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THE
NATURALIST:

A
MONTHLY JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

WM. DENISON ROEBUCK, F.L.S.,

VICE-PRESIDENT OF AND RECORDER TO THE CONCHOLOGICAL SOCIETY, AND HON. SECRETARY
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AND

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MEMBER OF THE BRITISH ORNITHOLOGISTS' UNION, AND OF THE BRITISH ASSOCIATION
COMMITTEE ON THE MIGRATION OF BIRDS; HON. SECRETARY YORKSHIRE
NATURALISTS' UNION, &c.

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1887.

P R E F A C E .

THE Editors have to express their thanks to the contributors whose writings have maintained the excellence of the journal at the high level of previous years, and to the subscribers who by their support show their appreciation of the efforts both of Editors and contributors to make *The Naturalist* a trustworthy repertory of information concerning the natural history of Northern England.

The Editors would be pleased if during the coming year their supporters would contribute papers and notes relating to those counties which reference to the indexes of this and previous volumes will demonstrate to have been somewhat neglected.

They also wish to bespeak the assistance of their friends in improving the circulation so as to enable them to realise the wish—much-cherished yet much-disappointed—to enhance its usefulness by giving illustrations more frequently than the exiguity of their financial position has permitted in the past.

The Editors have arranged for a paper by their old friend, Mr. John Cordeaux, upon the Isle of Heligoland and upon its intimate connection through bird-migration with Northern England, to appear in the January number, and to be illustrated by autotype photographs of the famous garden in which so many rarities have been observed.

The Bibliography will be resumed in 1888, its non-appearance during 1887 having been caused by pressure of original papers and notes. The Editors regard it as of the highest value, and are happy to know that this opinion is widely shared amongst the supporters of their journal.

2 DEC 1897





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The NATURALIST.

IT being the wish of the Editors to make the journal the recognised organ for information concerning the natural history of the North of England, they hope to rely on Naturalists keeping them supplied with articles and short notes from time to time.

Communications should be written on *one side* of the paper only, and should be sent as soon after the commencement of the month as possible.

Short Notes of important occurrences will be received up to the 20th of the month, and specially urgent ones even later.

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Advertisements.—Scale of charges may be had on application.

BOOKS RECEIVED.

- Natural History Journal, December 1886. [Mr. J. Edmund Clark, Editor.
The Young Naturalist for December 1886. [Mr. J. E. Robson, Editor.
Science Gossip for December 1886. [The Publishers.
The Midland Naturalist for December 1886. [The Editors.
British Stalk-eyed Crustacea and Spiders—By F. A. A. Skuse (Young Collector Series), 8vo, 1887, 128 pages. [Swan Sonnenschein & Co.
On the Origin of Agriculture—By H. Ling Roth, 8vo reprint, 36 pages. [Author.
Grevillea, a quarterly record of Cryptogamic Botany, No. 74, December 1886. [Dr. M. C. Cooke, Editor.
Belfast Nat. Field Club—Annual Reports and Proceedings, 1873-4, 1874-5, 1875-6, 1876-7, 1877-8, 1878-9, 1879-80, 1880-1, 1881-2, 1882-3, 1883-4, 1884-5. [The Club.
Cumberland and Westmoreland Association—Transactions, No. xi, 1885-86. [The Association.
Further additions to the Rev. T. A. Marshall's Catalogue of British Ichneumonidæ --By John B. Bridgman, 8vo reprint, 38 pages. [Mr. G. T. Porritt.

The Distribution of the Lepidoptera in the British Isles.—As I am compiling notes for a work on this subject, I shall be much obliged for Local Lists of Lepidoptera, which, however incomplete, will be useful to me.—W. HARCOURT BATH, The Limes, Sutton Coldfield.

Dragon Flies.—Wanted to correspond with Entomologists collecting these Insects, with view to exchange.—W. HARCOURT BATH, The Limes, Sutton Coldfield.

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The cheapest dealer in Birds, Skins, Eggs, Butterflies, Moths, Foreign Shells etc., is John Eggleston, Park Place, Sunderland. Lists free.

THE NATURALIST

For 1887.

THE RIVER TEES: ITS MARSHES AND THEIR FAUNA.

R. LOFTHOUSE.

THE River Tees (Teyse, Tesi, Teisa, Tesa, Teise, These, Teysa—of old records) separates the counties of York and Durham. At the mouth of the river there is a vast extent of mud-flats (or, as they are locally called, slems), some thousands of acres in extent. These mud flats or 'slems' used to be bordered by marshes more or less all the way to Stockton, a distance of about ten or twelve miles, and in former times were resorted to by vast numbers of wild fowl. The marshes on the south side of the river, and a good deal of the foreshore from Stockton to Eston, have been for the most part reclaimed and filled with slag, and are now occupied with ironworks, wharves, and ship-building yards; and of late years ironworks have been established on the Coatham Marsh opposite to the extreme mouth of the river, on the site of a rabbit warren, and close to a wild duck decoy, which existed there down to the years 1870-2. On the north side of the river one or two ironworks have been established at Port Clarence, opposite to Middlesbrough, at a distance of seven or eight miles from the sea: that of Messrs. Bell Brothers is the principal, and one of the oldest in the district. To the east of Port Clarence, the north side of the river is still open and unoccupied, and the Saltholm Marsh remains in much the same state as in former times, but extensive reclamation works are being carried out on the shore opposite by the Tees Conservancy Commissioners, who have reclaimed or have in course of reclamation over 2,500 acres of land, their operations being confined to the area principally of the foreshore on both sides of the estuary, comprised between high water at spring tides and high water at neaps, and who have constructed over a dozen miles of reclamation-embankments, principally of slag. The mud-flats at the mouth of the river are succeeded by a sandy beach, on the one side reaching from Seaton Snook to Hartlepool, and on the other by perhaps one of the finest stretches of sand in Great Britain, extending

from Tod Point to Saltburn, a distance of seven or eight miles, and firm enough for horses and vehicular traffic. These sands are thus referred to in the Cottonian MS., as quoted in Graves' 'History of Cleveland,' p. 399:—'From the passage of the sands, by Reason of the Fyrmenesse and Smoothnesse frequented by such as delight in Swifte Horses, you next come to Redcarre, a poor fysher Towne.' The Tees Conservancy Commissioners have erected a magnificent break-water at Tod Point, on the south side of the river, and are now erecting another on the north side. This, when complete, will leave the entrance to the river about 700 yards wide. From this break-water to Middlesbrough there is an area of between 5,000 and 6,000 acres, between the high-water embankments of the Tees Commissioners, which is covered at high tide only, except the channel; the greatest extent of mud-flat is on the north side, and called Seal Sand; that on the south side is called Bran Sand. Geologically, the basin of the Tees may be said to consist principally of Boulder Clay, with detached patches of an estuarine deposit of sand and gravel in places—the old part of the town of Middlesbrough being built on one of these. Under the Boulder Clay is found the New Red Sandstone; and below this again, at depths varying from 1,000 feet to 1,500 feet, has been found a bed of rock salt, about 100 feet in thickness, and underlying the town of Middlesbrough and adjacent district. It will probably be found to form a kind of basin, and to cover no very extensive area; yet, taking into consideration its great thickness and its quality, it may reasonably be expected to give a great impetus to the town and trade of Middlesbrough and district, with the development of the chemical trades connected with it. It is now being pumped up in the form of soluble brine in one or two places on the north side of the river, and has been reached at boreholes on the south side of the river at Middlesbrough and Eston. The method of raising the salt is thus described in a paper on 'The Iron Trade of Cleveland and the Industries of Middlesbrough,' by Sir Isaac Lowthian Bell, Bart., published in a handbook of Middlesbrough and district:—'A tube, 16 inches diameter, is carried from the surface to the bottom of the bed of salt—the portion which traverses the salt being pierced with holes. Inside this a second tube is placed, open at the lower end. Water is run down the annulus formed by these two tubes, and, becoming saturated with salt, rises in the internal tube until it is balanced by the outer column of fresh water. The proportional weight of fresh water and brine is as 1,000 is to 1,200, so that the inner column stands considerably below the outer. A pump is placed at the top of the inner column, and by this means the brine is raised to the surface.'

It would appear that the manufacture of salt is an old industry on the Tees, though operations appear to have been confined to the surface in former times. Brewster thus refers to it in his 'History of Stockton':—'Near the mouth of the Tees, on Seaton and Greatham Marshes, anciently were very considerable salt works. Traces of these works are still to be seen, and have the appearance of breast-works and fortifications. By an inquisition post mortem (an^o 36, Hatfield, 1380), it appears that Robert, son of Marm. de Lumley, Knight, died seized of 25s. rent and one quart of salt issuing out of three messuages and one saltwork in the tenure of John de Carrowe in Seaton. And by another inquisition of the same kind (an^o 15, Langley, 1421), that Arnisia, the widow of Thomas de Elmedon, died seized of a quarter part of the manor of Seaton, consisting, among other things of a saltwork value 2s., another saltwork, and a fourth part of a saltwork, and the passage of the river Teese. The farms in the parish of Greatham, bordering upon the marshes, holden by leases under the Master and Brethren of the Hospital of God in Greatham, are covenanted to pay a stipulated number of bushels of salt as an acknowledgement to the hospital, which, of course, are now commuted for a money payment.' In Burton's Mon. Ebor. it is stated that the canons of Guisborough possessed considerable salt-works here; and in the Cott. MS. before quoted, is the following reference to salt and other minerals:—'As the Tyde comes in, yt bringethe a small wash Sea-cole, which is imployed to the makinge of Salte, and the fuell of the poore fisher Townes adjoininge: the oylie sulphurousness beinge mixed with the salte of the sea as yt floweth, and consequently hard to take fyre, or to keep in long without quenching, they have a meanes, by making small vaults to passe under the hearthes, into which, by fore-setting the wynde with a board they force yt to enter, and so to serve instede of a pair of bellows, which they call in a proper word of art, a blowcole. The shells, sand, and sea-rock serve instead of marle to enrich the land, which is fruitfull of itself, but much bettered by the neighbourhood of the Sea, making the good husbands of the lowe towns fatt in purse and merry in the heart. Within the sea-marke on oone syde lyeth a rock of excellent plaister, cankered by the salte water; but if it were searched from sande, yt is probable that it would prove pure alabaster.'

On the north side of the river at Canoe Point, near to Greatham Fleet, are a series of low shelving banks or cliffs of sand and gravel, four or five feet high, grassed over on the top; the face of these reveal a large mixture of shells, chiefly cockles, mussels, and whelks, at a depth of about 18 inches from the surface, which would almost

suggest that the river had at some remote time emptied at a higher level, and covered much of the adjoining marshes and land which is now under cultivation; or perhaps, more properly speaking, that the beach had been raised. In the vicinity of the river, near Middlesbrough, are found patches of peat, in which occur large quantities of timber, in most cases hard and sound, and with the bark still on. In digging for drainage and foundation works, the stems of trees have frequently to be sawn through at each side of the cutting; in this peat have also been found deer's horns in perfect condition. The dredges of the Tees Conservancy Commissioners have at various times brought to the surface semi-fossil remains. In the Albert Park at Middlesbrough is a gigantic tree, dredged from the bed of the river some years ago, and said to be oak; it is perfectly sound and hard—indeed, sound enough to be made into furniture. I have also seen a fairly perfect skull of an animal of the genus *Bos* (probably *Bos primigenius*), which measured 2 ft. 4 in. across the horns—which were, however, imperfect—8 in. across the skull just below the horns, 10½ in. at the eyes, and 1 ft. 9 in. in height, though imperfect. I have also seen part of a very large skull, probably a Mastodon, and a single vertebra (of some animal) fully a foot in diameter, and two very large and perfect deer's horns, besides many other bones; these are all in private hands, and have not been examined by any expert, so far as I am aware.

Turning to the fauna of the Tees, if we look over the Ordnance and other maps, we find many names suggestive of the same, some of animals long since extinct. We have Seal Sand in the river estuary, and Seal Goit on the coast beyond Saltburn, Wolviston and Wolviston Grange on the north side of the river, and, as might be expected, Cowpen in the same neighbourhood; then we have Hartburn near Stockton, and Hart and Hartlepool on the adjoining coast, and, of less significance, Hunter Hall and Cat Coat; and on the south side, Warrenby at the mouth of the river, Eaglescliffe near Yarm, and probably Ayrsome near Newport, North Hern near Hartlepool, and Dabholm Beck adjoining Coatham Marshes.

