quantities of another of the winter midges, *Trichocera saltator* Harris, were disturbed. This species has been recorded as *T. fuscata* once or twice previously. Some small groups of dancing midges were found to be *Tanytarsus retusus* Goet.; close at hand were a Mayfly, *Baetis rhodani*, a Caddis, *Limnophilus lineatus*, an uncommon Lacewing, *Chrysopa carnea*, and one of the Hemiptera, *Dolichonabis limbatus*; these latter were kindly identified by Mr. J. Meikle Brown. On the Moss pools were a few whirligig beetles and pond skaters and it was interesting to see how the Cross-leaved Heath was making a second effort at flowering. The Bog Andromeda also had a fair show of flowers, this species usually having two flowering periods in the year here. It was first seen in flower this year on March 25th, and on

November 15th there were still plenty of blooms; at this later date another winter midge was dancing in small swarms all around; this was *Trichocera hiemalis* De G., the other species *T. saltator* Harris, being more confined to the bushy Bog Myrtle patches. A last solitary Crane-fly, *Tipula luteipennis* Mg. was seen on this later date but *T. pagana* Mg. was not seen after October. From this it is evident that such a wet marshy spot has something of interest in November.

CORRESPONDENCE

To the Editors of *The Naturalist*.

DEAR SIRS,

With reference to my note on page 322 of the 1938 *Naturalist*, reporting dead flies on the Common Stinkhorn, and to the comment thereon on p. 328 by Mr. W. G. Bramley, I may add that I sent my query also to the Director of Kew Gardens, whose mycological expert writes as follows, supporting (it will be noticed) Mr. Bramley's suggestion:

'The occurrence is certainly not normal. The spore mass of Phallus is usually eaten away by flies. The process has been repeatedly observed, and the flies suffer no disability. There may be several explanations of the death of the flies in the particular case observed. For instance, the Phallus in question may have been contaminated with bacteria which happened to be dangerous to the fly—or the particular batch of flies may have been infected with some fungus or insect parasite, and death would have taken place in any case. The observations do not appear to have been carried far enough for any judgment to be made as to the cause of death.'

I hope to visit the same spot next 'back end.'

Yours faithfully,
D. W. BEVAN.

SCARBOROUGH,
January 1st, 1939.

SPRING COTTAGE,
PALLATHORPE,
BOLTON PERCY.

To the Editors of *The Naturalist*,

DEAR SIRS,

A new edition of Groves' 'British Rust Fungi' is being prepared by Dr. Malcolm Wilson and he is desirous of ascertaining if any herbaria of this group are available, especially the specimens relating to Yorkshire, as there are some doubtful records.

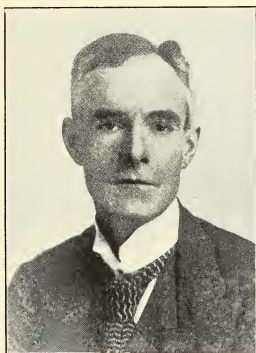
The writer would also be pleased to receive any records of Yorkshire Rusts and Smuts, as a fuller account of these organisms is under preparation. Data of host and especially of the status (common, rare, etc.), are especially wanted. Records for the south-west and west of the county are scarce and will be specially welcome.

Yours faithfully,
W. G. BRAMLEY.

The Naturalist

In Memoriam
ROSSE BUTTERFIELD
1874—1938

MR. E. P. BUTTERFIELD, the well-known banker at Wilsden, was a very great lover of nature. This love he implanted in the members of his large family, but perhaps there was the greatest response from the eldest son, the late Ruskin Butterfield, formerly Curator of the Brassey Museum at Hastings, and his second son Rosse Butterfield the subject of our notes. Rosse was born in 1874 and made a good start



in the wool trade after the usual school years. He seemed to show promise as a wool-sorter. In his early days he cycled a good deal and took every opportunity to see the country. Many of his holidays were spent with Mr. Jonas Bradley, of Stanbury, who has known him since 1889. They visited many places in all parts of Britain and Rosse also attended the meetings of the British Association whenever they were reasonably near at hand.

From 1904 to 1912 Rosse was one of the Joint Editors of the *Bradford Scientific Journal* and was chiefly responsible for the zoology therein.

Previous to 1910 he was helpful in inspiring a love of nature in the village where Mr. Jonas Bradley has done so much for nature study. In 1907 he was assisting Mr. H. E. Forrest in transcribing the material for his *Vertebrate Fauna of North Wales*. In 1910 he was appointed Curator of the Museum at Keighley, and in the words of one who repeatedly visited the Museum, 'it suddenly became alive.' His coming

led to the complete resuscitation of the Keighley Naturalists' Society.

Throughout his career he held office in connection with the Bradford Scientific Association and the Bradford Naturalists' and Microscopical Society, chiefly as Recorder in connection with one of the many branches of zoological work, and he also acted as Secretary and Recorder of the Committee for Zoology and for Hymenoptera and represented them on the Executive of the Yorkshire Naturalists' Union. He was also an active member of the Cross Hills Naturalists' Society.

He explored district after district in search of the 'life' therein, all tending to widen his experience of his own area. For instance, in one case he visited Norway along with Mr. W. J. Forrest to see as much as possible of the nesting habits of some of the birds that we only see as winter visitors.

Again in 1930 he went with Mr. Forrest to Connemara and the West of Ireland to check over very carefully and appreciatively Praeger's account of that area.

With a life centred at first at Wilsden and the Haworth district he was naturally attracted to the local cult and he rendered valuable help to the Brontë Society and the Brontë Museum, of which he was for some years (1931-1936) Honorary Curator.

As a naturalist he was extremely thorough and exact, everything was critically examined so that when his opinion was passed the result might be thoroughly depended upon. Exactness is of first-rate importance in the conduct of the Curatorship of a museum. This exactness in his case partly arose from his intense sincerity of character: he abominated shams. Combining this with his very careful study of the zoological subjects that he preferred it will be understood how he naturally achieved great accuracy in nomenclature. He was a Fellow of the Royal Entomological Society, and his knowledge of insects was remarkably extensive, by no means limited to the study of the hymenoptera, though in this group he was wonderfully well informed.

It is to be hoped that his own personal collection and books will not be dispersed but be rendered available for reference in a suitable place.

In later years he became much interested in archæology and has been associated with Dr. Villy and others in elucidating some of the secrets of the past. At the period during which his death took place he was engaged in assisting in excavations at Riddlesden in connection with waste heaps from iron working by the community at Kirkstall Abbey.

He has done much museum work of late in the collection of relics of past times and incidentally he was an excellent judge of good old glass. The work done at East Riddlesden

Hall was also keenly appreciated by him, and although it was not possible to save Marley Old Hall he did succeed in preserving a replica of the old fireplace.

Quite recently he added to the Museum a number of plant galls originally collected by Edward Connold and a huge specimen weighing $14\frac{1}{2}$ cwt. is just being trimmed. This was from a beech in Grass Woods.

In all his contacts with others he proved himself the same ; shy, modest, and withal most helpful, with no humbug and no camouflage.

‘ . . . Of epitaphs doubtless he’d call
 “ He had the gift of friendship ” best of all.’

All who knew him have lost a friend.

FRESHWATER CRAYFISH AT TONG PARK

SIDNEY JACKSON.

ABOUT two years ago there appeared in *The Naturalist* a series of notes with regard to the occurrence of the freshwater crayfish in various parts of Yorkshire. In re-reading these notes recently I do not find that Tong Park was included in the list of places mentioned. When I was at Tong Park Mills, Shipley, between 1918 and 1923, freshwater crayfish were abundant in the Round Dam and the Long Dam there, though I never saw any in the Reservoir, the larger of the two Tong Park ponds. Since that time the Round Dam has been drained, but the Long Dam, a kind of small canal carrying water from the Round Dam and the Reservoir to the mills, is still in its original state, and I have no reason to suppose that crayfish are not still to be found there.

RECORDS

GREEN SANDPIPER AND SMEW AT SWILLINGTON.

DURING one of our periodical excursions to Swillington, near Leeds, on Sunday, January 29th, Messrs. H. Foster, G. R. Edwards, and myself saw, reasonably close, a Green Sandpiper as it flew across the river to alight on mud and silt left recently by extensive floods in this area. The white rump, a prominent characteristic of this species, showed with remarkable clearness, and although the period of observation was limited, details in size, flight, and other points coincided accurately with those made of Green Sandpipers on migration from time to time. On the main sheet of water at Swillington, the same observers had splendid views through $\times 10$ binoculars and a

×60 telescope, of a party of Smew. The two drakes and seven ducks were all in excellent plumage, but care was necessary owing to extreme wariness. The pronounced whiteness of the drakes, with regular black lines dividing the plumage, black bill, and prominent nape patch, left no doubt as to identity. On our arrival the birds were divided, two of the ducks, at a considerable distance, causing some uncertainty because they closely resembled Grebes. This was partly due to their carriage on the water, for when alarmed they straightened necks and sank bodies as some of the Podicipidae will often do; the white patches on the cheeks were also a prominent feature. Fortunately, however, the two birds in question eventually arose in flight and joined the main party and it was then possible to see the chestnut heads surmounting the white cheeks of the ducks as they swam and dived in company with the two males at closer range.—V. S. CRAPNELL.

LONGTAILED DUCK IN HALIFAX DISTRICT.

ON January 20th, a female Longtailed Duck was seen on Ringstone Edge reservoir, at Barkisland, near Halifax, by Messrs. W. Greaves and H. Foster. It remained for several days and was later seen swimming in company with a female Tufted Duck, by Messrs. T. Walden, G. R. Edwards, and V. S. Crapnell. Two female Scaup were seen on this same reservoir, at close quarters, by H. Foster and V. S. Crapnell on January 1st and 3rd.—V.S.C.

SLAVONIAN GREBE.

A SLAVONIAN GREBE visited the East Park, Hull, on February 5th, 1939. The bird was not timid and spent most of the time on the surface. Identified by size, general slaty-grey colouration with white on throat, sides of face, and fore-neck, and the straight bill.—G. AINSWORTH, J. LORD, M.Sc.

GANNET IN HALIFAX AREA

MR. H. WATSON, of Hebden Bridge, reports a Gannet on the top reservoir at Gable in the Parish of Halifax. He states: 'On reaching the top reservoir; I observed a party of nine ducks in the bay on the right-hand side, as I began to make my way up the bank to them, I saw a huge white bird with black wing tips, sweep over the embankment. It was a Gannet, and a wonderful sight.'

BACK VOLUMES OF *THE NATURALIST*

Mr. Riley Fortune, of 8 West Cliffe Terrace, Harrogate, is prepared to receive offers for 21 volumes of *The Naturalist*, bound in half calf, running consecutively from 1883.

THE BRITISH MOSQUITOES

CHRIS. A. CHEETHAM

DR. W. D. LANG'S Handbook which was issued by the British Museum in 1920 has long been sold out and has now been replaced by a volume entitled *The British Mosquitoes* by J. F. Marshall, C.B.E., M.A., F.R.E.S., issued July 23rd, 1938. Some additions to the published Yorkshire list are found in it and are here noted and also the inevitable nomenclature alterations. Mr. Marshall is Director of the British Mosquito Control Institute at Hayling Island, and his interest in Mosquitoes dates from about 1920, when he organised an attempt to control a plague of Mosquitoes at Hayling Island. His success induced him to carry on the research into the control of other species in various localities, and in this way the Control Institute was established. He visited Austwick in 1935 in search of the breeding place of the Mosquito, *Theobaldia alaskaensis* Ludlow, which has its most southerly station here. He was unsuccessful, however, but I am indebted to his memories of this visit for the copy of the volume to which I now refer. The book is one of the comparatively few monographs written in a scientific manner that can be read and understood by a novice in the subject, all terms used in the descriptions being illustrated and explained. The fine coloured plates and many other illustrations in Dr. Lang's book are reproduced with a great number of additions and the life histories, habitats, and British distribution of the various species are given at length. Some interesting additions to our knowledge of the more common species are worth noting: *Culex pipiens* L. has long been considered to be the common biting Mosquito, but in recent years it has often been stated that in houses where this species hibernates in the cellars in great numbers the inhabitants are seldom bitten. Now it is shown that there are two varieties, or, as our author makes them, two species, of this insect: one, a dark-coloured race, which rarely bites human beings and which has been shown by laboratory research to obtain its blood-meals chiefly from birds, while the other light-coloured race readily attacks human beings and is responsible for occasional infestations of houses by biting Mosquitoes. In Yorkshire it was definitely identified from some cottage houses in Hull (Dr. Gebbie, 1935). Mr. Marshall has decided to name this light-coloured, man-biting insect *Culex molestus* Forskal, leaving the darker, man-ignoring insect under *C. pipiens* L.

Another similar case is concerned with *Anopheles maculipennis* Mg., the malaria carrier. This is now known to include several distinct races, and two of the six which have

been described and named are found in Britain; one, var. *atroparvus*, breeds chiefly in brackish, coastal waters; the other, var. *messeæ*, in non-salt inland ones, though there are some exceptional cases. *Messeæ* hibernates 'completely,' living through the winter on her previously accumulated 'fat-body' and is found in cold outhouses, lofts, etc., and rarely bites human beings. *Atroparvus* hibernates only 'incompletely' and takes opportunities for blood-meals during mild spells, they prefer the stuffy atmosphere of dark, ill-ventilated farm buildings and dwelling houses sufficiently out of date to provide similar conditions, and they also frequent buildings to their liking throughout the summer and autumn. This is the insect that carried the malaria, or as it was called 'ague,' of sixty years and more ago in the Fen districts and low-lying coastal areas, the last severe epidemic being recorded in 1859. It is obvious from what has been stated about its habits that modern houses with large windows, little furniture, bare walls and ceilings, and the slow but continuous amelioration of living conditions are responsible for the disappearance of indigenous malaria from England.

Changes of nomenclature include *Anopheles claviger* Mg. for what we have called *A. bifurcatus* L. The genera *Ochlerotatus* and *Finlaya* are now used as subgenera under *Aedes* and *Culicella* a subgenus of *Theobaldia*.

Culex cantans Mg. of Verrall's list is now *Aedes* (*Ochlerotatus*) *annulipes* Mg.

Culex nemorosus Mg. is now *Aedes* (*Ochlerotatus*) *punctor* Kirby.

Ochlerotatus maculatus Mg. (*Waterhousei* Theo.) is now *Aedes* (*Ochlerotatus*) *cantans* Mg. and *Finlaya geniculata* Ol. is now *Aedes* (*Finlaya*) *geniculatus* Ol. This is not shown as occurring in Yorkshire, but it was recorded in *The Naturalist*, 1926, p. 85, from Rawdon Crag Wood. This species is able to 'carry' yellow fever, a disease for long believed to be transmittable exclusively by the non-British species *Aedes Ægypti*.

The Entomologist's Monthly Magazine for January contains 'Contribution to the study of the Palpicornia. II,' by J. Balfour-Browne (figures); 'Coleoptera in a limited area at Oxford,' by J. J. Walker; '*Chrysopilus nubecula* Fallen (Diptera, Rhagionidae), a species new to Britain,' by H. Oldroyd; 'The Mallophaga (Biting lice) recorded from the Pacific Islands,' by G. B. Thompson; 'Notes on British Collembola,' by R. S. Bagnall, and several shorter notes.

The Entomologist's Record for January contains 'Variation in the Wing Markings of the Trypetid Fly, *Euribia* (*Urophora*) *stylata* F.,' by H. W. Andrews (with plate); 'Notes on *Pyrausta nubilalis* Hubn.,' by S. Wakely; 'Ants in the North of Scotland,' by L. H. Weatherill; 'Continuous Breeding. II, *Lasiocampa trifolii* Esp.,' by H. B. D. Kettlewell; several collecting notes and supplements, 'The British Noctuæ and their varieties,' by H. J. Turner, and 'Butterfly Races and Zygænæ of Macedonia,' by R. Verity.

SOME DERBYSHIRE MAYFLIES

JAMES M. BROWN, B.Sc., F.R.E.S.

THE Ephemeroptera or Mayflies represent still another order of insects that seem to have been rather neglected so far as Derbyshire is concerned. Very few references occur in the entomological literature. The list given in the Victoria County History of Derby (1905) contains references to 21 species, of which two are doubtful and require confirmation, and several others are without definite localities. This list, however, refers mainly to insects collected in the neighbourhood of the River Dove in the more southern parts of the country. It includes notices of three species of *Caenis* (*halterata* F., *rivulorum* Eat, and *horaria* L.), a genus of insignificant flies which I have not been fortunate in taking at all in the county.

To supplement the records contained in the Victoria History I include in the present communication my own records, made during the past few seasons. The localities correspond to those given in my previous papers on Derbyshire Stoneflies (*Naturalist*, 1936, p. 62-64) and Derbyshire Caddisflies (*Naturalist*, 1938, pp. 87-92), mainly in the north-east of the county, the region most easily accessible from Sheffield. It includes seven species not contained in the list referred to, but more extended search will no doubt increase this number.

SPECIES AND LOCALITIES

1. *Ephemera danica* Müll.

Monsal Dale, Bradford Dale, 28/5/33; Cordwell, 27/5/35; Bretton Clough, 1/7/36.

A plentiful species about slow-flowing streams, occurring frequently in swarms. The nymphs bury themselves in fine sediment, most often in sluggish waters, but are occasionally found in rapid brooks, as in Bretton Clough.

2. *Leptophlebia marginata* L.

Padley Wood, 13/6/31; Grindleford, 12/5/30; Longshaw Lake, 5/5/37.

The elegant nymph of this species is found in ponds and lakes, but also in the backwaters of streams.

3. *Paraleptophlebia submarginata* Steph.

Monsal Dale, 19/6/32, 29/5/37, 21/5/38; Bradford Dale, 20/5/33; Bakewell, 26/5/36.

The active nymph occurs in rapid streams with stony beds.

4. *Habrophlebia fusca* Curt.

Bradford Dale, 27/7/31; Lathkill Dale, 8/8/32; Dove Dale, 15/7/33.

The nymph is frequent in more sluggish streams than the last, especially streams with much vegetation.

5. *Ephemerella ignita* Poda.
Lathkill Dale, 8/8/33; Baslow, 1/7/32, 12/9/32; Hathersage, 12/7/30, 31/8/36; Monsal Dale, 17/7/32; Bakewell, 1/7/33; Cordwell Valley, 22/7/36, 10/9/38.
A very common and plentiful species, the characteristic and interesting nymph occurring in streams of various type, both rapid and slow-flowing, and is of frequent occurrence.
6. *Baetis bioculatus* L.
Bakewell, 2/9/33.
This species, and the next, appear to be much less common and more local than most of the genus.
7. *B. scambus* Eat.
Bretton Clough, 25/6/30.
8. *B. tenax* Eat.
Padley Wood, 25/9/35; Grindleford, 25/9/34; Alport, 6/6/32; Hathersage, 12/10/34.
This species seems to be one of the forms mostly seen later in the season.
9. *B. rhodani* Pict.
Lathkill Dale, 4/9/32, 31/5/30; Baslow, 5/30; Ashford-in-the-Water, 25/5/33; Bakewell, 26/5/36; Monsal Dale, 25/3/33, 21/5/38; Bradford Dale, 10/8/33; Hathersage, 12/10/34; Bretton Clough, 28/6/34, 29/8/36; Ford, 17/3/38.
This species appears to be the commonest of the genus with us. It occurs both early and late in the year, the late examples being frequently distinctly smaller than the early ones and might be mistaken for a distinct species.
10. *B. pumilus* Burm.
Hathersage, 12/7/30; Monsal Dale, 16/7/32, 25/5/37, 21/5/38; Bakewell, 25/5/33, 2/9/33; Dove Dale, 28/5/37.
Another very common species, and one that frequently flies in swarms during all times of the day.
The nymphs of the different species of *Baetis* are almost impossible to differentiate. They are among the most plentiful inhabitants of the streams, and are most frequent in rapidly flowing ones.
11. *Centroptilum luteolum* Müll.
Bakewell, 25/5/33, 2/9/33; Monsal Dale, 21/5/38; Lathkill Dale, 17/9/32.
12. *C. pennulatum* Eat.
Alport, 16/3/33, Lathkill Dale, 4/9/33; Bradford Dale, 10/10/31.
Nymphs of the species of *Centroptilum* frequently occur with those of *Baetis*, to which they bear a very strong general resemblance, but are readily separated from them by the structure of the palps.
13. *Cloëon dipterum* L.
Bradford Dale, 10/5/33; Cordwell.
The nymphs which at first sight somewhat resemble those of *Siphonurus*, occur plentifully in small pools and backwaters of streams.
14. *Siphonurus lacustris* Eat.
Longshaw Lake, 7/9/31; Padley Wood, 10/8/33, 26/6/35, 31/7/35, 16/9/37. The nymphs occur in ponds, lakes, and in silted backwaters of streams.

15. *Ameletus inopinatus* Eat.
Bradford Dale, 24/5/37. A single example of this rare and local species. The nymphs have been taken on several occasions (*Naturalist*, 1937, pp. 217-218), mostly in cold and usually upland streams.
16. *Rhithrogena semicolorata* Curt.
Bradford Dale, 20/5/33; Dove Dale, 28/5/37; Monsal Dale, 21/5/38; Lathkill Dale, 10/8/32; Bretton Clough, 1/7/36; Cordwell Valley, 27/5/37.
Another common and widely dispersed species. The nymph is a well-known form occurring in rapidly flowing streams having a stony bed.
17. *Heptagenia lateralis* Curt.
Cordwell Valley, 27/5/35.
This appears to be rather local in its distribution.
18. *Ecdyonurus venosus* F.
Bretton Clough, 28/6/30, 1/7/36; Cordwell Valley, 27/5/37; Monsal Dale, 28/5/37; Dove Dale, 28/5/37.
A very plentiful and common species in early summer, the nymphs being very well-known inhabitants of rapid stony streams.
19. *E. longicauda* Steph. (*fluminum* Pict.).
Padley Wood, Bretton Clough, 29/8/36.
Probably as plentiful as the preceding species, but occurring later in the season, and probably being frequently mistaken for it.

LIST OF YORKSHIRE TRICHOPTERA A CORRECTION.

Since publishing a list of the Trichoptera of Yorkshire in *The Naturalist* in 1938, our attention has been called to the inclusion of *Ecnomus tenellus* Ramb. from Hebden (*The Naturalist*, 1938, p. 317). It was pointed out that river conditions there were unsuitable for this species. The name was sent to us in a M.S. list by the late W. G. Bambridge. We knew that many of Bambridge's specimens had been submitted to specialists and assumed that the same had been done in this instance. After exhaustive enquiry we have been unable to trace the specimen or to get confirmation of any kind. In these circumstances we feel that *Ecnomus tenellus* Ramb. should be withdrawn from the Yorkshire list. For similar reasons we wish to withdraw *Cyrnus flavidus* Mel. (p. 317) and *Chimarra marginata* L. (p. 318).

(J.M.B. and H.W.)

REVIEWS AND BOOK NOTICES

Flora of North-east Ireland, by P. A. Stewart and T. H. Corry. Second edition by R. Lloyd Praeger and W. R. Megaw, Belfast. Quota Press, 1938. The flora of the counties of Down, Antrim, and Londonderry was first published fifty years ago. The present volume incorporates the records issued in a supplement published in 1895, together with all additional records made since that date, Dr. R. Lloyd Praeger being responsible for the Phanerograms and Vascular Cryptograms and Mr. W. R. Megaw for the Mosses and Hepatics. The introductory chapters include a historical account of botanical investigation in the counties and a botanical guide to the more interesting coastal, mountain, and

lough areas, treated on the lines of Praeger's *Botanist in Ireland*. The new edition shows an increase of close on 200 species not admitted to the original work, and though the elaboration of critical genera accounts for a large number, many other additions to the flora of the district have been made since the work first appeared. The treatment of critical genera follows that of the latest revisions and one is impressed by the large number of old stations which have been revisited during the past few years and the up-to-date information available throughout the book as to the persistence or otherwise, of the rarer species in old-standing localities. The Flora will be indispensable to all outdoor botanists visiting the area.

Common Objects of the Microscope, by the late Rev. J. G. Wood, pp. xiv+184, with 28 figures in the text, and 14 plates. Routledge, 4/6. Many older readers will be delighted to see yet another edition of this old favourite, which was first published in 1861. In this, the third edition, the work has been extensively revised and re-written by W. J. Ferrier. Although, like its fore-runners, the book is intended for beginners, it is most comprehensive in its scope, and covers all the elementary technique of microscopy, and deals with the principles of the modern instrument, and gives directions for simple photo-micrography. Of the fourteen excellent full-page plates, twelve are in colour.

The Microscope Made Easy, by A. Laurence Wells, pp. viii+182, with 12 plates and 20 line illustrations. Warne, 3/6. This is a most practical and simple introduction to microscopy. The microscope itself is first explained, and then follow straightforward directions for the preparation and mounting of material for examination, interspersed with descriptions of some of the objects which are most likely to appeal to the young beginner. This is just the book to accompany an instrument going into the hands of some one about to take up one of the most fascinating branches of natural history.

Serengati, by Audrey Moore, pp. xvi+266, with 36 illustrations. Country Life, 10/6. In this book Mrs. Moore gives a detailed account of the wild life of one of the great African game reserves, the Serengati National Park in Tanganyika Territory, which has an area of 4,000 square miles. Although it would not be everybody's choice to live in tropical 'wilds' far from pavements and the concomitant theatres, hotels, and all the other joys of civilisation, yet there are evidently compensations, especially for the keen naturalist and lover of animals, in the life of a Game Warden in Africa. Mrs. Moore, who is the wife of a Game Warden, is a great enthusiast and a keen and skilled photographer, and many a stay-at-home will be envious of her pictures of dozens of zebra, ostriches, buffaloes, wildebeest, and in some cases, literally miles of game. Much of the first part of the book is about lions, about which the author writes convincingly, and in five appendices there are notes and lists relating to the flora and fauna to be found in the reservation. The proceeds of the book are to be devoted by the author to improve the water supply of the animals in this great national park.

The Entomologist's Monthly Magazine for February contains 'Notes on British Collembola (with figures),' by R. S. Bagnall; '*Triphleps laevigata* Fieber (Hem Anthocoridae) new to Britain,' by H. Britten, (previously confused with *T. nigra*, from numerous localities); 'New and additional Haliplid records for Eire and some notes on variation in British specimens of *Haliphilus fulvus* F. (Coleopt.), by Rev. E. J. Pearce; 'New myrmecophilous Staphylinidae (Col.) from East Africa,' by M. Cameron; 'Additions to the British Homoptera,' by W. E. China; and several short notices.

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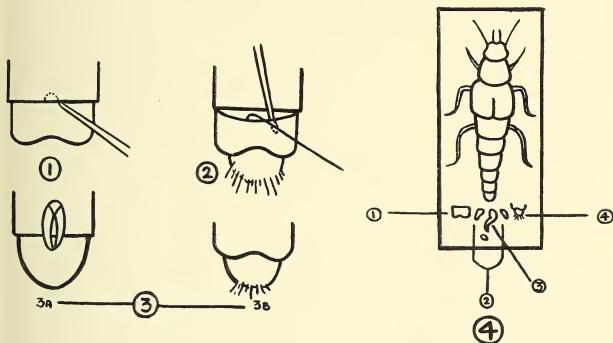
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THE PREPARATION OF SMALL COLEOPTERA AND HOMOPTERA FOR IDENTIFICATION

GEO. B. WALSH, B.Sc.

THE correct identification of many small beetles, especially Staphylinidae, and of many small Homoptera is almost an impossibility unless the antennae are carefully set in the case of beetles, and the insects have the genitalia extracted. The



following notes on this subject may be helpful; they are largely the product of assistance given me some years ago by my friend, Mr. B. S. Williams, and tested by practical experience.

COLEOPTERA

1. KILLING.—The insects are best collected in small clean glass tubes. If they are to be sent away alive, or if they are to be kept until the next day, a dry blade of grass should be put into the tube to prevent desiccation and death. Now have ready a saucepan of water just on the boil. Place the bottom of the tube in this, and agitate it violently for two to five seconds; in this way the insects are killed without opening their wings, and without marring the delicate pubescence in such genera as *Oxyptoda*. Leave the tube in the hot water for the minimum length of time necessary to kill the insects; if they are left there too long, they become dry and brittle. Now put them aside for $\frac{1}{2}$ -1 hour and then mount them.
2. SETTING.—(a.) GUM. Mix thoroughly four parts of powdered gum tragacanth and one part of powdered gum

arabic with sufficient pure methylated spirit to cover them. Then slowly run water into the mixture, stirring all the time, until it takes the consistency of thick cream.

(b.) Smear the card with gum on a brush in the usual way, taking care to use as little as possible, and seeing that none is put in the place where the antennae will be set; gum arabic is said to cause the antennal joints to swell. Set the *Athetæ*, etc., but not the antennae. After setting a dozen, go back to the first.

3. DISSECTING.—For setting needles, use two of the finest needles procurable; these are called beading needles, and are best obtained at a ladies' fancywork shop. These should be mounted in wooden handles. One should be left straight, the other should have not more than 1 mm. of the tip slightly and gently bent in a match flame with the aid of a fine pair of forceps; a greater heat burns the steel away.

Now insert the curved needle between the fifth and sixth dorsal plates with the handle pointing towards the anus (Fig. 1). Put the straight one into the same place after slightly pulling the sixth plate away; the handle of this needle points towards the head (Fig. 2). Then lift or gently tear off the sixth dorsal plate; sometimes the whole of the sixth and seventh segments comes away, but this does not matter as the sixth ventral plate can be replaced or laid on the card as desired. If the sixth dorsal plate comes away, bringing with it the ultimate segment, the aedeagus will be found lying in the sixth ventral segment, when it can easily be taken out. All this is best done under a dissecting microscope, of course, but there is no great difficulty in doing it under a simple lens fitted in a holder, with a more powerful lens to help at the more difficult parts.

If the specimen is a female, the spermatheca (where it exists) *generally* comes out with the sixth dorsal plate and is partially embedded in the seventh segment. These structures should be handled very gently; they are invaluable as determining characters, but are extremely fragile; being tubular they are apt to distort.

Figs. 3a and 3b show the sixth dorsal segment removed; 3a shows the ventral plate with the aedeagus *in situ*; 3b shows the sixth dorsal plate with the last segment attached; these should be separated and placed on the card.

When the aedeagus is extracted, dissect the main lobe from the two accessory lobes, and mount it to show its most characteristic shape, that is, the one which distinguishes it most easily from the corresponding structure in

closely related species. Sometimes this is most clearly seen in profile, and then the aedeagus should be mounted so as to give a lateral view. At times it is advantageous to mount obliquely so as to give a view intermediate between vertical and lateral. Others require mounting to give the vertical aspect. In our experience there can be no hard and fast rule.

After this is done, set the antennae by pulling them out as taut as possible, and fasten them down by means of a little gum under the last joint. A gummed-up antenna is useless for identification.

Fig. 4 shows the finished mount of a fully dissected male, with the ventral plate *in situ*: (1) dorsal plate; (2) side lobes of aedeagus; (3) main lobe of aedeagus; (4) last segment.

The last segment is important in females of the *fungivora* group; it bears a minute vaginal organ (?) in the females of *Britteni*, *debilis*, *deformis*, *subdebilis*, which at once determines the species.

OLD SPECIMENS.—These may be relaxed by placing them in a moist zinc relaxing box for a few hours, but this method is not so easy as dissecting them when fresh.

HOMOPTERA

1. Remove the anal block *i.e.* the last segment bearing the genitalia.
2. Place this in the well of a cavity slide containing a little 10 per cent. solution of caustic potash (or soda).
3. Heat this over a *very small* flame of a bunsen or spirit lamp until bubbles are seen to rise from the anal block. This method prevents the 'kicking' which is so apt to occur with potassium hydroxide, and as the quantity of liquid is so small, the structures are easily found.
4. Remove the slide from the flame and transfer the anal block to another cavity slide containing water.
5. Put this on a piece of white glass on the stage of a dissecting microscope, wash it, and then dissect it and mount as described above.

My thanks are due to my colleague, Mr. H. S. P. Taylor, for preparing the diagrams for publication.

RECORDS

MORE BIRD NOTES FROM SWILLINGTON

FOUR Pintail, two drakes and two ducks, were seen at Swillington on February 19th by H. Foster, G. R. Edwards, and myself. The drakes were easily recognised, even without

the glasses, by the pronounced white stripe down each side of the neck. Later more detailed observation was possible with binoculars and telescope. Swillington generally yields something interesting to the bird watcher, and on this occasion the large number of wild fowl flying and on the water was an impressive sight. There were hundreds of Wigeon, Pochard, and Tufted, together with parties of Mallard and Teal. The small company of Smew previously recorded were still present, although we did not see the full contingent. Brightly attired Shovellers, with their more soberly clad females, were conspicuous amidst the throng by their massive beaks and low heavy carriage. As usual, a Heron occupied the island, and Gulls, Blackheaded and Herring, added variety to the animated scene. Out in the centre were two Great Crested Grebes, and Dabchicks bobbed continually under the surface until one was never sure which was up and which down. Redshanks called from the water's edge, and Lapwings flickered black and white in a setting sun. Sedate Coots, and Waterhens here and there, completed a picture unique surely for number and variety of water birds in an industrial area so near a city the size of Leeds. As dusk fell the already large assemblage was constantly increased by those flying in to feed and roost, and for a short space, as silence was disturbed by gunshot, the air seemed literally full of whistling pinions and a medley of cries as the birds rose *en masse* in alarm.—V. S. CRAPNELL.

BANKS' OAR FISH

A FINE specimen of Banks' Oar Fish, seven feet in length, was landed in Hull on March 9th, having been caught off the coast of Iceland. It was exhibited in the shop of Messrs. Gee, Fish Merchant, West Street, Hull.—T.S.

THE LATE ROBERT KIDSTON'S COLLECTION OF FOSSIL PLANTS

OUR readers will remember that the late Robert Kidston, an authority on Coal Measure Plants, was a contributor to our journal, and also edited the publications on the Yorkshire Carboniferous Flora issued as *Transactions of the Yorkshire Naturalists' Union*. An account of his life and work appeared in *The Naturalist* for 1924. His collection of fossil plants, numbering 7,000, and including many type and figured specimens, has been acquired by the Geological Survey, as well as 4,000 negatives of similar fossils which he gathered during his researches. Three thousand of his microscope slides and his library are in the University of Glasgow. The H.M. Stationery Office has just issued a pamphlet (34 pp. price 9d. net) dealing with this collection, with a fine portrait of Kidston, an account of his life and work, and a record of hundreds of his papers between 1880 and 1926.—T.S.

A LONG TERM EXPERIMENT ON THE RADIAL GROWTH OF THE OAK

H. KNOWLSON, PH.D.

As long ago as 1862, Thomas Hartig (1) showed that the cambial activity in woody plants, which is responsible for their girth increase, commences in association with the outgrowth of the buds and spreads from these points down the tree. This observation has been confirmed by Professor Priestley (2) and his co-workers from the University of Leeds; the spread of activity has been followed from the buds, down the branches and trunk, and on to the proximal regions of the root system, and vessels in the new wood have also been followed, by injection experiments, and found to run from the wood of the trunk on to the root. When, however, the wave of activity extends from the trunk on to the root, within a comparatively short distance it shows a rapid falling off in vigour, and the main roots are replaced by numerous more slender branches; sometimes a few roots may be present which, though many yards long, are only of pencil thickness. These more distal parts of the root system may continue to show cambial activity throughout the year, with little relation to the periodic activity of the shoot system above ground, and consequently little suggestion of annual rings.

From such observations it seems clear that the rhythmic impulses to cambial activity spreading down the trunk receive a check as they pass on to the root system below ground. Just above the soil level, the annual rings of the trunk wood are often especially wide, which may be connected with a buttressing effect, due perhaps to a "piling up" of cambial activity in this region owing to the check to its further downward spread. Experiments to test the effect of the surrounding soil on cambial activity have been carried out by fixing boxes, filled with soil, around certain regions of the trunks of trees,

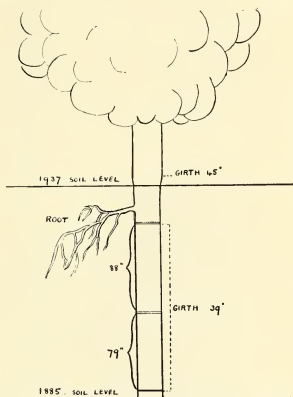


Fig. 1.

Diagram of tree A, showing the positions of the 1885 and 1937 soil levels, and of three sections examined.

or by fixing boxes, filled with soil, around the basal four feet of the trunk. In experiments of the second type, an effect was obtained in sycamore, where a buttressing effect was evident at the top of the soil box, while at a lower level wood corresponding with the outer part of the ring in upper regions was not developed. In spruce, though the wood did not decrease in amount, at lower levels the type of wood produced in the outer part of the ring was less like the normal outer wood, and, in fact, differed little from the wood of the inner part of the annual ring. These observations showed that the earthing-up of the basal trunk portions was having an effect, especially upon the outer part of the annual ring, but at the same time it was fully realised that such methods were somewhat inadequate, since the depth of soil was not great, the soil layer around the trunk was shallow, and the soil as a whole would tend to dry much more rapidly than the ground around roots, and the experiment had not been in operation for more than about two years.

In the autumn of 1937, a beautiful case of what might be regarded as a long-term experiment of this kind, upon an adequate scale, came under notice. During operations many years ago in a large stone quarry situated some four miles north of Leeds, the waste material, consisting of sandy soil and sandstone boulders, was dumped in a part of the oak wood, known as Clayton Woods, and the trunks of six oak trees (*Quercus sessiliflora* Salisb.) were buried to a depth of about 20 feet. During the autumn of 1937 this waste material was being removed; the trees were not disturbed and the trunks were again exposed down to the original ground level. Enquiries elicited the fact that the dumping had taken place during the lifetime of some of the local inhabitants, who placed the date at about 1885, so that the trunks had been earthed-up in this way to a depth of about 20 feet for some fifty-two years.

Two of these trees were of particular interest. Tree A, as shown in fig. 2, had developed a large root system some 15 feet above the original 1885 ground level, while above this, at the new soil level, the girth of the trunk showed a marked increase, as seen in fig. 3; Tree B also showed the increase in girth at the new soil level; in this case, large boulders had become deeply embedded in the trunk and were so firmly held that they were almost impossible to remove from the wood, even with a pick, fig. 4.

These earthed-up trees had evidently been growing in a normal manner, as comparison with neighbouring, but not earthed-up, trees showed that the extension growth for the last few years had been similar in both cases and leaf-fall in the autumn of 1937 occurred at the same time. In November.

1937, these specimens were brought to the University for examination. On the felled trees the girth could be measured, when it was shown that from the 1885 soil level to the new soil level the girth of the tree A was 39 inches, while at the



Photo by]

Fig. 2.

[A. C. S. Wright

Tree A, to show the root system developed from the trunk, 15 feet above the 1885 soil level.

1937 soil level the girth increased, with a typical buttress effect, to 45 inches.

To examine the type of radial growth during the earthed-up period, sections $2\frac{1}{2}$ to 3 inches in thickness were cut across the trunk of tree A with the aid of a cross-cut saw, a lower section just above the 1885 soil level, a middle section 79 inches up the trunk and about half way up to the crop of roots, and an upper section 88 inches higher and just below the roots, as shown on the diagram in fig. 1. These sections were planed on both faces with a steel smoothing plane for general

observation and from these, samples for other methods of examination were taken as required.

It was naturally to be expected that the most marked effect of the earthing-up would be in the lowermost section. In this, three regions were to be distinguished :

(a.) An inner region with the normal appearance of the trunk wood of oak. The annual rings were clearly distinguishable and ranged from 1.5 to 3 mm. in width ; the inner part of each ring, the early wood, was occupied by the characteristic large vessels forming the pore zone, and this region was 0.5 mm. thick in each ring. The vessel cavities appeared to be blocked, probably by thyloses. This was followed by the late wood of close texture.

(b.) An intermediate region consisting of three annual rings, with widths of 2.0, 3.5 and 3.0 mm. respectively. Besides their greater width, the rings of this region also differed from those of the inner region in that the vessels were wider and not blocked, and in the greater number of vessels per ring, giving a pore zone of 1 mm. in width.

(c.) In the wide outer region the annual rings were very indistinct, as the characteristic pore zones and fibre zones could not be distinguished. The vessels were smaller than those of the intermediate region and were not blocked by thyloses. This region was about 21 mm. in width, a space which would represent about 10 rings of the normal inner region, although this portion in the outer region probably represents about 50 rings.

When a sample was chiselled out from this section, the piece split into three parts, which roughly corresponded with the three regions described. Transverse and longitudinal sections were cut of the inner and outer regions and material was also macerated in chromic acid.

In the sections of the normal wood from the inner region, the bands of thick-walled fibres of the late wood were conspicuous, but these were completely lacking from the sections of the outer region and only very few fibres could be seen in the macerated material. In the outer abnormal wood, the vessels were distributed among wood parenchyma cells containing large starch grains.

From the sections it was possible to determine more exactly the diameter of the vessels in the three regions for comparison. The figures represent the diameter in μ of the largest vessel seen in successive rings :

Inner region, 225, 337, 300, 337, 286, 187, 375, 337.

Intermediate region, 315, 375, 375.

Outer region, 150, 240.

These data confirm the preliminary observation that the vessels of the intermediate region are somewhat larger than

the normal, and those of the outer region smaller. Similar comparisons of vessel size in the intermediate section and in the section from below the roots show the same occurrence of smaller vessels in the outer region. At the upper level the largest vessel in the normal inner rings was 300μ in diameter and in the outer wood also the diameters tended to be slightly

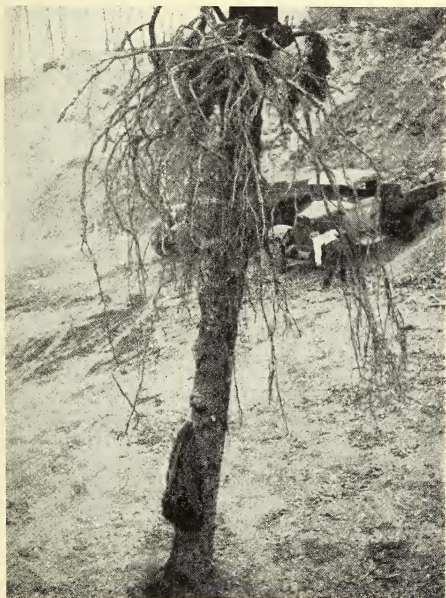


Photo by]

Fig. 3.

[A. C. S. Wright

Tree A, showing the root system, and the increase in girth of the trunk at the new soil level, just visible above the root system.

smaller than at the low level. For comparison with these data, the diameters of ten vessels from a pencil root were measured, when the maximum vessel diameter was found to be 136μ and the minimum 85.5μ , considerably less than in the trunk, even in the outer region.

In order to determine the relative areas occupied by vessels in the different regions, representative areas of the sections of normal trunk wood, wood from the outer region of the lower block, and of a pencil root were projected on to a sheet of

graph paper; the vessels were outlined and the area occupied by vessels was then estimated by counting the squares. From these determinations it was concluded that, while the vessel size is very different in the three types of oak wood, the relative area occupied by vessels is much the same in each case.

A comparison of fibre length was also made from macerated material, and the maximum length recorded in the different regions proved to be: top section (inner wood), 1.54 mm.; top section (outer wood), 1.14 mm.; lowest section (outer wood), fibres very scarce, 0.735 mm.; pencil root, 0.825 mm.

The marked differences in the outer wood from the lower section may thus be summed up. Within 16 mm. of the cambium, the annual rings are not possible to recognise. At a distance of 13 mm. in from the cambium, there is a sharp line, inside which the characteristic bands of fibres are seen, but outside which practically no fibres are present. At this line of sudden fibre disappearance, an enormous number of new rays appear. These differences are associated with reduction of vessel diameter and of fibre length.

When the sections of wood removed for examination had been planed, the annual rings of normal type could be counted, with the result that in the lowest section 63 were present, in the intermediate 62, and in the uppermost section 75; outside this is present a band of abnormal wood in which estimates of annual rings are of doubtful value and, indeed, in the two lower sections, quite impossible.

It is in any case clear from the figures that the effect of burial in soil has developed progressively, showing itself first at the lowest level. If it appeared at the same time in the intermediate section, this section is 79 inches higher in the trunk, a distance which, from height and increment figures, would correspond at least to 9 years of growth. If at the base, therefore, the abnormal wood appeared in the 64th year, at this level it should have appeared in the 55th year, but actually appears in the 63rd, at a level 172 inches above the base it should have appeared in the $64-18=46$ th ring, it actually appears in the 75th ring.

No safe conclusion can be drawn from these data as to the age of the tree, or the length of time the abnormal condition took to affect the radial growth at the base of the trunk. It would seem probable, however, that the three outermost distinct rings in the lowest section, with wider pore zone and less characteristic late wood, represent a first phase of response to burial and that this response occurred immediately. In that case the base of the trunk was 60 years old at the time of burial and the indistinct outer zone represents some 49 years' radial growth. If this estimate is correct then at the top section, which should be some 18 years younger at the time of burial,

60—18=42 normal rings had been formed on burial and the effect of the soil is not marked until 75—42=33 years had passed. In view of these observations, the small effect pro-



Photo by

Fig. 4.

[A. C. S. Wright

Tree B, to show the sandstone boulders firmly embedded in the part of the trunk which has been buried.

duced in the short term experiments previously described does not seem surprising.

The detailed structural changes produced are all significantly in the direction of the production of a type of wood characteristic of roots; with a sharp reduction in the amount of radial growth is associated a replacement of thick-walled and fibrous elements, particularly by thin-walled starch-containing parenchyma. The absence of thyloses in the vessels is also a very characteristic feature of root anatomy.

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1. Hartig, Th. *Bot. Zeit.*, 2, 1862.
2. Priestley, J. H. *Forestry*, 9, 1935, 84-95.

REVIEWS AND BOOK NOTICES

Alpine Flowers, from water colours by **Paul A. Robert**. Introduction by Prof. Carl Schroeter; 36 colour plates. Batsford, 10/-. This is a special volume in Messrs. Batsford's series on 'Art and Nature in Colour,' and contains some of the finest colour printing we have ever seen. The artist must have experienced some difficulty in making his selection of plants to depict, but no one will quarrel with his choice. All the well-known favourites are here and the drawings are exquisite. Each plate is so printed as to give the impression of a water colour sketch attached to a grey mount, considerable detail is given, and a charming pictorial effect has been obtained in every case. Professor Schroeter's introduction although short, supplies a most useful and informative account of the flora of the Alps in its relation to climate, soil, etc., and he also writes special notes on each plate.

[We note with deep regret, that Professor Schroeter, whose works on Alpine flora are known all over the world, died on February 7th, in his 84th year.]

Robert Bell, Geologist. A biographical sketch by **J. A. S. Stendall**, pp. 100. Quota Press, Belfast, 3/6. This is the life story of a remarkable man. Robert Bell, who died in 1934 at the age of 69, was a riveter in the shipyard of Messrs. Harland and Wolff of Belfast. He worked long hours, especially in his youth, and yet, in spite of all, he became a competent naturalist and a distinguished geologist. Natural history societies entirely justify their existence when they can turn out men like Robert Bell. The memoir is ably written, and the author's remarks are supplemented with appreciations from his Belfast colleagues.

An Introduction to the Vertebrates, by **L. A. Adams**, pp. viii + 479 with 327 figures in the text. John Wiley and Sons, and Chapman & Hall, 17/6. This work, now in its second edition, forms a very comprehensive introduction to an important section of biology, and the author follows a very clearly defined and easily comprehended plan. The first two chapters are devoted to an introduction and to classification, and then follows part 2 dealing with a comparative analysis of anatomical systems and specialised structures, and lastly part 3 which elaborates a general view of each of the five classes of vertebrates, with particular reference to those representatives normally used in the laboratory. The author is Associate Professor of Zoology in the University of Illinois, and his book follows his own methods of presentation. It is readable, copiously illustrated, and covers the subject in a very adequate manner. There is a good bibliography, followed by 25 pages devoted to a valuable glossary.

Textbook of General Zoology by **W. C. Curtis** and **M. J. Guthrie**, pp. xviii + 682 with 486 figures in the text. John Wiley and Sons, and Chapman & Hall, 18/6. Professors Winterton C. Curtis and Mary J. Guthrie brought out the first edition of this work in 1927, and that it is now in its third edition is a tribute to its well-deserved popularity. The work follows closely the course of study in General Zoology in the University of Missouri, and in the present edition the authors have brought their work well up to date. The 18 chapters are developed on conventional and generally approved lines, and are so readable and so extremely well illustrated that the work can safely be recommended both to the college student and to the amateur naturalist who seeks the essential groundwork of Zoological science. It is a great convenience to have such a comprehensive survey in one volume. There is a good glossary.

STATISTICS OF PETERHEAD WHALING FLEET

R. W. GRAY

GREENLAND WHALES (*Balaena mysticetus*) yield oil in proportion to their size, a '12-foot fish' yielding about 20 tons and a '6-foot' one only about a quarter of that amount.

The statistics of the Peterhead Whaling Fleet clearly show that the young whales—the future fathers and mothers of the species—suffered more in some seasons than in others. At 'Greenland' (*i.e.* the Greenland Sea) they suffered most in 'close' seasons and least in 'open' ones. For instance, in 1807—a 'close' season, according to Scoresby—the *Enterprise* caught 34 whales which yielded only 172 (old) tons¹; whereas in 1803—an 'open' one—the *Hope* caught 7 which yielded as much as 84 tons. Again in 1811—another 'close' season—the four Peterhead ships, at the fishing, caught 112 whales which yielded only 752 tons, whereas in 1813, another 'open' season, the 60 caught by the Peterhead ships yielded 722 tons, being almost as much.

Why were so many young whales killed in 'close' seasons? The answer appears to be as follows: firstly, because their migrations being interfered with by the unusual state of the ice they remained longer on the 'ground'²; secondly, because the barrier of light ice in latitude 76°, characteristic of a 'close' season, acted like a breakwater and hindered the swell of the ocean from reaching and breaking the 'floes' north of latitude 78°. The young whales frequent the vicinity of the 'floes' and in 'close' seasons ships which succeeded in getting far enough north always caught a number of them. On one occasion the *John*, of Greenock, is stated to have killed 22 at a 'fall' (*i.e.* at a single lowering of the boats) and in 1838, in the same limited interval, the *Eclipse*, my grandfather's ship, is said to have caught 15. In 'open' seasons on the other hand owing to the extent of open water and frequency of swell much of the heavy or 'whaling' ice was in the broken condition termed 'pack' and the young whales usually had a formidable and often impenetrable barrier between them and their human enemies.

In 1814, as stated in my 'Peterhead Sealers and Whalers'³ many small or half-grown whales were killed and much harm done to the species and the fishery. The Peterhead ships alone accounted for 160 which yielded only 1,390 tons, the

¹ The old ton only weighed about 17½ cwts; the imperial ton did not come into use until about 1830 or later.

² The best 'ground' was in about latitude 78° 40' longitude, about 1° or 2° West. In June, Greenland whales were often seen in or about this situation.

³ *Scottish Naturalist*, 1932-33.

Resolution, the best fished ship, having 44 which yielded only 299 tons. 1814 was an unusual season. According to Scoresby it was at first 'open' but in May a quantity of ice drifted east which doubtless sheltered the ice and the ships farther north.

At 'Greenland' the capture of the young whales does not appear to have commenced until about 1790 and to have coincided with the time when, according to Scoresby, 'two or three of the captains of the whale-fishing ships, men of abilities, commenced a system of activity and perseverance which was followed by the most brilliant results. Instead of being contented with two or three large fish and (instead of) considering five or six a large number, they set the example of doubling and trebling the latter quantity and were only contented to relax their exertions when their ships could contain no more.' Unfortunately this increased success was gained mainly at the expense of the young whales and it was mainly achieved by forcing a way north in 'close' seasons instead of remaining in latitude 76° and catching a few large fish.

At Davis Straits the young whales suffered most when in whaling language there was a 'land-floe across,' in other words, when the land-floe of the west side of Baffin's Bay was continuous across the mouths of Pond's Bay¹ and Lancaster Sound.² 1823, 1832 and 1833 appear to have been seasons of this sort; at any rate they were disastrous years for the whales. In 1823 the Peterhead ships killed 190 which only yielded 1,523 tons, the *Dexterity* heading the list with 35 yielding only 214 tons; in 1832 they killed 140 which yielded only 1,012 tons, the *Traveller* heading the list with 38 yielding only 273 tons and in 1833 they killed 186 which yielded only 1,404 tons, the *Perseverance* and *Superior* each having 29, the combined yield of which amounted to only 377 tons.

Another disastrous year for the Davis Straits whales was 1845. There was a 'land-floe' across. Referring to this season Sutherland³ says:

'Pond's Bay is one of the chief resorts of the common or black whale. . . Here they are met with in thousands, in June and July, lying quietly at the edge of the ice which is then attached to the land and is about 15 miles in breadth. I have seen the horizon to seaward a perfect forest of jets of vapour (not water) which escaped from the capacious lungs

¹ Pond's 'Bay' is really an inlet leading to Eclipse Sound.

² C.f., a reference to the migrations of the Davis Strait's whales in my 'Whale-fisheries' in 9th Edition of the *Encyclopædia Britannica*, Vol. XXIV, p. 527.

³ Sutherland, P. C. *Voyage to Baffin's Bay and Barrow Strait in 1850-51*, London, 1852.

of these huge creatures and was rendered visible in a ten-fold degree by the bright sun in the northern sky beyond. In less than an hour the sea around us was literally swarming with them, and they could be seen in threes and fours at the edge of the ice where they appeared to be in perfect safety. With enough men and material 50 ships might be filled without appearing to miss them. This was in 1845, than which there has not been a better season for whaling since Davis Strait became a whaling resort.' In 1845 the Peterhead ship, *Joseph Green*, killed 40 whales which yielded but 185 tons. How many of the *Joseph's* whales were either 'suckers' or young whales with very short whale-bone, the statistics unfortunately do not state.

1884, 1889 and 1893 were other seasons in which there was a 'land-floe across.' In 1884, according to Lindsay,¹ the Dundee ships killed 79 whales yielding only 566 tons. In 1889, according to Learmonth,² Lancaster Sound was blocked by 'an impenetrable barrier of ice in long. 81° 40' W." In July, mother whales and calves were seen, and the *Maud*, Learmonth's ship, killed two of the former, which yielded about 34 tons of oil and the same number of cwts. of whale-bone. The calves escaped, perhaps to die. In 1893, Southwell³ says: 'The *Aurora*, one of the Dundee ships, was very fortunate in crossing Melville Bay and found the ice in Lancaster Sound in *good condition*. Her captain lost his first whale on June 26th, but next day killed two old females and their two "suckers." Again on July 2nd he lost a whale but on the following day killed a third female and "sucker" and on the 9th, 10th, 11th and 12th killed a whale each day; one of these was accompanied by a "sucker" which escaped but was subsequently killed by the *Eagle*.'

Why were so many young killed in seasons in which there was a 'land-floe across'? The answer is simple enough—the young whales and the breeding females migrate west through Lancaster Sound and when this channel is frozen across they cannot proceed farther west until the ice breaks. In seasons of this sort ships which got through Melville Bay in time had only to 'hook-on' to the land-floe and wait for the whales to appear. In 1823, doubtless in these circumstances, the crew of the *Dexterity* already mentioned are stated to have killed 20 and flensed 18 at a 'fall.'

¹ Lindsay, D. M. *A Voyage to the Arctic in the Whaler 'Aurora,'* Boston, 1911.

² Livingstone-Learmonth, W. MS. account of whaling voyage to Davis Strait in 1889. The MS. is in the Zoological Library of the Natural History Museum, Cromwell Road.

³ Gray, D. 'Habits of the Greenland Whalebone Whale,' *Scottish Fishery Board's Seventh Annual Report*, Part 3.

At Davis Straits the capture of young whales did not commence until about 1820 when the whaling ships first began by a north-about route to turn the 'middle ice' and reach Lancaster Sound and Pond's Bay. Before 1820 they appear to have entirely escaped.

The capture of the young whales and the breeding females was of course a great mistake and both at 'Greenland' and Davis Straits was soon followed by disastrous results. My father¹ says: 'The scarcity of whales now (*i.e.* about 50 years ago) is not so much owing to the number killed in Greenland and Davis Strait, although there, no doubt, has been a vast number killed from first to last. It is more owing to the way in which the early (nineteenth century) whalers conducted their business in killing off the young whales before they were able to reproduce. In this way a large proportion of the mature whales died out and there were no young ones left to grow up and take their place.'

Both at 'Greenland' and Davis Straits the destruction of the young whales and breeding females might have been prevented by obliging the whalers to confine themselves to the lower latitudes and forbidding them to sail too far north. Had this been done the fishery might have been greatly prolonged and an interesting and valuable cetacean preserved.

The Physiology of Plants, by William Seifriz. Chapman & Hall, 17/6. This book may be said to fall into an intermediate category between an elementary and an advanced treatment of plant physiology. The range of subjects dealt with is so wide as to include something about all branches of plant physiology. Thus chapters are included on Reproduction and Plant Associations, the latter a rather misleading title covering Epiphytes, parasites, symbiosis, mycorrhiza, insectivorous plants and pollination. As the book is of moderate dimensions it follows that the treatment of the topics is brief and no encyclopædic assemblage of facts or critical evaluation of experimental data is attempted. The method of treatment of the subject matter follows the author's viewpoint that 'too often the student is left with facts alone and given no encouragement to think about them. Theory supported by facts is more likely to arouse a lasting interest in the subject than facts alone.' The book is clearly written and is well illustrated. It can be recommended to students as a very readable account of the principles and problems of plant physiology.

NEWS FROM THE MAGAZINES

The Entomologist for March contains 'Contribution to the life history of *Perizoma taeniata* (Stph.),' by F. Littlewood; 'An entomological trip to Shetland, July, 1938,' by C. G. M. de Worms; 'Changes in the generic names of some British moths,' by W. H. T. Tams; 'Stragglers in the Mallophaga,' by G. H. E. Hopkins; 'Two new butterflies from the Andaman Islands,' by Major-Gen. Sir H. Tytler; and several shorter notes and observations.

¹ Southwell, T. 'Notes on the Seal and Whale Fisheries of 1893.' *Zoologist*, 1894.

THE GERMAN NATURE PROTECTION LAWS

B. D. W. MORLEY, F.R.E.S., F.R.H.S., etc.

RECENTLY there have come into my possession, copies of the recent German Nature Protection Laws. These laws are three in number, the first two providing for the setting-up and the execution of the necessary offices, together with certain provisions for the protection of natural monuments and their surroundings, the preservation of rare and beautiful portions of the country, the preservation of land for scientific research, forestry, and the chase, and the formation of Nature reserves.

The third law, or ordinance, is that which is the most interesting, being almost unique owing to its detailed nature. This law, decreed on March 18th, 1936 (the other laws were passed on June 26th, 1935, and October 31st, 1935, respectively), is divided into three sections—*Section 1*, the Protection of Wild Growing plants—General prescriptions for their Protection; *Section 2*, the Protection of Non-Game Wild Birds—General Provisions for their Protection; *Section 3*, The Protection of the Other Non-Game Wild Animals.

The first paragraph of the first section is sweeping, being as follows :

‘It is forbidden to make any improper or inappropriate use of growing plants or to destroy their growths. To such improper practises belong any obviously unnecessarily large removals of flowers and ferns; any mischievous and causeless striking down (with canes or sticks) of shrubs and plants on the banks of streams and lakes; the unauthorised burning of the sod, etc., etc., even if thereby, in individual cases, no economic damage is caused.’

How we long for such a law in England. The remainder of the paragraph excepts weeds and vermin-infested lands from this decree.

The next paragraph of interest is paragraph 4, which contains a list of wild plants which, ‘it is forbidden (without prejudice to the prescription 1, item 2, of this ordinance) to damage or to remove them from their place of growth.

The list is as follows :

1. *Struthiopteris germanica* Willd.
2. *Scolopendrium vulgare* Smith.
3. *Osmunda regalis* L.
4. *Stipa pennata* L.
5. *Lilium martagon* L.
6. *Fritillaria meleagris* L.
7. *Narcissus pseudonarcissus* L.
8. ORCHIDACEAE (4 genera and four varieties listed).
9. *Dianthus caesius* Smith.

10. *Anemone narcissiflora* L. (*A. sulphurea* L.), *A. alpina* L., and *A. silvestris* L.
13. *Aquilegia*, all domestic varieties.
14. *Pulsatilla*, all domestic varieties.
15. *Adonis vernalis* L.
16. *Nymphaea alba* L.
17. *Dictamnus albus* L.
18. *Daphne*, all domestic varieties.
19. *Eryngium maritimum* L.
20. *Cyclamen europaeum* L.
21. *Primula auricula* L.
22. *Digitalis ambigua* Murr. (*Digitalis lutea* L.).
23. GENTIANA (5 varieties listed).
24. *Leontopodium alpinum* L.

Also, all domestic varieties of *Scilla*, *Muscari*, *Gladiolus*, and *Primula*, are partially protected (para. 5), as are the rosetted varieties of *Saxifraga*. Although protected, these plants can be collected if permission and a permit are obtained from the local police or forestry department. There are, however, many plants which are not allowed to be collected for sale or industrial purposes (para. 9). This list includes species of *Juniperus*, *Scilla* (all domestic varieties) *Lycopodium* (all domestic varieties), *Iris* (all domestic varieties), *Gymadenia* (all domestic varieties), *Orchis* (all domestic varieties), *Trollius*, *Aconitum* (all domestic varieties) *Rhododendron*, and *Arnica*. Finally this section concludes (paras. 10 and 11), with instructions concerning the protection of 'Schmuckreisig' which is defined as follows: 'small trees, shrubs, and bundles of branches which are suitable for use as decoration for interiors of all kinds, for buildings, streets, squares, or vehicles, in garlands (festoons), in the manufacture of wreaths, or for the purpose of protecting or covering plants in winter, as, for example, Christmas trees, green branches at Whitsuntide, branches of coniferae, deciduous trees and shrubs, in particular willows, hazel, aspen, alder and birch branches, branches of rock pear, etc., etc.'

The second section, which deals with non-game wild birds, protects all domestic non-game birds except *Corvus cornix* L., *C. corone* L., *C. frugilegus* L., *Garrulus glandarius* L., *Pica pica* L., *Passer montanus* L., and *P. domesticus* L., and also forbids the manufacture, stocking, sale, transporting, or turning over to third persons, or the acquisition of bird lime, limed sticks, nooses for bird catching, or other apparatus for catching birds, which neither catch the birds uninjured nor kill them. On the whole, the prohibitions and instructions contained in this section are more or less what one would expect, bearing in mind the nature of the law. The thoroughness of the measures is extraordinary, and the list of the

methods in which the non-protected birds may *not* be killed has to be seen to be believed, though I cannot understand why they do not say straight off that they must be shot, for as far as I can see that is what it works out to. Birds nests are protected in many ways by this law, the most interesting being the forbidding of the grubbing out of hedges, the burning of meadows or unutilised land, and the removal of growths of reeds between mid-March and the end of September. Another interesting measure protecting birds, deals with stray cats: 'The proprietors of land, the lessees of the same, or their delegates are permitted to capture cats, uninjured, and to take charge of them under the following conditions: From March 15th till August 15th, and as long as there is snow on the ground, when the animals are caught in gardens, orchards, cemeteries, parks, and similar places. Cats which have been taken in charge must be well treated.' The paragraph goes on to say: 'The capture of a cat must be reported to the police, and if the owner of the animal is known, to him also, within 24 hours. If the owner of the cat does not call for it within three more days and pay a mark a day for the care of the animal, the captured cat may be delivered to the police, who will proceed to kill the animal at the cost of the owner; a previous note to the owner is not necessary' Thus the cats concerned are not real strays and one's best Persian pussy is liable, one gathers, to be chased and put in prison if she strays far from home, and to complete the irony of the situation one receives a little bill of three marks for her removal! All of which may be beneficial for the birds but it does not sound quite like 'Nature Protection' to me.

This section is completed by instructions concerning the capture and keeping of cage birds. These measures are for the most part instructions concerning the various species which may be caught, and the time of year at which they must be caught. Also every one keeping cage birds has to satisfy the police that they possess the required knowledge of Ornithology, and of the regulations concerned before they are allowed to have a certificate permitting them to capture and keep these pets.

Another paragraph deals with the registration of scientific specimens, etc.

The third section is the most original, and I think, the most important, for while most people do not kill beneficial birds, many kill beneficial insects, and four insects are protected under this section. These are: *Papilio poladivius* L., *Parnassius* (types), *Lucanus cervus* L., and lastly the ant *Formica rufa* L. Of these four insects the ant *Formica rufa* L., is undoubtedly the most beneficial, and, indeed, it is one of the animals most beneficial to man which exists (I have

written a note on this elsewhere), though the preservation of the Stag beetle, the fine Swallow Tail butterfly, and the closely related *Parnassius* is a good measure.

Further measures practically abolish the Butterfly industry.

Other animals protected include such insectivorous reptiles and amphibians as turtles, snakes, frogs, toads, and salamanders, while Shrew Mice (except the Water Shrew), the common hedgehog, and a few other mammals are included in the list, though some of these animals are allowed to be kept as pets. The ordinance concludes with various humanitarian instructions, and regulations, and finally with a paragraph which, in effect, says that all these regulations can be waived for purposes of scientific experiment and study.

NEWS FROM THE MAGAZINES

In *British Birds* for March, the history of Irish Gannett colonies is traced by James Fisher, and their 1938 status described by S. Marchant. 'Recoveries of Marked Birds' (Miss E. P. Leach), includes the following Yorkshire records :

JACKDAW (*Corvus m. spermologus*), ringed as nestlings by C. Wontner Smith at Shipley, on 24/5/36, recovered where ringed, 29/5/38 ; on 28/5/36, recovered where ringed 18/1/38 ; on 31/3/37, recovered where ringed, 18/1/38.

TAWNY OWL (*strix a. sylvatica*), at Shipley by the same ringer on 22/4/37, recovered where ringed, 3/4/38.

MERLIN (*Falco a. aesalon*), ringed as nestlings by Sedbergh School, —at Sedbergh, 27/6/38, recovered at Brough, 25/8/38 ; at Dent, 2/7/38, recovered at Warrington, Lancs., 3/12/38 ; at Dent, 2/7/38, recovered at Dax (Landes), France, 20/10/38 ; at Sedbergh, 30/6/38, recovered at Bridgnorth, Salop, 10/12/38. R. M. Garnett, at Goathland, 20/6/38, recovered at Durham, 30/7/38.

SPARROWHAWK (*Accipiter n. nisus*), ringed by T. Kerr, at Grassington, 27/6/37, recovered at Kirkby Malham, 19/1/39.

An account of the Swallow census made in 1938, in the Sedbergh district by T. W. I. Cleashy and R. K. Martin, over an area of some 8 square miles, shows 71 breeding pairs, and that choice of building for nesting quarters is mainly governed by freedom of ingress, and accessibility of rafters.

The Entomologist's Monthly Magazine for March contains 'Additions to the British Homoptera' (with figures), by W. E. China (*Dicranotropis divergens* Kbm. Perthshire. *Psammotettix nodosus* Rib. widely distributed in England, *Typhlocyba scalaris* Rib. Alderley Edge, Cheshire, on oak, and Sleights, Yorks, H. Britten. *T. cruciata* Rib. Winchester and Somerset on sloe and elm. *T. froggatti* Baker, widely distributed in Britain) ; 'Notes on British Collembola,' by R. S. Bagnall, (*Folsomia litsleri* Bagn. Gibside, Durham and Boynton Woods, East Yorks. *F. diplophthalma* Axels, Boynton Woods. *F. similis* Bagn. Bridlington, Yorks. *F. penicula* Bagn. widely distributed in Britain. *F. manobechei* Bagn. Ryhope Dene, Durham, Danes Dyke, Yorks. *F. achaeta* Bagn. Low Fell, Durham). "The gall making Hymenoptera of some of the western islands of Scotland," by J. W. H. Harrison ; 'In memoriam. James John Walker,' by E. B. Poulton ; The Mallophaga (Biting Lice) recorded from the Pacific Islands,' by G. B. Thompson ; and three short notes.

THE 1938 FUNGUS FORAY AT HOVINGHAM

JOHN GRAINGER, WILLIS G. BRAMLEY AND JENNIE GRAINGER

THE Annual Foray of the Mycological Committee of the Union took place at Hovingham from September 2nd to 6th, 1938. On Saturday evening, September 3rd, the Annual Meeting of the Committee was held at the Worsley Arms Hotel, when Mr. W. G. Bramley delivered his Chairman's Address on 'Myxomycetes.' He described the life histories of typical species, and outlined the difficulties of various methods for spore culture. Mr. T. Petch sent two papers, on 'Pure Cultures' and 'Xylaria,' and in his unfortunate absence through illness these were read on Sunday evening, September 4th.

Pure cultures upon artificial media have been used to maintain accurately described species, and large scale collections have been built up at the Lister Institute, London, and the Centraalbureau voor Schimmelcultures, Baarn, Holland. Mr. Petch drew attention to some defects of the method; the innate characteristics of a species are sometimes changed when prolonged sub-culture upon artificial media is practised. He required a type-culture of a species of *Melanospora* and received one from Baarn which was quite untypical. Further enquiry, however, revealed the fact that it was a sub-culture of the original type species deposited by Mr. Petch himself several years previously!

Various species of the genus *Xylaria* were described critically, and the paper stimulated considerable search for the species mentioned. Mrs. M. Grainger found clavæ of *X. carpophila* upon fallen beech mast, and submitted them to Mr. Petch, who confirmed that asci were present. He says: 'The beech cupule . . . bore three clavæ sufficiently mature to show the ascospores, but all the others bore only sterile rhizomorphs with the usual accidental thickenings here and there. I found the ascospores 11-13 × 4.5-6µ rather smaller than given in the books, but *Xylaria* ascospores vary considerably.'

The main areas investigated during the Foray were Hovingham Park and Bank Wood, an outlying portion of the Hovingham Estate, adjoining the York Road. Soils in the Park were neutral, or alkaline in the lower parts, whilst a moderately acid reaction was characteristic of Bank Wood.

Mr. J. W. H. Johnson kindly supplied a list of species collected by him, whilst Mr. A. A. Pearson and Mr. T. Petch named material submitted to them. The authors take this opportunity of thanking these gentlemen for their valued help. A collection of species found during the Foray was exhibited in a hall at the Worsley Arms Hotel.

LIST OF SPECIES

The letter B after a name signifies that the species was found in Bank Wood, where the soil was considerably acid.

* New to V.C. 62

MYXOMYCETES

- | | |
|---------------------------------------|--|
| <i>Ceratiomyxa fruticulosa</i> Macbr. | <i>Dictydiæthaliium plumbeum</i> Rost. |
| <i>Badhamia utricularis</i> Berk. B. | <i>Reticularia Lycoperdon</i> Bull. |
| <i>Fuligo septica</i> Gmelin. | <i>Lycogala epidendrum</i> Fr. |
| <i>Stemonitis fusca</i> Roth. | <i>Trichia varia</i> Pers. B. |

PHYCOMYCETES

- | | |
|--|---------------------------------|
| <i>Phytophthora infestans</i> (Mont.) de Bary. | <i>Peronospora Ficariæ</i> Tul. |
|--|---------------------------------|

ASCOMYCETES

ERYSIPHALES

- | | |
|--|------------------------------|
| <i>Sphærotheca pannosa</i> (Wallr.) Lev. | <i>Erysiphe Polygoni</i> DC. |
| <i>Erysiphe Graminis</i> DC. | |

DISCOMYCETALES

- | | |
|---|---|
| <i>Galactinia badia</i> (Pers.) Boud. | <i>Belonidium pruinosum</i> Mass. |
| <i>Peziza aurantia</i> Pers. B. | <i>Dasyscypha nivea</i> (Hedw. f.) Sacc. |
| <i>Leucoscypha nivea</i> (Romell) Boud. | <i>Lachnella Nylanderi</i> (Rehm) Boud. |
| <i>Ciliaria scutellata</i> (Linn.) Quel. | <i>Trichoscypha calycina</i> (Schum.) Boud. B. |
| <i>C. asperior</i> (Nyl.) Boud. | |
| <i>Leotia lubrica</i> (Scop.) Fr. | <i>Hyaloscypha hyalina</i> (Pers.) Boud. |
| <i>Coryne sarcoides</i> (Jacq.) Tul. B. | <i>Mollisia cinerea</i> (Batsch) Fr. |
| <i>Bulgaria inquinans</i> (Pers.) Fr. | <i>Pseudopeziza Trifolii</i> (Biv.-Bern.) Fckl. |
| <i>Orbilbia leucostigma</i> Fr. | |
| <i>Helotium fructigenum</i> (Bull.) Fckl. | <i>Rhytisma Acerinum</i> (Pers.) Fr. B. |
| <i>H. citrinum</i> Fr. | |

PYRENOMYCETES-HYPOCREALES

- | | |
|---------------------------------------|---|
| <i>Nectria cinnabarina</i> (Tode) Fr. | <i>Dialonectria galligena</i> (Bres.) Petch |
| <i>N. coccinea</i> (Pers.) Fr. | <i>Hypocrea pulvinata</i> Fckl. |

PYRENOMYCETES-SPHAERIALES

- | | |
|--|---|
| <i>Melanomma pulvis-pyrius</i> (Pers.) Fckl. | <i>Diatrype stigma</i> (Hoffm.) de Not. |
| <i>Lasiosphæria hirsuta</i> (Fr.) Ces. et de Not. | <i>D. disciformis</i> (Hoffm.) de Not. |
| <i>Leptosphæria acuta</i> (Moug. et Nestl.) Karst. | <i>Quaternaria quaternata</i> (Pers.) Tul. |
| <i>Valsa ambiens</i> (Pers.) Fr. | <i>Diatrypella quercina</i> (Pers.) Nits. |
| <i>Anthostoma turgidum</i> (Pers.) Nits. | <i>Ustilina vulgaris</i> Tul. B. |
| <i>Diaporthe leiphemia</i> (Fr.) Sacc. | <i>Daldinia concentrica</i> (Bolt.) Ces. et de Not. |
| <i>Melanconis Alni</i> Tul. | <i>Hypoxyylon coccineum</i> Bull. |
| <i>Pseudovalsa lanciformis</i> (Fr.) Ces. et de Not. | <i>H. multiforme</i> Fr. B. |
| | <i>H. rubiginosum</i> (Pers.) Fr. |
| | <i>Xylaria carpophila</i> (Pers.) Fr. |
| | <i>X. Hypoxyylon</i> (Linn.) Fr. |

BASIDIOMYCETES

USTILAGINALES

- | | |
|---|----------------------------------|
| <i>Ustilago Avenæ</i> (Pers.) Jens. B. | <i>Ustilago utriculosa</i> Tul.* |
| <i>U. nuda</i> (Jens.) Kellerm. et Swingle B. | |

UREDINALES

- | | |
|--|---|
| <i>Pucciniastrum Circææ</i> (Schum.) Speg. II. | <i>Melampsoridium betulinum</i> (Pers.) Kleb. II. |
|--|---|

UREDINALES—continued.

- Coleosporium Senecionis* (Pers.) Fr. *Puccinia Hieracii* Mart. II, III.
 B. *P. Veronicae* Schroet. B. III.
C. Tussilaginis Tul. II, III. *P. Menthae* Pers. II, III, on
C. Petasitis Lev. II, III. *Mentha aquatica* and *M. viridis*.
Phragmidium violaceum Wint. B. *P. Betonicae* DC. III.
 II, III. *P. Conii* Fckl. II, III.
Uromyces Alchemillae Lév. III. *P. Lychnidearum* Link. III.
Puccinia Cirsii Lasch. II. *P. Caricis* (Schum.) Reb. II, III,
P. obtegens Tul. B. II, III. on *Carex paludosa*.
P. Chondrillae (Pers.) Corda. OI, *P. Holcina* Erikss. II, III.
 III. *P. simplex* Er. et Henn. II.

AGARICALES

- Amanita phalloides* (Vaill.) Fr. B. *Collybia velutipes* (Curt.) Fr.
A. porphyria (A. et S.) Fr. *Marasmius peronatus* (Bolt.) Fr. B
A. Mappa (Batsch) Fr. *M. hariolorum* (DC.) Quel.
A. muscaria (L.) Fr. *M. dryophilus* (Bull.) Karst.
A. rubescens (Pers.) Fr. B. *M. amadelphus* (Bull.) Fr.
Amanitopsis vaginata (Bull.) Roze *Androsaceus rotula* (Scop.) Pat. B.
 B. *A. androsaceus* (Linn.) Pat.
A. fulva (Schæff.) W. G. Sm. B. *Lactarius turpis* (Weinm.) Fr. B.
Lepiota procera (Scop.) Fr. *L. pyrogalus* (Bull.) Fr.
L. rhacodes (Vitt.) Fr. B. *L. piperatus* (Scop.) Fr. B.
L. cristata (A. et S.) Fr. *L. quietus* Fr.
L. granulosa (Batsch) Fr. *L. rufus* (Scop.) Fr. B.
Armillaria mellea (Vahl) Fr. B. *L. subdulcis* (Pers.) Fr. B., also
Tricholoma rutilans (Schæff.) Fr. var. *concauus* Fr., which was as
T. terreum (Schæff.) Fr. common as the type.
T. acerbum (Bull.) Fr. *L. subumbonatus* Lindgr. B.
T. nudum (Bull.) Fr. *Hygrophorus eburneus* (Bull.) Fr.
Russula delicata Fr. *H. metapodium* Fr.
R. chloroides (Krombh.) Bres. *H. coccineus* (Schæff.) Fr.
R. nigricans (Bull.) Fr. *H. conicus* (Scop.) Fr.
R. adusta (Pers.) Fr. *H. chlorophanus* Fr. B.
R. cyanoxantha (Schæff.) Fr. B. *Clitocybe infundibuliformis* (Schæff.)
R. virginea Cke et Mass. Fr.
R. ochroleuca (Pers.) Fr. B. *Laccaria laccata* (Scop.) B. et Br.
R. fragilis (Pers.) Fr. B. var. *amethystina* (Vaill.) B. et
R. emetica (Schæff.) Fr. B. Br.*
R. atropurpurea (Krombh.) Maire *Omphalia fibula* (Bull.) Fr.
 B. *Pleurotus salignus* (Pers.) Fr.
R. cutifracta Cke. *Lentinus cochleatus* (Pers.) Fr. B.
R. ochracea (A. et S.) Fr. *Pluteus cervinus* (Schæff.) Fr.
Mycena pura (Pers.) Fr. B. *Entoloma porphyrophæum* Fr.
M. nivea Quel. *E. ardosiacum* (Bull.) Fr.
M. prolifera (Sow.) Fr. *E. jubatum* Fr.
M. galericulata (Scop.) Fr. *E. clypeatum* (Linn.) Fr.
M. polygramma (Bull.) Fr. *E. nigrocinnamomeum* Kalchbr.
M. ammoniaca Fr. B. *Nolanea pascua* (Pers.) Fr.
M. hematopus (Pers.) Fr. B. *Leptonia incana* Fr. B.
M. sanguinolenta (A. et S.) Fr. *Pholiota erebica* Fr.
M. galopus (Pers.) Fr. B. *P. mutabilis* (Schæff.) Fr.
M. discopus Lev. *Bolbitius fragilis* (Linn.) Fr. B.
Collybia radicata (Relh.) Berk. *Inocybe fastigiata* (Schæff.) Fr.
C. longipes (Bull.) Berk.* *Galera tenera* (Schæff.) Fr.
C. platyphylla (Pers.) Fr. *Flammula sapinea* Fr. B.
C. fusipes (Bull.) Berk. *Crepidotus mollis* (Schæff.) Fr.
C. maculata (A. et S.) Fr. B. *Psalliota pratensis* (Schæff.) Fr.
C. butyracea (Fr.) Bull. B. *Stropharia aeruginosa* (Curt.) Fr. B.

AGARICALES—continued.

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| <i>S. merdaria</i> Fr. B. | <i>Coprinus plicatilis</i> (Curt.) Fr. |
| <i>S. stercoraria</i> Fr. | <i>Cantharellus Cibarius</i> Fr. |
| <i>S. semiglobata</i> (Batsch) Fr. | <i>Paxillus involutus</i> (Batsch) Fr. |
| <i>Hypholoma fasciculare</i> (Huds.) Fr. | <i>Boletus elegans</i> (Schum.) Fr. B. |
| <i>H. velutinum</i> (Pers.) Fr. | <i>B. viscidus</i> (Linn.) Fr. |
| <i>Panæolus phalænarium</i> Fr. B. | <i>B. granulatus</i> (Linn.) Fr. |
| <i>P. campanulatus</i> (Linn.) Fr. | <i>B. badius</i> Fr. B. |
| <i>Psilocybe semilanceata</i> Fr. | <i>B. chrysenteron</i> (Bull.) Fr. |
| <i>Coprinus micaceus</i> (Bull.) Fr. B. | <i>B. edulis</i> (Bull.) Fr. |
| <i>C. lagopus</i> Fr. | <i>B. erythropus</i> (Pers.) Quel. |
| <i>C. domesticus</i> (Pers.) Fr. | <i>B. scaber</i> (Bull.) Fr. B. |

APHYLLOPHORALES

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|---|--|
| <i>Polyporus squamosus</i> (Huds.) Fr. B. | <i>Fistulina hepatica</i> (Huds.) Fr. |
| <i>P. giganteus</i> (Pers.) Fr. | <i>Hydnum repandum</i> (Linn.) Fr. B. |
| <i>P. betulinus</i> (Bull.) Fr. B. | <i>Siereum spadiceum</i> Fr. B. |
| <i>P. dryadeus</i> (Pers.) Fr. | <i>S. rugosum</i> (Pers.) Fr. |
| <i>P. adustus</i> (Willd.) Fr. | <i>S. hirsutum</i> (Willd.) Fr. B. |
| <i>P. cæsius</i> (Schrad.) Fr. | <i>S. purpureum</i> (Pers.) Fr. |
| <i>Polystictus versicolor</i> (Linn.) Fr. | <i>Corticium læve</i> (Pers.) Quel. |
| <i>P. abietinus</i> (Dicks.) Fr. | <i>C. Sambuci</i> (Pers.) Fr. B. |
| <i>Irpex obliquus</i> (Schrad.) Fr. | <i>Cyphella capula</i> (Holmsk.) Fr. |
| <i>Lenzites betulina</i> (Linn.) Fr. | <i>Solenia anomala</i> (Pers.) Fr. |
| <i>Trametes mollis</i> (Sommerf.) Fr. | <i>Clavaria cinerea</i> (Bull.) Fr. B. |
| <i>Dædalia quercina</i> (Linn.) Fr. | <i>C. corniculata</i> (Schæff.) Fr. |

AURICULARIALES

- Auricularia auricularia*-Judæ
(Linn.) Schroet. on Beech,
Sycamore, and Elder.