Seal Sand was, until within the last fifty years, the resort of vast numbers of Seals, which bred there. They have, however, gradually disappeared, though, up to the present time, seldom a year passes but individuals are seen or procured. It could hardly be expected that they would long survive the enormous development of the iron and shipping trades, and the reclamation works which have been for years going on in the river. In Meynell and Perkins' 'List of the Mammalia of Northumberland and Durham,' it is stated that 'between 1820 and 1830 about 1,000 seals frequented the mouth of

the Tees, of which as many as thirty might often be counted at one time, but that in 1862 the number was reduced to three individuals.' So late as twenty years ago, however, I have been informed by a gentleman who was in the habit of shooting on the Tees, that it was a common occurrence to see twenty or thirty on the sand-banks at one time. They were doubtless then on the decrease, and had been for many years, as a large amount of shipping traffic was then developed in the Tees. My friend informs me they were very wary, and when approached in a boat it was an amusing sight to see them tumble about, throwing up the sand in all directions, in their awkward and seemingly ludicrous efforts to regain the water. They were, however, very curious, and would follow the boat at a safe distance. When on the sands they generally kept within about twenty yards of the water; but he remembered assisting to capture a young one that was asleep on the sands about 200 yards from the water near Seaton Snook; it was cut off from the water, and being laid hold of, it made desperate efforts to escape, being almost a match for two strong men. It was, however, at last secured, and was a beautifully-spotted specimen, or, as my friend expressed it, marked like a leopard. About this time two seals used to visit regularly every day the stake-nets set for Salmon at Seaton Snook, though repeatedly shot at. They are, undoubtedly, partial to Salmon. It is recorded in Messrs. Clarke and Roebuck's 'Vertebrate Fauna of Yorkshire,' published 1881, that in 1802 'they interfered to such an extent with the Salmon fishery that determined measures were proposed for their extirpation. There is no evidence to show that the extermination was so effected.'

Seals always appear to have been more partial to the north side of the river than the south, though I am informed that occasionally a few might be seen on Bran Sand. The north side is higher, lies better to the sun, and having a bend in the centre of what is called Seal Sand, commands the river both ways. It appears from an old chart of the river, bearing date 1762, published in Mr. Fallows' 'History of the River,' that there were two channels at this point; and that at low water Seal Sand formed an island between them. The river attains its greatest width across the eastern portion of Seal Sand, where it is about $3\frac{1}{2}$ miles wide between high-water marks at neap tides, and as the foreshore on the south side of the river is soft sticky mud from a foot to 18 inches in depth, it will be seen that Seals could rest here pretty securely. Eleven stones was not an unusual weight for Seals caught in the Tees.

Nearly all Seals captured and seen in the Tees during recent years have been young animals, which would almost suggest that they still breed in limited numbers somewhere in the neighbourhood.

In Brewster's list of Fishes, published in his 'History of Stockton,' 1829, it is stated that 'Salmon have much decreased of late years, owing chiefly to the method of hushing carried on in the lead mines of Teesdale, and probably also to the increase of Seals at the mouth of the river.' Of old records of Seals in the Tees, I have not been able to meet with much, except casual references. It is mentioned in the 'List of the Fauna of Cleveland' in Graves' History, published in 1808; in Sharpe's 'History of Hartlepool,' published in 1816; and in Brewster's 'History of Stockton,' mentioned above.

In the 'Durham Household Book, or accounts of the Bursar of the Monastery of Durham, from Pentecost, 1530, to Pentecost, 1534,' published by the Surtees Society, wherein is minutely detailed all the costs of provisioning that house, Seayll's and Seayll-Calves are frequently mentioned; and in one place Tyse fish are specially mentioned (p. 122). It is probable that some at least of these Seals were procured from the Tees. The conservancy of the Tees, together with the rivers Tyne and Wear, belonged to the Bishop of Durham from a very early period, and to him belonged the privileges and profits incident to such power, such as royal fishes, wrecks, duties, anchorage, fishings, weirs, etc.

In 1345 there was paid to the Bishop 22s. 11d. for fee farm rent, for the 'privilege of trading or towing of vessels in the Tees' (Bishop Hatfield's Survey).

Not only were Seals much more plentiful formerly, but they appear to have been regarded as a favourite article of food. At a great feast made by George Nevill, Chancellor of England, and Archbishop of York, at his inthronization (6th Ed. IV, 1468), 'thirteen Porresses and Seals formed part of the provision'; and again, at the inthronization of Archbishop Warham, in 1504, 'Seals et porposs were provided.' The value of a Seal or Porpoise was 13s. 4d. in the 17th year of Henry VIII.

In Brewster's 'History of Stockton' is a quotation from a record in the Curistors' Rolls (1530), having reference to the regulation of the fisheries in the Tees, in which 'Sealles, Purpose, Sturghion, and other like fishes' are mentioned. It appears that some difference had arisen between the fishers using 'drawing netts' and those using 'haling netts,' and is an agreement between the 'parties for appeasing of all variance in time to come.'

In an account of the Salmon fishery in the same history, it is mentioned that 'large shoals of porpoises frequent the sand-banks, and are supposed to be very injurious to Salmon and fishes of inferior size. A fishery for these has been attempted, but it has not been attended with success.' I imagine that Seals are meant here, and that these two animals are often confounded in old records.

Of recent occurrences of Seals in the Tees, I have the following records made by myself, and previously I can remember many being exhibited at Middlesbrough by fishermen and others:—One shot in Billingham Creek on Christmas Day, 1880; this Seal was 3 ft. 4 in. long, and, of course, immature. In the same winter one was shot at Redcar, and another was seen on the rocks at Redcar previous to this, date not noted. On the 24th August, 1881, a local newspaper reported that ‘a school of Seals were discovered in the cut at the Middlesbrough Dock entrance. One of the animals made its way into the dock. Efforts were made to capture it, but without success. It is supposed they had chased a number of Salmon up the river.’ I afterwards conversed with two persons who saw these Seals; they both put the number at two. It was in the afternoon of the day named when they were seen; they were pursued by boats, and dived whenever the boats came near them; they were eventually lost some distance down the river. At the beginning of the following November a large Seal was observed for several days to frequent the beach opposite the ironworks at Eston, a place noted for Eels, to which Seals are said to be very partial. It was observed through a glass from Eston Jetty. About the 15th of January, 1883, one was seen in the Tees, and shot at several times. At the beginning of the following February, one was captured in the Tees, opposite Eston Jetty, measuring 3 ft. in length. On the 28th of July in the same year, one was exhibited alive in the Middlesbrough Market, which had been taken in the river. In 1884, I have been informed, one was seen and shot at several times on the Durham side of the Tees’ mouth; this was in the autumn, and on October 25th, 1885, a Seal was captured in the Tees near Eston Jetty; this was a young female; it was pursued for some distance, and was at last shot. This I examined; it was 3 ft. 10 in. long, and beautifully mottled on the back with black and yellowish-white. It was reported there was another seen at the same time. One was caught on the rocks at Hartlepool on January 4th, 1886; it was left in a pool by the tide, and attracted some men by its call; it was a young female, and about 3 ft. 3 in. long.

It is probable that the Grey Seal (*Phoca gryphus*), as well as the Common Seal, occurred in limited numbers in the Tees. Graves, in his ‘History of Cleveland,’ published in 1808, and before referred to, mentions the Great Seal or Sea Calf (of Pennant’s Zoology, 36). I have seen a very large skull which was dredged from the Tees, and was probably referable to this animal. One is reported to have been found alive at Seaton Snook in the year 1871, as mentioned in Clarke and Roebuck’s ‘Vertebrate Fauna’; and in the Report on the

Migration of Birds for the year 1883 (page 58), reference is made to the occurrence of a large Seal, seen at the Tees mouth on the 18th of November, 1883, probably also referable to the above species.

Porpoises (*Phocæna communis*) are abundant in the sea at the mouth of the river, and frequently enter and are sometimes captured in the river. One was seen in the river at Newport, near Stockton, quite recently; efforts were made to capture it, but without success. They are generally mentioned together with Seals in old records; and *Porcus marinus* appears to have been a favourite dish with the old monks and the aristocracy, as appears from numerous entries in the 'Durham Household Book' before mentioned, and from their frequent mention in bills of fare of famous feasts. Otters (*Lutra vulgaris*) are found in the higher reaches of the Tees, but not often at the estuary. Some years ago one was caught at the Middlesbrough Docks, and I have heard of another caught near Stockton Racecourse. Brewster, in his 'History of Stockton' before referred to, states that the Otter is rare, but occasionally caught in the Tees. Two were seen on the rocks at Winston Ridge, about the end of April, 1883. The Water Rat (*Arvicola amphibia*) is common in all the tidal 'stells' which run into the Tees. The common or Norway Rat (*Mus decumanus*) swarms in all the reclamation embankments constructed by the Tees Commissioners, particularly those constructed of slag, and make short work of any wounded birds taking refuge there. The old English or Black Rat (*Mus rattus*) still lingers in some old warehouses at Stockton, and, I believe, in an old building at Middlesbrough, and probably at Yarm also. Three fine specimens in Newcastle Museum were procured at Stockton, in 1868; they are jet black, and finer and larger than some other specimens in the same museum from the south of England. Hares (*Lepus timidus*) have a peculiar partiality for the reclaimed land on the Tees' banks; at one place where the game is preserved they are very numerous. In the Saltholm and adjoining marshes several Kestrels (*Falco tinnunculus*) may often be noticed at the same time, hovering over the rough grass, on the look-out for Mice and Shrews, which there abound, particularly the Long-tailed Field Mouse (*Mus sylvaticus*), the Field Vole (*Arvicola agrestis*), and the Common Shrew (*Sorex tetragonurus*). Notwithstanding the aversion which the carnivora are supposed to have for the latter, I once shot a Weasel (*Mustela vulgaris*) which was carrying one in its mouth, but on picking the Shrew up I found it impossible to find any wound on it whatever. We have also in the neighbourhood, I believe, two Water Shrews, *S. fodiens* and *S. remifer* Macg. I have myself caught the latter with eight young. In the drier part of

the marshes and the adjoining land, Moles (*Talpa europæa*) are common, cream-coloured individuals being occasionally met with.

The sands and mud-flats of the Tees estuary and the adjoining marshes have always been the resort of vast numbers of wild-fowl, and many very rare birds have at various times been procured here; their numbers have, however, greatly decreased of late years, owing to the increase of shipping and boating on the river, the reclamation works, and the yearly increasing number of shooters, who take advantage of the reclamation embankments which have been made to intersect the mud-flats, or, as they are locally called, 'slems.' As these banks are formed of slag from the ironworks, small huts are easily formed in them, where a shooter can sit completely concealed, and wait the rising of the tide, when the Waders are compelled to leave and seek refuge in the adjoining marshes, and, of course, have to cross the banks; at times great numbers are thus shot, both of Waders and Ducks. At various places on the mud-flats may be observed the tops of casks, protruding out of the mud eight or nine inches. These have been put down by wild-fowlers to conceal themselves in (before the slag banks were built). They had to be approached on mud-pattens, or flat pieces of wood fixed to the boots, to prevent sinking into the mud. The casks had to be baled out every time they were used, not a very pleasant proceeding on a frosty day in winter; nor would they form a very comfortable waiting place when they were baled out. Curious experiences are related by some old wild-fowlers, who in former years were in the habit of using these casks. I have heard of one man who, after baling out his cask, was in the act of lowering himself into it when he accidentally caught the trigger of his gun with his foot, and had his hand shattered. The wild-fowlers frequenting the Tees at the present time are chiefly working men from Middlesbrough, and the guns they carry are a study in themselves, every conceivable kind of weapon being brought into requisition, from the modern breech-loader to adaptations of the flint and steel guns of our forefathers; the greater number are single muzzle-loaders. Some have old duck guns, such as were formerly used in the fen districts, fully six feet long over the stock, and almost as heavy as a punt gun. Some of these guns will kill at very long distances. One man I have met carries a double-barrelled 'Joe Manton,' which has been a very expensive gun in its day, and formerly belonged to Wynyard. Punt guns are also still used on the river, and, I understand, were much more frequently so formerly, when the river was periodically visited by wild-fowlers from Lincolnshire and other places, who usually took up their quarters on the river for some time.