TREMELLALES

- Tremella mesenterica* (Retz.) Fr. *Exidia glandulosa* (Bull.) Fr.

CALOCERALES

- Dacryomyces deliquescens* (Bull.) *Calocera viscosa* (Pers.) Fr.
Duby. *C. stricta* Fr.

GASTEROMYCETALES

- Phallus impudicus* (Linn.) Pers. B. *Crucibulum vulgare* Tul.
Lycoperdon perlatum Pers. B. *Scleroderma aurantium* Pers. B.
L. pyriforme (Schæff.) Pers.

FUNGI IMPERFECTI

- Phoma mirbelli* (Fr.) Sacc. on Box *Sepedonium chrysospermum* (Bull.)
leaves. Fr.
Melanconium Alni *Stilbella erythrocephala* (Ditm.)
Lind.
Oidium alphitoides Griff. et Maubl.* *Volutella Buxi* (Corda) Berk.
Trichoderma lignorum (Tode) Harz. *Fusarium roseum* Link.

The Entomologist's Record for February contains 'Lepidoptera of a Bagdad Orchard,' by E. P. Wiltshire; 'Names of Microlepidoptera,' by T. B. Fletcher; 'Note on *Sumeria dipotamica* Tams.,' by E. P. Wiltshire; 'Weesen and Pontresina' (with plate), by H. G. Harris and E. Scott; several collecting notes, and supplement 'The British Noctuae and their Varieties,' by H. J. Turner.

CORRECTION

The Naturalist, March, 1939, p. 77, line 9 from bottom, *Limnophilus lineatus* should read *Limnophilus lunatus*.

THE VEGETATION OF YORKSHIRE AND
SUPPLEMENT TO THE FLORAS OF THE COUNTY

(Continued from page 64).

Tragopogon porrifolius L.

Alien seen near Headingley Station, J.F.P. MS. 1898.

T. pratensis L.

CAMPANULACEÆ

Jasione montana L.

Wahlenbergia hederacea (L.) Reichb.

Only in West Riding, still plentiful above Dunsop bridge in Whitendale, C.A.C.

Campanula glomerata L.

C. latifolia L.

C. Trachelium L.

I must reject the nettle-leaved bellflower as a genuine native in the county. Dr. Spruce's station has never been confirmed and Carr's coalpit heap plant was an alien.

C. rapunculoides L.

Established, but of garden origin. Some further localities are rail side near Gargrave, T.W.E. in *Skipton Flo.*; between canal and rail, Newlay, 13/7/09, J. C. Herb.; below Gawthrop, Dentdale, by the Dee, J. Handley, *in lit.* (1897-1907).

C. rotundifolia L.

I have twice seen the thinly hairy var. *hirta* M. et K., but *lancifolia* M. et K. is rather commoner.

C. persicifolia L.

Alien. In wood above Clapham Stn.; W.A.S., 1936.

C. patula L.

Gone, I believe, from all the localities handed down to us, but I am not quite satisfied that the Yarm and Eskside plants were correctly named; the only specimens in extant herbaria that I have seen being *C. Rapunculus*.

C. Rapunculus L.

'Pot Rampion,' Adwick, 1928, *Herb.*, G. P. Nicholson! The description is correct and may be said to throw a searchlight upon the records of the past, assigned by Langley in 1828 and Applebee in 1831 to *C. patula*.

Legousia hybrida (L.) Del. (*Specularia*).

Legousia perfoliata (L.) Britton.

The Bingley *Specularia* found by Dr. Richardson in 1727 and reported *in lit ad* Dillenius is referred by G. C. Druce in *The Dillenian Herbaria* to this, a North American species.

L. Speculum-Veneris (L.) Fisch.

Alien. Wakefield, a grain-weed on quay waste, 1910, J.C.

VACCINIACEÆ

Vaccinium Myrtillus L.

var. *microphyllum* Druce. On high ridges of grit-capped fells from Shunnor to above Todmorden.

Hybrid *intermedium* Ruthe (*Myrtillus X Vitis-idæa*). Cardale Wood, near Pennypot Bridge, Oakbeckdale, Harrogate, 1893 !

V. Vitis-idæa L.

Not given in East Riding flora.

Oxycoccus quadripetalus Gilib. (*Vaccinium*).

Not given in East Riding flora.

ERICACEÆ

Arctostaphylos Uva-ursi (L.) Spreng.

Not given in East Riding flora. It is still found on the Yorkshire side of the Derbyshire Derwent river basin and in other adjacent places in Derbyshire, and also on Cronkley Fell in Teesdale. Dr. Lees gives the Levisham record of Dr. Braithwaite with his ! mark, but this has not been confirmed by Mr. R. J. Flintoff, who sought for it there. C.A.C.

Andromeda polifolia L.

Not in East Riding flora. Additional localities are eastern slope of Great Whernside, T. J. Foggitt MS., 1911, and on the catchwater moss of Woo-gill Head, Great Haugh, draining into the cover ! In plenty on the high mosses about the feeding sikes of Bowland which fall into the Hodder, J.F.P., 1895 *et seq.* ! In the *Naturalist*, 1928, p. 215, Mr. R. J. Flintoff gives a new North Riding station near Goathland. Also see *Naturalist* 1930, p. 11.

Rhododendron arboreum Sm., **R. ponticum** L., **R. punctatum** Andr.

Aliens put in to make a hardy 'cover' for game have established themselves and are now self-sown.

Kalmia glauca Ait. (**K. latifolia** Wang.).

An alien established on Far Black Moor, Adel.

Pernettya mucronata Gaudich.

Alien. Crimsworth Dene, 1903, W. B. Crump.

Calluna vulgaris Hall.

In the *Naturalist*, 1911, p. 322, G. C. Druce gives a var. *Erikae* Ascherson on the moors about Wessenden Head, new to Britain.

Erica cinerea L.

E. Tetralix L.

forma *fissiflora* with the corolla cleft to the base into five ligulate petals is not very rare.

E. mediterranea L.

An alien found on a heathy bit of ground near Holme-on-Spalding-Moor, A. E. Greaves, 1918.

Pyrola rotundifolia L.

Not in East Riding flora. On the damp slopes of the wooded gill at Oughtershaw, T. Basil Woodd, spns. ! 1888, under some suspicion of having been brought here in soil at the roots of planted conifers, etc., just as it had been at Hutton Bushel if Bean's name was right. Long gone from the Halnaby Carr station, now drained, near Croft.

P. media Swartz.

Not in East Riding flora.

P. minor L.

Some further localities are Baugh Fell, by waterfall on the Rawthey (Hugh Richardson !), Alb. Wilson; Grass Wood, high side of 'Gregory' Scar under beech, 1900-1906 !; Helwith Moss and Wharfe Wood, Austwick, C.A.C., 1937.

P. secunda L.

Not in East Riding flora.

MONOTROPACEÆ

Hypopitys Monotropa Crantz.

A further locality is at the head of Yowlas Dale (W. Foggitt in *Flower Chronicle of the Vale of Mowbray*, 1908).

PLUMBAGINACEÆ

Limonium vulgare Mill (Statice).

Not in West Riding flora.

L. humile Mill.

In the North Riding only.

Armeria maritima Mill.

A. alpina Will.

Here I follow Williams' *Prodromus*, Vol. I, 446-7; it defines how the Yorks. inland plant differs from the salsilittoral one. No 'new' stations beyond those of the floras, yet it survives still in all of them. (I know of no recent confirmation of the Stockdale, Settle, station, and the Grassington Moor station was probably a mistake, C.A.C.)

PRIMULACEÆ

Hottonia palustris L.

A new station is Marley, L.R. (*Flo. Skipton*). It was introduced into pits on Austwick Moss and is still there in 1938, C.A.C.

Primula vulgaris Huds.

P. veris L.

P. farinosa L.

Not in East Riding flora.

Lysimachia thyrsoflora L.

L. vulgaris L.

var. *villosa* ! The Semmerwater and Aysgarth form.

var. *angustifolia* H. C. Wats. In a water pit at Rossington.

L. Nummularia L.

Additional stations: Newton in Bowland and Bashall Eaves, J.F.P.; Wigglesworth-Long Preston and canal bank, Skipton-Gargrave, L.R.

L. nemorum L.

Trientalis europæa L.

Not in East Riding. Another locality is Whernside, above Winterscales, E. Douglas, *Naturalist*, 1932, p. 246. Extinct in the Widdale Carr Plantation, Garsdale, locality of West Riding Flora.

Glaux maritima L.

Anagallis foemina Mill. (*cærulea* Schreb.).

Colonist.

A. arvensis L.

A. tenella Murray.

Centunculus minimus L.

Samolus Valerandi L.

OLEACEÆ

Fraxinus excelsior L.

First notice (vice Salt) A.D., 1377, in a Calverley Charter (*Thorseby Soc.*, No. 254), wherein, for charcoal, 'Ash' is mentioned as well as 'Crab-apple' as not suitable for charcoal, S. Margerison, *comm.*

F. Ornus L. (The Manna Ash).

Alien well established in old planted demesnes.

Ligustrum vulgare L.

APOCYNACEÆ

Vinca minor L. and **V. major** L.

Gardener's aliens.

GENTIANACEÆ

Blackstonia perfoliata Huds. (*Chlora*).

Centaureum umbellatum Gilib. (*Erythræa Centaureum*).

C. pulchellum (Sw.) Druce (*Erythræa*).

Additional station, sandy hillocks, East Coatham, P. F. Lee, *Nat.*, 1906, 1908; Redcar, T.J.F., 1892, W.A.S., 1930.

Gentiana Pneumonanthe L.

Additional records: near Clapham Station, *Nat.*, 1910, p. 357, C.A.C. and A. R. Sanderson; Greenhead farm, Bentham, J.F.P. (*circa* 1900).

G. verna L.

Only in North Riding. No further information has been forthcoming *re* the note by Dr. Lees in the *Naturalist*, 1919, p. 390, on the occurrence of this species near Robin Hood's Bay, C.A.C.

G. campestris L.

Additional localities: upland pastures over Oughtershaw, T. B. Woodd, *Nat.*, 1904; Ribblehead and Feizor, C.A.C., 1938.

G. amarella L.

var. *uliginosa* Willd. Additional record: Midgely, above Luddenden, W. B. Crump, spn., 1896!

var. *calycina* Druce. Grows at elevations reaching 2,000 ft. descending to about 1,200 ft. over the Phillipsian 'Yoredale' of Yorkshire from Birkdale at Swale Head and Hell Gill at the source of the Yore down to the main limestone pavement

of Cam Fell ! Carperby Scars by Locker Tarn ! Skirethorns Bordley Mastiles, Coniston Dib, the Bowland Knots (J.F.P.) and Newton upland pastures of Ribble and Hodderdale (J.F.P.).

Menyanthes trifoliata L.

Nymphoides peltatum Rendle & Brit. (*Limnanthemum*).
Alien.

POLEMONIACEÆ

Polemonium cæruleum L.

Additional localities : Dale Head Scar, Bishopdale Head at 1,600 ft., C.A.C., *Nat.*, 1908, p. 458 ; Skirfare Valley a down-wash from Arnber Scar, J.F.P. ; Mossdale above Dib Scar, T. W. Edmondson, 1889.

BORAGINACEÆ

Omphalodes verna Moench.

Denizen. Buttercrambe Woods, 1910, H. Stansfield.

Cynoglossum officinale L.

Lappula echinata Gilib. and **Benthamia lycopsioides** Lehm.
Aliens, non-persisting.

Symphytum officinale L.

S. peregrinum Ledeb. and **S. asperrimum** Donn.

Are spreading about the county as aliens and are often misrecorded for the above.

S. tuberosum L.

N. Yorks, V.C. 65, 'S.M. 1821' according to Clarkson's record it grew in Church Lane, Richmond, and in S.E. Yorks., 'V.C. 61, York, S.E., A. O. Moore,' *Topogr. Bot.*, ed. 2, 327.

Borago officinalis L.

Virtually alien.

Anchusa sempervirens L.

Denizen.

A. undulata L., **A. hybrida** Tenore., **A. strigosa** Labill.,
A. officinalis L., and **Lycopus orientalis** L.

Are grain aliens.

Lycopus arvensis L.

Colonist.

Asperugo procumbens L., *Macrotomia echioides* Boiss. (*Arnebia*) and *Alkanna lutea* DC.

Aliens or garden waifs. The first-named has reappeared for many years in a stack yard near Topcliffe; C. M. Rob.

Pulmonaria officinalis L.

A garden escape.

Myosotis palustris Hill.

var. *strigulosa* Reich.

M. repens Don.

M. alpestris Schmid.

Only in North Riding. The original station was 'on the highest main limestone exposure at the eastern end of the ridge of Mickle Fell' (Jas. Backhouse, 1852). On Little Fell at the western end of the same fell ridge 'in still greater plenty' (*ex ore* W. Foggitt).

M. sylvatica (Ehrh.) Hoffm.

Myosotis arvensis (L.) Hill., and the var. *umbrosa* Bab.

M. collina Hoffm.

M. versicolor Sm.

Lithospermum officinale L.

L. arvense L.

L. purpureo-cæruleum L.

A garden escape.

Echium vulgare L.

Some further localities are Clapham, Sawley Abbey, and at 'Salt Lake' Ribbleshead, in plenty, C.A.C., 1938.

E. italicum L. and *E. violaceum* L.

Have occurred as aliens on Calderside and at Middlesbrough.

CONVOLVULACEÆ

Calystegia sepium Br.

C. Soldanella Br.

Not found in the West Riding.

Convolvulus arvensis L.

Cuscuta europæa L.

An additional river drainage is Airedale, on nettles on the road to Malham. W. N. Cheesman in *Nat.*, 1891, p. 177.

C. epithymum Murr.

A further locality is 'On the sward of the Terrace at Rievaulx where Wild Thyme predominated,' 3/8/1908, Geo. Webster. Still there, 1936, W.A.S. and C. M. Rob.

C. trifolii Bab. and Gibson.

SOLANACEÆ

Solanum Dulcamara L.**S. nigrum** L.

Colonist.

S. triflorum Nutt., **S. Melongena** L., **S. rostratum** Dunal.,
S. sisymbriifolium Lam., **Physalis Alkekengi** L., **P. viscosa** L.
 Have been recorded as aliens.

Lycium chinense Mill.

Not *L. barbarum* L. as given in floras. Often planted and persisting.

Atropa Belladonna L.**Datura Stramonium** L.

An occasional alien, never successfully establishing itself.

Hyoscyamus niger L.

Some further stations are Calder, Shepley Bridge ! H. Parkinson ; Aire, Kirkstall Goods Station, 1906, S. Margerison.

H. aureus L. and **H. albus** L.

Have occurred as aliens.

SCROPHULARIACEÆ

Verbascum Thapsus L.

Additional localities are Hodder, Dunnow Cliff, J.F.P. ; Aire, Ledstone Lodge, over recently felled ground, S.M., 1909-10 !

V. thapsiforme Schrad. vel., **V. Phlomoides** L., **V. sinuatum** L.,
V. collinum Schrad., **V. virgatum** Stokes., **V. Blattaria** L.,
V. phœniceum L., **V. Lychnitis** L., and **V. nigrum** L.

Have occurred as casuals.

Calceolaria Sinclairii Hook.

Once seen as a weed among potatoes at Kirby Malzeard.

Linaria vulgaris Mill.

L. trpartita Willd., **L. purpurea** Mill., **L. maroccana** Hook. f.,
L. anticaria Boiss. and Rt., **L. italica** Trevir., and **L. supina**
 Desf.

Have occurred as garden escapes.

L. striata DC.

An erect-growing whitish mauve race of the Linnean *repens*. Has been known on the stonework of the railway bridge on the road at Giggleswick station since 1897.

(To be continued)

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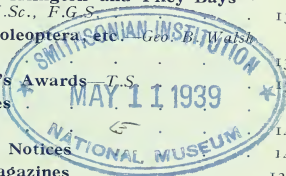
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THE LAPWING (*VANELLUS VANELLUS* LINN.)

T. HYDE-PARKER.

WITH the joyous spring call of the plover—for so it is generally known—popular attention is called, more, perhaps, than at any other season, to this handsome and useful bird; and, incidentally, to the fact that, in the whole history of Wild Bird Protection, since its not too successful inception over half a century ago, no species, in this district at any rate, has benefited more from protective legislation. In numbers it has increased enormously, so much so that, except during the actual breeding season, one hardly ever looks out without seeing huge flocks, wheeling and manœuvring in the air, or dotted, head to wind, in the fields. Nor do I ever hear of any undesirable alteration in their diet, despite this vast increase, and the ever-growing rivalry of starlings and gulls. Indeed, in a member of the family *Charadriæ* this seems hardly likely. Well may he be 'the wanton Lapwing,' now that both bird and eggs are secure from their worst enemy!

A greater sense of security, moreover, not unnaturally, induces increased confidence, and it is amusing these days to read, in old works on wild-fowling, of elaborate devices for getting within range of a bird which may now be approached with ease. I can sometimes watch them over the garden fence within half-a-dozen yards or so—at which short range, and looking down on them almost, one realises the justice of the term Green Plover. An odd bird occasionally patronises our very lawn, finding, apparently, good hunting as well as quietude. Certainly this is a greater show of confidence than is usual, but, even in the past, this species could be tamed, if we may credit Bewick, who gives an amusing instance of one which actually came indoors in winter, and shared the kitchen fire-side with the dog and cat!

The Lapwing has ever been familiar to country-dwellers, though usually by a local name. The word plover—of course, a generic term—is derived from some supposed sensitiveness to approaching rain. Lapwing, on the other hand, like the bird's scientific name and its French derivative, comes from its mode of flight: that short, flapping movement which causes the flickering appearance characteristic of a distant flock on the wing. Most of the popular names, however, such as Pewit, Peesweep, our own Teeafit, and perhaps Pywipe, are purely onomatopœic. The Italians and Portuguese both call it 'Little Peacock'—somewhat flattering, considering that the only point of resemblance is that each boasts a crest. This feature, by the way, is also in part responsible for a most cumbrous Gaelic appellation, *Abharacan-luachrach*!

Anyhow, it is, on its own merits, a very handsome bird.

Few, perhaps, observing it casually, realise how beautiful it really is, with its bold, variegated markings of black and white, metallic green and warm chestnut. A year or so back, a farm-hand here told me he had seen one 'a'most white ;' but careful search for some weeks afterwards failed to confirm this, nor have I, in all the years I have had these birds under more or less constant observation, ever noted any appreciable deviation from 'standard pattern,' though such cases are known to occur—one indeed, was recently reported in *The Naturalist*.

When at rest, probably the most noticeable feature is the long, slender crest, formed of singularly fine, narrow feathers, which, as Tennyson observed, is renewed in spring. This is depressed on the bird's taking flight, thus giving rise to a riddle which used to be well known among country children: What is it that's up when it's down, and down when it's up? At least one bird artist would seem to have been ignorant of this point!

The call of the plover—and this, again, especially in spring—cannot be ignored as he 'tires the echoes with unvaried cries.' It may then be heard, not only all day long, but at night too, especially when there is a moon. Indeed, among all the fowl who have been busy on their lawful occasions ever since day-break, he seems the last to be abroad in the evening. When roosting birds have sought their nightly perch, and long after the last lines of gulls have winged their way out to sea, odd plover may still be noted overhead in the fast gathering darkness while their plaintive cry may be heard with the first streaks of wintry dawn. And yet, though they never seem to repose, only once do I remember catching one literally asleep!

Apart from the well-known call, and the much-abbreviated winter note, a flock of Lapwings, when at rest in a field on a still sunny day, may sometimes be heard making a soft, crooning sound, the individual note being scarcely distinguishable, but the massed effect very distinct. Occasionally, if we happen to have exceptionally mild weather in late autumn, there is a sort of half-hearted attempt at the spring call—usually unfinished, like the first efforts in early spring.

The flight, though not particularly rapid, is wonderfully clever, and the bird seems to delight in those 'aerobatics' which so impressed W. H. Hudson. In defence of nest or young, it will boldly attack hawk or crow, relying for its own safety on its art in twisting and tumbling. Even this skill, however, is usually of little avail against the persistent pursuit of predatory gulls, which now make quite a trade of robbing the inoffensive Lapwing of its hard-earned worms and grubs. You may see a gull deliberately alight and wait for one to turn up something edible.

When the birds pair, and before the real nest—never very

elaborate—is made, the male may sometimes be observed, with much bobbing, to scratch out preliminary sketches, so to speak, presumably by way of egging on (appropriate phrase !) his more deliberate partner ; and it is usually one of these which is eventually utilised and completed. Despite the gay and striking appearance the Lapwing presents on the wing, it seems singularly inconspicuous when on its exposed and unscreened nest. If disturbed, it will, when possible, slip quietly away

. . . like a lapwing runs
Close by the ground.

but on any attempt to interfere with the nest, it flies round with loud reiterated cries, making angry swoops quite close to one's head. There is a reference to this habit in, of all unlikely places, Pepys' Diary !

Even as boys, I remember we used to be struck by the singularly symmetrical appearance of the four pyriform eggs—that being almost invariably the number of the full clutch. Exposed as they are, by the way, these nests are not the easiest to find. It isn't much good looking at random, and, unless, having spotted the bird, one takes careful landmarks, much time may be spent in fruitless search. In the past, dogs were sometimes trained for this purpose, soon becoming both successful and enthusiastic.

The young, like those of most species which are hatched on the ground, belong to the group known as *precoces*, and, though but tiny dappled balls of fluff, run about as soon as they emerge from the egg (a fact noted by Hamlet !) and are quite equal to squatting flat at a warning note from their parents. They will even swim, should necessity arise. As they grow up, they flock together, sometimes as early as July, but can still be distinguished for some time from the old birds by a perceptible brownish tinge. Later on, our local numbers are further increased by immigrants from over sea, of which I have myself seen occasional bands arriving. Excepting in real hard weather, when they often look sadly depressed, they are a cheerful, amicable crowd, and, when not actually searching for food, seem to take great pleasure in sunning themselves, and in bathing, especially in shallow flood-water on grass lands.

From a gastronomic point of view, it is hard to understand why Mosaic law should have condemned the Lapwing as unclean—even as an 'abomination' ; but here the translation may be at fault, and quite another bird implied. On the other hand, one would hardly go as far as the old French couplet, quoted in Col. Peter Hawker's immortal work

Qui n'a pas mangé de Vanneau
Ne sait pas ce que gibier vaut.

Possibly the truth lies somewhere between these two extremes, for the bird seems to have been always utilised, if not esteemed, for the table. Mention is made in an ancient document of a dozen plovers being sent as a present to the French Queen, though it is not clear whether these were Lapwings or Golden Plover. The latter are considered the greater delicacy, and doubtless many a humble Pewit has figured on the menu under the guise of his more distinguished relative. The gourmet, however, demands to see the feet—to detect, not the cloven hoof, but the tell-tale hind toe! In the “Northumberland Household Book,” compiled about 1512, and relating to the East Riding of Yorkshire, appears an entry: ‘Item, it is thought goode that Wypes be hade for my lorde’s own mees only, and to be 1d. a pece.’ This was a good figure for those days, in what, too, was then a remote district, and when ‘chekyns’ were rated at but $\frac{1}{2}$ d. each. Later on we find, in a list of market prices for 1663, one Pewit is 10d. and a dozen tame pigeons only 6d.

It was the delicacy of the eggs, however, rather than that of the birds, which was responsible for a steady reduction in the plover population, and this more especially as transport facilities improved. Lubbock, writing about the middle of last century, notes that they were ‘greatly reduced in numbers, owing principally to wholesale plundering of the nests.’ In 1821, a single egger at Potter Heigham in Norfolk, took 160 dozen eggs; according to the Pagets, 600 to 700 were sent to the London market from the Bure district alone, every week during the season; and, in 1839, Yarrell speaks of 200 dozen taken from Romney Marsh in Kent. So steady a drain as this, combined with wholesale shooting, and, in some parts, netting, of the birds themselves, would be bound to tell on the most prolific species. No wonder they became ‘greatly reduced in numbers.’

Happily all this may now be reckoned with ‘old, unhappy, far-off things.’ Let us hope that never again will be seen such persecution of what, apart from its beauty and interest, is, after all, one of the farmer’s best friends.

SHORT NOTE

At a meeting of the Linnean Society of London, recently held, a discussion took place regarding the National Parks. Eventually the following resolution was accepted: “The Linnean Society of London accepts the definition employed in the African Fauna Convention as an ideal for the preservation of Nature; but it knows that the term “National Park” has been given to areas which, for various reasons, are unsuitable for inclusion within the definition, *e.g.* too limited or situated too near populated areas. For such, it recommends the setting apart within each Park of special nature reserves under proper control; and it would like all authorities with power over Parks to seek advice from such bodies of naturalists as are competent to give it.”

THE BLACK-HEADED GULL (*LARUS RIDIBUNDUS*) IN YORKSHIRE

RALPH CHISLETT

THE last published records, by Mr. H. B. Booth, of Yorkshire, Black-headed Gulleries, covered the year 1920, and appeared in the *Naturalist* of May, 1921, since when many changes have taken place. In 1938, on behalf of the British Trust for Ornithology, Mr. P. A. D. Hollom undertook a survey of the breeding colonies of the species in England; and jointly with Mr. T. Kerr I assumed responsibility for the Yorkshire portion.

The survey was in part undertaken to provide data from which to ascertain, if possible, the connection between birds wintering in various parts of England and the colonies in which they breed.

To complete the task of surveying so large an area of difficult country it would have been necessary to devote our available time for practically the whole season but for willing help, and to Messrs. J. Cordingley, T. W. I. Cleashy, J. P. Utley, C. Oakes, A. Clark, T. N. Roberts, F. Snowdon, F. Taylor, A. Gilpin, J. A. Dell, W. J. Forrest, J. Lord, and others, we wish to make every acknowledgement. All who helped in the enquiry will wish me also to acknowledge the assistance we all of us received from Mr. Booth's paper which was our starting point, and for his advice in 1938.

Mr. Booth began with references to the changes that had taken place since 1881, when Messrs. Clarke and Roebuck published their Handbook to the Vertebrate Fauna of Yorkshire. I propose to confine myself mainly to the alterations since 1920; and more particularly to the breeding colonies of 1938. Several colonies mentioned in Mr. Booth's paper have been abandoned for some years prior to 1938; but many new breeding stations have been attempted, not always successfully, largely on the moorlands of the West Riding.

The numbers of this gull that winter in Yorkshire, referred to by Mr. Booth, have continued to increase. In south-west Yorkshire, 25 years ago, only a comparatively few birds wintered along the river sides and around sewage beds. During the winter of 1937-38, it was difficult to walk to the outskirts of towns and villages without seeing Black-headed Gulls, scores of which, sometimes hundreds, fed on the wider, ploughed and grassed lands and marshy places, irrespective of weather conditions, remaining with us until late February. In the winter of 1938-39, the greatest influx of gulls came in early December, and was followed by severe weather, through which the gulls remained.

Of the large number of Black-headed Gulls ringed abroad and recovered in England (over 300) as published in *British*

Birds, a number have been visitors to Yorkshire, although a much greater number of records come from south of the Wash. The birds come from Denmark, South Sweden, and the Baltic Islands, Finland, and North Germany. Mr. Hollom has caught birds and ringed them near London in winter, some of which have been recovered in these northern countries. It is evident that for many Black-headed Gulls to cross the North sea is a normal, vernal, and autumnal procedure, and possibly the Baltic colonies are composed of birds with definite, regular, migratory habits. One German bird ringed on June 15th, 1913, was in Yorkshire as early as August 20th of the same year. Black-headed Gulls arrived in numbers near to the mouth of the Humber Estuary on July 25th and August 21st of 1938, and soon passed on. That a considerable number of our Yorkshire wintering birds are migrants from the countries named above is highly probable, but what proportion they bear to the total number of winterers is uncertain. And whether many, if any, of the occupants of Yorkshire breeding colonies habitually winter in this county is equally uncertain, but many probably do not.

There are few records of Yorkshire ringed birds to add to those mentioned by H. B. Booth. The Yorkshire bird recovered in the Azores was described by Mr. Witherby and Miss Leach as in the category of 'lost' birds. Recoveries of birds ringed elsewhere in England show several young Ravenglass birds in Yorkshire in September of the same year, one bird in South Lincolnshire 17 years later, a bird returned to Ravenglass in spring 20 years later; and that when December comes, many English breeding gulls are still in England, generally, but not always, at varying distances to the south of their breeding place. This gull is a wanderer, quite apart from the effect on its behaviour of a place of birth of which the winter climate is too cold for comfortable maintenance of life; but without such stimulus migration with this species is not so regular, general, and purposeful.

Places at which Black-headed Gulls attempted to breed in Yorkshire in 1938 extended from the south-western edge of the Pennines, near to Sheffield, with no very lengthy intervals, right to the north of the country. Several colonies existed in central Yorkshire, whilst the large Twigmoor gullery is only some 10 miles beyond the Lincolnshire side of the Humber. In spite of the immigrants from abroad, some of the birds wintering in South-west Yorkshire may be from any of these places.

I begin with the southern portion of the West Riding and follow up the western side of the country, because the plan enables the regularity with which parties of gulls select suitably wet places on the moorlands of the Pennines to be traced. A small colony has existed since 1918 on a wet moor in Derbyshire,

at the extreme southern verge of the Pennine moors, not far beyond the Yorkshire boundary. South of that moor the bird does not breed in Derbyshire. From that place, northward, with breaks of not many miles, birds attempt to breed at suitable places along the Pennines right away to the north of Yorkshire and beyond. Just over the Westmorland-Yorkshire boundary, at Sunbiggin Tarn, near Orton, a colony has existed since 1892, or earlier, which, in 1938, consisted of some 1,500 pairs of birds (T.W.I.C.).

If the birds attempting to breed along the Pennines were undisturbed it is probable they would settle permanently in a smaller number of suitable places to form several large colonies. No doubt the food factor would affect the size of the colony, but the species can cover a wide range of country in its search for food if it has a secure place for its eggs and young. Many of the moorland sites, however, provide little security. Several sites are used irregularly, in dry weather, when 'mosses' normally considered more suitable are dried up. On many moors gamekeepers are suspicious of the gulls and take their eggs systematically, so that only a few are allowed to hatch, or otherwise drive them away, the gun being sometimes used. When a colony has been raided, many of the birds disappear, sometimes all of them, and such birds probably try to form a new colony elsewhere, or may swell the numbers in a colony already existing. Later in the season it may be found that in a colony so raided, a few birds have remained and bred. Where only a small number of early eggs are taken, the robbed birds generally lay again. Most of the keepers I have spoken to are of opinion that the gulls do little damage, except that if too numerous they compete for food with the grouse. Gulls however, do not eat the young heather tips, and although grouse may visit the marshy parts of the moor, such are probably of small importance to them as a source of food.

It is probable that a few parties of gulls bred in 1938 in places in Yorkshire that have been overlooked, but we think, if any, they were few and small. Whether there are as many birds of this species breeding in the country as heretofore is difficult to determine. Greater disturbance seems to make for more colonies with fewer birds. When we read of the 'vast' colony at Thornton Bridge, near Bedale, in 1702, of the large numbers that formerly bred on Strensall Common, and on the island in Hornsea Mere, of the number of colonies that were dispersed by the drainage of marshes in eastern parts of Yorkshire, where there are few colonies to-day, we must doubt if there are so many birds breeding in Yorkshire to-day as there were in the 19th century and earlier. The old writers do not tell us where Black-headed Gulls wintered in their day, but within living memory the inland flocks of Yorkshire (and

the Thames) seem to be a new feature to which contemporary outlook has not been long accustomed. In the London area, Mr. Hollom has located reservoirs to which enormous numbers of gulls repair to roost by night, mainly on the surface of the water. It is suggested that the solution of the Yorkshire problem will be carried a stage further if the night quarters of our wintering gulls are also located.

Breeding places marked with an asterisk were described in Mr. Booth's paper of May, 1921.

WEST RIDING LOWLANDS

**Thorn Waste*.—Formerly a large colony. The ground has not been preserved for some years, and the present farm tenants have no knowledge of gulls having bred there.

**Fairburn, Nr. Castleford*.—Commenced about 1910. Approximately 180 pairs of gulls in 1938.

Allerton, Nr. Castleford.—A new colony containing about 30 pairs in 1938 (T. Kerr).

Bolton Ings, Nr. Darfield.—A small colony formed on flooded land about 1913, at which there were some 40 pairs in 1938.

WEST RIDING PENNINE AREA

Broomhead Moors, Nr. Sheffield.—A site occupied occasionally, generally in dry years. In 1929 and 1931 the keepers estimated the gulls at 30 pairs. In 1938 some 250 pairs attempted to breed, but many eggs were collected.

Howden Moors, Nr. Penistone.—Birds have nested each year since 1920. In 1938 over 200 hundred pairs arrived, but the keepers took many eggs and only about 20 pairs bred.

**Whiteholme Reservoir, Blackstone Edge*.—Has been colonised since 1921. In 1938 A. Gilpin counted 110 nests. The keeper estimated the birds at 200 pairs, but said some nests were destroyed in a moorland fire.

Saddleworth Moors, Nr. Greenfield.—Commenced in 1931 or earlier and was a large colony of about 1,000 pairs (F. Taylor). None present in 1938.

**Black Moss Reservoir, Marsden and Diggle Moors*.—Deserted in 1938 and the new keeper said no birds had bred there for some years, having been driven away by his predecessors. In 1913 F. Taylor estimated the colony at 150 pairs.

**Fly Flat Reservoir, Cock Hill Moor, Nr. Denholme*.—25 pairs in 1938 (J. Cordingley). The colony has existed since about 1901.

Black Hameldon, Hoarside Moor, Nr. Heptonstall.—11 pairs in 1938 (C. Oakes). The colony was formed in 1927 or earlier.

Garple Moor, Nr. Hebden Bridge.—A. Gilpin counted 25 nests in 1938, but the birds were driven away by keepers.

Waddington Fell, Clitheroe.—30 pairs in 1938 (C.O.); have nested since 1933 or earlier.

Elslack Moor, Nr. Skipton.—7 pairs in 1938. 4 young seen by W. J. Forrest.

* *Keighley Moor Dam.*—No birds have bred here for some years.

* *Dovenanter Moor, Nr. Keasden.*—In 1938, T. Kerr counted 45 nests about one tarn and 57 nests about another, estimating the number of birds on both tarns at about 150 pairs.

Rathmell Moor, Nr. Clapham.—A new colony or branch of the previous one formed in 1937; had 211 nesting pairs in 1938 (A. Clark).

* *Oughtershaw in Langstrathdale.*—Although formed as long ago as 1897, there were only 6 pairs present on May 15th, 1938 (J.C.), which had been robbed on June 6th and the birds had gone (T.K.).

* *Browsholme Tarn in Bowland.*—Deserted for some years prior to 1938. (J.C.).

Greensett Moss, Great Whernside.—Colony formed in 1921 (H.B.B.) and estimated in 1938 at 250 pairs (T. W. I. Cleashy).

Swarth Fell Tarn, Nr. Sedbergh.—2 pairs in 1938 (T.W.I.C.)

Baugh Fell, Nr. Sarthwaite, Nr. Sedbergh.—4 nests in 1938 (T. K.).

* *Upper Barden Reservoir.*—An old colony from about 1900, which persecution reduced and then drove away (J. C.).

* *Grassington Moor.*—This old colony had about 20 pairs in 1938 (H. B. Booth).

Gowthwaite Reservoir, Nr. Ramsgill, Nidderdale.—4 nests in 1938 (J. P. U.).

NORTH RIDING

Widdale Tarn, Nr. Hawes.—The colony was formed prior to 1916. In 1938 J. P. Utley found 19 nests, but some were afterwards robbed, and on June 19th there were 3 pairs of birds with nests (T. K.).

Dodd Fell Tarn, Nr. Hawes.—An old colony formed prior to 1916, in which there were 11 nests in 1938 (J. P. U.).

Semmerwater, Nr. Countersett.—A few birds were present in 1938, but there was no proof of breeding. (T. K.).

Summer Lodge Tarn, Nr. Askrigg.—Apparently a new colony, or rather a very old one restarted, in which there were some 800 birds in 1938 (T. K.).

* *Locker Tarn, Nr. Camperley, Wensleydale.*—6 pairs laid eggs in 1938 (J. P. U.), but later the eggs went and the birds too (T. K.).

Balockdale Reservoir, Nr. Cotherstone.—A small variable colony has existed from 1932 or earlier (J. P. U.).

Arkengarthdale.—5 pairs nested in 1938; eggs taken, birds driven away (T. K.).

Scaling Moors.—Possibly a new colony in which about 30 pairs bred in 1937, and fewer in 1938 (J. Lord).

May Moss, Nr. Saltergate.—20 pairs in 1938, a new colony (T. N. Roberts).

**Foul Syke Mere, Fylingdale Moor.*—Colony formed about 1893. Birds estimated at 50 pairs in 1938, as against 150 pairs in 1936 (T. N. R. and F. Snowdon).

EAST RIDING

**Skipwith Common.*—An old colony of some 600 pairs in 1938, many eggs were taken for food, but a number of birds hatched (J. A. Dell, T. K., etc.).

**Bubwith Ings.*—Abandoned some years prior to 1938.

BRYOPHYTES IN ULDALE

F. E. MILSOM.

WEATHER conditions made it impossible to carry out a planned excursion to Uldale on the occasion of the August meeting last year. Later on, however, opportunity arose for Mr. Cheetham and myself to spend some hours in the district, which was revealed as a very promising one for further detailed exploration. The time was spent chiefly on the left bank of the Rawthey, on which the rock-masses were mainly Millstone Grit, although limestone was by no means absent, as exemplified by the large areas of *Plagiobryum Zierii*, which was growing in vivid green tufts nearly two inches deep. An interesting feature was the dominance of *Brevetelia arcuata*, which was everywhere, though, as usual, no fruit was found. *Anaetangium compactum*, a rare moss in Yorkshire, was also frequent. The following list of the more interesting species seen indicates the richness of the district :

Dichodontium pellucidum Schp. c.fr.

Anaetangium compactum Schwaeg. c.fr.

Bartramia pomiformis Hedw. var. *crispa* B. & S. c.fr.

Webera elongata Schwaeg. c.fr.

Plagiobryum Zierii Lindb. c.fr.

Orthothecium intricatum B. & S.

Plagiothecium pulchellum B. & S. c.fr.

Lophozia bantriensis (Hook.) Steph.

Lejeunea patens Lindb.

CORRECTION

In the account of the Fungus Foray at Hovingham (*Naturalist*, April, 1939, p. 109), there has been some confusion in the report of a paper on 'Pure Cultures,' which I contributed to that meeting. The fungus in question was a *Beauveria*, not a *Melanospora*. It was not received directly from Baarn; and it was not my species, but my isolation.

T. PETCH.

SHORT-EARED OWLS NEAR YORK

E. WILFRED TAYLOR

ABOUT four miles south-east of the city is an area of low-lying bent-covered marshy land of perhaps 500 acres in extent bounded by ditches and hedges. Here in summer Snipe, Redshank, and Green Plover nest, even in that portion given over to golf, but in winter there is an absence of bird life except for Wild Duck and occasional Whooper Swans that visit a flooded corner.

On November 12th two strange birds were seen beating backwards and forwards over the bents in the most systematic manner. Their flight was buoyant and one was twice seen to alight on the ground and scuffle with what may have been a vole. At intervals the two birds would meet and salute each other by soaring upwards until their talons almost touched and then resume their independent ways. When they came to the boundary hedge they rose buoyantly and glided round through a half circle to commence the next beat.

A week later the number had increased to four, and at one time all four rose in the air and soared together at a considerable height before separating and hunting in the usual methodical manner throughout the hours of daylight. One was observed to rest in a tree a few feet from the ground for a short time, but generally all four could be seen as the wings are raised rather high above the back at times and a flash from the light coloured feathers on the flanks catches the eye. On another occasion one was seen perched high up on the branch of a tree, but posts and even the flag pole on one of the golf greens were occasionally used as perches.

Because of their diurnal habits, their methodical method of quartering the ground, and their hawk-like flight which in no way resembles that of the nocturnal owls, the writer's mind turned first to Harriers, but the birds proved to be Short-eared Owls.

It was thought that the falls of snow which commenced on December 18th would make hunting difficult and that the owls might move on, but they turned their attention more to the open ditches and hedgerows and appeared to thrive. By mid-January their numbers had diminished to two, and a week later only one was seen. By the end of the first week of February all had gone, or had they fallen to the keeper's gun in spite of the writer's efforts to secure their protection?

In Witherby's Handbook the following sentence refers to this species: 'Wings in flight look conspicuously long in proportion to size of bird, being narrower and less rounded than Long-eared Owls and suggest those of some diurnal bird of prey.' They do indeed!

MORE NOTES ON BIRD LIFE IN VICE-COUNTY 65.

MONTAGU'S HARRIER: SUCCESSFUL BREEDING.—I am glad to report that during 1938 a pair of Montagu's Harriers successfully reared a brood of four within the vice-county, and what is most gratifying, this was accomplished under the eyes of the gamekeeper. Should the pair return this year, the keeper has promised to give them all the protection he can.

HEN HARRIER IN SWALEDALE.—For a period of at least a month during the severe weather of this winter, a female Hen Harrier hunted regularly over a certain section of Swaledale. With the coming of more open weather she disappeared.

GREENSHANK SHOT ON LAKE SEMMERWATER.—During the autumn of 1938, a few Greenshanks visited the Lake. One was accidentally shot in October and is now in the collection of Mr. Outhwaite of Carr End.

OSPREY ON LAKE SEMMERWATER.—During the summer and autumn of 1938, and winter of 1938/39, an Osprey has put in occasional appearances on the lake. On more than one occasion in November and December it was observed while catching fish. No one has yet attempted to shoot the bird, and I have requested those most likely to be shooting around the lake to leave it in peace whenever it appears; this was agreed upon.

WHOOPEER SWANS ON LAKE SEMMERWATER.—These birds have never been absent from the lake this winter, though their numbers have varied from 5 to 32.

GREAT BLACK-BACKED GULL IN RAYDALE.—This locality is at present carrying too many carrion crows, and when a sheep was found which had perished in a recent heavy snow, the keeper planted a number of traps around it, pegged to the ground. In an hour he returned to find one trap missing. Later in the day he saw a large gull apparently in difficulties. On going to investigate he found the bird could not rise sufficiently to get away, but could flop about enough to keep out of his reach. He shot it and found the missing trap attached to one of its legs. I later identified the bird.

CROSSBILL.—I have, this winter, observed Crossbills in varying quantities in a number of woods in different parts of V.C. 65.

ALBINO HOUSE SPARROW.—Miss C. M. Rob reports that a pure white House Sparrow has taken up residence at Catton, V.C. 62.

J. P. UTLEY.

The Naturalist

THE RELATIONSHIP OF THE 'BASEMENT CLAYS' OF DIMLINGTON, BRIDLINGTON AND FILEY BAYS

W. S. BISAT, M.Sc., F.G.S.

INTRODUCTION

THE term Basement Clay was first used in 1868 by Wood and Rome (*Q.J.G.S.*, Vol. XXIV, p. 147) for 'a lead coloured clay abounding in chalk debris,' which in a section of the Holderness cliffs (*op. cit.*, p. 148) they showed occurring at Dimlington and from Hilston to Hornsea, but not at Bridlington. Somewhat later Lamplugh studied the beds at Bridlington containing the shelly inclusions known as 'Bridlington Crag,' first mentioned by Sedgwick in 1826, and described by Bean in 1835 (*Mag. Nat. Hist.*, VIII, p. 355). Lamplugh concluded that the beds were of the same age as the shelly beds at Dimlington which there form the lower and less chalky part of Wood and Rome's Basement Clay. His first paper (*Geol. Mag.*, 1878, p. 509) referred the Bridlington beds to the Basement Clay, and a year later (*Proc. Yorks. Geol. Soc.*, Vol. VII, p. 167) he discovered and described a similar bed of shelly clay on the foreshore at Reighton in Filey Bay. This bed also he referred to the Basement Clay, but pointed out that there was a thin bed of browner clay beneath it, which had not been observed elsewhere. In 1890 (*Proc. Yorks. Geol. Soc.*, Vol. XI, p. 281) he definitely restricted the term Basement Clay to 'a dark earthy boulder clay with shelly inclusions typically developed at Dimlington and Bridlington.' The erratics in the shelly clay were also receiving attention from Lamplugh. In his earliest paper (*Geol. Mag.*, 1878, p. 510) he said: 'the pebbles contained in it are chiefly small—being derived principally from the Lias, Oolite and Chalk,' but by 1884 (*Q.J.G.S.*, p. 312) he had found that 'it included an immense variety of rocks of various ages, igneous and metamorphic rocks being especially abundant'; while by 1890 (*Proc. Yorks. Geol. Soc.*, p. 288) he stated on the authority of Harker that some of these were 'probably from Scandinavia.' It should, however, be noted that Lamplugh, somewhat inconsistently, in 1890 (*Proc. Yorks. Geol. Soc.*, p. 281) and 1891 (*Q.J.G.S.*, Vol. XLVII, p. 407) included in the Basement Clay both the lowest boulder-clay of Sewerby Cliff, and the similar drab-grey clay forming the lower part of the cliff in Filey Bay, neither of which contain any quantity of shells or Scandinavian erratics.

Lamplugh's criteria, however, though not always followed by himself, laid the foundation for the modern view represented by Stather (*Proc. Yorks. Geol. Soc.*, Vol. XXI, p. 155,

1929) that the Basement Clay is a dark green or bluish clay containing mollusca and Scandinavian rocks.

On the other hand, Raistrick, in a description of the heavy mineral assemblage in the various beds of boulder-clay at Dimlington (*Geol. Mag.*, Vol. LXVI, p. 337), went back to the earlier criteria of Wood and Rome, and included all the drab chalky beds in the Basement Clay irrespective of the character of the erratics or the presence or absence of mollusca.

Agreement in terminology must, however, be dependent on much clearer views as to the number and character of the beds which occur in Holderness and elsewhere on the Yorkshire coast. With this end in view, and as part of a wider research embracing the whole of the Yorkshire coastal drifts, the writer has mapped in considerable detail most of the lower part of the Dimlington section, among others, and the following notes may prove helpful.

THE MAIN DIVISIONS OF THE HOLDERNESS COAST DRIFTS

It is only proposed to discuss in this paper the Basement and closely overlying beds of boulder-clay, but the following table of the main divisions of the complete sequence which I have found necessary for an analysis of the Holderness coast sequence is here inserted so as to ensure clarity in discussion.

The sequence of beds of boulder-clay recorded below are mostly separated by thin intercalated sediments, such as silts, sands and gravels, and the boulder-clays themselves frequently have at their summits thin 'rafts' or 'cakes' of undigested soft material, such as pugged chalk, Trias marl, Lias shale and grey boulder-clay streaks with greywackés, Carboniferous limestone and Lake District erratics.

The sequence forms a shallow syncline centred on Withernsea, and the beds of the Purple Series form the whole of the cliff both north and south of the town. Northward, the Upper Drab comes up into the cliff base at Tunstall, and in a northward traverse from there past Aldbrough, Hornsea and Atwick to Skipsea, one sees in the lower part of the cliff the successive outcrops of the Middle Drab, Lower Drab and Sub Drab. From Skipsea northward to Bridlington the cliffs are low and usually obscure, though apparently consisting of Lower and Sub Drab, whilst the Sewerby cliff is believed to be Sub Drab and Basement Drab.

Southward from Withernsea a truncated development of the Drab series is seen between Holmpton and Easington, in which the Upper and Middle Drab are apparently missing. The Basement and Sub Basement are exposed at Dimlington.

The Upper and Middle Drab are at present only known on the coast from the exposures between Tunstall and Skipsea,

being apparently absent elsewhere. It is thought possible, however, that the Hesse Clay is Middle Drab, or perhaps Sub Drab.

The amount of soft red Triassic sandstone present is little or none in the Basement clays, increases upwards in the

Division	Characteristics	Type Area
(9) Upper Purple in at least 2 beds.	Upper bed reddish-brown often mottled, lower bed dark oak-brown, few erratics, Border rocks persistent.	South of Withernsea. (These beds absent between Hornsea and Flamborough)
(8) Lower Purple in 3 beds.	Dominant colour dark Arabian brown : (c) Very dark, fair amount chalk. (b) Paler than above, brown silty base. (a) Reddish brown.	
(7) Upper Drab.	Maximum hard white chalk and grey flints.	
(6) Middle Drab.	Highest beds with Scandinavian erratics, black flints numerous but mostly chips, top bed a reddish drab.	Hornsea.
(5) Lower Drab.	Maximum of granites.	Atwick.
(4) Sub-Drab.	Dark drab-brown colour, few erratics, very little chalk.	Atwick.
(3) Basement Drab.	Much soft chalk and fresh black flints. Entry Carb. Lime, Border and Scottish Rocks.	Dimlington.
(2) Basement.	Gault-grey colour, erratics few and small, entry of chalk, black flint, and Mag. Lime. <i>Tellina</i> .	
(1) Sub-Basement.	Bluish-grey colour, pure Scandinavian erratics, many species mollusca, including <i>Dentalium</i> .	

Drab Series and reaches a maximum in the Purple Series. Its absence or rarity in the Drab Series not only in Holderness but also much further north in Robin Hood's Bay and at Uppgang, north of Whitby, is very difficult to explain on the normal land-ice theory of the origin of the drifts, when one considers the great outcrop of Trias in the Teesmouth area.

Reid's ascription of the beds at Atwick, Hornsea, Mappleton, and southwards past Withernsea all to Upper and Lower Purple is erroneous, as it involves the correlation of groups 5-7 with beds of groups 8-9.

(To be continued)

DISSECTING SMALL COLEOPTERA, ETC.

GEO. B. WALSH

THE needles mentioned on p. 90, par. 3, are No. 16, made by Hy. Milward & Sons. They are so fine that anything hotter than a small dying match flame ruins them. About a quarter of an inch of the eye end can be cut off to prevent 'whip,' and they can quite conveniently be mounted in a match stick. If they cannot be bought locally it may be necessary to apply to the manufacturers.

RECORDS

GIANT SQUID NEAR SCARBOROUGH

DURING January last information reached me that a large



Photo by]

Beak of *Architeuthis*, sp. ?

[W. J. Clarke

Squid had been stranded shortly before on the rocky coast at Ravenscar, a few miles north of Scarborough. Enquiries showed that in October last the creature, which measured 16 feet in length, with tentacles as thick as a man's arm, had washed ashore about half a mile north of Ravenscar. It was found by a local man named Shippey, who did not realize the importance of his discovery. He cut out the beak and took it home as a curiosity, and a portion of the body was cut up for baiting fishermen's lines. Mr. E. A. Wallis kindly obtained the loan of the beak for me, and I sent it to the British Museum in the hope that it might prove a means of identification. Mr. G. J. Crawford, of the Mollusca Depart-

ment, replied saying : ' I have no doubt from the size of the animal and the size and form of the jaws that it is an *Architeuthis*, but I am not able myself to suggest what the species is, and I do not think, with our present uncertain knowledge of this genus, that anybody could say with any sort of certainty.' Very few British records are known for the genus *Architeuthis*, which contains the largest Squids known to science, and it is unfortunate that no part of the animal which would lead to its identification could be secured.
—W. J. CLARKE.

VARIETIES OF MALLARD AT SCARBOROUGH

DURING recent years the Mallard has shown a considerable



Photo by **Mallard Drake** (White Var.) *[W. J. Clarke*
The dark marks on the drake are caused by soot gathered up from the dirty water in the Fishpond. The bird was all a good white without any dark markings. The black spot behind the eye is the scar of an old wound.

increase as a breeding species in the Scarborough district. Many frequent the Mere during the winter months, making excursions to the Fishpond in the Ramsdale Valley, and to the sea. A number of these now stay to breed, and at the time of writing there is a nest containing eggs in the small pond in the Ramsdale Valley, not very far away from the Scarborough railway station. Mallards tried to nest in the same place last year but the eggs were taken. Amongst the numerous birds which have been visiting these waters during the past three weeks have been two remarkable varieties of

the Mallard. One, a drake, is a pure white all over without a speck of dark colour in its plumage. It is not a true albino, however, as it has the usual orange coloured feet, a lemon yellow bill, and a dark eye. It is spending most of its time on the Fishpond, but is missing on some days. The other was a duck, also a good white in colour, but inclined to ashy grey on the head. Each large white feather on the back, scapulars, and wing coverts bore a pear-shaped brown spot in the centre, giving the bird a pretty speckled appearance. This specimen was present in the Valley pond for several days between March 16th and the 21st, but it has not been seen since the latter date. The drake is still there at present (April 5th). The two birds did not associate with one another, and the normal drakes chased both away when they came near them.—W. J. CLARKE.

ACRIDIDIUM AEGYPTIUM L. AT BARNESLEY

A SPECIMEN of this large locust, which had been imported with bananas, was brought to me on January 18th. I kept it alive for a fortnight, notwithstanding the spell of cold weather which then prevailed. Most of the time it was in a state of torpor, but soon became lively if handled. Its strength, even for such a large insect, was amazing, on one occasion drawing blood from my thumb by pressing into it the black-tipped white spines which are ranged in two rows on the upper side of the posterior tibiae.—E. G. BAYFORD.

NEWS FROM THE MAGAZINES

Science Progress for April (Vol. XXXIII, No. 132) contains six long articles which include 'Chemistry of Wine,' by Emeritus Professor J. T. Hewitt; 'Crop Pests and Diseases,' by C. T. Gimingham; and 'The Directional Sensitivity of the Retina,' by W. S. Stiles. There are the usual reports on recent advances in science, and a large number of reviews of recent scientific works.

The Journal of the Society for British Entomology, Vol. 1, Part 9, contains numerous short articles on entomological subjects, including 'Supplementary notes on the life history of *Micromus variegatus* Fab. (Neur.),' with a plate of larva; 'The first instar larva of *Nathanica capitata* Fabr. (Neur.),' with plate; 'Notes on the Wood Wasp *Xiphydria dromedarius* F. on the cricket bat willow'; 'A chalcidid hyper-parasite on a braconid,' with figure; 'A joint infestation of barley by *Lasiosina cinctipes* Mg. together with *Chlorops taeniopus* Mg. (Diptera, Chloropidae) and their hymenopterous parasites'; 'Acridiidae (Orth.) in Worcestershire, East Herefordshire, and Shropshire, with a note on their ecology in the Malvern Hills'; 'Odonata in North East Hants, 1938'; and 'Trichoptera in the Chitty collection' (The following species are recorded from Yorkshire. *Limnophilus lunatus*, *L. auricula*, *L. bipunctatus*, *Stenophylax stellatus*, *S. vibex*, *Micropterna lateralis*, *Ecclisiopteryx guttulata*, *Tinodes waeneri*, and *Polycentropus flavomaculatus*.)

GEOLOGICAL SOCIETY'S AWARDS

At the annual general meeting of the Geological Society of London, various awards were made to prominent geologists. The President, Professor H. H. Swinnerton, handed the Wollaston Medal to Professor F. D. Adams, who, in his reply, drew attention to the fact that the first award of their medal was made in the year 1831, to William Smith, the medal being presented to him by Professor Adam Sedgwick, who in his eloquent and stirring address delivered on this occasion referred to William Smith as the 'Father of English Geology,' a designation which he has borne ever since.

Dr. H. Jeffreys, who received the Murchison Medal, stated :

'I should like to acknowledge my indebtedness to my old teacher, Professor Lebour ; I am, thanks to him, still able to distinguish a trilobite from a graptolite with some confidence, though I should hesitate to go much further : to Dr. T. G. Bonney, who called my attention first to a way of making a valid comparison between the theoretical and the observed amounts of compression ; and also to my old friend Dr. J. W. Evans, who did his best to bring me up to date at a critical stage.'

The Lyell Medal was given to Professor W. N. Benson, and the Prestwich Medal to Mr. S. Hazzledine Warren.

The President pointed out that :

'Carrying your archæological inquiries, you made observations on the prehistory of the submerged land-surface of the Lincolnshire coast. From my knowledge of the difficulties which attend work in that area I can testify to your acumen and perseverance. In North Wales you discovered an important Neolithic axe factory in the vicinity of Penmaenmawr, in which you were able to trace the stages in the manufacture of the perfect implement.'

In his reply, Mr. Warren stated :

'With reference to your comment upon a flair for making discoveries, I would like to say a word to those who may be beginners, and it is this : what discoveries I have had the good fortune to make have come through persistently searching in neglected and often unlikely places, without being discouraged at drawing many blanks.'

Professor A. E. Trueman received the Bigsby Medal, to whom the President said :

'Taking advantage of the successive geographical locations in which you have been placed, you have carried out careful investigations in each area, and added much to our detailed knowledge of Liassic stratigraphy and palæontology, first of all in Lincolnshire and subsequently in South Wales and Somerset.'

The Wollaston Fund was handed to Mr. I. S. Double ; the Murchison Fund, to Dr. A. L. Coulson ; and the Lyell Fund, to Dr. W. Q. Kennedy and to Dr. A. Raistrick, to whom he said :

'The award of a moiety of the Lyell Fund is an indication of the value which the Council of this Society attaches to your wide, and at the same time intensive, work in various fields of inquiry in the North of England.

'By mapping the greater part of the Pennine region you have been able to throw much light upon the problems associated with the retreat of the ice and the phenomena which accompanied this.

'In the same region you have made a close examination of the distribution of mineral deposits and the history of their exploitation and the methods of working them.

'Belonging to a quite different category is his work upon peat and coal. Starting with a careful study of the pollen grains in peats he first applied the knowledge thus gained to more purely geological uses in an examination of post-glacial deposits. He then attacked the problems of the investigation of fossil pollen in coal seams, and so initiated a line

of research which has immediate application to the correlation of seams, but which promises, in due course, to prove of even greater value in the discrimination of the conditions under which particular masses of coal were formed.

Scarcely less important are the contributions made to the archæology of the North of England and the investigations upon the Carboniferous corals, more particularly the dibunophyllids.

THE PRESIDENT'S ADDRESS

The President then delivered his Anniversary Address. Its subject was the contribution made by Palæontology to an understanding of the Mechanics of Evolution. In this, palæontology has the advantage that the material it uses enables a comparison to be made between the stages of individual growth and the phases of evolutionary change. Its approach is therefore essentially dynamic rather than static. While descriptions and diagnoses will always be in terms of static characters, their full hereditary and evolutionary significance can be wholly appreciated only if the rates of growth of the various characters be taken into account. This dynamic background to the study of form has received attention from a number of biologists. In order to illustrate the bearing of some of their findings upon palæontological problems, a detailed study was made of *Ostrea irregularis* and its gryphæoid derivatives in the lowest levels of the Liassic rocks.

This species of *Ostrea* exhibits a wide range of variation in each of the characters which make up the shell. The result is the existence of differences as great as those which have led systematists to subdivide other long-established species into a number of new species. Nevertheless, *O. irregularis* must be regarded as a biological unity. In this connexion especial emphasis must be laid upon the fact that when the young growth stages of a large number of individuals belonging to such a well-recognised species as *Gryphæa incurva* are examined, they are found to exhibit not only a wide range of variability, but also many variations belonging to the same categories as those found in the ancestral ostreoid community. This can only mean that, notwithstanding its great variability, it was a freely breeding community, and that the total heritage passed on from community to community was relatively constant.

Darwin regarded every variety as an incipient species. The body of facts just mentioned do not accord with this view, for a very large proportion of the varieties seen in the ancestral community reappear in each of the descendant species communities of *Gryphæa*. There are indications that this is true also for other organisms.—T.S.

FOSSIL WORM TUBES

At a recent meeting of the Geological Society of London, Mr. L. H. Tonks exhibited some curious tubiform structures in sandstone and mudstone from beds lying seven inches above the Brockwell seam (base of the Middle Coal Measures). The specimens were obtained from a boring near Wrekenton, south-south-east of Newcastle upon Tyne. They showed cylindrical and funnel-shaped tubes running down from a quarter-inch band of rough micaceous mudstone through a half-inch sandstone band into slightly micaceous mudstone below.

It was suggested that they were the infilled burrows made by worms of the type of the modern arenicolids. Some members of this group inhabit single vertical burrows on modern beaches and estuaries, seeking their food in galleries and chambers running horizontally outwards in all directions. Crumpling of the original burrows may have taken place during consolidation of the deposits owing to the differing compressibilities of sand and mud.

CORRESPONDENCE

To the Editor of *The Naturalist*.

DEAR SIR,

The British Section of the International Committee for Bird Preservation, decided, towards the end of 1936, to conduct an investigation into the Status of the Anatidae in the British Isles, and for this purpose appointed a Wild Fowl Enquiry Committee. The Vertebrate Section of the Yorkshire Naturalists' Union was approached, and conducted, through its Recorders, a preliminary investigation into the matter as it effected the Anatidae within the county.

At the last meeting of the Section, Mr. H. F. Tetley addressed the members upon the records, and it was decided to endeavour to obtain a complete report on the Status of the Anatidae whether regular or occasional visitors.

It is hoped to obtain the assistance of all interested members of the Society in preparing the Yorkshire Record. The report should cover all the points raised in the Questionnaire which follows at the end of this letter.

The reference to the date of publication of Nelson's *Birds of Yorkshire* will be noted, particularly in view of Mr. Ralph Chislett's contribution to *The Naturalist* of March, 1939.

It is certain that a very valuable report will result if a sufficient number of field workers will co-operate on the lines intimated and that the information so obtained will also be very useful in helping to bring up to date that part of the *Birds of Yorkshire* which deals with the Anatidae.

A number of reprints of the Questionnaire will be available on application to the Secretary of the Vertebrate Section, at the address given below.

It is hoped that a start will be made at once, and that at a date to be advertised later, probably in the Spring of 1940, all reports will be forwarded to a Committee of the Vertebrate Section to be appointed for this purpose. This Committee would then draw up a summarised report for the Wild Fowl Enquiry Committee and extract all pertinent matter that will assist in bringing up to date this section of Nelson's *Birds of Yorkshire*.

Yours sincerely,
 REX PROCTER.

18 QUEEN SQUARE,
 LEEDS, 2.

QUESTIONNAIRE

STATUS OF THE ANATIDAE IN YORKSHIRE

N.B.—It is particularly requested that *all* species should be included, whether these are of commercial importance or not and whether they are scarce or regular. What is aimed at is to get detailed and accurate information as to the status of *all* Geese and Ducks that occur at the present day, species by species. It would be a great help if a comparison could be made with Nelson's *Birds of Yorkshire*, though this was published in 1907.

DUCKS

1. Give a list of Ducks breeding in your area and state whether they have increased or decreased within the last 25 years.
2. Give a list of migratory Ducks which visit your area during the shooting season and state whether they have increased or decreased within the last 25 years.
3. Are there any reservoirs or similar sheets of water in your area?

- If there are, when were they constructed and is shooting allowed on them?
4. Can you give an idea of the population of Ducks on such reservoirs *species by species*? If shooting is allowed can you get figures of numbers of each species killed each year?
 5. Can you give details of Ducks that occur on the Humber with some idea of their movements, *i.e.* time of arrival, time of maximum numbers and time of departure.
 6. Can you give similar details for any other area, *e.g.* Bridlington Bay, Filey Bay, Teesmouth?
 7. Have the feeding grounds changed?
 - (a) Through change of farming.
 - (b) Through draining and reclaiming.
 - (c) Through building.
 8. As far as you know has the discharge of oil at sea had any effects on Ducks or their feeding-grounds?
 9. From your *personal* knowledge are Ducks much disturbed by aeroplanes?

GEESE

10. What are the different kinds of Geese found in your area, and have they increased or decreased during the last 25 years? As regard Brent Geese, does the light-breasted or dark-breasted form predominate?
11. Can you give an *accurate* idea of the numbers of each species that occur?
12. Has there been any change in farming which affects the feeding-grounds of Geese (*e.g.* increase or decrease of corn or potatoes, or more land laid down to grass).
13. Do farmers complain of damage to their crops by Geese, and can you, from your personal knowledge, give any information?
14. Can you give any figures showing the number of Geese shot during the past 15 or 20 years?
15. What do the Black Geese feed on in your area?
16. What is the condition of Grass Wrack (*Zostera marina*) in your area? *N.B.*—This should be identified by an expert.
17. As far as you know, has the discharge of oil at sea effected the Geese in any way?
18. From your personal knowledge are Geese very much disturbed by aeroplanes, either intentionally or unintentionally? (Geese are usually disturbed and may be driven off or return when the machine has passed).

REVIEWS AND BOOK NOTICES

A Downland Year, by Tickner Edwardes, pp. vi+262. Illustrated by Jack Matthew. Methuen, 7/6. It is a great pleasure to have a new book by the author of *The Lore of the Honey-bee*, *Lift-luck on Southern Roads*, *Neighbourhood* and other delightful works dealing with country life. In **A Downland Year** Mr. Edwardes gives us a charming and appropriate paragraph for every day of the year. The book is packed with natural history lore and the author is a keen and accurate observer, as is evident on every page. Probably a slip of the pen accounts for the phrase 'The redwing is a big thrush.' It is of course the smallest of the thrushes seen in this country. We can recommend this book very warmly to all nature lovers. Open it where you will, and you will find something of interest.

Birds as Animals, by James Fisher, foreword by Julian Huxley, pp. xviii+282. Heinemann, 12/6. Here, in a comparatively small volume, is a plain statement of the whole science of ornithology, up to date, authoritative and exceedingly well written. Mr. Fisher is Assistant

Curator to the London Zoological Society and is Treasurer of the British Trust for Ornithology. When he was 21 he joined A. R. Glen's expedition to Spitzbergen as ornithologist and he is only 26 now. The volume under review discusses in considerable detail the problems confronting the present day ornithologist, and the author has evidently put in an immense amount of reading and collating of recent appropriate literature. Some idea of the magnitude of Mr. Fisher's task is obtained by a glance at the 802 references to ornithological books and papers arranged according to the 12 chapters of the book. Mr. Fisher has made a most important contribution to scientific ornithology and his book should be in the hands of all serious ornithologists.

Australian Parrots. Their Habits in Field and Aviary, by Neville W. Cayley, pp. xxviii+332, with 11 plates in colour and 19 other illustrations. Angus and Robertson, 15/-. Some of the most brilliantly-coloured birds in the world are to be found among the Australian parrots, and it is sad to think that some species are on the verge of extinction. Mr. Cayley gives here a comprehensive survey of the various groups of parrots and every species is dealt with most thoroughly. There are references to authorities for nomenclature and classification, a complete description of each bird, notes on distribution and status and, where appropriate, useful aviary notes are appended. The book will appeal to field ornithologists and to the aviarist who specialises in lorikeets, cockatoos, or parrakeets. The coloured plates and others are by the author and are very well done.

Round about Three Palace Green, by Estella Canziani, pp. xii+404, with 16 plates. Methuen, 15/-. Everyone will remember "The Piper of Dreams," the charming picture, reproductions of which were in every art shop window only a few years ago. The author of this book was the painter of the picture. Her mother was a well-known portrait painter and her father an Italian civil engineer. Her book is one of delightful reminiscences of life in and about her London home at number 3 Palace Green, in Kensington. This is the house which the late Mr. E. V. Lucas described as a "country cottage in London," and here the artist has spent the greater part of her life. Her book is filled with the gossip and correspondence of artists of two generations and gives a vivid picture of London life during the last 40 years. A part of Miss Canziani's early training at home was to regard the keeping of wild creatures in cages as a form of cruelty, and so she did not often visit the Zoo, but nevertheless had opportunities of many contacts with birds and other animals which could be kept as pets or attracted to the garden by the usual methods. Miss Canziani's book is delightfully readable.

Outlines of Evolutionary Biology by the late Arthur Dendy, pp. xlii+480 with 190 figures in the text. Fourth Edition revised by Maurice Burton. Constable, 16/-. This edition of a well-known work first published in 1912 follows exactly on the lines of the original author. The five parts into which the work is divided deal with Structure and functions of organisms—the cell theory: The evolution of sex; Variation and heredity; The theory and evidence of organic evolution: adaptation; Factors of organic evolution. Dr. Burton is, we think, fully justified in reissuing such a useful and popular work, and on the whole it was as well not to attempt a recasting of the chapters. Professor Dendy wrote for those who had had no previous biological training, and the very elementary treatment of the subject in the first chapters and indeed throughout the work increases the value of the book for teachers and students. There is a very good bibliography.

The Science of Animal Life by Arthur Ward Lindsey, pp. xii+656 with 304 figures in the text. Chapman & Hall, 15/-. Like most American books, Professor Lindsey's work is eminently readable.

The six sections of this book are mainly on conventional lines until we come to the sixth and last part. Here the author deals with man's place in the animal kingdom, his evolution, the effects of environments, and finally there are discussions on biological problems of society and man's future. The trend of the author's reasoning is well exemplified by the following quotation from the end of Chapter 29: 'Man has his surroundings well in hand, in spite of occasional earthquakes, droughts, floods, scourges of animal pests, and epidemics. If only he had himself as well in hand as his environment, the brilliance of his future would be difficult to exaggerate. Here lie the greatest biological problems of human life.'

NEWS FROM THE MAGAZINES

The Entomologist's Record for March contains 'On *Rhyacia festiva* Schiff. ssp. *conflua* Tr. and ssp. *thulei* Stdr,' by H. Bytinski-Salz (with plate); '*Micrambe aubrooki* sp. n. (Cryptophagidæ, Col.)—A beetle new to science,' by H. Donisthorpe (Manchester, November 1934, at chrysanthemum show, C. Jones); 'Zeller's Versuch; March 1839,' by T. B. Fletcher; 'Continuous Breeding, III, *Orrhodia rubiginea* Fab.,' by H. B. D. Kettlewell; 'Collecting Notes,' and supplement 'The British Noctuæ and their varieties,' by H. J. Turner.

In the *Proceedings of the Leeds Philosophical and Literary Society, Scientific Section*, Vol. III, Part IX, just received, Dr. H. C. Versey has a paper on 'The Humber Warp.' In this he states that: 'In 1877, H. F. Parsons pointed out the difference which exists between the river alluvia and the warp, and although providing no microscopical data he concluded that the warp was of tidal origin. In 1901, W. H. Wheeler maintained that it was physically impossible for detritus eroded from the Holderness Cliffs to reach, much more to be carried, up the Humber. The materials of the warp, therefore, he regarded as derived from the detritus brought down by the streams of the Ouse basin. The same view, although given rather less dogmatically, was stated by A. E. Butterfield in 1902. A contrary opinion had previously been stated by T. Sheppard, who attributed the warp to Holderness erosion, but suggested that a microscopical examination of the particles would seem useless. Specimens of the warp and of the river alluvia have been collected in all the major West Riding streams below and above the tidal limit. These have all been submitted to heavy mineral analyses. The results of these analyses are given. It is obvious that the composition of this warp is different in every essential from that of the river alluvia. These latter seem divisible into northern and southern groups. In view of the resemblances mentioned above and the complete lack of correlation between the warp residue and the solid rocks in the Ouse basin, it is concluded that the warp represents material eroded from the Holderness coast and transported, tidally, up the Humber. It is just possible that it might have come second hand through the erosion of the older warps along the banks of the estuary, but this is rendered less likely from the fact that deposition, rather than erosion, is the prevailing process to-day.'¹ As showing the variety of material published by this society, the other memoirs have the following headings: Some further experiments on the excitation potentials of mercury vapour; Note on the magnetic properties of ferric oxide at low temperatures; The widths of X-ray reflections from metals at 86° and 293° absolute; Note on the energy distribution of electrons emitted from a hot filament; The formation of a new cell wall at cell division; The wall of the conifer tracheid as a single spiral complex.

¹ Marine diatoms occur in the Humber and in the Ouse as far as York.—T.S.

THE VEGETATION OF YORKSHIRE AND SUPPLEMENT TO THE FLORAS OF THE COUNTY

(Continued from page 120)

Linaria minor (L.) Desf. (*L. viscida* Mœnch.).

An early record is in Lune drainage at Feizor, John Tatham, June, 1835; the apothecary, Clapham, had a private botanic garden here.

L. spuria (L.) Mill. and *L. Elatine* (L.) Mill.

Are crop-seed imported casuals.

L. Cymbalaria (L.) Mill.

Antirrhinum majus L.

A. Orontium L.

A weed of cultivation not maintaining its hold.

Scrophularia vernalis L.

A denizen in North and West Ridings. There is a specimen in *Herb. Nicholson*, Vol. 8, localised 'Lady Wood, Hickleton' circa 1831.

S. aquatica L.

S. nodosa L.

Mimulus guttatus DC. (*Langsdorfii* Donn.).

Some notes on early Yorkshire records are in *Nat.*, 1938, p. 55.

M. moschatus Douglass.

On a sand spit, Oak Beck, above Harrogate gas works, 1893; Farnley Mills, near Huddersfield, W. E. L. Wattam, *Nat.*, 1936, p. 65.

Limosella aquatica L. :

Digitalis purpurea L.

Erinus alpinus L.

In North Riding, Sleddale quarry, Hawes-Oughtershaw road, see *Hawes Circular*, 396, 1936. In West Riding, first report, H. T. Soppitt, 1896. On bank of stream near Dunsop Bridge. Also seen by Y.N.U. members, May, 1896, on rocky railway bank between Rimmington and Chatburn. J.F.P., 1908, says most of the sites are just within Lancastrian bounds.

Veronica officinalis L.

V. serpyllifolia L.

V. Chamædryas L.

Veronica montana L.

V. scutellata L.

V. Beccabunga L.

V. Anagallis-aquatica L.

V. arvensis L.

V. triphyllos L.

Is not given in East Yorks. Flora. Not recently seen at York.

V. persica Poir. (*Buxbaumii* Ten.).

V. agrestis L.

V. polita Fr. (*didyma* Ten.).

V. acinifolia L., *V. repens* DC., *V. digitata* Vahl., and *V. peregrina* L.

Are beginning to appear as weeds in our fields. *V. digitata* was really the '*peregrina*' of the Sandal quarry tip.

Euphrasia micrantha Reichb. (*E. gracilis* Fries).

V.C. 62, Helmsley, J. G. Baker ; V.C. 64, Gordale, W.A.S. ; V.C.65, Cotherstone, Thompson.

E. scotica Wettstein.

V.C. 65, Cronkley Fell, Miss Todd.

E. nemorosa Löhr.

The commonest form of Eyebright throughout the county.

E. borealis Townsend.

V.C. 62, Fylingdales, H. W. Pugsley ; V.C. 64, Kettlewell and Ribbleshead, H.W.P. and W.A.S.

E. brevipila Burn. and Grem.

V.C. 61, Bempton, Edwards ; V.C. 62, Thirsk, J. G. Baker. Doubtless also in Mid. and North-west Yorks.

E. Rostkoviana Hayne.

V.C. 62, Warthill, Ingham ; V.C. 65, Sedbergh, Ingham.

E. montana Jord.

V.C. 64, Grassington and Ribbleshead, H. W. Pugsley ; Tarn Moss, Malham, W.A.S.

E. curta Wettst.

Also occurs and Mr. J. F. Pickard writes : ' Lees' *E. salisburgensis* Funck. in the Deepdale to Wensley area (specimens at South Kensington) are, I understood Mr. Wilmott to say, identical with the Irish ones.' This is not mentioned in the Lees' MS.

Bartsia alpina L.

Dr. Lees adds a third station for this, Wetherfell in Yore sloping down to Marsett, north-west of Semmerwater ! It is not recorded for East Riding.

B. Odontites Huds.

var. *verna* (Reichb.). Countersett side, and on grassy turf over limestone with *B. alpina* sparingly towards Marsett Slack (1886) and *teste* E. S. Marshall, from lane side, Barwick in Elmete.

var. *serotina* (Bert.). Is the prevailing growth in stubbles and on limey roadsides throughout the county.

Pedicularis palustris L.

P. sylvatica L.

Rhinanthus major Ehrh.

R. Crista-galli L.

Of the segregate micro-species the Tees (Cronkley) pasture forms are seen to fall best under the sub-alpine *monticola* (Stern.) Dr., and A. E. Bradley noted a great abundance of this near Malham Tarn, where *Bartsia alpina* grows. It also occurs in Upper Swale ! and Highest Wharfe !

Melampyrum cristatum L.

Casual or call it colonist-failure.

M. pratense L.

var. *latifolium* S. and M. (a state ?). Meanwood ! Nidd scarp, near St. Robert's Cave, 1893 ! Scotton Banks, 1906, and 2 miles further up !

var. *ericetorum* D. Oliver. West flank of Fountain's Fell, 1907, C.W. ! ; Birk Riggs above Appersett, 1885 ! ; Embsay Crag, J.B. ; Harlow Moor, 1893, J.F.

forma *montanum* Johnst. I look on as a growth under hardships.

var. *hians* Druce. Scrub at Winch Bridge, G.C.D. ! 1909 ; Whitendale, Bowland, J.F.P., 1909 ! Honley 'Old Woods,' G.C.D. (*Nat.*, 1911, 322).

M. sylvaticum L.

Other localities are Oughtershaw Hall (Woodd's list and J.B., 1904, Hb. !) ; Park Scar Scrub (Colt Park Wood), Ribbleshead, J.B., 1891 !

OROBANCHACEÆ

Orobanche Rapum-genistæ Thuill.

Not *O. major* L. which = *elatior* Sutt., but the *major* of Lond. Cat., 9th and 10th Edns. Howgill, 1903, J.H., *teste*

Alb. Wilson (*Nat.*, 10/1903). Wooded bank below Tanfield, Ripon botanists (*vide* C.W.). A spn. in Herb. C.A.C., 18/7/03 is clearly not *procera* nor *elatior* ! In Holderness, Keyingham only (C.W. MS.).

Orobranche rubra Sm. (*alba* Steph., **Epithymum** DC.).

Not given in East Riding Flora. Holwick whin-sill exposures, singly ! ; Scar ledges, Crookacre, towards Coniston, 1 spn. 1908 !

O. elatior Sutton (*O. major* L. of Ind. Kew and Oxford list).

Not given in West Riding Flora.

O. reticulata (Wallr.) Beck.

Between Thorner and Bardsey on the slope of the magnesian limestone 'Permian' overlay to the east of the Millstone Grit crag face of Etchell, first gathered by J.F.P. in 1902 ! ; let pass by me as '*O. major*,' then again in 1907 and 1908 (Herb. A. E. Bradley !) by H. E. Craven, who, not convinced it was *major*, sent it to G. C. Druce, who in July, 1908, sent it to Dr. Gunther Beck. Mr. Craven insisted the host plant was *Cirsium eriophorum*. From 1870 to 1879 the writer was practising his profession at Thorner and marked the gradual increase of the *Cirsium*, yet he could swear that there was no rape there during that time.

O. minor Sm.

Another locality is Cawood, 14/9/90, Geo. Roberts !

O. ramosa L.

An additional record is on tomato roots in Thorngumbald, East Riding, H. Knight (Herb. J.F.R. spns !).

Lathræa Squamaria L.

LENTIBULARIACEÆ

Utricularia vulgaris L.

The old records in N.Y. Flora include two species, as do those of my own 1888 Flora. I can only differentiate for a few of the places. Queen Mary's Dub by river above Ripon Bridge ! and Littlethorpe (Slater) ! Sandall brick ponds, H.H.C., J.F.P., and ! 3/8/1897. An '*U. major*' (*Nat.*, December, 1908), Hawkland Moss (C. Waterfall) is flowerless, but I think may prove to be *neglecta* Lehm. In the East Riding *U. vulgaris* is abundant enough.

U. neglecta Lehm. (**major** Schmid.).

Austwick and Lawkland Mosses, C.W., C.A.C., and J.F.P. ! Specimens all flowerless so somewhat doubtful as yet. Ferrybridge and Fryston district (Y.N.U. excur., A. H. Pawson,

1895); Strensall Common (J. Abbott !), less certainly because no flower; Dringhouses' bridge; north end Askham Bog! In the *Nat.*, 1913, p. 19, A. Bennett says there are specimens of *neglecta* from Potteric Carr.

***Utricularia ochroleuca* Hartm.**

In the *Nat.*, 1913, p. 19, A. Bennett refers to specimens from Strensall Common gathered by G. Stabler in 1881.

***U. intermedia* Hayne.**

Mr. Bennett considers specimens from Strensall Common gathered by A. Templeman and sent to him by H. J. Wilkinson to be this species.

***U. minor* L.**

***Pinguicula vulgaris* L.**

VERBENACEÆ

***Verbena officinalis* L.**

Additional localities are St. Helen's Ford, Thorp Arch, 16/7/1900!; Wath village, 1834, Herb. G. P. Nicholson; Great Wold Valley, Wold Newton, and Weaverthorpe, seen twice in one day's walk!; Driffeld Wold, 1886, Herb. M. Harman (J.F.R., MS.).

LABIATÆ

***Mentha rotundifolia* Huds.**

Not mentioned in East Riding Flora. Mr. A. E. Bradley finds two mints in King Lane, near the bridge over Blackmoor Beck, and in a cross lane leading to Pen-y-fynnon, neither of which can be placed fairly under either *rotundifolia* or *sylvestris* (Adel district).

***M. sylvestris* L. (*longifolia* (L.) Huds.).**

Not given in East Riding Flora. In 1880, Henry Ibbotson, visiting me at Wetherby, said that this species, which he discovered in plenty in its Wass locality—'the hill slope by a streamlet as far down as the highroad to Coxwold'—had decreased much in quantity. In 1885 I sought it in vain below West Burton.

***M. spicata* Huds. = *M. viridis* L.**

***M. piperita* L.**

***M. rubra* Huds.**

The forma *Wirtgeniana* F. Schultz. Bottom of wet hedge bank, Sedbergh, J.H. (*Nat.*, 1900, 298); rivulet near Giggleswick, 1833, B. Thompson, in Herb. Nicholson, Vol. 8, fol. 19.

Mentha aquatica L. (*hirsuta* Huds.).

var. *subglabra* Baker. Waterford Gill, near Skipton. So named for Mr. Rotheray.

M. arvensis L.

var. *agrestis* (Sole) Sm. Near Midgley in Herb. Gibson (now at Halifax), Flo. Hfx. 84.

M. Pulegium L.

Lycopus europæus L.

Origanum vulgare L.

var. *virens* G. and G. has been found as a ballast casual at Middlesbrough.

O. Onites L. and **O. Marjorana**.

Have occurred as escapes once or twice.

Thymus Serpyllum L.

Satureia Calamintha Scheele (*Calamintha ascendens* (Jord.) Dr.).

S. Nepeta (L.) Scheele.

S. Acinos (L.) Scheele (*arvensis* Lam.).

Hyssopus officinalis L.

Garden escape naturalised, Pontefract Castle and Knaresborough.

Clinopodium vulgare L. (*Calamintha Clinopodium* Spenn.).

Salvia Verbenaca L.

The var. *anglica* Jord. and Fourr. Rare on the west but not unfrequent on the east of the county. Other species have occurred casually; these include *pratensis* L., *controversa* Ten. (*clandestina* L. Hb.), *verticillata* L., *viridis* L., *Horminum* L., *sylvestris* L., *ceratophylloides* Ardnini., *Æthiopis* L.

Nepeta Cataria L.

N. hederacea (L.) Trev. (*Glechoma*).

Dracocephalum Moldavica L. (vel. *parviflorum* Nutt.).

A grain-alien. Has been found at York, Wakefield, and Mirfield.

Scutellaria galericulata L.

S. minor Huds.

An additional record is Keasden, near Clapham, *Nat.*, 1933, 285, C.A.C.

Prunella vulgaris L.

P. pennsylvanica Willd. and **Sideritis montana** L.

Have occurred casually.

Marrubium vulgare L.

An additional locality is 'Linton Common on the bridle path to Spofforth, many plants in rough ground,' Val. Palmer, July, 1911.

Stachys sylvatica L.

Hyb. *S. ambigua* Sm. (*sylvatica* × *palustris*). Often found where the parents impinge upon one another's colonies.

S. palustris L.

S. arvensis L.

S. lanata Jacq.

Alien, now gone from Thirsk.

S. annua L.

Calderside and Hull dock, alien, and J. Green, Thornton-le-Dale, *Nat.*, 1932, p. 19.

S. officinalis (L.) Trevis. (Betonica).

The var. *nana* Druce is perhaps what Robinson noticed on South Dalton Moor, Cherry Burton.

Galeopsis Tetrahit L.

G. speciosa Mill. (versicolor Curt.).

G. dubia Leers. (villosa Huds., ochroleuca Lam.).

Not given in North Riding Flora.

G. Ladanum L.

var. *Kernerii* Briq. 'York,' G. C. Druce.

(Type) *intermedia* Vill. Mainly alien. Noted at Goole and Apperley Bridge, also on a poultry run at Headingley.

Leonurus Cardiaca L.

A failing denizen hardly now surviving in any Flora station. In East Riding, near Barlby, Brumby, and Boulton, 1905, and Cliff Common, 1909, Robinson MS.

Wiedemannia (Betonica) orientalis Fisch., Moluccella lævis L., Lamium bifidum Cyr. (longiflorum Ten.), and Horminum canescens Ort.

All occurred as grain aliens by the Calder (P.F.L. !).

Lamium album L.

L. bithynicum Benth.

Named by Druce, from Wakefield.

L. maculatum L., L. purpureum L., L. hybridum Vill. (incisum Willd.), L. moluccellifolium Fr. (intermedium E.B.).

All recorded as aliens or garden escapes.

Lamium amplexicaule L.

L. Galeobdolon (L.) Grantz.

Ballota nigra L. (*foetida* Lam.).

Teucrium Scorodonia L.

T. Scordium L.

Doubtfully surviving now either at Bolton-on-Swale, Potteric Carrs, or Washingborough fen.

Ajuga reptans L.

PLANTAGINACEÆ

Plantago Coronopus L.

Another inland record is Fox Royd lane top, Thornhill Edge, H. Parkinson ! More plentiful and better established, though not in the adjacent quarries and coal-shale soiled fields than I know it elsewhere off the coast.

P. arenaria W. and K. (*ramosa* Asch.).

A casual, never permanent, but constantly reinforced.

P. maritima L.

Other inland occurrences are Kirby Stephen road near Sedbergh railway station, W. Robinson ; Threshfield Moor, near mine workings, 1908, D. Wilks ! ; as casual on Wakefield bargemen's quayside tip, 1906, J.C. !

P. lanceolata L.

var. *Timbali* Jord. Always casual, coal pit spoil heaps, Garforth !

var. *sphaerostachya* Rockl. Whitendale Head, J.F.P., at 1,100 ft., Camfell, still higher !

P. tenuiflora W. and K.

Alien, Wheatley (aspin), Flo. Hfx., 306.

P. Lagopus L.

Also at Mirfield (P.F.L. !) ; Wakefield (J.C.) ; Heslington, York, 1909 (H.S.) !

P. media L.

P. major L.

Littorella uniflora (L.) Asch. (*L. lacustris* L., *junceae* Berg.).

Gunthwaite (banks of a pond, 1884, and since, T. W. Woodhead, *Nat.*, 1892, 258) is an additional record.

(To be continued)

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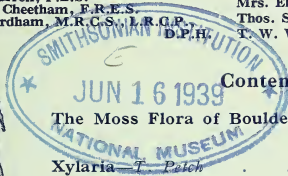
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THE MOSS FLORA OF BOULDERS

CHRIS. A. CHEETHAM

THIS paper is a result of residence in a district where boulders are a feature of the landscape. By boulders I mean masses of rock detached and removed from their original source; this may be due to falling down a hill-slope or by being moved away by the action of ice or running water. The moss flora developed on them is influenced by the texture of the rock, by the situation of the boulders and by the chemical nature of the rock.

Four rock types are reviewed here, the Millstone grit having the coarsest grain and the Carboniferous or Mountain limestone the finest. The Austwick grit belonging to the Silurian series is fine grained and the last of the four is a conglomerate consisting of small Silurian pebbles, or shingle, cemented together by a matrix of limestone.

Situation influences the water content of the rock; some boulders may be standing on a well-drained base while others may be partly submerged in a boggy area, or again, the surrounding vegetation may vary from short grass to deep bracken growth or the boulders may be under trees.

A visit to the summit of Bowland Knotts to examine detached Millstone grit boulders proved fruitless as no mosses grew on them, though the rainfall here is high. A dry-built Millstone grit wall is always without mosses unless it is a sunk wall built up against a bank of soil where the constant supply of moisture induces a good moss flora.

The chemical influence of lime is probably shown by the constant occurrence of two members of the *Grimmia* family: *Rhacomitrium heterostichum* and *R. protensum* on the siliceous Austwick grits while two others, *Grimmia pulvinata* and *G. apocarpa*, are always on the Mountain limestone. These two rocks have each a fine close grain but one is a limestone.

The 'Austwick grit' boulders of Silurian age are well known to geologists and the perched blocks of Norber are examined by all geologists who visit the district. This fine hard siliceous rock was apparently divided into blocks when *in situ* and so prepared for the moving ice sheet to carry away and eventually distribute over the countryside. For long bryologists have noted a small group of mosses on these boulders, and recently I made a census of the species to be found on them. In most cases when only one species occurred it was a tufted dark green moss hoary with grey hair points, *Rhacomitrium heterostichum* Brid.; less frequent were other species of this genus, *R. fasciculare* Brid. a creeping, yellower coloured species and a tufted darker green moss lacking any hair point and difficult to identify as it is an abnormal small growth of the large yellow-brown species *R. protensum* Braun. The type of this is quite rare at Austwick but plentiful in the

Ingleton ghylls and in the Lake District. I had previously considered this tufted small growth to be the hairless variety of *R. heterostichum* known as var. *gracilescens*.

Another moss, *R. lanuginosum* Brid., is not such a definite rock lover as the foregoing, but the small dark purple species of *Andreaea*, *petrophila* Ehrh. and *Rothii* W. & M., are true alpine rock mosses which occur here at the low elevation of 800 ft. O.D.

Another group of mosses evidently found here because dust and plant debris have accumulated or water has lodged in hollows include, first, the deep-tufted *Campylopus flexuosus* Brid., next the small stiff *Polytrichum piliferum* Schreb. and *Rhacomitrium lanuginosum* Brid. and *Campylopus atrovirens* De Not.

There is another set of mosses usually growing on the soil which creep up the boulders when conditions are favourable, say, when the boulder is more deeply sunk in the soil, this group includes *Polytrichum commune* L., *Dicranum scoparium* Hedw. and *Hypnum cupressiforme* L.

Occasionally there are lumps of a softer type of rock included in these boulders and in such places the minute *Seligeria recurvata* B. & S. is usually found, and on this softer material I have found *Grimmia apocarpa* Hedw. and *Orthotrichum anomalum* var. *saxatile* mosses typical of limestone rocks.

It soon became evident that water was the determining factor, for where the boulders were perched upon the limestone pavement very few mosses were found, the area being too well drained and the boulders exposed to sun and wind, but where the soil is heavier and especially where bracken is abundant this moss flora is best developed. Should there be still more shelter and dripping moisture from small bushes or if the boulder is almost buried in soil, *Hypnum cupressiforme* L. spreads upward and eventually becomes the chief moss. By following up this question of shelter and moisture and examining the same type of boulders in a woodland area the *Hypnum* is seen to overrun the whole rock surface to the exclusion of all others. These mosses influenced by accumulated debris or creeping upwards from the soil may be found on all the various types of boulders where conditions are favourable.

The next series of boulders is a very interesting set of rocks broken away from the mass of conglomerate at the head of Norber Syke, this is a shingle mass of broken Silurian slates and grits which was washed into a hollow of the sea bed and there cemented together by limestone as this was deposited in the Carboniferous period. The conglomerate is consequently half Silurian grit and half limestone and it carries a distinctive set of mosses, one, found nowhere else in the district, I consider

to be *Trichostomum nitidum*? I use the name with a ? as lately experts have named it var. *fragilifolium* of *T. tortuosum* (reference may be made to *Naturalist*, 1937, pp. 103-4). Typical *T. tortuosum* is found on these boulders with *Grimmia apocarpa* Hedw. and these two are typical of limestone rocks, while another moss on this conglomerate, *Pterogonium gracile* Swartz., is always found on slaty rocks, the mosses showing the composite nature of the boulders. A few of these conglomerate boulders were carried by the ice stream a mile or more away in the direction of Clapham. On these the moss flora is still the same, though the situation now faces south instead of east.

If we examine limestone boulders away from the limestone area we find another definite set of mosses: *Trichostomum*

CONGLOMERATES HIGHER UP HILLSIDE.

<i>Pterogonium gracile</i>	...	×	—	—	—	—	—	—	—	—
<i>Grimmia apocarpa</i>	...	×	—	×	—	×	×	—	×	×
<i>Trichostomum nitidum</i>	...	×	×	×	×	×	×	×	×	×
<i>T. tortuosum</i>	...	—	×	×	×	×	×	×	×	×
<i>Hypnum cupressiforme</i>	...	—	×	×	×	×	×	×	×	—
<i>Campylopus sericeum</i>	...	—	—	—	—	—	×	—	—	×
<i>Bryum?</i>	...	...	...	—	—	×	—	—	—	×
<i>Grimmia pulvinata</i>	...	—	—	—	—	—	—	×	—	×
<i>Orthotrichum anomalum</i>	...	—	—	—	—	—	—	—	—	×

tortuosum, *Grimmia apocarpa*, *Orthotrichum anomalum* var. *saxatile*, and *Hypnum molluscum* Hedw. being usually present. Such limestone boulders are easily distinguished at a distance by their moss covering, for they carry a great deal more moss than the Silurian or Millstone grit rocks ever do.

The Millstone grit boulders are the most barren and are much more influenced by water conditions. For long I have considered the var. *gracilescens* of *Rhacomitrium heterostichum* to be the only moss adapted to this rock, but Mr. F. E. Milsom brought to my notice a note in the *Journal of Botany* by W. R. Sherrin, A.L.S., pointing out that this moss is *R. sudeticum* B. & S. and that var. *gracilescens* is rarely found. An examination of a gathering made from a wide area of these Millstone grit rocks on Ingleborough and Penyghent certainly agrees with his description of *R. sudeticum*.

Typical mosses for the various types of boulders mentioned may be said to be as follows:

Austwick grits (Silurian), *R. heterostichum* and *R. protensum* (small dark form).

Norber conglomerate, *Trichostomum nitidum?* and *Pterogonium gracile*.

Limestone, *Grimmia apocarpa*, *Orthotrichum anomalum* var. *saxatile* and *Hypnum molluscum*.

Millstone grit, *Rhacomitrium sudeticum* (*R. heterostichum* var. *gracilescens*).

T. PETCH

THE following notes on *Xylaria* were read on my behalf at the Fungus Foray at Hovingham in September, 1938. It had been hoped to give a summary of the British species of the genus, as was done for *Hypoxylon* the previous year (see *Naturalist*, April, 1938, 115-118), but the list is too uncertain, chiefly because the available specimens are insufficient. It is possible, however, to make some corrections, and these notes may serve to prevent waste of time in identification. There are fifteen alleged species in the British list, viz.:

X. hypoxylon, *X. polymorpha*, *X. corniformis*, *X. longipes*,
X. bulbosa.

X. digitata, *X. scotica*, *X. tortuosa*.

X. pedunculata, *X. vaporaria*, *X. Tulasnei*.

X. carpophila, *X. filiformis*, *X. hippotrichoides*, *X. oxyacanthæ*.

X. hypoxylon and *X. polymorpha* are well-known species, and numerous figures are available. The former is the common candle-snuff fungus and has ascospores $12-14 \times 5-6\mu$; the latter has ascospores $20-32 \times 5-9\mu$. What is the colour of *X. polymorpha* when young? Winter says it is earthy brown; Cooke says dirty white.

X. corniformis was recorded by Berkeley from Speke Hall, Lancs. Plowright gathered specimens in Norfolk which he at first assigned to *X. corniformis*, but subsequently published as *X. longipes*. *X. corniformis* was recorded for Mulgrave Woods at the Fungus Foray of 1900, but at the Fungus Foray at Mulgrave in 1930 one of our American visitors identified a specimen as *X. longipes*. The latter has also been found at Berry Pomeroy, Devon. I have examined the available British collections of *X. corniformis* and *X. longipes*, and there is no doubt that they are all the same species, which for the present must be assigned to *X. longipes*. Whether the Continental *X. corniformis* is different from *X. longipes* is uncertain. The former is said to have ascospores $8-9 \times 5\mu$, and the latter $12-16 \times 5-7\mu$, but the variation in the size of the ascospores in a *Xylaria* is usually large. *X. longipes* is about 8 cm. high, with a well-defined stalk, thickened at the base, and a cylindrical head. It has the habit of growing in a cluster from the lower side of a fallen branch and curving upwards. In the immature state it should be pale yellow.

X. bulbosa is a very rare species which grows among pine needles, and has been found once in this country, by Broome at Bath. It has a tuberous base, about 2 cm. thick, and a stout stem which forks at the apex. Its ascospores are given as $12 \times 4\mu$, so it comes near *X. hypoxylon* in that respect, and it may be a form of that species.

X. digitata was apparently common fifty years ago, but it appears to be rare now. It seemed to have a preference for worked timber, and was said to occur frequently at the

base of gate posts. Now that gate posts are treated with a preservative, or made of concrete, it does not get so much chance. It owes its name to the fact that several clubs usually arise from a common sclerotioid base. It may be passed over as *X. hypoxylon*, but it is a different shape and has larger spores, $18-20 \times 5-6\mu$. It is white when immature.

X. scotica was first brought to notice by being exhibited at a fungus show at Perth. Specimens were sent to Cooke, who gave it its name. There is an abundance of specimens of that collection in the Kew Herbarium, but it has never been recorded again. The larger specimens are very striking. They have a long stalk which divides into two branches, and these divide again at the apex into clusters of clubs. But when one examines the specimens it is found that the soil mark is just below the clubs. The stalk was underground and might be regarded as a rhizomorph. It was said to have grown 'on the ground in wood, Meikleour Woods,' but from correspondence at Kew it would appear that that should have been on wood in the ground, actually in a flower bed. Cooke said that the spores were $5-6 \times 3\mu$, and he figured those spores on the herbarium sheet. Actually, the specimens are quite immature, the asci just beginning to develop, and the 'spores' figured by Cooke are the cells at the base of the perithecium, from which the asci develop. I have no doubt that *X. scotica* is immature *X. digitata*.

Sowerby was given a distorted branched specimen of a *Xylaria* about 140 years ago which he labelled *Sphaeria tortuosa* but did not publish. Cooke found the specimen in the Kew Herbarium and described it as *X. tortuosa*. It grew in a greenhouse on the ground, but in all probability from buried wood, and it is an abnormality of *X. digitata*.

The next three species grow on manure or manured ground. *X. pedunculata* was originally described from British specimens in 1785, but it is apparently rare. I have specimens from Missouri which grew in a ploughed field. It is possible that it was carried into the field with manure, as it grows from a sclerotium. It has a long thin stalk and a globose or conical head. Its spores are remarkably large, $40-57 \times 20-27\mu$, and are black with a thick hyaline mucous coat.

A sclerotium was found in a mushroom bed in Cornwall and was sent to Currey, who planted it in damp sand, covered it with a bell glass, and kept it moist in a warm room in a window facing south. It soon produced the clubs of a *Xylaria*, which matured in three months. Berkeley described it as a new species, *X. vaporaria*, but there is no doubt that it is *X. pedunculata*.

X. Tulasnei grows on rabbit dung. It is similar to *X. pedunculata*, but is very small with similar spores only half the size. Berkeley and Tulasne considered it a small form of *X. pedunculata*. Plowright figured it in *Trans. British Mycol.*

Soc. growing on a rabbit pellet on the surface of the ground, and also from a buried pellet. His figure of the latter resembles *X. pedunculata*, but he did not record any difference in the size of the spores in the two forms. I have not found a sclerotium in a rabbit pellet which bears *X. Tulasnei*, but further specimens are required to decide that point. Recently, owing to the spread of mushroom cultivation, these *Xylarias* have come into the news as infesting mushroom beds, and I have been informed that in these cases *X. Tulasnei* has been developed from small worm-like sclerotia found in such beds. In that case it would perhaps be preferable to regard *X. Tulasnei* as a small form of *X. pedunculata*.

The last group includes three species which produce long black cords, or rhizomorphs. *X. carpophila* is common on Beech mast, but is seldom found mature. Mature specimens were collected at Hovingham in September, 1938, the clavæ developing on the inner side of a Beech cupule, not on the rhizomorph. The spores measured $11-13 \times 4.5-6\mu$. Similarly, *X. filiformis* occurs among dead leaves, but is usually sterile. If one finds coarse black strands springing from Beech mast one calls it *X. carpophila*, while if one finds thin black strands among dead leaves one calls it *X. filiformis*. But in the same gathering on Beech mast I have measured strands varying from 0.75 mm. to 0.15 mm. at the base. *X. filiformis* was described as pink at the apex, but *X. carpophila* can also be pink. It is probable that these two are the same species, but until further mature clavæ are available the point cannot be decided.

X. hippotrichoides looks like horse-hair. It was first found in this country on a rotting bag of sawdust in a cellar at Wisbech. Then it was found on rotting matting in a damp pew at Cobham Church, Kent. Later, Berkeley found it on old matting in the church at Apethorpe and kept it in a cellar for six months until it developed perithecia. I do not suppose it is any use looking for it on matting in churches nowadays, as the matting on which it grew was rush matting. However, Masee recorded it on coconut fibre from Scarborough. It was formerly referred to the genus *Thamnomycetes*, and is included under that name in the *Fungus Flora of Yorkshire*. It may be noted that Sowerby did not call it *hippotrichoides*, like horse-hair, but *hypotrichoides*, which means somewhat hair-like.

X. oxycanthæ has been collected recently in Yorkshire by Mr. W. G. Bramley. It grows on Hawthorn fruits, usually buried in the soil. It is uncertain whether it should be classed with *X. carpophila* or with *X. hypoxylon*. The ascospores of Mr. Bramley's specimens are $12-16 \times 4.5-6\mu$ as against $10 \times 4\mu$ given in the text-books.

Thus our fifteen species reduce to eleven, with a prospect of further reduction when more specimens have been collected.

REVIEWS AND BOOK NOTICES

Butterflies and Moths of the Wayside and Woodland, compiled by **W. J. Stokoe**, pp. vi+309, with 430 species illustrated in colour, and 25 text figures. Warne 7/6. This valuable addition to Messrs. Warne's 'Wayside and Woodland' series is based on the three original volumes by Richard South. There has been necessarily much condensing and there are omissions of the more rare forms, but Mr. Stokoe has done his work well, and this volume should prove of much value to the young naturalist beginning the study of Lepidoptera. The coloured illustrations are up to Messrs. Warne's well-known high standard, and there are useful illustrated chapters on life cycles and on collecting and field work.

Some Beneficial Insects, by **W. R. Thompson**, pp. vi+26, H.M. Stationery Office, 9d. Economic entomology has made great advances since the first publication, in 1922, of Dr. Thompson's valuable monograph now in its fourth edition. The chapter headings give a good guide to the subject matter dealt with. They are: The Chief types of Beneficial Insects; Predatory Parasitic Insects; The Utilisation of Beneficial Insects. There are two useful plates in colour, and the brochure should be of much value to entomologists and gardeners.

By Weald and Down, by **A. A. Evans**, pp. x+240, with 17 illustrations. Methuen, 7/6. The author of this book was vicar of East Dean and Friston in Sussex, from 1908 to 1929, and knows his Sussex well. Visitors to this interesting and beautiful county would do well to take a copy of Mr. Evans' book with them. It deals with natural history, archæology, village architecture and folklore, and is suitably illustrated.

Nature and the Rambler, by **W. R. Calvert**, with note-book sketches by L. R. Brightwell, pp. 164. Nelson, 2/-. This is number 43 of Messrs. Nelson's Discussion Books, and in it Mr. Calvert has packed a very full natural history programme for the country rambler. The young folk with rucksacs have been well catered for in the way of suitable literature, but there has been nothing for the beginner better than this. The author gives just the right essentials for the would-be naturalist who is guided in his observations of birds, beasts, fishes, insects, and plants, and all is presented in an intensely interesting manner and without exaggeration. It is just the book for senior classes in nature study. The drawings are a valuable addition to the text.

An Ecological Glossary, compiled by **J. Richard Carpenter**, pp. x+306, with 12 appendices, including maps and charts. Kegan Paul, 15/-. Although Ecology can hardly be described as a new branch of science, there have been rapid developments during the last 50 years. The host of writers on plant and animal associations have between them evolved a specialised vocabulary in which words may have restricted meanings, the knowledge of which is essential to a right understanding of what is written. The same kind of thing has happened in the development of other sciences and it is, of course, inevitable. To any student of Ecology a knowledge of the exact meaning of a technical term is a necessity, and Mr. Carpenter has done a great service in compiling such an exhaustive list of words used by past and present writers on Ecological matters. Apart from certain words for which only a 'dictionary definition' is possible, all definitions of terms are followed by references to first usages of terms or to other texts in which the terms are employed. There is a list of works cited in the Glossary, an Historical Bibliography and an appendix of maps and tables. In his preface the author says of the appendix: 'Many of the maps are rapidly becoming inaccessible since the original works are out of print, and it was considered advisable to bring them together in one place.' Mr. Carpenter has produced an exceedingly useful reference book.

THE RELATIONSHIP OF THE 'BASEMENT CLAYS' OF DIMLINGTON, BRIDLINGTON AND FILEY BAYS

(Continued from page 135)

THE DIMLINGTON SECTIONS

The Basement Clay, in the sense of Lamplugh and Stather (Lower Basement Clay of Raistrick), occurs on the foreshore beneath the beach shingle practically continuously from Easington Lane End to Holmpton Lane End, its continuity only being slightly interrupted by small ravines plugged in by Purple Clay, and by the outcrops of Sub-Basement Clay to be mentioned later. It rises into the base of the cliff near Dimlington Farm, and may be seen northwards in the cliff almost continuously to Old Hive, at the northern end of the high cliffs.

It is feebly coloured and greenish grey when dry (near gault grey of the British Colour Council), and compared with the beds above contains only a moderate quantity of erratics. It also yields small chips of the valves of *Tellina* and a larger bivalve, probably *Cyprina*, and not infrequently whole valves of *Tellina balthica* may be met with. Other mollusca seem absent, or very rare. The fauna is thus very restricted as to species. The erratics include soft chalk, black flint, and Magnesian Limestone in fair number, together with casual igneous erratics, some of which, such as laurvikite and rhomb-porphry, are definitely recognisable as of Scandinavian origin. An occasional Scottish igneous rock or piece of Carboniferous Limestone also occurs. Most of the erratics are small, and many are waterworn.

During the year 1937 a previously obscure section of the cliff about 250 yards south of the summit of the high land became clear and disclosed a remarkable section in which for about 100 feet a series of mounds and ridges of a bluish clay rose up from beneath the Basement Clay. This clay is a distinct bluish grey, near dreadnought grey of the B.C.C., and it is much more shelly than the Basement Clay, yielding numerous hinge lines of a large bivalve, probably *Cyprina*, occasional whole valves of several species of bivalves, an occasional univalve, and very frequent *Dentalium*. The clay is very free from small crumbs of erratics, and thus presents a clean appearance, but occasional strings of usually waterworn erratics may be found, which seem almost purely Scandinavian in origin. Chalk and flint seem either absent or very scarce, and Magnesian Limestone is also uncommon. This clay, which seems distinct both in colour and erratics from the Basement Clay, I term the Sub-Basement Clay. A further small patch of this clay occurs in the cliff foot just below Cliff Farm, Out Newton, but it is at present badly exposed. It seems probable, however, that it was from this

exposure that Lamplugh obtained the shells referred to by him in his 1881 paper in the *Geological Magazine* (p. 541).

Overlying this blue Sub-Basement Clay in the first exposure mentioned, the lowest portion of the Basement Clay may be seen, and the first 2 or 3 feet still contain a fair number of shell fragments like the Sub-Basement Clay, but also contain many small fragments of chalk, black flint, and Magnesian Limestone. This lowest part of the Basement Clay, while perhaps less green than the upper part, is chiefly remarkable for containing an irregular streak about a foot thick of a peculiar purplish brown boulder-clay (near rose-beige of the B.C.C.). This brown band contains no chalk, but is full of small fragments of Magnesian Limestone, and, locally, pieces of coal. Its peculiar colour suggests that the matrix is largely derived from Upper Permian Marl or a bed of similar colour, and the whole assemblage suggests an origin in the County Durham area.

Above the Basement Clay is a series of beds of a chalky drab character, which together form the Upper Basement Clay of Raistrick, and which I refer to here as the Basement Drab. They consist of three main beds best seen in the lower part of the cliff in the neighbourhood of Dimlington Farm. The lowest of these three beds is of a darker colour and contains less chalk than the two upper ones, and is perhaps rather deficient in Carboniferous and Cheviot rocks. It thins out against the rising top of the Basement Clay northwards. The two upper beds of the Basement Drab are exceedingly chalky, the lower one being of a warm drab colour and the upper one of a greyer colour, in some exposures approaching a French grey in tint. These also thin away northwards at Dimlington, but reappear at Holmpton.

Above this very chalky Basement Drab Series there occurs at Dimlington a thin streaky and silty group. This includes :

- (a) Thin lenticles or wedges of dark relatively stoneless clay, not always present.
- (b) One or more bands of pale drab rather chalky clay a foot or two thick.
- (c) An horizon of streaks of pugged chalk, red Triassic material and grey streaks of Carboniferous and other material of northern or north-western origin, more or less crumpled and twisted.

Above this silty group, which in the northern half of the Dimlington sections lie in a long basin, comes in this section of the cliffs well-bedded silts and yellow sands, but these are not seen in the southern half of the Dimlington section, nor at Holmpton.

Capping the pale silty boulder-clays at many points is a thin, dark, warm drab bed of boulder-clay, which in the northern half of the Dimlington section is full of Liassic shale fragments.

It is quite probable that in places in the cliffs the drab sequence may be continued further upwards, but the exposures occur in the middle and most obscure part of the cliff, and but little investigation has so far been made of them. It is, however, known that the base of the Purple Series is extremely irregular, cutting down through the various beds of the Drab Series in places almost to the Basement Clay.

To the north, however, approaching Holmpton Lane End the cliff descends, and the Drab Series rapidly dips to beach level. Here the drab beds above the Basement Drab are much better developed and exposed. They are seen to consist of three beds of boulder-clay, the two lower ones being dark and relatively chalkless, the higher of these two being especially dark and with comparatively few erratics of any kind. At one time I thought that these two beds might represent the Middle Drab of the Hornsea area, but an examination of good exposures during 1938, and the collection from them of specimens of laurvikite and amygdaloid porphyrite shewed that there is much greater probability that they are the representatives of the Sub-Drab boulder-clay which is exposed at the base of Beacon Hill, Skirlington, near Atwick.

The third bed at Holmpton referred to above is a thin bed with much chalk and black flints, which appears to have no other very significant erratics. It is thought that it may represent the base of the Lower Drab of the Hornsea area. At Holmpton it is only about 6 feet thick, and is succeeded by the Purple Series.

The streaky horizon of the Dimlington sections is not well developed at Holmpton, but it is seen to occur between the two beds of the Sub-Drab Series. Apparently the very dark bed with few erratics of Holmpton is the same as the one above the silts at Dimlington.

The succession of the Drab and Basement Clays in the Dimlington area may therefore be summarised thus :

	Full ¹ Thickness	Probable Horizon
Chalky and flinty drab clay	6'	Base of Lower Drab. Sub-Drab.
Very dark drab-brown clay with few erratics and little chalk	2'-12'	
Silt and streaky horizon	0'-10'	
Dark drab clay with not much chalk...	0'-12'	
Chalky clays with many erratics in three beds; upper one grey, middle one warm drab, lowest one dark grey with less chalk	25'-30'	Basement Drab.
<i>Tellina</i> clay (olive-grey)	30'+	Basement.
<i>Dentalium</i> clay	10'+	Sub-Basement.

¹ In the northern half of the main Dimlington Section the Drab Series thins to about 3'-4', resting on the Basement Clay; and probably no individual section exceeds 40' in thickness of Drab Clays.

On the basis of the above views it will be realised that it is now thought that the upper part of the Drab Series met with in the Hornsea area is missing from the Dimlington outcrop, and that the Drab sequence at Dimlington is probably much more nearly paralleled by that of Sewerby cliff.

In the good exposures at Holmpton recently seen I was fortunate enough to find at the top of the grey bed which caps the Basement Drab a number of shells of mollusca of several different species of bivalves. They were not too well preserved but seem to me significant as a pointer suggesting the possibility that this horizon is the same as that of the shelly clays of Reighton and Sewerby foreshores. This point will be further discussed later.

I have not yet found at Dimlington the inclusions or streaks of sandy clay with shells recorded by Lamplugh (*Geol. Mag.*, 1881, p. 541), nor yet any of the casts in gritty sand of *Pholas* borings with the *Pholas* embedded in the midst recorded by that author from both Bridlington and Dimlington. I suspect, however, that the position of these shelly streaks is close to the poor exposure of Sub-Basement Clay below Cliff Farm, Out Newton, and careful watch for good exposures might clear up this point.

BRIDLINGTON

The exposures at Bridlington are practically non-existent, but those at Sewerby are usually fairly clear, and I was fortunate enough to see fair exposures in 1937 on the foreshore intermittently between Bridlington Promenade and the buried cliff section at Sewerby. These observations helped a little towards the understanding of Lamplugh's papers, and the following possible correlation with Dimlington is offered as a working hypothesis :

1. It seems obvious that the blue clay recorded at Bridlington by Lamplugh (*Geol. Mag.*, 1881, p. 539), in irregular masses between normal boulder-clay is the same as the Sub-Basement Clay of Dimlington. These clays agree in the abundance of shells, the absence of chalk and flint, and the colour of the clay. I have seen a streak of this clay on the foreshore at Bridlington, and it matches the Dimlington clay in colour. Lamplugh's remark that the largest mass of this clay at Bridlington seemed to be crushed vertically between walls of boulder-clay agrees curiously with the character of the exposures at Dimlington, where the exposures suggest a series of ridges or mounds extruded under pressure from below the beach level.

2. It seems uncertain whether the main mass of the Bridlington Basement Clay is the same bed as the *Tellina* Clay at Dimlington or not. In favour of this conclusion are

Lamplugh's statements as to its greenish colour and sandy character (*op. cit.*, p. 535), the comparative abundance of *Tellina* (*op. cit.*, p. 543), and the pebbly character of the erratics. Against it is Lamplugh's observation (*Proc. Yorks. Geol. Soc.*, Vol. XI, p. 299) on the common occurrence of Carboniferous rocks of various types, and my own observations that such exposures of the foreshore clays as I have seen are not actually green, but a French grey.

3. The latter observations, coupled with the similar ones on Reighton foreshore in Filey Bay, suggest that there is at Bridlington and at Reighton a shelly clay very similar to the grey drab clay forming the upper part of the Basement Drab at Dimlington. Whether this suggested equivalence is correct, or whether the Bridlington and Reighton bed represents a lower grey bed in the Basement Drab Series, and alternatively whether there are at Bridlington actually two shelly clays in addition to the blue Sub-Basement Clay, of which one may be the equivalent of the *Tellina* Clay of Dimlington, and the other a member of the Basement Drab Series as indicated above, is a matter the solution of which must await much further work in the field.

As a working hypothesis I suggest that at Bridlington there is a ridge of drift, possibly moulded on a chalk ridge as suggested by Lamplugh, which includes in its core masses of blue Sub-Basement Clay, that the Dimlington *Tellina* Clay is quite probably also present, and that on the flanks are representatives of the Basement Drab.

At Sewerby, sections on the foreshore south of the buried-cliff section, suggest that the French grey type of slightly shelly clay as it approaches the cliff merges landwards into the chalk grut of the buried cliff section. As the lowest bed in the buried cliff section of boulder-clays is clearly higher than this chalk grut, it must represent something higher than the Basement Clay, and might be considered as being the top bed of the Basement Drab or the lowest bed of the Sub-Drab series. The upper bed or beds of boulder-clay in the Sewerby Cliff section are of a darker and browner colour, and were referred by Lamplugh to the Purple Clay. They are, however, not in the least like the true Purple Clays of the Withernsea area, and probably represent the Sub-Drab Clay of Beacon Hill, Skirlington, and its equivalent at Holmpton. The streaky horizon in it referred to by Lamplugh (*Proc. Yorks. Geol. Soc.*, Vol. VIII (1882) as occurring south of Bridlington, is quite likely on the same horizon as the one at Dimlington.

The exact status and horizon of the 'Bridlington Crag' is still in doubt. The huge molluscan fauna recorded by Bell (*The Naturalist*, 1917, p. 95; 1919, p. 57), from the collections of Headley, Bedwell, and others, is of an Arctic type, and

comprises both littoral and deep water forms. Searles Wood, Jr., pointed out many years ago (*Q.J.G.S.*, Vol. 26 (1870), p. 97), that the Bridlington fauna was very distinct from and more Arctic in type than that obtained from the middle and lower glacial sands of East Anglia. This left the relative age somewhat in doubt, and there seems to be no later investigation of the probable age of the 'Bridlington Crag.' There appear, however, to be comparatively few extinct species in the fauna, and one would, therefore, surmise that the fauna is probably one of Middle or Late Pleistocene age.

The collections appear to have been derived in the main from the blue Sub-Basement Clay or sandy inclusions in it, but Lamplugh's earliest account (*Geol. Mag.*, 1878), included a diagrammatic section on p. 514, which referred to the 'Bridlington Crag deposit, consisting of sands and sandy clays lying on and mingled with the Basement Clay.' In the same paper he stated (p. 510), 'It is in the above-mentioned sandy clays on the South Shore that I have found the shells in question in the greatest abundance, though I have also actually obtained them from the Basement Clay itself.' It would thus appear that the Bridlington Crag is really a deposit lying on top of the 'Basement Clay,' and Lamplugh on p. 512 of the same paper wrote, 'Parts of the sandy clays (already mentioned as forming the upper portion of the "Basement" clay) when dried greatly resemble the true "Crag" both in colour and composition, having the same greenish cast, and containing the same small black cherty pebbles.' It would thus appear that the 'Crag' consists of 'cakes' or 'rafts' of shelly sea-bottom sand of analagous origin to the 'cakes' of chalk, Triassic marl, Lias shale, etc., which form patches on the top of later beds of boulder-clay. Whether any of these molluscs actually lived where they were found seems uncertain, but they may easily have been carried living to the site by ice. Although Lamplugh seems certain that they were all derived, another eye-witness of the deposits, Bedwell, stated (*Geol. Mag.*, 1878, p. 517), 'What I considered of most importance was that I saw the horizontal section of the beds for myself, and observed that the complete bivalved shells, which were numerous, lay horizontally and showed no signs whatever of disturbance, and I concluded then and still think that they lived and died very near to where I found them.'

There is obviously much room for study of any possible new exposures.

REIGHTON

The shelly clay of Reighton foreshore is exceptionally interesting. It is a dark French grey or squirrel grey colour,

and contains many erratics, including a great deal of chalk and fresh black flints, unknown in the fresh state anywhere else north of Flamborough Head. Apparently lying beneath it is four or five feet of slightly drabber clay with much less chalk and shells, which was termed the Brown Clay by Lamplugh in 1879. This clay I saw at several points in 1937-8 between Reighton Gap and Flatt Cliff, but its relation to the shelly clay (seen about half-way between Reighton and Hunmanby Gaps) was not so clear as desirable, and further observations are much to be desired. Both at Reighton and at Flatt Cliff there is a thin band of comminuted black Kimmeridge shale about two feet above the base of this lowest drabber clay. The only bed at Reighton which I have seen that is at all like the *Tellina* clay of Dimlington is the rather silty clay which occurs near the beach-level on the south cheek of the debouchure of The Gill, the ravine south of Reighton Gap. This has the same colour, and a good deal of the sandy character of the Dimlington clay, and the possibility suggests itself that the *Tellina* silts of the Speeton Shell Bed are the local equivalent of the Dimlington *Tellina* Basement Clay. It is known that the shelly silts descend rapidly northwards from their elevated position in Middle Cliff, Speeton, and they are occasionally visible in the lower part of the cliff south of The Gill, while Mr. Stather collected *Tellina* from them in a foreshore exposure north of Reighton Gap. It seems therefore likely that the exposure on the south cheek of The Gill may represent part of these silts. An exposure on the foreshore shewing the relationship of the silts and the shelly boulder-clay is much to be desired.

I have suggested earlier the possibility of the Reighton shelly boulder-clay being the equivalent of a bed in the Basement Drab Series of Dimlington. The only other bed at Dimlington which is at all like the Reighton one is the lowest 2 or 3 feet of the Basement Clay, which is of a dark grey colour and contains a fair amount of chalk and flint. If this, however, is the horizon of the Reighton shelly boulder-clay the erratics and adjoining beds are totally different at Dimlington and Reighton, and this suggestion, therefore, appears untenable.

It was possibly this Reighton shelly boulder-clay exposure that led Lamplugh in his later days (*Hull Geol. Soc.*, Vol. VI, (1925), p. 265) to conclude that the shelly clays are merely lenticles in the general sequence of drab-grey clays.

SHELLS AT THE TOP OF BEDS OF BOULDER-CLAY

Shells tend to occur in later beds at the top of individual beds of boulder-clay. This is true not only of the top of the Basement Drab at Holmpton, but also the top of the Lower

Drab at Atwick, the top of the Drab Series at Flamborough (both at North Landing and Little Thornwick Bay), and also at the junction of the locally lowest bed of Purple Clay and the next bed upwards at points near Aldborough. On the last rather remarkable horizon occur also gypsum, much Trias sandstone, Lias shale, and Neocomian clay. The reason why shells should tend to occur at the top of individual beds of boulder-clay at different horizons does not seem clear, but we are reminded that Lamplugh noted that at Bridlington shells were most abundant at the top of the Basement Clay.

ERRATICS OF AMYGDALOIDAL PORPHYRITE

So far back as 1885 Reid recorded in the *Holderness Memoir* (p. 18) that Lamplugh had presented to the Survey Museum specimens of amygdaloid porphyrite from the Basement Clay at Bridlington, and Lamplugh in his 1890 paper in *Proc. Yorks. Geol. Soc.* (p. 289), confirmed the record. My own experience on the Holderness coast is that erratics of this very distinct type (which Dr. Jas. Phemister has very kindly determined for me as vesicular olivine-basalt of Markle type, similar to those which occur in East Lothian, Lanarkshire and Ayrshire) are in Holderness confined to the lowest part of the Lower Drab, the Sub-Drab, and the Basement Drab. They occur at Dimlington, Atwick, and Sewerby in Holderness and are fairly common in the dark drab-brown clays of the centre of Filey Bay. Lamplugh's record of them from the Basement Clay of Bridlington therefore suggests that that bed has affinities on this ground with the Basement Drab, rather than with the *Tellina* clay or *Dentalium* clay of Dimlington. Somewhat on the same lines is Lamplugh's record in the same paper of the common occurrence of Carboniferous Limestone of various types in the Bridlington 'Basement Clay.' Richly fossiliferous Carboniferous Limestone is not common in Holderness except at one horizon, the top of the Basement Drab, where cakes with abundant fossiliferous lumps with brachiopods and corals occur at Dimlington. The same seems true at the top of the shelly boulder-clay on Reighton foreshore.

CONCLUSION

The above correlations are admittedly tentative, but they form a working hypothesis on which to base further research. Their accuracy must naturally depend on the uniformity in colour and erratics of the same bed over distances of many miles, and confidence can only be established by experience. The main difficulty is to determine what are the effective criteria for the separation of perhaps twenty or more beds of boulder-clay in a succession which is nowhere completely developed or exposed.

THE SIGNIFICANCE OF DISPLAY IN DUCKS

RICHARD PERRY

DUCK are the only British birds known to me that habitually display from day to day throughout the autumn and winter. Although early wigeon immigrants may be observed displaying at the end of September, display is not general among flying duck until late in October, and is at its zenith in December and January, falling away in February with the departure of local nesting duck.

What is the significance of this unseasonable display of duck, or indeed, of any avian display? Duck display, in general, coincides with the coming of the mature drakes into their full plumage after their *eclipse* and moult, and with an acceleration in the growth of the gonads, or germ glands, that stimulate their sexual impulses. But whereas teal may be observed to display on any calm sunny day from early November to late February, and occasionally on wet windy days, it is possible to watch shoveller throughout the autumn and winter and perhaps witness only a single instance of duck and drake excitement, and that not until March. It is usually affirmed that the display of birds serves the purpose of pairing up male and female: when, then, do shoveller achieve this desirable state?

We can understand that, with the autumnal coming into full health and acceleration of gonadic stimuli, duck and drake are likely to become intersexually conscious—though I have not observed shoveller to betray any such consciousness at that season. We can also understand that such highly organised entities as birds will be charged in this state with a store of energy over and above that expended on the normal activities of feeding and flying—an energy demanding some artificial safety-valve. We know, further, that the mass nature of these winter aggregations of duck is an additional excitatory stimulus to the individual: a stimulus of which one is profoundly aware at a starling rookery or at a nesting colony of divers or terns. It has, in fact, been suggested that birds of social habits may be unable to complete the nesting cycle successfully if the stimulus provided by adequate numbers of their fellows is lacking. And in respect of the prevalence or absence of display among various species of duck, it can be remarked that while teal associate in hundreds or thousands, shoveller seldom exceed a score or two.

Above all we see that display at any season is a physical expression of nervous excitement provoked by inter- or exteroceptive stimuli. And so in these winter aggregations of duck there is excitement, especially among teal. Now, since most forms of duck display from mallard's to smew's are perfectly or partially illustrated by the teal's, let us consider the behaviour of teal during that dominant season of display from

early November to late February. Their display is twofold, and the nature of the first is this—a score of teal may be squatting with heads tucked back into scapulars, or standing preening at the slushy marge of a stream: others are dibbling in the ooze with characteristic violence, or upending in the shallower parts of the stream. All is peace and quiet. Suddenly a duck, perhaps, lifts from the water a foot or two and hurtles through the air straight into and under the water beneath another duck or drake: for no sexual distinctions are recognised in this disport. She probably dives up at the other duck, for the latter lifts, with that same instantaneous acceleration, and fly-dives at another of her hitherto peaceful companions. In an instant a score of little duck are hurtling madly at one another in slashing flight, and darting and shooting through the water for a minute or more at lightning speed. The air is vibrant with their tiny *pheep-pheep* whistles. And then, as abruptly as the turmoil began, it ends, for the participants to resume their dibbling and preening. This disport is clearly pure release of energy, unprovoked by any sexual or territorial stimuli. Yet, aware of that inter-relationship of diverse avian actions, compare the spontaneous, inconsequent, and crazy movements of this teal disport with those of oystercatchers, shelduck, and ruffs in their part sexual, part aggressive, part nervously social display in spring and summer. And what stimulus is responsible for the spontaneous nature of this disport that owes nothing to any apparent external provocation, and brings it to as sudden an end? One supposes it to be that same unknown interoceptive stimulus that causes a spring-fighting peewit to change in an instant from slow lapping to reckless somersaulting.

Wigeon also disport themselves in this crazy manner of teal, chasing through the air and water with astounding velocity, and diving at one another with much plashing and wings threshing on the water, to a chorus of *correeoo* and *gug-gug-gaw*. On occasions even ponderous mallard disport in the same way, an astonishing feat for such big duck. But in this study of duck display the value of this disport lies in its illustration that it is inherent in duck to vent their superabundance of vitality in a set form of 'display,' at the sudden prompting of some interoceptive stimulus of which we are ignorant; a stimulus deep-seated in the *Anatidae*, for here are three unrelated species of duck, and no doubt others, reacting to this stimulus with an identical set pattern of 'display.' Indeed so inherent is the response in teal that it may be enacted by an individual without the social excitation of a crowd of his fellows, and one bird will disport by himself, suddenly rising with hanging legs from the water with a vigorous flapping of his wings, to shoot through the air and dive into the water in characteristic manner.

Let us now turn from this false display to the true display of teal. Of hundreds or thousands of teal lining the marge of stream or flush on calm sunny mornings, there are usually separate dozens and scores up and down the stream cruising idly in little packs, mostly of drakes. Occasionally one drake will shoot viciously at a fellow, and another will lift himself clear of the water on quickly beating wings, a supreme development of that wing-flap common to most duck in response to various stimuli. Tension among the individuals of the packs increases, the chorus of *pheep-pheep* grows more urgent, and the idle half-circling and circling maziily about one another, and infrequently about the three or four duck that may be included in the display pack, becomes an ecstatic spinning about their fellows and also on their own axes, as it were; a spinning common, I think, to most, perhaps all, species of displaying duck. Then at the height of their crazy spinning there comes a most fascinating inspiring evolution—a continual sudden raising, almost kicking, of rear of body and uptilted tail out of the water, followed by a hunching back of head on to back. But in its most perfect form uptilted tail and crested head (for under the stimulus of display the drake teal's headfeathers hackle into the conical mane of a goldeneye) meet at the psychological moment over the back, with that amazing tensile buck of the displaying shag, a wonderful-to-see fleeting adjacency of those golden wedges either side the under-tail-coverts and the burnished sienna head, coincident with a buzzing *quud-quud*, more vibrant than the duck's *quad*. In this remarkable jack-in-the-box movement the drakes throw up jets of water (like so many other displaying duck), though not apparently directed at any fellow in particular, for though two drake teal often bob before one another, as two or more drake mallard will rise and dip one to another, they also bob to space, and I do not think they ever bob directly to the ducks, although four or five of the latter may be taking part in the melee, 'throwing back' at the drakes with bill and head to either side; that 'throwing back' evolution characteristic of so many ground and water nesting birds when building their nests, when leaving their nests during incubation, and in display, either alone or before their mates: another of those many primary avian actions now set to a diversity of uses. Occasionally there is a suspicion of that wonderful bobbing of the drakes and a gyrating in perfect circles with explosive guttural *urg-urg*.

This true display of the teal from November to March is seen, then, to include aggression and mutual stimulation among the drakes, and a degree of awareness of the immediate presence of the ducks, but no direct display (or courtship as it is often called) of drakes to ducks: indeed, what direct display, or solicitation, there is comes from ducks to drakes. Is this indifference of drake to duck, of male to female, unusual?

But no, for consider the displaying drake mallard, gathering together in little masculine packs to rise before one another, thinly whistling, with a rearing and dipping of green heads and purple breasts. These drakes are actually evasive of the ducks, 'steaming' powerfully in pursuit of them at astonishing speed, continually 'throwing back' their heads to their sides in a curiously 'rigid' manner, furrowing the water with their bills; a wonderfully suggestive antic, the significance of which has been noted in the previous paragraph. Having come up with their drakes the ducks stretch out their necks along the water, not necessarily at their drakes, tilting up their heads and bills, like soliciting female black-headed gulls, jealous shelduck, or oystercatchers when danger threatens their young. Yet immediately after these sudden outbreaks of duck and drake display, the participants split up into pairs again; and a duck and a drake mate—and this in November, mark you! At this season coition must be considered either as lacking the actual discharge (the mating antics appear complete), or as a stimulant to the duck, though it is difficult to understand what value there could be in such a stimulus at this season.

In the light of what has gone before, can it now be suggested that the drakes display in order to attract and get paired up with ducks? Or, for that matter, that oystercatchers, sheldrakes, or ruffs do so for this purpose? Furthermore, immediately on their return to winter quarters in September and October, drakes and ducks are to be observed associating in twos and threes within the flock, although, as I have related, the drakes often disport in little masculine packs; just as in the spring sheldrakes and oystercatchers temporarily desert their mates, to join in a melee in their vicinity. Moreover, before the mature drakes arrive in the autumn, there are on salting and freshmarsh immature drakes—mallard with shiny pale brown heads, spotted teal, and chocolate-headed wigeon—associating in pairs with ducks, just as right through the winter into March immaturesly plumaged shoveller drakes, heavily spotted of snowy bellies, associate in pairs with their ducks. And in respect of this association of immature drakes and ducks it will be in order here to mention that I have watched in April a pair of immature mute swans go right through the complete and complex cycle of cutting out a territory from a pack of more than thirty of their fellows, though they did not subsequently nest in the territory on whose maintainance they expended so much energy day after day; black-headed gulls I have watched actually breeding in immature plumage, a not uncommon phenomenon of these gulls.

Besides associating in pairs these immature drakes and ducks are also to be observed in the familiar trios: two drakes and a duck or two ducks and a drake, just as later in the

autumn a pair of adults are accompanied everywhere by an immature drake or duck. This triangle association is an overtly dominant seasonal feature in the lives of a great many British birds. In some species, such as ravens and ducks, it endures throughout the autumn and winter and taking up of spring territories, and up to the beginning of nest building, when the young bird is finally driven away: in others, such as larks, magpies, and oystercatchers, it is a feature of the territorial season only, from February up to nest building. In this association of three birds of a kind lies, I believe, the secret of the pairing up of male and female, which in the present stage of evolution is wholly divorced from display. This belief I shall proceed to develop.

I have not space, here, to recount the overwhelming evidence, both of my own and other naturalists, that the young bird returns in its second year, all things being equal, to the vicinity of its birthplace, and the adult bird to that of a previous year's nesting territory. In my experience this axiom is no less true of a migrant in relation to its winter territories, and, incidentally, to its migratory routes between the two. This being so, the odds are that, with both male and female returning to previous winter and summer territories, the pair of last year will be that of this year and of next year. Of ducks it is often said that the females arrive with the young birds in winter territories before the drakes; but what general proof is there of this? Continental ducks and drakes migrate together, and in pairs, as every wildfowler knows; and even if the ducks did precede the drakes, the latter would tend to join them in the accustomed winter territories.

In March I have seen two full drake garganeys, an immature drake, and a duck halt for a week at a passage resting marsh, and have observed one of the full drakes and the duck actually to mate, after a brief head bobbing—I have no doubt, myself, but that ducks and drakes join up after the *eclipse* and moult, and migrate together within the flock: a belief strengthened by the custom of the duck and geese, and many other birds, of a given area gathering at a central rendezvous before migration in spring and autumn. In many species, such as ravens, stonechats, and gulls, male and female may be observed to keep company for three hundred and sixty-five days in every year. I submit that in the present state of our knowledge it can be categorically stated that, the accidents of time and fate permitting, *wild birds pair for life*. And, in submitting this law, I am not overlooking the tendency of the males of certain migrant *passeres* to arrive at their nesting territories before the females; an eccentricity fully covered by the likelihood of male and female returning to a previous year's nesting territory or birthplace; an eccentricity not observable of, say,

fulmar petrels, lesser black-backed gulls, duck, and geese. I have shown that some young drakes and ducks are associating in pairs and threes before the adult birds arrive in their winter territories, and I do not see any reason to doubt that gaps in the pairs of the latter are filled by that third unmated duck or drake commonly to be observed in close association with the pair. That the association does comprise a pair and a third bird is indicated, especially, by the actions of the duck. How common a sight it is to see a duck sticking closely to one drake and continually, both in the air and on the water, digging viciously with hissing bill at a second drake, who continues to keep close company with her and her mate, no whit discouraged. You may see a wigeon duck with four drakes in attendance continually assaulting three of them, or a shoveller with a drake and three ducks doing the same thing, or similarly a mallard with as many as six drakes: but the trio is far and away the commonest association. In extension of this observation I need not recount here the familiar ease with which obvious birds, such as eagles or ravens, get themselves a succession of new mates when persecuted.

If we are agreed upon the postulates already advanced, we are left with two points to consider: the purpose of display and the precise form of attraction bringing about the pairing of duck and drake. That incomparable observer of birds, the late Edmund Selous, proved to his satisfaction that ruffs displayed in order to be selected by reeves. But Selous was a strong Darwinian searching for proofs of sexual selection: I have studied his beautiful account of displaying ruffs, besides watching them myself, and can find no evidence in his notes or mine suggesting that one ruff mated with more than one reeve, or that the mature ruffs and reeves were not already paired up before the display began. On a more colourful basis, perhaps, this display of the ruffs seems to me identical in its general scope and stimuli with that of teal during the winter or of oystercatcher and shelduck during the spring: a seasonal and automatic inherited urge intensified by the irritant effect of the presence of one male upon another male's nervous organism at that season when the growth of the gonads is stimulating sexual impulses, further provoked by the arrival of the females.

On the other hand, no one watching the display of birds can doubt but that physical antic and beauty of plumage have evolved one out of the other: the ruff's mane and his bowed head, the teal's golden wedges and his tilted tail. Bearing in mind the *eclipse* plumage of drakes, one must believe that duck and drake are similarly plumaged in the beginning. The bright colours of certain drakes may have originated from ruptures of the pigmentary system resulting from the special

physical antics of attempted coition, for the display of every bird shows greater or lesser affinities with the coitional antics before and during the mating of barndoor cockerel or blackbird, and display may well be partly an evolutionary automatous formalisation of primitive coitional antics. Chemical action of the hormones, under the organic excitement of attempted coition or display, would probably assist in this setting up of colour zones relating to those parts of the body prominent in the physical antic, just as it has been suggested that the dominant barring pattern of hawks is related to alterations in the circulatory rhythm of the blood. The modern theory of display and bright plumage is that it is primarily a mutual stimulant to duck and drake of value in maintaining the marital bonds; and such a theory is fully borne out by the constant display of certain species of duck throughout the winter. A secondary value lies in the stimulus of male display to the female's impulse of nidification and ovulation; and this seems to apply to terns who display throughout the summer, but hardly to ducks whose display is essentially a social winter performance. Undoubtedly all estimates of display must be modified by the consideration that, like so many other avian actions, it has become in great degree an automatous seasonal impulse releasing energy, associated with certain organic changes in the bird's body; a pleasurable part of a bird's everyday life at certain seasons, a pleasure likely to be provoked, in suitable weather conditions, whenever a bundle of full-fed drakes come together in the presence of ducks, with the resultant nervous irritation. It is incorrect to think of a drake's display and bright plumage as a direct product of sexual selection: the term 'courtship' should be replaced by 'solicitation' both of drake and duck. The drake's bright colour zones may have originated by pigmentary rupture out of physical antic of attempted coition as suggested above, but to regard the colour zones as having originated for the express purpose of attracting the duck is to put a false value on them. We do not expect a rabbit or a badger to display before pairing, and we are uncomfortably aware that the male and female of the human species come together because of some subtle attraction, of the nature of which we are ignorant. That birds have bright colours (and in most cases male and female are similarly plumaged) is no good reason for implying that these have sexually selective values. It is doubtful whether the female can have a physical awareness of such colours, or even react to them organically. It is the physical antics that excite, not the colours displayed by these antics. The pairing of duck and drake within the flock is governed by the same unknown attraction that brings together rabbit or badger or primitive man. Display and pairing are entirely divorced.

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NOTE:—British Grasshoppers and their Allies: Burr. Messrs. R. B. Janson & Son, 44 Great Russell Street, London, W.C.1., are now the publishers of, and have taken over the entire stock of, *British Grasshoppers and their Allies*, by Dr. Malcolm Burr, and anyone desiring this interesting and useful little work on the British Orthoptera may obtain it at the above address at the price of 6/-.

NEWS FROM THE MAGAZINES

The Entomologist for April contains 'More about *Aplasta ononaria* at Folkestone,' by A. M. Morley; 'The life history of *Eucosma nitidulana* Zell. (*ericetana* H.S.),' by W. Mansbridge; '*Lycaenopsis argiolus*, *Catocala nupta* and other lepidoptera in Nottinghamshire,' by the late Professor J. W. Carr; 'The Hanbury collection sale,' by W. Rait-Smith; 'An unrecognised race of *Erebia pluto*, hitherto confused with the ssp. *anteborus* Frhst. (Lep. Satyridæ),' by B. C. S. Warren; and several notes and observations.

The Entomologist's Monthly Magazine for April contains 'The Mallophaga (Biting Lice) recorded from the Pacific Islands,' by G. B. Thompson; 'A selected and classified bibliography of J. J. Walker's publications, 1872-1939,' by Sir E. B. Poulton; 'A new British *Opius* (Hym. Braconidæ),' by G. E. J. Nixon (*O. ilicis* Nixon. Berks., Bucks., Hants., Surrey, Sussex, Yorks. (Kirkstall, 2/7/32, A. M. Low), and Ireland, parasitic on *Phytomyza ilicis* Curt. on holly); 'On the affinities of the genus *Eclytus* Holmgren. (Hym. Ichneumonidæ),' by J. F. Perkins; 'Three new species of lamellicorn beetles from the Caroline Islands,' by G. J. Arrow; 'Notes on British Collembola,' by R. S. Bagnall (*Hypogastrura willemi* Bonet. Gidside, Durham; *H. nivicola* Fitch. Cheviot, Northumberland; *Onychiurus laminatipes* Bagn. Northumberland and Durham; *O. flavidulus* Bagn. Cullercoats, Northumberland; *Isotomodes britannicus* Bagn. Northumberland, Durham, Yorks., and Lancs.); and several shorter notes.

The Entomologist's Record for April contains 'Notes on *Euxoa cinerea* Schiff,' by A. J. Wightman; 'A few Orthoptera near Worthing,' by M. Burr; 'Gadflies in the Savoy Alps, 1938,' by P. A. H. Muschamp (with plate); 'Collecting Notes, 1938, I, January—Mid-June,' by A. J. L. Bowes; 'Continuous Breeding, IV, *Coscinia cribrum*,' by H. B. D. Kettlewell; 'Collecting Notes'; 'Current Notes'; and supplement, 'The British Noctuæ and their Varieties,' by H. J. Turner.

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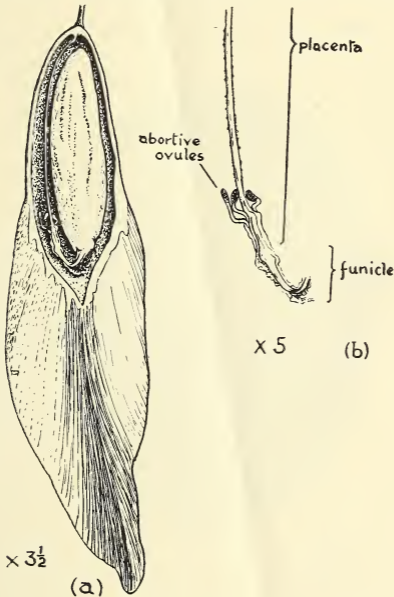
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THE SEED OF *FRAXINUS EXCELSIOR*

D. HILARY.

EVERYONE knows that the seed of the common ash, *Fraxinus excelsior*, has an abnormally long stalk, but the nature of this stalk does not seem to be generally recognised.

My attention was recently drawn, by one of my pupils, to



a tiny outgrowth about one-fifth of the way from the top of the stalk. Careful examination of this outgrowth with a lens shows it to consist of three abortive ovules. The ovary of the flower consists of two chambers with two ovules in each chamber. One of these develops into the single pendulous seed, while the other three abort. These can be plainly seen, two at one side of the stalk and one at the other. Hence the greater part of the stalk is not the funicle as it is generally thought to be, but the placenta which has broken away from the top of the ovary.

The accompanying sketch, by Miss M. E. Malins, shows

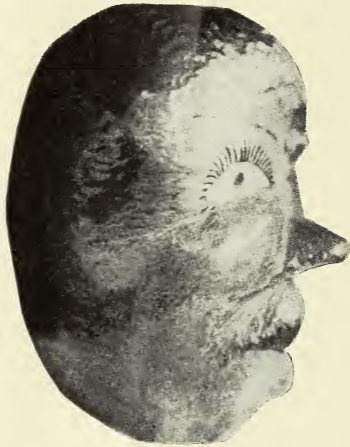
(a) the fruit with pericarp opened, (b) the stalk enlarged showing the three abortive ovules.

Although this phenomenon seems to have escaped the notice of most recent writers, it is described and illustrated in Lubbock's *Seedlings*.

A WHALE'S EAR-BONE

T. SHEPPARD

IT is well known that certain fish and mammals have ear-



bones, or Otoliths, in fact in certain geological deposits, records of extinct species have only been established by the preservation of the Otoliths, when the rest of the animal has disappeared.

Perhaps the most familiar of these is the massive, very hard, ivory-like ear-bone found in whales, examples of which are usually preserved by whalers. It has not previously been noticed, however, that these have a remarkable resemblance to a human face, and from a specimen of an ear-bone of a whale brought from the Antarctic last year, which has been decorated by a Scandinavian artist named Aarnod, the similarity is astonishing. The bone has not been carved or interfered with in any way, and the shape of the head, nose, lips, etc., are quite natural.

A REMARKABLE FISH

W. J. CLARKE, F.Z.S.

IN December of last year a trawler belonging to Messrs. Irvin and Johnson of East London, South Africa, hauled up her net containing half a ton of Kob and Redfish, as well as a ton and a half of Sharks. Included in the catch, taken at a depth of 40 fathoms, was a strange looking fish, the like of which none of the fishermen had ever seen before. It was 5 feet in length bright steel blue in colour, with big dark blue eyes, and it weighed 127 lbs.

Its strange appearance aroused curiosity, and upon reaching port word was sent to Miss Courtney Latimer, Curator of the East London Museum, who went to the wharf and secured the specimen. She realised at once that she had got something very strange and primitive, but was unable to identify it. She therefore made sketches and notes, and sent the specimen to the taxidermist for the skin to be preserved. Unfortunately, in this process the body, bones, and internal organs were thrown away, but it was noted that the bones were composed of soft cartilage, and the fish was very oily, no less than 20 gallons exuding from it.

Word of its occurrence was sent to Dr. J. L. B. Smith, the well-known ichthyologist, but he was away from home at the time and the letter was delayed for ten days. On receipt of the communication Dr. Smith realised that something very unusual had turned up, went to East London to inspect the creature, and pronounced it to be a very sensational scientific discovery.

He writes of it: 'Fortunately the terminal caudal portion of the vertebral column and part of the pectoral girdle remain. The skull is, of course, intact. The specimen is 1,500 mm. in total length, and weighed 127 lbs. when caught. The colour was a bright metallic blue which has faded to brown with preservation.'

'In major characters this remarkable specimen shows close relationship with the mesozoic genus, *Macropoma Agassiz*, of the family Caelacanthidae, order *Actinistia*. The gephyrocercal tail with protruding axial supplement, the normal first dorsal, the obtuse lobation of the remaining fins, the ganion tubercle ornamentation on the scales and on some of the dermal bones of the head, the nature and arrangement of the dentigerous bones of the mouth, and form of the dermal armour of the head, are all typically caelacanthid.

'The skeleton was cartilaginous, the vertebral column apparently tubular, and the whole fish extraordinarily oily. The fish has small spiracles, and a definite, though not very

obvious, lateral line, which continues uninterrupted to the end of the supplementary caudal.'

The order *Crossopterygii*, which includes the family *Caelacanthidae* and the group *Actinistia*, is a very ancient one, dating back to the Devonian and Carboniferous periods. The fishes composing this order are known as fringe finned ganoids, characterised by the fan-like structure of the paired fins and frequently, as in the specimen under review, of the caudal fin.

Only two species belonging to this order have hitherto been known to exist at the present day—the Bichir, a large fish reaching 4 feet in length found in the Nile and other African rivers, and the curious little Reed Fish of Old Calabar, of which living examples are on exhibition in the aquarium at the London Zoo. And now this new discovery has added a third species to those still known to survive at the present time.

Photographs show that this East London fish is a very curious creature. The head is covered with strong bony plates and the skin is protected by rows of thick bony scales covered with a substance like enamel, found only in the most primitive of fishes. The fins are placed at the ends of limb-like processes and are paddle shaped, while the curious formation of the caudal fin is also apparently an early stage in the evolutionary development of that organ. The jaws are large and armed with plates of sharp teeth. Just above and behind the eye is an opening known as the spiracle which is characteristic of primitive forms.

The fish was alive when brought on board the trawler and snapped savagely at the hands of those who touched it. It lived for three hours after being taken from the water.

Dr. Smith proposes that the fish be named *Latimeria chalumnae*, gen. et. sp. nov. He is preparing, in due course, a full account of the species and of its relationships for the Transactions of the Royal Society of South Africa.

A responsible resident of East London, interested in fishes, declares, after examining the mounted specimen, that about five years ago he had found an exactly similar fish, but considerably larger, stranded upon the shore in a very decomposed condition. By the time he returned with assistance the fish had been washed away by the rising tide.

Comparing photographs of this fish with 'ideal' restorations of members of the group to which it belongs, made by deductions from their fossil remains, it is remarkable to see how very nearly these restorations resemble the real thing. They are wonderfully true to life.

A SWARM OF FLIES IN EAST YORKSHIRE

GEO. B. WALSH, B.Sc.

Scarborough

ON Monday, May 22nd, dwellers on the East Coast experienced the commencement of a swarm of flies such as has not been known for many years. Mr. D. W. Bevan of Scarborough, *in litt.*, says, 'I never saw anything like it on the shore. From the Harbour to the Spa and further, unnumbered millions of black flies appeared from nowhere. On Monday evening I went on the Spa to see the peak of the phenomenon. Every seat, balustrade, lamp standard—everything, was beset by masses of flies. As these things have all been recently painted in light tints, and the flies are black, the effect is remarkable. I swept into a match-box a group occupying perhaps half a square inch, but many took to flight. There was also a sprinkling of a much larger fly.'

Mr. T. Hyde-Parker of Reighton writes, 'I was in Speeton Ghyll early this week, and it being the first summer-like day I had donned a light grey flannel suit. By the time I got down to the beach I was black with flies from head to foot, and all the way home I did nothing but kill them as they crawled on my neck. Our rain-water tubs are covered with dead and dying specimens.'

In the Holbeck Gardens, gardeners were much incommoded by the swarms of flies which settled on them and got into their eyes and ears; visitors to the Beach Bungalows had to go inside and shut the doors; new paint, especially on the Spa and the Lighthouse, was covered with them, and it is estimated that several hundred pounds worth of damage to paint was done in the town. On the shore there was a thin black line of dead bodies left by the wave, and in the town, the flies on the pavements looked like the spots formed by the first fall of a heavy shower of rain, and in some places they could be swept up with a hand brush.

Two miles from the shore there were only a few of the flies. They were not confined to Scarborough, however, but occurred all the way along the coast from Whitby to Bridlington, and inland extra numbers of the flies were reported from Beverley. This exceptional abundance lasted for about a week, after which the numbers were quiet normal.

The larger flies mentioned by Mr. Bevan were *Bibio Marci* L. The first part of the swarm seemed to consist largely of its relative, *Dilophus febrilis* L., but the great mass later were *Sciara carbonaria* Mg. The larvae of all these species feed on rotten vegetable matter; I have bred *B. Marci* from rotten haystack refuse and also from rotten wood.

Dr. Sharp (*Cambridge Natural History*, Vol. VI, Insects, Part II, p. 464) says 'The larvae of certain species of *Sciara* migrate in columns. The larva of *S. militaris* lives under

layers of decomposing leaves in forests, and under certain circumstances migrates, sometimes perhaps in search of food, though in some cases it is said this cannot be the reason. Millions of the larvae accumulate and form themselves by the aid of their viscous mucus into great strings or ribbons, and then glide along like serpents; these aggregates are said to be sometimes forty to a hundred feet long, five or six inches wide, and an inch in depth.'

Dr. Innes (*A General Textbook of Entomology*, 1st edn., 1925, p. 623) says, 'Larvae of the *Sciarinae* have been found in decaying apples, pears, turnips, potatoes, etc., and sometimes attack seedlings. In certain species of *Sciara* they exhibit the curious habit of travelling in vast numbers. This phenomenon is not uncommon at certain seasons in woods in Germany, Sweden, Russia, and also in North America. The movement is stated to be at the rate of about an inch a minute. No satisfactory explanation has yet been advanced to account for the assemblage of these hordes of footless larvae. Berthold regards the phenomenon as a collection of larvae for the purpose of mutual protection prior to pupation (one would think that this would give to insectivorous birds an excellent opportunity for gorging, C.B.W.). Beling believes that they are marching for the purpose of moving to a fresh feeding ground, but as they are usually fully fed when the phenomenon occurs, this explanation is open to doubt.'

Many species of insects, as of other animals, are prone to have years of exceptional abundance, but in very few cases has a really satisfactory explanation been given to account for the phenomenon, though probably in all cases it is primarily and fundamentally meteorological. The weather for a month prior to this swarm had been very cold, with steady cool winds from the north and east. Then the wind veered to the South-west, and the weather became much warmer. Five days after this change, the first flies appeared, so that the swarm may have been due to their sudden emergence in a short time, instead of a more protracted emergence over a longer time. Another possibility is that the weather in 1938 was particularly suitable for the insects or unsuitable for their parasites and other enemies, or that there was an exceptional amount of suitable food for the larvae.

I am indebted to Mr. C. A. Cheetham for his kind assistance in naming the flies.

The Entomologist's Record for May contains 'Pupa-digging and some moralising,' by an old moth hunter; 'James John Walker,' by H. Donisthorpe (obituary with portrait); 'Notes on food plants of the larvae of British Trypetidae,' by M. Niblett; Oviposition of *Ochria ochracea* Hub. syn *flavago* Schf., by P. B. M. Allan; Collecting Notes, Current Notes, and supplement 'The British Noctuae and their varieties,' by H. J. Turner.

THE AQUATIC COLEOPTERA OF NOTTINGHAMSHIRE

J. W. CARR, M.A., F.L.S., F.R.E.S.

Emeritus Professor of Biology, University College, Nottingham.

[EDITORIAL NOTE :—The sad news was received in the middle of January of the death of John Wesley Carr, following an operation. He retired from the Chair of Biology at Nottingham in 1927, after forty years on the staff of the College, and for a number of years afterwards supervised the work of college students in the Natural History Museum. He was a leading authority on the Natural History of Nottinghamshire in all branches, and perhaps his most important published work was *The Invertebrate Fauna of Nottinghamshire*, published in 1916, which, together with a supplement added in 1935, refers to more than 6,000 species observed in the county].

IN *The Invertebrate Fauna of Nottinghamshire* (1916) and the *Supplement* to this work (1935) 74 species of Aquatic Coleoptera—Hydradephaga and Hydrophilidæ—were recorded, two of which, *Hydroporus marginalis* and *Paracymus nigroæneus*, were probably errors of identification; the remaining 72 species have all since been confirmed. Obviously many more species might be expected to occur in the county, and in the three years 1935-37 a considerable amount of collecting was done, resulting in the addition of 34 species to the list, thus making a total of 106 species occurring in Nottinghamshire, besides the two doubtful ones mentioned above. Even this number could doubtless have been augmented as some of the most promising parts of the county remained unexplored, but my somewhat unexpected removal from Nottingham in the autumn of 1937 brought my work there to an end. In addition to my own captures many species have been taken in the county by the Rev. E. J. Pearce and Professor Balfour-Browne, and lists of the species taken by them have been kindly communicated by these gentlemen. An article in the *Naturalist* for October, 1937, contains a list of species taken by the Rev. C. E. Tottenham from a pond at Misterton in North Notts., and this adds two interesting species, *Rantus gapii* and *Hydroporus tristis* to our list.

The most important recent addition to our records is *Ilybius anescens*, taken by Professor Balfour-Browne in a pond at Stapleford Hill on September 4th, 1937. Another interesting species is *Ilybius subæneus* taken from the same pond at Stapleford Hill by myself in August, 1937, and by Professor Balfour-Browne on September 4th; it was also taken by the Rev. C. E. Tottenham at Misterton about the same time.

I am greatly indebted to Professor Balfour-Browne for his kindness in naming my captures. All the Halipli, Hydropori, and indeed all but the most easily identifiable species have been determined or confirmed by him.

The localities given under the various species are additional to those in the *Invert. Fauna Notts.* Unless otherwise stated the records are my own. Species new to the county are indicated by an asterisk.

Brychius elevatus Panz.

Running water; generally distributed and occasionally common.

Haliphys obliquus F.

Ponds, often common, especially in *Chara*-filled ponds in old Magnesian Limestone quarries in Warsop Vale; also occasionally in canals.

**H. confinis* Steph.

Ponds and canals, not common. Pond between Whatton and Elton, 13/6/1932 (Rev. E. J. Pearce). Grantham canal: Gamston, Cotgrave, and Hickling.

H. flavicollis Sturm.

Canals, streams, ponds; widely distributed and rather common.

H. fulvus F.

Ponds; rather common in the extreme south of the county, but also occurs in the far north.

H. ruficollis Deg.

Ponds, canals, streams; generally distributed.

H. fluviatilis Aubé.

Ponds, canals, streams; generally distributed.

**H. heydeni* Wehn.

Ponds. Whatton, 13/6/1932; East Leake, 18/6/1933 (Rev. E. J. Pearce). Pond, Cotgrave Wolds, rather common, 1-19/5/1936; pond near Trent, High Marnham, 25/5/1936.

**H. wehnckeii* Gerhardt.

Ponds, canals, streams; widely distributed but not very common.

**H. immaculatus* Gerhardt.

Ponds, canals, streams; common and generally distributed.

**H. lineolatus* Mann. (*nomax* Balf.-Br., *browneanus* Sharp.).

Ponds, canals, streams; widely distributed but not very common.

H. lineatocollis Marsh.

Common and generally distributed in both stagnant and running water.

**Hygrobia tarda* Herbst.

Ponds at Eakring, 20/5/1936, and Oxtom, 19/5/1937 (Carr). Pond in sandpit, Stapleford Hill, near Bramcote, 5/9/1937 (Balfour-Browne).

Noterus clavicornis Degeer.; Fowler, *Brit. Col.*

Dyke, near Old Bank End, Finningley, 7/9/1937 (Balfour-Browne).

N. capricornis Herbst. (*sparsus* Marsh.; Fowler, *Brit. Col.*).

Ponds, canals; widely distributed and occasionally common.

Laccophilus hyalinus Degeer. (*interruptus* Panz.).

Common in canals throughout the county; scarce in R. Soar at Ratcliffe and in the R. Poulter at Normanton Bridge; dykes at Misson; only once found in a pond, viz., by the R. Trent

at Gunthorpe Bridge, which is frequently inundated by the river.

Laccophilus minutus L. (*obseurus* Panz.).

Common and generally distributed in ponds and in ditches of stagnant water; once in canal at Cotgrave.

**Bidessus geminus* F.

Ponds, rare. Pond by railway and canal bridges, Bramcote, 11/8/1936 (Carr). Pond near R. Idle, Misterton, 7/8/1937 (Rev. C. E. Tottenham). Pond in sandpit, Stapleford Hill, near Bramcote, 5/8/1937 (Balfour-Browne).

Hyphyrus ovatus L.

Ponds, canals, streams; common and generally distributed.

Hygrotus versicolor Schall.

Ponds, canals, streams; common and generally distributed.

**H. quinquelineatus* Zett.

Common in R. Poulter at bridge north of Normanton Inn, Clumber, June to October, 1935-36 (Carr). Dyke near Old Bank End, Finningley, 7/9/1937 (Balfour-Browne).

H. inæqualis F.

Ponds, canals, streams; common and generally distributed.

Cœlambus confluentis F.

Ponds, often common; occasionally in streams. Ponds at Bramcote, Cotgrave and Cropwell Wolds, Owthorpe, Woodborough, and Salterford dam; stream from Cuckney dam.

**C. impressopunctatus* Schall.

Ponds. Eakring, 5, 20/5 and 11/9/1936; Oxtan and Woodborough, May, 1937 (Carr). Pond near R. Idle, Misterton, 7/8/1937 (Tottenham). Pond in sandpit, Stapleford Hill, near Bramcote, 4, 5/9/1937; dyke near Old Bank End, Finningley, 7/9/1937 (Balfour-Browne).

Deronectes assimilis Payk.

Canal, Awsworth, 11/6/1932 (E. J. Pearce). Canal, Bramcote, 10/7 and 1/10/1935; pond in old Magnesian Limestone quarries, Warsop Vale, 7/1935; R. Poulter, Normanton Bridge, June and July, 1936, and 7/9/1937.

D. elegans Panz.

Streams, rarely in canals. Brook, Kingston-upon-Soar; R. Whipling between Whatton and Elton; R. Smite, Aslockton; R. Trent, Newark; canal, Awsworth (E. J. Pearce). R. Trent, Nottingham, Colwick; stream from Cuckney dam; brook at Moorhouse, near Laxton; very common in the R. Poulter at Normanton Bridge; canal at Kinoulton.

D. duodecimpustulatus F.

Canals; rare. Awsworth, 11/6/1932; Gamston, 26/6/1933 (E. J. Pearce). Kinoulton, 4/7/1935.

Oreodytes rivalis Gyll.

Brooks; rare. Woodborough, 13/7/1935; Kirklington, 25/7/1935.

O. halensis F.

For this species the only record is that given in the *Invertebrate Fauna of Nottinghamshire*. The identification has been confirmed by Prof. Balfour-Browne.

Graptodytes pictus F.

Canals, ponds, etc.; generally distributed.

Graptodytes granularis L.

Pond, Cotgrave Wolds, 1/5/1936; common in pond at Wellow, 3, 13/4 and 28/5/1937; pond at Hickling, 17/5/1937 (Carr). Pond by R. Idle, Misterton, 7/8/1937 (C. E. Tottenham). All these are the true *granularis* with which *G. bilineatus* has hitherto been much confused (*teste* Balfour-Browne).

G. lepidus Oliv.

Ponds and ditches; widely distributed but not very common.

Hydroporus lineatus F.

Ponds and ditches; generally distributed but apparently not very common.

H. dorsalis F.

Ponds at Oxtun, Woodborough, Wellow, Widmerpool, and Cotgrave Wolds; scarce in all these localities, but Rev. C. E. Tottenham took over 100 specimens from a pond near the R. Idle at Misterton in the extreme north of the county on 7/8/1937 (*Naturalist*, October, 1937, p. 250).

**Hydroporus tristis* Payk.

Pond near R. Idle, Misterton, 7/8/1937 (Tottenham).

**H. umbrosus* Gyll.

Pond by R. Trent, Rolleston, 17/6/1936.

**H. angustatus* Sturm.

Great pond in Bunny Park, 28/5/1936; pond at Octon, 1, 6/4 and 19/5/1937; pond, Wellow, 3, 13/4/1937 (Carr). Pond, Misterton, 7/8/1937 (Tottenham).

H. gyllenhalii Schiödte.

Ditch, filled with *Potamogeton*, at Langford Moor, near Newark, several specimens taken in October, 1936 (Carr). Taken in same locality by Prof. Balfour-Browne, 4/9/1937. Pond by R. Idle, Misterton, 7/8/1937 (Tottenham).

**H. striola* Gyll.

Pond, Eakring, 1/8/1936 (Carr). Dyke near Old Bank End, Finningley, 7/9/1937 (Balfour-Browne).