In the Coatham Marshes, on the south side of the river, there existed down to the years 1870-72 a Wild Duck decoy, in which used to be taken the Mallard (*Anas boschas*), Sheldrake (*Tadorna vulpanser*), Widgeon (*Mareca penelope*), Pintail (*Dafila acuta*), Shoveller (*Spatula clypeata*), and Pochard (*Fuligula ferina*), and occasionally the Scaup Duck (*Fuligula marila*). On the 17th of March, 1850, a Ferruginous Duck (*Nyroca ferruginea*) was taken. Very little indication of this decoy now remains, the establishment of the ironworks in the neighbourhood would soon scare the birds away. That most beautiful of our native ducks, the Sheldrake (*Tadorna vulpanser*), used to breed in some numbers on the sandhills at both sides of the estuary, and does yet in limited numbers. I have frequently seen old birds in the breeding season; and the birds shot early in the autumn are chiefly young. In 1880 a pair nested in a metal pipe that goes under a slag-bank at Tod Point. In 1883 a pair nested in a slag-bank at the north side of the river. The young birds were caught by some navvies who were working there, and, I am afraid, destroyed. I have heard of several other nests being found within these last few years, but I am afraid in most cases the eggs have been taken. There is an accession of numbers in winter, when flocks of from three or four to a dozen or more are not unfrequently met with. The Mallard (*Anas boschas*) is sometimes met with in large numbers in the autumn and winter months, flocks of one hundred or more being not unfrequently seen. A few years ago a number were washed ashore dead at Tod Point after a severe gale. The other ducks most commonly met with are the Widgeon (*Mareca penelope*) and Teal (*Querquedula crecca*). The Mallard and Teal breed here in the marshes, and it is possible that the Garganey Teal (*Querquedula circia*) may occasionally. I have known an old and a young bird be shot together early in August. Others of the duck tribe frequently met with are the Goldeneye (*Clangula glaucion*), Shoveller (*Spatula clypeata*), Pintail (*Dafila acuta*), Pochard (*Fuligula ferina*), Scaup Duck (*F. marila*), Tufted Duck (*F. cristata*), and occasionally the Long-tailed Duck (*Harelda glacialis*) and the Common Scoter (*Edemia nigra*), in considerable numbers at times in the autumn and winter months. The Eider Duck (*Somateria mollissima*) has been met with a few times in the Tees. The Goosander (*Mergus merganser*) has frequently been met with; one was shot in the winter of 1883. The Dabchick or Little Grebe (*Tachybates fluviatilis*) is a winter resident. The Slavonian or Dusky Grebe (*Podiceps auritus*) and the Eared Grebe (*P. nigricollis*) have also been met with.

It appears that two centuries ago the sands and marshes by the Tees estuary were remarkable for the numbers of birds which nested

there, as the following quotation from the Cott. MS., copied from Graves' 'History of Cleveland,' will show:—'Neere unto Dobham, The Porte of the mouth of the Teese [now called Cargo-fleet, or, more properly, the Cleveland Port] the shore lyes flatt, where a shelf of sand raised above the highe water marke, entertaines an infynite number of sea-fowle*, which lay theyr Egges heere and there scatteringlie in such sorte, that in Tyme of Breedinge one can hardly sett his Foote so warylie, that he spoyle not many of theyr Nests. These curious Buyliders may furnish themselves with choice of shells and particoloured stones fytt for the makinge of artifyciall works.' In the memory of man large numbers of birds, I have been informed by a friend who was born there, still frequented the shore opposite Cargo-fleet, and nested on the shingle there and in the adjoining ditches and marshes. Wild Ducks, Wild Geese, Snipe, and Water-hens were some of the birds mentioned as breeding here. Snipe may be taken as including the Redshank and others, as I find birds of that kind are called Snipes indifferently by many people in the district. The foreshore at Cargo-fleet is now covered with ironworks and a graving dock. The Ring Dotterel (*Ægialitis hiaticula*) no doubt nested on the shingle, as it does still at a particular place, in some numbers, every season. I have before me, while writing, two eggs of this bird, taken from a nest containing four, found in a slag-bank last year (1885). They are spotted with dark brown, on a drab ground, and also with less distinct greyish-purple spots. Dunlins remain all the spring and summer, but I doubt whether they breed. The Redshank (*Totanus calidris*) used to nest in Coatham Marshes, and may do still occasionally; a pair nested, to my knowledge, on the north side of the river in the summer of 1884. Two or three Spotted Redshanks (*Totanus fuscus*) were shot at the estuary last autumn.

It is not improbable that the Ruff (*Machetes pugnax*) bred here formerly. I have seen a very fine pair of male birds that were shot in the month of March, in the act of fighting, twenty-five years ago. Cormorants (*Phalacrocorax carbo*) still nest in the cliffs beyond Saltburn, and during the breeding season they are observed to make daily visits to the Tees mouth.

Numbers of non-resident birds sojourn for longer or shorter periods on the sands and mud-flats in the spring and autumn—or, perhaps, more properly speaking, there is a succession of the same species. Autumn birds begin to arrive at the beginning of August, and continue passing southwards until late in October; these are the Whimbrel (*Numenius phæopus*), Dotterel (*Eudromias morinellus*), Pygmy Curlew (*Tringa subarquata*), Little Stint (*Tringa minuta*), in

* Probably Terns, with a few Oystercatchers and Ringed Plovers.

limited numbers, and others of the Sandpipers. The Dotterels pass here, going north, early in May, and return early in September. The numbers are said to be on the increase; a few years ago, before there was a close time for birds, a local sportsman, who is an expert at tying trout-flies, shot seven in one day; he uses the feathers for making flies. They are stupid birds, and easily shot, allowing themselves to be walked up to and shot in succession. Unlike many of the other migrants, they appear to be oftener met with in the spring than in the autumn migration. In 1883 one killed itself against the telegraph wires, and in the same year over a dozen were observed flying over Cowpen Marshes. The Little Stint (*Tringa minuta*) is occasionally met with; I came across four on the 22nd September last year, and shot one. Their note is a feeble plaintive whistle; nothing like that of the Dunlin.

The Common, Sandwich, and Arctic Terns (*Sterna fluviatilis*, *cantiaca*, and *macrura*) also appear at this time, the first sometimes in great numbers. If one of these birds be shot, the others will hover round it, regardless of their own danger, even after several shots have been fired. The Roseate and Black Terns (*Sterna dougalli* and *Hydrochelidon nigra*) are also occasionally met with; one of the latter was observed among others of the common species this last autumn. The Little Tern (*Sterna minuta*) and the White-winged Black Tern (*Hydrochelidon leucoptera*) have also been met with. All the commoner Gulls are abundant during the winter and autumn months, and in less numbers the whole year. The Iceland, Glaucous, and Little Gulls (*Larus leucopterus*, *L. glaucus*, and *L. minutus*) have been met with occasionally; one of the latter in November of last year (1885); and an Ivory Gull (*Pagophila eburnea*) on the 14th February, 1880.

Hérons (*Ardea cinerea*) are also very common in the autumn, chiefly, if not entirely, young birds; at least, all those I have known to be shot were birds of the year. I remember seeing ten or eleven on the wing together on the 2nd of September, 1884, skimming along lazily just over the surface of the ground. They leave before the winter sets in. They must come from a considerable distance, as there is no heronry in the neighbourhood; there used to be one at Kildale, another at Sedgfield, and I have been informed there was one at Greatham, but none of them exist at present that I am aware of. Other birds, such as the Grey Plover (*Squatarola helvetica*), are resident, but in diminished numbers, most of the winter; as is also the Turnstone (*Streptilas interpres*), Oystercatcher (*Hæmatopus ostralegus*), Purple Sandpiper (*Tringa striata*), Knot (*Tringa canutus*), and Bar-tailed Godwit (*Limosa lapponica*). The Common Curlew

(*Numenius arquata*), Golden Plover (*Charadrius pluvialis*), and Redshank (*Totanus calidris*) are resident all the year, but in greatly increased numbers in autumn and winter. The Dunlin (*Tringa alpina*) and Ring Dotterel (*Ægialitis hiaticula*) are also resident all the year, and congregate in immense flocks in the autumn and winter, occasionally associated with Knots (*Tringa canutus*), Turnstones (*Streptilas interpres*), Greenshanks (*Totanus canescens*), and Redshanks (*Totanus calidris*). Dunlins (*Tringa alpina*) shot on August 7th still retained the black pectoral patch, but it had entirely disappeared in birds shot on September 22nd. These birds vary greatly, not only in plumage, but in the length of the bill and other members, so much so, that a taxidermist of my acquaintance maintains there are two distinct species, one having a bill much longer and more bent, and more slender legs, than the other.

Of the winter migrants, the average date of the arrival of the Woodcock (*Scolopax rusticula*) at the Tees mouth is about the 5th of October, generally with north-east or easterly winds. They begin to arrive early in September, and continue until late in December, but the greatest number usually arrive about the date named, and, curiously enough, often accompanied by Goldcrested Wrens (*Regulus cristatus*). The breakwater, which is built of slag, at times swarms with these pretty diminutive birds, which arrive in an exhausted condition. In Sharpe's List, published in 1816, it is recorded that many Woodcocks were found drowned on the north sands about twelve years previously, 'in the spring, supposed to have met with a contrary wind.' Redwings (*Turdus iliacus*), and Fieldfares (*T. pilaris*) begin to arrive about the end of September, but the second week in October for the Redwings and the third for the Fieldfares is about the average time of arrival. There is generally, too, a very large immigration of other Thrushes about the same time, or a little earlier, chiefly the Missel Thrush (*Turdus viscivorus*), with a sprinkling of the Common Thrush (*T. musicus*) and the Blackbird (*T. merula*) amongst them. I have several times noticed the fields suddenly to literally swarm with these birds; they, however, soon disperse, or probably pass on in a body further south. Short-eared Owls (*Asio brachyotus*) arrive chiefly in September and October; Hooded Crows (*Corvus cornix*) about the middle of October; and Snipes (*Gallinago caelestis*) from October, probably on to December. Large numbers of Wild Geese pass over in September and October in flocks of from a dozen to one hundred, and occasionally stay a short time on the mud-flats; they do not, however, frequent the mud-flats much until later on, when cold and frosty weather sets in and

they are driven down from the moors. Wild Swans [? *Cygnus musicus* and *bewicki*] frequent the estuary in severe winter weather, and are seen passing over in the autumn months. Individual birds are shot almost every winter, both mature and young birds in grey and white plumage. Sometimes they are observed singly or in pairs, at other times in flocks of from five to upwards of one hundred. I have examined many birds in private collections that were procured on this river. In Brewster's List it is described as follows:—'The Wild Swan visits the marshes near the Tees in large flocks in severe winters. In the beginning of the year 1823, several were killed at Cowpen, and also in January, 1827.' The following actual records of the occurrence of Swans in the Tees are copied chiefly from the last six years' Reports of the Committee appointed by the British Association to collect statistics from the lighthouse-keepers on the migration of birds:—

1879.	December	4th.	—Six at Teesmouth, flying N. to S.	
"	"	8th.	—Five at Teesmouth.	
"	"	14th.	—Nine	"
"	"	15th.	—Forty-three	"
"	"	16th.	—Three	"
"	"	18th.	—Two	"
"	"	20th.	—Ten	" 10 a.m.
"	"	20th.	—Ninety-five	" 11 "
1879-1880.	} Winter,	{	One shot in Billingham Bottoms: a young bird in grey plumage.	
1881-1882.			} Winter,—Two noticed at Durham side of estuary.	
1882.	August	5th.	—Six at Teesmouth.	
"	October	24th.	—Six	"
1883.	March	25th.	—One, Tees Light-vessel.	
1884.	October	5th.	—Nine at Redcar, flying N.	

Semi-wild birds of the tame species or Mute Swan (*Cygnus olor*), that have escaped from confinement on ornamental waters, are frequently met with in the estuary. Last winter one was shot; and on August 1st this year (1886) eighteen put in an appearance, and on the following day eight or ten were shot for wild birds; a few of the remainder were observed about for several days; three were seen by a friend (some distance inland), who supposed them to be wild birds from their strong, steady flight. Bewick's Swan (*Cygnus bewicki*) has been shot in the estuary on two or three occasions. Snow Buntings (*Plectrophanes nivalis*) frequent the margin of the river in the winter, arriving about the beginning of November, and departing again early in the spring. They may be seen in vast flocks or clouds, sometimes associated with Larks and other small birds; in severe weather

feeding on the stubbles—they eat grain and other seeds, and always appear to be in good condition. I have examined them at all times during their stay here, and never saw one in bad condition; they are exceedingly fat when they arrive in November. I witnessed their arrival on a cold and stormy day the 3rd of November, at Tod Point, last year. They appeared to be somewhat exhausted, but heading inland in great numbers; they apparently did not wait long to rest. Larks (*Alauda arvensis*) swarm at times in the winter months by the margin of the river; and vast numbers of Brown Linnets (*Linota cannabina*) and Redpoles (*Linota rufescens*) frequent some patches of Sea Lavender (*Statice limonium*) on the south side of the river, feeding on the seeds. Starlings (*Sturnus vulgaris*) and Lapwings (*Vanellus vulgaris*), associated with Golden Plovers (*Charadrius pluvialis*), congregate in immense flocks on the marshes; and in very severe winter weather Wood Pigeons (*Columba palumbus*) come down to feed after the receding tide. Reed Buntings (*Emberiza schæniclus*) frequent the reeds and long grass by the sides of the saltwater ditches, and breed there; and Meadow Pipits (*Anthus pratensis*) are abundant all the year. Kingfishers (*Alcedo ispida*) are frequently met with by the river-side, and in the small tributaries, but are sadly persecuted by gunners, their skins being readily purchased by the dealers for half-a-crown each. Wheatears (*Saxicola œnanthe*) are common on the river-banks during the summer months, and nest there; their numbers are greatly increased during the autumn months when migrating—on August 22nd last year the banks literally swarmed with them. This is one of the earliest of the migrants to arrive with us, generally appearing about March 29th or 30th, and I have seen it so late as October 9th.