H. palustris L.

Ponds, ditches, canals; very common and universally distributed.

**H. incognitus* Sharp.

Ditch, Hockerton, near Southwell, 18/7/1937; canal, Bramcote, 1/10/1935 (Carr). Langford Moor, near Newark, 4/9/1937 (Balfour-Browne).

H. erythrocephalus L.

Ponds and ditches; often common. Ditch, Langford Moor; dyke, Misson; ponds, Stapleford Hill and Warsop Vale (Carr). Pond, Misterton, abundant (Tottenham). Dyke, Finningley (Balfour-Browne).

H. memnonius Nic.

Pond, Lady Lee Quarries, Worksop, 27/7/1936 (Carr). Ditch, Langford Moor, near Newark, 4/9/1937 (Balfour-Browne).

**H. nigrita* F.

Pond, Lady Lee Quarries, Worksop, 27/7/1936; ditch, Langford Moor, 22/10/1936; pond, Wellow, 13/4 and 28/5/1937.

H. discretus Fairm.

Ditch, Kinoulton, 27/5/1937 (Carr). Ditch, Langford Moor, 4/9/1937 (Balfour-Browne).

H. pubescens Gyll.

Ponds; generally distributed and rather common.

Hydroporus planus F.

Ponds and ditches ; common and generally distributed.

H. tessellatus Drap. (*lituratus* Brullé).

Ponds and ditches ; frequent and widely distributed.

[*H. marginatus* Duft.

This must be deleted from our list. The specimen recorded in *Invert. Fauna of Notts.* cannot be traced and was probably an error, and the record in the *Supplement* to the above work is now known to have been a *lapsus calami*.]

Agabus guttatus Payk.

Streams. I have not taken this species with the water-net, but have found it very commonly under stones in the beds of streams which have dried up in hot weather. Abundant in bed of stream crossing the Kneesall-Ossington road in the parish of Laxton, and in the bed of Halloughton Dumble where it crosses the Halloughton-Southwell road ; also in bed of ditch on the east side of Kneesall Common.

A. paludosus F.

In running water ; scarce. Dover Beck, Calverton ; stream issuing from Cuckney Dam—both in July, 1935.

A. didymus Oliv.

Ponds, ditches, streams ; widely distributed and rather common.

A. nebulosus Forst.

Ponds, ditches ; common and widely distributed.

A. sturmi Gyll.

Occurs in both stagnant and moving waters. Ponds at Eakring and Warsop Vale ; ditches at Hockerton, Epperstone, Sutton Bonnington, and very common in a ditch full of *Potamogeton* at Langford Moor, near Newark ; stream from Cuckney Dam (Carr). Nottingham Canal, Awsworth (E. J. Pearce).

A. chalconatus Panz.

Ponds and ditches ; not common. Ditch at Langford Moor, near Newark, two ♂♂, 20/7/1935 ; pond by Fosseyway, Cotgrave Woods, ♂, 1/7/1936, ♀♀, 10/6/1937 ; roadside pond, Hickling, ♀♀, 27/5/1937.

According to Professor Balfour-Browne (*Systematic Notes upon British Aquatic Coleoptera*, Vol. I, p. 55), the male of this species is dimorphic, the two forms being *chalconatus* proper and *melano-cornis*. The Langford Moor males are the true *chalconatus*.

A. bipustulatus L.

Ponds and ditches ; common and generally distributed.

Platambus maculatus L.

Brooks and rivers ; widely distributed and occasionally common.

Ilybius fuliginosus F.

Ponds, ditches, streams ; generally distributed and common.

**I. subæneus* Er.

Pond by R. Idle, Misterton, 7/8/1937 (C. E. Tottenham). Pond in sandpit, Stapleford Hill, near Bramcote, 17/8/1937 (Carr), and taken in same locality by Professor Balfour-Browne, 4, 5/9/1937-

I. fenestratus F.

Ponds, canals, etc. Nottingham canal, Wollaton, Bramcote, Cossall ; Grantham canal, Cotgrave, Cropwell Bishop, and abundant at Kinoulton (Carr). Pond in sandpit, Stapleford Hill, 4/9/1937 ; dyke near Old Bank End, Finningley, 7/9/1937 (Balfour-Browne).

Ilybius ater Degeer.

Ponds and ditches ; rare. Pond near railway and canal bridges, Bramcote, August and September, 1936 (Carr). Pond, Stapleford Hill, 5/9/1937 ; ditch, Langford Moor, 4/9/1937 (Balfour-Browne).

I. obscurus Marsh.

Ponds and ditches rare. Pond by R. Idle, Misterton, 7/8/1937 (Tottenham). Ditch, Langford Moor, 4/9/1937 ; dyke near Old Bank End, Finningley, 7/9/1937 (Balfour-Browne).

**I. ænescens* Thoms.

Very rare. A single specimen taken in pond in sandpit, Stapleford Hill, near Bramcote, 4/9/1937 (Balfour-Browne).

**Rantus graphii* Gyll.

Rare. Pond by R. Idle, Misterton, two specimens, 7/8/1937 (C. E. Tottenham).

**R. exsoletus* Forst.

Rare. Near Ollerton, Sherwood Forest, June, 1914 (Carr). Pond by R. Idle, Misterton, 7/8/1937 (Tottenham). Dyke by Old Bank End, Finningley, 7/9/1937 (Balfour-Browne).

**R. pulverosus* Steph.

Ponds and ditches ; frequent. Ditch near Zouch Mill, Sutton Bonington, 21/9/1935 ; pond, Wellow Green near Ollerton, 24/3/1936 ; pond, Eakring, 11/9/1936 ; pool by R. Trent, Rolleston, 23/9/1936 ; pond, Stapleford Hill, near Bramcote, 17/8/1937 (Carr). Taken also in last locality by Professor Balfour-Browne, 4/9/1937. Pond by R. Idle, Misterton, 7/8/1937 (C. E. Tottenham).

Colymbetes fuscus L.

Ponds and ditches. Common and generally distributed.

**Dytiscus semisulcatus* Müll. (*punctulatus* F.)

Ditch, Langford Moor, near Newark, one ♀, 22/10/1936.

D. marginalis L.

Ponds and ditches ; frequent.

Acilius sulcatus L.

Ponds ; frequent. Cotgrave Wolds, Owthorpe, Widmerpool, Stapleford ; very common in pond at Woodborough.

Gyrinus natator L. var. *substriatus* Steph.

Ponds, canals, streams. Common and generally distributed.

G. marinus Gyll.

Ponds, canals ; common.

**G. thomsoni* Zait. (*Edwardsi* Sharp).

Canals ; rare. Grantham Canal, Nottingham, 19/9/1913 ; in same canal at Hickling, 27/5/1937.

Orectochilus villosus Müll.

R. Trent, Newark, 26/6/1933 (E. J. Pearce).

Hydrobius fuscipes L.

Ponds and ditches ; common and generally distributed. The var. **picicrus* at Langford Moor.

**Enochrus melanocephalus* Oliv.

Canals, frequent ; rarely in ponds. Nottingham canal, Wollaton, Bramcote, Cossall ; Grantham canal, Cotgrave, Cropwell Butler, Owthorpe, Hickling ; pond, Bramcote.

Philydrus frontalis Er.

Ponds, apparently rare. Great pond in Bunny Park, 28/5/1936 ; Oxtun, 19/5/1937.

**Philydrus coarctatus* Gred.

Rare. Great pond in Bunny Park, 28/5/1936.

Cymbiodyta marginella F.

Pond by R. Idle, Misterton, two specimens, 7/8/1937 (Tottenham).

[*Paracymus scutellaris* Rosen.

The only record is that in the *Invert. Fauna of Notts.*, and confirmation is required before it can be accepted as a Nottinghamshire insect.]

Anacæna globulus Payk.

Ponds, ditches, streams; common and generally distributed.

A. limbata F.

Ponds, ditches, canals; generally distributed.

A. bipustulata Steph.

Rare. Grantham canal, Hickling, three specimens, 27/5/1937.

**Helochares lividus* Brit. auct.

Ponds, local. Oxtou, Wellow Green, Woodborough, Upper Broughton, common in pond by R. Trent, Rolleston (Carr).
Pond by R. Idle, Misterton (Tottenham).

**H. punctatus* Sharp.

Rare. Dyke near Old Bank End, Finningley, 7/9/1937 (Balfour-Browne). Probably one or more of the Rolleston specimens of *lividus* should come under *punctatus*. Professor Balfour-Browne considers them to be merely colour forms of one species.

Laccobius nigriceps Thoms.

Canal, Wollaton; ditch, Langford Moor; R. Poulter, Normanton Bridge; brook, Moorhouse, near Laxton.

L. alutaceus Thoms.

Ponds, canals, streams; widely distributed but not very common. Ponds, Stapleford Hill, Hickling, Warsop Vale; Nottingham canal, Cossall; Grantham canal, Kinoulton; R. Poulter, Normanton Bridge, Clumber.

L. minutus L.

Ponds, canals; often common. Nottingham canal, Bramcote; Grantham canal, Kinoulton, very common; common in same canal at Hickling; dyke, Misson; Salterford dam near Oxtou; pond, Wellow (Carr). Pond by R. Idle, Misterton (Tottenham).

L. biguttatus Gerh.

Ponds, canals, streams; generally distributed and rather common.

**Berosus luridus* L.

Found in one locality only. Ponds in old Magnesian Limestone quarries Warsop Vale, rather common on 3/7/1936, but scarce on 13/8/1936 and 5/9/1937.

**Limnebius truncatellus* Thunb.

Ponds, ditches, canals; widely distributed. Nottingham canal, Awsworth, 11/6/1932; Grantham canal, Gamston, 26/6/1933 (E. J. Pearce). Langford Moor, near Newark, July-October, 1935-36; pond, Widmerpool, 6/9/1935; brook, Moorhouse, near Laxton, 21/8/1935; pond, Misterton, 7/8/1937 (C. E. Tottenham).

**L. papposus* Muls.

Ponds and ditches; widely distributed. Ditch at Epperstone Bridge, 4/9/1935; ponds, Eakring, 5/5/1936; Kneesall, 1/6/1936 Wellow, 3/4/1937; Woodborough, 4/5/1937; Hickling, 17/5/1937; Stapleford Hill, 8/6/1937 (Carr). Pond by R. Idle, Misterton, 7/8/1937 (Tottenham). Pond, Warsop Vale, 5/9/1937 (Balfour-Browne).

**Limnebius nitidus* Marsh.

Rare. Dyke by Old Bank End, Finningley, 7/9/1937 (Balfour-Browne).

Chaetarthria seminulum Herbst.

The record in *Invert. Fauna Notts.* is still the only one.

Helophorus (Megempleurus) rugosus Oliv.

No further records; the specimens mentioned in *Invert. Fauna Notts.* are the true *rugosus*, not *porculus* Bed.

H. (Empleurus) nubilus F.

No further records.

H. (Trichelophorus) alternans Gené.

Meadows near Nottingham, May 1834. *teste* Stephens.

H. (Megalephorus) aquaticus L.

Ponds and ditches; rather common. Ponds at Oxtou, Eakring, Rolleston, Cotgrave Woods, Hickling; ditches at Epperstone, Bleasby, Hockerton. The small form, *M. æqualis*, which Prof. Balfour-Browne considers unworthy to rank even as a variety, has occurred in several of the above localities.

H. quadrisignatus Bach. (*dorsalis* Marsh.).

No further records.

H. viridicollis Steph. (*æneipennis* Thoms.).

Ponds and ditches; widely distributed and probably common. Ponds at Woodborough, Eakring, Kneesall, Hickling; ditches at Bleasby, Kinoulton; R. Meden, Budby (Carr). Pond, Misterton (Tottenham).

**H. affinis* Marsh.

Ponds, Woodborough, Eakring, Wellow, Lady Lee Quarries, Work-sop. This and the next are considered by Prof. Balfour-Browne to be merely extremes of one species.

**H. griseus* Herbst.

Ponds and ditches. Pond, Kneesall, 1/6/1936 (Carr). Pond, near R. Idle, Misterton, common, 7/8/1937 (Tottenham). Ditch, Langford Moor, 4/9/1937; ponds, Warsop Vale, 5/9/1937 (Balfour-Browne).

H. (Atractelophorus) brevipalpis Bed.

Ponds, canals, streams; common and generally distributed.

Hydrochus elongatus Schall.

The original record (confirmed by Prof. Balfour-Browne) is still the only one.

**Ochthebius impressus* Marsh. (*pygmæus* Brit. Auctt.).

Ponds; widely distributed. Pond, near R. Trent, High Marnham, 25/5/1936; Hickling, 17/5/1937; Wellow, 16/7/1937 (Carr). Pond near R. Idle, Misterton, 7/8/1937 (Tottenham). Sandpit, Stapleford Hill; Warsop Vale; ditch, Langford Moor, all September, 1937 (Balfour-Browne).

O. bicolon Germ. (*rufimarginatus*) Steph.

No further records.

**O. ævatus* Steph.

Canal, Cropwell Butler, 27/5/1936.

Hydræna nigrita Germ.

No further records. The identity of the original specimens has been confirmed by Prof. Balfour-Browne.

Celostoma (Cyclonotum) orbiculare F.

No further records.

TABLE SHOWING THE AQUATIC COLEOPTERA RECORDED FOR NOTTINGHAMSHIRE AND THE COUNTIES AND VICE-COUNTIES SURROUNDING IT.

	Nottingham	Leicester	Derby	Lincoln S.	Lincoln N.	Yorkshire S.W.
<i>Brychius elevatus</i>	x	x	x	—	x	x
<i>Haliphys obliquus</i>	x	x	x	x	x	x
<i>confinis</i>	x	x	x	—	—	x
<i>mucronatus</i>	—	—	x	—	—	—
<i>flavicollis</i>	x	x	x	x	x	x
<i>fulvus</i>	x	x	x	—	x	x
<i>variegatus</i>	—	x	x	—	—	x
<i>laminatus</i>	—	x	x	x	—	x
<i>ruficollis</i>	x	x	—	—	x	—
<i>fluviatilis</i>	x	x	x	x	x	x
<i>heydeni</i>	x	x	—	—	—	—
<i>wehnckeii</i>	x	x	x	x	x	x
<i>immaculatus</i>	x	x	x	x	x	—
<i>lineolatus</i>	x	x	x	x	x	—
<i>lineatocollis</i>	x	x	x	x	x	x
<i>Peltodytes cæsus</i>	—	x	—	x	—	x
<i>Hygrobia tarda</i>	x	x	x	—	x	x
<i>Noterus clavicornis</i>	x	x	x	—	—	x
<i>capricornis</i>	x	x	x	—	x	—
<i>Laccophilus hyalinus</i>	x	x	x	x	x	x
<i>minutus</i>	x	x	x	x	x	x
<i>Bidessus geminus</i>	x	x	—	—	—	x
<i>Hyphyrus ovatus</i>	x	x	x	x	—	x
<i>Hygrotus versicolor</i>	x	x	x	x	x	x
<i>quinquelineatus</i>	x	—	x	—	—	—
<i>inæqualis</i>	x	x	x	x	x	x
<i>decoratus</i>	—	x	—	—	—	x
<i>Calambus confluens</i>	x	x	—	—	x	x
<i>parallelogrammus</i>	—	x	x	—	x	—
<i>impresopunctatus</i>	x	—	—	—	x	x
<i>Deronectes latus</i>	—	—	—	—	—	x
<i>assimilis</i>	x	x	x	x	x	x
<i>elegans</i>	x	—	—	—	—	x
<i>duodecimpustulatus</i>	x	x	x	x	x	x
<i>Oreodytes septentrionalis</i>	—	x	—	—	—	—
<i>borealis</i>	—	—	—	—	—	x
<i>rivalis</i>	x	x	x	—	x	x
<i>halensis</i>	x	—	—	x	x	—
<i>Graptodytes pictus</i>	x	x	x	—	x	x
<i>granularis</i>	x	x	—	x	x	x
<i>lepidus</i>	x	x	—	x	x	x
<i>Scarodytes lineatus</i>	x	x	x	—	x	x
<i>Hydroporus dorsalis</i>	x	x	x	—	x	x
<i>scalesianus</i>	—	—	—	—	—	x
<i>neglectus</i>	—	—	—	—	—	x
<i>tristis</i>	x	—	x	—	—	x
<i>umbrosus</i>	x	—	—	—	x	x
<i>angustatus</i>	x	—	x	—	x	x
<i>gyllenhali</i>	x	x	—	—	x	x
<i>striola</i>	x	x	—	—	x	x
<i>palustris</i>	x	x	x	x	x	x
<i>incognitus</i>	x	—	—	—	—	—
<i>erythrocephalus</i>	x	x	x	—	x	x
<i>rufifrons</i>	—	—	—	—	x	—

	Notting- ham	Leicester	Derby	Lincoln S.	Lincoln N.	Yorkshire S.W.
<i>Hydroporus longulus</i> ...	—	×	—	—	—	—
„ <i>melanarius</i> ...	—	—	—	—	—	×
„ <i>memnonius</i> ...	×	×	×	×	×	×
„ <i>obscurus</i> ...	—	—	—	—	×	—
„ <i>nigrita</i> ...	×	×	×	—	×	×
„ <i>discretus</i> ...	×	×	—	—	×	×
„ <i>pubescens</i> ...	×	×	×	—	×	×
„ <i>planus</i> ...	×	×	×	×	×	×
„ <i>tessellatus</i> ...	×	×	×	×	×	×
„ <i>marginatus</i> ...	?	—	×	—	—	—
„ <i>ferrugineus</i> ...	—	×	—	—	—	—
<i>Agabus guttatus</i> ...	×	×	×	—	×	×
„ <i>biguttatus</i> ...	—	×	—	—	—	×
„ <i>paludosus</i> ...	×	×	×	×	×	×
„ <i>uliginosus</i> ...	—	—	×	—	—	×
„ <i>didymus</i> ...	×	×	×	—	×	×
„ <i>nebulosus</i> ...	×	×	×	×	×	×
„ <i>conspersus</i> ...	—	—	—	—	—	×
„ <i>striolatus</i> ...	—	—	?	—	—	—
„ <i>labiatus</i> ...	—	×	—	—	—	×
„ <i>undulatus</i> ...	—	×	—	—	—	—
„ <i>arcticus</i> ...	—	—	—	—	—	×
„ <i>sturmii</i> ...	×	×	×	—	×	×
„ <i>chalconatus</i> ...	×	×	×	×	×	×
„ <i>bipustulatus</i> ...	×	×	×	—	×	×
<i>Platambus maculatus</i> ...	×	×	×	×	×	×
<i>Ilybius fuliginosus</i> ...	×	×	×	—	×	×
„ <i>subæneus</i> ...	×	—	—	—	×	—
„ <i>fenestratus</i> ...	×	×	×	—	×	×
„ <i>ater</i> ...	×	×	×	—	×	×
„ <i>obscurus</i> ...	×	×	×	—	×	×
„ <i>ænescens</i> ...	×	×	—	—	—	—
<i>Copelatus agilis</i> ...	—	×	—	—	×	×
<i>Rantus grapii</i> ...	×	—	—	—	×	×
„ <i>exsoletus</i> ...	×	×	×	×	×	×
„ <i>pulverosus</i> ...	×	×	×	—	—	—
„ <i>bistriatus</i> ...	—	—	×	—	×	×
<i>Colymbetes fuscus</i> ...	×	×	×	×	×	×
<i>Dytiscus semisulcatus</i> ...	×	×	×	—	×	×
„ <i>marginalis</i> ...	×	×	×	×	×	×
„ <i>circumflexus</i> ...	—	×	—	—	—	—
„ <i>circumcinctus</i> ...	—	—	×	—	—	—
<i>Hydaticus transversalis</i> ...	—	×	—	—	—	—
<i>Acilius sulcatus</i> ...	×	×	×	×	×	×
„ <i>canaliculatus</i> ...	—	—	—	—	—	×
<i>Gyrinus suffriani</i> ...	—	—	—	×	—	—
„ <i>minutus</i> ...	—	×	—	—	—	×
„ <i>natator</i> var. <i>substriatus</i> ...	×	×	×	×	×	×
„ <i>marinus</i> ...	×	×	×	—	×	×
„ <i>thomsoni</i> ...	×	—	—	—	—	—
<i>Orectochilus villosus</i> ...	×	×	×	—	—	×
<i>Hydrous piceus</i> ...	—	×	×	—	—	×
<i>Hydrophilus caraboides</i> ...	—	×	×	—	—	×
<i>Hydrobius fuscipes</i> ...	×	×	×	×	×	×
„ „ var. <i>piceus</i> ...	×	—	—	—	—	×
<i>Limnoxenus oblongus</i> ...	—	×	—	×	—	—
<i>Enochrus melanocephalus</i> ...	×	×	×	—	×	×

	Nottingham	Leicesters	Derby	Lincoln S.	Lincoln N.	Yorkshire S.W.
<i>Philydrus testaceus</i>	—	×	×	—	×	×
<i>bicolor</i>	—	—	—	—	×	—
<i>frontalis</i>	×	×	×	—	×	×
<i>quadripunctatus</i>	—	—	—	—	—	×
<i>minutus</i>	—	—	×	—	—	—
<i>coarctatus</i>	×	—	×	—	×	×
<i>Cynbiodyta marginella</i>	×	×	×	—	×	—
<i>Paracymus scutellaris</i>	—	×	—	—	—	—
<i>Anacæna globulus</i>	×	×	×	—	×	×
<i>limbata</i>	×	×	×	—	×	×
<i>bipustulata</i>	×	×	—	—	×	×
<i>Helochares lividus</i>	×	×	×	×	×	×
<i>griseus</i>	×	—	×	—	—	×
<i>Laccobius nigriceps</i>	×	—	—	—	×	—
<i>alutaceus</i>	×	×	×	—	×	—
<i>minutus</i>	×	×	×	×	×	×
<i>biguttatus</i>	×	×	×	—	×	×
<i>Berosus signaticollis</i>	—	×	—	—	—	—
<i>luridus</i>	—	×	×	—	×	×
<i>affinis</i>	×	—	×	—	—	—
<i>Limnebius truncatellus</i>	×	×	×	×	×	×
<i>papposus</i>	×	—	×	—	×	—
<i>nitidus</i>	×	—	×	—	×	—
<i>Chaetarthria seminulum</i>	×	×	×	×	×	×
<i>Helophorus rugosus</i>	×	—	—	—	—	—
<i>nubilus</i>	×	×	×	×	×	×
<i>alternans</i>	×	—	—	—	—	—
<i>aquaticus</i>	×	×	×	×	×	×
<i>nanus</i>	—	×	—	—	×	—
<i>mulsanti</i>	—	—	×	—	×	—
<i>quadrisignatus</i>	×	×	—	—	×	×
<i>viridicollis</i>	×	×	×	—	×	×
<i>griseus</i>	×	×	×	—	×	×
<i>affinis</i>	—	×	×	—	×	×
<i>granularis</i>	×	×	×	—	×	×
<i>brevipalpis</i>	×	×	×	×	×	×
<i>Hydrochus brevis</i>	—	×	—	—	×	—
<i>elongatus</i>	×	×	×	—	×	×
<i>angustatus</i>	—	×	×	—	—	—
<i>Henicocerus exsculptus</i>	—	×	×	—	—	×
<i>Ochthebius marinus</i>	—	—	—	—	×	—
<i>pygmæus</i>	×	×	—	—	×	×
<i>bicolon</i>	×	×	×	—	×	×
<i>auriculatus</i>	—	—	—	—	×	—
<i>æratu</i>	×	—	—	—	×	—
<i>Hydræna testacea</i>	—	×	—	—	—	×
<i>riparia</i>	—	×	×	—	×	×
<i>nigrita</i>	×	×	×	—	—	×
<i>gracilis</i>	—	×	×	—	—	×
<i>atricapilla</i>	—	—	×	—	—	×
<i>pulchella</i>	—	—	×	—	—	×
<i>pygmæa</i>	—	—	—	—	—	×
<i>Calostoma orbiculare</i>	×	×	×	—	×	×

[NOTE.—The records of Leicestershire and Derbyshire are taken from the Victoria Histories of those counties; those of Lincolnshire from *The Transactions of Lincolnshire Naturalists' Union* for 1908 and 1909; the South-west Yorkshire records are from a manuscript list kindly supplied by Dr. W. J. Fordham].

NORTHERN GLACIAL DRIFTS

AT a meeting of the Geological Society of London, held on April 19th, Mr. Robert George Carruthers, F.G.S., read a paper on Northern Glacial Drifts: some Peculiarities and their Significance.

After much controversy an agreement on the interpretation of British glacial drifts, or at any rate of the boulder-clays and interstratified sediments, seems to have been reached by common consent. For a generation these fundamental matters have not been questioned. Boulder-clay is now regarded as 'ground-moraine,' with or without englacial dirt—in exceptional cases as englacial dirt alone—while the interstratified beds belong to brief periods of recession, of deglaciation. If there is a multiple series of these drifts, then each successive boulder-clay marks a readvance, however slight, and eventually we get a record of ice-front oscillations, as so frequently happens with modern ice-sheets. That was the position even among monoglacialisists in Lamplugh's time: since then it has been so consolidated that multiglaciation is now returning to fashion.

Widely held though these views may be, and for so long a time, it would seem that they are based almost wholly on assumptions rather than on observed fact. Very rarely indeed do we find any attempt at definite proof from field-evidence. In particular, there seems to have been no close inspection of the sediments, or of their contacts—their actual junctions—with overlying boulder-clay. A long series of such observations made during the last 16 years, in no way supports the orthodox view. These observations began in Northumberland; they were extended to Durham, to the Yorkshire coast and other parts of northern England, besides one or two places in the Central Valley of Scotland. From the outset it was noticed that the bottom boulder-clay, that resting on rock-head, was the only one which showed contacts proving such forward movement as would be expected from an advancing ice-sheet. The others showed either no disturbance whatever, or at most a minor, local crumpling with no definite orientation. Moreover, examination of the sediments revealed unexpected features, showing that these deposits merited closer study than they had hitherto received.

The conclusions reached may be summarized as follows. The general melting of an ice-sheet is two-fold. (1) The well-known 'external' or 'top melt' making its way downwards, and giving rise to fluvio-glacial sands and gravels which cover the tapering snout and the outwash plain beyond; if there be any laminated clays, they will be lake deposits laid down on this foundation. (2) The 'internal' or 'bottom melt' (often noted, though apparently not seriously studied), which is persistently found along the sole of the ice-sheet, probably

for a long way back. As the snout or outer edge retreats, this bottom melt makes its way upwards through the englacial detritus; at first through the heavy 'bottom dirt,' with boulder-clay as a resultant, and then through the 'banded dirt' so frequently described in accounts of present-day ice sheets. Far back from the outer edge, the released water is still of comparatively small amount, and is squeezed out from the 'banded dirt' as fast as they are released from the ice. The result is a 'pressed melt,' a series of laminated clays wherein the original arrangement within the ice is still retained, though in a compressed or telescoped form, the degree of compression varying with the relative amounts of dirt and of ice among the various bands. These "pressed melt" clays (which rest on boulder-clay, and not on sand or gravel) have highly characteristic features, which will be treated in detail. They do not, of course, show current-bedding or ripple-marks, features which appear towards the borders of the ice-sheet, at first in a minor degree, when the water, making its way between the layers of the 'pressed melt,' begins to corrode some of its structures, and in particular the highly folded bands. This stage marks the initiation of what may be termed the 'free melts,' and as the water gathers volume a more definite re-arrangement appears, leading to dirty silts and finally, close to the outer edge, well-washed sands and gravels. In this zone there is evidence that the ice had a caverned base, incessantly changing its points of support. The clay or 'rock-flour' elements do not gather here, but are swept away to the outwash plain.

The result of these processes is the formation of a series of sediments which have been accumulated, not in open water, but entirely under the ice, following hard on the bottom melt as it made its way upwards. It is now clear why overriding boulder-clays never occasion the profound disturbances, the rafting and incorporation so common on the softer rock-heads. They do not indicate re-advance at all, but are the melt-out of bottom dirt brought up by ice-shear. The whole represents an englacial melt making its way upwards through the complex contents of a single ice-sheet.

RECORDS

GREENLAND WHEATEAR (*OENANTHE OENANTHE LEUCORRHOA*) AT
SCARBOROUGH

ON April 15th, 1939, a Wheatear was picked up dead in a Scarborough street and brought to the writer. It was a female bird and the colours were not noticeably bright, but the wing measurement of $3\frac{15}{16}$ in. suggested that it might belong to the large northern race. It was sent to Mr. H. F. Witherby for verification, and he kindly replied that the bird 'is

undoubtedly a Greenland Wheatear.' This race is not included in Clarke and Roebuck's *Handbook of Yorkshire Vertebrata*, nor in Nelson's *Birds of Yorkshire*, and it appears to be the first recorded specimen for the Scarborough district.—W. J. CLARKE.

SHORT-EARED OWLS NEAR YORK

FOLLOWING the note which appeared in *The Naturalist* for May, a single specimen was seen at Tilmire on April 20th and again on the 24th. The following notes refer to the Great Lake at Castle Howard. On January 22nd a dead Red-Throated Diver was seen at the edge of the lake. The webbed feet and small size made identity certain. Carpel joints to wing tip, 10.5 inches. On the same day a pair of Goosanders was present on the lake; the cock bird, in full plumage, was a beautiful and conspicuous object and appeared much larger than the hen. On February 12th a dead Shag was seen at the edge of the lake. The identity was made doubly certain by counting the tail feathers which numbered 12. On December 24th a Cormorant (or possibly a Shag) was seen to fly over the central tower of York Minster, which it circled as though about to alight.—E. WILFRED TAYLOR.

THE NUTHATCH IN THE WHITBY DISTRICT

MANY years ago, the Nuthatch was noted as having occurred in the Whitby district, but for a very long period it has either been absent from this part of the county or has escaped observation, until the winter of 1934, when it was observed at Esk Hall Sleights, coming to the bird-table with other small birds. Since that time the bird has been seen and heard in the grounds of Esk Hall and about the bird-tables in the village many times and at all seasons of the year, so that it appears to have become a resident. Although close observation has thoroughly established the identity of the bird, only a single bird has ever been seen. So many people are interested in the bird and pay it such close attention that if there was more than one the fact could hardly have escaped notice.—F. SNOWDON.

STONECHAT IN THE ELLAND AREA

A NEST of the Stonechat was found in the Elland area on April 26th by Mr. H. Spencer, and when five of us went over from Halifax to see it two nights later the hen bird was fortunately off and we all saw the five eggs, four of which hatched. I have searched through 26 volumes of *The Naturalist* and up to the year 1933 found no more than half a dozen references to the Stonechat nesting in the West Riding, so that the importance of Mr. Spencer's record is clear. It is the first time Stonechats are known to have nested within the parish of Halifax. The nest was in a rough field, and

the actual site was a grassy bank. Whinchats have previously nested in the same field.—WALTER GREAVES.

GREATER SPOTTED WOODPECKER

A DEAD male Greater Spotted Woodpecker with a broken neck was brought to the Cartwright Memorial Hall Natural History Museum, Bradford, on 1st May, by Mr. Tunnicliffe, who had found it beneath the dining room window of Mr. Eustace Illingworth's residence, Daisy Bank, Bradford. Mr. Tunnicliffe believed that the bird had met its death by flying against the window glass. It had been an annual visitor for the past three or four years, coming usually in February and March. It was fond of sweet cake and cheese.—SIDNEY JACKSON.

RINGSTONE EDGE RESERVOIR

AT Ringstone Edge Reservoir, Halifax, June 1st, 1939: 12 Ringed Plover, 4 Greenshanks, 7 Temminck's Stints. June 2nd, 7 Ringed Plover, 2 Greenshanks, 7 Temminck's Stints. It is the first record for Halifax Parish of Temminck's Stint. We had excellent views from about 20 feet range in full sunlight, noting the white outer tail feathers in flight, the spluttering trill and the habit of rising to a great height when flushed. They were all in the mottled breeding plumage, which was identical with that of our birds in Scotland. On June 1st the observers were W. Greaves and myself, and on June 2nd we had in addition E. Watson and J. Druery.—G. EDWARDS.

PYROPTERUS AFFINIS PAYK. : A NEW YORKSHIRE LOCALITY

ON the occasion of the Y.N.U. excursion to Wentbridge on May 6th, 1939, while examining a fallen and decaying tree, besides other larvae which have not matured, I collected a few which seemed to be of unusual occurrence. They were fleshy larvae, of an intense ivory white, with two transverse oblong marks of a brownish drab hue on the upper half of each segment. These, to the number of five, emerged on June 5th and proved to be *Pyropterus affinis* Payk. All were males. Hitherto, the only locality in Yorkshire where it has been met with is Wheatley Wood, near Doncaster, where I found larvae in October, 1890, which matured in the following year, and where the only specimen on the wing was taken by H. V. Corbett in 1903. The occurrence of the species in a fresh locality some 15 miles from Wheatley is some reason for supposing it to be not so rare as is commonly supposed. Now that the larvae has been described sufficiently well to make recognition fairly easy, fellow coleopterists may find rearing the larvae the best way of procuring the species. Rearing, it may be noted, is very little trouble, the main point is to see that the wood is kept sufficiently moist. Better over-wet than just damp.—E. G. BAYFORD.

DARLINGTON AND TEESDALE NATURALISTS' FIELD CLUB

JOHN E. NOWERS

Hon. Secretary

A PARTY of 19 members of the above club visited the Teesmouth (Yorkshire side) on May 13th, 1939, for the purpose of observing bird life. They took train to Grangetown, making their way over the slag to the river side. On reaching the river they followed along the bank. Bird life was scarce, although Larks were singing overhead all the time, and occasional Wheatears were seen and odd Redshanks. The tide was well out and no doubt the birds were scattered over the mud flats. Nearer the mouth of the river more birds were seen, Ringed Plover, Grey Plover, Sheld-Duck, Common Terns, Yellow Wagtails, and a Whimbrel was heard. The party had particularly hoped to see the Little Tern and later in the afternoon saw one dive into the water and catch a fish and carry it to its mate standing on the water's edge. The birds were not yet nesting. The main party had practically reached Redcar when two members who were in the rear made the most unusual observation of the day. They had the good fortune to see a party of about 200 Scoter swimming a short distance from the shore. This duck is a winter visitor to the coast, being rarely seen in such numbers and at this late date. A dead Puffin was picked up near Redcar; this bird must have got a long way from its usual abode. At our meeting on June 6th, a member reported having seen 6 Lesser Terns' nests, also Dunlin, on June 4th, in the same locality.

THE HANDBOOK OF BRITISH BIRDS

(Volume III).

ON the 21st of last month, Messrs. Witherby published the third of the five volumes of *The Handbook of British Birds*, which is being compiled by Messrs. Witherby, Jourdain, Ticehurst and Tucker. The volume under review deals with birds in the British list ranging from Hawks to Ducks, and includes all the Diurnal Raptorial Birds, Storks and Herons, and Swans, Geese, and Ducks.

As in the two previous volumes, it is obvious that extraordinary care has been taken to give accurate and very detailed information under all heads. Experts and specialists have been freely consulted with regard to individual species, families, etc., while the illustrations include a complete series of paintings of British species of geese, made especially for this volume by Mr. Peter Scott. Mr. J. C. Harrison contributes two valuable plates illustrating adult male and female ducks in flight, eighteen species being depicted. There are some useful sketches of birds of prey in flight, and four plates of feathers from the nests of geese and ducks. When the remaining two volumes of the Handbook have been published we shall have by far the most comprehensive work of reference on British ornithology which has ever been published. It should be regarded as an essential item in the library of every natural history society. We remind our readers that the subscription price for each of the five volumes is 21/-, but if all the volumes are not required, the price is 25/- per volume.

CONGRESS OF BRITISH ENTOMOLOGISTS AT MANCHESTER

July 15th—17th: An Appeal

W. D. HINCKS

THE Society for British Entomology holds its fourth Annual Congress at Manchester from July 15th-17th. Hitherto these interesting meetings have been convened at centres in the south, and have naturally appealed largely to south country entomologists. This season the experiment of holding Congress in the north is being tried and its success must depend largely on the support accorded by northern visitors. I should like to appeal to all Yorkshire entomologists and their friends who can, whether members of the Society or not, to come to this gathering. They will be cordially welcomed and will find much of the greatest interest in the programme arranged by the Congress Committee. Papers of first-rate importance and wide interest will be read by eminent entomologists and Professor Balfour Browne as President will deliver his address. The social side of the gathering, always an important feature, is well arranged and a collecting expedition to Delamere Forest will prove very popular. I particularly wish to stress the fact that every function has been arranged to minimise expense to visitors, whose accommodation, etc., may be obtained at special cheap rates. Throughout the Congress entomologists are assured of a delightful and interesting week-end at very low cost. A programme with full particulars may be obtained from the Hon. Secretary, Society for British Entomology—E. Rivenhall Goffe, Esq., 102 High Street, Southampton. I shall be present and any assistance I can render to Yorkshire visitors would be willingly given. Northern entomologists, I feel sure, will show themselves at least as keen and enterprising as their southern colleagues and I look forward to seeing many friends at Manchester.

CORRESPONDENCE

REIGHTON,
Near FILEY,
May 24th, 1939.

To the Editors of *The Naturalist*.

DEAR SIRS,

Hearing the other day that the recent N. and N.E. winds had brought in a good many oiled sea-birds, I went on to Speeton and walked back along the shore as far as Reighton Gap, a distance of not more than a mile. Jotting down on paper, so as not to lose count, I recorded, on that stretch of beach, the following: Guillemots, 36; Puffins, 11; Razorbills, 5; Gannet, 1; Duck (too oiled to identify with certainty), 1; total 55.

I have included no birds which were not definitely oiled, some of them almost encased in the foul, tar-like substance.

Yours faithfully,
T. HYDE-PARKER.

REVIEWS AND BOOK NOTICES

Methuen's Monographs on Biological Subjects: Palaeozoic Fishes, by J. A. Moy-Thomas, pp. 149, 31 fig. (Methuen, 5/-.) The rise of the vertebrata has always been a major scientific problem, and therefore this latest volume of a well-known series is welcome in that it summarises a large amount of modern research on early fishes to which the author has largely contributed. Most of the work is devoted to a technical zoological description of the various orders and sub-orders of Palaeozoic fishes—the non-zoological reader being assisted by a glossary of terms which might have been written in simpler words. A summary of the scheme of classification adopted by the author appears in the last

chapter along with a brief summary of the early evolution of fishes, while an extensive list of recent literature on the subject will enable the reader to pursue the subject further. The appeal of the book is primarily to the zoologist, for it would appear that the author's hope that fossil fishes would become more valuable as stratigraphical indices is not likely to be quickly fulfilled. The price is rather higher than that of previous volumes in the series.

The Goldfish, by **Leonard C. Betts**, with drawings by **Ernest Richardson**, 30 pp. **An Introduction to Tropical Fishes**, by **M. G. Elwin**, illustrated, 35 pp. Both of these small handbooks are published by the Marshall Press, who are the proprietors of the weekly paper *Water Life*. The two items under consideration are numbers 8 and 9 in the *Water Life* series, and the price of each is sixpence. The authors have included in a few pages all the essential information for those who are considering running an aquarium, either for goldfish or for those species which demand artificial heating. The instructions given are clearly set forth, and in both handbooks are to be found details of suitable fish, their food and maintenance in good health.

The Lyre-bird, by **R. T. Littlejohns**, 12 pp., with 30 full-page plates. Angus and Robertson, 4/6. The Lyre-bird is a remarkable creature even for Australia. It is a marvellous songster, mimicking many other species to the life, two-thirds of its repertoire comprising the best items from other songsters. In its ability to reproduce the effect of different birds singing or screeching simultaneously it can rival a gramophone record. Its nesting habits are strange and the male bird is capable of an extraordinary display with its tail, the show being accompanied by a kind of dance. Mr. Littlejohn has made a close study of this unusual bird and illustrated his concise account with a fine series of photographs, most of which are his own.

Animal and Bird Painting, by **Charles Simpson, R.I.**, viii + 136 pp., with 80 illustrations. Batsford, 10/6. Domestic animals and those associated with the chase have formed subjects for artists right through the ages. An account of the development of the art of painting animals ought to be of interest to artists and to naturalists, and that the task has been undertaken by an author of Mr. Simpson's rank and technical experience is most fortunate. The chapters deal with the Horse, Cattle, Sheep, the Dog, Beasts of the Chase, Big Game, Flight, the Poultry-yard, etc., and the author illustrates his comprehensive surveys with coloured and black and white reproductions of famous pictures of the past and present. Six of these illustrations are from Mr. Simpson's own work. The book is one which all art students will find useful, and it will be a delight to the naturalist who takes sketching materials on his rambles.

Deserts, by **Gayle Pickwell**, xvi+174 pp., with 64 illustrations. McGraw-Hill, 15/-. The average person asked to define the term 'desert' would probably say that it was an area where nothing can live. Anyone reading Mr. Pickwell's fascinating book will realise that such a description is quite wrong. Some of the most interesting forms of life are to be found in the great desert regions of the earth. Here conditions are so unusual that curious and ingenious modifications develop in both plant and animal forms. These modifications are such as to enable life to be maintained where temperatures run to great extremes and where water is very scarce. Mr. Gayle Pickwell is Professor of Zoology at San José State College, California, and has made good use of his opportunities for prosecuting researches on a most interesting aspect of ecology. He discusses the factors governing desert formation including 'man-made' deserts, and deals very fully with the plants and animals of desert regions, and more particularly those regions which occur in the south-western states of U.S.A.

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THE WALRUS

R. W. GRAY

THE fearless nature and carnivorous instincts of the walrus are frequently overlooked. According to Parry it is the only animal of which the Eskimo are really afraid. Scoresby calls it a fearless animal. He says :

'It pays no regard to a boat, excepting as an object of curiosity. It is sometimes taken by a harpoon, when in the water. If one attack fails, it often affords an opportunity for repeating it. The capture of a walrus in the water, cannot always be accomplished without danger, for as they go in herds, an attack made upon one individual draws all its companions to its defence. In such cases they frequently rally round the boat from whence the blow was struck, pierce its planks with their tusks, and, though resisted in the most determined manner, sometimes raise themselves upon the gunwale and threaten to upset it. The best defence against these enraged animals is, in this crisis, sea sand, which being thrown into their eyes, occasions a partial blindness, and obliges them to disperse. When on shore, they are best killed with long-pointed knives.'

Other Arctic voyagers bear witness to the fearless nature of the walrus and the risks attending their capture in the water.¹ For instance, Buchan in his '*Voyage of the Dorethia and Trent towards the North Pole in 1818,*' says :

'On the evening in question, several herds of these animals had crawled upon the ice to enjoy the fine evening and rest themselves after their exertions in the late boisterous weather. The boats, properly equipped, and manned with some of the officers and seamen, pushed off in pursuit of them.

'The first herd which was selected disappointed the sportsmen, but another was so intent upon its gambols, that, notwithstanding the extreme vigilance I have noticed, several of the crew managed to effect a landing upon the ice without any alarm being given to the animals, but immediately upon the first musket being fired, the affrighted group made such a desperate rush towards the edge of the ice that they nearly overturned the whole of our party purposely stationed there to intercept them. The seamen, finding this charge more formidable than they expected, were obliged to separate, to allow their opponents to pass through their ranks, and being thus in their turn taken by surprise, they suffered them almost unmolested to perform their "summersets" towards the sea. What with their uncertain movements, the extreme

¹ *Arctic Regions*, Vol. I, p. 504. These remarks do not apply to the present time ; a walrus even in the water having but a poor chance against a man armed with a modern rifle standing in the bow of a boat.

toughness of their skin, and the respectful distance at which the men were obliged to keep to avoid the lashing of the heads and tusks of the animals, it was indeed no easy task to inflict any serious injury upon them. One, however, was desperately wounded in the head with a ball, and the mate of the brig, being determined, if possible, to secure his prey, resolutely struck his tomahawk into its skull, but the enraged animal, with a twist of its head, sent the weapon whirling into the air and then, lashing its neck as if he would destroy with his immense tusks everything that came in his way, effected his escape to the water. The seamen followed and pushed off in their boats, but the walruses, now finding themselves more at home than on the ice, in their turn became the assailants and the affair began to assume a serious aspect. They rose in great numbers about the boats, snorting with rage and rushing at the boats, and it was with the greatest difficulty that they were prevented upsetting or staving them by placing their tusks upon the gunwales, or by striking at them with their heads.

‘It was the opinion of our people that, in this assault the walruses were led on by one animal in particular, and a much larger and more formidable beast than any of the others, and they directed their efforts more particularly towards him, but he withstood all the blows of their tomahawks without flinching and his tough hide resisted the entry of the whale-lances which, unfortunately, were not very sharp and soon bent double. The herd was so numerous, and their attacks so incessant that there was no time to load a musket, which indeed was the only effectual mode of seriously injuring them.

‘The purser, fortunately, had his gun loaded and the whole crew now being nearly exhausted with chopping and sticking at their assailants, he snatched it up and, thrusting the muzzle down the throat of the leader, he fired into his bowels.

‘The wound proved mortal and the animal fell back among his companions, who immediately desisted from the attack, assembled round him, and in a moment quitted the boat, swimming away as hard as they could with their leader, whom they actually bore up with their tusks and assiduously preserved from sinking.

‘Whether this singular and compassionate conduct, which in all probability was done to prevent suffocation, arose from the sagacity of the animals, it is difficult to say, but there is every probability of it, and the fact must form an interesting trait in the history of the habits of the species.’

As the following instances show, the walrus is capable of making an unprovoked attack. In 1869, a number of German explorers were attacked by one when they were crossing some thin, recently formed ice. The walrus, which was in the water

underneath, broke the ice and the explorers had to flee for their lives. Koldeway, referring to the incident, says:

' We then followed the line of the coast, but there we met with complicated and impassable masses of ice, so we had to return to the treacherous ice-field. As with difficulty we were following the road, we were suddenly startled by a walrus breaking through the ice close to us. We fled as quickly as we could, for any attempt to defend ourselves would have been madness. But the walrus swam as quickly under the ice after us, breaking through it near us, evidently intending to swim in our company. We dispersed as much as possible, springing over the ice-crust, through which the alpenstock constantly broke, followed by the rustling and flapping caused by the monster. Had anyone fallen in, it would have been impossible to have pulled him out again. Fortunately, near Cape Wynn, a screen of old ice relieved us of our pursuer. These creatures can break through ice six inches thick, and strike the exact spot where they last saw their enemy.'¹

In 1896, Dr. Nansen was attacked by one when he was in his kayak, but he hit it with his paddle, which, fortunately, caused it to desist. Referring to the incident, he says:

' At 1-30 the next morning (Monday, June 15th, 1896) we proceeded on our way in beautifully calm weather. As walrus swarmed on all sides, we did not much like paddling singly, and for some distance lashed the kayaks together, for we knew how obtrusive these gentlemen could be. The day before they had come pretty near, popped up close beside my kayak, and several times followed us closely a long distance, but without doing us any harm. I was inclined to think it was curiosity, and that they were not really dangerous, but Johansen was not so sure of this. He thought we had had experience to the contrary, and urged that, at any rate, caution could do no harm. All day long we saw herds that often followed us a long way, pressing in round the kayaks. We kept close to the edge of the ice, and if any came too near, we put in, if possible, on an ice-foot. We also kept close together or beside one another. We passed one large herd on the ice, and could hear them a long way off, lowing like cows.

' Towards morning we rowed for some time without seeing any walrus. Just then we saw a solitary rover pop a little in front of us. Johansen, who was in front at the time, put in to a sunken ledge of ice, and, although I really thought that this was caution carried to excess, I was on the point of following his example. I had not got so far, however, when suddenly the walrus shot up beside me, threw itself on to the edge of the

¹ Koldeway, *Die Zweite Deutsche Nordpolar fahrt in den Jahren 1869 und 1870*, Leipzig, 1874, pp. 368-369.

kayak, took hold farther over the deck with one fore-flipper, and, as it tried to upset me, aimed a blow at the kayak with its tusks. I held on as tightly as possible, so as not to be upset into the water, and struck at the animal's head with the paddle as hard as I could. It took hold of the kayak once more and tilted me up so that the deck was almost under water, then let go and raised itself right up. I seized my gun, but at the same moment it turned round and disappeared as quickly as it had come.'¹

In the case of the walrus, a separation of the sexes appears to take place in the summer months: the females with their young and the immature animals of either sex remaining near the land where they feed on shell-fish, the adult males resorting to distant situations where the water is deep and where they feed on seals and other mammals. My reasons for making this statement are as follows:

(1) The Swedish naturalist, Malmgren, who visited Spitzbergen in the sixties, says:

'Of thirty full-grown walruses killed in Henlopen Straits in the month of July, not one was a male. Where the full-grown males were at this time was unknown, but they were believed by the hunters to be "on the banks," remote from land, while the females with their young sought the bays and open sea near the shores, the two sexes thus living in separate herds.'²

(2) In 1897 three of the Dundee whalers having met with little or no success at the 'Greenland' whale fishery, decided to visit Franz Joseph Land in the expectation of capturing numbers of walruses. Southwell, in his *Notes on the Seal and Whale-fishery of 1897*, referring to the fact, says:

³ 'The *Balaena* was the first to arrive, sighting Cape Flora after a twelve days passage, and she made a clean sweep of the coast, killing 600 walruses, and leaving little or nothing for those which followed, the *Active* only securing seventy and the *Diana* eighty-four. Great was their disappointment, as they expected to find something approaching the numbers seen by Mr. Lamont on the Thousand Islands in 1852 . . . *To add to the disappointment, almost all those met with were females and young and a few young bulls; it was evidently the nursery of the species. Where the old bulls were was not discovered, but the females and their young were exterminated.*'

(3) The flesh-eating instincts of the walrus are beyond dispute. Scoresby⁴ mentions finding the remains of seals in their stomachs, and at Davis Straits, in the sixties, Dr. R.

¹ Nansen, F., *Farthest North*, Vol. II, pp. 451-454.

² Quoted by Allen in his *North American Pinnipedia*, p. 108.

³ *Zoologist*, 1898, p. 75.

⁴ Scoresby, W., *Arctic Regions*, Vol. I, p. 503.

Brown¹ found the stomach-contents of one to consist of the flesh of a recently killed whale.

(4) Instances have occurred wherein walruses have been seen in deep water far from land where they could not possibly obtain shellfish. In each of these instances the animal was solitary, was an adult, and in the few cases in which the sex is recorded, a male. These instances are as follows :

A.—IN THE GREENLAND SEA.

(1) In 1879, in lat. 78° long. 2° W., my father came across a large walrus which had recently killed a Narwhal. In his account of the incident, published in Bucklands *Notes and Jottings* :

‘Running north through floes and loose ice, this forenoon, I noticed some distance ahead what I at first took to be the stock of a hand harpoon, standing out of very greasy water, and a number of birds sitting round it. This I at first thought might be a dead whale just rising to the surface, but I soon saw that it was a narwhal horn. As we came nearer I observed something brown-looking, and was puzzled for some time before I made this out to be a walrus, evidently holding the narwhal.

‘As soon as we were near enough I sent two boats away with orders to strike a hand harpoon into the narwhal and fire a gun harpoon into the walrus, both of which they did.

‘The first harpooner struck the narwhal close past the walrus’s nose, whereupon he looked very savage and let go his hold of the narwhal, which immediately began to sink. The walrus, being unwilling to part with his prey upon such easy terms, dived underneath the narwhal and raised him to the surface again, renewing his hold with his teeth, and clasping him round the body with his flippers.

‘The second boat now came up and the harpooner fired his gun harpoon through the walrus’s neck. He then let go his hold of the narwhal and dragged the boat a considerable distance to windward, when a rifle bullet in the back of the head finished him.

‘On examination after getting them on board, we found the narwhal disembowelled, and a great part of the belly eaten away or torn into shreds by the walrus, who had been very particular as to the parts he ate, and had been taking plenty of time to feed. He had eaten the blubber as clean off the skin as if it had been flinched with a knife. The narwhal was quite fresh, and newly killed, and in the death struggle had been all scored with the walrus’s tusks from nose to tail in every direction, although the inner skin was not cut.

¹ Cf., Allen’s *North American Pinnipedia*, p. 135, pp. 353-354.

'The walrus was in prime condition. The blubber upon him was three inches thick; his stomach was quite full of pieces of sealskin and the part of the narwhal which he had eaten. He had, at a moderate estimate, one hundred and fifty gallons of oil and blubber in his stomach.

'The length of the narwhal was fourteen feet, exclusive of horn, by nine feet in circumference. The length of horn was five feet.

'The walrus measured eleven feet long, and nine feet ten inches in circumference.

'The question is, how did the walrus manage to hold a powerful animal like the narwhal? certainly more in his element than the walrus, and who can spin out a hundred fathoms of whale line very smartly, even with a big gun harpoon through and through him.

'The only way I can think of is that he had found the narwhal asleep, gone underneath him, dug his tusks into his belly, and clasped him round the body with his flippers, in which position we found them, with this difference, that the walrus was uppermost.

'This is only the third walrus I have seen off on the deep water whaling banks during the last fourteen years. Their natural home being nearer the land, where their ordinary food is all kinds of shellfish; I could never before understand how they got their living so far from the shore, not knowing that they would eat seals and narwhals, or that they could catch them.

'I expect that those we see out in deep water are like rogue elephants driven out of the herd, or like the man-eating tigers we hear of in India.'

(2) In 1880, at the 'old sealing' the *Hope*, my uncle's ship came across a walrus but did not capture it. My uncle, commenting on the fact in his log book, says, 'a rare visitor far from land.'

(3) In 1885, as recorded at the time, in lat. 73° long. 16° W. we killed a large walrus which had been feeding on seals.¹

(4) In 1887 (22nd June, lat. 73° long. 16° W.) we saw a Walrus in the water with a Floe-seal in its month; lowering a boat we got both.

(5) In 1888, as recorded at the time, we killed a large male walrus which had been feeding on seals. It was in lat. 79° $50'$, long. 5° E.²

(6) In 1890, as stated in a letter on the subject which I communicated to *Nature* some years ago, we came across a dead narwhal which had been recently killed by a walrus.³

¹ *Zoologist*, 1886, p. 54.

² 'Voyage to the Greenland Sea in 1888,' *Zoologist*, 1889, p. 8.

³ *Nature*, 1927.

The circumstances were as follows. When in the crow's nest I noticed something floating in greasy water surrounded by birds. Lowering a boat it proved to be a dead narwhal. It was criss-crossed with wounds and its abdominal viscera had been eaten away. The culprit, a large walrus, was asleep on a neighbouring piece of ice, but through a mistake on my part it escaped.

(6) In 1891, in lat. 78° long. $0\ 15^{\circ}$ W., as stated in my *Peterhead Sealers and Whalers*, the *Hope*, my uncle's, killed a large walrus.¹

(7) In 1897, in lat. $79^{\circ}\ 40'$, long. 2° E., as stated in my *Peterhead Sealers and Whalers*, the *Balaena* of Dundee, Captain Robertson, killed a large walrus.²

B.—IN THE WATERS NORTH OF SIBERIA.

(1) In 1880 the *Jeannette's* people killed a large walrus in this situation. After recording the capture of the animal, which seems to have been a female and was supposed to be pregnant, the account of the ill-fated expedition says:

'To-day (April 20th), however, it was cut up, and to our astonishment, instead of a foetus, we found part of a young seal in its stomach, known to be young because having its first coat of hair.'³

(2) In 1893, Dr. Nansen saw a large walrus far from land. In his account of his voyage the celebrated explorer says:

'But who expects to meet a walrus in close ice in the middle of a wild sea of a thousand fathoms depth, and that in the heart of winter. None of us had ever heard of such a thing before; it is a perfect mystery. As I thought we might have come upon shoals or into the neighbourhood of land, I had soundings taken with 130 fathoms of line, but no bottom was found.'⁴

FIELD NOTES

Semmerwater Notes, 15/2/1939.—7 Whooper Swans. The previous day the number was said to be 32. 18/2/39.—9 Whooper Swans, 5 Herons, quantities of Mallard, Teal, and Widgeon. Few Tufted Ducks, several Lapwings, Redshanks, and Herring Gulls. Further up in Raydale, 2 Buzzards, 2 Ravens, Crossbills, Gold Crests, Stock Doves, and Coal Tits. 10/3/39.—1 Slavonian Grebe, 4 Gadwalls, several Shovellers, 9 Whooper Swans, 4 Bewick Swans, several Mallard, Teal, and Widgeon, 2 Great Crested Grebes. 2/7/39.—2 Great Crested Grebes, 1 Curlew-sandpiper.

¹ *Scottish Naturalist*, November-December, 1933, p. 163.

² *Scottish Naturalist*, November-December, 1933, p. 167.

³ *Voyage of Jeannette*, Vol. 1.

⁴ *Farthest North*, Vol. 1.

Buckden Pike, 9/3/39.—2 Raven and 1 Buzzard, probably same as seen in Raydale. On 15/2/39 a Badger weighing 32 lb. was found dead on the Bowes-Greta Bridge road, probably killed by a car.

Rainfall at Moorcock, 1938.—A rain gauge has been in operation near Moorcock Inn for 21 years and celebrated its coming of age in 1938 by recording 106.8 in. for the year, this being the first time in the 21 years that a three-figure total had been reached.

Albinos.—On a recent visit to Kirkby Overblow the following were reported: 2 pure white Magpies, 2 pure white Blackbirds, and 1 pure white Swallow.

NOTES

A 'RINGED' KESTREL.—A gamekeeper on the Harewood estate a short time ago showed me a bird-ring marked 'Musée Hist. N. A. Bruxelles D.3726.' He said he had taken it from the leg of a Kestrel in June, 1937, which he had shot, because it was hovering too near to his coops of young Pheasants. He had kept quiet about it at the time in case he might get into trouble. I sent the particulars to the Musée Royal D'Histoire Naturelle, at Brussels, and received a reply from the Director, of which the following is a translation: 'We thank you greatly for the particulars of the Faucon cresserelle (*Falco tinmunculus*) carrying the ring D.3726. This bird, captured near Leeds in June, 1937, was ringed as an adult, at Merksem, near Antwerp, on the 7th of October, 1934.' It is rather a curious fact that this bird should be in the West Riding in the height of the breeding season.—H. B. BOOTH.

AN OLD WAKEFIELD RECORD OF THE POLECAT.—A short time ago I had the privilege of going to Stonyhurst College, near Clitheroe. My chief interest was to see the Charles Waterton collection of stuffed birds, etc. These consisted chiefly of Central American birds, but contained at least one Australian bird, viz. the Giant Kingfisher, or the Laughing Jackass of the Australians. I was surprised how well these birds had kept their colour for so long, because they were exposed to a strong light, and it would appear as if Waterton had used some special curative in his unique method of taxidermy. But to the subject of this note, I was very pleased to see a fine male specimen of the Polecat (*Putorius foetidus*), which was labelled 'English Polecat, Walton Park, 1836.' I was unable to find that portion of Waterton's collection (Hérons and other long-legged birds) that forty to fifty years ago were on exhibition on the top floor of the Central Public Library at Bradford. On enquiry they told me that they were not at Stonyhurst.—H. B. BOOTH.

THE NATURAL HISTORY OF TONG PARK, BAILDON

SIDNEY JACKSON.

BETWEEN 1917 and 1923, when I was in my teens, I had ample opportunities for observing the wild life at Tong Park. During that period I kept a series of nature diaries, from which I have now culled the following notes. These do not profess to be a complete record of the natural history of Tong Park, but only a compilation of such nature facts as I was able to appreciate at that period.

Tong Park comprises that portion of the parish of Baildon in the West Riding, lying at the foot of a short, narrow valley between Baildon on the south and Hawksworth on the north. It consists of a textile mill with a small village clustered round the foot of a steep hill crowned by Tong Park Hall, the home of the Denby family, the whole surrounded by fields and woods. For the sake of convenience I have divided up the district into the following headings; the Gasometer Pond, the Long Dam, the Round Dam, the Reservoir, Ghyll Beck, the fields, the swamp, and the village.

THE GASOMETER POND.

I first made the acquaintance of the Gasometer Pond, a deep, triangular, tree-shaded piece of water surrounding two small gasholders, situated at an intermediate level between the Long Dam and the beck close to the mill. Waterhens frequented this pond, but only once did I see a nest. It was built on top of the brickwork surrounding the smaller gasometer, between spikes of spotted orchis which flourished there, rooting in the soft mortar between the bricks. I watched this nest closely, but the mill boys discovered it, too, and it was soon no more. After that, during the whole five and a half years I spent at Tong Park, I never saw another waterhen's nest in the district.

When the Gasometer Pond was pumped dry for repairs to be done to the gasholders, a floundering trout weighing $2\frac{3}{4}$ lbs. was raked from the black, muddy bottom by one of the mill stokers. This capture settled a long-disputed point as to whether fish could live in this gas-tainted water or not.

THE LONG DAM.

The Reservoir and Round Dam were filled by Ghyll Beck, and water from them was drawn off for mill purposes by the Long Dam, a shallow channel or goit running along the hillside, and flanked by a magnificent row of elms, beeches, and sycamores.

The constant movement of the water kept the Long Dam

free from weeds, excepting near the mill where water plants were abundant. There the Tong Park anglers went on summer evenings and risked broken lines by casting into the small patches of open water between the green weed. From this end of the Long Dam the water was led to the mill by a series of pipes of varying diameters. The turbine pipe frequently allowed trout to pass through until they were stopped by a grating at the far end. After those occasions the mill engineer had a fish tea. One day the water softening plant was held up by an eel which traversed the pipe until it came to the valve, where it stuck. I measured it after it had been removed from the pipe and found it to be 37 inches long. Prior to that no eels had been seen at Tong Park for over 20 years.

Formerly, an old man from Idle came regularly to the Long Dam to catch freshwater crayfish. Half a dozen of these, boiled as lobsters are boiled, made him a satisfying meal, he said.

When the puddled clay in the bed of the Long Dam developed leaks, the workmen sent to do the repairs dropped dye powder into the small whirlpool over each one, then watched the bank below for the trickles of coloured water in order to trace the course of each leak.

THE ROUND DAM.

The Round Dam was surrounded by trees, excepting on the south side, where, from a long straight stretch of swampy shore, the grassy embankment of the Reservoir rose steeply. Generally reputed to be deep, it was quite shallow when I knew it. In dry weather, large areas of mud were uncovered on which the broad-arrow footprints of the waterhens made a decorative pattern.

Water entered this dam at two places, through a sluice gate from the beck, and through a valve-controlled pipe from the Reservoir above. Round the pipe mouth there extended a clean yellow bed of sand and gravel, where the large trout used to gather, catching food coming through the pipe.

A small peninsula, fringed on each side with thick beds of rushes, extended some distance into the Round Dam. Here I used to disturb water voles. Mallard nested in the rushes during two seasons, but the local boys made the rearing of the young a difficult matter. Small dragonflies were numerous about this peninsula. Their empty nymph-cases, clinging with hollow legs to the slender reeds, were a common sight.

Little grebes visited the Round Dam at certain times, but I rarely saw more than one, nor did I ever see a nest or young. Kingfishers occasionally perched on the low branches of the willows along the peninsula. Both kingfishers and dippers

nested on the beck side higher up the valley. Frog spawn was always to be found in the Round Dam in the spring.

The late Mr. Alfred Hartley of Idle, well known as a clever conchologist, once told me that the Round Dam was the only known habitat in Airedale of the freshwater mollusc, *Planorbis crista*. He also said that many years ago, he and the late Mr. Fred Rhodes, for a long period the curator of the Cartwright Hall Museum, Bradford, introduced to the Round Dam the species *Limnea stagnalis*. At that time the only known West Riding habitat of this mollusc was a pond near Gain Lane, Thornbury, Bradford. This pond suddenly dried up owing to the sinking of a well close by, and in order to preserve the species Mr. Hartley and Mr. Rhodes removed all they could find. Some they placed in a small dam near Buck Mill, Thackley, and the remainder they deposited in the Round Dam. The Buck Mill Dam was drained shortly afterwards, and, presumably, the *Limnea* perished, but the Tong Park colony became firmly established.

The Tong Park anglers usually ignored the Round Dam owing to the abundance of water weed, but there were some good fish to be caught occasionally by those who took the risks.

THE RESERVOIR.

To the people of Tong Park the Reservoir was always known by its dialect name, 'T'essivoy.' It was a triangular pond, two sides being natural shores, the third and longest an embankment paved on the inner side with large round pebbles from the beck. Almost devoid of rushes and water weed, the Reservoir was not attractive to the water birds, but there was good trout fishing to be had, and I have spent many happy hours sitting on the bank watching my float. I have seen the surface of the water almost boiling with rising trout coming up for the flies, while above water crowds of swifts, swallows, house martins, and sand martins whirled about taking their toll of the insects also. In those days I used to hear the harsh 'crake, crake' of the corncrakes from across the valley, and the cries of the peewits which nested in the fields around Mill Hill Farm.

At intervals the Reservoir was stocked with young fish by the Tong Park Fishing Club. I was told that a large quantity of fry once came into the Reservoir via Ghyll Beck and one of its tributaries from new Dam (or Hawksworth Dam) near Hawksworth cross roads. This dam was stocked by a Bradford fishing club, but the bank burst and the young fish were swept down by the great outrush of water and came, in due course, to Tong Park.

Near where the water entered the Reservoir from the beck I once saw a six-legged creature about 3 inches long crawling

on the gravelly bottom and upon describing it to the late Mr. Jo' Beanland I was told that it was without doubt the larva of one of the larger species of dragonfly found at Tong Park. The curious thing was that Mr. Beanland said that he had never seen one of these in the Tong Park ponds, though he had looked often.

Wild duck in small parties occasionally came to the Reservoir in winter. Sandpipers paid visits during migratory periods. Herons, called by the Tong Park people 'Heron-cewes,' came far too often for the liking of the local fishermen.

GHYLL BECK.

Gill, or Ghyll, Beck had its source on the southern slopes of Rombalds Moor. It was fed by many small tributaries, and on its course to the point where it joined the River Aire at Esholt, passed through Sconce Wood and Hawksworth Spring or Spring Wood. Below Spring Wood some of its water was diverted to the Reservoir and Round Dam.

In former days it had been a more powerful stream and had driven water wheels at Tong Park Mills, and, below, Clifton Mill and Esholt Corn Mill. Many traces of its former boundaries were to be seen along its course. The reason for its decline in volume was the building of Wecher and Reva Reservoirs close to Rombalds Moor, and the diverting into them of a considerable quantity of water which would normally have been carried by the beck.

Nearly forty years ago a cloudburst turned the beck into a torrent which tore up everything in its track. Trees and debris blocked the entrance to the tunnel through which the water passed beneath Tong Park Mills, and very soon the lower mill buildings were flooded to a depth of nearly two feet. Some workpeople escaped on an improvised raft. Several days were occupied in cleaning mud and gravel from the machinery.

A large pool near Esholt Corn Mill (now owned by a firm of fellmongers) was once the scene of some remarkable fishing. When the River Aire first became polluted, the fish in it sought refuge in the tributaries. This pond soon became literally crammed, and the Tong Park and Esholt people went with buckets and ladled out all the fish they wanted.

The birds that I associated with the beck were the kingfisher, dipper, pied, yellow, and grey wagtails. Water voles inhabited certain quieter pools: Trout were to be found in every pool of decent size. Stone loach and sticklebacks were common, too. I learnt to 'tickle' trout, and, until I heard of water bailiffs and their powers, brought in regular supplies of fish for the office cat.

One evening a poultry keeper showed me nearly 30 rats

feeding outside his hen hut. Magpies also caused this man trouble until he obtained a gun, and, firing up through the nest, shattered it.

Mimulus, or monkey musk, grew abundantly in certain parts of the beck's course. Elsewhere were great areas of butterburr and rose-bay willow-herb.

(To be continued)

RECORDS

BIRDS

AT Ramsgill, Upper Nidderdale, on June 4th, 1939, I had good views of a Wood Sandpiper (*Tringa glareola*) and a Black Tern (*Chlidonias niger niger*). The Wood Sandpiper, feeding on the exposed reservoir bed, allowed a very close approach, the light axillaries, well-flecked coverts, white rump, and long, yellow-olive legs being noticeable. The Black Tern kept to the same 'beat' throughout the afternoon. A 'brown-headed' Goosander (*Mergus merganser merganser*) was seen with a party of Mallards at Eccup Reservoir, June 25th, 1939.—P. STOCKS.

CAREX CAPILLARIS L. STILL IN GORDALE

YORKSHIRE botanists will be glad to know that *Carex capillaris* L. still occurs in the station in Gordale, Malham, discovered by William West in June, 1878. On June 24th, after several previous unfruitful searches, I was successful in finding a small quantity over a very limited area in West's old station, that is, to quote Lees: 'on the left hand as the ascent is made, above the large mass of debris.' It does not appear at the present time, however, to be plentiful, as is suggested in *The Flora of West Yorkshire*. From enquiries which I have made it would seem that this *Carex* has not been observed in Gordale by any living botanist, and it is good to know that it is still a member of our Yorkshire flora.—GEO. A. SHAW.

CAREX OEDERI RETZ., VAR. ELATIOR ANDERS AT SEMMERWATER

WHEN on a visit to Semmerwater with Mr. J. P. Utley on July 2nd I gathered *Carex oederi* Retz. in several places along the western shore of the lake. There is no record for this species in Baker's *North Yorkshire* or Percival's *Flora of Wensleydale* (*The Naturalist*, May, 1888), nor can I find any reference to it in old circulars or reports of Y.N.U. meetings in the area. This sedge has apparently not been gathered anywhere in the county for many years, and the only published records appear to be that from the Sheffield district given in Lees' work and old records for Strensall and Skipwith commons. All the Semmerwater plants fall under the var. *elatior* Anders., many of them reaching the unusual height of 18 inches. Other

interesting plants observed on this excursion were *Eleocharis acicularis* (L.) Br., *Callitriche intermedia* G. F. Hoffm. var. *pedunculata* (D.C.) Dr. (with some of the fruits on stalks 5 mm. long) and *Orchis latifolia* L. \times *purpurella* Steph.).—W. A. SLEDGE.

REVIEWS AND BOOK NOTICES

From 'Dawn' to 'Eclipse': *The Story of the Horse*, by Cecil G. Trew, pp. xiv+142, illustrated by the Author with over 100 line illustrations and 16 plates. Methuen, 12/6. This is an exceedingly graphic and readable account of the evolution of the horse. In prehistoric times this evolution was a natural one, and we read of the horse's first ancestors, creatures about the size of a small dog, which inhabited what is now the Western United States. This is followed by detailed descriptions of the various stages of development through successive geological periods up to the advent of Man. Now begins the period of man-directed development and specialisation which brings the book down to modern times with its numerous breeds of horses for many varying purposes. The illustrations are numerous and serve their purpose very well indeed. There is a good bibliography.

Beth, a Sheep Dog, pp. viii.+262; *Beowulf, Guide Dog*, pp. viii+253; *The High Mettled Racer*, pp. xxii+230. The above three volumes are by Ernest Lewis—the pen-name of the late Ernest Vesey—and are published by Messrs. Constable at 5/- each. We are glad to welcome this uniform edition of the works of Mr. Lewis, whose last book, *In Search of the Gyr-Falcon*, was reviewed in this journal. The author, who died at the early age of 29, was a great lover of wild life and a keen sportsman. In the books under review he writes about dogs and horses with wonderful understanding and sympathy. In *Beth*, the life and character of a sheepdog is sketched with great fidelity, and in *Beowulf* the main theme is the training of Alsatians to become guides for the blind. The third volume is the story of 'Revenge,' a racehorse, and finally a hunter. In this book appears a memoir of the life of Ernest Lewis, who must have been possessed of indomitable courage. At the age of 12 he lost an eye, and not many years later he lost an arm as a result of a motor accident. In spite of these severe handicaps he continued to live a very full life, which included riding to hounds, hawking, and, incidentally, writing these very charming books. His early death has meant a loss to the literature of life in the country.

The Language of Sport, by C. E. Hare, pp. xvi+192. Country Life, 7/6. Even the most confirmed townsman must be aware that the various hunting sports have their several vocabularies, but how many experienced sportsmen realise what a host of special terms and expressions are employed in fox-hunting, beagling, fishing, shooting, etc. Major Hare has devoted much time over a period of many years in a patient research on this fascinating subject. He has produced a monumental work which will prove of great interest and real value to naturalists and sportsmen alike. There are four parts to the book, which has 25 chapters and 3 appendices. In Part I are grouped hunting terms, ancient and modern, and ranging through all field sports. In Part II are arranged 'peculiar' terms, such as those dealing with annual behaviour, hunting cries, etc., while Part III is devoted to group terms. Part IV is bibliographical, and in the appendices are to be found pet names and a digression which includes a list of facetious company terms culled from many sources, including *Punch*. Here we read of a 'slink of mannequins,' a 'guzzle of aldermen' and a 'giggle of chorus girls.' But wherever the book is opened will be found matter of great interest, and we strongly recommend it to our readers.

YORKSHIRE NATURALISTS AT WENTBRIDGE

May 6th, 1939

WITH a similar weather forecast, 'Showers with bright intervals,' for Friday and Saturday, the steady rain of Friday brought visions of last year's opening meeting at Ramsgill. Fortunately, our genial Divisional Secretary, Dr. John Grainger, had profited by last year's experience and we had the showers all day Friday and the one long bright interval all Saturday.

Members and associates from the South-west corner of the county came in strong force and at the tea and meeting 13 Societies were represented by some 56 persons, good evidence that this part of the county, the birth-place of our Union, is still a stronghold of naturalists.

As Stapleton Park has been acquired by the West Riding Mental Hospitals Board and the Broc-o-dale Woods have been partly sold, divided, and built on, with a loss of what were to naturalists well-known old tracks, this may prove to be the last time the Union will meet here and in future Kirk Smeaton will be the better venue for nature lovers.

Almost before we entered the Park, the Speckled Wood Argus butterfly was seen and it proved to be fairly plentiful in the woods; it is an uncommon species in Yorkshire. Two-winged flies were not plentiful, but over the lake were some species of midges, the largest being *Chironomus dissidens* Wlk., and under the odd trees on the lake side the Empid, *Rhamphomyia sulcata* Flin. hovered in small swarms in its odd way, with long hind legs hanging down. On the flowers in the woods were a few Syrphids, *Syrphus ribesii* L., *Chilosia vernalis* Flin., *Platychirus albimanus* F., and *Melanostoma scalare* F.; perhaps the most interesting species was *Tipula vittata* Mg. This occurred in fair numbers among low bushes growing over damp ditch sides. An odd specimen was caught of *T. couckeii*, one of the *lateralis* group not often recorded in Yorkshire, and a single *T. oleracea* L., the product of the disliked leather-jacket. Another smaller crane-fly caught was *Empeda nubila* Schum., and finally one of black species, *Ptychoptera scutellaris* Mg.

The Pasque flower mentioned in the circular was not refound, but the large extent of the open grazing land and the presence of a bovine animal, cited feelingly by Mr. H. B. Booth in his note, detracted from a thorough search. The Spring Potentilla was plentiful and in full bloom; it appeared to have a smaller flower than the plant of the Settle district, the actual measurements of the larger petals being 5 mm. wide by 7 mm. long, with a more shallow indentation than those of the Settle plant, which measures 6 mm. wide and 6½ mm. long.

With an ornithologist, Mr. Ralph Chislett, as President of the Union, the Vertebrate Section was strongly represented and few birds can have escaped notice.

Mammalia.—Mr. H. B. Booth writes: There was little of note under this heading. The Water Vole was in evidence at the lake in Stapleton Park. The most noticeable mammal was an adult male *Bos domesticus*—otherwise a bull of the 'Lincolnshire Red' breed, who left his harem of cows and showed an intense desire to join our party. The farmer and his man very kindly came to protect us from the bull, but after we had all gained the fence. On mentioning to the farmer about the paucity of Rabbits in a place where one would expect to see them in numbers, he replied, 'the place absolutely swarms with foxes,' and that they sometimes even took his young lambs.

A fact worthy of note is that so far as I could learn, none of our members had seen a Squirrel, neither the native British, nor the North American Grey species. A Stoat was recorded.

Aves.—Mr. Ralph Chislett writes: After a late cold period, on this the fourth day of comparative warmth, conditions for the date were becoming normal.

By the lake a Coot's nest with 2 eggs was seen, and in a Waterhen's nest were young birds at least a week old. A Dabchick was heard and subsequently seen at its nest of semi-floating weeds.

Green Woodpeckers were calling and were seen on the ground (where ants were numerous) and on trunks; below two borings in the same tree, were freshly-excavated chips. Through a hole in a tree protruded sticks of the nest of a Jackdaw and a daw flew from another hole above (the species was common). From the same tree a Stockdove was also flushed. A Jay's nest with 2 eggs was found by Mr. Utley, and a Long-tailed Tit's nest with eggs was found by Mr. Forrest.

Other species identified were Carrion Crow, Rook, Magpie, Starling, Greenfinch, Chaffinch, Yellowhammer, Skylark, Tree-Pipit (singing blithely), Great Tit, Blue Tit, Cole Tit, Willow-Warbler, Garden Warbler, Wood Warbler, Mistle Thrush, Song Thrush, Blackbird, Robin, Wren, Swallow, Cuckoo (heard for the first time this year by several members), Little and Tawny Owls, Sparrowhawk, Mallard, Ring-dove, Common Partridge, and Pheasant.

Mr. J. P. Utley adds: I was fortunate in finding some Marsh Tits by the Went, below Broc-o-dale House, after Tea.

Fresh-water Biology.—Mr. H. Whitehead writes: A brief visit to the lake in Stapleton Park yielded a few aquatic larvae, but nothing of outstanding interest. A number of nymphs of the Mayfly *Cloeon* were taken. Of Trichoptera the most numerous larvae were Linnophilids. An interesting species was *Trienodes bicolor*—one of the few caddis larvae which can swim. There were two or three species of dipterous larvae, including a Stratiomyid with its coronet of hairs around the spiracle. A few aquatic beetles were netted and handed to Mr. Barnes for identification.

After tea, a visit was paid to the River Went, where it passes through the Broc-o-dale Estate. The stream bed contains a good deal of silt, with some gravel and large stones. The latter were covered with the filamentous alga *Cladophora*. The Fresh-water Shrimp (*Gammarus pulex*) was common and one or two specimens of beetles which will be included in Mr. Barnes' report.

Botany: (W. A. Sledge): Broc-o-dale Woods and the limestone pastures and rocks bordering the River Went were the most productive ground for plants. In Stapleton Park no species of note were seen. A visit later in the year might give better results, though the grazing of cattle throughout the Park will severely limit the number of species which might otherwise be expected to occur. The woodland bordering the Park, especially along the rides, contains many planted shrubs, such as *Syringa*, *Viburnum Lantana* L., and *Lonicera Xylosteum* L. *Taxus* and *Ligustrum* are frequent and their status, whether indigenous or introduced, more difficult to determine, while *Viburnum Opulus* L., *Cornus sanguinea* L. and *Clematis Vitalba* L. were among the native shrubs seen. Among the ground species observed was an abundance of *Helleborus foetidus* L. in one part of the wood. The Lesser Periwinkle (*Vinca minor* L.) noted on the 1937 excursion was revisited and found in flower. Violets were much in evidence, the species seen being *V. Riviniana* Reichb., *V. hirta* L., and *V. calcarea* (Bab.) Greg. The last named has not previously been recorded for V.C. 63; I have seen it in woodlands on the Magnesian limestone in Mid-West Yorks, and it doubtless occurs in many other similar places throughout the Permian tract, but it scarcely deserves the rank of species. At Smeaton Crags, *Potentilla verna* L. was in full flower and growing with it were *Cerastium arvense* L., *C. semidecandrum* L., *Arenaria serpyllifolia* L., *Alchemilla arvensis* L., and *Sedum acre* L. Other plants seen hereabouts included *Stellaria aquatica* Scop., *Arenaria trinervia* L., *Hypericum montanum* L., *Inula Conyza* DC., *Lithospermum officinale* L., and *Parietaria ramiflora* Moench. Mr. A.

Malins Smith recorded *Dipsacus pilosus* L. in a locality some distance from that in which it was seen on the 1937 Excursion.

Lichens.—Mr. W. E. L. Wattam writes: I spent the whole of the time available in Stapleton Park and parts of the surrounding woodlands. There is an extreme paucity of lichenoid growths, which is somewhat surprising considering the number of aged trees within the Park and the rural character of the neighbourhood. With the exception of *Peltigera canina* Willd., no other fruticulose or foliose species were noted. The only corticolous species seen being *Calicium hyperellum* Ach, *Lecanora cinerea* Sommerf., *L. effusa* Ach., *L. varia* Ach., *L. conizæa* Nyl., *L. symmictera* Nyl. An occasional calcareous stone fence and stray pieces of rock embedded in the ground gave the species *Lecanora muralis* Ach., *L. galactina* Ach., *Biatorella pruinosa* Mudd., *Verrucaria viridula* Ach., *V. nigrescens* Pers., and *V. muralis* Ach., Moss covered tree stumps yielded *Cladonia pyxidata* Hoffm., *C. fimbriata* Fr., and *C. gracilis* Willd.

Fungi: (W. G. Bramley):

MYXOMYCETES

Reticularia lycoperdon Bull.
Lycogala epidendrum Fr.
Trichia affinis De Barry.
T. scabra Rost.
T. botrytis Pers.

PHYCOMYCETES

Plasmopara nivea (Ung.) Schroet, on *Sanicula europea*.
P. pygmaea (Ung.) Schroet, on *Anemone*.
Bremia lactucæ Regel, on *Lapsana communis*.

ASCOMYCETES (DISCOMYCETALES)

Morchella deliciosa Fr. (*esculenta* Pers.)
Ciliaria scutellata (Linn.) Quel.
Helotium cyathoides (Bull.) Karst.
Mollisia cinerea (Batsch.) Fr.
M. melaleuca (Fr.) Sacc.
Rhytisma acerinum (Pers.) Fr. (*ascophores*).

HYPOCREALES

Nectria cinnabarina (Tode) Fr.

SPHÆRIALES

Leptospora spermoides (Hoffm.) Fckl.
Ophiobolus acuminatus (Sow) Duby, on Thistle.
Cryptosphaeria eunomia (Fr.) Fckl. (Valsa), on Ash.
Anthostoma turgidum (Pers.) Nits., on Beech.
Melanconis stilbostoma (Fr.) Tul., on Birch (conidia only).
Pseudovalsa lanciformis (Fr.) Ces and de Not., on Birch.
Diatrype stigma (Hoffm.) de Not.
D. disciformis (Hoffm.) de Not., on Beech and Sycamore.
Quaternaria quaternata (Pers.) Tul. on Beech.
Q. dissepta (Fr.) Tul., on Elm.
Diatrypella verruciformis (Ehrenb.) Nits., on Birch.
Ustilina vulgaris Tul. (conidial stage) on Beech.
Daldinia concentrica (Bolt) Ces. and de Not., on Ash.
Xylaria hypoxylon (Linn.) Fr. (*ascophores*).

BASIDIOMYCETES

UREDINALES

Melampsora rostrupii Wagner, O, I, on *Mercurialis perennis*.
Puccinia obtogens Tul, O, II, on *C. arvense*.
P. violæ (Schum) DC., O, I, on *Viola riviniana* and *V. hirta*.

AGARICALES

Hypholoma fasciculare (Huds.) Fr. *Coprinus micaceus* (Bull.) Fr.
Pleuteus cervinus (Schaeff.) Fr. *Tricholoma gambosum* Fr.

APHYLLOPHORALES

Peniophora pubera (Fr.) Sacc.
Polyporus betulinus (Bull.) Fr.
Polystictus versicolor (Linn.) Fr.
Irpex obliquus (Schrad.) Fr.
Stereum hirsutum (Willd.) Fr.
Corticium læve (Pers.) Quel.

TREMELLALES

Tremella mesenterica (Retz.) Fr.

FUNGI IMPERFECTI

Oidium on Hawthorn.

A Pocket Book of British Birds, Eggs and Nests, by C. A. Hall, pp. 159, with 48 plates, illustrating 140 eggs. Black, 5/-. This is a noteworthy addition to Messrs. Black's excellent series of nature pocket books. Those who know the eggs of birds well are aware of the uselessness of the coloured pictures in the average cheap book on birds. In Mr. Hall's book will be found really accurate representations of the eggs of all but the rarer species of the birds of this country. The colours and definition are extremely good, and the plates can be used with confidence by an absolute beginner. It is perhaps a pity that in one plate—that on page 83—the drawings are much less than the actual sizes, and there is no indication in the text to this effect. The descriptions of nests are concise but adequate.

NEWS FROM THE MAGAZINES

The Entomologist for May contains 'Further contributions to our knowledge of the Lepidoptera of the Western Isles of Scotland: I, The Outer Hebrides,' by J. W. H. Harrison; 'Changes in the generic names of some British moths,' by K. G. Blair; 'Tineina from Ireland,' by B. P. Beirne; 'Insects and other things which arrive by steamer from Overseas,' by Brig.-Gen. J. B. G. Tulloch; 'Wicken Fen,' by W. G. Sheldon; 'Migration Records, 1938,' by Capt. T. Dannreuther; and numerous Notes and Observations.

The Entomologist's Monthly Magazine for May contains 'Notes on British Collembola,' by R. S. Bagnall (*Isotoma poseidonis* Bagn., Cullercoats and Alnmouth, Northumberland, *Isotomurus alticola* Carl., Cheviot, Northumberland); 'The Aquatic Coleoptera of the environs of Pannal Ash, near Harrogate, Part II,' by R. R. U. Kaufmann; 'Notes on Syrphidæ (Diptera), III,' by J. E. Collin (*Brachyopa insensilis* Collin, Cambridge, Suffolk and Worcestershire; *B. bicolor* Flin., New Forest, *B. scutellaris* Dsv., numerous localities from South England to Lancs.; *B. pilosa* Collin, Hampshire; *Xylota xanthocnema* Collin, Oxford, Surrey and Isle of Wight); 'Four new genera of British Sawflies (Hym. Symphyta),' by R. B. Benson (*Melissandra* Benson, type *Selandria morio*, *Stethomostus* Benson, type *Tomostethus fuliginosus*, *Halidamia* Benson, type *Blennocampa affinis*, and *Apethymus* Benson, type *Emphytus abdominalis*); 'The occurrence of *Tribolium destructor* Uytt. in seeds in England,' by C. Potter; '*Cryptopleurum crenatum* Panz. (Col. Palpicornia, Sphæridiinae) new to the British list,' by K. M. Guichard (Hampstead Heath, Shirley and New Forest); '*Cryptopleurum minutum* Fab. and *C. crenatum* Panz. (Col. Palpicornia, Sphæridiinae),' by C. E. Tottenham (*C. crenatum* at Kearby, M.W. Yorks.); 'The Mallophaga (Biting lice) recorded from the Pacific Islands,' by G. B. Thompson and several short notes.

ENTOMOLOGICAL REPORT FOR Y.N.U. EXCURSION TO WENTBRIDGE

M. D. BARNES

THE weather experienced on this excursion was excellent from the entomologist's point of view, but owing to the early date, the number of species in evidence was rather limited. This was particularly true of the lepidoptera, very few of which were seen.

A shallow pond of some five or six acres in extent, situated in Stapleton Park, yielded in the course of an hour, some very interesting species. Unfortunately many specimens still remain to be identified, a complete list of which will be given later. The writer is much obliged to the Rev. E. J. Pearce, of Mirfield, for the identification of the Haliplidæ.

In addition to the aquatic coleoptera taken in Stapleton Park, Mr. H. Whitehead took *Potamonectes elegans* (Panz.) and *Brychius elevatus* (Panz.) in the River Went below Wentbridge.

The most interesting beetle captured was *Pyropterus affinis* (Pk.), larvae of which were taken by Mr. E. G. Bayford in Broc-o-dale Woods.

Insects captured by Mr. E. G. Bayford :

COLEOPTERA

<i>Cychrus rostratus</i> (L.).	<i>Scaphidium 4-maculatum</i> (Ol.).
<i>Nebria brevicollis</i> (F.).	<i>Rhizophagus bipustulatus</i> (F.).
<i>Leistus fulvibarbis</i> (Dej.).	<i>Coccinella 7-punctata</i> (L.), abundant.
<i>Bembidion lampros</i> (Hbst.).	<i>C. bipunctata</i> (L.), type.
<i>B. dentellum</i> (Th.).	<i>Meligethes aenus</i> (F.).
<i>B. rupestre</i> (L.).	<i>Pyropterus affinis</i> (Pyk.), bred larva.
<i>Pseudophonus pubescens</i> (Mel.).	<i>Chaetocnema concinna</i> (Ma.), June 5th.
<i>Abax ater</i> (Vill.).	<i>Phylltreta undulata</i> (KT.).
<i>Pterostichus niger</i> (Schall.).	<i>Apion apricans</i> (Hbst.), abundant.
<i>Agonum mulleri</i> (Hbst.).	<i>Sitona hispidulus</i> (F.).
<i>Tachyporus chrysomelinus</i> (L.).	<i>S. lineatus</i> (L.).
<i>T. hypnorum</i> (F.).	<i>Phyllobius pyri</i> (L.).
<i>Stenus clavicornis</i> (Scop.).	<i>Hylesinus fraxini</i> (Panz.), abundant.

HYMENOPTERA

Andrena rufa were much in evidence and their burrows abundant in the rides.

CYNIPIDÆ

1 *Rhodites rosæ*.

ICHNEUMONIDÆ

1 *Orthopelma luteolator* (Grav.).
1 *O. brevicornis* (Morley).

LEPIDOPTERA

Pieris napi, abundant.

Parage ægeria, seen on the banks of the Went.

Insects taken by Writer :

COLEOPTERA

Aquatic Coleoptera taken in Stapleton Park.

<i>Haliplus flavicollis</i> (Sturm.).	<i>Laccophilus</i> (species).
<i>H. ruficollis</i> (De G.).	<i>Hyphydrus ovatus</i> (L.).
<i>H. lineolatus</i> (Man.).	<i>Graptodytes pictus</i> (Fab.).
<i>Hydro-porus palustris</i> (L.).	

OTHER COLEOPTERA

<i>Agonum dorsalis</i> (Pp.).	<i>Otiorhynchus singularis</i> (L.).
<i>Amara plebeia</i> (Gy.).	<i>Phyllobius argentatus</i> (L.).
<i>Dromius linearis</i> (Ol.).	<i>Barynotus moerens</i> (F.).
<i>Aphodius merdarius</i> (F.).	<i>Phytonomus nigrirostris</i> (F.).
<i>A. punctato-sulcatus</i> (St.).	<i>Dorytomus taeniatus</i> (F.).
<i>Pyrochroa serraticornis</i> (Sp.).	

1 Identified by Claud Morley, F.R.E.S.

YORKSHIRE NATURALISTS AT QUEEN MARY'S DUBB, RIPON

June 17th, 1939

THIS meeting was made the official meeting of the Entomological and the Conchological Sections, and because of this and the fine weather the meeting proved very successful. The report of the entomologists will be published later. The area was unknown ground to the Union and it proved very attractive. We were not expecting such rough and hilly country, nor so many interesting sheets of water, and the afternoon was far too short for the members really to explore the place.

Ornithology.—Our President, Mr. Ralph Chislett, writes: That the birds to be expected under the ecological conditions of the vicinity of Queen Mary's Dubb were seen, but that none were abundant, sums up the position ornithologically.

The holes filled with deep water, locally termed dubb, in the ground raised above the level of the adjacent river, and surrounded by rushes and other marsh plants are visited by Mallard, Heron, Kingfisher, and Redshank; and Coot and Moorhen nest there, as Reed Bunting and Sedge Warbler do on the adjacent marshy ground. A Snipe's nest was found with eggs. Lapwings were seen in the fields, and the Yellow Wagtail and Sandpipers by the river.

In the moist bottoms of the woods the Garden Warbler, Blackcap, and the Common and Lesser Whitethroats occurred. Willow Warblers were common, and the Wood Warbler was heard, while Tree Pipits sang above some outside trees. Titmice seen included Great, Blue, Cole, and Marsh. The Green Woodpecker, the Jay, and the Turtle Dove were heard.

On the rough, bushy, sloping ground were Skylarks, Meadow Pipits, and Lesser Redpolls, and a pair of Redstarts had young. From this ground the Whinchat was a notable absentee.

Other species noted during the day were Carrion Crow, Rook, Jackdaw, Magpie, Starling, Missel Thrush, Song Thrush, Blackbird, Chaffinch, Greenfinch (in some numbers), Hedge Sparrow, Yellowhammer, Swift, Swallow, House Martin, Sand Martin, Cuckoo, Spotted Flycatcher, Pied Wagtail, and Wren.

Botany.—Dr. W. A. Sledge writes: A notable feature of this excursion was the wide variety of types of vegetation to be seen within a small area. The various Dubbs provided an interesting selection of aquatic and marsh species, while the higher and dryer ground near by included on the one hand calcicolous associations with such plants as Rock Rose, White Bryony, and Bee Orchis, and, on the other hand lime free or leached mounds with *Scilla*, *Holcus*, *Pteridium*, and *Mnium hornum*. Attention was mainly devoted to the Dubbs where the point referred to in the Circular as regards each one having a characteristic flora of its own was noted. While many species such as Iris were generally distributed, others appeared to be either wholly or largely confined to a single pool where, however, they were usually present in quantity. Thus *Hottonia* was found in one pool only though abundant in that; *Carex rostrata* was only seen at Queen Mary's Dubb; *C. vesicaria* was truly dominant in a near-by pool but scarce elsewhere; *Catabrosa aquatica* was seen only on the margins of one of the Dubbs, though the conditions appeared equally favourable for it elsewhere; whilst of the truly aquatic species, *Potamogeton crispus*, *P. perfoliatus*, and *Chara hispida* were each noted in one pool only. Streams issuing from the surrounding Magnesian limestone pastures provided sufficiently calcareous waters for *Primula farinosa*, *Crepis paludosa*, and *Schoenus nigricans*, and a few plants of *Orchis purpurella* were seen in one such place. The following list includes

species noted from the Dobb's and surrounding pastures and from the wooded banks of the Ure. It will be seen that the Cyperaceæ were much in evidence, twenty-two species being listed, but *Carex gracilis* and *C. stricta* recorded from here by Lees were not met with.

<i>Thalictrum flavum</i> L.	<i>Ophrys apifera</i> Huds.
<i>Cardamine amara</i> L.	<i>Gymnadenia conopsea</i> (L.) Br.
<i>Stellaria graminea</i> L.	<i>Colchicum autumnale</i> L.
<i>S. uliginosa</i> Murray.	<i>Sparganium ramosum</i> Huds.
<i>Hypericum hirsutum</i> L.	<i>Alisma Plantago-aquatica</i> L.
<i>H. humifusum</i> L.	<i>Triglochin palustris</i> L.
<i>Erodium cicutarium</i> L'Herit.	<i>Potamogeton natans</i> L.
<i>Euonymus europæus</i> L.	<i>P. perfoliatus</i> L.
<i>Agrimonia Eupatoria</i> L.	<i>P. crispus</i> L.
<i>Poterium Sanguisorba</i> L.	<i>Eleocharis palustris</i> (L.) Br.
<i>Rosa spinosissima</i> L.	<i>Scirpus lacustris</i> L.
<i>Parnassia palustris</i> L.	<i>S. setaceus</i> L.
<i>Oenanthe aquatica</i> (L.) Poir.	<i>Eriophorum angustifolium</i> Roth.
<i>O. fistulosa</i> L.	<i>Schoenus nigricans</i> L.
<i>Viburnum Opulus</i> L.	<i>Carex riparia</i> Curt.
<i>Sherardia arvensis</i> L.	<i>C. acutiformis</i> Ehrh.
<i>Valeriana dioica</i> L.	<i>C. vesicaria</i> L.
<i>Eupatorium cannabinum</i> L.	<i>C. rostrata</i> Stokes.
<i>Carduus acanthoides</i> L.	<i>C. hirta</i> L.
<i>Crepis paludosa</i> (L.) Moench.	<i>C. sylvatica</i> Huds.
<i>Hottonia palustris</i> L.	<i>C. fulva</i> Host.
<i>Primula farinosa</i> L.	<i>C. flava</i> L.
<i>Lysimachia Nummularia</i> L.	<i>C. flava</i> var. <i>lepidocarpa</i> Tausch.
<i>Anagallis tenella</i> Murr.	<i>C. flava</i> var. <i>lepidocarpa</i> × <i>C. fulva</i> .
<i>Centaureium umbellatum</i> Gil.	<i>C. caryophyllea</i> Latour.
<i>Menyanthes trifoliata</i> L.	<i>C. flacca</i> Scop.
<i>Verbascum Thapsus</i> L.	<i>C. panicea</i> L.
<i>Scrophularia aquatica</i> L.	<i>C. Goodenowii</i> Gay.
<i>Veronica scutellata</i> L.	<i>C. stellulata</i> Good.
<i>V. Anagallis-aquatica</i> L.	<i>C. remota</i> L.
<i>V. Beccabunga</i> L.	<i>C. vulpina</i> L.
<i>Pinguicula vulgaris</i> L.	<i>C. disticha</i> Huds.
<i>Listera ovata</i> (L.) Br.	<i>C. pulicaris</i> L.
<i>Orchis latifolia</i> L. (<i>O. incarnata</i> Auct.).	<i>Catabrosa aquatica</i> (L.) Beauv.
<i>O. purpurella</i> Steph.	<i>Glyceria plicata</i> Fr.
<i>O. Fuchsii</i> Dr.	<i>Ophioglossum vulgatum</i> L.
	<i>Chara hispida</i> L.

Fungi.—Mr. W. G. Bramley gives the following list :

MYXOMYCETES

<i>Reticularia lycoperdon</i> Bull.	<i>Perichæna corticalis</i> Rost.
<i>Lycogola epidendrum</i> Fr.	

PHYCOMYCETES

<i>Plasmopara pusilla</i> (de B.) Schroet. on <i>Geranium pratense</i> .
<i>Peronospora ficariæ</i> Tul. on <i>Ran. flamula</i> .
<i>P. schleideni</i> Unger. on <i>Allium ursinum</i> .

ASCOMYCETES

<i>Erysiphe graminis</i> D.C. conidia on grasses.
<i>Helotium cyathoideum</i> (Bull.) Karst.
<i>Mollisia cinerea</i> (Batsch.) Fr.
<i>M. melaleuca</i> (Fr.) Sacc.
<i>M. lignicola</i> Phill.
<i>Leptosphaeria doliolum</i> (Pers.) de Not. on thistle stems.
<i>Diaporthe leiphæmia</i> (Fr.) Sacc. on oak.

- Eutypa flavo-virens* (Fr.) Tul.
Diatrype stigma (Hoffm.) Fr.
Diatrypella quercina (Pers.) Nits. on oak.
D. verruciformis (Ehrh.) Nits. on hazel.
Daldinia concentrica (Bolt.) Ces. and de Not.
Hypoxylon fuscum (Pers.) Fr. on hazel.
H. howeanum Peck. on Hawthorn.
Xylaria hypoxylon (Linn.) Grev.

USTILAGINALES

- Ustilago longissima* (Sow.) Tul. on *Glyceria fluitans*.
U. olivacea Tul. on *Carex riparia*.
Tilletia striæformis (Westend.) Neissl. on *Holcus*.

UREDINALES

- Triphragmium ulmariae* Wint., OI on *Spirea*.
Phragmidium subcorticium (Schränk.) Wint., OI on *Rosa spinosissima*
Uromyces junci Tul., III (old) on *Juncus obtusiflorus*; OI on *Pulicaria dysenterica*.
Puccinia obtegens Tul. OII on *Cirsium arvense*.
P. lapsanæ Fckl. II. III on *Lapsana*.
P. hieracii Mart., II, III on *Hieracium pilosella*.
P. pulverulenta Grev., OI, II, III on *Epilobium hirsutum*; Aecidial stage, rather common.
P. violæ (Schum.) D.C., OI on *Viola riviniana*.
P. betonica D.C., III on *Stachys betonica*.
P. oblongata Wint., II, III on *Luzula campestris*.
P. caricis (Schum.) Reb., III (old) on *Carex* sp.
P. baryi Wint., II on *Brachypodium*.
P. arrhenatheri Erikss., II on *Arrhenatherum elatior*.

AGARICALES

- Mycena discopus* Lév.
Pleurotus applicatus (Batsch.) Berk.
Coprinus atramentarius (Bull.) Fr.

APHYLLOPHORALES

- Polyporus squamosus* (Huds.) Fr.
P. betulinus (Bull.) Fr.
P. hispidus (Bull.) Fr. (old).
Polystictus versicolor (Linn.) Fr.
Irpex obliquus (Schrad.) Fr.
Grandinia farinacea (Pers.) B. and G.
Stereum hirsutum (Willd.) Fr.
Auricularia auricula judæ (Linn.) Schroed.
Dacryomyces deliquescens (Bull.) Daly.

FUNGI IMPERFECTI

- Oidium alphitoides* Griff. and Maubl. on oak leaves.
Oidium sp. on Hawthorn.
Botrytis cinerea f. *sclerotiophylla* (Rab.) Sacc.

Conchology.—Mrs. Morehouse writes: The combined efforts of the Conchological Section resulted in quite a number of species being found. Queen Mary's Dubb consisted of five pieces of water of varying dimensions surrounded by hawthorn scrub, pasture, and a mixture of trees.

The ponds produced nearly all the same molluscan fauna:

- | | |
|--|--------------------------------------|
| <i>Bithynia tentaculata</i> L. | <i>Planorbis fontanus</i> Lightfoot. |
| <i>Planorbis carinatus</i> Müll., very fine clean specimens. | <i>P. albus</i> Müll. |
| | <i>Succinea pferifferi</i> Ross. |

PISIDIUM

Around the second pond visited many *Cochlicopa lubrica* Müll. and *Euconulus fulvus* Müll. were found on pieces of wood, evidently fallen posts.

Arion ater v. *aterrima* Taylor.

Agriolimax agrestis L.

Limax maximus L.

L. tenellus v. *fulva* Normand.

Vitrina pellucida Müll.

Vitrea crystallina Müll.

V. cellaria Müll.

V. alliaria Miller.

V. nitidula Drap.

Euconulus fulvus Müll.

Mr. and Mrs. Thurgood, on their walk from Ripon to headquarters, noted the following :

Theba cantiana Montagu.

Helix hortensis Müll. 1 2 3 4 5.

Punctum pygmaeum Drap.

Pyramidula rotundata Müll.

Hygromia hispida L.

Acanthinula aculeata Müll.

Ena obscura Müll.

Cochlicopa lubrica Müll.

C. lubrica v. *lubricoides* Ferussac.

Jaminea cylindracea Da Costa.

Clausilia bidentata Strom.

Carychium minimum Müll.

Helix hortensis v. *lutea* Moq-Tan.

o o o o o.

Hygromia rufescens Pennant.

Unfortunately, only one specimen of *Pisidia* was found ; this was given into the custody of one of the party—in some way it disappeared. It was very small and could easily have fallen out of the tube when inserting another capture.

Diptera.—Your secretary took the following ; others were caught by members of the Entomological Section and will be included in their account of the excursion.

Simulium equinum L.

Corethra plumicornis F.

Erioptera divisa Walk. (macro-
phthalma Lw.).

E. diuturna Walk.

Acyphona maculata Mg.

Rhamphidia longirostris Mg.

Limnophila ochracea Mg.

L. nemoralis Mg.

L. aperta Verr., very dark.

Epiphragma ocellaris L. (*picta* F.).

Ptychoptera scutellaris Mg.

P. paludosa Mg.

P. contaminata L.

Tipula maxima Poda.

T. fulvipennis Deg.

T. oleracea L.

T. unca Wd.

T. luna West.

T. pruinosa Wd.

T. ochracea Mg.

Oxycera pygmaea Fal.

Chloromyia formosa Scop.

Beris chalybeata Forst.

Hæmatopota pluvialis L.

Chrysops cæcius L.

Bicellaria (Cyrtona) spuria Flin.

Leptogaster cylindrica De G.

Chrysopilus cristatus F.

Empis trigramma Mg.

E. stercorea L.

E. chioptera Flin.

E. grisea Flin.

Hilara bistrata Zett.

H. chorica Flin.

Hemerodromia precatória Flin.

Ardoptera guttata Hal.

Psilopus platypterus Fab.

Argyra argentina Mg.

Dolichopus campestris Mg.

D. popularis Wied.

D. pennatus Mg.

D. brevipennis Mg.

D. atratus Mg.

D. plumipes Scop.

D. trivialis Hal.

D. festivus Hal.

Sympycnus cirrhipes Wlk.

Campsicnemus curvipes Flin.

Hypophyllus crinipes Staeg.

Pipunculus terminalis Thoms.

Chrysogaster hirtella Lw.

Chilosia albitarsis Mg.

Platycheirus scambus Staeg.

Pyrophaena granditarsa Forst.

Syrirta pipiens L.

Sciomyza albocostata Flin.

Elgiva albiseta Scop.

Psila fimentaria L.

Sciomyza schoenherrri Flin.

Sepsis cynipsea L.

Henicita annulipes Westw.

Saltella nigripes Dsv.

Notiphila cinerea Flin.

Borborus suillorum Hal.

Scatella stagnalis Flin.

NEWS FROM THE MAGAZINES

The London Naturalist for 1938 contains, among other articles 'The distribution of the Grey Squirrel in the London area,' by R. S. R. Fitter; 'Archæological Inspections,' by G. J. B. Fox; 'The Crested Buckler fern,' by L. G. Payne (with plates); 'Botanical records in 1938,' by R. W. Robbins; 'Plant gall records for 1938,' by H. J. Burkill (with figures); 'Neuroterus schlechtendali Mayr,' by J. Ross; Entomological notes and records,' by various writers; 'British butterflies in 1938,' by H. J. Burkill; 'The survey of Limpsfield Common,' by J. E. Lousley and others; and the supplement, 'London bird report for 1938;' 'Birds in the London area, 1938' (with plate of Grasshopper warbler rearing a young cuckoo); 'Special species for 1938 (Reed Warbler, Tufted Duck, and Turtle Dove)'; 'Changes of bird life in relation to the increase of London,' by W. E. Glegg; and 'Arrival and departure of migrants, 1938,' by D. A. T. Morgan.

The Entomologist's Monthly Magazine for June contains 'The Mallophaga (Biting Lice) recorded from the Pacific Islands,' by G. B. Thompson; 'A preliminary list of Irish fleas,' by E. O'Mahony; 'Some new species of Staphylinidae (Col.),' by C. E. Tottenham; 'On various new or little known British Diptera, including several species bred from the nests of birds and mammals,' by J. E. Collin (*Hydrotæa basdeni* Collin, Oxford, from owl's nest; *Fannia nidica* Collin, Cambs., Bucks, from song thrush's nest; *F. clara* Collin, Berks., Hereford, from little owl's nest; *F. immutica* Collin, Scotland, from fungi; *F. ringdahlana* Collin, Wales;) and several short notes.

The Entomologist for June contains 'The butterflies of Lapland, 1938,' by P. H. Thomas; 'Further notes on the generic names of British moths,' by W. H. T. Tams; 'Bees of the genus *Centris* from Barbadoes, B.W.I.,' by T. D. A. Cockerell; 'New Lymantriidae (Lep. Het.) from Central Madagascar and S.W. Africa,' by C. L. Collenette (with plate); 'Migration Records,' by Capt. T. Dannreuther; and several notes and observations.

The Entomologist's Record for June contains 'New and Little Known Forms of *Hepialus* mostly from Great Britain,' by H. Bytinski-Salz (with plate); 'Coccinellid Notes. Two New Aberrations,' by T. F. Marriner (with plate); 'Notes on Orthoptera in Gloucestershire,' by T. B. Fletcher; 'Continuous Breeding, V,' by H. B. D. Kettlewell; 'Collecting Notes, 1938, Mid June-August,' by A. J. L. Bowes; 'Collecting Notes and Current Notes; and Supplement, 'The British Noctuæ and their Varieties,' by H. J. Turner.

The Entomologist's Monthly Magazine for July contains 'On Various New or Little-known British Diptera, including Several Species Bred from the Nests of Birds and Mammals,' by J. E. Collin (*Nupedia latipalpis* Stein, Nottinghamshire; *Elachiptera uniseta* Collin, Buckinghamshire; *Oscinella posticata* Collin, Bucks., Hants.; *Hydrellia tenebricosa* Collin, Bucks.); 'Aphis and Ant Populations at Garforth (Yorkshire) during 1937,' by W. Pickles (*Myrmica scabrinodis* and *Lasius niger*, ants; *Aphis epilobii*, *A. sambuci*, and *Euceraphis betulæ*, aphides); '*Typhlo-myrmex richardsi* (Hym. Formicidae), a New Species of Ponerine Ant from British Guiana,' by H. Donisthorpe; 'New Species of Asiatic Staphylinidae (Col.),' by M. Cameron; 'Some New Species of Staphylinidae (Col.),' by C. E. Tottenham; and several short notes.

The Transactions of the Society for British Entomology, Vol. 6, Part 1, consists of 'A Check-list and Host-list of the Ectoparasites recorded from British Birds and Mammals. Part 1, Mammals (excluding Bats)' (Mallophaga, Siphunculata, Diptera, Coleoptera, and Siphonaptera—a very useful paper), by G. B. Thompson, Part 2; 'Taxonomic Value of Wing Venation in the Larger Dytiscidae (Coleoptera),' by F. D. Goodliffe (with four plates); Part 3, 'Aspects of the Ecology of Aquatic Insects,' by H. P. Moon (with plates).

THE VEGETATION OF YORKSHIRE AND SUPPLEMENT TO THE FLORAS OF THE COUNTY

(Continued from page 152)

ILLECEBRACEÆ

Herniaria glabra L.

A recent, unsuccessful coloniser on pathways in Woodhouse Ridge quarries !

H. cinerea Lam. and DC.

An impersisting colonist, Boxtree Mill, Wheatley ; C. Crossland.

Paronychia (probably) *argyrocoma* Nutt.

Casual at Frizinghall, F. Rhodes !

Scleranthus annuus L.

AMARANTACEÆ

Amaranthus albus L. and *forma viridis* Willd.

Alien, all our species are of impermanent recent class, Ripon, Heslington ! Meanwood ! Linthwaite !

A. Thunbergii Moq.

Meanwood !

A. retroflexus L., *A. deflexus* L., and *A. chlorostachys* Willd.

Frizinghall and Mirfield.

A. caudatus L.

On rubbish tips.

A. Blitum L.

Camphill.

CHENOPODIACEÆ

Chenopodium rubrum L.

C. botryodes Sm.

Little more than alien, Meanwood ! Wakefield (J.C.).

C. Bonus-Henricus L.

C. urbicum L., *C. hybridum* L., *C. murale* L., *C. opulifolium*

Schrad., *C. ficifolium* Sm., and *C. glaucum* L.

Have all occurred casually about Thirsk, York, Hull docks, and the Middlesbrough ballast hills.

C. album L.

The var. *viridescens* St. Am. ' frequent in rich soil ' (Baker), var. *viride* Syme, not rare, the type *candicans* Lam. is ubiquitous in tool-touched ground.

Chenopodium striatum (Kras.) Murr., *C. hircinum* Schrad., and
C. chilense Schrad.

Occur about skin yards.

C. Vulvaria L. (*olidum* Curt.).

Gardens, etc.

C. Botrys L., *C. aristatum* Asch., *C. virgatum* (L.) Ambrosi.,
Roubieva multifida Moq., and *Spinacia oleracea* L.

Have been recorded.

Beta maritima L.

B. vulgaris L.

A stray from cultivation.

B. trigyna W. and K.

Bingley 'tip,' F. Rhodes, 1909 !

Atriplex patula L. (incl. *littoralis* L.).

A. Babingtonii Wood.

Salt marshes from Coatham through Sandsend, Scarborough, Withernsea (var. *virescens* Lange teste, A. Bennett (C.W.)), and up the Humber to Hessele.

A. rosea L., *A. laciniata* L. (*arenaria* Woods.), *A. hortensis*
L., and *A. tatarica* L.

Have occurred as aliens.

A. Portulacoides L.

Not in West Riding Flora.

Salicornia europæa L.

In West Riding has been seen below Goole near Trent Falls, Adlingfleet.

S. ramosissima Woods.

Teesmouth, W.A.S.

S. radicans Sm.

Only known from Teesmouth.

Suæda altissima Pall. and *Corispermum hyssopifolium* L.

Aliens from Hull docks.

S. maritima Dum.

Not in West Riding Flora.

The var. *procumbens* Syme, Spurn (Waterfall) teste A. Bennett.

Salsola Kali L.

Not in West Riding Flora. The var. *Tragus* (L.) and *S. Soda* L. have occurred as aliens at Middlesbrough and Hull docks.

POLYGONACEÆ

Polygonum Convolvulus L.

var. *subalatum* Lej. and Court., once as alien, Fixby.

P. Bistorta L.

P. viviparum L.

Not in East Riding Flora. Some further stations are Fleet Moss ! Cush Rigg, Outershaw (Woodd.), Hesletine Gill, Cray Gill, J.F.P. ! From Whitaside and Ivelet higher riggs over Great Oxber Gill to Skell Gill in Yoredale ! Gordale, *Nat.*, 1888, 301.

P. amphibium L., incl. status *terrestre* !

P. Lapathifolium L. and *P. Persicaria* L.

var. *incanum* Lej. and Court. is a casual in millyards. var. (*vel. sp.*) *densiflorum* Meisn., Shepley Bridge, 1908 (P.F.L.) !

P. tomentosum Schrank. (*maculatum* Bab.) in poultry-runs and where malt sweepings have been cast.

P. Hydropiper L.

P. mite Schrank.

P. Minus Huds.

Hyb. *P. Braunianum*, F. Schultz (*minus* × *Persicaria*), near the Stray, Harrogate, 1893 !

P. Raii Bab.

Sea wall, Redcar, 1874, T. J. Foggitt, and to Saltburn through Marske links by 1908 !

P. aviculare L.

The type *agrestinum* Jord. in rich manured soils ; var. *brevifolium* Gray is the common form ; var. *rotundifolium* (*arenastrum*), Vesper Gate, Kirkstall, Welton (C.W.), Skipwith (Thompson) ; var. *rurivagum* Jord., not rare ; *microspermum* Jord. is rare.

P. Corrigioloides Jaub. and Spach. (*P. pulchellum* Lois., *P. arenarium* of Flora).

Another station is in lane near Hambleton (in 1904) towards Bishopwood.

P. amplexicaule D. Don. and *P. cuspidatum* Sieb. and Zucc. Occasionally have escaped from gardens.

Fagopyrum esculentum Moench.

In coverts not abiding ; also at Olympia Sidings, Selby, with *F. tataricum* (L.) Gaertn., W.A.S.

Rumex Hydrolapathum Huds.

Rumex longifolius DC. (*domesticus* Hartm.).

Not in East Riding Flora.

R. crispus L.

R. obtusifolius L.

The hybrid between the last two, *Hyb. pratensis* Mert. and Koch., has three entries in West Yorkshire, but only Slater's is trustworthy. James Ward found it in the early sixties in the sunk fence of Easby Abbey and sent me the first specimen I had seen. Moore reported it—credibly and accepted by Baker—from Heworth, York. Casually at Sutcliffe's Mill, Mirfield (Lee, 1909). A plant noticed at Appersett, Widdale, in 1886, appeared to be *R. propinquus* Areschong—a cross with the *R. longifolius* there !

R. alpinus L.

Not in North or East Riding Floras. Has long been known at Cookridge and on road side near Guy's Cliff, Pateley Bridge.

R. scutatus L.

An escape from cultivation not in East Riding Flora. In Swaledale seen near Long Row in 1883 and 1906 ! Much 'Swardal cheese about Summer-lodge, and Springend was renned with it' as James and George Broderick informed me. Near Croasdale beck, Slaidburn, and near Rimmington, J.F.P. sp. !

R. sanguineus L.

var. *viridis* Sibth. The type rare, some further records are Harrogate, 1892-4 in ditch bordering Aldi's piece of allotment gardens ! Laneside, near Gibb's farm, Newton in Bowland, J.F.P. (1909).

R. conglomeratus Murr.

R. maritimus L.

Lost at Kirklington and Scarborough ! Only left at Adlingfleet, Goole, Riccal, Skipwith ! Dairycoates (Hull), and by one 'flash' at Strensall (1907) distinctly degenerating !

R. palustris Sm. (*limosus* Auct.).

On Strensall Common ('abundant,' J. Wheldon) and with the preceding by a drying-up pond at Skipwith (J.F.R., MS., 13/9/02).

R. flexuosus Soland., **R. Brownii** Campd., and, I believe, **R. halophilus** F. Muell.

Gibson's tanyard, Meanwood.

R. pulcher L.

Adventive, no further records.

Rumex Acetosa L.

R. Acetosella L.

Emex spinosa Campd.

Once noted at Frizinghall Sewage works (1887).

ARISTOLOCHIACEÆ

Asarum europæum L.

Naturalised in wood, Austwick Hall, probably brought from Clapham's garden at Feizor.

Aristolochia Clematitis L.

Has not been seen at Fountain's Abbey lately.

THYMELÆACEÆ

Daphne Laureola L.

D. Mezereum L.

The question of *Daphne* distribution is full of difficulties—the two British species are much cultivated, the one for its evergreen, the other for its ornamental character. In Yorkshire *Laureola* is practically confined to the Eastern calcareous and marly soiled tracts, not so much planted with quickset in the hedges as retreating and surviving there when the aboriginal thicket was cleared. The Yorkshire distribution of *Mezereum* is peculiar, no known locality in the East Riding even as an obvious escape. Other West Yorkshire records for *Mezereum* are Grasswoods, J. Cryer; Eshber Wood, Starbottom, J.F.P.; Dunning Wood, Hodder, J.F.P. At the present time (1939) the Linn Gill Colony has gone (man carried back to gardens instead of bird carried from them) thirty years ago one could count up to twenty-five plants of it there; the Feizor plants that survive are mostly safe and growing amongst the hazel roots; at present there are well over a score plants and odd plants occur at Crummock and by the side of the Ribble at Helwith, C.A.C.

LORANTHACEÆ

Viscum album L.

ELÆAGNACEÆ

Hippophæ Rhamnoides L.

Only given for East Riding coast.

EUPHORBIACEÆ

Euphorbia platyphyllos L.

The 'Rawcliffe' record in North Yorkshire Flora is in S.W. Yorks near Goole.

Euphorbia Cyparissias L.

Other records for this alien are Arthington, V. Palmer spn ! 1911. Among trees on moor behind St. Ives, Bingley, 1904, S. Margerison.

E. Peplus L.

E. exigua L.

var. *retusa* DC. seen with other grain-brought aliens.

E. Lathyris L., Ricinus communis L., Buxus sempervirens L.

Have also been recorded.

Mercurialis perennis L.

var. *ovata* (Steud) Mitten I have seen five or six times only, always on calcareous soils, viz. Levitt Hag, Conisbro', Roche Abbey, Bramham, Hook Moor, and Mulgrave Castle.

M. annua L.

Alien.

ULMACEÆ

Ulmus scabra Mill. (glabra Huds., montana Stoke).

U. glabra Mill. (procera Salisb.).

I cannot but suppose this is a name for a group of familiar elms always puzzling to name because of their crossed-characters.

U. sativa Mill. (campestrus Ehrh., surculosa Stokes, and suberosa Sm. non Ehrh.).

URTICACEÆ

Humulus Lupulus L.

Additional records are Boarsden farm, Bowland, J.F.P., and South end of Rudgate above St. Helen's Ford on the Wharfe !

Cannabis sativa L.

A relic of cultivation near Harrogate, J.F.; Olympia Sidings, Selby, W.A.S.

Ficus Carica L.

Often in retaining walls of small becks in manufacturing districts.

Urtica dioica L.

var. *angustifolia* Wimm. and Grab. Robinson says, 'occasionally' but I have only noticed it as an alien. var. *hispida* (DC.), Harewood Castle (Val Palmer spn., 1910) and Rudgate !

Urtica pilulifera L.

Not in the Floras. Noted 16/7/1900 on the 'Rudgate,' leading from St. Helen's Ford northwards to Walton (Wharfedale), it grew just where a bit of the ancient agger had been broken into for some purpose! Undoubtedly a relic of the Roman street makers. In Clarkson's *History of Richmond* (1821) is a list of 113 plants found growing near Richmond among which is '*Urtica pilulifera*, Roman nettle, near St. Nicholas.'

In Calder, Mirfield, 1903, Buckley and Jessop, as a casual.

U. gracilis Aiton, probably var. *Lyalii* Grey.

Alien, Frizinghall, F. Rhodes, 1905!

U. urens L.

Parietaria ramiflora Moench (*P. diffusa* Mert. and Koch.).

MYRICACEÆ

Myrica Gale L.

J. F. Robinson asks if it is an East Riding plant to-day. Yes! the writer saw fresh specimens brought from Sutton-on-Derwent by G.R. in 1887. Houghton Moor (G.N.) is misspelt and is Aughton, North of Bubwith, in the East Riding Flora.

AMENTACEÆ

Betula alba L. (*verrucosa* Ehrh., incl. *pendula* Roth.).

B. pubescens Ehrh. (*tomentosa* Reith., *glutinosa* Wallr.).

Alnus rotundifolia Mill. (*glutinosa* Gaertn., var. *laciniata* Ehrh.).

Is planted in the Meanwoodside demesne.

A. oblongata Willd.

Established in Gledhow Lane, Roundhay.

Carpinus Betulus L.

Planted.

Corylus Avellana L.

Platanus orientalis L., *P. occidentalis* L., *Castanea sativa* Miller, and *Juglans regia* L.

Are planted.

Fagus sylvatica L.

Quercus Robur L. (as *Aggreg.*).

Q. pedunculata Ehrh.

Quercus sessiliflora Salisb.

Hyb. *intermedia* Boenn. non D. Don. *hybrida* Bechst., 1816, *rosacea* Moench?), *Nat.*, 1909, C. E. Moss for S.W. Yorkshire and W. M. Rankin for Mid-West Yorkshire.

Q. lanuginosa Thuill., **Q. Cerris** L., **Q. coccinea** Pursh., **Q. Ilex** L.
Are planted.

SALICACEÆ

Salix pentandra L.

Salix fragilis L.

The planted hybrid *Russelliana* Sm. (*S. viridis* Fries. in Oxford list) is not uncommon. There is a fine tree of *S. decipiens* Hoffm. at the Gale House, Kirkstall Abbey !

S. alba L.

S. triandra L.

S. hippophæfolia Thuill., **S. acutifolia** Willd., **S. babylonica** L., and **S. daphnoides** Vill.

Are planted, the latter is the *P. balsamifera* of the Flora.

S. purpurea L.

S. viminalis L.

Hyb. *Smithiana* Willd. in willow garths and gardens.

S. Caprea L.

S. aurita L.

Hyb. *lutescens* A. Kerner (*aurita* × *cinerea*), Scarcroft, A.E.B. Hyb. *ambigua* Ehrh. (*aurita* × *repens*), Skipwith Common, H. F. Parsons !

S. cinerea L.

Hyb. *lurina* Sm. (*phylicifolia* × *cinerea*), Applegarth Bridge, Richmond, Cray Gill, J.F.P. !

S. nigricans Sm.

S. phylicifolia L.

S. repens L.

S. herbacea L.

Not in East Riding ; in North Riding on bare stony summit slope of Great Shunner Fell with N.W. aspect going up from Thwaite, 1883 and 1906 ! The Whernside and Ingleborough stations are still known, the Penyghent station has never been confirmed. W. West reported it on Yorkshire side of Greygreth not far from the county stone. East facing summit turf of Simon Fell, September, 1889 !

(To be continued)

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with the assistance as referees in special departments of

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THE NATURAL HISTORY OF TONG PARK, BAILDON

SIDNEY JACKSON

(Continued from page 213)

THE FIELDS

The northern side of the valley was always more interesting than the southern side, because, although there were public footpaths crossing these fields, few people used them and wild life was more plentiful. I liked to visit a small disused quarry near Hollings Hill. It was the finest place I have ever known for blackberries. A pair of kestrels nested on an inaccessible ledge there and I used to pick up and dissect their pellets.

To the west of the quarry were several small clumps of alders, all wet swampy places. Marsh Marigolds were always plentiful there in the spring. One year I found the nest of a spotted flycatcher with four eggs, on top of a low tree stump. Occasionally I disturbed snipe from these marshy spots, but I never knew these birds to breed in Tong Park.

Some of us knew the largest of these alder clumps as 'The Spinney,' though that was not its proper name. Here I saw my first stoat in its winter coat. A dead hedgehog furnished me with my first home museum specimen in the form of a jawbone, several tiny molars, and some prickles, which I mounted on a card. A dead rook provided me with my first sexton beetles. On the high side of the Spinney was a large rush bed where I frequently found hares. I was once with a friend on the west side of this alder clump when we saw a curlew on the wall beyond us, its body, neck, and head flattened against the wall top to avoid detection. It remained in that attitude several minutes until we moved towards it.

The railway embankment carrying the L.N.E.R. line crossed the northern side of the valley. On its slopes marguerites, or dog daisies, grew in thousands, and common blue butterflies were truly common.

Wasps' nests, colonies of small red ants, and borings of wild bees were to be found in these fields. I saw several wasps' nests dug out by local anglers who wanted the soft white grubs for bait.

Occasionally I flushed small coveys of partridges and more rarely saw cock pheasants. Molehills were a very common sight. I always had a desire to catch moles for their skins, and to prepare myself for the work of skinning and curing I practised on house mice. Eventually I was given six dead moles which had been flooded out by the beck when in spate, and made quite a successful job of the skinning and curing.

SEP 12 1939

During the winter of 1917-18 a large number of fine trees on the Tong Park estate were felled for war purposes. Lone Wood, high up on the southern side of the valley, disappeared completely. The torn-up track left by the trunks as they were dragged by the team of horses to the loading point at Hollings Hill was quickly grown over with grass and apparently obliterated, yet whenever there was a fall of snow, the innumerable tiny hillocks made by the upturned sods showed most distinctly where the timber had been hauled across.

On the south side of the valley, near the railway viaduct, was a small quarry where pied wagtails nested. Lonk House Farm stood on the hill top above. The strangest sight I ever saw there was a row of 32 dead pullets, each with its head bitten off by a fox. I saw a live fox at Tong Park only once, but they were always about, the farmer told me. Along the cart-road leading from Lonk House to Low Springs there was a cylindrical iron gatepost which had been used as a nesting site by bluetits for many years, the birds entering through a small bolt hole.

THE SWAMP

On the north side of the beck, between the Reservoir and Spring Wood, there was a moderately large swamp curving under the lee of a steep hill covered with small hollies, hawthorns, birches, brambles, and some well-grown guelder rose trees, from which I gathered bunches of shining red berries to form part of the decorations for a Shipley church harvest festival. I have always believed, though I have never heard it stated, that the swamp was originally the course of the beck. Marsh marigolds, cuckoo flowers, and celandines grew there in abundance. Up the hillside one could find violets and wood anemones.

Looking back now I realise that this swamp was for me the most important part of Tong Park, because it was there that I became an entomologist. One hot summer's day my brother and I were up there and were sadly troubled by flies. I picked up a stick and waved it about my head to rid myself of the pests, when suddenly my brother called out that I had accidentally knocked down a butterfly. Picking it up I found that it had orange tips to its forewings, and dimly realised that it was something unusual for the district. I took it home, and from directions given in a boys' book of hobbies made a setting board and placed on it my first specimen. I still have that orange tip, along with my other early specimens, preserved in a separate case to themselves. From that day my main interest in natural history was lepidoptera and insects in general. On the hillside above the swamp small copper butterflies were quite numerous, and I soon possessed set

specimens of them. Common blues from the railway embankment, small tortoiseshell larvae from near Tong Park cricket field, green veined whites from Spring Wood, chimney sweeper moths from the fields—all these were my first species.

Then I saw for the first time one of the $3\frac{1}{2}$ inch-bodied dragonflies flying about above the swamp and marvelled at its size. With my brother's aid I caught it, but not until we had spent a hot couple of hours chasing it up and down the swamp in brilliant sunshine. I now took some of the small, slender dragonflies from the rush bed in the Round Dam, and so, before the end of the summer, had made a good start as a collector.

THE VILLAGE

The name 'Tong Park' was used in two senses; in a specific sense to refer to the street of houses straggling up the hillside between The Mill and Tong Park Hall, and in a general sense to refer to the entire district. At the bottom of the village street stood a large old house with a spacious garden in front. A lady who had lived there as a girl told me that at one period of her childhood a toad inhabited the garden, and that when the house door was left open in the evening it would hop inside the house, make its way to the fireside, and sit there, gazing at the blaze. A field near this house bore the curious name of 'Dog Kennels'.¹

About the village there were some magnificent trees, where the rooks built year after year. The Tong Park rookery was a large one, but I never knew the precise number of nests which it contained. The residents in Primrose Row complained sometimes about the hooting of owls in the plantations around the Hall.

Between Tong Park village and the Shipley-Guiseley road there were many large morainic mounds which gave a peculiar undulating effect to these fields.

FIELD NOTES

Red-necked Phalarope.—On Sunday, July 16th, we paid a visit to Kilnsea, on the north of the Spurn peninsula. While watching a party of Dunlin feeding we noticed that among them was a bird of a somewhat different character. Instead of probing around in the mud and wading about like the Dunlins it seemed very fond of swimming and would make frequent darts at the numerous flies that were skimming on the surface of the water. It proved to be a Red-necked Phalarope. The bird continued its fly catching activities, swimming

¹ There is a tiny hamlet near to the Moors at Ben Rhydding which bears the same name, and where formerly a small pack of hounds was kept.—H.B.B.

about in water that the Dunlin were wading in. Being still in summer plumage, the chestnut-red markings were in full evidence. In connection with this district, it may also be of interest to note the nesting of Shoveller Duck in the marram grass on the dunes. On May 7th there were 13 eggs in the nest, although a visit on May 21st revealed that five had been taken. However, the remainder were successfully hatched by May 29th. Whilst the duck was sitting, the drake was often observed on the pond where the Phalarope was seen. The pair of Oyster-Catchers that usually nest in this district have this year chosen a field sown with peas. On June 4th, when the three eggs were found, the pea shoots were about six inches high, and a definite nest had been made on the soil between two rows of plants.—L. SMITH and H. O. BUNCE.

Sand Martins Congregating—We counted over six hundred sand martins on telegraph wires at Swillington on July 25th and 30th. Hundreds more flew above the River Aire. The total number must have easily exceeded a thousand.—H. FOSTER, G. R. EDWARDS, V. S. CRAPNELL.

Supposed Polecat near Scarborough—The Editors have received a letter from Mr. James Cooper, of Killerby Hall, near Scarborough, in which he states that he saw in his grounds on more than one occasion in June, what he believed to be a true wild British Polecat, of which he gives a very good description. But in view of the fact of the rarity of this mammal in Yorkshire and also that the domesticated Polecat-ferret has on several occasions been reported as the Polecat, we feel we cannot accept it as a record. Perhaps Mr. Cooper or some other naturalist in the neighbourhood may have further opportunities of verifying it. At any rate, the poultry-keepers will be having something to say if there should be a Polecat in the neighbourhood.

Scutovertex bilineatus Michael (Oribatidae) in Yorkshire.—On August 10th, while searching for sub-maritime beetles at Robin Hood's Bay, Mr. T. Stainforth and the writer turned up several small colonies of this mite, which the Rev. J. E. Hull has kindly identified. It was described by Michael (*British Oribatidae*, Ray Society, 1888, Vol. II, p. 571) from specimens taken by Mr. E. Bostock on algæ in freshwater pools by the streams along the coast in Anglesea. Dr. Hull, in his 'Terrestrial Acari of the Tyne Province' (*Trans. Nat. Hist. Soc. of Northumberland, Durham and Newcastle upon Tyne*, N.S., Vol. IV, 1909-1913, p. 385) says: 'Wholly aquatic, nearly always in pure sea-water,' and gives as his only locality 'Roker Pier (Bagnall).' It does not seem to have been recorded for Yorkshire.—GEO. B. WALSH, Scarborough.

THE PRE-ROMAN SETTLEMENT OF THE PARISI AT NORTH FERRIBY

PHILIP CORDER, M.A., F.S.A., C. W. WRIGHT, F.G.S., AND E. V. WRIGHT

IN the summer of 1932, Messrs. C. W. and E. V. Wright noticed on the low cliffs of the Humber bank, near North

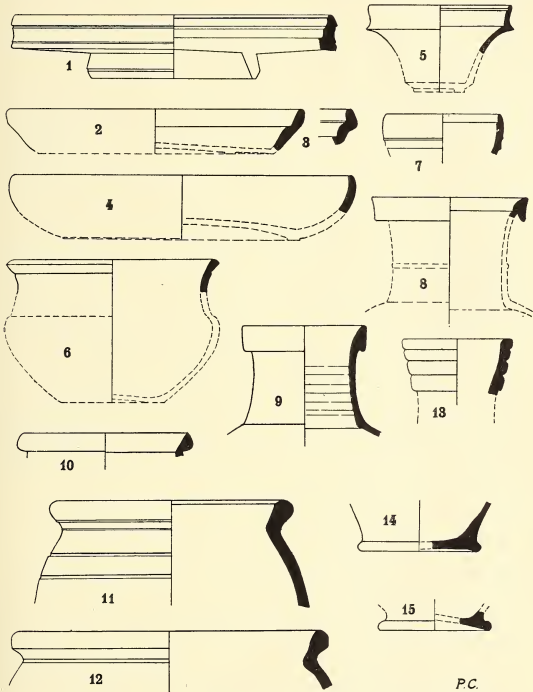


Fig. 1. Pottery from the Pre-Roman Settlement at North Ferriby. ($\frac{1}{2}$).

Ferriby, dark patches of black earth containing bones and sherds. Some of these potsherds were recognised by Miss M. Kitson Clark, F.S.A., as belonging to plates of Belgic *terra nigra* (*Y.A.J.*, XXXI, 199). These and further discoveries of pottery from the same area, which lies between Long Plantation and Melton Creek, were submitted to one of the writers, who in collaboration with Dr. T. Davies Pryce,

F.S.A., contributed a paper to the *Antiquaries Journal* (Vol. XVIII, July, 1938, pp. 262-277), in which they were described in detail, and their implications discussed.

The collection included a chip of Samian form 15/17 of pre-Claudian date, white Belgic butt-beakers, white pipe-clay jugs, and bell-shaped cups and plates in *terra nigra*, two of the latter bearing potters' stamps. No comparable collection of pre-Claudian pottery of Gaulish origin has ever before been found in Yorkshire, or indeed in the north of Britain. Leicester is the nearest site where pottery of this period and origin has been found, and it occurs rarely elsewhere outside the Belgic districts of south-eastern Britain. The main occupation of the North Ferriby settlement clearly falls, therefore, into the first half of the first century A.D. before the establishment of the Ninth Legion at Lincoln in A.D. 47. The site of the settlement is on the only piece of relatively high ground at the water's edge for some miles, at the point where the wolds of East Yorkshire and Lincolnshire are divided by the Humber. On the south side of the river there is ample evidence of contemporary occupation at South Ferriby. The well-known collection of brooches and small bronze objects from this site in the Hull Museum contains two *Aucissa fibulae* of early first century date, comparable with the brooch found by Messrs. Wright at North Ferriby (*A.J.*, *loc. cit.*, Fig. 6), though no contemporary collection of pottery has yet come to light south of the river. The settlement at North Ferriby was, therefore, established on the prehistoric river crossing formed by the Wolds and on a navigable river conveniently placed for coastal trade by sea. It is conceivable that the pottery referred to above as of continental origin may have found its way to North Ferriby by inland river transport, but, on the whole, sea-borne trade is more likely.

The importance of this discovery of a pre-Roman Parisian settlement was such that it was resolved, if possible, to undertake some trial excavations. In September, 1938, with the kind permission of the agent, Mr. Babington, and the tenant, Mr. Greathead, some short trial trenches were made by the writers, with the assistance of Mr. M. W. Barley and Mr. A. L. Congreve, F.S.A., and the finds made on this occasion and since are the subject of this paper. They have all been placed in the Mortimer Museum, Hull.

The presence of a public footpath close to the cliff edge and the fact that the cliff here has been seriously subject to erosion in recent years made it impossible to excavate inwards from the patches of dark soil that had produced the pottery previously described. Work had to be confined to trial trenching at least 15 feet from the cliff edge. The soil here is sand and gravel over boulder clay, and the percolation of water

had rendered it extremely hard and compact. No recognisable structures were encountered in these trenches, beyond somewhat indefinite pits and little ditches that could not be

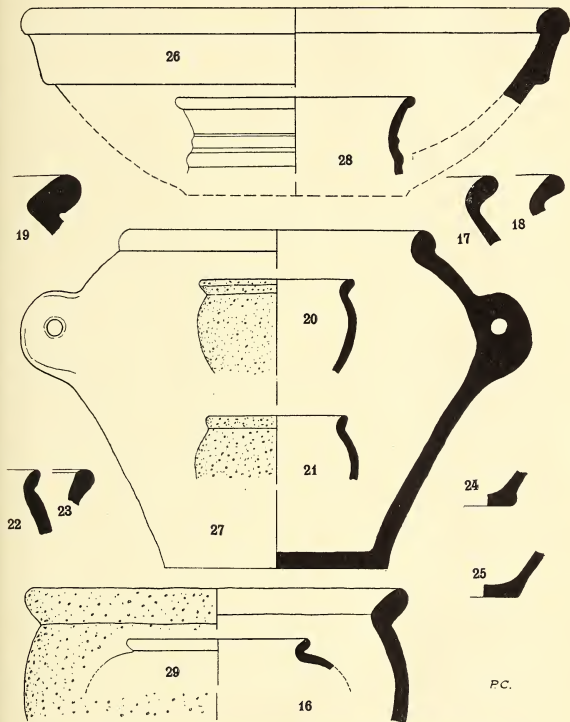


Fig. 2. Pottery from the Pre-Roman Settlement at North Ferriby. (1).

planned. One bronze brooch and a considerable quantity of pottery, with a few fragments of daub and some bones and shells, showed that the area of occupation extended inland and had not been entirely removed by erosion.

In January, 1939, Messrs. Wright partially investigated another dark patch in the cliff which was almost certainly the remains of a hut floor. The presence of the footpath made

excavation impossible, but fortunately the edge of the floor was preserved for some distance. It could be seen that the floor of the hut had been laid a foot or more below the original ground level. Its limit was marked by an edge of hard clay with a steep inner face. The hut appeared to have been roughly rectangular, with sides from 12 to 15 feet long. The walls had been of wattle and daub. No post holes were, however, found, though fallen daub was plentiful. Some lumps of this seemed to have been made of a clod of coarse clay with a layer of finer clay plastered on the outside to make a rectangular block like a brick. On the face of several of these blocks were a series of diagonal incised lines, or coarse combings. These were apparently for decoration rather than to form a key for plaster. On the site of this hut was found a chip of the rim of an Arretine plate (Fig. 1, 1) which has been discussed in a note by Dr. T. Davies Pryce and one of the writers in the *Ant. Journ.* (Vol. XIX, p. 207). The bulk of the pottery described below was found in the trial trenches cut in September, 1938. Among the other finds made then was a sherd of 'rustic' ware. This and the brooch, and a sherd of a Samian bowl, form 29, found later in the cliff near Long Plantation (Fig. 3) belong to a rather later date than the rest of the pottery and indicate that the occupation that must have begun early in the first century A.D. may have extended to A.D. 75 or 80.

The result of the excavation is that a little more light has been thrown on this interesting site. The previous conclusions, put forward tentatively, have been justified. It is clear that the Parisi of East Yorkshire were always village-dwellers and never constructed hill-forts as did the Belgic tribes of south-east Britain. There is practically no overlap between the pottery from the North Ferriby settlement and that from the earliest occupation of Petuaria, $2\frac{3}{4}$ miles to the west, which is known to have been first occupied about A.D. 50. It is clear that the majority of the Parisian villagers of North Ferriby migrated to the new site at Petuaria, induced, no doubt, by trade, when the Ninth Legion established itself at Lincoln and the Humber came to form the Roman frontier.

It is tempting, if perhaps not fully justified in the present state of our knowledge, to complete the story suggested by these finds by reference to a sea-going boat, of unique construction, discovered by Messrs. Wright lying in the mud below high-water level, a short distance south of North Ferriby. The construction of this boat, which is 43 feet long, is more elaborate than that of any Bronze Age ship so far known and does not resemble known boats of Roman or Viking age; indeed no parallel to it has yet been encountered in Britain. It is to be published shortly elsewhere and this

is not the place to describe its construction in detail. Its great age is not in doubt and, though the evidence does not justify any dogmatic statement, it is tempting to think of it as the wreck of one of the sea-going craft that brought the vessels of Arretine and early South Gaulish Samian, and the wares of Belgic fabric, to the Parisian settlement on the Humber bank in exchange for the products of the Parisian farms.

THE POTTERY

ARRETINE SIGILLATA.

1. A plate of Haltern type, Loeschcke, no. 2. The glaze is dull red and worn off (not flaked off) at the angles, both features characteristic of much Arretine ware. The clay or paste is yellowish and soft. These characteristics are highly distinctive of Italic ware. This form varies considerably in structural detail. The Ferriby example closely approximates to *Haltern*, Abb. 2, 2. Compare also with the Verulamium plate, from the pre-Claudian Belgic settlement of Praewood (*Verulamium*, fig. 11, 6). The platter is undoubtedly pre-Claudian and can, with confidence, be assigned to the late Augustan-Tiberian period, c. A.D. 10-30.

IMPORTED BELGIC TERRA NIGRA.

2. Dish with upright lip, in imported Belgic Terra Nigra with gloss perished. The commonest Belgic platter previously found on the site. *Ant. J.* XVIII, fig. 2, 6-10 & p. 266. First half of 1st cent. A.D.
3. Scrap of rim of platter similar to *Ant. J.*, *loc. cit.*, fig. 2, 2, in hard light grey, gloss perished.
4. Dish with rounded wall and inbent rim, in good black glossy imported terra nigra. This form is abundant at Claudian Hofheim, (Type 99), but lasts into the Vespasianic occupation (*Ant. J. loc. cit.*, fig. 2, 11, 12, p. 266).
5. Small bell-shaped cup with upright concave rim in good glossy terra nigra with white fracture (*Ant. J.*, *loc. cit.* fig. 2, 13, 14, p. 266). First quarter of first century A.D.

OTHER BELGIC WARES.

6. Rim of carinated bowl in polished black ware with brownish core. The outline has been drawn by analogy with *Verulamium*, fig. 15, 4.
7. Cup in smooth red ware resembling Samian with the glaze perished. It is a much damaged fragment of somewhat uncertain diameter. The internal step beneath the rim and the exterior profiling are characteristic of South Gaulish Samian form 15/17, but the diameter of this vessel is too small for the fragment to be considered as a dish. No close parallel has been noted.

JUGS.

8. Dirty-white pipe-clay jug with overhanging concave rim, deeply undercut with $\frac{1}{4}$ -round moulding inside the rim. *Ant. J.*, *loc. cit.* fig. 2, 16. Pre-Claudian.
9. Dirty-white pipe-clay jug with upright collar around rim, slightly undercut. The type resembles Loeschcke Type 48 (Abb. 24, 4a) and Type 53 (Abb. 28B, bi.) and *Hofheim* Type 50 (Abb. 62, 3). No evidence was forthcoming as to the number of handles.

13. Scrap of the rim of a 'screw-neck' jug in white pipe-clay, of mid. 1st cent. type; cf. *Colchester Mus. Rep.* 1927, 5373C, mid. 1st cent. A.D.: *Colchester Mus. Rep.* 1928, 6503-27, from the Sheepen Farm site, not later than A.D. 60.

BUTT BEAKERS.

10. Small scrap of rim of an imported butt beaker in soft white pipe-clay similar to *Ant. J. loc. cit.* fig. 3, 18-20, but without the internal offset of the previous example from North Ferriby.
11. Coarse sandy black, wheel turned. The form may be compared with *Verulamium*, fig. 14, 31d.
12. Hard compact black, with some large pebbles in the sandy paste. cf. Loeschcke Abb. 42, 2.
14. Smooth brown ware, with black surface, perished. Probably the base of a butt beaker.

PEDESTAL BASE.

15. Hard red ware with orange surface. A type of flattened pedestal base that may be compared with *Verulamium* fig. 16, 47—a solitary example in its group.

NATIVE CALCITE-GRITTED WARE.

16. Large hand-made jar in very soft black to coffee-coloured ware, reddish inside the rim, but with a grey core. Much pitted. cf. *Ant. J., loc. cit.* fig. 3, 29.
17. Fairly hard yellowish-brown gritty hand-made jar.
18. Rim of a soft hand-made jar in reddish-brown ware with black core. Much pitted.
19. Rim of large soft, black, hand-made jar with red-brown surface and black core. Full of pebbles and much pitted on the surface. Diameter 15½ inches.
20. Small hard brown hand-made pot with reddish core, well made, but much pitted on the surface. cf. native type *Haltern* 98.
21. Small, soft, black, hand-made pot with brown core, containing large pebbles and grit. Much pitted. cf. *Ant. J., loc. cit.* fig. 3, 27-28.
22. Soft, black to brown, hand-made jar with smooth but pitted surface.
23. Rim of hard, black, hand-made jar with smoothed surface.
- 24, 25. Types of bases of black to brown, hand-made jars with pitted surface. No. 24 diameter 6 inches, No. 25, 3¼ inches.

MORTAR.

26. Coarse, rather soft, light, yellowish-buff bowl or mortar with no stone particles on the inner surface. The type is common at *Haltern* (Loeschcke, Type 59: Abb. 33,6) and occurs in the Claudian period at Hofheim (Ritterling, Pl. XXXV, 79 & Abb. 78, 1-7), and at Richborough (*Richborough* III, Pl. XLI, 347, dated A.D. 45-75), and on the Sheepen site at Colchester (Type 191, unpublished; and *Colchester Mus. Rep.* 1928, 6328, and five others. Not later than A.D. 60). Although certainly a type that belongs to the first half of the 1st cent., it appears with 'pre-Flavian and Flavian pottery' at Richborough (*Richborough* III, Pl. XLI, 348) and at the Roman theatre at *Verulamium* (*Archæologia* 84, fig. 10, 1) from the earliest flooring of the orchestra (2nd quarter of 2nd cent. A.D.). It is said to survive at *Verulamium* into the early 2nd cent., A.D., but no parallels are quoted or have been illustrated, and it seems more probable that

the bowl found in the theatre is a survival or stray from the heavy pre-Flavian occupation of that part of the city, revealed opposite the theatre in the excavations of 1938.

27. Composite drawing from several large pieces of a single vessel found with the Arretine plate, No. 1, at the hut site in January, 1939. The ware is heavy, hard black, with a reddish-brown surface, and contains a good many fine crystalline sandy particles and some pebbles. It is probably wheel turned. The vessel has a bead rim and large lug handles of rectangular section, $\frac{3}{4}$ in. wide, standing out boldly from the profile of the pot. The base is relatively small, certainly of smaller diameter than the rim. The drawing of this interesting vessel makes no claim to be more than approximate.
28. Upper part of a bowl with raised corrugations or cordons on the shoulder in brown ware, with 'soapy' black or burnished surface. Colchester type 218, cf. *Richborough III*, XXXVIII, 276.

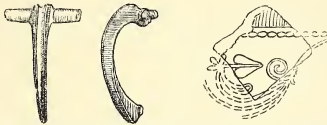


Fig. 3. Bronze Fibula and Fragment of Samian Bowl, form 29. ($\frac{1}{2}$).

29. Rim of globular Roman beaker in pale drab ware, like the Colchester series (type 108 and variants). cf. also *Richborough I*, 62; *Richborough III*, 285, 1st century.

BRONZE FIBULA.

'Dolphin' brooch of Collingwood type H. The bow is humped forward over the arms, which in this case are rather longer than usual, and form in section a semi-circular cover for the spring. The catchplate is plain. A semi-circular groove, bordered by ridges with finely beaded edges, like a double keel, runs the full length of the bow.

No fewer than three examples of this type have been found at Petuaria (*Brough V*, fig. 9, 1-3), one of which came from the foundation trench of a Trajanic building (*ibid* p. 45), and another from the clay filling of the Flavian ditch beneath Bastion I (*ibid* p. 46). The type is common, particularly in the south of Britain, in the late 1st and early 2nd century A.D. This brooch is therefore later than the bulk of the pottery from the site, and is evidence for some overlap of the occupation with that of Petuaria.

DECORATED SAMIAN.

Fragment of the upper frieze of a Samian bowl, form 29. It shows part of a spurred stipulated leaf beneath a row of elliptical beads. This leaf occurs in the work of INGENVVS, BASSVS, BASSVS & COELVS, DARIBITVS, RVFINVS and later Flavian potters, *i.e.* from the Tiberio-Claudian period to the end of the 1st century A.D. Occasionally it survives on Trajanic ware. Dr. T. Davies Pryce, F.S.A., to whom the fragment was submitted and to whom we are indebted for these notes, dates it to Nero-Vespasian, *c.* A.D. 65-75. It was a surface find, and contemporary with the fragment of 'rustic' ware noted above. It seems clear that there was some continued occupation of the site after the founding of Petuaria.

FRESHWATER BIOLOGY AT QUEEN MARY'S DUBB, N. STAINLEY

June 17th, 1939

H. WHITEHEAD

CONSIDERING the large volume of water and the number of pools there was surprisingly little variety of aquatic life.

Only three species of Trichoptera were taken on the wing. One specimen of *Limnophilus flavicornis*, one of *Silo pallipes* (near a stream) and a number of the small, dark *Leptocerus aterrimus* larvæ of *Triaenodes bicolor* were found in several pools.

No winged mayflies were seen but nymphs of *Cloeon* and *Caenis* were recognised.

Of Diptera, the Phantom larva, *Sayomyia* (*Corethra*) was numerous in one of the ponds. The larva of a species of *Dixa* was found.

The most interesting captures were in a small pond with much vegetation round the edge and sheltered by trees. In this pond Mr. Barnes found a good specimen of the Chequered Leech (*Proclipsis tessellata*). The other captures were three specimens of the Freshwater Louse or Hog Slater, which proved on examination to be *Asellus meridianus* Racov., and not the common *A. aquaticus* L.

The leech and isopod appear to be first records for the county, and brief notes on them are given below :

The Chequered Leech (*Proclipsis tessellata*). A specimen of this interesting leech was found in a small pond.

The specimen in normal resting position was about 24 mm. long and 5 mm. wide. It was translucent with six rows of yellowish brown spots and had four pairs of eyes. This leech is unable to penetrate the skin of man but is generally found on the beaks, around the mouth and nostrils and in the oesophagus of duck of various species—Wigeon, Teal, Long-tailed Duck and Domestic Duck. *P. tessellata* is not common but is widely distributed throughout the British Isles and Europe. It has been recorded from South America. The specimen taken had 80 young, each about 3 mm. long, attached to the underside of the adult.

Asellus (*Proasellus*) *meridianus* Racovitza. Three females of this species were found in pools at Queen Mary's Dubb. This species is very similar though smaller than the Common *A. aquaticus*, but it is necessary to dissect specimens in order to identify the species with certainty.

A. meridianus has been recorded from Dulwich, Devon and Derbyshire. It is probably widely distributed. The writer has taken specimens at Driffield.

HARPOONS AND THE CAPTURE OF WHALES

R. W. GRAY

WHALES are easily killed—a 'rocket' (a kind of bomb) or even a rifle bullet will achieve this purpose, but if the animal dies under water its body will sink to the bottom and be a loss to all concerned.

The harpoon is the most important of the instruments used in the capture of whales. Its function is not to kill, but merely to attach a rope or 'line' to the whale so as to render it entangled or 'fast.'

The harpoon is stabbed, darted, or fired deeply into the whale, it being essential for its head to pass through not only the entire thickness of the integuments (including the blubber) but also the sheets or webs of very strong fascia under them.

The instrument must possess both rigidity and flexibility, the latter to permit the shank to bend when the animal dives and the strain comes on the line. The best harpoons are made of Swedish iron, this being the material which possesses the necessary properties in the highest degree.

Simple harpoons such as were used by the old time whalers were of two kinds: those with fixed, and those with moveable or jointed heads. The former retain a hold because they are barbed like a hook, the latter (termed 'toggle' or swivel harpoons) because the head assumes a position at right angles to the shank when the strain comes on the line.

The Eskimo harpoon belongs to the second type. It consists of three pieces so contrived that they can be socketed into one another to give rigidity, but automatically fall apart instead of breaking when the strain comes on the line. Parry¹ referring to it says:

'The device is in its principle superior even to our own barb, for the instant any strain is put on the line it acts like a toggle, opposing its length to a wound only as wide as its own breadth.'

Dr. Nansen also admired the Eskimo harpoon, he calls it 'the highest achievement of the Eskimo mind,' and gives excellent figures of it in his book *Eskimo Life*.²

The 'toggle iron' the light and handy instrument introduced by the Americans, is a copy of the Eskimo harpoon, but as it is made of iron the shank is in one piece and the line is not attached to the head as in the prototype.

There are three usual ways of catching whales: firstly the Eskimo method, secondly what may be termed the old or obsolete method (the one we used), and lastly the modern or Norwegian method.

¹ Parry, E., *Second Voyage*, p. 508.

² Nansen, F., *Eskimo Life*, p. 35.

(a) *The first or Eskimo method.*

In this method, devices termed 'drogues' are used, by means of which the whale's progress is retarded and its strength exhausted. Parry gives the following excellent description of an Eskimo whale hunt.

'When a fish is seen lying on the water they cautiously pull up astern of him till a single canoe preceding the rest comes close to him on one quarter so as to enable the man to drive the *katteelik* into him with the force of both arms. This having the *siatko*, a long *allek*, and the inflated seal-skin attached to it, the whale immediately dives, taking the whole apparatus with him, except the *katteelik*, which floats to the surface and is picked up by its owner. The animal reappearing after some time, all the canoes again paddle towards him, some warning being given by the seal-skin buoy floating to the surface. Each man being furnished like the first, they repeat the blows as often as they find opportunity, till perhaps every line has been thus employed. After pursuing him in this manner, sometimes for half a day, he is at length so wearied by the resistance of the buoys, and exhausted by loss of blood as to be obliged to rise more and more to the surface, when by frequent wounds with their spears, they succeed in killing him and towing their prize to the shore.'¹

(b) *The second method.*

It is obvious that the method of catching whales just described has two serious drawbacks. Firstly, the length and tension of the line or rope cannot be regulated; secondly, the boats may not be able to keep up with the whales and its pursuers may have the mortification of seeing the animal escape with a harpoon in its side. It is also obvious that these defects can be overcome by making the attacking boat act as a drogue, after first equipping it with a sufficient supply of line and a bollard or post by means of which the tension on the line can be increased or diminished at will.

(c) *The third method.*

In the second method which is described by Scoresby, Beale, and others, a number of boats had to co-operate and the whale had to be exhausted before it was killed. It is obvious that these drawbacks might be eliminated by shooting a harpoon and a bomb simultaneously into the whale so as to entangle and kill it at one and the same time. The first attempts to capture whales in this way were a failure, because the whale usually died under water and had to be hauled up, a difficult or impossible undertaking with light gear. The Norwegians, however, made it a success by using much heavier

¹ Parry, E., *l.c.*, p. 509.

gear and by substituting for the time-honoured whale-boat, a small steamer fitted with apparatus for heaving up dead whales.

Reverting to the second method (*i.e.* the capture of whales by means of whale boats) and recalling former times, I now propose to say a few words about the capture of Greenland and Bottlenose whales at the Northern or Arctic Fisheries and about the capture of Sperm whales and Southern Right whales at the South Sea or Pacific Fisheries.

A. THE NORTHERN OR ARCTIC FISHERIES

(1) *The Greenland Whale.*

When attacked this whale usually 'sounds' or tries to reach the bottom. The capture of whales which behave in this way is possible because they come up near where they went down. At least five boats, each carrying a deal of line had to co-operate in the capture of a large Greenland whale, *viz.*, the attacking boat and another with it, termed the 'bending-on boat,' with additional line, the boat which saluted the animal with a second gun-harpoon when it reappeared after its first and deepest dive, the boat which saluted it with a third gun-harpoon when it reappeared after its second dive and the killing boat, which gave the unfortunate animal its *coup de grace* by means of a lance.

(2) *The Bottlenose Whale.*

The Bottlenose also sounds when struck. A big strong male took out about 700 fathoms, the smaller females about half that amount. I was with my father in 1883 when he caught 157. We prosecuted the fishing outside the ice using the gear which we used at the whaling, but only coiling 360 fathoms of line into each of the boats and being more sparing in the use of the gun harpoon. Three or four boats were required in catching a big male, *viz.*, the attacking boat and the one or two bending-on boats that stood by with extra line, and the killing boat that saluted the animal when it reappeared, with a hand harpoon in the region of the neck and a few lance thrusts in the region of the chest. The smaller females could be caught with a boat or two less.

Bottlenose whales can be caught with fewer boats than just mentioned, but only by equipping the ship itself with a gun, etc., and making it play the combined parts of attacking and bending-on boats. This method of catching them was introduced by the Norwegians and is described by Hjort in his *Fiskerei og Hvalfangst*, p. 175. Here is what he says :

' . . . the Bottlenose in his form and habits resembles the Sperm whale . . . '

' The fishing of both takes place in the open sea, far from land . . . '

'The Norwegian Bottlenose fishers use a small swivel-gun, 30-36 inches long and $1\frac{1}{2}$ -2 inches in diameter . . .

'The guns are mounted in the bows of the ship itself and the Bottlenose comes to the side of the ship to look and then can be shot from the ship itself. One has not to hunt it as one must do with the Fin-whale. The Bottlenose dives straight down towards the bottom, sometimes, according to Captain Ingebrightsen, he goes as deep as 400 fathoms and he comes up at the same place where he went down.'¹

B. THE 'SOUTH SEA' OR PACIFIC FISHERY.

(1) *The Sperm Whale*.²

I have had no experience of the capture of this whale, but fortunately, a captain Day, an English South Sea whaler and a contemporary of Scoresby has left what appears to be a reliable account of the fishery. Unlike the Greenland whale and the Bottlenose, and contrary to the accepted belief, this whale usually seeks safety in horizontal flight. The capture of whales which behave in this way is possible, because after a time the animal becomes exhausted, enabling the attacking boat to haul up and use the lance. Here is what Day says :

'When a number of fish are seen, four boats, each furnished with two or three lines (*i.e.* with 240 or 360 fathoms of whale line), two harpoons, four lances, and a crew of six men proceed in pursuit, and if practicable each boat 'fastens to,' or strikes a distinct fish, and each crew kill their own. When a fish belonging to a herd is struck, it generally takes the lead and the whole herd follow it. A "fast fish" seldom goes far under water, it generally swims off with extreme rapidity when struck, but usually stops after a short race, so that the boat can be hauled up by the line or rowed sufficiently near to lance it. The dying struggles of the animal are so tremendous that the water is beat by its fins and tail into a foam. The boats at this crisis, which is generally known to be approaching by the tall jets of blood discharges from the blow-holes, keep aloof, or otherwise they would be dashed to pieces.'

(2) *The Southern Right Whale*.³

Captain Day has also left what appears to be a reliable account of the capture of this species. Here is what he says :

'When struck, the southern mysticetus often dives to the bottom, the depth being seldom more than 200 fathoms, returns to the surface after an interval of a few minutes, and occasionally dives a second, a third, and a fourth time. But sometimes it "runs" along the shore 20 or 30 miles in a

¹ Hjort, J., *Fiskerei og Hvalfangst*, Bergen, 1902, p. 175. See also *Zoologist*, 1888, p. 127.

² Scoresby, W., *Arctic Regions*, Vol. II, p. 533.

³ Scoresby, W., *l.c.*, p. 535.

direct line. When it is seen by any others of the species, they usually take the alarm and, running off, are followed by the "fast-fish" as long as it is able. The first striker endeavours to "fasten" two harpoons in the first attack, both attached to the same line, by which he has a double security of the fish. The harpoons are usually thrown at the whale when at the distance of six or eight yards and the lances, which are kept in fine order, are sometimes used in the same way. Two boats are considered sufficient to kill a Right whale, so that when it can be accomplished, two are struck at the same time. The fast-boat is hauled up to the fish whenever it appears at the surface, thus affording an opportunity to the harpooner to lance it, and enabling him, sometimes, to kill the fish without the assistance of any other boat.'

A. Table giving details of the ships employed in the capture of Greenland and other whales.

	tons	crew	boats
1. GREENLAND WHALE			
(a) auxiliaries ...	400-500	55	7
(b) sailing vessels ...	300-400	50	7
2. THE BOTTLENOSE WHALE ¹			
(a) auxiliaries ...	400-500	55	7
(b) sailing vessels ...	150-200	30	4
3. SPERM WHALES AND SOUTHERN RIGHT WHALES	300	30	4

B. Table giving details of the boats used in the capture of Greenland and other whales.

	Crew	Line		Harpoon	
		Length	Size	Kind	Weight
1. GREENLAND WHALE	6	600 fms.	2 $\frac{1}{4}$ "-2 $\frac{3}{4}$ "	gun	12 lbs.
2. BOTTLENOSE WHALE	6	360 fms.	2 $\frac{1}{4}$ "-2 $\frac{3}{4}$ "	gun	12 lbs.
3. SPERM AND SOUTHERN RIGHT WHALE	6	220 fms. ²	2"	hand	10 lbs. ³

C. Table giving length of line taken out and depth descended by adult Greenland and other whales when struck, also the number of boats which co-operated in their capture.

Whale	Line and Depth	Boats	Authority
1. GREENLAND	700-800	5	Self
2. BOTTLENOSE			
Males	600-700	3-4	Self
Females	300-400	2-3	Self
3. SPERM			
Males	440-660	? 3-4	Bennett
Females	220-330	1-2	do.
4. SOUTHERN RIGHT ...	200 ⁴	2	Day

¹ The Norwegian method of catching these whales is purposely excluded.

² According to Bennett (author of *A Whaling Voyage Round the Globe* in 1833-1836).

³ Including the wooden stock.

⁴ In water of that depth.

MOUNTAIN AND MERE

NOTES ON TWO EXCURSIONS

J. P. UTLEY, B.Sc.

(1) AFTER months of talking about it, Saturday, July 1st saw a party of us, including Dr. and Mrs. Sledge and the Secretary, Chris. A. Cheetham, set out to explore the summit of Great Whernside and the country leading to the Great Wham. Dr. and Mrs. Sledge and myself proceeded through a typical Coverdale rainstorm to the top of the road leading to Kettlewell and here we met the Secretary.

A cold North wind was blowing and heavy showers threatened as we faced the short but steep climb up the shoulder of Great Whernside. Curlew, Snipe, and Meadow Pipit were observed at this stage and Skylarks were heard singing. It is a good walk from the N.E. shoulder to the summit and occasional Meadow Pipits were the only birds seen. The massive wind and weather swept millstone grit rocks of the summit are an imposing sight and very clearly illustrate the severity weather conditions can attain at that open altitude. The recently erected ordnance survey white concrete pillar, with its gun-metal instrument plates, looked definitely out of place; moreover, the Bench Mark height stamped thereon caused hurried consultation of maps and of Sledge's aneroid. These agreed at 2,310 feet, but the Bench Mark said 2,975. We had to leave it at that, and after admiring the range upon range of hills leading to the West, with Ingleboro' standing out dominant in the middle distance, turned to view the long slope leading down to the Plains of York in the East. The play of light and shade on Angram and Scar House reservoirs was very fine.