The Spotted Crake (*Porzana maruetta*) breeds in the marshes on the north side of the estuary, and is frequently shot in the autumn. Baillon's Crake (*Porzana bailloni*) and the Little Crake (*Porzana parva*) have been met with in the same place.

In stormy weather the Storm Petrel (*Procellaria pelagica*) and the Little Auk (*Mergulus alle*) are often driven into the estuary. On the 22nd November, 1884, I got a fine specimen of the latter, and others were seen.

The Great Snipe (*Gallinago major*) is occasionally shot in the marshes. The Jack Snipe (*Limnocryptes gallinula*) and the Common Snipe (*Gallinago cælestis*) were, until late years, abundant, the latter breeding there. In speaking of the Common Snipe, Brewster, in his List, says:—'I am informed that there is a Snipe sometimes shot in the marshes, which is commonly called the Russian Snipe; it is larger than the Common Snipe, and differs from it in the white lines

on the back, and some other marks of the plumage. As I have not yet seen a specimen, I know not whether it be a distinct species or only a variety of the Common Snipe.'

Of rare birds that have been procured here, I may mention the Avocet (*Recurvirostra avocetta*), the Spoonbill (*Platalea leucorodia*), and some Pallas' Sand Grouse (*Syrhaptes paradoxus*), shot at Port Clarence in 1863, which went to Mr. Oxley's collection at Redcar; two bought at his sale are now in the Newcastle Museum.

A Bee-Eater (*Merops apiaster*) was shot some years ago under peculiar circumstances. A wild-fowler had seated himself in a slag-bank to wait for birds, when suddenly a bird alighted on the barrel of his gun. He shot it, and it turned out to be a specimen of this rare bird.* The commonest of the Falconidæ are the Kestrel (*Tinnunculus alaudarius*) and the Sparrow Hawk (*Accipiter nisus*); and the Merlin (*Falco æsalon*) is by no means uncommon in the autumn and winter months; while the Iceland Falcon (*Falco islandus*), the Hobby (*Falco subbuteo*), and the Rough-legged Buzzard (*Archibuteo lagopus*) have been shot here, and I have heard of one of the latter being noticed inland this autumn (1886).

In the autumn of 1883 a Kite (*Milvus iclinus*) was shot near Warrenby, and has been purchased for the Middlesbrough Museum; it was a female bird, and in good condition. A Golden Eagle (*Aquila chrysaëtus*) is reported in Brewster's List as having been shot near the Tees on the 5th November, 1823, by Mr. L. Rudd, of Marton, Cleveland. It weighed 12 lbs.; its length was 3 ft. 4 in.; the extent of its wings 7 ft. 5 in.; bill, 3 in. long.

* Mr. Hancock ('Birds of Northumberland,' &c., p. 28) says an example of the Blue-tailed Bee-eater (*Merops philippinus*) 'was shot near the Snook, Seaton Carew, in August 1862.' I have not been able to ascertain whether the above refers to the same bird as my own note, made several years ago from information communicated by a friend, who saw the bird.

NOTES AND NEWS.

The annual meeting of the Yorkshire Naturalists' Union is to be held at Dewsbury, on Monday afternoon the 14th of March. In the evening the Rev. W. H. Dallinger, LL.D., F.R.S., will deliver his address as retiring President.

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The Members and Associates of the Union will be pleased to learn that the Presidency for 1887 has been accepted by Sir Ralph Payne-Gallwey, Bart., M.B.O.U., in whom they will welcome a worthy successor to Dr. Dallinger.

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Bryological readers will be pleased to learn that the honorary degree of M.A. has lately been conferred upon Mr. Henry Boswell, of Oxford, in recognition of his services to botanical science.

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The same honorary degree was conferred at the same time upon the Rev. Robert Harley, F.R.S., F.R.A.S., whose high mathematical repute is known to his fellow-Yorkshiremen.

FORMATION OF A YORKSHIRE BOULDER COMMITTEE.

It has long been thought advisable by many members of the Yorkshire Naturalists' Union that in addition to the sectional work conducted at the field excursions, committees should be formed to carry on scientific research throughout the year, to be conducted in a similar manner to those of the British Association. The work of the latter body is by no means all done at the great annual meetings, but committees are continually working upon special subjects, and reporting their results annually. Thus we have committees upon the rainfall of the British Isles, the migration of birds, tidal observations, the erosion of our sea-coasts, the erratic blocks of England and Wales, and many others. In this manner valuable facts are collected and collated by scientists of repute and experience, and the year's work of these committees is carefully recorded.

The Yorkshire Naturalists' Union had at the last annual meeting no fewer than 2,310 members and associates, resident in all parts of the county. It is thus, from its composition, its magnitude, and also from the wide radius of its operations, specially adapted for the formation of such committees as the above-named. If the ladies and gentlemen connected with the Union, recognising the value of such committees, will promote their formation and then forward reports, there would soon be such a mass of systematic scientific information relative to Yorkshire, as would make it in this respect, as it is in many others, the premier county in the kingdom.

The geologists of the Union have taken the initiative in the matter, and a circular was lately issued to the leading geologists in the county, convening a meeting to consider the advisability of forming a committee to receive reports relative to the erratic blocks of Yorkshire. The meeting was duly held in Leeds, and letters were read from Professor Green, F.R.S., Professor Miall, F.L.S., Mr. J. W. Davis, F.G.S., and other well-known Yorkshire geologists, expressing their approval and promising their support. The Rev. E. Maule Cole, M.A., president of the Geological Section of the Union, and other gentlemen had previously commended the idea. The following resolution was then unanimously passed, and afterwards ratified by the Executive of the Yorkshire Naturalists' Union:—'That in connection with the Yorkshire Naturalists' Union, a committee be and is hereby formed, to be named the "Yorkshire Boulder Committee," the duty of this committee being to receive reports and conduct observations relative to the Erratic Blocks of Yorkshire, including particulars as to their position, height above the sea, lithological character, size and origin, and to work upon the same lines

generally as the Boulder Committee of the British Association, to whom annual reports will be presented.' An influential committee of gentlemen resident in the three Ridings of Yorkshire was then formed, with Mr. Samuel A. Adamson, F.G.S., of 52, Wellclose Terrace, Leeds, as hon. secretary. Mr. Adamson will be glad to forward schedules to record observations upon to anyone knowing of isolated erratic blocks or boulders, or groups of boulders—that is, in other words, masses of rock, evidently transported by natural agency from some locality more or less remote. Geologists have for some time recognised the great importance of this special subject, as its careful study will explain many of the phenomena of the glacial epoch, and will clear away many of the speculative theories involved in glacial geology. The Yorkshire Boulder Committee is now an accomplished fact, and if local and county geologists will give their assistance, signal service will be rendered to the British Association in their endeavours to promote geological science. Dr. Crosskey, of Birmingham, the eminent glacialist, and secretary to the Boulder Committee of the British Association, has written, giving practical hints and valuable instructions for procedure, expressing his delight that Yorkshire geologists are about to engage in such good work, and also further expressing his appreciation by becoming an honorary member of the Yorkshire Committee.

NOTES—GEOLOGY AND PALÆONTOLOGY.

Fossil Polyzoa in Lincolnshire.—Through the kindness of Mr. H. Wallis Kew, of Louth, I have received four specimens of a Polyzoan from the Neocomian Clays of Donington-on-Bain. This is the first time that I have been able to examine a fossil Polyzoan from Lincolnshire, and the species is either new, or allied to foreign examples of the *Entalophora gracilis* (*Ceritopora gracilis*) Goldfuss. On account of the peculiar 'closure' of the aperture, one of the specimens will merit closer study and fuller description, but as Mr. Wallis Kew expressed a desire that I should make a note of the fossil for publication in the *Naturalist*, I have complied with his request, thanking him for the present, and hoping that he will be able to find other Polyzoa in the strata of his neighbourhood. If he should succeed I shall be glad to examine them in detail.—G. R. VINE, Sheffield, Nov. 10th.

Exposure of a Fault at Apperley.—Mr. Wm. Cheetham, vice-President of the Leeds Geological Association, reports that travellers on the Midland Railway between Leeds and Bradford may, at present, see at Apperley a splendid example of what is known geologically as a 'fault.' 'Faults' or dislocations of the strata are caused by the movements to which the crust of the earth has been subjected, by which the strain has been so great that the continuity of the strata has been disturbed. This fault is the one shown on the Geological Survey Map as passing nearly S.W. by N.E. through Apperley Station to Buckstones. The Midland Railway Company in their extensions now being made at Apperley to provide space for a waiting room, are having the rock cut away up the side of the north platform. This grandly exposes the above-named fault, the rough rock being on either side. It may be seen that to the east it is a solid mass dipping slightly to the S.E., whilst on the west the dip is slightly greater, but to the N.W., the rock being considerably shattered. The line of fracture is represented by a band of crushed and broken rock (Fault Rock) about two feet in thickness. Such a clear exposure of a prominent geological feature is rarely to be seen, and certainly deserves a report.—S. A. ADAMSON, November 11th, 1886.

Naturalist,

**NOTES ON
VARIETIES OF BYTHINIA TENTACULATA.**

GEORGE ROBERTS,

Lofthouse, Wakefield; Author of the History and Topography of Lofthouse, etc.

Bythinia tentaculata monst. **scalariforme**. In July 1886, I found one specimen of this monstrosity at Milford, near Pontefract. The description is:—Shell conical, pointed at the apex; whorls $5\frac{1}{2}$, tumid, narrow; suture very deep; mouth round; length, 11 mill. The shell very much resembles a coloured enlargement of *Bythinia leachii* inserted in Tate's 'British Mollusca,' p. 34.

Bythinia tentaculata var. **major** Locard. Specimens were found by myself at Fairburn, in September 1886; and others have been found near Bradford by Mr. J. A. Hargreaves. Locard's description of this, which I have obtained, along with others, through the kindness of Mr. T. D. A. Cockerell, of Chiswick, is:—Shell 12 mill. or more in length; same form as type; pale in colour, sub-transparent.' The Fairburn specimens were not pale but reddish-brown in colour, 12 mill. to 14 mill. in length.

Bythinia tentaculata var. nov. **angulata**. Specimens were collected in 1886 by Mr. J. A. Hargreaves, in the canal near Bradford. Description: Each whorl somewhat sharply angulated or shouldered above the periphery, giving the shell a turreted appearance; colour, reddish; length, 9-10 mill. At p. 58 in 'British Conchology,' vol. i, Jeffreys mentions a single specimen of *Paludina vivipara* (which is classed next preceding *B. tentaculata*) that had 'a keel occupying the place of the upper band.' This would be a parallel form to the angulated variety of *B. tentaculata*.

Bythinia tentaculata var. ?**producta** Menke. In September 1886, Mr. J. Wilcock, of Wakefield, dredged a peculiar form (one specimen) from a ditch at Fairburn. It is about 14 mill. in length; somewhat cylindrical; suture deep; spire pointed.

Bythinia tentaculata var. **zonata** Baudon. Shell reddish, zoned with one or more white lines or bands. Collected by Mr. Hargreaves near Bradford. Noted also in my second volume of 'Topography of Lofthouse' (1885), p. 237.

Bythinia tentaculata var. **fulva** Locard. Collected at Apperley, near Bradford, November 1886, by Mr. J. A. Hargreaves. A pretty variety of a shining tawny colour. Apparently new to Britain; I do not find it in any recent shell list.

Bythinia tentaculata monst. **decollatum** Jeff. I have specimens from Kirkthorpe, near Wakefield, J. Wilcock; near Bradford, J. A.

Hargreaves; and from Prestwich, B. Tomlin—all from ponds or still water.

Bythinia tentaculata var. **ventricosa** Jeff. This is described by Jeffreys as white, but I think some misapprehension may arise from this description. I take it that the variety, which is a *form-variety*, may be white or any other colour. If the true *ventricosa* be always white, it must be rare. I should be glad to have the views of anyone else, or to hear of localities where the true variety has been collected.

NOTES—CONCHOLOGY.