We pushed on to the point known as Stone Head Crag and in the shelter of these rocks partook of lunch. We had just got 'opened out' when it rained heavily for a few minutes. Mrs. Sledge found she fitted beautifully into a fissure of the rock, and so missed getting wet.

Such a wide expanse of moorland opening out to the S.E. caused some doubt as to the definite fixing of the Great Wham position, but we decided to push on to a point considered to be the hill Meugher. Wheeling high overhead as the journey was resumed, were six Swifts. We descended down the eastern slopes on to Riggs Moor and then our troubles commenced. For at least two miles we encountered nothing but a rapid succession of peat hags of appalling severity of slope and depth. We rarely saw each other, but at times the booming voice of the Secretary could be heard coming as from the depths of an abyss—and well it might—'Where is the Great Wham?'

Suddenly a large grit boulder was discovered, bearing a Bench Mark; maps were consulted, this must be 1837, it could not possibly be any other. From that the high conical point to the S.E. was undoubtedly Meugher. Just about now a beautiful specimen of adult Blackcock was seen—but the Great Wham was still a long way off. After another hour of peat hags, Meugher Dyke was reached and crossed. This dyke almost completely encircles an area enclosing the hill, and singularly, on crossing it we left the peat bogs behind and entered a large flat area of cotton grass. On climbing the grit-capped point of Meugher we observed that all inside the circle of the dyke was similar cotton grass area, while all outside the circle was tortuous peat bog. Another interesting point is that although innumerable exposures of the peat base had been seen on crossing Riggs Moor, no evidence of timber was observed until Meugher Dyke was reached, and here at the base was a thickness of about one foot, chiefly Birch.

Time was getting on; where *was* the Great Wham? A survey was made and there it lay at the foot of the cone and abutting on to the dyke. We examined it thoroughly, but from the vertebrate aspect it produced nothing but frogs! On the way back to Meugher point, a Red Grouse was put up.

A council of ways and means was now called. To endeavour to return by Riggs Moor ridge was to ask for trouble, so after a few minutes rest we made a bee-line over acres of Cloudberry with setting fruit—Cheetham says this makes fine jam—to just below the peat line in the direction of Mossdale, and so, by devious ways and sheep tracks we rounded the top of the valley to Stone Head, and here was seen what Cheetham called a Kestrel (by its form and flight I considered it to be a Merlin) He also spotted a lizard.

It was a tired party that reached the summit of Great Whernside and we felt there must be something in that B.M. 2,975 after all! Our knees developed a 'quiver' as we made the sudden drop to Little Hunters Sleets, and we were an hour behind time—but we *had* visited the Great Wham, and the Secretary was blithe as ever as he jumped on his cycle to ride where he could on his long journey home.

(2) On Sunday, July 2nd, we had planned to visit Lake Semmerwater. It rained. It rained all day—till we got home again. When we arrived at the lake it presented a fine sight, carrying countless "white horses" under pressure of the westerly gale. The downpour was so heavy that we could not see Marsett at the top end. The gale was strong and the lee-side of the Carlow Stone wonderfully dry, and two members of the party sought haven there till inaction and cold drove

them back to the shelter of the car. With the aid of a telescope Sledge said he could identify quite a long list of plants, so why venture out! Birds observed from the car included Rook, Starling, Chaffinch, House Sparrow, Reed Bunting, Skylark, Tree Pipit, Meadow Pipit, Grey Wagtail, Pied Wagtail, Willow Warbler, Song Thrush, Blackbird, Swallow, Martin, Swift, Lapwing, Common Sandpiper, Redshank, Curlew, Black Headed Gull, and Moorhen.

The rain continued, time passed, and lunch was demanded; this was taken; then two of us, thus armed and probably a little put to shame by the sight of three fishermen who had been patiently standing out all the time, decided to brave the elements and explore the marshy side of the lake to its head. We soon divided, Sledge taking the reeds and myself the willows. The list of birds began to grow, Sand Martin were flying with the Martins, and on the wall near the bridge was a Yellow Wagtail. From the willows a cheeky little Wren soon advertised his presence; here too were Hedge Sparrow, Greenfinch, and Sedge Warbler. As the thicker growth and cluster of trees was approached, Jackdaws became noisy, their cry being in harsh contrast to the softer cooing of Wood Pigeons. Sledge was near the water's edge, half hidden and sometimes completely disappearing among the reeds; he disturbed some Coots from there, but do not think he was aware of the fact. The Tit family now came into the picture, first a pair of Blue Tits with a family, then from the alders a Great Tit scolded most vehemently. In the willows near the water were Marsh Tits; an effort to find a Willow Tit was made in vain. Later, the Coal Tit was seen.

The rain came down with greater violence, and being near an old boathouse I slipped in, to cause considerable discomfort to a Tawny Owl, who assumed there was but room for one, so slipped out. From here the head of the lake could be well commanded with a telescope and a pair of Great Crested Grebe were soon spotted, well out in the lake and busy diving. No young were noted. Little Grebe were also seen swimming round an island of reeds. Mistle Thrush were heard in the Trees around, and sure enough, nearby a Robin was singing.

Further up the lake side the willow and alder growths became thicker and the reed beds bigger, here the Reed Warbler was seen. For some time the note of a bird in the thicket on the promontory at the head of the lake had attracted attention but it was not yet possible to cross over. Moving into some cut meadow land near Carr End, Golden Plover were found to be feeding, while overhead two or three Common Snipe were zig-zagging across the marshland.

An attempt was now made to cross to the promontory. It was a hazardous enterprise, the further the advance was

carried the deeper sank the feet and the higher rose the reeds, but soon the note which attracted me was so distinct as to be unmistakable, it was that of the Grasshopper Warbler. An effort was made to get nearer, but visibility was lost, for the top of the reeds was above eye-level, moreover, it was very wet, below, around, and above, and as a hope was entertained of seeing the bird at a later date, a retreat was deemed advisable. This was safely accomplished, but emergence to less encumbered ground was met by the harsh 'Kraa' of a Carrion Crow.

After skirting the undergrowth a return journey was made on the shingle laid bare by the lowering of the lake's level. Here the boldness and excitement of Common Sandpipers called a halt, and soon members of their very young family were seen crouching among the pebbles. The return was continued, to be again stopped when another Sandpiper was risen from the water's edge, but this one was different, the tail coverts were white. Quickly glasses were raised and focussed, yes, the bill was undoubtedly curved—a Curlew Sandpiper. No duck were seen about the lake, though it is well known that Mallard breed there.

The car was reached and a quick journey made to home, dry clothes and hot tea.

These were days of contrast; one on high grit and peat moorland, where only eight species of birds were recorded. The second day on marshy ground bordering a lake, where, under extremely bad conditions, 46 species were noted. On a more suitable day this number would probably have been increased. A point of interest on the Saturday's journey was that on the high grit and peat areas, no Lapwing was seen or heard, while on the long crest of Great Whernside the Meadow Pipit was the only bird recorded. Are these high millstone grit lands as devoid of variety in birds as they are in plants?

In Memoriam

ALFRED HARKER

THE death has occurred at Cambridge of Alfred Harker, M.A., F.G.S., F.R.S., a native of Hull, who in the early days of the Hull Geological Society had much to do with its formation and progress.

Harker was 80 years of age. Over 50 years ago he was a great collector of minerals and rocks of the Yorkshire coast, and made a special study of the erratic blocks, transported boulders which have reached this country from Scotland, the Lake District, Norway, and Sweden from the great Ice Age.

Harker was one of the first to identify many of these

rocks, and his early papers describe many specimens. In recent years he had made a special study of the volcanic rocks of the British Isles, and wrote a number of valuable books on the subject.

Harker took a prominent part in the work of the Geological Society of London, the British Association, and many other bodies. He was an honoured vice-president of the Hull Geological Society at the time of his death.

SHORT NOTES

Judging from the *Whitby Gazette* of July 14th, the Whitby Naturalists' Club had a particularly successful excursion to Kettle Ness recently and were joined by members of the Cleveland Field Naturalists' Club. The geologists were led by Dr. J. E. Hemingway, who gave an account of the geology of the district, paying particular reference to the jet bearing beds.

At the Annual Conference of the Museums Association, presided over by Lord Bledisloe, at Cheltenham, an unusual procedure was the election of honorary members of the Association to those who had been of especial service in the museum world. The recipients were Lord Harewood, whose work among the National Museums is well known; Dr. E. E. Lowe, Director and Librarian of the museums, art gallery and libraries at Leicester; and Mr. T. Sheppard, Director of the Hull Museums; the two latter having held the Presidential Chair of the Museums Association. During the forty years he has been at the museum, Mr. Sheppard has been elected an honorary member of the Linnean Society of London, Spalding Gentlemen's Society, Selby Scientific Society, Yorkshire Conchological Society, Hull Literary Club, Hull Scientific and Field Naturalists' Club, Hull Photographic Society, Worthing Archæological Society, York and East Yorkshire Architectural Society, and the Yorkshire Naturalists' Union. He is also a Life Member and Medallist of the French Association for the Advancement of Science.

At a recent meeting of the East Riding Antiquarian Society held at Kirbymoorside, Mr. T. Sheppard gave an account of the origin of Kirkdale Cave. He pointed out that largely as a result of the work of the late S. S. Buckland, as recorded in his *Reliquiæ Diluvianæ*, interest was taken in scientific matters generally with the result that Literary and Philosophical Societies were founded in different parts of the country, and at Hull, York, Scarborough, and other places, a selection of specimens from the Kirkdale Cave practically started the museums which these societies formed. The Hull museum still contains the remains of various extinct animals from this cave, which together with specimens presented by William Smith and his nephew, John Phillips, formed a fitting beginning to the museum at Hull, and these treasures still occupy a prominent place in the geological gallery there.

REVIEWS AND BOOK NOTICES

Patterns of Survival, an Anatomy of Life, by John Hodgdon Bradley, pp. 228. Routledge, 7/6. Any attempt to do adequate justice in a short review to Dr. Bradley's thought-provoking book would fail of its purpose. The most one can do is to quote from the author's introduction and urge all who can to read his book. He says: 'While the

fundamental mystery of life remains as mysterious as ever, the manifestations of living are each year becoming better known . . . life left a trail in the mud of the past which grew more distinct as the æons slipped away. To retrace its devious windings is to relive the most exciting drama ever enacted in the theatre of time . . . The student of early history sees in retrospect what could never have been foretold. Life was a new experiment under the sun . . . If there is any meaning for mice or men in the restless drive of life a thousand million years of living should contain it. To search those years for that meaning will be the object of this book.' This is an ambitious programme, but it has been carried out in a most thorough manner in the clearest possible language. The book closes with chapters on man's place in nature and discusses at some length the unique evolution of the human brain and all that this evolution implies. Man is the only creature having a conscious say in the direction of his own evolution, and this power is a function of brain power. We may aptly conclude this notice by quoting Dr. Bradley's last paragraph: 'Minorities of men have already demonstrated—in laboratories, hospitals, churches, and schools—a capacity for extending the welfare of men as individuals. Should majorities of men intelligently and sincerely attempt to extend the welfare of man as a species, who can say what dreams might not possibly come true? It is not for the historian of life to say: Self-directed evolution, so far as he knows, is an adventure without precedent in a thousand million years.'

The Insect Legion, by **Malcolm Burr**, pp. xiv+321, with 27 illustrations. Nisbet, 12/6. In this very absorbing book the reader will find a most informative and entertaining account of the insect life of the world. The volume has four parts, the first of which is devoted to the insects themselves, and deals with their structure, habits, and life histories. In Part II Dr. Burr discusses insects in their relation to man, and here the author seems at his best. There are chapters on insect-borne diseases, damage to plant life by insects, useful insects, and so on. Part III touches on the immense period of time during which insect life has persisted. While man may have an ancestry dating back from a million to five million years, insects have existed at least a hundred times as long. In Part IV is given a readable account of the history of entomology, ancient and modern. The illustrations, which are drawn from many sources, are all good.

The World of Insects, by **C. D. Duncan** and **Gayle Pickwell**, pp. x+409, with 194 figures in the text. McGraw-Hill, 21/-. This American book is a really scientific introduction to entomology. The authors are to be congratulated on getting into 400 pages such a graphic account of the subject, including definitions of technical terms used. Out of 19 chapters no less than 14 are devoted to the structure and life of insects, and these are followed by chapters on The Value of Insects, Injurious Insects and Their Control, Where to Look for Insects, Rearing Insects, and How to Collect and Preserve Insects. The many illustrations contain some of the clearest diagrams and finest insect photography we remember to have seen.

Nature's Cavalcade, by **J. Oliver Wilson**, pp. 286, with 29 illustrations. Hamilton, 12/6. This is an exceedingly pleasant book of the countryside throughout the year. The author is a real naturalist and writes about the things he is familiar with. His style is an easy one, and his writing is entirely free from the sentimentality which all too commonly is associated with natural history books of the lighter kind. The illustrations vary very much in quality and certain of the marginal photographs give the impression that they have been considerably enlarged before reproduction.

NEWS FROM THE MAGAZINES

The Entomologist for July contains 'Aberrations of *Abraxas grossulariata* L.,' by E. A. Cockayne (with plate); '*Abraxas grossulariata* ab. *inframaculata* ab. nov.,' by G. H. T. Stovin; 'British Gall-causing Cynipidæ, II,' by M. Niblett; 'New Genera and Species of Mallophaga,' by T. Clay and Col. R. Meinertzhagen; and numerous notes and observations.

Science Progress for July contains a 19-page article on 'The X-ray Study of Proteins and Related Structures,' by Dr. W. T. Astbury, who is Reader in Textile Physics at the University of Leeds. Other articles include 'Modern Work on Earwigs,' by Dr. Malcolm Barr; 'The Determination of Temperature below 1° K,' by Dr. F. Simon; 'Heavy Oxygen,' by Dr. Day; and 'Erosion and Soil Conservation in Theory and Practice,' by Dr. E. G. Richardson.

The Miller for July 17th, 1939, contains an interesting article on insect control in flour mills. Some 10 per cent. of the wheat of the world is rendered useless for human consumption by the ravages of insects. Some 50 insects alone are associated with grain during storage. The greater part of the damage is done by three or four species, of which the weevils *Calandra granaria* L. and *C. oryzae* L. are the most important. During the process of milling, a new set of insects are encountered. Of these, the Mediterranean flour moth, *Ephestia kuhniella* Zeller is the most formidable. Of the numerous beetles to be found in the elevators, machines, etc., the Confused flour beetle, *Tribolium confusum* Duval, and the Cadelle, *Tenebroides mauritanicus* L. are probably responsible for most damage. In the finished product the mites assume the greatest importance as pests. *Aleurobius farinae* De Geer, *Glyciphagus cadaverum* Schrank, and *Tyroglyphus longior* Gervais are the most prevalent. Control of insect pests is by fumigation, the best agent being the proprietary mixture Carbexite.

The Entomologist's Record for July-August contains 'More Notes on Kurdish Lepidoptera,' by E. P. Wiltshire; 'Movements of Coccinellidæ,' by T. F. Marriner; 'Continuous Breeding. VI. *Taeniocampa gracilis* F.,' by H. B. D. Kettlewell; 'Collecting Notes, 1938. III. August-September,' by A. J. L. Bowes; 'Names of Microlepidoptera,' by T. B. Fletcher; 'A gynandromorph of *Ithybia* (*Nyssia*) *zonaria* Schiff.,' by E. A. Cockayne; 'Collecting Notes and Supplement, 'The British Noctuæ and Their Varieties,' by H. J. Turner.

The Entomologist for August contains 'A few notes on *Platyptilia tesseradactylus*,' by H. C. Huggins; 'The history of *Pieris napi* var. *citronæa*,' by H. W. Head; 'A contribution to the classification of the Limnichidæ (Coleoptera),' by H. E. Hinton (with figures); 'Dragonflies in 1938,' by H. G. Attlee; '*Hyantis hodeva* (Lep. Amath.), descriptions of new sub-species and revisional notes,' by C. J. Brooks; and numerous notes and observations.

The Entomologists Monthly Magazine for August contains 'Some new species of Staphylinidæ (Col.),' by C. E. Tottenham (with figures); '*Bruchus loti* Payk. (Col.) and its aberrations,' by H. Donisthorpe; 'Notes on American Elmidae, with descriptions of new species (Coleoptera),' by H. E. Hinton (with figures); 'Notes on British Collembola,' by R. S. Bagnall; '*Friesia claviseta*, Wooler (Northumberland), Gibside, Cox Green, and St. John's Chapel (Durham), and Ravenscar, Sewerby, and Boynton Woods (Yorks). *F. poseidonis*, Alnmouth and Seaton Sluice (Northumberland), and Ferriby (Yorks). *Pseudachorutes dubius*, *corticola* and *subcrassus* (Ravenscar), *P. parvulus* (Boynton Woods, under elm bark, Yorks.); and several shorter notes, including 'Further notes on *Pyropterus affinis* Payk. (Col. Lycidæ),' by E. G. Bayford.

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Yorkshire Naturalists' Union

NOTICE TO ALL SECTIONS

Owing to the difficulties of travel and the lighting restrictions none of the October Sectional Meetings will be held this session.

Will all members send their notes to the Section Secretaries to enable them to compile the Annual Reports.

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SAXON RELICS FROM BARTON, LINCS.

T. SHEPPARD, M.Sc.

ST. PETER'S CHURCH at Barton-on-Humber, North Lincolnshire, has long been known to antiquaries as one of the oldest churches in the country, and much of it is in its original state, as built by the Saxons. Up to the present, however, little evidence has been obtained about the people who built this church.

Recently, during excavations for air-raid shelters on the property of the Elswick-Hopper Cycle & Motor Co., Ltd., two or three human skeletons were found, together with objects quite correctly described as 'pieces of metal.' Through the kindness of Mr. A. Stow, the Managing Director, we had an opportunity of visiting the site, and the various finds were handed over to us.

From the nature of the soil it is apparent that at some time, probably comparatively recently, the construction of an adjoining road has caused 5 ft. or 6 ft. of Boulder clay to be dumped on to the land at this particular point, and this very tough material had to be cut through before reaching the original ground level.¹

At this depth it was apparent that just below the original soil surface a number of Anglo-Saxons had been buried, with various objects which in pagan Saxon times were placed with the dead so that they should be available again after their long sleep.

The nature of these objects suggests that one of the bodies was that of a woman, but from the bones collected it is clear that another was that of a man of rather large proportions, aged about 45. Subsequently one of my staff visited the site, turned over the soil which had been thrown out of the trench, and in this way we were able to complete some of the objects previously found, in addition to which one or two of importance were obtained.

The human bones were so stained with copper that they gave the impression of having been painted green, which indicates that the bronze objects were actually buried with the skeletons.

The most interesting find consisted of a large thin bronze hanging bowl, 10½ in. in diameter, which originally would be

¹ The Rev. Canon W. E. Varah, of Barton, writes: 'The site is near the lane called Castledyke South. I think the boulder clay you noted must be part of the old rampart that surrounded the town, parts of which have adjoining roads called Butts, Sheepdyke, Castledyke South, Holydyke, and Castledyke West. This rampart was probably to keep out in the open fields the herds at certain times of the year. If my surmise is correct, it strengthens your conclusions as to date, for the rampart was later than Early Anglian times.'

3½ in. in depth. When first excavated this was complete, but with the usual, perhaps pardonable, anxiety to ascertain what was inside, the bottom was knocked out, though this has been restored. The bowl was evidently suspended with a thin chain or cord, and at equal distances are three bronze escutcheons, with hooks, each fastened with three small bronze rivets. This bowl is very similar to one found at Hawnby in the North Riding of Yorkshire, figured on p. 78 of *The British Museum Guide to Anglo-Saxon Antiquities* (1923), and on Plate CXVIII, No. 6, of Baldwin Brown's *Arts of Early England*.

While examining the various fragments of this bowl we found a piece of metal which has a circular portion, 1¾ in. in diameter, punched out of it. It has not been clearly cut but has been provided with a collar or rim, and this, on comparing the various pieces, clearly is the centre of the bottom of the bowl, and obviously the bowl had this aperture, though it is not quite clear what purpose it served. In this case it resembles precisely the bronze bowl found at Hawnby, and Baldwin Brown writes: 'It is a beaten bowl rounded below and with a marked circular depression in the lowest part that would enable it to stand firm if set down, but when it was suspended and looked at from below would offer a suitable field for ornamental treatment.' From a note on the Manton bowl, appearing below, it was evidently the receptacle of an ornamental disc.

The bowl has a flat flange or rim, ¾ in. wide, but beyond the escutcheons, is devoid of decoration. In the Mortimer Collection at Hull is a very similar but perfectly plain bowl, but without attachments for hanging. This is 10½ in. in diameter, and was found at Brough many years ago 'with Roman pottery.' In this case the bowl is much thicker and heavier, but is of a similar type. The fact that Roman pottery was found in association is not necessarily an indication of its age, as the Hull Museum already possesses a large collection of Saxon and Viking relics from the Brough district, with which fragments of Roman pottery were also obtained during their excavation.

Also of a similar type, but more resembling the Barton example in structure and thinness, is a plain bronze bowl 6¼ in. in diameter from the New Cut between Rotsea and Leven, found during excavations at Leven in 1883. In this case also there was no evidence of hooks for suspension or other form of decoration.

Another interesting object found at Barton was a cylindrical bronze box, decorated with horizontal lines made by some implement with very small punctures, 30 to the inch, these bands being ⅜ in. to ¼ in. apart. The cylinder was made of



Saxon Bowl from Barton, Lincs.

a flat piece of bronze bent over and fastened by rivets $\frac{5}{8}$ in. apart, and on one side at the box bottom was a bronze loop, presumably for attachment, probably to a lady's chatelaine or waistband. From an illustration of a precisely similar box from Sibertswold, Kent, figured on Plate XCVII of Baldwin Brown's book, already referred to, it is clear that this cylindrical box, provided with a bronze lid, was used for sewing or other materials by the ladies of the period, and similar examples, but slightly smaller, have occurred at Uncleby, etc., in Yorkshire; Cambridgeshire, Derbyshire, Northamptonshire, and Bedfordshire. In the Mortimer Collection at Hull is the one from Uncleby, which is perfectly plain, and there is also a similar box from Garton, near Driffield. Both contained carbonised remains of the thread, and needle. The latter is recorded in Mortimer's *Forty Years' Researches*, as under :

' Upon the ankles were the following articles : a cylindrical bronze box, to which was attached a bronze ring and two S-shaped links connecting the lid and box. To these were attached several portions of iron links. With these was found an iron hook, a bronze buckle, a flat bronze ring $1\frac{5}{8}$ in. in diameter. There was also a spoon-like article of iron, and fragments of a bone comb. The bronze box is $1\frac{3}{4}$ in. high and 2 in. in diameter, ornamented with dotted lines punched from the inside.'

The Barton example was in fragments, but when restored proved to be $2\frac{1}{2}$ in. in height, the ring for the lid being more complete, being $\frac{3}{4}$ in. deep. There are two discs accompanying this, one of which, forming the lid, and the other the base of the box. The lid, which is more convex, is $1\frac{3}{4}$ in. in diameter, has three concentric circles made by a punch tool similar to that on the side of the box, and in addition the lid has one small pinhead-like punch mark in the centre, four in the second ring, and four in the fourth. The base is similarly decorated, but is not so concave.

Among the other objects is a long gold bead $\frac{7}{10}$ in. in length and $\frac{1}{8}$ in. deep, with horizontal striations and a slight rim at each end. Mr. T. D. Kendrick, of the British Museum, tells me this seems unique among Anglo-Saxon gold beads, and is probably of the fifth-sixth century, though similar examples, but with transverse grooves, occur in Saxon necklaces with pendants attached, similar to that found at Brassington Moor, Derbyshire, figured on Plate CII of Baldwin Brown's book.

With this Barton gold bead was found a small bead of jade green glass, $\frac{1}{4}$ in. diameter, $\frac{1}{8}$ in. wide, and with an exceptionally large hole for threading.

With regard to the find generally, the extraordinary similarity between the bowl, thread box, etc., and other

examples found in different parts of England, and their rarity on the continent, it is generally assumed that these are Irish or English workmanship. The Saxons naturally treasured them, and their burial customs have enabled us to record them.

It is assumed that the hanging bowl was not made for cooking purposes, and certainly our example would not long



Bronze case for needles and thread, and glass and gold beads, from Barton, Lincs.

resist the action of fire on account of the thinness of the metal. On this point Mr. Baldwin Brown says :

‘ The bowls in this class differ from all the others in that they are arranged for suspension and are without the ordinary handles that can be grasped. This peculiarity at once removes them out of the category of household objects of use and suggests that they served some ceremonial purpose. The use in churches of certain hanging lamps, supported on platters named “*Gabata*,” was brought forward by Sir Augustus Franks, as furnishing a possible explanation of these enigmatical objects, but if the bowls had ecclesiastical connections it is hard to see why they should appear among ordinary

items of tomb furniture in private graves. Objects that were part of the fittings of a church would naturally remain in use from generation to generation as the property of the community, and not be consigned to private sepulchres.'

I wish to thank Mr. A. Stow for giving facilities for examination of the site, and also Mr. Jackson, of the Grammar School at Barton, who first drew my attention to the find.

A sample of the metal from the bowl was submitted to Dr. J. A. Smythe, of King's College, Newcastle upon Tyne, who reports as under :

'A fragment of the bowl submitted for examination was in the form of thin sheet, $\frac{1}{100}$ in. in thickness. The metal was not greatly corroded and possessed quite a remarkable amount of springiness, from which it was inferred that it was probably in the cold-worked condition.

The micro-section was that of an alpha-bronze, the metal being entirely recrystallised, with twinned and striated crystal grains. There was no visible lead in the section. Chemical analysis gave the following composition :

Copper	...	...	88.70
Tin	...	...	11.02
Lead	...	...	trace
			99.72

'The metallographic evidence clearly proves that the metal has been wrought, annealed and worked again, probably many times over, and finally left in the cold-worked condition. As the grain structure is very fine, it is probable that the annealing has been done at a moderate temperature.

'Tin content is high for a worked bronze, and it is evident that considerable skill must have been exercised to fashion such a thin object from metal so rich in tin.'

(To be continued)

YORKSHIRE NATURALISTS IN TEESDALE

May 27th-29th, 1939

THE weather proved very favourable and enabled us to carry out most of the suggested excursions, though some had to be curtailed being too strenuous for some members of the party and also the attractions of the Durham side were too inviting.

The Juniper scrub on the Holwick area appeared to carry all the fungus species which are associated with the plant on Moughton Scar, but our friend the head keeper stated that the large patches of dead stumps were the result of local collection for firewood purpose rather than disease.

At the meeting a vote of thanks was accorded to Lord Glamis for permission to visit parts of the Strathmore Estates on the proposal of Mr. J. Utley seconded by Mr. E. R. Cross. The new Divisional Secretary,

The Naturalist

Mr. J. Utley was thanked and congratulated on the success of this meeting, the first in his term of office.

Writing on the geology of the area Mr. A. C. Dalton of Eyam, writes : To the geologist the district was particularly interesting though we had no expert to guide us. There being no variety of rock exposures, the physical nature of the district offered considerable scope for study. The predominate rock was of course the Dolerite or Whin Sill. This huge sheet of intrusive rock gave characteristic features in the landscape at Holwich Scars, Cronkley Scars, and Falcon Clints, its bold outlines were much admired, the resistance of this rock to water erosion gave us some of the beautiful waterfalls for which the district is famous, the difference in structure of this rock, where it cooled slowly and where rapidly, was very noticeable. The metamorphic characters of the adjacent shales and limestones were well seen, and at Caldron Snout a very interesting example of a metamorphosed coral (Lithostrotion) was found. The sugar Limestone proved of considerable interest. The Silurian rocks were seen at Cronkley Fell and a fine example of Adanole (a rock rich in alkalies) was seen. From various mineral veins several typical specimens of Baryta, Galena and Zinc Blende, etc., were found. The valley formation and watershed of the Tees occupied considerable attention, and the effect of glacial action was duly noted.

Our President and the Divisional Secretary made long journeys in their search for the birds of the district and Mr. Ralph Chislett says : Moorlands rising to an altitude of over 2,500 feet, crags, walled fields sloping down to the river whose rocky banks are occasionally wooded, provided varied habitats to suit a good variety of birds. No less than 57 species were identified during the fine and warm week-end.

Golden Plover, Curlew, and Lapwing were abundant and could be seen over the whole area investigated—15 Golden Plovers were observed feeding together in one wet field, all of the British sub-species. Snipe and Redshank were present in the wetter riverside fields, Dipper and Sandpiper by the river itself. Over the high ground Peregrine Falcon, Merlin, Kestrel, Raven and Carrion Crow were identified. Meadow Pipits were abundant, and the Tree Pipit well in evidence lower down. All three types of British breeding Wagtail (Pied, Grey and Yellow) were breeding within a comparatively few yards of the same reaches of river, the last-named in the adjacent fields. Ring Ousels were scattered from Tees level up to the altitude reached by the Juniper ; but more Ring Ousels frequented their customary heathery banks than were to be seen about the special shrub of the district.

Nests were seen of the following species : Carrion Crow, Tree Pipit, Meadow Pipit (many), Yellow Wagtail, Grey Wagtail, Willow Warbler, Song-thrush, Blackbird, Ring Ousel, Lapwing, Curlew, Common Sandpiper, and Red Grouse.

Additional to those already mentioned the following species were well in evidence : Starling, Lesser Redpoll, Greenfinch, Chaffinch, Skylark, Coal-Tit, Goldcrest, Wood Warbler, Blackcap, Garden-warbler, Mistle Thrush, Wheatear, Redstart, Robin, Wren, Hedge-sparrow, Swallow, Tawny and Barn Owls, Stock-dove (in the rocks), Ring-dove, and Woodcock.

Species seen only once or twice and apparently scarce were Linnet, Creeper, Blue and Great Tits, Whinchat, Spotted Flycatcher, Martin and Sand Martin, Great Spotted Woodpecker, Cuckoo, Mallard, and Black-headed Gull. The Pied Flycatcher was not observed.

Although the highest ground, which alone was possible as a habitat for Dotterel, was well searched by J. P. Uttley and the writer, the bird was not seen, nor was the Dunlin seen or heard.

Mrs. Morehouse sends this Conchological report : The weather for the High Force meeting was ideal, very hot and a glorious sun was

enjoyed by all, but for the conchologist a very thin time was consequently experienced. No terrestrial molluscs were observed, either dead or alive. Mr. Broadbent found *Ancylus fluviatilis* Müll. and *Limnaea peveger* Müll. in Blaebeck. He said they occurred in great numbers. Slugs were fairly numerous in the wooded areas and by the streams. A pocket of *Agriolimax agrestis* L. was noticed under a stone in a wood near the High Force Hotel. Seven adult specimens were in the hole. They were the type as well as *v. reticulata* Moq-Tan. and *v. nigra* Morelet, *Arion ater* L. and *A. ater v. Brunnea Roebuck* were evenly distributed over the districts visited, as well as *Agriolimax agrestis* L.

For the botanists Dr. Sledge writes: The exploration of Holwick Scars failed to produce any plants of outstanding interest. No streams run over the face of the Scars and the basaltic rocks are too dry to form a favourable habitat for alpine plants. The Parsley Fern is the most abundant of the less common plants, being suited to the dryness of the locality. Oak Fern and Beech Fern occur but the only other species listed were *Epilobium angustifolium* L., *Hieracium anglicum* Fr., and *Populus tremula* L. The fields and riverside from Park End Wood to High Holwick Bridge proved much more interesting ground and here were seen *Thalictrum* sp., *Trollius europæus* L., *Viola lutea* Huds., and *f. amoena* Hensl., *Geranium sylvaticum* L., *Rubus saxatilis* L., *Potentilla fruticosa* L. (just coming into flower), *Myrrhis odorata* (L.) Scop., *Galium boreale* L., *Serratula tinctoria* L., *Primula farinosa* L., *Plantago maritima* L., *Polygonum viviparum* L., *Salix phylicifolia* L., *Listera cordata* L. (in wet Juniper heath between High Holwick Bridge and Holwick Scars), *Convallaria majalis* L., *Melica nutans* L., *Sesleria cærulea* (L.) Ard., *Equisetum pratense* Ehrh. (of which a few sporing plants were found), *E. variegatum* (Schleich) Weber., and *Selaginella selaginoides* (L.) Link.

On Cronkley Fell the well-known station for *Dryas octopetala* L. and *Helianthemum canum* (L.) Baumg. var. *vineale* (Pers.) was visited but neither plant was in bloom and only a few flowers of *Gentiana verna* L. were seen. Both here and on Widdy Bank Fell where Gentian blooms were also rather scarce, an examination of the turf showed plenty of plants present and it is probable that, at least in the parts less easily accessible from the roads, sheep are as much if not more responsible than the amateur rock gardeners for the decline in the show which this plant makes now as compared with formerly.

Other species noted were *Thalictrum alpinum* L., *Arenaria verna* L., *Galium sylvestre* Poll., *Antennaria dioica* (L.) Gaertn., and *Primula farinosa* L. A search for *Polygala amara* L. above the White Force was unsuccessful but the striking acaulescent form of *Primula farinosa* which has been noticed here by previous botanists was met with. The return from Cronkley was made via the river bank to Cronkley Bridge and on the descent of the Scars to the river *Arctostaphylos Uva-Ursi* (L.) Spreng. was seen in great quantity and in fine flower. *Potentilla fruticosa* L. was again seen in abundance below the Scars and so low was the river that it was possible to cross over dryshod to the Durham side, and here *Bartsia alpina* L. and *Carex capillaris* L. were seen in flower together with young plants of *Saxifraga aizoides* L.

Monday's excursion to Widdy Bank Fell and Cauldron Snout provided *Viola arenaria* DC. just coming into flower and more *Arctostaphylos* was seen on rocks by the waterfall. An ascent was then made of Meldon Fell on the Westmorland side of the river in an endeavour to verify the old record for *Vaccinium uliginosum* L. but neither the plant nor likely ground for it was encountered. *Carex rigida* Good. was gathered on the summit of the fell and *Saxifraga stellaris* L. and *Epilobium alpinum* L. were seen by a spring near the summit. On the return a single specimen of *Andromeda polifolia* L. was found on Great Cocklake but shortness of time precluded a search being made for more. So far as I am aware the only other record

for *Andromeda* in Teesdale is from bogs near the junction of the Black Beck and Balder Beck many miles to the south. There is no record for the Teesdale drainage area in Mr. Albert Wilson's *Flora of Westmorland*.

Mr. Milson writing on mosses and hepatics says: The district surveyed included Holwick Scar and Fell (V.C. 65), Cronkley Scar and Fell (V.C. 65), pastures near R. Tees opposite Cronkley Scar (V.C. 66), Widdybank Fell, Cauldron Snout and Falcon Clints (V.C. 66), Winch Bridge and near-by Juniper scrub (V.C. 65). In all but the very moist spots, the prevailing weather had dried up bryophytes very much, in spite of which upwards of one hundred mosses and thirty hepatics were seen, which is a testimony to the richness of the district. The hoped-for confirmation of the old records for the small mountain *Dicranums* was not realised, but two other old records were noted, namely, *Gymnomitrium obtusum* on Holwick Scar and *Scapania æquiloba* at Winch Bridge. *Tetraplodon Wormskjoldii* was sought for in its old station on Widdybank Fell, but was not found. A careful search was also made for *Orthodontium gracile* var. *heterocarpum*, but despite abundance of suitable habitats, the plant was not seen.

A certain tendency to abnormality in bryophytic growth in the district in general was noticed. There was found, for instance, a densely caespitose form, growing in compact tufts, of *Bryum filiforme* which resembled *Plagiobryum Zierii*, a dark form of *Hypnum Patientiæ* almost as robust as *H. scorpioides*, a form of *Fissidens osmundoides* in good fruit, as small as *F. bryoides*, and *Scapania aspera* in scattered upright stems in a moist place among *Breutelia arcuata*.

A list of the more interesting species noted is given below :

MOSSES

<i>Rhabdoweisia denticulata</i> B. & S. (65).	<i>Bartramia ithyphylla</i> Brid. c. fr. (65).
<i>Blindia acuta</i> B. & S. c. fr. (65).	<i>Webera cruda</i> Schwaeg. c. fr. (65).
<i>Dicranum fuscescens</i> Turn. var. <i>falcifolium</i> Braith. (65).	<i>Plagiobryum Zierii</i> Lindb. c. fr. (65).
<i>Fissidens osmundoides</i> Hedw. c. fr. (65).	<i>Orthothecium intricatum</i> B. & S. (66).
<i>Rhacomitrium lanuginosum</i> Brid. c. fr. (65).	<i>Plagiothecium pulchellum</i> B. & S. c. fr. (65).
<i>Barbula ferruginascens</i> Stirt. (65).	<i>Hypnum Patientiæ</i> Lindb. (65).
<i>Splachnum sphaericum</i> Linn. fil. c. fr. (65).	<i>H. molluscum</i> Hedw. var. <i>condensatum</i> Schp. (65).
<i>Tetraplodon mioides</i> B. & S. (65).	<i>H. giganteum</i> Schp. (66).
<i>Bartramia Oederi</i> Swartz. c. fr. (65).	<i>Hylocomium rugosum</i> de Not. (65).

HEPATICES

<i>Gymnomitrium obtusum</i> (Lindb.) Pears. (65).	<i>Blepharostoma trichophyllum</i> (L.) Dum. (65).
<i>Marsupella Pearsoni</i> Schiffn. (65).	<i>Scapania aspera</i> Bernet (66).
<i>Calyptogeia arguta</i> Nees et Mont. (65).	<i>S. æquiloba</i> (Schwaeg.) Dum. (65).
	<i>Radula complanata</i> (L.) Dum. (66).

Fungi (Dr. John Grainger) :

Lophodermium Juniperinum de Not. Every Juniper bush round High Force appears to be infected. Green leaves are attacked, and turn brown, with ultimate death of the shoot.

Uredinales.

Phragmidium Sanguisorbæ Schroet. I, II, on *Poterium Sanguisorba*.

Gymnosporangium clavariæforme DC. on *Juniperus communis*.

G. Juniperi Link. on *Juniperus communis*.

Melampsora Lini Desm. on *Linum catharticum*.

Uromyces Alchemillæ Lév. II on *Alchemilla vulgaris*.

Puccinia Violæ DC. I on *Viola riviniana*.

Puccinia tumida Grev. III on *Conium maculatum*.

P. Caricis Reb. I on *Urtica dioica*.

P. Lapsanæ Fckl. I on *Lapsana communis*.

Agaricales.

Galera hypnorum (Schrank.) Fr. var. *sphagnorum* (Pers.) Fr.

Aphyllphorales.

Phlebia sp.

The rusts upon *Anemone* (*Puccinia fusca*) and *Celandine* (*Uromyces Ficariæ*) were not found on this excursion. Their absence should be correlated with their abundant local distribution in Swaledale. Both species of fungi appear to have little possibility of wide distribution by means of their teleutospores (Grainger and Ridgwick, *The Naturalist*, Feb., 1938) and their basidiospores also do not appear to be readily distributed by wind.

Dr. Sledge found *Mitruha phalloides* Cher. (*M. paludosa* Fr.) at Park End Wood.

Lichens.—Mr. W. E. L. Wattam writes: It was scarce to be expected that during the short visit to Upper Teesdale additions would be made to my list of 253 species and varieties as published in *The Naturalist* for 1925, pp. 250-252. Further, the dry conditions which had been prevalent during the whole of May in the region, militated in some degree to these plants being seen at their best. However, there was ample scope for study in the areas traversed. A whole day spent at Holwick Scars revealed a magnificent picture of those species, cosmopolitan and otherwise, which here were in perfection upon the vast rock debris of varied sized boulders at the base of the Scars. Outstanding species in that picture were *Parmelia omphalodes* Ach., *Rhizocarpon geographicum* DC., *Lecidia contigua* Fr., and its varieties *platycarpa* Fr., and *flavicunda* Nyl. and *Stereocaulon coralloides* Fr. The Durham side of Cauldron Snout, and moorland as far as Falcon Clints, was also fruitful ground. On the peat *Lecidia granulosa* Schaer. and *L. uliginosa* Ach. were prominent species. *Cladina sylvatica* Hoffm., *Cl. uncialis* Web., with its variety *bolocina* Nyl., occur in large sheets. *Stereocaulon evolutum* Græme, *St. denudatum* Floerke, *Cladonia furcata* Schrad., and *Lecanora tartarea* Ach. were also noted. Here Dr. Grainger found *Collema granuliferum* Nyl. on silicious stones alongside the border of one of the streams. Dr. Sledge brought me specimens of *Cetraria Islandica* Ach. from the summit of Meldon Fell, Westmorland. The comparative low state of the Tees enabled me to work a good portion of shady rocks on the Yorkshire side of the river, but I was unable to record *Ephebe lanata* Wain.

The entomological side of the meeting was restricted to your Secretary's search for Diptera, of these two species of *Tipula* were noted by many of our members as being in very large numbers on the higher moorlands. *Tipula subnodicornis* Zett. where the Cottongrass occurred and *T. alpium* Bergr. on the rather drier areas. These species must play a large part in the provision of food for the moorland birds both in the larval and perfect stages of their life history. On these higher stations a single *Triogma trisulcata* Schum. was caught, this was on a damp spot where the Alpine Meadow Rue grows and with it *Ephelia trimacula* Zett. was plentiful. Other species of *Tipula* caught during the week-end were *Tipula varipennis* Mg. (plentiful), *T. cheethami* Edw., *T. montium* Egg. and *T. lateralis* Mg. Other Limnobiids were *Dactyloblabis sexmaculata* Mcq. (*frauenfeldti* Egg.), *Tricyphona immaculata* Mg., *Erioptera trivialis* Mg., *Molophilus ater* Mg., *Poecilostola punctata* Schrk., *P. pictipennis* Mg. Two other species which were fairly plentiful were *Bibio reticulata* Lw. and *Rhamphomyia sulcata* Mg., whilst on damper ground with Marsh Marigolds and Globe flowers were *Hydromyia dorsalis* F., *Ptiolina atra* Stg., and *Chia스토chaeta trollii* Ztt.

ON THE STRANGE COURTSHIPS OF BRITISH MERGANSERS

W. K. RICHMOND

EVEN in autumn and mid-winter there is occasionally some sort of courtship display among the wild fowl, though usually of a mild and entirely abortive nature. A mild, sunny day sets the Mallards whistling and jerking their heads back as they swim, causes the lively Teal to flute excitedly, and prompts the watchful Curlew to send up his passionate trill, filling a whole estuary with wild rippling music. Even so, it was with a certain surprise that I made the following observations on the courtship of Red-breasted Mergansers.

' January 3rd, Teesmouth.

' It was a clear, frosty morning, enormous sun-filled clouds crowding the blue sky and an icy breeze freshening on the water. Four ginger-crested birds were diving together in the company of a single adult drake Merganser. At first I took all four for ducks, but afterwards decided that the five must be a family party—parents and offspring. After a time other Mergansers appeared, diving in scattered formation. In the end there were fourteen birds in the company, five or six being adult drakes.

' Having fished, the whole party set to work to preen, some of them rolling on their backs to bill their white underparts or scratch their faces with blood-red feet. The spiky crests of the drakes blew about loosely in the breeze, their velvet-dark heads flashed bottle-green, and their bodies, oddly patterned in brilliant black and white, sparkled in the sunlight. As they floated idly a suppressed excitement seemed to overcome them; one, swimming before two ducks, depressed his flowing crests flat against his neck and pointed his neck and crimson bill stiffly in the air. At the same time his wings were slightly loosed and great show made of the spotless white patch there. In this rigid position, his neck slightly forward, he remained for several moments; then suddenly, as if some tension were relaxed, he sunk in his head and bowed forwards in the water with an easy elastic motion.

' After a moment his head shot up again, and this time a second drake joined him alongside, both sky-pointing earnestly. There was something quite spasmodic in this upward action—as if a spring had been released inside or as if the displaying bird had without warning been shot through with nervous pain. There was, too, a tense, dynamic character about it, a suggestion that great energy was required in the performance, and this was particularly noticeable when the birds slumped forward into their looser, normal postures.

'A great deal of confused excited chasing followed these displays, as the drakes, with necks outstretched, made jealous rushes at each other across the water. To all their posturings the ducks seemed (and, I am tolerably sure, were) entirely indifferent. As far as they were concerned the excitement appeared to have no meaning. They continued to preen.'

This premature readiness on the part of the males puzzled me quite a lot. If pairing were not actually here in the process of taking place then the whole business must be irresponsible—a sort of abortive attempt at promiscuity on the male side. Or could it be that such antics, originally connected purely with sexual preparedness, had grown, as it were, formalised to the extent of becoming a meaningless routine, a nervous tic exercised by the drakes in moments of well-being or sudden excitement? If these reptilian posturings were an attempt to show off and to attract the attention of the ducks then they had failed most miserably. Could it be that there was another function stimulating them?

Considering the fervour and intensity of their actions I came to the conclusion that what I had seen was indeed a real sexual-display. True, pairing had not occurred, the females not being in a sufficiently advanced state to appreciate (or at least to share in) the efforts of the drakes. Coition and consequent pairing (and in my experience the one invariably precedes the other) do, nevertheless, occur in February and March.

After the end of January it is unusual to see those family parties so usually and understandably mistaken for drake and 'harem.' Whether the adult birds, parents of the previous year, remain paired in the new season is at present beyond proof, though the fact that they remain together throughout autumn and winter makes me strongly suspect it. In March there is for a time some segregation of the sexes, probably among the younger unpaired Mergansers. At the end of the month a distinct northward movement is visibly taking place on all British coasts. By then the majority are paired, and unpaired drakes in twos and threes may be seen fighting restlessly in the estuaries looking for mixed parties where courtship is still in progress. New arrivals keep dropping in, and as the numbers increase so the excitement rises and the drakes' displays grow more jealously passionate. Parties of paired birds are not readily distinguishable from mixed companies of single birds—and that newcomers are as liable as humans to be misled is shown in the following incident.

'March 25th, Blackwater estuary, Essex.

'It was low-tide, the water very quiet and slack. Six Red-breasted Mergansers were fishing busily in the creek,

three drakes and three ducks. There was no attempt at posturing, and after a time I decided that they were three distinct pairs, a decision which appeared confirmed when all six swam slowly towards the shore and jumped nimbly out on to the mud. There they stood for a few minutes, their short legs very wide apart, each drake standing guard over his duck. Being disturbed by gulls they returned to the water where they were soon all diving confusedly again.

'At this point two more drakes flew over and wheeling round dropped down amongst them. It did not take them long to realise their error, however, for though none of the paired drakes made the slightest show of aggression, the newcomers soon scuttled over the waves and took to the air.'

Among some species there seems to be an unwritten law, an etiquette that paired birds should be left severely alone. I have noticed unmated Great-crested Grebes that had been quietly fishing, stop feeding, and slink unobtrusively away at the approach of a courting pair. Even in a flock paired Wigeon are always, as it were, isolated, and in their case it is the duck who gives point to the union by attacking forgetful or thoughtless drakes who may unwittingly have strayed too near. Mergansers once paired grow quiet and neighbourly and the absence of fighting is the best criterion when deciding whether a company is comprised or mated or of single birds.

It is clear from this that coition (effective or otherwise) and pairing take place some time before the Merganser reaches its northern breeding-grounds, sometimes while on its way there, but in most cases before the journey is ever begun.

This behaviour of the Red-breasted Merganser seemed to me so remarkable that I decided to pay particular attention to the other saw-billed ducks on the off-chance that they might offer a solution to certain problems already raised.

The tiny white Smew, smallest of all the Mergansers, does not appear in any numbers in South-eastern England until the second half of December—at least not on fresh water. Even then some Smeews give the impression of being permanently mated, though at other times odd white drakes (why can't we still call them White Nuns?) swim by themselves or in confused companies. Unless conditions are particularly favourable it is well-nigh impossible to distinguish the females from young immature drakes, which naturally complicates matters further. Display of a rather half-hearted kind occurs in January or February, but without apparent results.

'January 28th, River Thames.

'A fresh sunny morning. A party of two adult drakes and three duck Smeews were fishing. When they had finished the drakes grew mildly excited. Both puffed out their face feathers, giving the head a peculiarly globular appearance,

and at the same time they erected their white crests. The purpose of this seemed to serve for aggression as much as for display (and, indeed, as we shall see later, sex-feeling and jealous aggression merge inextricably). Next both drakes rose up on the water with a wriggling motion, showing their sparkling white breasts and underparts. Shaking their blue-grey bills in the air they bowed before the ducks. One then swam ahead nodding his head, and without warning turned and scuttled after the other with neck outstretched, like a Moorhen chasing off a rival. The pursued bird seemed to accept the aggression resignedly and fled discreetly.

'By this time the truculent drake appeared to have all three ducks under his control and shepherded them carefully. Once when one of the ducks tried to approach the meeker drake she was neatly headed off. The more successful suitor kept wriggling up out of the water and pointing his bill, but in a few moments the effects were clearly forgotten—just as if nothing had ever occurred in fact. Evidently sex-attractions had as yet but little power over the claims of hunger, for all the birds resumed their fishing, and the two drakes dived busily side by side, careless of either rivals or of paramours.'

Such an interlude was interesting, if inconclusive, and the concluding stages of the Smew's courtship seemed almost as momentary.

'March 4th, Barnes.

'Sunny and calm.

'A drake Smew swimming in a company tossed his bill and wriggled upwards several times. Afterwards I noticed one duck, some distance off, floating inert. Her whole body, apart from the tail-feathers, which she held raised, lay half-sunken and flush with the water. In this soliciting attitude she gradually approached the drake, who swam as if uneasy, lightly shaking his bill beside her. Coition occurred almost at once.

'What it was that produced this sudden transformation in the duck, and whether the previous posturings of the distant drake had anything to do with it, was not clear. At least it escaped me.'

This was all very confusing, and if the Smew's behaviour did not provide much in the way of enlightenment neither did the Goosanders' . . . for a time. There is a permanent fascination, an intrinsic pleasure in watching these, the largest and noblest of our saw-bills. The big black-and-white drakes with their high, arched foreheads and stream-lined bodies stand stolidly erect for long hours at the water's edge, displaying to perfection the exquisite salmon flush of their underparts, but for the most part doing absolutely

nothing. Baffling birds! The grey-backed ducks are equally undemonstrative. Sometimes in December or January a drake will sip the water and having done so raise and shake his bill—a noble-looking movement, but a mere formalised Goosander mannerism of no functional significance. Throughout several weeks of watching the birds produced no action which seemed to have any real meaning, and though I had pages of scattered observations they were all tritely fragmentary, adding up to nothing. Then came a day which can only be described as a holocaust of action and sensation.

‘19th February. Staines Reservoir.

‘For many weeks there has been no such day as this—sunny and calm, the water smooth and everywhere as blue as polished steel.

Display begins at first almost surreptitiously among an inconspicuous party of two drake Goosanders and two ducks. They are all swimming quietly near the concrete edge when one drake grows suddenly truculent, and splashing the water with his wings (an odd movement) he makes a rush at the other with neck outstretched. As if in answer to this gallant action one duck immediately rises up on the surface in a little courtseying movement. The drake now makes a second dash at his rival, who disappears unceremoniously in a crash dive, shooting underneath vertically with a great splash like a scared Dabchick.

‘The whole party now begins swimming to and fro in a restless excitable manner. The second drake kicks the water with a backfiring movement—perhaps he uses his wings too, for he raises a distinct flash of spray behind him. In nine cases out of ten this is a sign for immediate aggression among Goosander drakes, but oddly enough his rival only responds by appearing to drive off one of the ducks. Possibly it is a young immature drake, but I doubt it, he may have other reasons. . . .

‘There are now four ducks. Their behaviour is most strange to watch. They are all atwitch, constantly darting and jumping in the water, just as if they were trying to escape from some invisible assailant now behind, now beneath them. This they do even regardless of the fact that no other bird is anywhere near. Both sexes frequently bow their heads.

‘Next one of the drakes adopts new tactics. He raises his dull-green head and runs lightly along the surface on his feet, looking for all the world like some clockwork mouse. The second drake follows in his wake, but there is no truculence. By this time both appear to have attracted the attention of two ducks and each swims with his attendant pair of admirers all of which are now rising and bowing more frequently than

ever. The effect of this, however, is lost upon the drakes, who maintain a fine show of independence. One even drives away a female bird, and his rival (although he can hardly be called that now !) appears to have relapsed into stolidity.

'As if to resuscitate his flagging excitement one of his obsequious ducks kicks the water behind her in a splash, and he responds by repeating the action. But a noticeable quietening down is visible, and after much dipping of heads in the water and ruffling of wings the affair temporarily peters out.

'Even so the excitement is only suppressed, not extinct. All the Goosanders are now in the water, seventy or eighty all told, and in scattered companies they all swim in one direction, very slowly but as if with purpose. Just as I see the flame die down among these last six birds so it may be seen to flicker up elsewhere, now in a party or even in a single bird swimming in solitude. Telepathic or not, it is the same urge, smouldering in all, fitful and undecided, but as if only waiting for the signal to flare up everywhere.

'Here a drake by himself shoots up his head and bobs forward on the water. Then he kicks the water with the same backfiring movement, appearing to recoil over the surface with the energy of his thrust. He is now swimming to and fro, slowly but with the same controlled, restless expectancy described above. Now he raises his bill and pointing it up in the air with a proudly-sweeping, most eloquent gesture, he shakes it lightly.

'That this display has its attractions for the ducks and acts magnetically upon them is obvious, for though previously quite alone he has now attracted a female bird who swims behind him. The attitude in which she has placed herself is most extraordinary. Scarcely visible, her neck is outstretched flat on the water with the waves breaking full over her head. In this posture of complete and abject abasement she lies inert, floating half-submerged like a thing long dead. Motionless she drifts behind him, not more than two feet from his tail. He swims slowly onwards, and as if tied by a piece of string she appears to be towed behind him. He does not turn to look at her, yet as he glides smoothly through the water he tosses his bill in the air, nervously it seems. He pauses. The duck, still prostrate and half-submerged now begins gyrating slowly in the water, turning on her axis so that as he swims around her the outspread tail feathers and bright fawn-coloured vent are constantly presented. For a few moments he continues to swim in a little circle in the centre of which she rotates, occasionally sipping water and tossing his bill and appearing rather at a loss as to what to do. Then she stops, and he too, as if mesmerised. Quickly

he mounts, and billing her head, coition takes place without more ado. Afterwards both preen vigorously, the duck rises and shakes water over herself, then washes and vigorously bills the feathers of her lower back. The drake swims dully away.

By this time erotic excitement has spread like wild fire; there is a general one-way movement of Goosanders, and all over the water drakes are to be seen with ducks following at their tails, all in that same level attitude of prostration already described. In some instances a drake has two or even three birds following. Here and there coition occurs, but for the most part the drakes now seem peculiarly indifferent and lead their females for hundreds of yards without responding to any of their solicitations. It seems clear that though they are the originators of this mass eroticism their sensations are of an entirely spasmodic nature, whereas the ducks, once roused, remain so for long periods.

Considering this complete cycle of display it appears that the ducks are far the more active of the two sexes, the more forward in bringing about its dénouement. Before adopting her prostate pose each duck has a display of her own, quite distinct from anything done by the drake and performed at times irrespective of his presence or absence. She jumps suddenly through the water, then leans forward with her neck held rigid and the red-brown crest splayed wide at the back of her head. Slowly she lowers her neck (still rigid) at the same time deflating her crest, and as she bends forwards she raises her outspread tail-feathers. In this gradual, restrained manner she sinks down, her neck now outstretched in the water. Once she has adopted this position she remains thus until satisfied, and will follow an indifferent drake for quite half an hour.

The whole manner of this performance, with the bird so obviously gripped as in a vice of sensation, and the fact of it occurring in the absence of a drake, makes one wonder whether it can be called a display. In its contortion the bird appears to be oblivious to everything: it is seized and controlled as by an overmastering passion, and to think of it as a show, conscious or not, would be equivalent to a misunderstanding of Life itself. Such action cannot have originated as a show and I doubt whether its routine-repetition through a million years has much changed its meaning.

The one-way swimming affects the whole community of Goosanders, but though the excitement is general, actual rivalries and displays are confined to separate parties and "cliques." A drake fighting from one end of the reservoir to the other is attacked most viciously immediately he drops in. Rivalry and jealousy are just as marked

among the ducks as among the drakes, and it is they who are by far the more vocal of the two sexes. They have a weird trick of jumping sideways and opening their mandibles wide. With a fierce reptilian expression they then peck the air savagely, uttering as they do so: Kárrr uk uk uk uk uk, a suppressed, sonorous grating cry which dies away in low, inarticulate mutterings. Whether it is a sign of internal stimulation or of jealous antagonism it is difficult to decide: as before I decide that the two (having the same source) are not only similar but indistinguishable in their external manifestations.

'After a time this orgy of mass-feeling dies down and there ensues a quiet time. Even now drakes and ducks snap their bills and shake them skywards. There is much preening, interrupted by ceremonious pointings, as they scratch themselves vigorously, careening on their backs, as if still tingling in an afterglow of sensation. Even in such periods the emotional awareness is kept alive with a vibrant korrr orr from the drakes or a soft nasal ker 'úk ker 'úk from ducks as they urge themselves through the water. Dusk intervenes and cuts short the possibility of further watching.'

When I returned the following day these Goosanders had suffered a relapse, and throughout the following week they remained undemonstrative, apart from occasional pointing movements of the head. Later I observed periods of stimulation similar to the one just described, though never quite so remarkable, and on each occasion the day was noticeably calm and bright, the water smooth as glass. As coition has been observed as early as December, and as such outbursts are largely controlled by such comparative details as a temporary calming of the waves, it is obvious that sex is never far away, ready at any moment to break the placid surface of their existence and set it rippling with sensation. There is a discouraging thought here—that we are quite incapable of sensing or suspecting anything that goes on inside the mind of an undemonstrative bird, and that even its sudden moments of activity often leave us more baffled than enlightened.

In all this whirl of indiscriminate, almost uncontrolled activity two distinct types of display stood out quite clearly. First, that which immediately preceded coition (and I take it that in every species this is the primal posturing) was quite simple: the duck prostrate in the water and the drake beside her sipping or tossing his bill. There was no elaboration about it, no sense of show, nothing protracted. Indeed the actions gave every appearance of being quite unconscious, uncontrolled, almost reflex—though doubtless as signals of assent they had their value.

The other displays were clearly of a different type and for a different purpose. Of these secondary manoeuvres both sexes shared a distinctly lengthy repertoire—pointing the head, shaking the bill, ‘backfiring’ in the water, running over the surface and all the rest—each of which items was produced at appropriate moments without resulting in anything conclusive. The purpose of such actions appears to be largely excitatory, to foster the erotic atmosphere and sustain it when it flags. In my experience it is the drakes who invariably start the ball rolling with this type of display: sometimes it is obvious that they are straining every nerve to the utmost in an effort to rouse the ducks into interest and activity. Once that is achieved, however, it is the ducks who take command of the situation. Once the barrier of indifference has been broken down, the drakes tend to cease posturing, and it is the females who carry the courtship-cycle to its irresistible conclusion.

In many ways it is strange to find the females going through an almost identical series of display as the males. If our present ideas of sexual-selection are correct surely display would be confined to the male side—unless of course there has been an increase in the numbers of female birds. If that had happened the increased competition (males being scarce) *might* have led them to develop some sort of display. My impressions are that such a state of affairs does not exist here, however, for though as many as three ducks will solicit a single drake, the proportion of the sexes is just as frequently reversed in the earlier stages of the display-cycle. That there is such a thing as sexual-selection I do not doubt, but it must work in a far more complex and inward manner than we have hitherto been led to suppose—so much so that in the case of the Goosander one cannot help believing that the final unions are almost accidental in their achievement and the whole affair indiscriminately promiscuous, at least in the beginning. If there is ‘selection’ then it is the drakes more often than not who make the final ‘choice.’ This completely rules out the possibility of their displays having any direct bearing on sexual-selection other than by providing the necessary and appropriate prelude. Hard though I watch I cannot see when or why two individuals become a pair, nor what it is that produces the harmonious synchronisation necessary for such union, but it is quite clearly not just the display which achieves it.

That such displays should be shared by both males and females, each apparently cancelling the other out, need not puzzle us unduly provided that our valuation of them is reorientated and we regard them as purely secondary affairs.

That this is so is further suggested by the observation that many of them have degenerated into a meaningless routine, part of the bird's nervous mechanism, and that they are all noticeably of the jealous-aggression-showing-off type. In other words, they are decorative rather than primal in their origin. Their direct bearing on any final selection that may be made is negligible: their purpose is to rouse excitement, to spread the flame and fan the conflagration.

That the display-cycles of three such closely-related species should resemble each other at so many points might have been suspected from the start, but it is interesting to find that in every case coition and subsequent pairing are effected before the northward-migration is concluded, usually before it is even begun. Can it be that this almost premature preparedness has been brought about by the necessity of their making a long migration?—that the purposeful hand of Evolution has put forward their development? Is it that the extravagance of the displays and the fact of their being shared by both sexes are also explainable as efforts to hasten on the process of mating? The evidence for such an hypothesis, though scanty, is good. Goldeneyes and Long-tailed Ducks which nest far into Siberia are both early and exaggerated displayers, whereas Pochards and Tufted Ducks, which breed in large numbers as far south as our own country, are practically undemonstrative. Among the waders, many of whose breeding grounds are in the extremes of Arctic Europe, there is not much behaviour to support the idea that birds which make long-distance migrations to the North arrive there paired and prepared. That this takes place among the various ducks seems proved, and I am personally convinced that a similar state of affairs exists among the waders. A Wood Sandpiper which rises from the marsh hovering on flickering wings, trilling intensely like a love-lorn Redshank, or a pair of Grey Plovers courting while still in partial breeding dress—such incidents supply hints if nothing more.

If we consider the shortness of the Northern summer and the length of time taken by the birds in their long journeys to and fro, the purpose of such early preparedness becomes clear. It enables the Goosander duck, leaving her winter quarters in southern England at the beginning of April, to complete her migration, settle down and have eggs by the end of the month. If she were to wait until the time of her arrival there before courtship and pairing began, much valuable time would thereby be lost and the days at the close of the summer when the young are preparing to fly might prove critical or even disastrous. Viewed in that way, this by-process of evolution appears as a wise provision—a cunning type of natural time-saving device.

THE VEGETATION OF YORKSHIRE AND SUPPLEMENT TO THE FLORAS OF THE COUNTY

(Continued from page 232)

Populus alba L.

P. canescens Sm.

P. tremula L.

P. nigra L.

Distribution in Yorkshire unknown. Nearly all old records (and many modern ones, too) refer to \times *P. serotina* Hartig, which is the common Black Poplar with us. I have a specimen of *P. nigra* L., var. *betulifolia* Torrey from Foss banks, York.—W.A.S.

Another later introduction is *P. candicans* Ait.

EMPETRACEÆ

Empetrum nigrum L.

Not in *East Riding Flora*. Dr. Lees says: 'I would rather regard it as "gone" than "never present" in South-east Yorks., seeing that it was a North Lincoln plant in Axholme Isle and Friskney Common in 1799 (Arthur Young) and in 1856 at Frodingham near where Canon W. Fowler was just in time to detect it.

CERATOPHYLLACEÆ

Ceratophyllum demersum L.

Some other records are: Millpond on Baildon Green; F. Haxby per F.R., 1909. Holly Park, Calverley, in mill dam in immense quantity, 1911, S.M., originating years back in the emptying of a goldfish aquarium into the dam. Canal at Salterhebble, 1895, H.T. Soppitt. There 1909!

C. submersum L.

Reported in *North Riding Flora* at Newburgh Priory; Archdeacon Peirson. At my only visit I could see no waterfoil growth at all.

MONOCOTYLEDONES

HYDROCHARIDACEÆ

Elodea canadensis Michx.

Both sexes of flowers have now been found—though I think no ripened fruits—but such are, similarly, much more rarely observed in both Canada and the U.S.A. (Fernald and Robinson's Gray.)

Hydrocharis morsus-ranæ L.

The Arksey, Doncaster Station reported in 1873 is confirmed by P. Biggin, August, 1938.

Brickponds at Bramhope, W. Kirby, 1880 ! Hb. P. Backwater of old canal, Woodlesford, 1911, H. J. Wilkinson spn. Dikes between Sherburn and Ulleskelf, J.F.P. !

Stratiotes aloides L.

In the Doncaster 'Carr' dikes it flowered copiously, June, 1895, W. West, Junr., and in 1900 H. H. Corbett. Carlton, near Selby, T. Bukner ! Pond behind the 'Vesper Gate,' Kirkstall, planted there, I should say.

ORCHIDACEÆ

Malaxis paludosa (L.) Swartz.

Not in East Riding Flora. The High Force, Teesdale site, confirmed by W. Ingham, 26/8/1895, *Nat.*, 1895. Still in Gulliver's Swamp (1906) but A. Wilson in *Nat.*, 1918, 335, says now lost owing to the construction of a reservoir; he gives a new site near Sedbergh and J. B. Foggitt reported over thirty plants there in 1934. It was seen at Sedbergh on the Y.N.U. excursion in 1938.

Neottia nidus-avis (L.) L. C. Rich.

The *Mrs. S. Meanbrook* on p. 432, W. R. Flora, should read Meers-brook, Mr. Shore, 1802; Hb. Salt.

Thorpe Hall (!) West of Bridlington, and I have had it from Sledmere Parish by a non-botanist.

Listera ovata (L.) Br.

Forma quadrifolia F.A.L., *Nat.*, 1894, 55.

Cum. J.F. and A.M. Nidd Rock Cobby.

L. cordata (L.) Br.

Some additional localities are Moughton Fell, Horton-in-Ribblesdale, Y.N.U. excursion, 1930; Coombs Scar, Dentedale, Y.N.U. excursion, 1933; Baildon Moor, A. Malins Smith, *Nat.*, 1931.

Spiranthes spiralis (L.) C. Koch (*autumnalis*).

Not in East Riding Flora.

Grassington 'Sweet-side' Rev. E. F. Linton, September, 1873, (*in litt. ad.* J.F.P.).

Goodyera repens Br.

Not in West and North Riding Floras. The first record for this at Houghton Wood, East Yorks., is credited to J. J. Marshall in 1888. There are specimens in my (W.A.S.) herbarium from the same locality dated 1841. Not seen there recently.

Cephalanthera longifolia (Huds.) Fritsch. (*ensifolia*).

Only in West Yorks. and North Yorks. Floras and not seen for many years in West Yorks.

C. Damasonium (Mill.) Druce (*grandiflora* Gray, *pallens* Rich.).

East Riding only, at Brough, 1920. Miss Burnett and Mrs. Bisat, *Nat.*, 1922, p. 22.

Helleborine palustris (Mill.) Schrank.

Some additional localities are Heaning Bog, Newton in Bowland. J.F.P. ! Plentiful at Oughtershaw and Kettlewell. C.A.C. Austwick and Wharfe. C.A.C.

H. latifolia (All.) Druce.

H. purpurata (Sm.) Druce (*violacea* Bor.).

An additional locality is Gibb's Wood, Newton in Bowland, Miss Peel, 1909 !

H. atropurpurea (Raf.) Dr. (*atrorubens* (Schultz), *ovalis* (Bab.)).

Not in East Riding Flora.

Orchis ustulata L.

A further Wharfedale site is Kettlewell—'seen there'—W. West.

O. Morio L.

O. latifolia L. (*O. incarnata* auct.).

This, the *O. incarnata* of the Floras, is widespread in Yorks., the deep purple var. *pulchrior* Druce occurring in acid Sphagnum peat as at Austwick Moss, W.A.S.

O. praetermissa Druce.

A southern species which is apparently near its limit in Yorks. I have seen it at Aberford and it has been vouched for from Newbald Springs, East Yorks., where found by A. K. Wilson. All records for *O. praetermissa* var. *pulchella* Dr., belong to the next species of which they are forms with unspotted leaves. W.A.S.

O. purpurella Steph.

This, the *O. eu-latifolia* of W. Yorks. Flora, is common in calcareous marshes in the dales. I have seen it at Cronkley, Austwick Moss, Wharfe Wood, Austwick, Ribbleshead, Arncliffe, Kilnsea, Malham. It occurs in several places near Whitby (*vide* Britton) and I have specimens from Ringing Keld Bog near Scarborough. I also saw it, one specimen, at Askham bog in 1935. W.A.S.

O. purpurella Steph. × **O. elodes** Griseb.

Wharfe Wood, Austwick. W.A.S.

Orchis purpurella Steph. × *O. Fuchsii* Dr.

Eldroth, near Clapham; Ribbleshead; Tarn Moss, Malham; and Kilnsey. W.A.S.

O. purpurella Steph. × *O. latifolia* L. (× *O. latirella* P.M.H.).

Wharfe Wood, Austwick; Austwick Moss; Kilnsey; P. M. Hall and W.A.S. (*vide* P.M.H. in *Journ. Bot.*, Nov., 1936). Semmerwater; July, 1939. W.A.S.

O. majalis Reichb., subsp. *Traunsteinerioides* Pugsl., var. *eborensis* (Godf.) Pugsl.

Helmsley (Foggitt), Hellifield (W.A.S. and H. W. Pugsley), Kilnsea (W.A.S. and P. M. Hall). Only differs from the subsp. (which was described from Wicklow) in its dwarfer habit and less distinctly deltoid labellum. (*Vide* H. W. Pugsley in *Journ. Bot.*, No. 914, p. 54, 1939.).

O. elodes Griseb. (*O. ericetorum* E. F. Linton, *O. praecox* Webster).

In all three Ridings. Predominantly on acid soils. The pure white var. *candidissima* (Weber) I have seen at Winterscales, Whernside. W.A.S.

O. Fuchsii Druce.

Common in all three Ridings. Predominantly on basic soils.

O. Fuchsii Dr. × *O. latifolia* L.

Askham Bog, W.A.S. Teesmouth, W.A.S.

O. mascula L.

var. *obtusifolia* Koch., I have noticed occasionally in open land.

O. pyramidalis L.

Ophrys muscifera Huds.

I saw it in the East Riding at Rudstone in 1910. Knipe Wood, Kettlewell. C.A.C.

O. apifera Huds.

Gymnadenia conopsea (L.) Br.

G. conopsea (L.) Br. × *O. latifolia* L.

Between Dale Head and Tosside, June, 1909. J.F.P.

G. conopsea (L.) Br. × *O. Fuchsii* Dr.

Teesmouth, W.A.S.

G. conopsea (L.) Br. × *L. albida* (L.) Mey.

Hole of Horcum; 1937, Britton.

(*To be continued*)

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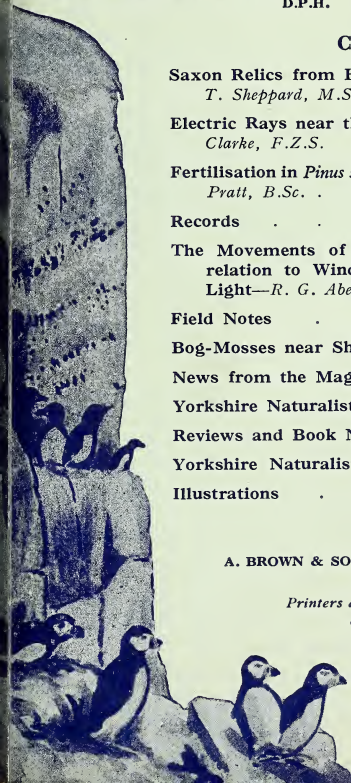
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SAXON RELICS FROM BARTON, LINCS.

T. SHEPPARD, M.Sc.

(Continued from page 262)

It is rather remarkable that Lincolnshire has produced



Top—Bowl found at Caistor, Lincs., in 1857, now in the Lincoln Museum.

Lower—Bowl found at Manton Common, Lincs., in 1939, now in the Scunthorpe Museum.

two other examples of these Saxon hanging bowls, all very much of the same type. The Lincoln Museum has a fine example found at Caistor in 1857, and I am indebted to Mr. F. T. Baker for the accompanying illustration. Its escutcheons are larger than those on the Barton example, and each

has a bronze ring for suspension. This example is figured by Baldwin in Vol. IV of his work, page 800.

The third bowl, oddly enough, was found a few days after the Barton excavations, and it is now in the Scunthorpe Museum, so that each of the three museums specializing in Lincolnshire antiquities possesses a specimen.

Mr. H. E. Dudley, the Curator of the Scunthorpe Museum, writes :

‘ Does it not seem strange that after the first Lincolnshire record of the finding of such an object—at Caister in 1857—no fewer than 82 years should have passed, and then that two bowls should have been found within a few weeks of each other, at Barton-on-Humber, and Manton Common respectively? This latest bowl was found by workmen when digging sand on the edge of Manton Common. The bowl must originally have been a beautiful and costly object. Of graceful form, it was suspended by chains, or cords, from hooks attached to elaborately ornamented circular discs, or escutcheons, each disc being surrounded by a circular frame, and flanked by three small discs. Inside, at the base, was a circular ornament, bearing designs typical of the Anglo-Saxon period, while underneath the bowl was fixed another circular disc having beautiful ornamentation upon it. All the escutcheons and plates were originally filled with enamel and inlaid in colours, some of this “jewelling” consisting of slices of a glass rod that bore the same pattern all through, like a tiny stick of mint rock. To-day the bowl has lost much of its beauty, and some of its parts are missing, but, nevertheless, it forms an important record of Anglo-Saxon art. Mr. T. D. Kendrick, of the British Museum, has offered to have the bowl cleaned in their laboratory, and has also expressed the wish that the bowl may be exhibited for a short period in the British Museum series of “Notable Antiquities.”

‘ Mr. T. Sheppard tells me that the hanging bowl and other objects found recently at Barton-on-Humber have now been cleaned and restored, and they have improved so much in the operation that it is difficult to realize that they are the same objects as were dug out of that A.R.P. trench.’

METAL OBJECTS MADE BY THE VIKINGS.

As illustrating the importance of a scientific metallographical examination of antiquities, attached is a report from Dr. J. A. Smythe, of King’s College, Newcastle upon Tyne, on two iron objects from the hoard of Viking relics found at Crayke, which are illustrated and described in the *Journal of the Yorkshire Archæological Society*, Part 135, reprinted as Hull Museum Publication No. 203.

FLAT IRON SLAB FROM CRAYKE, EASINGWOLD. This is not

an ingot, but a piece of bloomery iron which has been beaten out. It contains a fair amount of cinder, which is disposed in long streaks, arranged normally to the direction of forging. Like all such ancient iron, it is very much mixed, layers of pure iron alternating rapidly with steel, the degree of carburisation of which is of the order of 0.4 per cent. of carbon at the maximum.

CHISEL. This is an interesting object. Cross-sections near the head and side-faces near the cutting end were examined metallographically. Near the head the metal consists almost entirely of steel containing 0.9 per cent. of carbon, in the condition, metallographically speaking, of sorbitic pearlite. There are, however, patches of different composition, one containing about 0.4 per cent. of carbon, the other 1.2 per cent. of carbon, and each of these shows a well-marked Widmanstätten structure, which is evidence of heating to a high temperature, possibly 1000° C. The hardness of this metal varies from 238 to 283 V.P.N. (Vickers Pyramid Number).

Near the cutting end of the tool, the structure is that of a quenched, high carbon steel, consisting largely of martensite. The hardness is variable, but much higher than at the head, rising in places to the values 657, 782 and 870 V.P.N.

It may be remarked that there are two essential processes in producing such a tool from wrought iron. The iron must first be carburised to a fairly high degree, and it must then be quenched from a temperature of 750° C. or above that.

With respect to the carburisation, this appears to have been done very satisfactorily, the average carbon-content being that of a eutectoid steel (0.9 per cent. of carbon), and considerable uniformity having been attained throughout, having regard to the fact that the steel was never melted.

The hardening has also been skilfully done. It is clear that the tool has been heated to about 1000° C., and only the cutting end hardened by quenching in water.

Though the Romans were acquainted with the method of hardening steel, it is apparent from objects I have examined, that they did not (at least, always) realise that the metal should first be carburised. The maker of this tool evidently understood the whole process.

(To be continued)

Camberwell Beauty near Leeds.—On September 7th I saw a Camberwell Beauty Butterfly on the wing in my garden, Bardsey, Leeds. It settled on a rhubarb leaf and was obliging enough to stay there sunning itself for several minutes while my wife and I examined it at arm's length. It was a splendid specimen and showed no signs of weathering.—**DR. FRYER.**

ELECTRIC RAYS NEAR THE YORKSHIRE COAST

W. J. CLARKE, F.Z.S.

ON June 15th, 1939, as Edward White was walking along the sands at Whitby, he saw a large fish struggling in the shallow water. On securing it, which he did without any difficulty, he took it to the local Museum for identification; they in turn sent it on to the writer. It proved to be a medium sized Electric Ray (*Torpedo nobiliana*), the commoner of the two species of these fish which are found from time to time in the North Sea. It measured $30\frac{1}{2}$ inches in length, 20 inches wide, and weighed 15 lbs. The colour of this perfectly fresh specimen was uniform purple brown on the upper surface, deepening to almost black on the edges of the fish. The under surface was white. The spiracles behind the eye were oval in shape and smooth on their inner margins. A photograph showed the presence of rows of extremely minute spines embedded in the apparently smooth skin, which were not visible to the eye unless very carefully looked for.

On July 6th, another example of the same species was caught in the salmon nets at Filey. It weighed 7 lbs. 15 ozs., and was 25 inches long with a width of 18 inches. It gave its captors a smart electric shock when they handled it. It was placed on exhibition and Mr. T. Hyde-Parker, who examined it, kindly assured me that the colour was blackish brown above and white beneath, the spiracles being oval in shape and not serrated, these characteristics distinguishing it from the second British species, *T. marmorata*, which has a marbled yellowish brown back with round spiracles whose inner margins are strongly serrated.

Both these are small examples, for they have been caught in British waters weighing up to 110 lbs., and such a fish can deliver a very severe shock. The electrical apparatus consists of a number of vertical hexagonal cells, situated between the head and the pectoral fins and reaching right through the body.

As many as 470 of these cells have been counted and they are capable of delivering up to 150 shocks per minute. The lobes supplying the current to these cells are as thick as the spinal cord. This power is used in self-defence and probably also to stun the organisms on which the fish subsists. These appear to consist chiefly of other fishes sometimes of considerable size. In the stomach of one example was found a salmon weighing between 4 and 5 lbs.; in another an eel of 2 lbs. weight and a flounder of nearly 1 lb. had been swallowed.

A number of different species of these fish are known, their distribution ranging over the Indian and Atlantic oceans and the Mediterranean sea.

FERTILISATION IN *PINUS SYLVESTRIS* L.

JOAN PRATT, B.Sc.

(Department of Botany, University of Leeds)

IN 1937 a short note was published in *The Naturalist* to give the approximate dates when the cones of the Scot's Pine might be collected to show certain stages of development in the neighbourhood of Leeds (Sissons, 1937).¹ Since that time some further study has been carried out on the development of ovulate cones in their second year, and certain stages have been observed which make the 1937 account more complete. The new observations have been obtained from material collected at Wykeham, near Scarborough, on June 28th, 1938.

In the 1937 material, second year ovulate cones collected on June 14th showed the archegonial initials in the gametophyte (endosperm). At about this time the initial divides, and the smaller cell towards the micropyle is the neck initial; this divides to form a neck of eight cells, arranged in two tiers of four cells (Fig. I). About the same time (June 14th to 26th) the cytoplasm of the central cell of the archegonium undergoes striking changes in consistency; at first the cytoplasm has the relatively uniform, though frothy, appearance described as 'alveolar,' but now it changes to the 'proteid vacuole stage' in which conspicuous globules of more chromatic material are distributed in the cytoplasm. These globules give some protein reactions and are evidently very different from the rest of the cytoplasm, as they are often seen to contract more on fixation so as to appear to lie in vacuoles.

The large central cell of the archegonium then undergoes a very unequal division to cut off the ventral canal cell (Fig. I). The mitotic figure for this division lies close beneath the neck, and one pole of the spindle is very close to the cell membrane. The ventral canal cell is separated by a wall from the large lower cell, which may now be described as the oosphere. The nucleus of the ventral canal cell disintegrates relatively soon, while that of the oosphere travels to the centre of the cell, where it undergoes very considerable increase in size.

As shown in the 1937 time-table, pollination occurs in the first year of the ovulate cones, and the pollen tube is developed and branches in the outer nucellar tissue prior to the winter

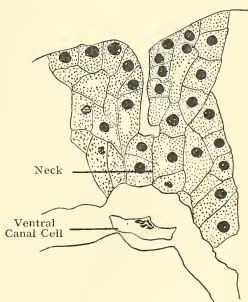


Fig. I
Section of archegonium showing
neck and ventral canal cells ($\times 300$)

cessation of activity. The next April the pollen tube resumes growth and forms a straight extension through the less brown and collapsed, inner nucellar region. When the tube reaches the oosphere, the separating walls are ruptured and the contents of the pollen tube are injected with some force into the oosphere.



Fig. II. Syngamy ($\times 85$)

The cytoplasm at the end of the pollen tube contains the tube (or vegetative) nucleus, the two male cells formed by division of the body cell of the antheridium (each of these cells consists of a nucleus surrounded by a sheath of cytoplasm), and the disintegrating nucleus of the stalk cell of the antheridium, and in addition the cytoplasm contains a quantity of starch grains. When these are shot into the oosphere, their path in the oosphere cytoplasm is very clearly seen owing to the presence of starch, which is completely absent from the oosphere cytoplasm. One of the male nuclei passes down to the oosphere nucleus, to which it becomes closely adpressed. The

photograph (Fig. II) and the annotated plan (Fig. III) shows the way in which the male nucleus becomes closely pressed into the large oosphere nucleus before the disappearance of the nuclear membranes for the first division of the fusion nucleus. In the same photograph the end of the oosphere nearer the neck shows the presence of the tube nucleus, the second male nucleus and the disintegrating stalk cell nucleus.