Monstrosities of various Lancashire Shells.—The occurrence of the following monstrosities in Lancashire has probably not been previously noted, and may be worth a place in your journal. The specimens are in the Woodwardian collection in the Cambridge Museum.

Planorbis complanatus monstr. *terebrum* Turton: Rochdale.

Helix aspersa monstr. *sinistrorsum* Taylor: Ulverstone.

Helix aspersa monstrosity in which two shells have grown together: Ulverstone.

The *H. aspersa* monstr. *sinistrorsum* is not noted in Taylor's monograph of this species (Journ. Conch, vol. iv, p. 100).—BROCKTON TOMLIN, Pembroke College, Cambridge, November 5th.

Variation in *Helix ericetorum* near Chester.—While collecting *Helix ericetorum* Müll. last month on the banks of the Dee near Chester, I came across a form which does not seem hitherto to have been differentiated from the type. It corresponds to the var. *subalbida* (Poir.) of *Helix virgata*, except that the single band left is rather higher up the whorl than in that variety. Its occurrence was very much limited, not more than one in twenty-five, or four per cent. I also secured two fairly representative monstr. *scalariforme*. The small amount of variation was remarkable, and out of many hundred specimens examined I saw not one approaching var. *alba*. The '*subalbida*' form I have lately taken more commonly in the neighbourhood of Cambridge. In company with *Helix ericetorum* at Chester lived hundreds of *Helix caperata* Mont., nearly all type with occasional specimens of var. *alba* Picard, and of a unicolorous brown variety.—BROCKTON TOMLIN, Pembroke College, Cambridge, November 7th, 1886.

Reversed Specimen of *Helix virgata* at Coatham.—On November 24th I was strolling on the sandhills at Coatham, and was surprised to find *Helix virgata* still on the move, crawling upon the grass in great numbers. I had not walked far before my eye encountered, with no small delight, a sinistral example. It is alive, and an average-sized specimen of the white variety without bands, so common in that locality. I see Mr. Norman found a sinistral example at Clevedon. I was particularly interested in this find, because it occurred within a few yards of the spot where, some years ago, I found a reversed specimen of *Helix aspersa*. As these are the only reversed Helices I ever found in my life, and as I do not visit the spot in question oftener than once a year, and then only for a few minutes, one is tempted to see something more than mere chance in the occurrence of sinistral forms of two species at the same place.—WM. C. HEY, St. Olave's Vicarage, York, November 25th, 1886.

NOTE—HYMENOPTERA.

Additions to the Yorkshire List of Ichneumonidæ.—Part III of the Entomological Society's Transactions for 1886 contains a paper by Mr. J. B. Bridgman, F.L.S., on 'Additions to the British List of Ichneumonidæ.' This list includes some species sent to him by Mr. G. T. Porritt, F.L.S.; two of them were taken in Yorkshire, and are additional to the list of Yorkshire species. They are *Campoplex uncinatus* Holmg., and *Campoplex trisculptus* Holmg.; both taken at the Green Farm Wood, Doncaster, on May 31st, 1884.—EDS. NAT.

Naturalist,

**TORTRIX TRANSITANA (DIVERSANA), SPILONOTA
ROSÆCOLANA, AND DEPRESSARIA WEIRELLA
IN YORKSHIRE.**

GEORGE T. PORRITT, F.L.S., F.E.S.,

Huddersfield; Author of the List of Yorkshire Lepidoptera; &c.

It is with much pleasure that I announce the addition, during the past season, of the above three species of lepidoptera to the county list. The two first named I captured at Edlington Wood, near Doncaster, on August 2nd. At the time I was compiling the 'List of Yorkshire Lepidoptera,' Mr. Thomas Wilson, of York, wrote me he believed *S. rosæcolana* occurred at York, and sent me a number of larvæ in rose twigs, which he supposed were the species; but as my attempt to rear them was unsuccessful, the species was omitted, though, in all probability, Mr. Wilson's surmise was correct. *D. weirella* I found in plenty (when collecting in company with Mr. G. C. Dennis, of York) at Saltburn, during August. We found it along with seven other species of *Depressaria*—(including several *D. douglasella*, whose claim as a Yorkshire species rested previously on the capture of a single specimen at Redcar by Mr. Sang)—when searching for *Pterophorus dichrodactylus* (which we took freely) on flowers of tansy, after dark.

NOTES—MAMMALIA.

An Ingenious Rat's Nest.—In some work I am carrying out it was necessary to drive a heading along the course of an old brick barrel-drain in Dale Street, Liverpool, from Imperial Chambers to the main sewer, when an ingeniously constructed Rat's nest was laid bare. From the crown of the culvert a pipe about three inches in diameter had been driven vertically upwards a distance of four feet. At the top of this pipe, and a little to the side, the Rat's nest was situated, and from it a horizontal gallery, driven in stiff plastic boulder clay, branched off a distance of about seven feet. The gallery was about three inches diameter near the nest, gradually tapering to a point at the far end. In the nest itself was found a *silver spoon*, now in my possession, several *stems of tobacco pipes*, together with buttons and bones. What the use of the spoon and tobacco pipes could be to the Rat family it is difficult to conjecture. The Rat dropped out of the hole, and was killed by the workmen, who told me it was quite bald on the back. The clay was a solid boulder clay, but very free of stones, and the depth of the nest twenty feet below Dale Street. In this tenacious stuff the excavation of the pipe and gallery must have been a work of very great labour; also, the pulling-up of the spoon would not be easy. The construction was ingenious, as placing the Rat in a secure retreat above the storm water. Probably the heading, incompleated, was being driven to provide another outlet.—T. MELLARD READE, Park Corner, Blundellsands, November 23rd, 1886.

Cannibalism in the Long-eared Bat.—On the same date as the observation of the Hawfinch I obtained several Long-eared Bats, all full grown except one which had scarcely any fur on. Having placed them in a box, and forgetting to attend to them for four days, on my opening the box I found to my surprise that the older ones had entirely eaten away the body of the young one, except the head and wings. Has such an occurrence been previously noticed?—

WM. STOREY, Pateley Bridge, October 6th, 1886.

LITTLE GULLS AT FLAMBOROUGH HEAD.

J. H. GURNEY, JUNR., F.Z.S., M.B.O.U.,
Northrepps, Norwich.

ON August 5th I obtained a Little Gull (*Larus minutus*) at Flamborough Head. When freshly killed the roseate tint of the under parts was very delicate. It was shot by T. Leng, who brought in at the same time a great number of Kittiwakes, with which I suppose it was consorting. The next day Mr. M. Bailey shot another, and saw a third. Mr. Bailey's, which he has been good enough to make me a present of, is an adult with a white tail and beautiful black collar and red legs, the occiput and part of the crown being also black. It is probably quite as old as the female in perfect breeding plumage which was shot by him on July 12th, 1868 (Zoologist, p. 1379), and if it had been killed three weeks earlier would have had an entirely black head. So many Little Gulls have been killed at Flamborough and its vicinity at one time and another, that they have ceased to be much novelty there. I presume it is partly because they are attracted by the breeding Kittiwakes, but no doubt it is also the result of the slaughter which goes on among these birds for the supplying of the plume trade, the Little Gulls generally being in their company when shot. If they exhibit no more fear of man than the unfortunate Kittiwakes, it is no wonder they are killed. Yet neither the presence of the Kittiwakes, nor the amount of shooting which goes on, could account for the occurrence of thirty Little Gulls in Bridlington Bay, in February 1870. These (like the Pomatorhine Skuas on another occasion) must have been simply storm-driven birds, perhaps seeking the shelter afforded by the promontory of Flamborough. But, whatever be the cause, the fact remains that the Yorkshire coast has produced more Little Gulls than any other place—and it is a very singular and interesting one. There is a great deal yet to be learnt about the movements of Gulls, and what we call the accidental appearance or abundance of different species, rare or common, may be accounted for in a way hitherto little considered—viz., by wind and a knowledge of its effects.

NOTE—BOTANY.

Bee Orchis in Craven.—On July 24th Mr. W. Eade found a specimen of the Bee Orchis (*Ophrys apifera* Huds.) between Stirton and Gargrave. This plant was, I believe, fairly common round Skipton in certain localities some twenty years ago, but has been lost sight of altogether until last year.—T. W. EDMONDSON, Skipton-in-Craven, August 4th, 1886.

NOTE—ORNITHOLOGY.

Bird-notes from the Humber District.—On the 9th, 10th, and 11th of October a pair of Kites—'fork-tailed gleads,' as Mr. Dobson, of the 'Donna Nook' Lifeboat, called them—were seen beating about over the rabbit-warrens near Somercotes.

On the 19th I saw at Mr. Musham's, Lincoln, a remarkably fine male Buzzard, one of the lightest in colour I have seen—the head and upper parts with the feathers broadly margined with white; the under parts yellowish white, with only a few dark streaks. The iris in this bird, Mr. Musham told me, was hazel-yellow. It was trapped on October 2nd, in Mr. Chaplin's Park at Blankney, and was probably one of a pair of light-coloured Buzzards which frequented that locality during the summer.

Mr. Musham had also a Grey Phalarope, taken at Bassingham, near Lincoln, on the 14th.

A young Gannet, in the spotted plumage, was captured near Kirton-in-Lindsey about the same time; like the Phalarope, probably driven inland by the gale on the 14th and 15th.

In the second week in October a Little Grebe was killed in the night against the lantern of the Spurn Lighthouse.

A few Ring Ouzels have occurred on the Lincolnshire coast—young males of the year, with the pectoral gorget smoke-grey and very indistinct, in fact barely perceptible. So far, however, the season has been a very unfavourable one for immigrants arriving on the coast.—JOHN CORDEAUX, Great Cotes, Oct. 23rd.

BOOK NOTICE.

The Badminton Library of Sports and Pastimes. Edited by His Grace the Duke of Beaufort, K.G. **Shooting.** By Lord Walsingham and Sir Ralph Payne-Gallwey, Bart. With contributions by Lord Lovat, Lord Charles Kerr, the Hon. Gerald Lascelles, and A. G. Stuart Wortley. Two vols., 8vo.; with numerous illustrations. London: Longmans, Green & Co., 1886.

Sportsmen may be divided into two classes—those whose ideas of sport are measured by the size of the bag only—such are mere 'shooting machines' and 'slaughterers,' and may be dismissed without further consideration; secondly, a much smaller class, who, with a love of sport and much manly exercise, combine a love of nature. Men of the type of Charles St. John and John Colquhoun, the beau-ideals of the sportsman-naturalist—to men of this stamp are we indebted for these two volumes—volumes which will be read with keen interest by the naturalist and sportsman alike, for they contain the experiences of those who have the best and most intimate knowledge of their subject, and who can handle the pen as readily as rifle or gun; wise in all the ways and habits of wild creatures—a knowledge acquired with much labour, difficulty, and patient endurance in field and forest, moor and bog, as well as in the lonely bays and creeks along the sea-coast.

The merits of these two volumes as a complete guide to modern shooting have already been so fully discussed in various reviews that it is scarcely necessary in this respect further to notice them. They

contain every information from the choice of a gun to the best dressing for shooting-boots. We shall, therefore, rather draw the reader's attention to those chapters which refer more especially to the Natural History of the various 'beasts and fowl of warren,' and their numerous enemies.

Chapter xii. in Vol. I deals with 'vermin' which are known to be more or less inimical to the game preserver. We fear in a large majority of cases the lack of knowledge amongst gamekeepers, who, as a rule, are deeply ignorant of Natural History, has led to a far larger extension of the 'black list' than is warranted by fact. To the ordinary keeper every living thing which can by any stretch of imagination be considered to interfere with the rearing of game, or is unfortunate in bearing a general resemblance to an evil-doer, is ruthlessly persecuted to death, and even such harmless creatures as the Water-vole, Fern Owl, and Cuckoo are not excepted from the sweeping ban.

Mr. Lascelles divides vermin into three classes. First, such as do nothing else but harm, in which are included Crows, Magpies, Sparrow-hawks, Stoats, Weasels, Cats, Pole-cats, and Rats. Secondly, those which do some little harm, yet are credited with some good—as Jays, Jackdaws, Kestrels, and Hedgehogs. Thirdly, those which, although they destroy a certain number of game, afford sport in themselves, or are creatures of such rarity or beauty, that they ought not to be indiscriminately destroyed, such as Foxes, Badgers, Peregrine Falcons, Buzzards, Harriers, Ravens, and Owls.

We can scarcely agree altogether with this classification, for even in the first and blackest list Stoats and Weasels confer great services on the game preserver in keeping down rats, and there are few animals which possess a greater aptitude for the destruction of young game and eggs than an old rat with a litter of young to support. The domestic Cat when it takes to poaching is a terrible enemy to game, both flying and running, and should be destroyed without mercy. Polecats and the larger raptorial birds are now practically extinct, and can scarcely be considered factors in the case. Much can be urged in favour of the Peregrine, which we have generally found preys in England during the winter on Plover, the Wild Pigeons, and domestic Pigeons, and on the coast on wild fowl generally and seabirds. It cannot, however, be denied that the Peregrine will take Black-game, Grouse and Ptarmigan, whenever opportunity offers; not unfrequently, too, striking birds down apparently out of wantonness and for the mere love of the thing, without descending to prey on his victims. For all this the Peregrine is worthy of preservation; to the true sportsman the flight and

capture of a Grouse or Duck by a Wild Falcon is worth several birds in the bag—a sight not soon to be forgotten, and to be much talked of in future days.

Buzzards also destroy much real vermin,* although they will seize wounded game if opportunity happens. The continued destruction of these birds in the British Isles is a matter to be deplored by all alike. Owls of all species should be omitted from the black list; the service rendered by them to the farmer and gardener in keeping down sparrows,† mice, and rats, infinitely outweighs any slight injury to the game preserver. It should also be borne in mind that when Owls are beating for prey, the young of all flying game are safe in covert or beneath their mother's wing.

Undoubtedly, the Carrion Crow and his new cousin, the Grey Crow, are the worst pests possible. The former, whose capacity for mischief exceeds all others, we heard an old keeper designate as 'the king of all the varmints.' If once a pair of Carrion Crows discover—and they miss nothing that moves—a nide of young Pheasants or brood of Partridges, they never desist pursuit as long as one is left. A Highland keeper told us that he considered a pair of Grey Crows with a nest of young to feed, equal in destroying power to a couple of guns for the season. On our remarking, 'Why, Donald, they must be bad shots!' he went on to say that he and another keeper once found the remains of several hundreds of Grouse eggs in a moss hagg, where they had been carried and sucked by a pair of Grey Crows, whose nest had been inadvertently overlooked in a neighbouring wood. Not only do they destroy game, but they are the inveterate enemies of all small birds, destroying eggs and young alike, and in a prolonged frost they will attack and carry off any weak or disabled bird which they come across.‡

Ravens also, carrion-feeders although they are, make sad havoc with Grouse and Ptarmigan when they get amongst a brood, gobbling

* In a nest of *Buteo vulgaris*, taken in North Wales in June, 1872, there were two young partly-fledged birds, and beside them lay two Moles, two Stoats, and a Pine Marten.—Zool., 1876, p. 4829.

† Mr. Frank Norgate, of Sparham, Norfolk, once found 20 dead Rats, fresh killed, in a Barn Owl's nest. And out of 700 pellets of this Owl, examined by Dr. Altum, remains were found of 16 Bats, 2,573 mice, 1 mole, and 22 birds, of which 19 were sparrows.

‡ Mr. W. Stock, master on the Outer Dowsing Light-vessel, reports, under date of October 6, 1886, 'Caught one Redwing, which was struck by a Crow and fell bleeding on deck; several small birds struck by Crows and fell in water.' As no possible use could be made of the stricken and disabled birds by the black and grey pirates, this useless raid on their fellow travellers must have been from sheer wickedness, and out of pure cussedness only.

up the young in a wholesale manner. Rooks, in dry weather and when their ordinary supply of food is cut off, are determined nest seekers and egg destroyers; and we are by no means certain that they are not, in this respect, quite equal in destructiveness to the Grey and Carrion Crow. Jackdaws, Magpies, and Jays will suck eggs whenever they come across them and are able to circumvent the old birds.

Lord Walsingham commences the second volume with an admirable chapter on Grouse and Grouse-driving. Perhaps on no subject connected with sporting has there been more speculation than in connection with the so-called grouse disease. There has, also, always been a great division of opinion amongst authorities as to the primary cause of this most fatal and destructive malady. It has been shown that the intestines of birds which die contain very large numbers of a small entozoic parasite, described by Dr. T. Spencer-Cobbold under the name of *Strongylus pergracilis*, which many suppose to be the cause of the malady. These should, however, more probably be considered as indications of a diseased state rather than the primary cause. Grouse-disease may be ranked with those epidemical diseases like cholera, rinderpest, and 'foot-and-mouth' murrain, which break out from time to time and run a certain course, and then disappear. The weak and unhealthy condition of the birds at the time, induced by unwholesome food or some equally potent cause, as too close breeding, making them fit recipients of the seeds of disease.

A marked difference in the habits of Grouse on the Yorkshire and Lancashire moors as compared with the Western Isles and the North of Scotland, has been observed in late years. In the former case the birds pack early, and there would now certainly be little chance of making a bag over dogs after the end of August. In the latter, fair bags may be made, with dogs, throughout September, and even in October. Lord Walsingham suggests that it is probable that the gradual alteration in climatic conditions, which have put a stop to the cultivation of cereals on land bordering the high moors of Yorkshire, has also affected the habits of moor game.

To those who love grand scenery and rough, healthy exercise, Ptarmigan shooting offers much attraction, not so much from the mere sport afforded, as the wild localities where the birds are found. Equally interesting also to the ornithologist are these lingerers from a past age—left stranded, like the Snow Bunting and many a small Arctic plant—on the summits of the highest ranges in Scotland. There, on the barren, stone-strewed plateaux, where the snow lies in patches all through the summer months, in mist and cloud-land, the *Tarmachan* finds a congenial home, feeding on the fruit of the many berry-

bearing shrubs which, dwarfed and creeping, cover the sides and hollows of the hills. 'No one,' says Lord Walsingham, 'who has seen them in their native haunts—be he naturalist or sportsman, or the more happy combination of both—can have failed to be struck by the perfect resemblance of their colour to the objects by which he finds them surrounded. The first time he makes their acquaintance he will probably see them at from ten to fifteen yards distance, where the short jerking motions of their tails will first attract his attention as the birds walk along among the stones, and he will wonder how he could have been so near them without noticing them before.'

We have ourselves, after marking Ptarmigan down, and being perfectly certain within a few yards of their position, found it most difficult to make them out, even with the aid of a glass, so nearly did their plumage assimilate to the loose shingle and tufts of silver-grey and pale-yellow lichens; and it was then only by catching sight of the scarlet patch above the eye that we were able to discover the crouching form of the bird. If it were not for this protective colouring. Ptarmigan would never be safe so often as the winged-shadow of the keen-eyed Falcon drifts along the hill.

The best hills in Scotland for Ptarmigan are in Ross-shire, round Loch Maree, and in the Auchnaehellach Forest; Sutherland, Caithness, and parts of Perthshire also afford good ground on their highest peaks and ridges. Ben Wyvis, in Ross-shire, is a noted Ptarmigan hill; also the elevated and continuous ridges north of Loch Laggan, in Perthshire.

In windy weather Ptarmigan sit on the lee side of a hill, and in looking for them the sportsman should endeavour to walk as much as possible at one level, and not up and down. When rising, their flight is at first directly away from the hill, and then parallel with it, following the curves. The sketch at page 43, by Mr. G. E. Lodge, excellently represents the grouping and flight of Ptarmigan when leaving a hillside.

Black-game, says Lord Charles Kerr, are becoming less numerous than they were some years ago. Amongst the theories advanced to account for this are the abnormally wet seasons in late years, also the deep open drains now made by hill farmers, into which the young birds fall and are drowned. We are inclined to think, also, that the premature slaughtering of the young broods in the early season may have something to do with this. There is a general agreement amongst sportsmen that the 20th of August is too early for Black-game shooting to commence; even in the middle of September we have found them lie like stones, so that the merest tyro cannot fail to kill, and each bird in a brood can be easily obtained. It is

not till October that they are in full feather, when the cocks are well able to take care of themselves, but the hens can scarcely be said ever to get very wild. An old cock on the wing has a very close resemblance at some distance to a Velvet Scoter.

While Grouse cling to the heather, Black-game may be found in September in boggy patches on the moors, in spots spangled with the pretty flowers of the Grass of Parnassus, and amongst rushes, on the seeds of which they partly feed. When flushed they fly up wind, whilst Grouse, as a rule, fly down wind. It is a curious fact that Black-game are not found in Ireland, although many attempts have been made to introduce them. Small and isolated colonies of the old indigenous race exist in several localities in England, and Scotch birds have been turned out as a cross, but notwithstanding this, and careful preserving, they are gradually diminishing.

That magnificent game bird, the Capercaillie, became extinct in the north of Scotland soon after the commencement of this century.* They were introduced again in 1836 from Norway, by the second Marquis of Breadalbane, at Taymouth, and since this period have extended to many districts in the north, such as are best adapted to their habits; they feed chiefly on the shoots of the pine, also on various berries. An old cock on the wing, with a bright sunshine lighting up his plumage, is a noble sight. The cocks, when driven a few times, get very wary, and will soar above the woods for a long time, higher almost than any other game-bird.

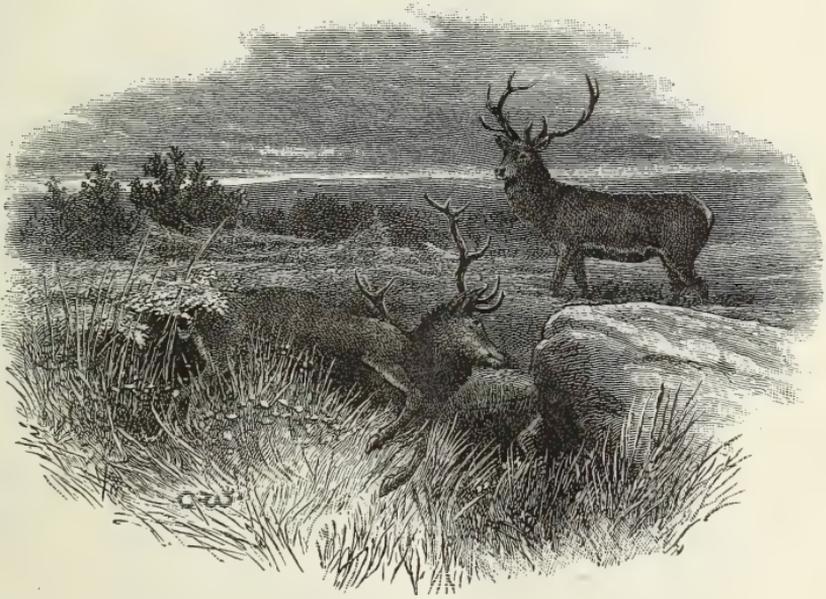
In chapters iii and iv the whole subject of deer-stalking and deer-forests has been exhaustively treated by Lord Lovat, and many interesting facts are recorded in connection with the habits of the Deer. Deer, it is known, shed their horns towards the middle of March or in April. It is a curious fact, which we have often heard keepers remark upon, how seldom these cast antlers are found in the forest; their scarcity being probably due to the habit, both of the stags and hinds, of gnawing and eating them; they will also gradually gnaw away any other bones they find.

It has often been stated that each year adds two points to a head, but this, Lord Lovat says, is a mistake; some heads never have more

* Mr. J. A. Harvie-Brown, in some further additions to the Appendix 'Capercaillie in Scotland,' speaking of the former extension of this species into England, and quoting from the review of his book, says:—'We have met with old grants (circa 1343-1361) of land in the county of Durham, held by the tenure, *inter alia*, of paying 'one wode-henne yerely' to the Bishop of Durham for the time being, indicating pretty clearly the 'Ceiliog Coed' or Capercaillie.

Mr. James Backhouse, of York, has discovered numerous bones of this species in caves in the mountain limestone of Teesdale, so that there can be no doubt it was at one period a common species in the North of England.

than four points (Caber Slat, or rod-heads), while others may have eight or ten at two or three years of age, and this number may or may not increase with each year till the Stag has reached his prime. Heads of eighteen or even twenty points have been obtained in Scotland ; but in Germany and Austria, where the feeding is far



better, Deer have been obtained with heads of forty, or even more, points. There is an old head of a Stag shown in the magnificent collection at the Castle of Moritzburg, near Dresden, which carries sixty-six tines.

With regard to the weight of a full-grown Stag, they range from 15 stones to 20 stones. One mentioned by Lord Lovat, a notable beast, was shot in 1876, by Colonel the Hon. Alastair Fraser, of the great weight, quite clean, of 30 stones 2 lbs. His haunches weighed 73 lbs. and 75 lbs. Mr. Scrope also mentions several exceeding 30 stones.

The 20th of September is called in Gaelic 'the day of the Roaring,' for it is on that day the rutting season is supposed to commence. Sometimes it begins before, and sometimes after, but in average years the proverb seems to hold good.