The photograph of syngamy (Fig. II) was obtained from the June 28th material from Wykeham. It illustrates the fact that, in *Pinus*, both nuclei at syngamy are in interphase, and each has its membrane still present. The first mitotic division of the fusion nucleus was also seen in Wykeham material. The spindle for this division is characteristically oblique and is exceptionally large in comparison with those of subsequent divisions. In the division cutting off the ventral canal cell, centrosomes have been reported at the poles of the spindle (Blackman, 1898),² but at the first division of the fusion nucleus no centrosomes are seen, though the spindle radiations are peculiar. There is some slight indication of astral radiations from the poles, but more striking are the longer radiations from the poles which splay out around the equatorial plane of the spindle.

The fusion nucleus undergoes two divisions to form four nuclei in the central cytoplasm of the cell. These subsequently migrate to the end of the cell distal from the neck and arrange themselves in one plane. These four nuclei divide transversely to the long axis of the cell, when the lower tier becomes separated by wall formation, while the upper remains open to the cytoplasm of the large cell. When four tiers of nuclei have been produced, the future developmental regions are demarked; the lowest tier gives rise to the embryo, the second to the suspensor, the third to the rosette, a tier of short cells which lie between the suspensor and the undivided part of the oospore cytoplasm, which still contains the four free nuclei of the fourth tier. From this stage the most active growth is in the

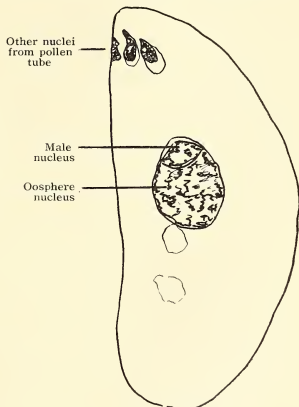


Fig. III. Syngamy ($\times 90$)

developing embryo, which completes its development by the next winter. The seeds are shed in March of the third year, before the trees have commenced their extension growth for the new season.

REFERENCES :

¹ Sissons, Edna (1937). *The Naturalist*, pp. 269-271.

² Blackman, V. H. (1898). *Phil Trans. R. S. London. B.* 190, pp. 395-426.

RECORDS
HONEY BUZZARD NEAR PONTEFRACT

A CORRECTION. In *The Naturalist* for 1927 (p. 236), the capture of a Goshawk by the head gamekeeper of Stapleton Park is recorded. This bird has been in the Tolson Memorial Museum, Huddersfield, since 1929 and, as doubt as to its correct identification has been expressed, Miss E. Gallwey wished me to see the bird before she left the Museum for her marriage. I found it to be a Honey-Buzzard (*Pernis a. apivozus*) of the light form—all the under side of its body, even up to the lores are white. It looks rather on the short side for an average Honey-Buzzard, but doubtless this may be attributable to the taxidermist. It does not speak much for the veracity of the gamekeeper who shot it and who put down to this bird's depredations the remains of adult Partridge, Wood Pigeon, and even lambs. It is a great shame that protected birds of this handsome and harmless species are not allowed to live and breed, and to adorn our countryside by their presence. Mr. R. Chislett has also seen the bird, and confirms my identification.—H. B. BOOTH.

WHITE BEAKED DOLPHINS NEAR SCARBOROUGH

Two handsome specimens of the White Beaked Dolphin (*Delphinus albirostris*) were captured near Scarborough during the summer. The first, a female measuring 9 feet in length, was caught 25 miles E.N.E. from the town on July 28th, 1939. The second, a male, was caught about 26 miles off to the N.E., and measured 7 feet. Both were exhibited for charity by the British Tunny Club. These fine cetaceans appear to be more abundant now than formerly, but do not often approach very close inshore. Yarrell says they are not common in British seas, and the *Handbook of Yorkshire Vertebrata*, published in 1881, gives only a single Yorkshire record, near Grimsby in 1875. Now they appear off Scarborough every summer, sometimes in herds of considerable size. They are well known to the fishermen, who call them 'ascus,' a name which, however, seems to be also applied to other species of dolphin but not to the porpoise. Larger cetaceans are known to them as 'blowfish.'—W. J. CLARKE.

THE MOVEMENTS OF THE FOLIAGE OF TREES IN RELATION TO WIND AND THE DISTRIBUTION OF LIGHT

R. G. ABERCROMBIE, M.D.

THE whole structure of the forest tree is necessarily adapted to sustain without damage the pressure of the wind upon the great expanse of foliage. The resilient strength of the bole, the pliability of the boughs and the texture of the leaves enable all the parts of the plant to conform to the direction of the wind and thus to diminish the pressure by yielding to it. Further, in comparison with herbaceous plants, the leaves of our native trees are relatively small in size, or are divided into small segments; the leaves of the Elm and the Oak are the size of those of the Nettle and the Dandelion, and are far smaller than those of many herbaceous plants. Small-scale leaves conform more readily to air-currents than large ones, and the multiplicity of their points of attachment tends to distribute the strain. A tree with its small leaves may thus be compared to a ship with its sails close-reefed in readiness for stormy weather.

In general, the movements of the foliage, the swaying of boughs and the fluttering of leaves, are a response to alternations in the force and direction of air-currents; such movements may be designated 'stream-line,' since their effect is to diminish the impact of the wind. But in certain instances, as in the Aspen, the Ash and the Beech, air-currents of low velocity give rise to movements of a more complex and more definitely rhythmic type. In each of these instances the movements in question are dependent on special mechanisms based on a modification of the plant's structure, and it is therefore reasonable to assume that they are of physiological value. The view is here put forward that movements of this specialised type tend to distribute the sunlight among the foliage, thus promoting the activity of the chlorophyll and serving as an adjunct to the photosynthetic function. The rhythmic movements may also influence the interchange of gases at the stomata, but enquiry into this effect would require technical investigations beyond the scope of this paper. On the other hand, the effect of the movements on the distribution of light may be directly observed and it is this aspect of the problem which is here considered.

The 'shivering leaves' of the Aspen are an example of rhythmic movements distinguishable from ordinary stream-line movements and dependent on specialised adaptation of structure. The leaf-blades of the Aspen are thin and stiff in texture; the petioles are relatively long and slender, much flattened from side to side, and owing to the abundance of

bast-strands, they possess a resilience of almost spring-like character. As the result of this specialised structure, the lightest breath of wind is sufficient to throw the leaves into lateral movements which have the character of a rapid oscillatory or rhythmic tremor. Morphologically the leaves are alternate, but this feature is often obscured, for many of them arise in clusters from the branchlets, being thus irregularly superimposed several deep. When at rest, the lower leaves in each cluster are overshadowed by the upper ; but when stirred by a gentle breeze, the rapid and rhythmic lateral movements disclose the lower leaves, and light thus penetrates intermittently throughout the clusters. Kerner has described the elasticity of the petioles of the Aspen as a defensive mechanism serving to protect the leaves from injury during strong winds ; he assigned no special function to the lateral rhythmic movements (*Natural History of Plants*, I, 428). This explanation appears hardly adequate, since the highly specialised structure does not appear to confer an immunity from injury greater than that which results from the ordinary stream-line movements of the leaves of other trees. It is also to be observed that the peculiar lateral rhythmic movements only occur during a gentle breeze, being replaced by the ordinary stream-line movements during high winds. The whole structure of the leaves and petioles of the Aspen appears to be specially adapted for the production of the peculiar rhythmic movements, and in Aspens of a bushy habit it was observed that the petioles of the upper and outer leaves were noticeably longer than those of the inner and lower ; the lateral movements thus possessed the widest range where they exercised the chief effect on the distribution of light.

In the Ash, rhythmic lateral movements of the leaves occur which are comparable to those of the Aspen in that they are only brought into play by a gentle breeze, and are dependent on a special mechanical structure. At the point of its attachment to the branch, the common petiole of the long pinnate leaves is thickened and its upper surface is flattened, so that it is here resistant to lateral movements ; the middle portion of the common petiole is rounded, and the terminal portion is flattened from side to side so as to resemble a knife-blade with the edge held upwards, and is thus here highly pliable in respect of lateral movements. Owing to the peculiar formation of the petiole, a faint breeze sets the leaves swinging and wagging from side to side ; the terminal leaflet is often the largest, and its weight then acts like the bob on a pendulum. As in the case of the Aspen, the rhythmic criss-cross movements of the leaves distributes pencils of light intermittently throughout the foliage.

The foliage of the Beech forms a large, dense, irregular

mass, partially divided into layers by the branches. When unstirred by the wind, the illumination of many of the inner leaves is imperfect, but when stirred by a breeze, the illumination is enhanced by rhythmic movements of the foliage somewhat different in type to those of the Aspen and the Ash. The petioles of the Beech are of unusual form; they pass horizontally outwards from their attachment to the branch, then curve upwards, and then with a second curve they pass horizontally to their junction with the leaf-blade. The mechanical effects of this sigmoid curvature are difficult to analyse with exactness; in conjunction with the leaf-blade, an aerofoil surface is apparently formed so that a breeze exercises a lifting effect upon the leaves, which is transmitted to the boughs in the form of the rhythmic vertical or billowy movements noticeable in the Beech. Light is thus intermittently suffused between the planes of the dense foliage-mass, and is distributed upon the surface of leaves which would otherwise be in shadow.

In herbaceous plants, the distribution of sunlight among the foliage is effected by the alternate, decussate, whorled, or serial arrangement of the leaves, or by the formation of leaf-mosaics; in trees, on the other hand, a large proportion of the leaves are overshadowed amidst the irregular mass of foliage. It has been shown (Brown and Escombe, *Proc. Roy. Soc.*, B.76, 1905) that with the usual atmospheric concentration of carbonic acid gas, direct and normal solar radiation may be transmitted through three superimposed leaves of ordinary texture, and may still activate the chlorophyll in a fourth leaf. But in an actual tree, the number of leaves in the path of the rays is often in excess of four, the further leaves being thus beyond the scope of activation, apart from the intermittent illumination due to movements of the foliage.

Warburg (quoted by Emerson and Arnold, *Journ. Gen. Physiology*, 1932) found that a given amount of light reduces more carbonic acid gas when allowed to fall on the chlorophyll-bearing cells intermittently than when allowed to fall on them continuously, since a phase of the photosynthetic process continues during the intervals in which light is absent.

These findings support the view that the specialised rhythmic movements in the Aspen, the Ash and the Beech serve as a factor in the photosynthetic process, owing to their effect in promoting intermittent illumination.

It is probable that the specialised light-distributing movements have been evolved from more simple stream-line movements as the result of gradual modifications of structure; and further observations may find traces of a rudimentary light-distributing function in the foliage-movements of many species of trees.

Plusia moneta at Huddersfield.—A specimen of this moth, locally uncommon, has been safely reared in July from a cocoon found on a plant of Monkshood in a garden in George Street, Huddersfield, and brought to me by Mr. C. W. Dyson.—W. E. L. WATTAM, Newsome.

Baeomyces rufus DC. in the Halifax District.—An excellent specimen of this lichen growing on sandstone and collected at Shibden, was brought to me for determination in November last. The locality is an addition to the two previous records given in Crump & Crossland's *Flora of Halifax*.—W. E. L. WATTAM, Newsome.

Pied Rook at Newsome.—Among a small flock of Rooks which frequented our garden feeding ground in March and April one bird was very conspicuous by reason of the many white feathers in both wings and neck.—W. E. L. WATTAM, Newsome.

The Hedgehog in the Huddersfield District.—It is pleasing to note that this mammal still survives despite increasing building encroachments within the precincts of the village where I reside. This year in particular it has been most conspicuous on several occasions and especially so in what now remains of Springwood valley on the outskirts of the village. One was foraging in my neighbour's garden on July 17th in the late morning.—W. E. L. WATTAM, Newsome.

Teratological Specimens of *Plantago lanceolata* L.—Adverting to my records published in *The Naturalist*, 1938, p. 209. As a matter of interest in showing the wide dispersal of the monstrous forms of this plant, I noted five plants on the roadside waste at Herstmonceaux, Sussex, in July last, each having five peduncles carrying normal inflorescences and having three shortly stalked inflorescences at the base.—W. E. L. WATTAM, Newsome.

Waders at Swillington.—Among the usual large flocks of water-birds at Swillington, H. Foster and I saw, on September 10th, four Black Terns in autumnal plumage, hovering and dipping over the surface. Four immature shelduck fed at the water's edge, together with a Greenshank and two Ruffs. There were hundreds of duck, Shoveller, Teal, and Mallard, a few Herons, and Grebes, Great Crested and Little.—V. S. CRAPNELL.

Little Stints in Halifax District.—There were 13 Little Stints, on September 12th, at Elland Sewage works, near Halifax. The observers had excellent views at close quarters, although the light was not of the best. Later, a Ringed Plover called, but was not seen. A further visit the following evening enabled, in improved visibility, the difference to be noted between this species and Temmincks, reported from Halifax

Parish earlier in the year. Well hidden by banks of uncut grass, we admired, within a dozen yards, the richly marked back plumage and the distinctive call notes were heard. Two Dunlin fed in company and enabled interesting comparisons in size to be made. Other notable visitors were three Ruffs, more wary than their smaller companions and invariably first on the wing at any pronounced disturbance. All were still present on September 17th, and, in addition, two Wigeon swam with a Teal. The former is an unusual species at local sewage farms and is more often seen on reservoirs among the hills.—H. FOSTER, G. R. EDWARDS, V. S. CRAPNELL.

A Textbook of Geology. Part I—Physical Geology, by **Chester R. Longwell, Adolph Knopf and Richard F. Flint**. Second (Revised) Edition, pp. xii+544. Chapman and Hall, 18/6. It is not surprising that a second edition of this useful work should be forthcoming seven years after its first appearance. The authors have used the opportunity to bring their matter up to date in the light of recent geological literature, and all chapters have been revised. The book is an ideal text for the serious beginner. The style is clear, and the authors have avoided the use of undefined terms. Naturally the bulk of the illustrative examples are drawn from the American continent, but this does not present serious disadvantages to British readers. The figures in the text number 340 and are mostly of a high order of excellence, the 'block' diagrams being particularly good.

The Vegetation of Craven in Wharfedale, by **F. Arnold Lees**. Edited by A. A. Dallman. T. Buncle & Co., Arbroath, 5/-. Among the writers of county floras the name of Dr. F. A. Lees will always stand pre-eminent. *The Flora of West Yorkshire* is a great work and a lasting memorial to its author. Acclaimed at the time of its publication as the most comprehensive work of its kind in existence, it still stands after the passage of fifty years in the front rank of county floras. In his later years, Dr. Lees produced another even more voluminous but never published work, entitled *The Vegetation of Yorkshire*. To have compiled a flora of the entire county on the lines of his previous book would have been a monumental work indeed; but those very characteristics which make their strongest appeal in, and give lasting value to his earlier work—the enormous accumulation of factual matter, carefully sifted, critically examined and annotated, and methodically tabulated—are here subordinated to theorisings on the 'assurgence' and 'declinace' of species, while the whole work is cast in that extremely euphuistic style and florid phraseology which marked all his later writings. The present work was abstracted by Dr. Lees from this unpublished manuscript and is now issued separately after appearing serially in the *North-Western Naturalist*. It provides a useful guide to the flora of upper Wharfedale, is well set out and commendably free from typographical errors. Its author's aim was to give the facts as to the distribution of species throughout the area together with 'the Why and Wherefore, the How, Whence and When' of their occurrence. This latter aim involves the introduction of much speculative matter of dubious scientific merit and there can be no question that the value of the work lies wholly in the plain facts which it presents. Would that they were available in sentences of less tortured construction, less teeming with coined words, parentheses, inverted commas, hyphenated adjectives, and Anglicised latin epithets. The reader will be left in no doubt as to why the ponderous *Vegetation of Yorkshire* was never published as such, nor is this work likely to convince him of the discredit to those concerned imputed by its editor.

BOG-MOSSES NEAR SHEFFIELD

A. THOMPSON.

THE following list gives records of *Sphagna* for localities within 15 miles of Sheffield.

- Sphagnum fimbriatum* Wils., Linton gives Houndkirk Road ; Burbage Brook.
 var. *robustum* Braithw., Ecclesall Wood.
 var. *validius* Card., Wharncliffe Chase ; Hollow Meadows ; Slippery Stones ; below Stanage Edge ; Burbage Valley ; Offerton Moor ; Longshaw ; near Surprise View ; near Pebley Pond.
 var. *intermedium* Russ., Blacka Moor.
 var. *tenue* Grav., Blacka Moor ; Ramsley Moor.
 var. *laxifolium* Warnst., Ecclesall Wood ; Hollow Meadows ; Cupola, Hathersage.
- S. Girgensohnii* Russ., Longshaw.
 var. *robustum* Russ., Stainery Clough, off Derwent Valley.
 var. *gracilescens* Grav., Blacka Moor.
- S. Russowii* Warnst., var. *girgensohnioides* Russ., Longshaw.
- S. Warnstorfi* Russ., Longshaw.
- S. rubellum* Wils., Blacka Moor.
- S. acutifolium* Ehrh., Slippery Stones ; Burbage Valley ; Offerton Moor ; Shatton Clough ; below Stanage Edge ; Longshaw.
- S. plumulosum* Röhl., Old magnesian limestone quarry, Shireoaks ; near Pebley Pond ; Offerton Moor ; Bradwell Edge ; near Surprise. Linton gives Burbage Brook ; Chatsworth ; Ashopton.
- S. tenerum* Warnst., Hollow Meadows.
- S. molle* Sulliv., Linton gives Burbage Brook.
- S. squarrosom* Pers., Lees gives Midhope Moor ; Bradfield Moor.
 var. *spectabile* Russ., Ecclesall Wood ; Hollow Meadows ; Slippery Stones ; Whitwell Wood ; Blacka Moor ; Offerton Moor. Linton gives Ashopton ; Dore ; above Padley Wood.
- S. teres* Ångstr., var. *imbricatum* Warnst., Linton gives Bamford Moor ; Bar Brook, Baslow.
 var. *subteres* Lindb., Slippery Stones ; Hay Wood, Grindleford ; Shatton Clough.
- S. amblyphyllum* Russ., Linton gives Burbage Brook ; above Padley Wood.
 var. *macrophyllum* Warnst., Longshaw ; Shatton Clough ; Whim Wood, Hathersage ; below Surprise.
 var. *mesophyllum* Warnst., Wharncliffe Chase ; Hollow Meadows ; Slippery Stones ; Longshaw ; Chatsworth Park ; Cupola, Hathersage ; Blacka Moor ; Hay Wood, Grindleford.
- S. balticum* Russ., Linton gives Burbage Brook.
- S. pulchrum* Warnst., below Rivelin Edge ; moors between Strines and Derwent ; below Stanage Edge ; Longshaw.
- S. recurvum* P. de B., Lees gives bogs of Rivelin.
 var. *robustum* Breid., Hazlehead ; Cupola, Hathersage ; Howden Moors ; Blacka Moor ; Offerton Moor.
 var. *majus* Ångstr., Ecclesall Wood ; moors between Strines and Derwent ; Stainery Clough, off Derwent Valley ; Wyming Brook ; Howden Moors ; Burbage Valley ; Offerton Moor ; Longshaw ; below Stanage Edge ; near Padley Chapel ; Ashopton Clough ; Blacka Moor ; Curbar Moor ; Slippery Stones.
 var. *parvulum* Warnst., Longshaw ; near Higgarr Lodge.

- S. fallax* von Klinggr. var. *laxifolium* Warnst., Hollow Meadows ; Longshaw.
 var. *plumosum* Warnst., Hazlehead ; Hathersage Moor ; Longshaw ; Totley Moss ; Burbage Moor ; Curbar Gap ; Chatsworth Park ; Cupola, Hathersage.
 var. *microphyllum* Warnst., Longshaw ; below Stanage Edge.
 var. *Roellii* Schliep., Hazlehead ; near Devil's Elbow ; below Stanage Edge ; Cupola, Hathersage ; Burbage Moor ; Longshaw ; Chatsworth Park.
 var. *robustum* Warnst., Hollow Meadows ; near Hazlehead ; Houndkirk Road ; Totley Moss ; Curbar Gap.
 var. *Schultzii* Warnst., Slippery Stones ; Hollow Meadows.
- S. cuspidatum* Ehrh. Linton gives Burbage Brook. Lees gives Bell Hagg Bogs.
 var. *falcatum* Russ., Curbar Moor ; Longshaw.
 var. *submersum* Schp., Longshaw ; Burbage Moor ; below Stanage Edge ; Curbar Moor.
 var. *plumosum* Schp., Baslow Moor.
 var. *plumulosum* Schp., Howden Moors.
 var. *serratum* (Aust.), above Ringinglow.
- S. obesum* Wils. var. *plumosum* Warnst., Blackbrook ; Totley Moss ; Curbar Lane, near Bar Brook and in Curbar Gap ; Blacka Moor ; Offerton Moor.
 var. *luxurians* Warnst., Totley Moss.
 var. *insolitum* Card., Ecclesall Wood ; Longshaw.
 var. *teretiramosum* Warnst., Offerton Moor.
 var. *canovirens* Warnst., Ecclesall Wood ; Stainery Clough, off Derwent Valley ; Burbage Spring ; Whim Wood ; near Ramsley Reservoir ; near Devil's Elbow ; Offerton Moor.
 var. *hemi-isophyllum* Warnst., Slippery Stones ; Totley Moss.
- S. subsecundum* Nees., Linton gives near Surprise View.
- S. inundatum* W. var. *robustum* (W.) Sherrin, Longshaw.
 var. *lancifolium* Warnst., Bretton Clough.
- S. auriculatum* Schp., Linton gives Burbage Brook.
 var. *laxifolium* Warnst., Shatton.
 var. *submersum* Warnst., near Derwent Dams ; Stainery Clough, off Derwent Valley.
- S. crassicladium* Warnst., Linton gives Houndkirk Road ; Burbage Brook ; Chatsworth.
 var. *magnifolium* Warnst., Blacka Moor ; Hathersage Moor ; Longshaw ; Burbage Valley.
 var. *diversifolium* Warnst., below Stanage Edge ; Blacka Moor.
- S. papillosum* Lindb. var. *normale* Warnst., Hollow Meadows. Linton gives above Hope.
 var. *sublaeve* Limpr., Slippery Stones ; Totley Moss.
- S. cymbifolium* Ehrh., Ecclesall Wood ; Wharnciffe Chase ; Hollow Meadows ; Slippery Stones ; William Clough ; Padley Wood ; Longshaw ; Whim Wood ; below Stanage Edge ; Blacka Moor ; below Surprise ; Hay Wood, Grindleford ; Chatsworth Park ; Burbage Moor.
 Linton gives Burbage Brook ; Froggatt ; above Padley Wood ; near Ringinglow ; near Horsley Gate.

The Entomologist's Record for September contains 'New and little known Asiatic Phalaenoidea,' by H. Bytinski-Salz (with plate) ; 'Coleoptera of Easton,' by T. F. Marriner ; 'Names of Microlepidoptera,' by T. B. Fletcher ; Collecting Notes, Current Notes, and supplement 'The British Noctuae and their varieties,' by H. J. Turner.

YORKSHIRE NATURALISTS' UNION AT
DRIFFIELD
July 8th, 1939

THE good fortune which attended the earlier meetings this year deserted us at Driffield, and the East Riding gave us a similar greeting to the one it provided at Hedon last year. A light drizzle to begin with turned into persistent rain, which drove us away from the choicest area, and finally when we left for home, the heavens opened and the roads were turned into rivers. All this was very unfair to our Divisional Secretary, Mr. C. W. Mason, who had gone to the extent of providing maps of the area, with times of arrival at various points for late comers, and had made every possible arrangement for our comfort.

Dr. W. A. Sledge made a gallant effort to overcome the difficulties and got thoroughly wet in the attempt. He writes; Deplorable weather conditions prevented a thorough examination being made of all the proposed route and though the rain held off while the King's Mill marshes were being worked, it was not possible to give more than a cursory examination to the much richer ground at Kelleythorpe. At King's Mill, the following species were noted

<i>Lotus uliginosus</i> Schkuhr.	<i>Pedicularis palustris</i> L.
<i>Hippuris vulgaris</i> L.	<i>Salix pentandra</i> L.
<i>Conium maculatum</i> L.	<i>Listera ovata</i> (L.) Br.
<i>Apium nodiflorum</i> (L.) H. G.	<i>Orchis Fuchsii</i> Dr.
Reichb.	<i>Carex acutiformis</i> Ehrh.
<i>Silaus flavescens</i> Bernh.	<i>C. hirta</i> L.
<i>Galium palustre</i> L.	<i>C. panicea</i> L.
<i>Crepis paludosa</i> (L.) Moench.	<i>C. paniculata</i> L.
<i>Menyanthes trifoliata</i> L.	<i>C. disticha</i> Huds.
<i>Scrophularia aquatica</i> L.	<i>Glyceria aquatica</i> (L.) Wahl.
<i>Veronica Anagallis-aquatica</i> L.	

The Kelleythorpe marsh is notable for the remarkable quantity of *Dryopteris Thelypteris* (L.) A. Gray. Other marsh plants additional to those already observed were *Cirsium dissectum* (L.) Hill, (*C. pratense* [Huds.] DC.), *Orchis latifolia* L. (*O. incarnata* auct.), *Scirpus compressus* (L.) Pers., *Schoenus nigricans* L., and *Carex diandra* Schrank. Some plants were noted which it was difficult to assign either to robust *C. diandra* or depauperate *C. paniculata*. Some of these were *C. paniculata* L., var. *simplex* Peterm., others may well have been hybrids, but I am satisfied that none which I collected was *C. paradoxa* Willd. That these puzzling plants have been noted before is evident from the late Mr. C. Waterfall's remark in Circular No. 145. They certainly deserve a close and special study as the hybrid *C. diandra* × *paniculata* has not been detected in this country, though it is known from many places on the continent.

Fungi.—Mr. W. G. Bramley writes: Included in the following list are a few records made on July 23rd, when a short visit was made to the King's Mill marsh to verify one or two observations, and the majority of the records are from this area.

PHYCOMYCETES

- Plasmopara nivea* (Unger) Schroet. on *Conium*.
**Peronospora trifoliorum* de Bary. on *Trifolium pratense*.
P. grisea Unger on *V. beccabunga*.
Pilobolus crystallinus (Wigg.) Tode, fairly abundant on horse dung.

ASCOMYCETES

- **Podosphæra oxyacanthæ* (DC.) de B. conidia and perithecia on *Spiræa ulmaria*.
 **Erysiphe graminis* DC. conidia on grasses.
Taphrina aurea (Pers.) Fr. on *Populus*.
Diatrype stigma (Hoffm.) de Not.
Endodothella junci (Fr.) Theiss. et Syd., on *Juncus*.

USTILAGINALES

- Ustilago tritici* (Pers.) Jens., on wheat.
U. longissima (Sow.) Tul. on *Glyceria aquatica*.

UREDINALES

- Triphragmium ulmaria* Wint., on *Spiræa ulmaria*.
 **Uromyces acetosæ* Schroet. II. on *R. acetosa*.
 **U. junci* Tul. OI. on *Pulicaria dysenterica* common.
Puccinia oblegens Tul. O. II on *C. arvensis*.
P. variabilis Grev., II., III, on *Taraxacum*.
P. major Diet. OI, II, III, on *Crepis paludosa*.
P. menthæ Pers. II, III, on *Mentha* sp.
P. pulverulenta Grev. OI, II, III on *Epilobium hirsutum*.
 **P. zopfii* Went., II, III, on *Caltha*.
P. caricis (Schum) Rab. II, on *Carex* frequent.
 **P. festucæ* Plowr. II, III, on *Festuca rubra*, L.
 **P. holcina* Erikss. II, III, on *Holcus*.
P. orchidearum-phalaridis Kleb. OI, on *Orchis maculata* and *O. latifolia*.
 II, on *Phalaris arundinacea*.
 **P. anthoxanthina* Bubak, II, on *Anthoxanthum odoratum*.
P. magnusiana Koern. OI, on *Ranunculus* III (old) on *Phragmitis*.
P. poarum Niels OI, on *Tussilago*.
P. Baryi Wint. II on *Brachypodium*.
 **P. arrhenatheri* Erikss. II, III, on *A. elatior*.

AGARICALES

- **Bolbitius fragilis* (Linn.) Fr.
Stropharia semiglobata (Batsch.) Fr.
Anellaria separata (Linn.) Karst.
Panæolus campanulatus (Linn.) Fr.

AURICULARIALES

- Auricularia auricula-judæ* (Linn.) Schroet.

CALOCERALES

- Dacryomyces deliquescens* (Bull) Duby.

FUNGI IMPERFECTI

- Polythrincium trifolii* Kunze on *Trifolium repens*.
 Species marked * are not listed for V.C. 6I in *Catalogue of Yorkshire Fungi*.

Your secretary soon had to pack up his collecting net and accept the weather as ideal for mosses and the following species were collected :

- | | |
|--|--|
| <i>Fontinalis antipyretica</i> L. | <i>Funaria hygrometrica</i> Sibth. |
| <i>Eurynchium rusciforme</i> Milde. | <i>Bryum pallens</i> Sw. |
| <i>Amblystegium filicinum</i> De Not. | <i>Barbula cylindrica</i> Schp. |
| <i>Eurynchium swartzii</i> Hobk. | <i>Webera carnea</i> Schp. |
| <i>Brachythecium rutabulum</i> B. and S. | <i>Eurynchium prælongum</i> Hobk. |
| <i>Tortula muralis</i> Hedw. | <i>Amblystegium serpens</i> B. and S. |
| <i>Hypnum cupressiforme</i> L. | <i>Brachythecium velutinum</i> B. and S. |

It was strange to note the absence of such common species as *Mnium*

hornum, *Campylopus flexuosus*, and *Thuidium tamariscinum* from the floor of the small wood we sheltered in at Kelleythorpe.

Ornithology.—Our President, Mr. Ralph Chislett writes: The area of ground investigated before lunch consisted of a few bushy fields, with some marsh, intersected by a stream. A number of Goldfinches could be heard twittering in some tree-tops, after four had flown down to some thistles, probably two or more local broods had joined forces. Greenfinches were numerous and Lesser Redpolls and Linnets. A young Cuckoo was observed with a Tree-Pipit in attendance. Nests were seen containing eggs of Linnet, Greenfinch, and Waterhen, and of a Yellowhammer, containing an egg and one newly-hatched chick. The Little Grebe was noted. Lapwings were in flock 60 strong. On the way to Kelleythorpe a cock Corn-Bunting was heard singing. At Kelleythorpe, the promise of the marshy ground was denied by the performance of the weather, which did its worst.

Mollusca.—Mr. E. Dearing writes: Of the freshwater species mentioned in the circular, all were obtained except *Valvata piscinalis*.

Mr. Chas. Oldham has kindly identified the *Pisidia* found as *Pisidium subtruncatum* and *Pisidium nitidum*.

Land species were not abundant, despite the congenial weather and only two species were noted: *Helix memoralis*, plentiful around Thrushes' anvils; and *Helix infescens*.

Lepidoptera.—Definitely a poor day and the only butterflies seen were Meadow Browns (*Epinephele ianira*).

The only two species of Diptera noted were *Chrysopilus cristatus* Fab. which was plentiful in the wet grass at King's Mill, and the gall fly, *Oxyphora flava* Geof. (*Tephritis miliaria* Schrk.), though the troublesome *Hydrotaea irritans* was far too plentiful.

At the meeting in the evening where the reports were made, our President, Mr. Ralph Chislett, was in the chair and a vote of thanks was proposed to Major W. D. B. Thompson for his kind permission to visit Kelleythorpe and to the Divisional Secretary for making the arrangements.

Bio-Ecology, by **Frederic E. Clements** and **Victor E. Shelford**, pp. viii+426. Chapman and Hall, 22/6. In the author's own words this book constitutes an attempt 'to correlate the fields of plant and animal ecology,' believing that to do so 'would tend to advance the science of ecology in general.' This is an ambitious programme, but the work has been done exceedingly well. There is, of course, every justification for the close linking up of the studies of plant and animal communities. In the present state of knowledge of such difficult subjects as animal migration and animal cycles, to mention only two examples of problems requiring intensive study over many years and by large numbers of competent observers, it might be supposed that the quantity of good material available would not warrant the publication of a textbook on the subject. Messrs. Clements and Shelford have entirely justified themselves. Their book should provide inspiration for ecological studies of all kinds. The chapter headings give some idea of the scope of the work. They are: Nature and Relations of Bio-Ecology; Community Functions; Reaction: The Influence of Community on Habitat; Co-action: The Inter-relations of Organisms; Aggregation, Competition and Cycles; Migration; Climax and Sere; The North American Grassland: *Stipa-antilopra* Biotic Formation (Biome); Aquatic Climax Communities, Marine Biotic Communities. There is an Appendix dealing with methods and a good bibliography. The work is eminently readable throughout and is especially valuable to the junior student because of the authors' careful avoidance of the more specialised technical terms. There are 85 well-chosen illustrations.

YORKSHIRE NATURALISTS AT CASTLETON IN ESKDALE

THE August Bank Holiday Meeting at Castleton was a difficult task for a new Divisional Secretary to attempt, but Miss C. M. Rob came through the task with flying colours. It was very evident that the success attained was a result of several early visits of investigation and search for local help.

The first day, Saturday, we set off in high spirits, but after lunch a persistent rain turned to a deluge and a very wet party got back to headquarters; the following days, however, made up for this wet start and we were able to carry out our programme.

Birds.—Our President, Mr. Ralph Chislett, writes: With August here, and the moulting season, birds are usually inconspicuous, keeping to cover and producing few sounds. Some species had already left their nesting grounds for feeding-places nearer to their migration routes. The presence of fully-grown young birds, too, necessitates greater care in identification of some inconspicuous species.

In the three valleys below the high moors selected for investigation, Rooks, Crows, and Jackdaws were in some numbers, and one Jay. Starlings were in flocks. Finches were represented by the Greenfinch, Chaffinch, Linnet and Lesser Redpoll; and a small party of Reed Buntings was seen. In this group only the Greenfinch, Redpoll, and Yellowhammer were still in song. Meadow Pipits were common, Tree Pipits scarce, and the Pied Wagtail was the only Wagtail seen.

Titmice were well represented by parties of Cole Tits and Marsh Tits. Blue and Great Tits were scarce, and only one party of Long-tailed Tits was seen. A Creeper was noted, and one or two parties of Goldcrests.

The Spotted Flycatcher was quite numerous, as also were Willow Warblers. Wood Warblers and Whitethroats also occurred. The Thrush tribe was normal except for the absence of Ring Ousels from the suitable higher ground. A Whinchat was noted, but the Wheatear, which, we were informed by Mr. MacMillan, had been not uncommon earlier, seemed to have left the hillsides.

Only two Dippers were noted. Wrens were abundant, and Robins and Hedgesparrows normal.

Swallows and House Martins hawked conspicuously, as also did the Swifts up to our departure on August 8th. On August 6th a brood of lusty young Swifts were fed by an adult in their nest under the eaves of a roof which also sheltered the Divisional Secretary each night.

The Green Woodpecker was heard twice. Two Tawny Owls were seen and one Kestrel, and a Merlin was seen by Mr. Utley. Young Sparrowhawks able to fly, but still attended by a parent, wailed in a coniferous wood above the President. Characteristic bunches of feathers proved to include remains of Meadow Pipit, and Tit, probably Cole, and some 'blue-pen' feathers. A skeleton of long legs and sternum probably belonged to a well-grown young Plover. Castings also contained remains of Meadow Pipit, and at the time of examination larvæ and eggs probably of a small beetle.

Lapwings were in flock feeding among sodden hay. One Golden Plover called from the heather on Danby Moor behaving as if it still had young there on August 7th. Curlews were seen and heard but had mostly departed. Common Snipe were flushed several times. A few Herring Gulls and a Lesser Black-backed Gull swam on the only sheet of water. A Waterhen was seen by a beck. Red Grouse were few and had small families; a covey of Common Partridges, six in number, were strong on the wing.

Three members paid a visit to Teesmouth and saw the following species: Corn Bunting (near Redcar), Gulls of five species in considerable

numbers, Common, Arctic, Little, and Sandwich Terns, one Oystercatcher, one Curlew, six Whimbrels, one Ringed Plover, some Cormorants on the rocks, three Common Scoters, one Yellow Wagtail, and several Linnets, Skylarks, and Meadow Pipits about the marram grass. The ironworks have made a sad mess of this interesting old haunt of migrant birds.

Entomology.—Few entomologists were present and your Secretary states that interesting species of diptera were not plentiful, although that plague of woodlands, *Hydrotæa irritans*, was far too abundant at times.

The common crane-fly was *Tipula paludosa* Mg., and the biting Cleg, *Hæmatopota pluvialis* L. was not infrequent. The more handsome *Hæmatopota crassicornis* Whlbg. was seen in Baysdale, where the uncommon males were seen sitting in the sunshine on a gate. In one of the deep ghylls running into Baysdale the phantom crane-fly, *Dolichocheza sylvicola* Curt., was often seen, or at least the white tips of its outspread legs were noted.

Among the hover-flies two species of *Volucella*, *bombylans* and *pellucens*, and the large *Sericomyia borealis* Flin. were seen occasionally.

The following is a list of some of the captures; others will have to await examination at a later date.

Ptychoptera paludosa Mg.
Pedicia rivosa L.
Dolichocheza sylvicola Curt.
Tipula alpium Bergr.
T. scripta Mg.
T. paludosa Mg.
Berris vallata Forst.
B. geniculata Curt.
Hæmatopota pluvialis L.
H. crassicornis Whlbg.
Chrysopilus cristatus Verr.
Empis chioptera Flin.
Dolichopus festivus Hal.
Argyra leucocephala Mg.
Callimymia speciosa Mg.
Orthoneura nobilis Fal.
Platycheirus immarginatus Ztt.

Melanostoma scalare F.
Chrysogaster solstitialis Fal.
Syrphus ribesii L.
Sphærophora menthastri L.
Baccha obscuripennis Mg.
Sphegina clunipes Flin.
Volucella bombylans L.
V. pellucens L.
Xylota segnis L.
Syritta pipiens L.
Sericomyia borealis Flin.
Micropalpus vulpinus Flin.
Graphomyia maculata Scop.
Phormia cærulea R-D. (*Protocalliphora grænlandica*).
Phæomyia fuscipennis Mg.
Loxocera albisetæ Schrk.

Botany.—Miss C. M. Rob says: The heavy rain on Saturday to a great extent marred the visit to Westerdale, and the upper part of the valley had to be left. Near the Hall there was a fair amount of *Stellaria nemorum*; *Ranunculus hederaceus* and *R. Lenormandi* were seen, also *Potamogeton polygonifolius*, *Epilobium palustre* and *Equisetum sylvaticum*. For the rest of the time the weather was kind, and Sunday's excursion up Baysdale was fine and hot. The upper part of the valley held little of interest for the botanists, the most striking feature being *Vaccinium Vitis-idea* in magnificent fruit, other plants of this part were *Trientalis*, *Myosotis repens* and *Lastrea montana*. Below the ford there were several bushes of Juniper, and in boggy ground near the beck a Forget-me-not was collected which Mr. Wade has named *Myosotis brevifolia*; this is, I believe, a new record for V.C. 62. In this and other nearby bogs there was a fair amount of *Carex helodes*, also *Epilobium obscurum*. Danby Dale provided a greater variety of plants, and these included *Habenaria chlorantha*, *Nartheicum ossifragum*, *Orchis elodes*, *Melampyrum pratense*, *Myosotis repens*, *Sagina apetala*, *Carex pallescens*, *C. helodes*, *Trientalis* and *Lastrea montana*. On Tuesday I paid a visit to Ewe Crag Slack and found there more of the *Myosotis brevifolia* in a bog near the Danby end of the slack.

Ecology.—Mr. A. Malins Smith: Although both the lias and oolite rocks of this district were stated in the Circular (No. 420) to include limestones, yet these are not sufficient in amount to affect the general plant covering of the surface, and this consisted of the usual associations of acidic regions, ling on the flatter tops of the hills, bracken on the lower steep slopes and oak woodland in the dales. A noteworthy feature of the moorland is the very great infrequency of cotton-grass. The rainfall of the district, some 38-40 ins. per annum, is sufficient to allow of the growth of a good deal of cotton-grass in West Yorkshire over the Millstone Grit and the probable cause of the absence of cotton-grass in this area is the nature of the underlying rock of the higher hills. The oolite is a coarse-grained, easily drained rock, which must form a drier substratum than the Millstone Grit, and thus prevent the growth of cotton-grass. The bracken area extended upwards from the streams to about the 1,000 ft. contour line, and probably coincided with the area of former woodland, as was indicated by the presence of isolated trees, such as mountain ash, to its upper limit. Towards the upper limit the boundary between ling and bracken was evidently unstable, and a walled area in this region in Baysdale, which was occupied by pure bracken, was evidently a former intake from the moor, and the removal of the covering of ling had allowed of the invasion and establishment of bracken, while near by, at the same level, ling still flourished. Bracken is probably spreading in the neighbourhood and the bracken-breaker had been recently used in Baysdale and the results of its continued use will be interesting to follow in this, as in many other areas.

The oak woodland of the dales had in some places the usual undergrowth of bluebell, bracken, and wood soft-grass, but owing to the rather heavy nature of the soil formed from the lias, which was very retentive of water, and to the fairly high rainfall, the ground flora tended to be rich in species of a more moisture-loving character, the ferns Lady Fern, Buckler Fern, and Scented Mountain Fern being abundant, along with Meadowsweet, *Deschampsia caespitosa*, and Marsh Thistle. Garlic and Dog's Mercury, which need a less acid soil, the one of a moister and the other of a drier nature were comparatively uncommon. Foxglove was abundant in the drier parts.

A special feature of the moorland of Baysdale was the abundance of Cowberry which was flourishing and bearing much fruit on both sides of the dale. It is not very clear what conditions of the environment cause an abundance of this plant, but its presence here and in Derbyshire compared with its comparative scarcity in West and South-west Yorkshire would indicate that it favours the drier type of moorland.

Bilberry and Crowberry were common associates of bracken and ling and a gill in Baysdale clothed with oakwood showed a magnificent development of Bilberry which was co-dominant with bracken in the ground flora to the exclusion of almost everything else. The plants were often 3 to 4 feet high and a couple of stems taken as samples were found to be respectively, near the base (1) 20 years old and $1\frac{1}{2}$ inches in girth, (2) 15 years old and $1\frac{1}{8}$ inches in girth. It was clear in this gill that the Bilberry flourished in the deeper shade, and the bracken in the more open parts. The very fine development and abundant fruiting of the Bilberry here point to shade being important for the full development of this plant, and its frequent occurrence in the open in a more stunted form may be but a kind of second best development. There was a special local problem as to the relative distribution of bracken and ling at the head of Danby Dale and to a lesser extent in Baysdale. In Danby Dale ling was found in the lower parts of the bracken area on the steep slopes just above the stream. On these slopes bracken replaced ling wherever a gully allowed of overflow of water from above, so that vertical zonation of bracken and ling was produced, with bracken in the wetter, ling in the drier parts. This was probably a special feature due to the

dry oolitic rocks, which allowed in their drier parts of the development of the more drought-tolerant ling only.

A few bushes of juniper were found in the lower part of the bracken zone in Baysdale on the slope facing south, not far above the stream. Though there appeared to be only some fifteen to twenty bushes in all, yet they showed those special features which have been found in all Yorkshire juniper :

- (1) All the bushes were pretty old, one which seemed quite small was found at the base to have three large branches each 10-12 inches in circumference, which joined just below the soil surface. Two of these branches were dead.
- (2) No young plants were found.
- (3) Dying bushes like the above were found.

Thus, the little colony is, like the larger ones on Moughton and in Swaledale, apparently on the way to extinction, and possibly from the same cause as those, namely, animal attack on the seedling plants. Gymnosporangium was found on the bushes, but no Lophodermium. In any case these are probably insufficient to account for death.

It was thought that it would be interesting to compare the rate of growth of these bushes with those on Moughton. A branch was taken from a bush which was now too tall for serious rabbit attack. The growth of this nineteen-year-old branch was 2.2 mms. per annum. The average of all the specimens on drift soil on Moughton was 2.3 mms. per annum, a surprisingly close similarity of rate being thus shown. The rate on limestone soil on Moughton was much lower.

It remains to notice an interesting effect, presumably due to the limestone bands in the lias. Though, as stated earlier, these are insufficient to affect the general vegetation, yet they appear to have local effects on the vegetation of flushes on the sides of the dale streams. It was found that in some of these flushes in Baysdale, for example, the water was only very slightly acid, while other flushes not far away had very acid water like that running off the moor above. This difference of acidity was correlated with a difference in the vegetation, the very acid flushes growing Sphagnum with scattered clumps of Juncus and a little Polytrichum, while the slightly acid flushes had a more varied vegetation, including Marsh Horsetail, Bog Pimpernel, *Carex laevigata* and Common Sundew. A list from another of these nearly neutral flushes was scattered Juncus, Marsh Thistle, Marsh Bedstraw, Marsh Pennywort, Marsh Willow Herb, White Clover, Opposite-leaved Golden Saxifrage, with the mosses *Mnium punctatum*, *Philonotis fontana*, *Hypnum cuspidatum* and the liverwort *Pellia epiphylla*. This latter flush was separated by only about fifty yards from the Sphagnum flush, and yet the acidities of the water and the plants growing were strikingly different in the two places. A bog near Westerdale provided a still more striking example of the proximity of waters with different acidities. Among the Sphagnum the water was strikingly acid, but at one side of the same bog was an area of Bogbean in which the water was neutral.

Tree seedlings were common in the district, including Oak, Ash, Hazel, Hawthorn, Birch, Rowan, with Alder particularly abundant near the stream sides.

Fungi.—Mr. W. G. Bramley : In spite of the wet, the larger fungi were not plentiful, due partly to the absence of woods and to much of the ground traversed being more or less moor and bracken slopes. Danby Dale was more open and cultivated and provided most of the agarics, several of which were in too dilapidated a condition for identification after the meeting terminated. Parasitic fungi also were not abundant, though several interesting species were noted. In Baysdale, *Exobasidium vaccinii* was fairly plentiful on *V. vitis-idea*. Miss Rob drew our attention to *Agrostis pumilla* with its characteristic smut, a new record

for the county, and also to *Sphaerospora (Ciliaria) asperior*, which is no doubt passed over as *Lachnea scutellata*. The discovery of Juniper led Mr. Malins Smith to find the swelling caused by *Gymnosporangium* and also the accidial stage on the Mountain Ash. In the oatfields, smut was prevalent in some cases up to .05 per cent., but without going into the crop this estimation may be rather high.

W.—Westerdale. B.=Baysdale. D.=Danby Dale.

* New to V.C. 62. † New to County.

MYXOMYCETES

- | | |
|---|---|
| <i>Ceratiomyxa fruticulosa</i> Macbr., W. | <i>Comatrachia nigra</i> Schroet., B. |
| <i>Physarum nutans</i> Pers., D. | <i>Reticularia lycoperdon</i> Bull., W. |
| <i>Fuligo septica</i> Gmel., W.B. | <i>Lycogola epidendrum</i> Fr., W.B. |
| <i>Physarum contextum</i> Pers., D. | <i>Arcyria incarnata</i> Pers., B. |
| <i>Stemonitis fusca</i> Roth., D. | <i>A. nutans</i> Grev., D. |
| <i>S. flavogenita</i> Jahn., D. | |

ASCOMYCETES

- Erysiphe graminis* D.C. on oats, barley and grasses (chiefly conidia), W.D.
Ciliaria asperior (Nyl.) Boud, D. (recorded from Hovingham).
Trichoscypha calycina (Schum.) Bond, W.D.
Rhytisma acerinum (Pers.) Fr., W.B.D., severe in some cases.
**Lophodermium juniperinum* de Not., B.
Nectria aquifolii (Fr.) Berk., W.
Hypocrea pulvinata Fckl., B.D.
Epichloe typhina (Pers.) Fr., W.D.
Endothenella junci (Fr.) T. and S., W.B.
†*Phyllachora dactylidis* Del., D. I have specimens (det. Kew) from Bolton Percy, V.C. 64, 2/10/35.
Melanconis alni Tul., W., conidia only.
M. stilbostoma (Fr.) Tul., W., conidia only.
Diatrype stigma (Hoffm.) Fr., W.B.D.
Diatrypella favacea (Fr.) Ces. and de Not., D. (= *D. tocciacana* de Not.) on alder.
Hypoxyton fuscum (Pers.) Fr., D., on hazel.
H. multiforme Fr., W., on alder.
Xylaria hypoxylon (Linn.) Grev. (*ascophores*), D.

BASIDIOMYCETES

- Ustilago avenæ* (Pers.) Jens. on oats, W.D.
U. tragopogonis-pratensis (Pers.) Wint. (coll. Miss Rob at Glaisdale, 3/7/39).
†*Tilletia separata* Kunze on *Agrostis pumilla*, D.
Urocystis anemones (Pers.) Wint. on *Ran. repens*, D.
Coleosporium senecionis (Pers.) Fr., II, III, on *S. vulgaris* and *S. sylvatica*, D.
C. campanulæ Lév., II, on *C. rotundifolia*, D.
Triphragmium ulmaricæ Wint., II, on *Spirea*, W.
**Gymnosporangium juniperi* Link., I, on *Pyrus aucuparia*, B. Which of the species the galls on the Juniper belong to can only be determined by the examination of *teleutospores* at the proper season.
Uromyces valerianæ (Schum.) Fckl., II, III, on *V. officinalis*, W.
U. alchemillæ Lév., III, on *A. vulgaris*, D.
Puccinia cirsii Lasch., II, on *C. palustre*, W.
P. obtogens Tul., O.II, III, on *C. arvensis*, W.B.D.
P. chærophylli Purt., II, III, on *Myrrhis odorata*, D.
P. epilobii D.C., III, on *E. palustre*, B.
P. violæ (Schum.) D.C., II, III, on *V. riviniana*, W.D.
P. chrysosplenii Grev., III, on *C. oppositifolium*, B.
P. zopfi Wint., II, III, on *Caltha*, W., rather common.

- Puccinia lychnidearum* Link., III, on *L. dioica*, D.
P. behenis Otth., II, on *L. dioica*, W.D.
P. obscura Schroet., II, on *Luzula sylvatica*, B.D.W.
P. oblongata Wint., II, on *L. campestris*.
P. lolii Niels., II, III, on *Arrhenatherum*, D.
 **P. bromina* Erikss, II, III, on *Bromus mollis*, W.
 **P. holcina* Erikss, II, III, on *Holcus lanatus*, W.D.
 **P. triseti* Erikss, II, III, on *Trisetum flavescens*, W.
Uredo on *Festuca gigantea*, D., probably belong to *P. festucæ* Plowr.
-
- Amanita rubescens* (Pers.) Fr., W.D.
Amanitopsis vaginata (Bull.) Roze, D.
A. fulva (Schaeff.) W. G. Sm., D.
Russula adusta (Pers.) Fr., D.
R. cyanoxantha (Schaeff.) Fr., W.D.
R. ochroleuca (Pers.) Fr., W.
R. fragilis (Pers.) Fr., W.D.
R. emetica (Schaeff.) Fr., W.D.
Mycena sanguinolenta (A. and S.) Fr., B.
M. galopus (Pers.) Fr., W.D., var. *Nigra* Fl. Dan., B.
Collybia maculata (A. and S.) Fr., W.
Marasmius oreades (Bolt.) Fr., W.B.
M. dryophilus (Bull.) Karst., B.D.
Androsaceus rotula (Scop.) Pat., W.
A. androsaceus (Linn.) Pat., D.B.
Lactarius subdulcis (Pers.) Fr., D.
Hygrophorus miniatus Fr., B.
H. chlorophanus Fr., common on roadside to Westerdale.
Omphalia umbellifera (Linn.) Fr., W.
Pholiota mutabilis (Schaeff.) Fr., D.
Flamula sapinea Fr., W.
Crepidotus mollis (Schaeff.) Fr.
Psalliotia arvensis (Schaeff.) Fr., W.D. Modern authors consider that most records of this should be called *P. flavescens* Gill.
P. campestris (Linn.) Fr., W.
Stropharia semiglobata (Batsch.) Fr., W.B.D.
Anellaria separata (Linn.) Karst., W.B.D.
Hypholoma fasciculare (Huds.) Fr., W.D.
Paneolus campanulatus (Linn.) Fr., W.D.
Paxillus involutus (Batsch.) Fr., B.
Boletus elegans (Schum.) Fr., D.
B. chrysenteron (Bull.) Fr., W.B.D.
B. subtomentosus (Linn.) Fr., D.
Polyporus betulinus (Bull.) Fr., B.D.
Fomes annosus Fr., D., on larch and ash roots.
Irpex obliquus (Schrad.) Fr., W.B.D.
Stereum hirsutum (Willd.) Fr., W.B.D.
Corticeum læve (Pers.) Quel., D.
Cyphella capula (Holmsk.) Fr., W.
Exobasidium vaccinii (Fckl.) Woronin, B., frequent on *V. vitis-idea*.
Auricularia auricula-judæ (Linn.) Schroet, W.
Tremella mesenterica (Retz.) Fr., W.
Calocera viscosa (Pers.) Fr., D.
Phallus impudicus (Linn.) Pers., W.D.

FUNGI IMPERFECTI

- Darlucula filum* (Biv.) Cast., D., in *uredosori* of *P. obscura*.
Oidium crataegi Died., D., on leaves of hawthorn.
Sepidomium chrysospermum (Bull.) Fr., W., on *Boletus*.
Trichoderma lignorum (Tode) Hartz.

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TWO NEW ALGAL RECORDS FROM THE SHEFFIELD DISTRICT

EDNA M. LIND

Uroglena soniaca (Conrad).

THE genus *Uroglena* belonging to the Chrysophyceæ has hitherto been represented in this country by one species, *Uroglena volvox*. The alga forms free-swimming, greenish-brown, oval to spherical colonies 80-150 μ in diameter and

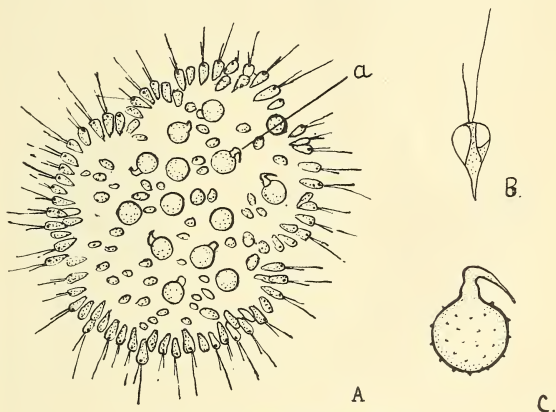


Fig. 1. *Uroglena soniaca* (Conrad.)

(A) Colony. (a) cyst X450. (B) Single cell from colony X1350. (C) Cyst X1,100.

bearing a superficial resemblance to *Volvox* (Fig. 1A). The colonies, however, are irregular in shape, and the pear-shaped cells of which they are composed are loosely embedded in the periphery of a gelatinous matrix and bear two very unequal flagella (Fig. 1B).

The most striking feature of *Uroglena soniaca* is its remarkable cysts, of which 6 to 15 may occur in a colony. They have a globular silica body ornamented with short pointed projections, and a pore which is prolonged into a tubular process bent sharply near its extremity to form a hook (Fig. 1C). The distal part of the hook easily breaks off and is often not found in preserved material. These cysts are quite different in shape from those of *Uroglena volvox* (1).

Good preservation of the material is not easy to secure as the colonies disintegrate very readily. The cysts, however,

persist, and from a sample sent him, Dr. Conrad, of the Belgian Museum of Natural History, was able to identify the alga as *Uroglena soniaca*, a new species which he had recently found and described from a lake in Belgium (2). Closer investigation, however, suggests that the British and Belgian species may not be identical (3).

The pond in which *Uroglena soniaca* occurred at Beauchief, near Sheffield, has a bottom of black organic mud supporting a considerable growth of *Elodea* and *Potamogeton natans*. Although the pond has been under regular observation for several years, *Uroglena* was noticed for the first time in May, 1938, when it was accompanied by *Eudorina elegans*, *Trachelomonas volvocina*, *Gymnodaenium aeruginosum*, *Synura uvella* and a few colonies of *Volvox aureus*. It is pro-



Fig. II. *Gloeotaenium Loitlesbegerianum* (Hansg.)

(A) Single cell. (B) Two celled colony. (C) Four celled colony X240.

bable that *Uroglena* is not uncommon in English ponds but owing to its spasmodic appearances it has escaped the notice of collectors.

Gloeotaenium Loitlesbegerianum (Hansg.).

This striking member of the Chlorococcales appeared on the walls of a jar in which mud from a calcareous pond at Shireoaks had been kept for some weeks.

The alga consists of single green cells 25μ in diameter (Fig. IIA) or of two to four-celled colonies (Fig. IIB and C). The cells have a clear cell wall and lie embedded in a stratified mucilage sheath containing crystals of calcite. In multicellular colonies a black band of calcite separates the cells from each other, and polar calcite pads are frequently present in addition. A striking feature of the organism is the black calcite band of the four-celled colonies which takes the form of a Maltese cross (Fig. IIC).

On division, each new group of two or four cells splits away from the parent colony surrounded by its own gelatinous sheath, leaving the calcite band behind.

The alga has been recorded for several countries but not hitherto for the British Isles.

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THE FORDHAM COLLECTION

READERS of *The Naturalist* will be familiar with the excellent work which has been done for so many years by Dr. W. J. Fordham, of Barmby Moor, York. He has taken a great interest in what are described as the 'neglected orders' of insects, and his numerous contributions to this journal, and the correspondence he has had with naturalists not only in Yorkshire, but in various parts of the country, have shown how much his work has been appreciated.

Readers may care to know that recently a large collection of his specimens of Coleoptera, Diptera, and Neuroptera and Hymenoptera, and also some of the rarer Lepidoptera, have been placed in the Natural History Department of the Hull Museum, where they will be available for students in the future. The collection is contained in 57 trays, and is remarkable for the smallness of some of the specimens. One drawer alone contains some hundreds of coleoptera averaging the size of a pin's head, yet in each instance the specimen is properly mounted with the legs and antennæ displayed, labelled, and localised.—T.S.

**THE COUNCIL FOR THE PRESERVATION OF
RURAL ENGLAND**

THE Council for the Preservation of Rural England have decided to continue the work for the preservation of the countryside throughout the War. It is important that all should help to instil into the consciousness of town dwellers who are now unexpectedly sharing an agricultural life, a realisation of the debt which they owe to the land worker, who has for centuries shaped the landscape, in the scenery of which we find so much pleasure.

PROTECTION OF SPAWNING SALMON

THE Minister of Agriculture and Fisheries desires to call attention to the importance (in connection with the policy of husbanding all natural sources of food supply) of protecting the salmon and migratory trout that will soon be spawning in numbers in the breeding grounds of the rivers of England and Wales.

Owing to the fact that the national emergency has entailed the withdrawal, for military and naval service, of a large proportion of the men comprising the watching staffs employed by Fishery Boards, the difficulties involved in affording protection to the breeding fish on the spawning beds are likely to be increased.

Although the practice of destroying such fish at this season of the year is, generally speaking, less prevalent than it was formerly, it has unfortunately to be admitted that it still continues in certain parts of the country, where this offence against the Law (and, indeed, against the public interest, in that it results in the senseless destruction of stock on which future supplies depend) is still regarded lightly.

It is to be noted that, under the provisions of the Salmon and Freshwater Fisheries Act, 1923, Fishery Boards are empowered to appoint honorary water bailiffs. Under the conditions at present applying, this power might usefully be put into effect. Among those who are directly concerned in the maintenance of the national salmon fisheries (including those who draw a livelihood therefrom as members of the public fishing in the tidal and common waters), there may well be a number of people who might be prepared to offer their services in that capacity. Offers should be made direct to the Clerks of the Fishery Boards concerned, whose names and addresses may be obtained on application to the Fisheries Secretary, Ministry of Agriculture and Fisheries (Dept. O.J.), 10 Whitehall Place, London, S.W.1.

CONVOLVULUS HAWK MOTH IN EAST YORKS.

W. J. FORDHAM, M.R.C.S., L.R.C.P., D.P.H.

ON September 13th a convolvulus hawk moth was brought to me which had been found on a telegraph pole in a lane at Barmby Moor. It was very much rubbed on the fore wings. At Buddleia in September I took two peacock butterflies (*Nymphalis io* L.) which have not occurred here to me before. With them were two *Vanessa cardui* L., numerous *Vanessa atalanta* L., and *Aglais urticæ* L., one *Gonepteryx rhamni* L., and numerous *Pieris brassicæ* L. and *rapæ* L.

W. A. SLEDGE

THE discovery of the Lizard Orchid (*Himantoglossum hircinum* (L.) Koch) in the Pickering district during the past summer is one of the most interesting and important additions which have been made to the Yorkshire flora for many years past. The history of this orchid as a British plant is of outstanding interest, as it provides a unique example of a species of great rarity which is becoming progressively *more* frequent and thereby providing a remarkable reversal of the normal effects of the passage of time on rare native plants. Its distribution in this country has recently been the subject of detailed investigation by R. Good (*New Phytologist*, Vol. 35, No. 2, 1936) and a brief restatement of the facts elicited by this enquiry may be of particular interest to Yorkshire botanists now in view of the addition to our flora of so striking a species. The data here recorded are taken entirely from Mr. Good's paper, which should be consulted by those desirous of having more comprehensive details as to the facts and causes of the past and present distribution of this plant in England.

The Lizard Orchid was first recorded in this country from Dartford in West Kent, in 1641. About ten different localities in the immediate neighbourhood of that town are known to have yielded the plant, which persisted there for about 200 years, dying out finally in 1867. Between the years 1769-1899 there are authentic records of its occurrence in twenty different localities in East and West Kent, Surrey, North Hampshire, East Suffolk, and West Sussex. Except in the case of three Kentish localities, however, these records in every case consist of a single transitory appearance for one season only. Thus, during this long period the plant appeared nowhere beyond the Dartford area, except as an extremely sporadic and impermanent occurrence. During the period which followed the dying out of the Dartford colonies, up to the end of last century, the Lizard Orchid must be accounted one of the rarest of all British plants. It was commonly referred to at that time as being on the brink of extinction and during the twenty-nine years from 1869-1897 there are only six years in which there is any record of the plant having been observed.

Since the beginning of the present century, however, it has steadily increased in numbers and in range. Between 1900-1919 it appeared in East Sussex, East Gloucester, North and South Wiltshire, North Essex, and North Lincolnshire. Since then the increase has been even more remarkable. 'In 1920 the plant appeared for the first time in Oxfordshire; in 1921 in Cambridgeshire and Berkshire; in 1923 in Dorset, East Norfolk, and North Somerset; in 1925 in South Hampshire; in 1930 in Bedfordshire; in 1931 in Buckinghamshire, Hertfordshire, Rutland, and South Lincolnshire; and in 1933 in the Isle of

Wight.' By the end of 1933 it had been recorded in all from no less than 129 different localities in England, and since this survey was completed it has been found in North Devon. The appearance of the plant in North Yorkshire, though easily the most northerly station in this country, and indeed in Europe, was therefore rather to be expected than otherwise, in view of the observed progressive increase in range of the species in recent years.

In a discussion of the possible causes of this increase, Mr. Good advances evidence to show that slight changes in climatic values may be quite sufficient to explain the rapid increase in range and frequency of the Lizard Orchid during the last 30-40 years. It is an axiom of plant geography that the limits of distribution of any species are determined by climatic factors, while the occurrence of the plant within its distributional boundaries is determined by many factors, of which chemical and physical characteristics of the soil are of primary importance. It is impossible to envisage any significant and sufficiently widespread changes in soil conditions within the last three or four decades such as would account for this increase in range and frequency of the plant under consideration. There is, however, indisputable evidence of a definite if small change in the climate of this country, which occurred about 1900. This change has resulted in an amelioration of winter and spring temperatures and a slight increase in the preponderance of winter rain. The change is thus in a direction of greater 'oceanity' and thus tends to lessen the difference between the subcontinental climate of eastern England, where the Lizard Orchid mainly occurs, and the more oceanic climate of west central France, where climatic conditions are evidently optional for the species as judged by its maximum frequency in this area. As the orchid reached its northern limit of distribution in south-eastern England, it is argued that for many years a climatic borderline left only a very limited area in this country open to its possible colonisation, but since a change in climatic values took place early in the present century, this borderline was much extended and the proportion of the country over which conditions were now suitable for the plant was much increased. This had been followed by the rapid spread of the plant into these regions.

In conclusion may I appeal to those who know the whereabouts of this plant in its Yorkshire station not to disturb it and to do all in their power to keep its locality secret. If the plant should reappear next year, which it is by no means certain to do—indeed in about 60 per cent. of the recorded stations the plant never reappeared after the season of its discovery—it is to be hoped that it will be allowed to seed and so to contribute to that process of dispersal which has brought it to the county.

VIABILITY IN SEEDS

T. HYDE-PARKER

A POINT which must, at some time or another, have struck anyone at all interested in either botany or horticulture—or, of course, in agriculture, for that matter—is the varying viability of seeds, and the fact that this is apparently much greater in the case of weeds than in that of cultivated plants.

Probably, in the latter case, we are, not unnaturally, so anxious to obtain the best possible results that we often discard seed which is the least bit out of date. It is to be noticed, for instance, that, despite the oft-repeated report of corn germinating after being buried for long ages in an Egyptian tomb, farmers usually prefer seed not dating further back than the preceding season; and even beans are generally allowed only a couple of years. Yet much seed might quite conceivably be good for years to come, despite Government enactments framed for our protection. Even delicate garden seeds will occasionally seem to slip a season. For instance, we have this summer a few plants of that tiny annual *Leptosyphon*, which, sown in the spring of last year, have lain low, as it were, ever since. Generally speaking, however, it is only by using the best and freshest seed that one may hope for a reasonable return for one's outlay and labour; while, on the other hand, not only does nothing seem to daunt certain weed seeds, but they would appear capable of hanging fire indefinitely.

Most of us must have come across cases of this, and everyone is familiar with the phenomenon of mud, taken from the bottom of a pond which has not been cleaned out for years, producing an abundant crop of nettles. Here the seeds must not only have been lying dormant for an indefinite period, but that under circumstances which might reasonably be considered most unfavourable to survival. Gorse seeds, also, long buried among the debris that accumulates beneath a patch of whins, will suddenly germinate should the old growth be cut down, and light and air admitted. Further, when sowing a lawn, no matter how often one works the soil over or how long actual sowing is delayed, one thing alone is certain: an abundance of undesired plants!

A point I have repeatedly noted is that, whenever the arable field next to us is under 'seeds,' there is a vast quantity of Common Filago (*F. Germanica*). This to all intents and purposes disappears after ploughing, until, with the rotation of crops (*i.e.* four years after) the same favourable conditions recur. The plant in question, being apparently ignored by sheep, always matures; while on the other hand, and having

obviously no forage value, it can scarcely be included in the 'small seeds' purchased by the farmer.

Again, some half-a-dozen years ago, there appeared in our garden, in the midst of a row of Sweet Peas, one solitary plant of Climbing Persicaria (*Polygonum Convolvulus*)—a weed not very common in this immediate neighbourhood. As the Peas had got well away before the intruder was noted, and as I feared that, if uprooted, I might also disturb its neighbours, I decided to let things be. Under these favourable circumstances, it grew to a noble size, and, despite my vigilance, succeeded in seeding freely. Needless to say, there was a profusion of offspring next year; but the noticeable feature is that, though none of these was ever allowed to grow up, every year since has seen a renewed crop of seedlings, showing that each time the soil is turned over and worked, a further lot of perfectly good seeds is brought into operation.

These are but a few examples that come to my mind. Similar instances will doubtless occur to readers of *The Naturalist* with a much greater knowledge of the subject than I can boast, and fuller and more authoritative information might be of general interest.

SOME BEMPTON NOTES, 1939

J. LORD AND G. H. AINSWORTH

THE cliff-climbers at Bempton have had a poor season this year. The ropes were up when we were there on June 17th, and although some climbing will be done on the Buxton stretch a little later in the month, the Bempton cliffs will be left until early next May.

Guillemots and Razorbills were crowded on all the available ledges, but these were few, as the Kittiwakes, which are now to be found there in thousands, had built their nests wherever possible. In fact, the cliff tops literally stank with the smell of these birds; the noise made by them was terrific; and this together with the oil refuse on the water is blamed by the climbers for the bad season. Certainly oil is taking a terrible toll of the Guillemots and Razorbills; evidence of this can be found all along the coast from Speeton to Spurn.

It is always interesting and amusing to watch the Puffin, and these cliffs give one plenty of opportunity to watch and marvel as they return to their nesting holes with beaks so neatly loaded with fish.

Rock Pigeons are always in evidence, but it is towards evening when they gather together that one becomes aware of the numbers that are at Bempton. Homers may be seen

resting on the cliff face. The two young of the Peregrine Falcon which nested there last year did not lack food.

This year there is no Peregrine. The two young died before they got off the nest and the old bird has not returned. In fact, Mr. Petty, the climber, did not see the Tiercel the whole of the time the young were being fed, though the Falcon was much in evidence.

We were pleased to see the Gannet had come back again. For some years it had attempted to nest there, but the Kittiwakes tore the nest each year. Last year it succeeded in rearing its young one, and we are hoping that in a few years we shall have their young breeding there too.

Fulmers are becoming quite common, and it is worth a visit to Bempton simply to watch these birds. Gulls are graceful in the air, but to us the Fulmer made the Kittiwake and Herring Gull look novices. They are very tame, coming close, as if to peer in one's face, before, with a slight movement of their tail, soaring away.

Jackdaws and Herring Gulls are taking their share of Kittiwakes' young and eggs, waiting until the sitting bird is disturbed from the nest by the climber before attempting to pillage. There is no market for the Kittiwakes' eggs, the shell is thin, and so they are left by the climbers.

The Cormorant was not building at Bempton, but we were told by one of the climbers with whom we spent an interesting day, that a few pairs were nesting nearer Flamborough.

Sand Martins were nesting in the few sandy parts of the cliff tops, and House Martins on the chalk.

Rock Pipits were seen on the grassy slopes, and one pair of Lesser Black-backed Gull appear to be nesting.

In Memoriam

RILEY FORTUNE

THE bearer of a name that to many of us has been a household word for as long as we can remember, passed away on October 13th, 1939, after a sudden seizure, at the age of 74 years. And with him went one of the few remaining links with the earlier history of Yorkshire Vertebrate Zoology, with the days of the activities of Denison Roebuck, Eagle Clarke, T. H. Nelson, and their contemporaries.

Riley Fortune dated his interest in Zoology, and his Fellowship of the Zoological Society of London, back to his boyhood. He joined the Y.N.U. in 1887; and at the time of his death was the oldest member. For many years he was a tower of strength to the Vertebrate Section, serving in

several capacities, and becoming President in 1909. When the Wild Birds' Protection Acts Committee was formed in 1906 he became Joint-Secretary with the late T. H. Nelson. For many years he acted as Union Divisional Secretary for the North-West. Actively for many years he aided the Editors of *The Naturalist*. The honour of the Presidency of the Union was given to him for the year 1915.

In his early years Fortune was a collector of eggs and skins, some of which eventually found a home in the Hull Museum. Then as his interest in the living bird grew, the ex-collector became one of the keenest of bird-lovers. With the advent of the dry plate he began photography as a means of collecting illustrations of bird life and mammals, being, along with the Keartons and R. B. Lodge, one of the first to do so. The titles of the lantern lectures he continued to give until recently indicate the use he made of his camera—'Birds of the Farne Islands' (a very complete set), 'A Naturalist in Holland,' 'Birds of the Scilly Islands,' and 'British Mammals,' the latter being a very fine set. Almost always his companion in the field was the late Jasper Atkinson. Much of his photography was done with a stereoscopic camera. When the Zoological Photographic Club was formed in 1899 he became an original member, was Secretary 1924-1930, President in 1931, and remained in active membership until his death. Latterly, with failing health, he took up colour photography successfully, mainly using garden subjects. He accepted the Fellowship of The Royal Photographic Society in 1933. And all through the years he retained his interest in the Harrogate Societies.

In the earlier decades of the present century, the national weekly and monthly magazines published many a plain tale from Riley Fortune's pen of his field experiences, illustrated by his photographs. But Yorkshire claimed him especially. The notes he contributed to *The Naturalist* are numerous. Many of the illustrations to *The Birds of Yorkshire* are his work. In a letter written in 1939 he referred to his many consultations with T. H. Nelson, who stayed in Harrogate a good deal while writing *The Birds of Yorkshire*, and concluded with a promise to supply a list of points regarding which he thought the work should be amended, adding that he had begun the task once himself, but that a fire had destroyed his notes. His great reputation was the natural result of energetic ability and singleness of purpose, begun early, and continued through a long life, in which faculties and interest were maintained to the end. We shall miss very much the kindly mature words with which he replied to requests for his opinion.

The interment took place at Harrogate on October 17th ;

the Y.N.U. being represented by the President and a Past-President (Messrs. R. Chislett and H. B. Booth), and florally. He is survived by three married daughters.—'Anon.'

ALBERT GILLIGAN
(1874-1939)

ALL members of the Yorkshire Naturalists' Union will lament the passing of Professor Albert Gilligan, who died with such tragic suddenness on October 14th, exactly a fortnight after he had retired from the Chair of Geology in the University of Leeds.

After having graduated in the University of Wales, he came to Yorkshire in 1907 to join the staff of the University of Leeds and quickly made a name for himself in geological and naturalist circles. In the realm of pure geology, he will always receive recognition for the way he used the then new methods of sedimentary petrology to confirm the earlier suggestions of Sorby regarding the source and mode of accumulation of the Millstone Grit of Yorkshire. Later he used the same methods of study in the investigation of other formations thus enriching the literature of the Coal Measures and of Glacial and Post-glacial geology. His conclusions concerning the Millstone Grit had more than local interest for an address written in 1930 on the relation of these conclusions to the problem of the North Atlantic found publication in the Report of the Smithsonian Institution of Washington.

Gilligan's work was done in the laboratory rather than in the field, and although it did not lend itself to demonstration in the field he was able to make of it an absorbing story in the lecture room. As a lecturer he was in demand all over the county for his vigorous and clear presentation of the subject made him very popular.

He joined the Union in 1913 and for many years was President of the Geological Section. He was President of the Union in 1932 and gave an address on 'Sand Grains and Sandstones.' He had also occupied the Presidential Chair of the Yorkshire Geological Society, the Leeds Geological Association, the Leeds Philosophical and Literary Society, and the Leeds Astronomical Society. He was keenly interested in the work of local societies to which he gave freely of his time and energy.

In 1922 he succeeded Professor P. F. Kendall and took an active part in student life, endeavouring to create a close accord between staff and students.

To his widow, son and daughter the sympathy of all Yorkshire Naturalists is tendered.

H. C. V.

DERBYSHIRE MECOPTERA, NEUROPTERA, AND MEGALOPTERA

JAMES M. BROWN, B.Sc., F.R.E.S.

YET another group of insects which has been little worked in Derbyshire is the Neuroptera and associated orders. In the *Victoria County History of Derby* (1905), only ten species which are included in the above-mentioned orders are noted, and there seem to be no county lists published more recently. As my collecting in Derbyshire has now been interrupted, I give in the present paper my captures of recent years, incomplete though they may be, in order to bring the county records more up to date.

The localities mentioned are, in the main, the same as those noted in my previous papers dealing with Derbyshire insects ('Stoneflies,' *Naturalist*, 1936, pp. 62-64; 'Caddisflies,' *Naturalist*, 1938, pp. 87-92; 'May-flies,' *Naturalist*, 1939, pp. 85-87). Short notes on the habitats of adult and larva will be found in my paper on the Yorkshire species (*Naturalist*, 1937, pp. 79-87).

The number of Derbyshire species has been increased to 34.

SPECIES AND LOCALITIES

MEGALOPTERA

Family—SIALIDÆ (ALDER FLIES)

Sialis flavilatera L. (*lutaria* L.).

A common species and widely distributed.

Longshaw, 6/7/35; Cordwell, 5/35; Padley Wood, 6/35; Monsal Dale, 28/5/37; Lathkill Dale, 5/6/37. *Vict. Hist.* gives Trent, Dove, and Derwent.

S. fuliginosa Pict.

Probably as common as, though confused with, the previous species. Padley Wood, 28/6/35; Alport, 23/6/34. Mappleton in *Vict. Hist.*

Family—RAPHIDIIDÆ (SNAKE FLIES)

These flies have not been frequently taken in the county, and I have few records.

[*Raphidia notata* Fab.]

Recorded in the *Vict. Hist.* for Repton Shrubs and Little Eaton].

R. xanthostigma Schum.

Ryecroft Glen, 6/23.

NEUROPTERA (PLANNIPENNIA)

Family—CONIOPTERYGIDÆ (DUSTY WING FLIES)

These are probably much commoner than my records suggest.

Conwentzia psociformis Curt.

Blacka Moor, 26/6/35, 21/8/37, on oak.

Coniopteryx tineiformis Curt.

Blacka Moor, 6/35; Lathkill Dale, 21/6/38; Grindleford, 7/38.

Semidalis aleyrodiformis Steph.

Blacka Moor, 26/6/35; Calver, 6/36, on oak.

Family—OSMYLIDÆ (SPOTTED LACEWING FLIES)

Osmylus fulvicephalus Scop. (*chrysops* Scop.)

Adults were taken in Ryecroft Glen, 1/6/36, and larvæ under stones by the stream side in Ryecroft Glen, 22/3/38, Ford Valley, 17/3/38, and Cordwell, 18/3/38 (*Naturalist*, 1937, p. 4, and 1938, p. 259). Also recorded for Repton Shrubs, Little Eaton, and Mappleton in *Vict. Hist.*

Family—SISYRIDÆ (SPONGE FLIES)

Sisyra fuscata Fabr.

Recorded in *Vict. Hist.* as 'common'.

Family—HEMEROBIIDÆ (BROWN LACEWING FLIES)

Micromus variegatus Fabr.

Recorded as 'common' in *Vict. Hist.*

Eumicromus paganus L.

In my experience this is the common species, and is probably more widely distributed than my records suggest.

Blacka Moor, 27/6/35.

Hemerobius humulinus L.

Frequent about deciduous trees such as Hazel.

Ryecroft Glen, 5/28; Bakewell, 5/28; Padley Wood, 6/32.

H. simulans Walk. (*orotypus* Wallengr.)

Cordwell, 22/7/36, on Scots pine.

H. stigma Steph.

Common on conifers, and frequent even in winter.

Lathkill, 5/28; Grindleford, 7/28; Troway, 7/38; Bretton Clough, 4/35; Cordwell, 7/35, 4/38; Blacka Moor, 19/4/37, 6/1/38; Longshaw, 27/8/37, 8/4/38 when many were found by the lake, having been driven from the trees by the smoke of a ground fire.

H. atrifrons McL.

Longshaw, 8/35, 27/8/37; Blacka Moor, 7/8/37, 17/5/38, on Larch and Scots pine.

H. nitidulus Fabr.

Another species occurring on Scots pine.

Blacka Moor, 7/35, 28/7/37; Padley Wood, 3/9/37; Bretton Clough, 3/9/37.

H. micans Oliv.

Perhaps the most common species on deciduous trees.

Longshaw, 9/35; Blacka Moor, 8/35; Cordwell, 7/30; Bakewell, 5/28; Padley Wood, 10/8/33, 20/8/36, 11/8/37.

H. lutescens Fabr.

Longshaw, 27/8/37; Cordwell, 27/7/36; Blacka Moor, 27/6/35, 6/8/37.

Kimminsia (Boriomyia) betulina Strm. (*nervosa* Fabr.)

Dovedale, 8/32; Lathkill Dale, 7/32; Blacka Moor, 24/8/37.

K. subnebulosa Steph.

Cordwell, 10/31; Blacka Moor, 24/8/37, 17/5/38.

Wesmaelius quadrifasciatus Reut.

Blacka Moor, 27/7/38, on Scots pine and larch.

Symphorobius elegans Steph.

Cordwell, 7/35; Blacka Moor, 6/35.

S. fuscescens Wallengr. (*inconspicuus* McL.)

Bradford Dale, 7/31.

Family—CHRYSOPIDÆ (GREEN LACEWING FLIES)

Chrysopa flava Scop.Cordwell, 7/29. Also given for Kirk Ireton, *Vict. Hist.**C. vittata* Wesmael.Lathkill Dale, 7/28. *Vict. Hist.* gives Burton district.*C. ciliata* Wesm. (*alba* L.)

Blacka Moor, 26/6/35; Cordwell, 7/35, 22/7/36.

C. albolineata Kill. (*tenella* Schn.)

Common in deciduous woods.

Blacka Moor, 26/6/35; Dore, 1/8/38; Longshaw, 27/7/36, 8/7/35; Calver, 7/36.

C. carnea Steph. (*vulgaris* Schn.)Youlgreave, 9/28. *Vict. Hist.* gives Little Eaton.*C. ventralis* Curt.

Bretton Clough, 1/7/36.

C. ventralis f. *prasina* Burm.

Along with the type at Bretton, 1/7/36.

C. perla L.

Cordwell, 7/23; Cressbrook Dale, Monsal Dale, 4/7/36.

MECOPTERA

Family—PANORPIDÆ (SCORPION FLIES)

[*Panorpa communis* L.]Recorded in *Vict. Hist.* for Burton, Little Eaton, and Kirk Ireton.

Probably common and widely distributed, but I have no actual records of my own].

P. germanica L.

According to my own experience this species occurs more frequently both in Derbyshire and Yorkshire than the last.

Ryecroft Glen, 21/6/35; Hathersage, 7/35; Monsal Dale, 6/38; Lathkill Dale, 5/37, 5/6/37; Cordwell, 6/34.

Family—BOREIDÆ

Boreus hyemalis L.My only locality for this species is Padley Wood, 5/2/38, 8/2/38 (*Naturalist*, 1938, p. 144).