Stags will often travel great distances for *health*, actually for sea-bathing. There are several places on the coast, one in Aberdeenshire, forty miles from the nearest forest, where Stags are annually killed in winter and spring. They come to bathe in the sea, as seen by their tracks, bathe two or three nights, and go home again.

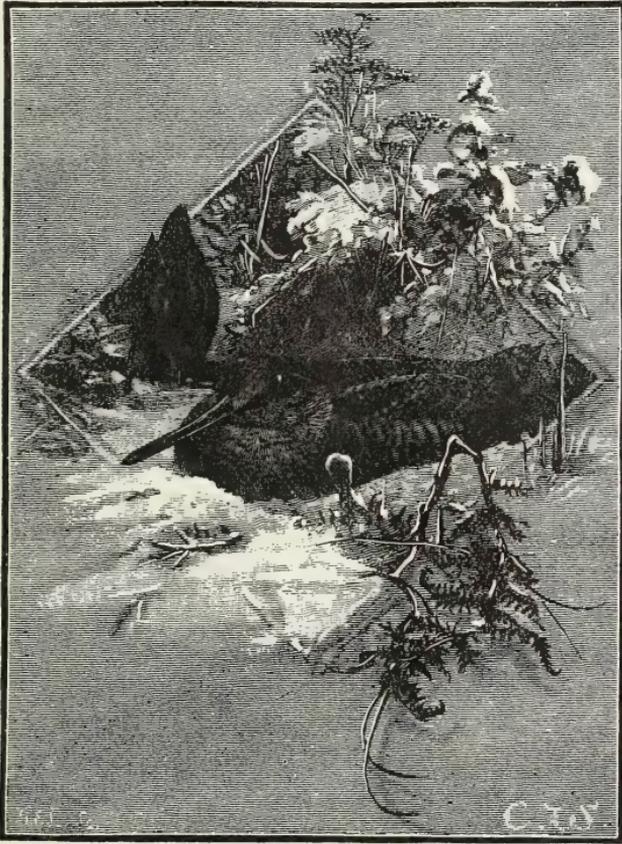
Chapters v to xiii, by Sir Ralph Payne-Gallwey, on Woodcock, Snipe, and Wild-fowl generally, will be read with much interest by the naturalist, as they are written by a specialist, who, by long experience and much observation, has made himself thoroughly acquainted with the life-history and habits of the birds which frequent the mere and marsh and sea-coast. These chapters, indeed, contain as much Natural History as they do other matter pertaining to sport. A short description is given by the author under the head of separate species, of the Geese, Swans, Ducks, Divers, Grebes, and Waders, which are known to occur in the British Isles, sufficient for their identification. The list includes also many of those rarest wanderers, which from time to time have turned up on these islands, and thus obtained an entrance into the British list, such as the American Widgeon, Red-crested Pochard, Ferruginous Duck, Buffel-headed Duck, Steller's Western Duck, Surf Scoter, and the Hooded Merganser, also several rare Waders, with particulars of their natural haunts, and the circumstances and number of their occurrences on our shores.

The Woodcock breeds in England much more commonly than it did, and there are now few, if any, counties in which it has not been recorded as nesting. It is a well-established fact that these home-bred birds do not remain to winter in the localities where they have been brought up. They leave about the last week in August and early in September, and their place is taken by foreign birds which arrive in October and November, with great regularity to the same favourite coverts and spots.*

From the accounts which have been handed down by old sportsmen, Woodcocks are much scarcer now than formerly. Sir Ralph Payne-Gallwey thinks this may to some extent be due to the increased number of shooters, and the more rapid means of firing with breech-loaders. The custom of shooting down Woodcock on their first arrival in an exhausted condition on the east coast is greatly to be deprecated. It is not uncommon for sixty to a hundred to be shot in a very limited locality; when we consider this, and the enormous and wholesale slaughter of these poor birds during a season of severe frost by the peasants in Ireland, we cease to be surprised at the gradually diminishing numbers which come to us. Considering the persistence with which they are followed up by shooters, we have often been surprised that any are left to return northward in the spring.

* The writer knows an oak spinney of about five acres, near the east coast, which for the last thirty years has almost invariably held a couple of cock. These in the course of the season have generally been shot, yet the next autumn another couple have taken their place. The conditions of the locality would appear to be favourable to the support of two Woodcock and no more.

In proportion to their bulk, the appetite of the Woodcock is enormous. Sir Ralph Payne-Gallwey once gave a tame Woodcock a large cupful of garden worms for his breakfast, and yet after swallowing these he followed him about looking wistfully for further supplies.



Besides worms, Woodcocks will feed on on all sorts of larvæ or any insects they can pick up. We have sometimes detected their presence in a wood by seeing places where the dead oak-leaves had been carefully turned over in their search for slugs and insects.

It is frequently asserted that Woodcocks are in wretchedly poor condition on their first arrival, and scarcely worth powder and shot. The contrary, however, is the case, a poor bird is the exception, heavy birds in high condition the rule.

Notwithstanding assertions to the contrary, it is really not possible to distinguish the sexes by their plumage. Our author points out that the tooth-like markings on the outer feather of the wing are absent in the old birds of either sex, although very apparent in the young.

Of the Snipe, Sir Ralph Payne-Gallwey remarks, 'it is strange, after all that has been written and observed, how little we really know concerning their habits ; how they come, where they go, or when they may be expected in numbers. The eccentricity of their movements baffles the oldest Snipe shooter ; no one can with any certainty look for sport with Snipe on Tuesday, because he had it on Monday, though he seeks the birds at the same place and under the same climatic conditions.'

We can quite bear out the observation of the writer that the Jack Snipe is becoming scarcer every year in our islands ; why, it is hard to say, as they have never been known to breed with us, and when full Snipe are abundant often get off without a shot.

Not the least attractive portion of these volumes are the numerous excellent illustrations from the pencils of our best painter-naturalists, as Messrs. Stuart Wortley, Charles Whymper, G. E. Lodge, J. G. Millais, and others.

Much more might we have said, had space permitted, about these excellent volumes. We can strongly recommend our readers to buy them, or at least to borrow them and read them. They will form a valuable addition to the book-shelves of the sportsman and naturalist, and we venture to say for many years to come, be the chief work of reference on all matters connected with the sport of Shooting.



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BOOKS RECEIVED.

The Young Naturalist, Part lxxxv, for January 1887. [Mr. J. E. Robson, Editor. Science Gossip. No. 265, for January 1887. [Messrs. Chatto and Windus, Publishers. The Naturalists' World, vol. 4, No. 37, for January 1887. [Mr. Percy Lund, Editor. The Midland Naturalist, No. 109, for January 1887. [The Editors, Birmingham. Scottish Naturalist, No. 14, New Series, Jan. 1887. [Prof. J. W. H. Trail, Editor. Revue Bryologique, Bulletin bimestriel, 1887, No. 1. [M. T. Husnot, Redacteur. Journal of the New York Microscopical Society, July and November 1886. [Society. Journal of Microscopy and Natural Science, Part xxi, January 1887.

[Mr. Alfred Allen, Editor.

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SOME TRACES OF AN ANCIENT (KEUPER) BEACH AT CASTLE DONINGTON.

JAMES SHIPMAN, F.G.S.,

*Author of papers on 'The Drift and Alluvial Deposits of the Trent Valley near Nottingham';
'Triassic Rocks of Cheshire and Nottingham'; 'Story of the Hemlock Stone'; &c.*

(Abstract of a paper read before the Nottingham Naturalists' Society, November 1886.)

EXCAVATIONS for the extension of the gasworks and the laying down of a new gasholder at Castle Donington, about twelve miles south-west of Nottingham, in the autumn of 1884, exposed to view for a short time a rather interesting section. The gasworks are situated in a lane that runs at the foot of the Trent escarpment, on the north side of the village, and stand on a narrow strip of Carboniferous rocks that are shown on the Geological Survey map of the district as rising to the surface here from beneath the Lower Keuper, which forms the escarpment. The excavation happened to be made on the line of junction of the two formations, and so exposed to the light of day a fragment of the beach of the old Keuper lake. The section not only revealed the Lower Keuper resting across the truncated edges of the Carboniferous strata (Fig. 1), but also showed that for a time at any rate, during the early part of the Keuper period, this spot formed probably the northern boundary of the great inland salt lake in which we know the greater part, if not the whole, of the Keuper sediments were laid down. Many other sections have been described at one time or another in various parts of the Midlands, all more or less interesting, wherein the Keuper strata have been seen resting on older rocks; and in some of them—notably, those where the Keuper is seen resting on the flanks of the pre-Cambrian rocks of Charnwood Forest—there is vivid evidence of how the old land that surrounded this ancient lake, or that still reared its head above the waters in the form of islands, as a large part of what is now Charnwood Forest must have done at this period, slowly sank until it was ultimately overwhelmed with the red sediments that now constitute what we call the Keuper. But no exposure that I am aware of has ever exhibited terraces so well-marked or showing such distinct evidence of the shape of the ancient shore line that, for a time, as I have said, formed the northern boundary of this part, at least, of the Keuper lake as was afforded by this section. Unfortunately, however, the lower and most important part of the section at Castle Donington—the part showing the actual junction—was circular, being, in fact, the well of the gasholder, and therefore did not itself show quite the true shape of the junction as it would have appeared had the cutting been made in a straight line. But by the aid of

sketches made of the sides of the excavation while the work was in progress, and careful observation of the ground from time to time, it was possible to construct the sketch-section represented in the woodcut (Fig. 1), which I think fairly represents the character of the junction.

Curiously enough, the little strip of Carboniferous rocks—it is not many yards in width, and about half a mile in length—that runs along the edge of the alluvial plain of the Trent at Castle Donington had for years been an object of solicitude by local geologists, but no one that I ever came across, except Professor Hull himself, who surveyed this part for the Geological Survey, had ever been able to get a glimpse of these Carboniferous beds. And it was while examining the Keuper escarpment here, and hunting for a possible exposure of these beds with my friend, Mr. Horace Brown, F.G.S., of Burton-on-Trent, that I came upon the excavation that was destined to turn out so interesting.

In his memoir on this district,* Hull describes a section which was at that time opened out north-west of Castle Donington ‘in certain strata, which are probably referable to the Millstone Grit.’ ‘The section,’ he goes on to say, ‘occurs in a lane leading to Cavendish Bridge,’ and ‘the strata consist of yellow, white, and blue shale, alternating with thin-bedded grits and rusty ironstone bands or concretions. He adds that ‘if these strata do not form part of the Millstone Grit, they at least belong to the lower portion of the Coal Measures.’ This description of the character of the strata agrees perfectly with what was met with in the gasholder excavation. The Carboniferous strata, where Hull saw them, dipped towards the south-east; here, however, the dip was south-westerly.† But this only bears out the natural inferences to be drawn from the section recently exposed, and tends to show that the Carboniferous rocks were not only bent into an anticlinal arch, but were broken up by dislocations before Keuper times.

The first trace of the base of the Keuper that I met with at this spot, however, was in the summer of 1880, when I chanced to come across a very interesting band of breccia (*c* in the woodcut, Fig. 1) in the Keuper at the foot of the cliff. It was in a newly-made excavation that afterwards became the site of the new gasholder. The outcrop of the breccia was about two feet above the level of the road, and the bed dipped at a low angle in a southerly direction.

* ‘Geology of the Leicestershire Coalfield,’ &c., p. 8.

† In a diagrammatic section of the Keuper rocks at Castle Donington given in this memoir, the Carboniferous strata are represented as dipping to the north, however. This must be an error.

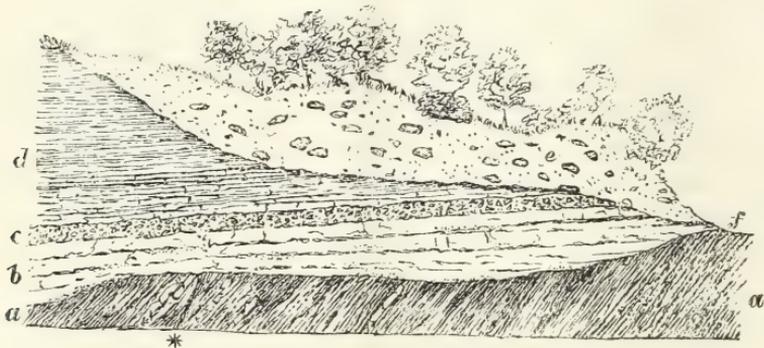
The lowest bed of the Keuper in other localities is occasionally a brecciated conglomerate, and it seemed not unlikely therefore that this breccia formed the base of the Keuper here. In order to test the question I had a trial hole made to the depth of three or four feet. No Carboniferous rock was met with, however; but, instead, a chocolate-red argillaceous sandstone, containing lenticular seams of greenish-yellow fine-grained clayey sand, that somewhat resembled Lower Mottled Sandstone. Mr. Horace Brown had a similar trial hole made during our visit in 1884, in order, if possible, to reach the Carboniferous rocks through the 'feather edge' of the Keuper, as they were nowhere else visible; but with no better success. A few weeks afterwards the sinking of the large well for the new gasholder showed that we had got down to within a few inches of the Carboniferous rocks in each case.