REVIEWS AND BOOK NOTICES

Mankind in the Making, by M. Cathcart Borer, pp. vi+152 with 8 colour plates and 57 line illustrations. Warne, 3/6. This is a rapid sketch of the evolution of man up to the New Stone Age. Quite young people should be able to get a fair picture of the way in which the ethnologist and palæontologist have worked out the changes in the pattern of life on the earth throughout the great geological periods. The book is very well illustrated for the price and is interesting to read. In his praiseworthy attempt to make things easy for young students, the author has gone rather too far in the beginning of Chapter III. He is dealing with climate and makes this rather surprising statement: 'On a hot day, the sun, pouring on to a small island, will heat the surface of the land to a high temperature. The same amount of heat will have shone on the sea surrounding the island, but the sun's rays are able to pierce father into water than into land. Therefore they spread their warmth over a greater area. A large expanse takes longer to heat than a smaller one. During the daytime, therefore, the sea surrounding the island will be cooler than the land.' Of course, the

explanation of the comparative coolness of seawater in summer is referable to the high specific heat of water. The result is that if equal quantities of heat are supplied to equal masses of land and water, the latter registers a lower temperature.

Field Book of Animals in Winter, by Ann Haven Morgan, pp. xvi+528 with 283 illustrations, including 4 full-colour plates. Putnam, 18/-. Although this is an American book and deals with animal life in North America it will be read with interest by British naturalists. It is packed with information and deals in much detail with such interesting subjects as Migration, Hibernation, Seasonal Changes, and the Winter Habits of a host of creatures. No aspect of the subject is neglected and the book covers far more natural history than its title indicates. Complete life-histories are more the rule than the exception, and there are copious references. The illustrations, which include some valuable charts, are very much to the point and are well drawn. The largest chapters are the two devoted to birds and mammals, and these take up well over a hundred pages. Students of animal ecology will find this a most useful supplementary reference book.

The Wild Life Around Us, and the Story of the Rocks, edited by Ian Cox, pp. 218 with 23 illustrations. Allen & Unwin, 6/-. Here are twenty articles by as many writers, giving a bright and authoritative survey of British natural history. The essays are all modifications of broadcast talks, and although they vary considerably in merit, the compilation is of value in that, generally speaking, the writers reveal the methods of naturalists and outdoor scientific workers in a clear and interesting manner. Without being too chatty and discursive, a surprising amount of information is imparted and all through the book one is conscious that one is reading of first-hand experiences. The illustrations are very good, and in their attempt to adapt their style of writing to younger readers the authors have been most successful, and this without departure from scientific accuracy. We are rather surprised that a B.B.C. editor has passed the following sentence (p. 49): 'By and large, the fisherman takes off his hat to the otter.'

NEWS FROM THE MAGAZINES

The Entomologist for September contains ' *Vanessa cardui* ; a possible line of migration,' by Lt.-Col. N. Eliot ; ' A new species of *Armandia* (*Lep. Papilionidae*),' by N. D. Riley (with plate) ; ' Flight and abundance of the winter moth,' by M. K. Colquhoun ; ' *Hyantis hodeva* (*Lep. Amath.*), descriptions of new subspecies and revisional notes,' by C. J. Brooks ; and numerous notes and observations.

The Entomologist's Monthly Magazine for September contains ' Notes on British *Collembola*,' by R. S. Bagnall (the following species from Yorkshire : *Aphoromma thalassophila* Bagn., Ferriby and Flamborough ; *Anuridella immsiana* Bagn. Sewerby ; *Micranurida pygmaea* Born., Ravenscar, under pine bark ; *Paramura sexpunctata* v. *clavisetis* Axels., Ravenscar, under bark ; *Archisotoma nigricans* Bagn., Sewerby). ' A species of *Philonthus* (*Col. Staphylinidae*) new to the British Islands, and two new varieties,' by C. E. Tottenham (*P. furcifer* Renk., Killarney, *P. sanguinolentus* Grav. ab. *suturamonus* Tott., Bagley Wood, *P. debilis* Grav. ab. *coloratus* Tott., Chichester) ; ' *Cossonus linearis* (*Col. Curculionidae*) a species of coleoptera new to Britain,' by H. Donisthorpe (Ranworth Broad) ; ' The Mallophaga (Biting lice) recorded from the Pacific Islands,' by G. B. Thompson ; and several short notes.

The Transactions of the Society for British Entomology, Vol. VI, Part 4, consists of ' The biology of the British Pompilidae (Hymenoptera),'

by O. W. Richards and A. H. Hamm. It is a very interesting paper. The Pompilidae is a very distinct family of aculeate Hymenoptera, not closely allied to any other group. It is a very large family of world wide distribution. The British fauna contains thirty nine species. Few observations on the biology of the family have been published in this country. The wasps appear in early summer, the males a little earlier than the females. Some species are found on Umbelliferae. After mating, the females search for spiders, the prey being obtained before the nest is made, and hidden until required. The wasp nearly always walks backwards with prey and pulls it into the nest in this position. After oviposition, the nest is closed. Most species pass the winter as larva or pupa within the cocoon and emerge at the end of June. A few species appear in the autumn. There is probably a single generation in the year. The prey usually consists of spiders, a single spider stored in each cell. When closing the nest the sand is beaten down with the end of the abdomen. The nest-making habit has been lost in the parasitic species, such species laying their eggs on the prey of another pompilid. The individual species are treated of after a general summary, with a profuse bibliography at the end.

The Entomologist for October contains 'A tent building white fly (Aleurodidæ) from Trinidad,' by C. B. Williams; '*Callicera yerburyi* Verrall (Diptera: Syrphidæ), a synonym of *C. rufa* Schummel; further details of its life history, with a description of the puparium,' by R. L. Coe; 'The flight of *Nyssia lapponaria* Boisd.,' by A. J. L. Bowes; 'The new Entomology,' by P.B.M.A.; 'British Lepidoptera collecting, 1938,' by C. G. M. de Worms; 'A new bee (*Nomia*) from North Africa,' by T. D. A. Cockerell, and several notes and observations.

The Entomologist's Monthly Magazine for October contains 'The Mallophaga (Biting lice) recorded from the Pacific Islands,' by G. B. Thompson; '*Philonthus explanipes* nom. nov. (Col. Staphylinidæ),' by C. E. Tottenham; '*Gnypeta rubrior* N. sp., a staphylinid beetle new to science,' by C. E. Tottenham (Richmond, Surrey, and Burford Oxon.); 'Some new species of Xantholinini (Col. Staphylinidæ),' by C. E. Tottenham; 'Description of the female of *Xylota xanthocnema* Collin (Dipt. Syrphidæ),' by R. L. Coe; 'A second British record of *Rhingia rostrata* Linnæus (Dipt. Syrphidæ), its distinctions from *R. campestris* Meigen,' by R. L. Coe; 'On some new and little known South American *Neoelmis* Musgrave (Coleoptera Elmidae),' by H. E. Hinton; '*Ithytrichia clavata* Morton (Trich. Hydroptilidæ), new to Britain,' by L. W. Grensted (Llanbedr, Merioneth.); 'The Belgian Congo species of the genus *Dicrana* Burr. (Dermaptera, Pygidicranidæ),' by W. D. Hinks, and several shorter notes.

The Entomologist's Monthly Magazine for November contains 'Additions to the list of British Craneflies,' by F. W. Edwards (*Tipula winthemi* Lack, New Forest; *T. bistilata* Lundstr., Nethy Bridge; *T. serrulata* Lack., Wyre Forest; *Nephrotoma sullingtonensis* Edw., Pulborough; *N. submaculosa* Edw., common and widely distributed; *N. quadristriata* Schum., Branton Burrows; *Prionocera proxima* Lack., Norfolk; *Limonia bezzii* Alex., Dorset; *L. inusta*, Cheshire; *Dicranota robusta* Lundstr., Derbyshire; *Oxydiscus dalei* Edw., Dorset; *Gonomyia bradleyi* Edw., Wyre Forest). 'Notes on Irish Siphonaptera I,' by E. O'Mahony; '*Stiphrolamyra comans* sp. n., a new African asilid,' by B. M. Hobby; 'Larvæ of British Beetles, I. A key to the genera and most of the species of British cerambycid larvæ,' by F. van Emden, and several shorter notes.

The Entomologist's Record for October contains 'More notes on Kurdish Lepidoptera,' by E. P. Wiltshire; 'A gyndromorph of *Bupalus piniaria* L.,' by E. A. Cockayne; 'Some Easton Lepidoptera,' by T. F. Marriner; Collecting Notes, Current Notes, and Supplement 'The British Noctuæ and their varieties,' by H. J. Turner.

THE VEGETATION OF YORKSHIRE AND
SUPPLEMENT TO THE FLORAS OF THE COUNTY

(Continued from page 280)

Coeloglossum viride (L.) Hartm.

The var. *bracteata* (Asa Gray), upland pastures, brush scattered, between Coniston and Kettlewell west by north of the 'Dib,' June, 1908. J.F.P. ! Colt Park Wood, Ribbleshead. W.A.S.

Leucorchis albida (L.) Mey.

Not in East Riding Flora.

Some further records are : Near Sedbergh, 1892, A. Wilson. Cray Gill, Wharfedale; Colt Park, Ribbleshead; Winterscales, foot of Whernside; Gastack Beck, Dent. C.A.C.

Platanthera chlorantha (Cust.) Reichb.

P. bifolia (L.) Reichb.

Cypripedium calceolus L.

Not in East Riding Flora. An additional station in the North Riding is Whitfield Gill, spn. 1906 ! In West Riding at Kettlewell, 1906, *Naturalist*, p. 377; in 1911 six blooms were cut here to preserve the plant. Rev. W. A. Shuffrey reported it in lower Arnedale (1901) and Upper Wharfedale (1904). More recently (1937) the plant flowered in Grass Woods.

IRIDACEÆ

Iris Pseudacorus L.

var. *acoriiformis* (Bor.) Baker. Hymen Wood, Barnsley ! H. Johnson.

I. foetidissima L.

A 'survival' now in a few spots but the relic of cultivation in more !

Miss M. Morton, of Ripon, writes (17/iv/'88) : since Rev. H. H. Slater left Ripon she found it 'growing still in the spot indicated by Mr. Brunton.'

I. versicolor L. *teste* W. R. Dykes (*I. foetidissima* of Flo. Hfx. 104 and *I. sibirica*, *teste* Sir Michael Foster in same Flora on p. 3 of Appendix).

Tag Lock between Elland and Brighouse in 1893 and 1901. W. B. Crump. spn. ! A 'washdown' from some garden higher up Calderdale.

Crocus nudiflorus Sm. (*Colchicum commune* Deering *Cat. Stirp. Nott.*, 1738).

W. B. Crump, M.A., in an article on 'The Halifax Autumn Crocus,' *Yorkshire Observer*, Oct., 18th, 1909, sums up the

historic and economic questions very conclusively. I quite accept his suggestion that the Knight's Hospitallers and others of like mind are the *fons et origo* of Crocus dispersion in Yorkshire.

In Ribblesdale at Waddington, not above a hundred yards into Yorkshire: 'appears each year, a few plants only, near Waddow Hall'; W. G. Travis, *corr.*

Crocus aureus Sibth. and Sm., and **C. vernus** (L.) All.

Are garden escapes. [The Beverley record for *C. vernus* in *E. Riding Flora* (J.J.M., 1898) is antedated by specimens in my herbarium from the same locality dated 1861. Is it still there? W.A.S.]

AMARYLLIDACEÆ

Narcissus Pseudo-Narcissus L.

I never saw a station for it *above* the highest farmstead or hamlet. Not yet (1939) extinct in Halifax parish as stated in *Flora W. Yorks.* The other Narcissi like *N. major* Curt. and *N. biflorus* Curt. are all bare-faced aliens.

Galanthus nivalis L.

Alien in Yorkshire.

DIOSCOREACEÆ

Tamus communis L.

LILIACEÆ

Ruscus aculeatus L.

Alien.

Polygonatum officinale All.

Not in East Riding. In North Riding on Red Scar, Downholme (S)!

P. multiflorum (L.) All.

Denizen. An additional locality is Grass Woods, 1912, J.F.P.

Maianthemum bifolium Schmidt.

Only in North Yorks.

Convallaria majalis L.

Asphodeline lutea (L.) Reichb. and **Hemerocallis fulva** L.

Have occurred as aliens.

Tulipa sylvestris L.

Alien. Not given in East Riding Flora.

Gagea lutea (L.) Ker-Gawl.

Some other localities are Bolton Woods ! W. West, Jun. ; Hebden above Bolton Abbey, J. Crowther ; Ilkley, A. Wilson ; Burley in Wharfedale, *Nat.*, 1895 ; Silsden, *Nat.*, 1901 ; between Whitewell and Mitton, Stonyhurst Flora. An extension in altitude is 1,200 ft. O.D., Colt Park Wood, Ribbleshead, C.A.C., *Nat.*, 1921.

Allium Scorodoprasum L.

A. vineale L.

A. Schoenoprasum L.

Denizen. Only given in East Riding Flora.

A. oleraceum L.

The var. *complanatum* Fr. is only given in the West Yorkshire list.

A. carinatum L. and **A. roseum** L.

Have occurred as aliens.

Scilla non-scripta (L.) H. and L. (*nutans* Sm.).

The var. *bracteata* Druce recorded by Dr. H. H. Corbett in Edlington Wood, May, 1901 !

Ornithogalum umbellatum L., **O. nutans** L., **Lilium Martagon** L.,
and **Fritillaria Meleagris** L.

Occur as aliens.

Colchicum autumnale L.

Narthecium ossifragum (L.) Huds.

Tofieldia palustris Huds.

In North Riding only.

Paris quadrifolia L.

JUNCACEÆ

Juncus maritimus Lam.

Not given in East Riding Flora. The writer, however, noticed it twice, in the 'seventies and July 15th, 1886, on a shoaling bight south of Hilderthorpe.

J. acutus L.

New to Yorkshire ! Saltmarsh Flats, East Coatham, P. F. Lee, July, 1905 !

J. conglomeratus L.

Juncus effusus L.

Hyb. *diffusus* Hoppe. (*effusus* × *inflexus*) not on record for East Riding. Mr. A. E. Bradley noted it as very fine near Allwoodley Gates ! in August, 1904.

J. inflexus L. (*glaucus* Leers.).*J. subnodulosus* Schrank. (*obtusiflorus* Ehrh.).

Some additional localities are near Towton, W. West, ms. ; Askern Lake in great masses, H.H.C. and C.W. ! 'Mooreflo' *Top. Bot.* 2, 432 ; Howden Dyke.

J. acutiflorus Ehrh. (*sylvaticus* Reich.).*J. articulatus* L. (*lampocarpus* Ehrh.).*J. bulbosus* L. (*supinus* Mœnch.).*J. alpinus* Vill.

Only on Cronkley Plateau ! and Great Shunnor Fell ! [Was this true *alpinus* or *J. articulatus* L. var. *nigritellus* (D. Don.) ? No other records exist for it in Yorkshire, yet few areas are better known botanically than Cronkley.—W.A.S.]

J. squarrosus L.*J. triglumis* L.

On the bleak, wet, stony water-parting of the Wherside ridge near the tarns, on Cronkley Fell [where it was introduced by Binks in 1814.—W.A.S.], and in small quantity on the denuded black-chert shoulder of Dodd Fell.

J. tenuis Willd.

First recorded for Yorkshire by A. Wilson, August, 1917. 'By a field footpath near High Bentham at 380 ft.'

J. compressus Jacq.

In the East Riding at Bubwith, Miss C. M. Rob, 1937. Other additional records are Skellbrook, 1908, H. H. Corbett, spec. ! ; Austwick, W.A.S., 1936 ; Newton, near Fairburn, W.A.S. ; Nun-Monckton, C. M. Rob.

J. Gerardi Lois.

An inland station for this maritime species is Newton, near Fairburn, V.C. 64, W.A.S., 1937.

J. bufonius L.*Luzula sylvatica* (Huds.) Gaud. (*maxima* DC.).*L. pilosa* (L.) Willd.*L. multiflora* (Retz.) DC.*L. campestris* (L.) DC.

TYPHACEÆ

Typha latifolia L.

T. angustifolia L.

Sparganium ramosum Huds.

var. *microcarpum* Neuman. Ditch near Bretton, 1889, P.F.L. spn ! teste A. Bennett. Blackburn Sike, just below Hawes ! and I think Baker's Summer Lodge Beck plant should be referred to the same.

? Hyb. *racemosum mihi provis* (*ramosum* × *simplex*), Newton in Bowland, 1893, J.F.P.

S. simplex Hudson.

var. *longissimum* Fr. Canal side, Skipton, W.W. ; Turner's soap works, Norland, W.B.C. (2 spns. 1896 !). Gone from here in 1909.

S. minimum Fr.

ARACEÆ

Arum maculatum L.

Acorus Calamus L.

LEMNACEÆ

Lemna polyrhiza L.

L. trisulca L.

L. minor L.

L. gibba L.

Wolffia arrhiza (L.) Wimmer.

Alien, only known to me in the rock garden water at Elmete Hall.

ALISMACEÆ

Alisma (*Elisma* Buchen.) *natans* L.

Has never been confirmed at Semmerwater or Hornsea, its only recorded stations.

A. Ranunculoides L.

var. *repens* Davies. Nearly or quite as common at the higher levels as the more erect type.

A. Plantago-aquatica L.

var. *lanceolatum* With. Mostly by clay-bottomed shallow pools in fields subject to dryings-up.

Sagittaria sagittifolia L.

Damasonium Alisma Mill. (*stellatum* Pers.).

Only in East Riding and one locality.

Butomus umbellatus L.

NAIADACEÆ

Triglochin maritimum L.

T. palustre L.

Scheuchzeria palustris L.

Not in East Riding. Extinct at Leckby Carr and Thorne Waste. Reported from Hunder Moss, Balderdale, Prof. Lewis, 1903.

Potamogeton natans L.

P. polygonifolius Pourr.

P. coloratus Hornem.

Another locality is Potteric Carrs, Y.N.U. excursion, August, 1937.

P. alpinus Balbis. (*rufescens* Schrad.).

Further localities are Hodder bed, Newton in Bowland, J.F.P. ! Canal, Kirkstall-Armley ! Malzeard Moors ! Thornton Rust Moor (J. Percival); Birkdale Tarn; Summer-Lodge Tarn ! Widdale Tarns ! Sandall Beat, Doncaster, 1907, H. H. Corbett (*Nat.*, 1907).

P. gramineus L. (*P. heterophyllus* Schreb.).

× *P. nitens* Weber. (*gramineus* × *perfoliatus*).

New to Yorks. North Idle Drain, Roe Carr, Hatfield, August 13th, 1939, C. I. and N. Y. Sandwith. Stream from Malham Tarn, May, 1935, J. E. Lousley (Herb. P. M. Hall) *vide* Dandy and Taylor in *Journ. Bot.* 921, pp. 254-5, September, 1939.

× *P. Zizii* Koch ex Roth. (*gramineus* × *lucens*; *P. angustifolius* auct. brit.).

Malham Tarn, W. H. Pearsall (*Nat.*, 1925, p. 278). Semmerwater, 1886 (Herb. Cartwright, Mem. Hall, Bradford) *vide* Dandy and Taylor, *loc. cit.*

P. lucens L.

The var. *acuminatus* (Schum.) occurs with the type in Malham Tarn.

P. prælongus Wulfen.

Only in West Riding Flora.

Potamogeton perfoliatus L.

The pond weed growing in the Wharfe near Ilkley (A. Wilson spns !) is referred by A. Bennett to *P. Cooperi* Fryer (*P. crispus* × *perfoliatus*), the Scotton Banks form is precisely like Mr. Wilson's !

P. crispus L. (incl. forma **serratus** Huds.).

P. compressus L. (**zosterifolius** Schum.).

Absent from West Yorkshire, and the Hovingham and Beverley records have never been confirmed.

P. obtusifolius Mert. et Koch.

Additional stations are Askern, C.W. (*Nat.*, 1906) ; Busby Stoop, nr. Thirsk, Miss C. M. Rob ; and stream south of Mickle Fell, 1861 ?, Herb. Backhouse, *vide* Dandy and Taylor, *loc. cit.*

P. Friesii Ruprecht. (**mucronatus** Schrad., the **compressus** of Sm.).

Another locality is Thorne to Keadby Canal, Y.N.U. meeting, *Nat.*, 1907.

P. Berchtoldii Fieb. (**pusillus** auct.).

P. trichoides Cham. and Schlecht.

New to Yorks. Calder and Hebble Navigation by Salterhebble Bridge, Halifax, July 20th, 1939, G. Taylor (*vide Journ. Bot.* 921, p. 258, September, 1939).

P. interruptus Kit. (**flabellatus** Bab.).

P. pectinatus L.

P. densus L.

P. epihydrus Rafin. var. **ramosus** (Peck) House (**P. pennsylvanicus** Cham. and Schlecht., **P. Nuttallii** C. and S.)

Canal near Halifax (Salterhebble Bridge !) where aired water from a cotton mill enters the canal. Miss Vigurs *spns. ad.* A. Bennett, 1907 ; *Naturalist*, 1908, 10. In 1911 it was in evidence below Brighouse, near Mirfield ! Still at Halifax, W.A.S.

Aponogeton distachyum Thunb.

An alien established in the garden pools at Elmete Hall.

Ruppia maritima L.

Not in West Riding Flora. Brackish ditch, Kilnsea, V.C. 61, June 1935, W.A.S.

Zostera marina L.

Not in West Riding Flora.

Zannichellia palustris L.

Some other localities are: Dog Kennel Wood, Bramham Park, Herb. H. E. Craven !; Norton Station, H.H.C. !; Brewery pool, Conisborough, Hb. Craven !; ditch one mile S.S.-E. of Doncaster, E. J. Lumb, W. West, Jun. (*Nat.*, December, 1895).

Z. pedicellata Fries. var. **pedunculata** (Reichb.)

With *Ruppia* at Kilnsea, V.C. 61, June 1935, W.A.S.

CYPERACEÆ

Heleocharis palustris (L.) Br.**H. multicaulis** Sm.**H. acicularis** (L.) Br.

Muddy margin of Semmerwater (still there, 1939, W.A.S.) and by the Bain lower down; Redshank pools near Masham !

Scirpus sylvaticus L.

Not given in East Riding Flora, but since found on the East Riding side of the Derwent at Kirkham Abbey, J.F.R. Other fresh records are in Hodder District at Agden Clough (Stoneyhurst Flora), above Whitewell, A. Wilson, m.s.; old river bed, Newton, J.F.P. !; Fen beck, Austwick, C.A.C.; west bank of river, Burley-in-Wharfedale, W.R.; Ferrybridge, J.F. (*Nat.*, 1899, Bibliography).

S. maritimus L.**S. lacustris** L.**S. Tabernæmontani** Gmel.

Not given in North Riding Flora (but it grows in salt marshes at Teesmouth, W.A.S.). Additional localities are: Askern, near the Shallowing Pool, 1901, H. H. Corbett ! (*Nat.*, 1901, 268); brick pond, Copgrove, 1888, W. Kirby.

S. cæspitosus L.**S. pauciflorus** Lightf.

A new station is 'near the edge of Malham Tarn,' W. West.

S. setaceus L.

Additional localities are Nidderdale from Sugar-well Keld on Great Whernside to Harrogate; Trough of Bowland, J.F.P.; Hebden Valley, W. West !; Cockett Moss, 1911, C.E.S., m.s.

S. filiformis Savi (**cernuus** Vahl.).

Unexpectedly grew in wet sandy ground at Gibson's felmongery, Meanwood, July, 1912 !

(To be continued)

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CORRIGENDA

- Page 73, line 35, for 'Tarte' read 'Twite.'
 " " " 38, for 'Duvlin' read 'Dunlin.'
 " 82, " 34, for 'Gaple' read 'Gorple.'

Yorkshire Naturalists' Union.

President :

RALPH CHISLETT, F.R.P.S., M.B.O.U., Rotherham.

Hon. Secretary :

CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer :

S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary :

DR. JOHN GRAINGER, B.Sc., Tolson Museum, Huddersfield.

The 416th Meeting

WILL BE HELD AT

WENTBRIDGE

For the investigation of Stapleton Park

On Saturday, MAY 6th, 1939

HEADQUARTERS.—Broc-o-dale House, Wentbridge. Proprietor, Mr. J. A. Boddy. Broc-o-dale House is 800 yards off the Great North Road. Members coming by road should turn along the road east of the north side of the bridge, where a prominent sign is displayed. Members taking tea will also be able to investigate a further area of 35 acres sloping down to the Went, which is owned by Mr. Boddy.

The District has recently been acquired by the West Riding of Yorkshire Mental Hospitals Board, and is not normally open for investigation. The Board has, however, kindly granted permission for the visit.

ROUTES.—No definite routes are proposed since Stapleton Park is a closed area which adjoins Broc-o-dale House. Parties will be formed at 11 a.m. and at 2-30 p.m. outside Broc-o-dale House.

GEOLOGY.—Dr. H. C. Versey writes : The River Went has cut a deep gorge through the Magnesian Limestone and has thus permitted examination of most of that formation as well as the underlying Coal Measures. The unconformable junction between the two formations can be seen in the road cutting north of the village. The Lower Magnesian Limestone is visible in many quarries, and while occasional fossils may be found in the lower beds, the bulk of the formation is a compact dolomite, often wedge-bedded, and entirely unfossiliferous. Reef-structures have been discovered immediately to the south, and search might be made for similar phenomena in this area. The Middle Marls are exposed in the railway cutting near Kirk Smeaton, and are covered by typical thin-bedded Upper Magnesian Limestone with a few fossils in its lower portion.

The 100 ft. strand-line of Pleistocene age, recently described by Mr. Edwards, occurs to the east of the limestone tract and consists principally of Magnesian Limestone pebbles, thus contrasting markedly from the rest of the drifts of the area.

ORNITHOLOGY.—Mr. Geo. E. Hyde writes : The usual species likely to occur in such country may be expected, and these include Kestrel, Sparrow-hawk, Barn Owl, Long-eared Owl, Tawny Owl, Little Owl, Redstart, Lesser Whitethroat, Blackcap, Garden Warbler, Goldcrest, Grasshopper Warbler (rare), Wood Warbler, Long-tailed Tit, Coal Tit, Nuthatch (rare), Tree Creeper, Grey Wagtail, Yellow Wagtail, Hawfinch, Lesser Redpoll, Bullfinch, Goldfinch, Corn Bunting, Carrion Crow, Magpie, Jay, Nightjar, Great Spotted Woodpecker, Green Woodpecker, Kingfisher, Tufted Duck, Stock Dove, Turtle Dove, Woodcock, Great Crested Grebe.

ENTOMOLOGY.—In *The Naturalist*, 1937, pp. 261-4, there is a note of the insects seen when the Union visited the Park in August. Most of these insects will not be seen at the early date of the present meeting, but the lists give promise of other earlier species.

LEPIDOPTERA.—Mr. Hyde writes : The district is not rich in butterflies, and of moths I have not met with many species specially worth recording. It will be rather early for great success, but the following are a few of those included in the list and worthy of mention : *Gonepteryx rhamni*, *Vanessaio*, *Argynnis aglaia*, *A. selene*, *Parage egeria*, *Epinephele tithonus*, *Thecla rubi*, *Hesperia sylvanus*, *Smerinthus ocellatus*, *Macroglossa fuciformis*, *Cerura bifida*, *Pheosia tremula*, *Notodonta dromedarius*, *Drepana falcataria*.

COLEOPTERA.—Mr. M. D. Barnes writes : Stapleton Park is situated in the midst of country which should well repay a visit made in pursuit of insects. Although the date of this excursion

is rather early for many of the insects which are usually recorded from this area, given good weather many interesting captures should be made.

The following beetles have been taken, chiefly within the confines of Broc-o-dale Woods: *Badister bipustulatus* F., *Sinodendron cylindricum* L., *Clytra 4-punctata* L., *Clytus arietis* L., *Rhagium bifasciatum* F., *R. mordax* D. G., *Scaphidium 4-maculatum* Ol., and *Soronia grisea* L.

BOTANY.—Members should read Dr. W. A. Sledge's account of the last visit in *The Naturalist*, 1937, p. 258, where a full list of species will be found. The district is perhaps the only place where the Pasque Flower, *Anemone pulsatilla* L., may still survive in Yorkshire. It was certainly there in 1870, and an effort should be made to re-find it, especially as the date of the meeting is in the plant's flowering period. Another interesting plant to be seen flowering is the Spring Potentilla, *Potentilla verna* L. and it is an opportunity for seeing this species on the warm Permian soils for comparison with the riverside plant at Grassington and with the later flowering *P. Crantzii* (*alpestris*, *West Yorks Flora*) of the limestone scars of Craven.

Other interesting plants are *Helianthemum chamæcistus* Mill., *Hypericum montanum* L., *Anthyllis vulneraria* L., *Astragalus danicus* Retz., *Spiræa filipendula* L., *Hippuris vulgaris* L., *Silaus flavescens* Bernh., *Asperula cynanchica* L., *Inula squarrosa* Bernh., *Centaurea scabiosa* L., *Ligustrum vulgare* L., *Blackstonia perfoliata* Huds., *Lithospermum officinale* L., *Cynoglossum officinale* L., *Campanula glomerata* L., *Ballota nigra* L., *Daphne laureola* L., *Epipactis latifolia* Sw., *Ophrys apifera* Huds., *Butomus umbellatus* L., *Potamogeton crispus* L., *P. pectinatus* L., *Poa compressa* L., *Bromus erectus* Huds., *Brachypodium pinnatum* Beauv. Botanists should not miss the lake near the Hall.

MOSSES AND LIVERWORTS.—Mr. F. E. Milsom states that the following have been found in the district: **MOSSES**—*Pleuridium axillare*, *Fissidens bryoides*, *Tortula muralis* v. *aestiva*, *Pottia bryoides*, *P. minutula*, *Phascum cuspidatum*, *Weisia microstoma*, *W. tenuis*, *Encalypta vulgaris*, *Plagiothecium tenellum*. **LIVERWORTS**—*Preissia quadrata*, *Pellia fabbroniana*, *Targionia hypophylla*, *Aneura latifrons*, *Haplozia riparia*.

LICHENS.—Mr. W. E. L. Wattam writes: I can trace no records for the area under investigation, but considering the geological formations within the area many interesting species should be noted. Corticolous species on the aged trees within the park, as well as the hedgerows, should also yield their quota. A reference to the list of species given by me in the Doncaster

Circular No. 406 (July, 1937) is a fair indication as to what may be expected.

MYCOLOGY.—*Peniophora pubera* was recorded for the Union's excursion to Wentbridge in August, 1916. *Cribraria aurantiaca*, a slime fungus with green plasmodium, was also found.

CONCHOLOGY.—Mrs. E. M. Morehouse writes: Around Wentbridge and from there to Smeaton is a very rich area for the molluscan fauna. Of the larger helices *H. aspersa* Müll, *H. nemoralis* L., *Theba cantiana* Montagu are to be found in quantity. A good series of these snails can be had, especially if the weather be favourable. A large number of the Vitreas and one Clausilia are also to be seen, as well as a number of other small Helices. In the quarries is a habitat for *Caecilioides acicula* Müll. Two quarries, one on either side of Stapleton Park, have yielded this species in the past. There is an old record by Chas. Ashford and others in 1885 of *Vertigo minutissima* Hartmann 'being very abundant on the old limestone wall by the Roman road behind Went Hill and sparingly on limestone rocks at Wentbridge and Smeaton Craggs.' *Vertigo pusilla* Müll. is said to occur in the same places.

Slugs, several species, may be found with many varieties of *A. ater* L., especially *v. brunnea* Roebuck, which is very common and large; also *v. plumbea* Roebuck. In the River Went there used to be several aquatic species, including *Unio tumidus* Retzius, but they practically disappeared under the drastic cleaning of the river. I have not worked it for three or four years, so they may have recovered by now.

TRAVEL FACILITIES.—Buses to Wentbridge (W. Riding)

	(1)	(2)
Leeds (Sovereign St.)	9-44 a.m.	12-44 p.m.
„ Wentbridge	10-45 a.m.	1-45 p.m.
Doncaster (bus station)	10-18 a.m.	1-18 p.m.
„ Wentbridge	10-49 a.m.	1-49 p.m.

(1) for the 11 a.m. party; (2) for the 2 p.m. party.

MAP.—Sheet 31, Large Sheet series; 1-in. Ordnance Survey, and 6-in., S.W.

MEETING.—Tea (meat tea 2/-, afternoon tea 1/3) will be arranged for approximately 4 p.m., and will be followed by a meeting for the presentation of reports and election of new members. We shall be glad to have nominations for intending members at this meeting.

The next meeting of the Union will be the Whitsuntide meeting at High Force Hotel, Teesdale, May 27th-29th, 1939.

Yorkshire Naturalists' Union.

President :

RALPH CHISLETT, F.R.P.S., M.B.O.U., Rotherham.

Hon. Secretary :

CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer :

S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary :

J. P. UTLEY, B.Sc., Roova Garth, Leyburn.

The 417th Meeting

WILL BE HELD AT

HOLWICK SCARS

AND

UPPER TEESDALE

Saturday, MAY 27th, 1939
to Monday, MAY 29th, 1939

HEADQUARTERS.—The High Force Hotel, Middleton-in-Teesdale.
Terms from 9/- to 12/6 per day according to rooms.

TRAVEL FACILITIES.—

Train Services.

		a.m.	a.m.	a.m.	p.m.	p.m.	p.m.	p.m.	S.O.	p.m.	Sundays.
Darlington...	... dep.	6-40	8-40	10-5	12-33	2-50	4-45	6-18	7-34	9-0	8-25
Barnard Castle	... { arr.	7-21	9-23	10-45	1-11	3-32	5-23	6-57	8-14	9-40	9-5
	... { dep.	7-34	9-25	11-0	1-16	3-38	5-28	7-5	8-16	9-49	9-15
Middleton-in-Teesdale	... arr.	7-58	9-48	11-22	1-38	3-57	5-50	7-27	8-38	10-11	9-37

S.O.=Saturday only.

S.X. Sundays.

		a.m.	a.m.	a.m.	a.m.	p.m.	p.m.	p.m.	p.m.	p.m.
Middleton-in-Teesdale	... dep.	6-31	8-13	10-10	11-50	2-15	4-8	6-6	8-20	5-30
Barnard Castle	... { arr.	6-51	8-34	10-30	12-12	2-37	4-23	6-30	8-40	5-54
	... { dep.	7-23	8-57	10-36	12-17	2-48	4-25	6-50	9-32	6-0
Darlington...	... arr.	8-1	9-35	11-16	12-54	3-23	4-56	7-27	10-1	6-47

S.X.=Saturdays excepted.

Bus Services.

						a.m.	p.m.	p.m.	p.m.	p.m.
Middleton-in-Teesdale	... ..	... ..	... ..	... ..	... ..	dep. 10-20	12-20	2-20	4-20	6-20
High Force Hotel	... ..	... ..	... ..	... ..	... ..	arr. 10-40	12-40	2-40	4-40	6-40
High Force Hotel	... ..	... ..	... ..	... ..	... ..	dep. 10-50	12-50	2-50	4-50	6-50
Middleton-in-Teesdale	... ..	... ..	... ..	... ..	... ..	arr. 11-10	1-10	3-10	5-10	7-10

ROUTES.—**Saturday**—Footbridge, Holwick Scar, Millbeck Wood, Crossthwaite Scar, Park End, then *via* stream to River Tees and back to footbridge following Yorkshire bank.

Sunday.—Footbridge, then *via* Yorkshire bank of River Tees round Cronkley Fell bend to junction of Merrygill, then up Merrygill to Old Hush and on to Silverband. Then back down Crookus Gill to Holm Wath and along bridle road called Man Gate, over Thistle Green and down Birk Rigg to Pashnee Foot and River Tees. A keeper will accompany this party, and not more than six may proceed beyond the junction with Merrygill; any number in excess of this must return *via* River Tees.

Monday.—Footbridge, then *via* footpath from Hield House, Pike Hill, Dee Pit Holes, Jonathan Hush, Bleabeck Grains, then on to Long Crag, down to Millings Shop on Long Hurst, and by footpath over High Hurst, across Dry Beck to Bleabeck Washfold and down Bleabeck to River Tees.

Not more than six members to make up this party, which will be accompanied by a keeper.

Members may freely explore the country of Saturday's route and the immediate vicinity of the River Tees as far as the junction with Maizebeck, and parties will be arranged to visit the Widdy Bank area.

The footbridge referred to is the one immediately downstream from High Force Hotel, known as Winch Bridge.

Great care must be taken by all members taking the moor excursions. The time of the meeting occurs at the period of grouse hatching, and disturbance of these birds must be avoided.

BOOKS AND MAPS.—The river is 1,000 ft. above sea-level at High Force and 1,250 ft. O.D. at the foot of Cronkley Scar. The district is covered by the 1" Ordnance Sheet No. 14, with the exception of part of the Cronkley Fell bend which is on Sheet No. 10.

Baker's *North Yorkshire Flora* should be consulted, and also Kendall and Wroot's *Geology of Yorkshire*.

GEOLOGY.—Mr. J. A. Butterfield, M.Sc., F.G.S., writes: The Middleton-in-Teesdale area is made up of Yoredale rocks penetrated by the great Whin Sill and overlain by Millstone Grit on the higher ground. The Whin Sill is a mass of basalt or dolerite of uncertain age covering a large area in Northern England and associated in the Middleton area with the Tyne Bottom limestone (Middle limestone of Wensleydale). A good example of an intrusive sill, showing fine columnar structure, it is well exposed at Holwick Scars, Cronkley Scars, Falcon Clints, Winch Bridge, Fairy Glen, etc., and is responsible for fine waterfalls at High Force, Cauldron Snout, and White Force. It is also to be studied in local quarries. Its metamorphic effects include prismatisation of shales and bleaching and quartzitisation of sandstones. On limestone it produces a saccharoidal effect yielding a loosely granular crystalline marble often termed 'sugar limestone' and well displayed at White Force and at Widdy Bank near Cauldron Snout. At High Force the limestone (Jew limestone) is rich in corals and crinoids.

Several conspicuous faults are to be studied. The Teesdale fault downthrowing to the north decides the course of the Tees for several miles. It accounts for the presence of the Whin Sill on the one side of the valley and not on the other. A second major fault runs along Lunedale downthrowing to the south, and the great Burtreeford dyke crosses the Tees in this area and gives excellent opportunities for examining the disturbance of the strata.

At the foot of Cronkley Fell on the western side of the Burtreeford fault is an exposure of finely cleaved Silurian (?) shale intersected by mica trap dykes. This rock was formerly worked for slate pencils.

The district is well supplied with minerals. Middleton has been an important lead mining district, and the hills to the north are gashed with old workings. Ruins of lead workings are to be found in the picturesque gorge of the West Skears or Hudeshope Beck. Zinc blende, barytes, iron ore have been worked, but the present activity is directed to the quarrying of whinstone for road metal.

The area has been intensely glaciated by ice coming from the Vale of Eden and bringing with it Shap Granite and Lake District rocks. Moraines, overflow channels, and other evidences of glacial activity are common. Upper Teesdale presents an example of the 'valley-within-the-valley' type of glaciation resulting in the curious system of gorges and channels to be seen on the southern side of the valley, e.g. at the castle at High Holwick.

ORNITHOLOGY.—Mr. J. P. Utley writes: Although a considerable variety of lowland birds may be found in the woods and near the banks of the Tees; this is essentially a district for birds of the high, open spaces. Those for which a particular lookout should be kept are Peregrine Falcon, Buzzard, Merlin, Raven, Short-eared Owl, and Nightjar. On the higher ground Dotterel may be found, and Whimbrel have also been reported from near Mickle Fell. Blackcock may be seen. Of smaller birds the Twite should be in evidence.

In *Birds of Yorkshire*, Nelson reports that both Marsh and Hen Harriers have nested in Upper Teesdale, and also that the Ruff was occasionally shot on the grouse moors.

ENTOMOLOGY.—**Coleoptera**—Dr. W. J. Fordham writes: The following beetles have been taken in the neighbourhood of Middleton-in-Teesdale:

Lunedale.—*Dyschirius globosus*, *Amara lunicollis*, *Calathus micropterus*, *Mycetoporus lepidus*, *Deliphrum tectum*, *Aphodius constans*, *Ceuthorrhynchus ericæ*.

Mickleton.—*Silpha nigrita*.

Cronkley.—*Bradycellus cognatus*, *Pterostichus vitreus*, *Bembidion stomoides*, *B. monticola*, *Lathrobium punctatum*, *Aphodius fetidus*, *A. borealis*, *Hydroporus tristis*, *H. morio*, *H. melanarius*, *Ilybius guttiger*.

Mickle Fell.—*Carabus glabratus*, *Calathus* var. *nubigena*, *Patrobus assimilis*, *Agabus congener*, *Atheta islandica*, *A. tibialis*, *Lesteva monticola*, *Aphodius lapponum*.

Cauldron Snout.—*Corymbites* var. *æruuginosus*, *Ancistronycha abdominalis*, *Chrysomela varians* green var.

On the moorlands is found *Carabus nitens*, and in moss by waterfalls *Stenus guynemeri*, *Quedius auricomus*, and *Lathrobium punctatum*.

Diptera.—Dr. W. J. Fordham has taken the following species of Diptera in the neighbourhood of Middleton-in-Teesdale, mainly on the Durham side of the River Tees: *Tipula cheethani*, *T. montium*, *T. subnodicornis*, *T. variicornis*, *Pedicia rivosa*, *Polymeda trivialis*, *Boletina trivittata*, *Bibio lacteipennis*, *Cricotopus tremulus*, *Serromyia femorata*, *Melusina ornatum*, *Beris chalybeata*, *Bicellaria pilosa*, *Coryneta agilis*, *C. longicornis*, *Empis chioptera*, *E. opaca*, *Hilara maura*, *Rhampomyia dentipes*, *R. sulcatina*, *R. tibialis*, *Chilosia albitarsis*, *Cinxia lappona*, *Eristalis intricarius*, *Neoscasia podagrica*, *Copromyza equina*, *Hydrellia griseola*, *Norellia striolata*, *Scopomyia squalida*, *Azelia macquarti*, *Egle æstiva*, *Cælogyia spathulata*, *Hydrophoria linogrisea*, *Hera longipes*, *Hylemyia variata*, *Myiospila meditabunda*, and *Phaonia consobrina*.

BOTANY.—Dr. W. A. Sledge writes: The rich and unique flora of this district has been so thoroughly investigated that new plants will not easily be found, though many rarities may be seen. A detailed account of the botany of the area is to be found in Baker's *North Yorkshire*, pp. 128-138.

The rarer plants growing in the fields and by the stream sides and river bed below the High Force include *Thalictrum umbrosum*, *Trollius europæus*, *Stellaria nemorum*, *Geranium sylvaticum*, *Potentilla fruticosa*, *P. Crantzii*, *Rubus saxatilis*, *Rosa Sabini*, *Sedum purpureum*, *Peucedanum Ostruthium*, *Galium boreale*, *Crepis mollis*, *Hieracium anglicum*, *H. iricum*, *Serratula tinctoria*, *Bartsia alpina*, *Melampyrum sylvaticum*, *Plantago maritima*, *Polygonum viviparum*, *Rumex longifolius*, *Salix phylicifolia*, *Juniperus communis*, *Habenaria albida*, *Convallaria maialis*, *Melica nutans*, *Poa Parnellii*, *Asplenium viride*, *Equisetum pratense* and *E. variegatum*. Above the High Force, about the basaltic scars of Cronkley Fell and on the open ground between the scars and the river are to be found *Thalictrum alpinum*, *Trollius europæus*, *Cochlearia alpina*, *Draba incana*, *Viola lutea f. amœna*, *Geranium sylvaticum*, *Potentilla fruticosa*, *P. Crantzii*, *Peplis portula*, *Ribes pubescens*, *Sedum purpureum*, *S. villosum*, *Saxifraga aizoides*, *S. stellaris*, *S. hypnoides*, *Galium boreale*, *Hieracium iricum*, *Primula farinosa*, *Gentiana verna*, *Arctostaphylos Uva-ursi*, *Bartsia alpina*, *Littorella uniflora*, *Polygonum viviparum*, *Salix phylicifolia*, *Habenaria albida*, *Kobresia bipartita*, *Carex capillaris*, *Sesleria cœrulea*, *Poa Parnellii*, *Cryptogamme crispa*, *Polypodium calcareum*, and *Equisetum variegatum*. Additional species occurring on the 'sugar limestone' areas of the fell top are *Helianthemum canum*, *Hippocrepis comosa*, *Dryas octopetala*, *Galium sylvestre*, *Antennaria dioica*, *Plantago maritima*, *Tofieldia palustris*, and *Juncus triglumis* (planted by Binks in 1814). A plant which should be looked for by the side of the eastern fork of the stream running over the White Force is *Polygala amara* (first discovered there by the Backhouses in 1852), and this should be searched for elsewhere on Cronkley and Holwick Scars. *Pyrola secunda* formerly grew at the White Force, but its continued existence is doubtful and confirmation of this record would be very welcome. Other plants which should be kept in mind when exploring the limestone areas of Cronkley and Holwick are *Polystichum Lonchitis* and *Cystopteris alpina*. The higher slopes of Mickle Fell yield *Arenaria verna*, *Saxifraga Hirculus*, *Myosotis alpestris*, *Gentiana verna*, *Epilobium alpinum*, *E. alsinifolium*, and *Carex rigida*, but the season will not be sufficiently advanced for most of these and time will be more profitably spent on an exploration of the lower slopes and scars.

BRYOLOGY.—Mr. F. E. Milsom writes: The district is a very interesting one, which has been worked by bryologists from the time of Spruce. It contains a number of survivals of plants which are more common in alpine habitats in Scotland, but which are extremely rare in Yorkshire. Some of these have not been gathered in the district since Spruce's day, and opportunity should be taken during the present visit to make a concerted search for them. They comprise *Rhabdoweisia fugax*, *Cynodontium polycarpum*, *C. strumiferum*, *Campylopus setifolius*, *Dicranum fulvellum*, *D. schisti*, *D. falcatum*, *D. Starkei*, *Grimmia funalis*, *G. torquata*, *Ulota Drummondii* (on Juniper near High Force), *Bryum lacustre*, *Cinclidium stygium*, *Hypnum hamulosum*, *Antitrichia curtispindula* c. fr., *Pallavicinia Lyellii*, *Gymnomitrium obtusum*, *Sphenolobus ovatus*, *Hygrobrella laxifolia*, *Scapania æquiloba*. Of the above, the *Gymnomitrium* was found a year or two ago, and there seems no reason why some of the others should not also be present.

MEETING.—Tea will be arranged for 4 p.m. Monday, and will be followed by a meeting for presentation of reports and election of new members.

The Secretary will send forms for nomination of new members on request; we welcome new members and are thankful to those who endeavour to bring in others.

The next meeting of the Union will be at Queen Mary's Dub, between Ripon and Tanfield, in V.C. 64, Mid-West Yorks., on June 17th, 1939.

Yorkshire Naturalists' Union.

President:

RALPH CHISLETT, F.R.P.S., M.B.O.U., Rotherham.

Hon. Secretary:

CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:

S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary:

W. G. BRAMLEY, Bolton Percy, York.

The 418th Meeting

WILL BE HELD AT

NORTH STAINLEY

FOR

QUEEN MARY'S DUB

On Saturday, JUNE 17th, 1939

HEADQUARTERS.—Cross Keys, North Stainley. Tea with sandwiches, 1/3, or with meat (if ordered previously), 1/6. It will be a considerable help if as many members as possible will call and state their requirements on arrival.

TRAVEL FACILITIES.—Ripon is well served by train and bus services from all parts, but North Stainley has only a limited bus service; one leaves Ripon at 9-25 a.m. and then there is an interval until after 12 noon. Those coming in the afternoon could get the 2-30 p.m. from Ripon.

Return bus from North Stainley, 5-58 p.m.; Ripon, 6-14 p.m.; or North Stainley, 7-28 p.m.; Ripon, 7-44 p.m.

ROUTES.—Start 11 a.m. from North Stainley. Follow the cart road opposite the church passing Ripon Parks Farm on the right to Middle Parks Farm where the Dubs are situated. Indicators will be placed on gates where members may go wrong. In the afternoon members coming by bus or train should take the North Stainley bus (2-30 p.m., Ripon Market Place) and alight at the Golf Course car park where a guide will be waiting, then take the lane on the right adjoining the car park.

Queen Mary's Dub can be reached on foot by taking the Tanfield road for a mile and then turning right from the main road just beyond High Common Farm and opposite the entrance gates of the Episcopal Palace grounds.

PERMISSION has been kindly given by Mr. T. Ellis, of Ripon, who requests that members will keep off arable land.

THE DISTRICT.—Queen Mary's Dub lies some two to three miles north of Ripon in the area known as Ripon Parks which lies between the Ripon-Tanfield road and the river Ure (the term Parks is found again at Topcliffe Parks, north of Topcliffe). The boundary between the North (V.C. 65) and West (V.C. 64) Ridings follows the river from Hackfall to East Tanfield but then leaves it, crossing it several times and enclosing small areas on each side. At the Queen Mary's Dub area both sides of the river are in the West Riding, V.C. 64.

BOOKS AND MAPS.—Sheet 21 (Large Sheet Series) of the 1-inch Ordnance Survey covers the area. The district is included in Lees' *Flora of the West Riding*, and in Kendall and Wroot's *Geology of Yorkshire* there is a photograph of the contorted Gypsum bands found on the bank of the Ure near the Dub.

GEOLOGY.—Dr. H. C. Versey writes : The origin of Queen Mary's Dub is not quite clear. It is surrounded by mounds of glacial drift but when this material is exposed, as to the east of the pool, it consists of coarse gravel, so that the hills are perhaps kames rather than moraines.

Nearer to Ripon are other smaller holes, with and without water, which are attributed to collapse following the solution of gypsum or anhydrite beneath. It is noteworthy that in the bank of the River Ure near Queen Mary's Dub this gypsum outcrops so that the Dub might be the site of another collapse.

This outcrop of gypsum is the result of the Upper Permian Marl being dropped between the two faults which, farther east, form the Coxwold Trough. The base of the section is occupied by massive gypsum while above are marls, much contorted, with fibrous gypsum of secondary formation. This section will repay detailed examination and measurement.

Little is known concerning the glacial deposits mentioned above and attention should be paid to the content of the gravels and their relation to the adjacent river terraces.

BOTANY.—Miss D. B. Burch (Training College, Ripon) says that each Dub has a dominant flora of its own and that the surrounding vegetation is also different and should give some interesting work to ecologists. She includes the following in a long list of plants from the Dubs: *Veronica anagallis*, *V. scutellata*, the var. *triphyllos* and *heterophyllos* of *Ranunculus aquatilis*, *Menyanthes trifolia*, *Stellaria palustris*, *S. graminea*, *S. uliginosa*, *Alisma plantago*, *Scirpus palustris* var. *multicaulis*, *Carex vesicaria*, *Sparganium ramosum*, *Triglochin palustre*, *Hydrocotyle vulgaris*, *Ænanthe fistulosa*, *Æ. aquatica*, *Iris pseudacorus*, *Silene inflata*, *Linum catharticum*, *Botrychium lunaria*.

There is a part known to her as the Mealy Primrose Field where there is plenty of lime and here are found *Primula farinosa*, *P. veris*, *Pinquicula vulgaris*, *Alisma plantago*, *Valeriana dioica*, *Lychnis flos-cuculi*, *Listera ovata*, *Rubus cæsius*, *Poterium sanguisorba*, *Carex disticha*, *C. lepidocarpa*.

Mr. W. G. Bramley writes: As far as I can gather nothing is known about the mosses and hepatics. The mycology will be chiefly restricted to parasitic species, but there are one or two woods which may be profitably worked.

VERTEBRATE ZOOLOGY.—Miss Burch sends the following list of species which have been reported from the district: Linnet, Chaffinch, Blue Tit, Cole Tit, Kingfisher, Snipe, Lapwing, Swallow, Yellow Hammer, Wild Duck, Heron, Moorhen, Corncrake.

A Fox was seen in 1918.

CONCHOLOGY, ENTOMOLOGY.—No reports are to hand and full lists of all species seen will be very useful for inclusion in the report of the meeting.

MEETING.—Tea will be arranged for 5 p.m. and a Meeting for presentation of reports on the day's work and for election of new members will follow at 5-45 p.m.

We are anxious to get more members and the Secretary will gladly send forms for nomination and information to anyone asking for them.

The next meeting of the Union will be at Driffield, S.E. Yorks., V.C. 61, on July 8th, 1939.

YORKSHIRE NATURALISTS' UNION.

For particulars apply to

The Hon. Secretary, Chris. A. Cheetham, Austwick via Lancaster ;
 or to The Hon. Treasurer, S. D. Persy Fisher, Sackville Street, Leeds.

This form, when filled up and signed, should be sent to the Hon. Secretary of the Union, accompanied by the amount of the first year's subscription.

The Subscription of 15/- entitles the members to receive the Union's monthly magazine, "The Naturalist," as well as the "Transactions."

Persons related to and resident in the family of a member are admitted as 5/- members, to enable them to attend excursions, but not to receive the publications.

Qualification for Life Membership :—A Donation of 11 Guineas.

Yorkshire Naturalists' Union.

.....19.....

[Signature and Titles.]

[Address.]

wishes to become a member of the Yorkshire Naturalists' Union, and will subscribe FIFTEEN SHILLINGS (15/-) per annum until the end of the year in which written resignation is given.

[Signature of Proposer and Seconder.]

Elected.....19 at.....

.....Chairman's Signature.

Yorkshire Naturalists' Union.

President :

RALPH CHISLETT, F.R.P.S., M.B.O.U., Rotherham.

Hon. Secretary :

CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer :

S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary :

C. W. MASON, 15 Park Avenue, Hull.

The 419th Meeting

WILL BE HELD AT

DRIFFIELD

FOR KING'S MILL AND KELLEYTHORPE

On Saturday, JULY 8th, 1939

HEADQUARTERS.—The Bell Hotel, Driffield. Tel. No. 42 Driffield. Members should address their requirements to the Manager (Mr. D. Mill). Terms, bed and breakfast, 7/6. There is a good car park by the hotel, and members will find it best to leave their cars there for the day.

TRAVEL FACILITIES.—Driffield is well served by bus and train services.

Trains for Driffield leave Hull 9-3 a.m. and 11-5 a.m.; Malton, 10-37 a.m.; Selby, 8-50 and 10-46 a.m.; Whitby, 8-13 a.m.; Scarborough, 10-0 a.m. For bus times consult your local time-table.

BOOKS AND MAPS.—The 1 in. Ordnance Survey Map, Sheet 64, includes the area to be investigated. Circulars Nos. 84 and 145 contain information on the natural history of the area to be visited. Robinson's

Flora of the East Riding, the Geology of the Country around Driffield, and Sheppard's Geological Rambles in E. Yorks., should be consulted. The prehistoric features of the Wold area are fully described in Mortimer's *Forty Years' Researches*.

ROUTE.—The route proposed is from Headquarters at 11 a.m. to King's Mill where the marshy ground in the vicinity and Emswell and Driffield becks will be investigated. Then the path through the marsh towards Kelleythorpe and after crossing the railway the road to Kelleythorpe will be taken. The interesting and extensive marsh at Kelleythorpe will then be examined. From Kelleythorpe the Eastburn beck will be followed to the bridge at Sunderlandwick. Return may be made to Headquarters by a bus which passes the bridge at 5 p.m. If time permits, the wooded lane at Sunderlandwick can be visited.

The springs arising from the chalk, and the marshy ground resulting, together with the cold, swiftly-flowing trout streams, furnish habitats for investigation and should prove attractive to all types of naturalist.

PERMISSION has been kindly given by Major W. D. B. Thompson, D.S.O., M.C., T.D., of Kelleythorpe.

THE DISTRICT.—Mr. T. Stainforth writes: Two movements of uplift running athwart have given to the Yorkshire Wolds their familiar sweeping curve, and in the curved angle formed by the component trending east and that bending south stands the market town of Driffield. Upon it converge some of the longest of the Wold Valleys, those from Cowlam, from Sledmere, from Wharram Percy, and Fridaythorpe, Wetwang, and Huggate. Dry they are now, or nearly so, but the sand and gravel and the broad patch of alluvium on which Driffield is built speak of other days and ways. It is near Driffield that the main streams arising from the chalk have their sources, and this is undoubtedly due to the structure impressed on the chalk by two systems of earth folds. The streams flowing by Driffield give the area an interest to the naturalist, and much attention should be paid to their plant and animal ecology. The upper reaches of the River Hull form here a trout stream with cold and clear waters rapidly flowing in a tortuous course through marshy meadows. Here and there remains of ox-bows, filled in with aquatic plants, invite the naturalist's attention.

GEOLOGY.—Mr. S. Melmore, B.Sc., writes: The deposits at Craike Hill described by Carvill Lewis in 1894 (*Glac. Geol. Gt. Brit. and Ireland*, pp. 218-21) and supposed by him to represent a raised beach, have received little if any attention in recent times. The hill is not named on the 1 in. Ordnance map, but is represented by a 150 ft. contour ring half a mile west of Garton Station and opposite the end of a lane running south from Garton-on-the-Wolds.

In the pit at Craike Hill the descending sequence of Hesse Clay, warp, chalk and flint gravel, and sand, described by Carvill Lewis, can still be readily recognised, and the clay boulders coated with pebbles which he mentions can still be found.

The 'gravel of the dry chalk valleys' is exposed in a pit at Gartonslack Gatehouse. The sand in this section is of finer grade and more micaceous than that at Craike and occasionally there are to be found in it rounded idiomorphic crystals of dolomite of the type described in *The Naturalist*, 1929, pp. 341-3. But such differences as there may be between the heavy minerals of Craike and Gartonslack are perhaps sufficiently accounted for by the difference in grade size.

MAMMALS, REPTILES, and AMPHIBIANS.—Mr. C. F. Procter writes: This is a game country. Hares and rabbits are plentiful and occasionally outbreaks of disease occur, generally synchronising with a

time when the animals are more than usually plentiful. It persists through all the seasons for maybe two years.

Otters and badgers occur, but—although their appearance is rare—they are very secretive and are more numerous than is generally thought. The brown squirrel is slowly decreasing but the grey squirrel is equally rare. Stoats, weasels, all the rodents are common and the old black rat exists in one or two areas. The water vole and red bank vole are ubiquitous.

The grass snake is more common than it used to be.

The adder does not occur nor any of the lizards.

The great crested and common newt are to be found in every suitable sanctuary, but the palmated newt is definitely getting more and more rare. I have not seen one for several years, but they used to be common. This is a very interesting phenomenon, without a ready explanation.

BIRDS.—Mr. W. W. Nicholas writes : The following is a list of birds that I have known to nest at Kelleythorpe and may be there this year. Tawny Owl, Barn Owl, Little Owl, Kestrel, Jackdaw, Wood Pigeon, Turtle Dove, Blackbird, Mistle Thrush, Song Thrush, Robin, Chaffinch, Greenfinch, Long-tailed Tit, Great Tit, Blue Tit, Sedge Warbler, Reed Bunting, Mallard, Waterhen, Little Grebe, Kingfisher, Spotted Flycatcher, Common Wren, House Martin, Lapwing, Redshank, Snipe.

Other birds that have been observed from time to time are Carrion Crow, Sparrow-hawk, Gulls, Willow Warbler and Gold Crest. I have never found nests of these latter.

Notes on the Fauna of the Driffield Trout Stream.—Mr. H. Whitehead, B.Sc., writes : There are three definite types of stream bed, viz. :

(1) Stony regions of flint flakes and chalk fragments with the caddis *Agapetus fuscipes* and the fresh-water shrimp, *Gammarus pulex*, in abundance.

(2) Silt and mud with growths of starwort and *Potamogeton perfoliatus*. Specimens of *Pisidium sp.* and larvae of various chironomids are characteristic.

(3) Bed with thick growths of *Sium erectum*, *Ranunculus sp.*, and in the deeper parts mare's-tail (*Hippuris vulgaris*). This is the richest in animal life and among the mare's-tail, great numbers of nymphs of the mayflies of the genera *Baetis* and *Ephemerella* occur during the summer.

The following species have been found in the stream stretching about two miles above Poundsworth Mills.

MOLLUSCA.—The two fresh-water limpets, *Ancylus fluviatilis* and *Acroloxus lacustris*, also *Limnaea pereger*, *Physa fontinalis*, *Valvata piscinalis*, Large quantities of *Paludetrina jenkinsi* occur in some of the smaller tributaries. Several species of *Pisidium*.

DIPTERA.—In addition to chironomids, large numbers of Simulium (Black flies) are found attached to aquatic plants. These include *S. latipes*, *S. equinum*, *S. variegatum*, and *S. angustitarsus*.

COLEOPTERA.—Larvae of *Brychius*, *Platambus*, and *Helmis*.

TRICHOPTERA (Caddis flies).—*Glyptotaelius pellucidus*, *Limnophilus lunatus*, *L. nigriceps*, *L. extricatus*, *Anabolia nervosa*, *Halesus radiatus*, *H. guttatipennis*, *Chaetopteryx villosa*, *Sericostoma personatum*, *Silo pallipes*, *Tinodes waeneri*, *Polycentropus flavomaculatus*, *Rhyacophila dorsalis*, and *Agapetus fuscipes*.

Ephemeroptera (Mayflies).—There are few species, but many individuals of *Baetis bioculatus*, *B. tenax*, and *Ephemerella ignita* (Blue-winged Olive).

Stone flies are uncommon and only *Chloroperla grammatica* and *Nephelopteryx nebulosa* have been noted.

The fresh-water leech, *Piscicola geometra* is abundant in the vegetation and is parasitic upon fish. The widely distributed fresh-water leeches *Glossosiphonia complanata*, *Helobdella stagnalis*, and *Herpobdella spp.* are present.

ENTOMOLOGY.—Mr. T. Stainforth, B.A., B.Sc., writes: Apparently no entomologist has lived in the immediate district and in consequence records are few. Such investigations as have been made on the Hull Society's and previous Y.N.U. excursions to the district have not indicated a rich insect fauna. The fullest account of the entomology area is that given by Mr. J. M. Brown in *The Naturalist* for 1930, pp. 23-25. Possibly greater concentration on one area, such as the Kelleythorpe marsh, with its great tussocks of sedges, would yield good results.

FLOWERING PLANTS AND FERNS.—Mr. T. Stainforth, B.A., B.Sc., writes: The recorded list of plants for the district is a long one, and a list of some of them will be found in Y.N.U. Excursion Circulars No. 145 (July, 1899), No. 266 (July, 1916), and No. 350 (August, 1929), and in the reports of these excursions in *The Naturalist* for September 1916, and January, 1930. At Kelleythorpe itself, the Marsh Buckler Fern, *Lastraea Thelypteris*, occurs in abundance, together with *Schoenus nigricans*. The Marsh Lousewort, varieties of the Marsh Orchid, Bogbean, numerous Sedges and rushes are found with the usual elements of lowland marshes. The Carices found in the area include *dioica*, *pulicaris*, *disticha*, *teretiusscula*, *paradoxa*, *paniculata*, *vulpina*, *muricata*, *fulva*, *flava*, *riparia*, *glauca*, and *Goodenovii*.

In the Kelleythorpe marsh, the tussocks formed by *C. paniculata* are truly enormous.

MEETING AND TEA.—At the Bell Hotel, Driffield. A tea with meat at 2/6, or plain at 1/6, will be ready at 5-30 p.m., and this will be followed by a General Meeting for presentation of reports on the work done during the day and the election of new members.

The next meeting will be held at Castleton, Eskdale. August 5th to 7th, 1939.

YORKSHIRE NATURALISTS' UNION.

For particulars apply to

The Hon. Secretary, Austwick, via Lancaster; or to the Hon. Treasurer, S. D. Persy Fisher, Sackville Street, Leeds.

.....19.....

.....[Signature and Titles.]

.....[Address.]

wishes to become a member of the Yorkshire Naturalists' Union, and will subscribe FIFTEEN SHILLINGS (15/-) per annum until the end of the year in which written resignation is given.

Members are entitled to receive 'The Naturalist' and all other current publication of the Union, free.

..... } [Signature
of Proposer
and
Seconders.]

Yorkshire Naturalists' Union.

President:

RALPH CHISLETT, F.R.P.S., M.B.O.U., Rotherham.

Hon. Secretary:

CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer:

S. D. PERSY FISHER, Sackville Street, Leeds.

Divisional Secretary:

Miss C. M. ROB, Catton Hall, Thirsk.

The 420th Meeting

WILL BE HELD AT

CASTLETON, ESKDALE

On Saturday, AUGUST 5th, to
Monday, AUGUST 7th, 1939

HEADQUARTERS.—The Robin Hood Hotel, Castleton, N. Yorks.
Proprietor: Mrs. Ratty. Terms, 8/6 per day. The accommodation is
very limited and members requiring rooms should apply at once.

TRAVEL FACILITIES.—

Train Service.

		a.m.	a.m.	p.m.	p.m.	p.m.
Whitby	...	6-54	10-10	1-20	5-47	8-12
Castleton	...	7-44	10-57	2-10	6-37	9-0
Castleton	...	8-46	11-27	2-58	5-37	7-21
Whitby	...	9-29	12-11	3-45	6-20	8-8

United Bus Service 58.

		a.m.	a.m.	p.m.	p.m.	p.m.	p.m.	p.m.
Middlesbrough	...	8-5	10-5	12-5	2-5	4-5	6-5	8-5
Castleton	...	9-28	11-28	1-28	3-28	5-28	7-28	9-28
Castleton	...	9-47	} and every two hours					
Middlesbrough	...	10-57						

These services will in all probability be augmented during August Bank holiday.

BOOKS AND MAPS.—The 1 in. Ordnance Survey Map, Sheet 16, Whitby, Saltburn and district covers the district. The area to be investigated is included in sheets 43 and 34 New Series of the 1 in. Maps geologically coloured. General information concerning the district can be obtained from Canon Atkinson's *Forty Years in a Moorland Parish*; Kendall and Wroot's *Geology of Yorkshire*; Baker's *North Yorkshire*; Elgee's *Moorlands of North-east Yorkshire*; Nelson's *Birds of Yorkshire*; *Papers and Proceedings of the Cleveland Naturalists' Field Club*; Y.N.U. Circular, No. 230; Cowper Reed's *Geological History of the Rivers of East Yorkshire*; Kendall's 'System of Glacier Lakes in the Cleveland Hills' (*Q.J.G.S.*, 1902); *Geol. Survey Memoir* ('Jurassic Rocks of Yorkshire').

The district to be investigated includes the upper portion of the valley of the Esk and the dales of Baysdale, Westerdale, and Danby Dale. The village of Castleton is situated on a narrow ridge dividing Eskdale from Danby Dale and is surrounded by widespreading moors and wooded hills and valleys.

ROUTES.—The suggested routes are :

Saturday (August 5th).—Road and path to Low House, then follow River Esk up Westerdale and return by Tower Beck to Castleton.

Sunday.—Baysdale.

Monday.—Danby Dale, following the Beck and returning *via* Danby Rigg and Hinthorpe Quarries.

GEOLOGY.—Mr. J. A. Butterfield, M.Sc., F.G.S., writes: Castleton, situated in the upper portion of the beautiful valley of the Esk, with its finely-wooded hills and dales and surrounded by health-giving moors, offers an attractive area of study for the geologist.

Stratigraphically the area is made up of Jurassic rocks, including Lower, Middle, and Upper Lias, Dogger, Lower Estuarine Series, Grey Limestone Series, Upper Estuarine Series with Moor Grit at the base and Cornbrash at the top, and also Kellaways Rock. The Lias consists of shales and impure limestones with interbedded ironstones. The other rocks, collectively forming the Lower Oolites, consist of a great succession of estuarine beds made up of shales, sandstones, beds of coal, and at intervals calcareous beds and bands of ironstone. The whole series is reminiscent of the Coal Measure rocks of other parts of Yorkshire and was laid down by a great river entering a shallow sea at this point, forming sandy and muddy deltaic flats. Occasional incursions of the sea gave rise to the limestone bands. The direction of this river is not known. At the present time the Lower Oolites form the cap-rocks of most of the hills in this area, occasionally forming scars, whilst the Liassic rocks are only exposed by denudation in the valleys. The latter can be examined in Baysdale, Westerdale, and Danby Dale, but good sections are rare. Beds of Oolite age are well seen in the Castleton Ganister Quarries. North of Castleton, in the neighbourhood of Freeborough Hill, is an outlier of Kellaways Rock. At Castleton coal pits were formerly operated and old workings can be examined near Danby Beacon. The coal is of poor quality, occurs beneath the Grey Limestone Series, and is about 2 ft. thick. Disused ironstone mines are to be seen in Kildale. Fossils are fairly common in these rocks and some of the shales contain good plant remains.

The Cleveland Dyke runs close to Castleton appearing at Toad Hole near Dale Ends and being traceable for some distance. Old quarries in this rock, much overgrown, occur $\frac{1}{2}$ a mile west of West House and a few exposures exist in Kildale. The dyke consists of a bluish-grey, finely crystalline, augite-andesite, and is of probable Tertiary age. A peculiar feature of the dyke is the small amount of alteration it has produced on adjacent rocks.

Perhaps the most interesting feature of this area is its glacial geology. This portion of Eskdale was occupied by a large extra-morainic lake dammed up by the invading ice-sheets from the North Sea, Cheviots, Southern Scotland, and the Pennines. The lake occupied also the neighbouring valleys of Sleddale, Commondale, Baysdale, etc. The floor of this lake became covered with lake silts in the form of laminated clays which can be examined at the Danby Brick and Tile Works. The various other features associated with such glacial lake phenomena, including beaches, deltas, overflow channels, etc., can be studied to advantage in this area, e.g. Ewe Crag Slack gives a perfect example of an overflow channel, and the delta at Castleton, near its exit, is supposed to be one of the finest examples of its kind. In this connection Professor Kendall's paper on a 'System of Glacier Lakes in the Cleveland Hills' should be consulted.

Finally the geologist will find a study of the river system and drainage of this area of great interest. Mr. Cowper Reed described this aspect of the district in his *Geological History of the Rivers of East Yorkshire*, and this subject will repay study.

BIRDS.—Mr. A. S. Frank writes : Early August is a transition period, nesting time being over and the autumn migration not yet in full swing. Most of the local curlews have already left their nesting grounds on the moorlands for the estuaries of the Tees and Humber. An early autumn migrant—the Green Sandpiper—is occasionally seen about moorland ponds at this season. Montague's Harrier bred successfully in the Castleton area in 1935, and the birds have been seen from time to time since. When it successfully eludes the keeper's gun the Merlin also nests on these moorlands. Parties of Whimbrels may sometimes be seen in August.

BOTANY.—**FLOWERING PLANTS.**—Mr. Percy Burnett writes : Castleton in Upper Eskdale lies outside the area worked by the Whitby Naturalist's Club, and therefore the Society's records do not greatly help. The country is varied, with pleasant fields, stream sides which should be worth examination, charming and interesting woods lower down the valley and a higher background of moor.

Among moorland plants will be found *Vaccinium myrtillus* L., *V. vitis-idaea* L., *V. oxycoccus* L., *Myrica gale* L., and *Empetrum nigrum* L. There is a long-standing note of *Drosera anglica* Huds. from Battersby Slack a few miles away. *D. rotundifolia* L. is more common and *Pinguicula vulgaris* L. also occurs. *Calamagrostis epigeios* Roth. is recorded from the foot of Kildale Moor, also *C. canescens* Gmel. (*Arundo Calamagrostis* L.). In a wood near Lealholm, a little further down the dale, I have found *Stellaria nemorum* L. Below the woods of Crunkley Ghyll the stream is specially interesting because of the many alien plants which are establishing themselves and which have been carried down at a time of flood from near-by gardens, affording an illuminating sidelight on how and why unusual plants occur in unexpected places. *Epilobium nummularifolium* Cunn. covers many square yards of river bank in the Egton Bridge neighbourhood and *Mimulus guttatus* D.C. is well established. *Sisymbrium thaliana* L. grows on the railway embankment. *Myrrhis odorata* Scop. and *Viburnum Opulus* L. should also be found. On the bracken hill side slopes of Baysdale *Trientalis europæa* L. is not uncommon. Among woodland plants, *Carex pendula*, *Epipactis helleborine* Crantz., *Solidago virgaurea* L., and *Poterium officinale* A. Gray may be mentioned, and *Osmunda regalis* L. occurs in more than one locality.

A most interesting piece of ground is the site of the old slag heaps at Glaisdale where a great many species abound, including *Verbascum thapsus* L., *Reseda luteola* L., *Linaria vulgaris* Mill., *Linaria minor* Desf., and *Echium vulgare* L.

It may be that similar slag heaps at Grosmont are too far away to warrant mention, but many local records exist solely because of this one notable station.

LICHENS.—Mr. W. E. L. Wattam writes: The district has an interesting lichen flora, and amongst the species occurring are *Collema pulposum* Ach., *Peltigera canina* Willd., *P. polydactyla* Hoffm., *Ramalina farinacea* Ach., *Parmelia physodes*, *P. sulcata* Tayl., *P. conspersa* Ach., *P. omphalodes* Ach., *P. lævigata* Ach., *Cetraria glauca* Ach., *C. aculeata* Fr., *Evernia furfuracea* Mann., *Xanthoria parietina* Th. Fr., *Placodium collopismum* Mer., *Pl. flavescens* A. L. Sm., *Lecanora muralis* Schaer., *L. campestris* B. de L., *L. hageni* Ach., *L. atra* Ach., *L. parella* Ach., *L. calcarea* Sommerf., *L. effusa* Ach., *Bæomyces rufus* D.C., *Pertusaria faginea* Leight, *L. pertusa* D.T. and S., *Cladina sylvatica* Hoffm., *C. uncialis* Web., *C. coccifera* Willd., *Lecidia sanguinaria* Ach., *L. confluens* Ach., *L. rivulosa* Ach., *Rhizocarpon obscuratum* Massal., *Rh. geographicum* D.C., *Opegrapha atra* Pers., *O. varia* Pers., *Verrucaria nigrescens* Pers., *V. muralis* Ach.

MEETING AND TEA.—At the Robin Hood Hotel, Castleton, on Monday evening, 5 p.m. Tea with sandwiches, 1/6. This will be followed by a meeting for the presentation of reports on the work done on the excursions and for the election of any new members.

This is the last of the five Vice-County Meetings, and will be followed by the Fungus Foray at Richmond, September 1st to 6th. The Annual Meeting of the Union will be at Scarborough on December 2nd, 1939.

YORKSHIRE NATURALISTS' UNION.

For particulars apply to

The Hon. Secretary, Austwick, via Lancaster; or to the Hon. Treasurer, S. D. Persy Fisher, Sackville Street, Leeds.

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wishes to become a member of the Yorkshire Naturalists' Union, and will subscribe FIFTEEN SHILLINGS (15/-) per annum until the end of the year in which written resignation is given.

Members are entitled to receive 'The Naturalist' and all other current publication of the Union, free.

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..... } of Proposer
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Yorkshire Naturalists' Union.

President :

RALPH CHISLETT, F.R.P.S., M.B.O.U., Rotherham.

Hon. Secretary :

CHRIS. A. CHEETHAM, F.R.E.S., Austwick, *via* Lancaster.

Hon. Treasurer :

S. D. PERSY FISHER, Sackville Street, Leeds.

The 421st Meeting

WILL BE THE

FUNGUS FORAY

AT

GILLING WEST, RICHMOND

From September 2nd to 6th, 1939

MYCOLOGICAL COMMITTEE :

Chairman : Dr. J. GRAINGER, Huddersfield.

Convener : Miss J. GRAINGER, Skelmanthorpe.

Recorders : Dr. J. GRAINGER, Huddersfield ; W. G. BRAMLEY, Bolton Percy.

Rep. on Executive : R. FOWLER JONES, Ikley.

HEADQUARTERS.—The Angel Inn, Gilling West *via* Richmond. Proprietress, Mrs. N. Taylor. Accommodation inside the hotel is limited but comfortable rooms are available near by.

Terms, 8/- per day for single room ; 7/- per day for those sharing a room.

BOOKS AND MAPS.—Most of the area to be visited is included in the 1-inch Ordnance Survey Map Sheet No. 15. Members should bring *The Yorkshire Catalogue of Fungi*.

PERMISSION.—The Marquis of Zetland has kindly granted permission to visit the Aske estate and Major G. H. Craddock his estate at Hartforth.

MEETINGS.—The Annual Meeting of the Mycological Committee will be held on Saturday evening, September 2nd,

1939, when Dr. Grainger will deliver his presidential address on 'The Ecology of Fungi.'

Another evening paper is 'New diagnostic characters in the Agarics,' by Mr. A. A. Pearson.

WORKROOM.—A large workroom is available at headquarters. An 'Exhibition of Fungi' will be held at the close of the meeting.

Members are requested to bring microscopes and books.

TRAVEL FACILITIES.—There is a Service 29 bus from Darlington *via* Gilling to Richmond :

Darlington	8-0	10-15	then every	6-15	9-0	On Sats.
Gilling ...	8-43	10-58	2 hours	6-58	9-43	the service
Richmond	8-55	11-10	until	7-10	9-55	is hourly
Richmond	7-30	9-15	then every	7-15	10-0	On Sats.
Gilling ...	7-42	9-27	2 hours	7-27	10-12	the service
Darlington	8-25	10-10	until	8-10	10-55	is hourly

Percival's Bus is from Barnard Castle *via* Gilling to Richmond.

Bd. Castle	7-55	11-10	2-10	5-10	On Sats. there is
Gilling	8-47	12-2	3-2	6-2	a 2 hourly service
Richmond	9-0	12-15	3-15	6-15	8-10 to 4-10
Richmond	9-30	12-45	3-45	6-45	On Sats.
Gilling	9-43	12-58	3-58	6-58	9-45 and every
Bd. Castle	10-35	1-50	4-50	7-50	2 hours to 3-45

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H. HAMSHAW THOMAS, M.B.E., F.R.S., M.A., Sc.D., F.G.S., Cambridge.

The 422nd Meeting and 78th Annual Meeting

WILL BE HELD AT

LEEDS

On Saturday, December 2nd, 1939

The Annual Meeting, which was to have been held at Scarborough this year, has had to be transferred to Leeds owing to difficulties of travel and lighting restrictions. We are grateful

to the University authorities for the kind assistance given to us so promptly in this emergency and for the excellent arrangements they have made for our convenience for holding the meeting during daylight hours.

PROGRAMME

- 11-0 a.m. **Sectional and Committee Meetings.** The Vertebrate Section will meet in the Committee Room in University House. Other sections will meet in Botany House. These rooms are in Beech Grove Terrace.
- 11-30 a.m. **Executive Meeting** in the Board Room in University House.
- 12 noon. **The General Committee Meeting** in the General Lecture Theatre on the ground floor in the Baines Wing, entrance by the Baines Door, the nearest entrance in University Road, approaching from Woodhouse Lane.
- 1-0 p.m. **Lunch** will be provided at 1/9 per head at the Staff House almost immediately opposite the Baines Wing for members who notify Miss L. I. Scott, The University, Leeds, 2, in advance by post-card. Members are earnestly asked **to do this at once and not defer it and then forget** as they usually do.
- 2-0 p.m. **The Annual Meeting and the Presidential Address** 'On the Birds about a Part of the Southern County Boundary': A Survey of the levels between Hatfield and the Idle (illustrated).
-

The Vice-Chancellor of the University, B. Mouat Jones, M.A., will welcome the Union on their visit to Leeds University.

Will members of the **Executive** and of the **General Committee** take note of the above times as no further notice of these meetings will be sent out.

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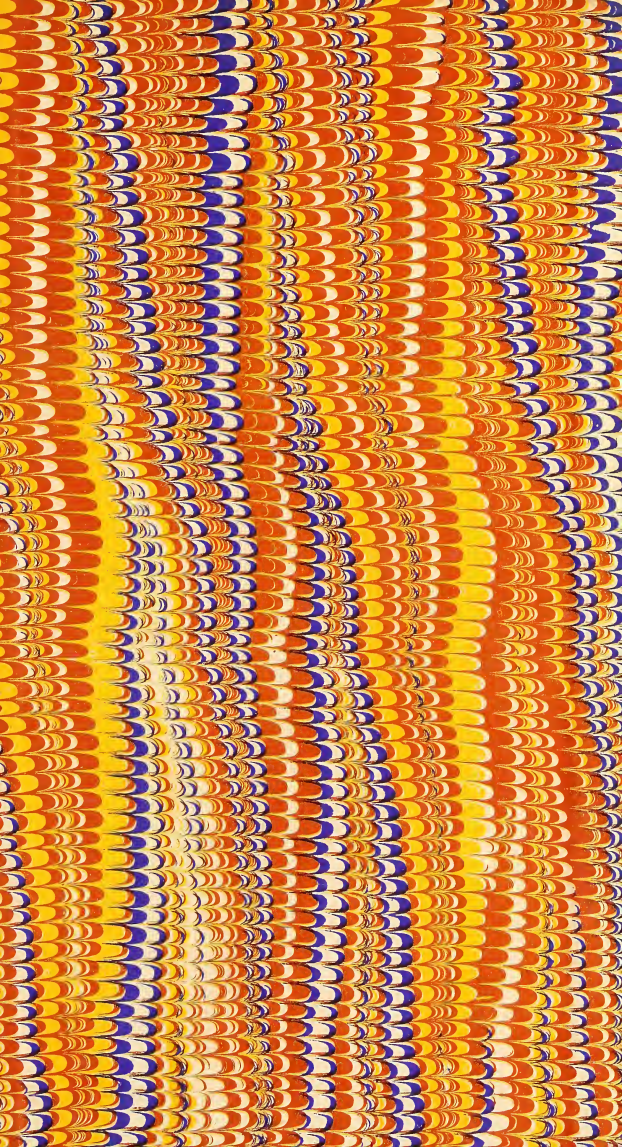
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