The gasholder-well was excavated to a depth of twelve feet below the level of the road, and was about seventeen yards in diameter. It passed through the lowest beds of the Keuper, and penetrated the Carboniferous strata to a depth varying from two to twelve feet. It was then seen that the Keuper not only rested on the highly inclined and truncated edges of the Carboniferous strata, but that the Keuper rested on a succession of terraces, which had been cut back into the Carboniferous shales and grits. Indications of three distinct terraces could be made out, the middle one extending very nearly the full width of the excavation. The Carboniferous rocks consisted of thin alternations of red, yellowish-brown, purple, white, and pale mottled greenish shales, containing in the upper part of the series exposed (1) beds of hard brown and bluish-grey sandstone, with traces of plant remains; (2) concretionary hematite ironstone, and (3) very hard compact purple grit, one of the beds of the latter being nine inches thick. The strike of the Carboniferous strata trended from S. 40° E. to N. 40° W., or roughly south-east and north-west, and therefore the true direction of the dip was S. 50° W., or nearly south-west.

A curious fact in connection with the dip of the Carboniferous strata was that the inclination shown in the opposite sides of the excavation did not tally, as might be expected, one side (the east) showing a maximum dip of 34°, the other (west) a dip of 45°. Nor did the beds altogether match on the two sides of the excavation as they ought to have done. This suggested some disturbing agent. There was no distinct evidence of a fault, however. On the west side there was some appearance of a hitch or slip having taken place, but it could not be traced passing across to any other point, though the exposure of the Carboniferous on the south side was so

shallow and obscure that it might have disappeared in that direction without being distinctly observable. Mr. Horace Brown, who also made a careful examination of the section, has since suggested to me as a probable explanation of the difficulty, that 'as the Carboniferous strata must in Triassic times have dipped seawards at an angle of something like 20° (for we must, of course, subtract the dip of the Keuper, which is roughly in the same direction), there must have been from time to time great slips, and that it is extremely likely that all traces of these landslips were not worn away before subsidence had carried them below the surface action of the waves, and sufficiently deep to have laid down upon them the early deposits of the Keuper sea.'

A careful examination of the surface of the ground when the site was first cleared for the well, and afterwards during the progress of the work of sinking, showed that the old shore line of Carboniferous rocks was worn back into little inlets, separated by rounded buttresses of rock, describing a series of parabolic curves, and did not run in anything like a straight line.



* LOWER KEUPER RESTING ON THE TRUNCATED EDGES OF LOWER COAL MEASURES AT CASTLE DONINGTON.

- f.* Road to Cavendish Bridge.
- e.* Drift and brickyard débris.
- d.* Red shaly clay.
- c.* Breccia.
- b.* Chocolate-red sandstone, with greenish-yellow streaks in it.
- a.* Lower Coal Measures or Gannister beds.

The middle or main terrace shown in the excavation presented a nearly level surface on which the lowest beds of the Keuper rested, with an inclination towards the south-west of 8° . It was now seen that the chocolate-coloured sandstone below the breccia belonged to the Keuper. This sandstone was six feet thick, and lay in regular beds, about a foot thick. It contained no pebbles, except a few small

sub-angular bits of quartz here and there along the planes of bedding. Above the chocolate-coloured sand-rock came the breccia, eighteen inches thick, which preserved the same thickness with remarkable uniformity throughout the length of fifty feet that it was exposed. An examination of the materials composing the breccia showed that it was made up of angular, or only slightly water-worn bits of highly indurated or metamorphosed slaty rock, very compact, hard, pale-greenish grit, concretionary ironstone, and pebbles of quartz, with an occasional fragment of what seemed to be decomposing impure limestone, like the Carboniferous Limestone of Breidon Hill, about four miles to the south-west, the whole embedded in a purplish-red clayey matrix. Only about thirty per cent. of the fragments of the breccia had been derived from similar rocks to those on which the Keuper rested, but as they were all angular, and still retained their sharp edges as if they had not been long broken off the parent cliff, they could not have been rolled about much in the water before they became covered up, and therefore could hardly have travelled far. All this showed that the cliff from which the breccia was derived must have been close at hand. The breccia was probably formed by the wearing back of a third and higher terrace, which must have occupied a position a little above the level of the present road to Cavendish Bridge. But of this terrace, or of the cliff that doubtless rose up behind it, nothing now remains ; in its stead there is the broad expanse of the Trent Valley. And where to the south stretched far as the eye could reach, the open waters of the Keuper lake, there are now the swelling hills of red marl that form so large a portion of North Leicestershire. The breccia represented the ancient beach of the Keuper lake, strewn, as many a modern beach may be seen strewn at the present day where there happens to be a cliff, with angular bits and pieces of rock, some resting on the surface of the muddy beach, others in various stages of submergence in the deposits now forming around our coasts.

Three points in the ancient physical geography of the Castle Donington area are brought prominently before us by the section which was here exposed. First of all we see that after the deposition of the Carboniferous strata, and before the dawn of the Keuper period, these rocks had been forced upward into a great anticlinal ridge, extending in a north-west and south-easterly direction. In the second place, the Permian and the three sub-divisions of the Bunter formation are absent. It is very probable that they were never deposited over this area, and that it must, therefore, have formed land for a long period during this interval, until it was ultimately submerged by the waters of the Keuper lake. Then, thirdly,

it is clear that this anticlinal ridge had suffered a considerable amount of erosion before it was finally covered up by the Keuper deposits. The terraces on which the Triassic rocks rest, show that this ancient land did not go down rapidly, or even at one continuous rate; but that there were occasional pauses in the process of submergence, during which the Keuper waters had time to wear back the coast-line for a few yards before the next downward movement set in.

NOTE—CONCHOLOGY.

Helix ericetorum.—The variety of *Helix ericetorum* recorded by Mr. Tomlin on p. 20, from the neighbourhood of Chester, is apparently referable to *v. monozona* Pascal, which has not hitherto been recorded as British; it is described as having a single band above the periphery. The *m. scalariforme*, also mentioned, is the *m. disjunctum* of Turton, originally found near Dublin. It may be well to note also that the large variety of *Planorbis lineatus* found by Mr. Tomlin near Cambridge (Sci. Goss., p. 16) agrees in size with Pascal's var. *major*, which is said to be '7 mill. diam., $1\frac{3}{4}$ alt., greenish-yellow, dull.' Another addition to the British List is *Arion hortensis v. nigra* mog., recently sent me from Wakefield by Mr. J. Wilcock.—T. D. A. COCKERELL, Bedford Park, Chiswick, Jan. 2nd, 1887.

NOTE—ICHTHYOLOGY.

Whitby Fish-notes.—Three Grey Mulletts were taken here in the salmon-nets on the 12th August, 1885. I believe I neglected to report these. I got one for the museum, but unfortunately the skin got lost, and am therefore unable to say what it was, but I think from what I remember it was '*Mugil capito*.'

On the 12th November last two specimens of the Boar Fish (*Capros aper*) were given to me in the flesh, one by J. Mitchell, fish salesman; the other (having been steeped in alum) by a person named Chapman, who picked it up on the pier near the larger fish, having apparently been ejected from the stomach of some larger fish there lying previous to being sold. I should have reported these before, but Mitchell said he thought his had come out of a Cuttle-fish sent from Plymouth, but Chapman (very properly in my opinion) stated that it could not have come from a Cuttle-fish, which he considered could not have swallowed a Boar Fish whole, but would tear it in pieces with its parrot-like beak and swallow it piecemeal. I have both specimens, but, on account of the difference of opinion, have not deposited either in the museum. Chapman feels convinced both had been ejected from the stomachs of the larger fish; in this I am inclined to agree.

The following are from notes made by me of occurrences:—

August 26th.—Jaw and tail of large Greenland Shark (*Lamargus borealis*), brought into Whitby by screw fishing-boat 'Albatross.' The fish, which was estimated to be 17 ft. long, was caught about fifty miles at sea, off Whitby. I have part of the lower jaw, which I obtained about a fortnight after it was brought here.

September.—During this month four common Topes (*Galeus canis*) have been brought in here by the same boat. I have not yet reported this fish as having been taken off here, as till now I had no opportunity to examine it. They have been frequently taken here, and are known locally as 'Tomear' or 'Tom Ear.'

October 2nd.—Sandy Ray (*Raja circularis*).

October 7th.—Common Sea-bream (*Pagellus centrodontus*).

October 11th.—In conversation with two Staithes fishermen this day as to Sharks, they informed me that in June last a large Shark was caught (about fifty miles off Whitby) rolled up in the fishing lines of the fishing-boat 'Good Intent.' They described it as being prickly all over like a Thornback; they had to cut their line and let it go. It was about 10 ft. or 12 ft. long. From their description, I conclude it was a specimen of *Echinorhinus spinosus* (Spinous Shark).—THOS. STEPHENSON, Whitby, October 15th, 1886.

THE EXTINCT ANIMALS OF THE LAKE DISTRICT.

JOHN WATSON,

Fern Leigh, Kendal.

It need hardly be said that the fauna of the Lake counties of Cumberland and Westmoreland was not always so unimportant as it is to-day; and a series of recent explorations in the mountain limestone has yielded the best of all evidence—the actual remains of the animals themselves. Nothing has been written on the subject of bone-caves having reference to the area indicated, and it is proposed now to shortly sketch the progress that has been already made. The following notes have reference to the Arnside Cave, to a fissure on Whitbarrow Scaur, to a second fissure at Helsfell, to a third in Long Sleddale, to excavations at Silloth, to Ressondale, and to numerous mosses and other places where animal remains have been found. As the subject of cave exploration opens up such a wide field, even when conducted over a limited area, these remarks will be restricted exclusively to those animals which (with the exception of man) have become extinct within historic times. At one or other of the places indicated, the remains of the following animals have been found:—Man, Bear (2 species), Wild Boar, Wolf, Red, Fallow, and Roe Deer, Beaver, Wild Cat, White Wild Cattle, several animals of the Weasel kind, remains of *Bos primigenius* and *Bos longifrons*, Irish Elk (so-called), Horse, and Badger, together with a host of the remains of animals at present existing. The human remains consist of parts of the skull and teeth of an adult male, several ribs of a child, together with a number of gnawed and splintered pieces.

The whole of the species represented by the above list have not been found in any one cave or fissure, the most general finds occurring at Helsfell and Whitbarrow. The curious mixture of animals of such widely-different haunt and habit—the bears with the bovines, the deer with the wolf—at once suggest the idea that the quieter creatures have been dragged to the recesses which constituted the lairs of the larger carnivora. Another interesting fact is that a human tibia found among the remains shows marks of having been sawn by a blunt or jagged instrument. Before examining somewhat more minutely the above list, just a word as to the caves and fissures whence they are derived, and as to the substance in which the bones are found embedded. Speaking generally, the caves in this district occur in calcareous rocks, and it is well known that wherever calcareous strata are sufficiently hard and compact to support a roof, caves are to be found in greater or less

abundance (Dawkins). Ours, as already stated, are in the mountain limestone, and in two instances front upon the sea or upon an ancient sea-bottom, and have been formed by its agency. A moment's general description of a bone-cave will describe the whole of the local ones. The floor is covered with stalagmitic matter, stalactites depending from above. Beneath is a pulverised red loam. Much of this, from its fineness, might consist of ground bone, to which substance it bears considerable resemblance. It is in this layer that the first remains are found, the parts best preserved being teeth and the harder bone-cases. These are usually found matted and massed together in confused heaps, whilst others are loosely strewn throughout the loam. In one or two exceptional cases bones were found on the surface, embedded in the stalagmitic matter that had been brought down from above. Few of the bones found are entire, and most have been gnawed (Buckland).

Probably the best portion of the finds are the remains of a Beaver and two species of bear. One of these latter was the common Brown Bear, still found in the wilder portions of northern and middle Europe, and the Grizzly Bear, now restricted to its American habitat in the Rocky Mountains. It is possible that the hinder part of the skull of a bear found at Helsfell may turn out to be that of the Cave Bear, an animal never known in the flesh, and therefore long extinct prior to historic times. Although this Cave Bear is described as *Ursus fossilis*, it may be well to clear the ground by stating that none of the remains are in a fossilized condition, but are preserved by reason of their being embedded in the stalagmitic matter of the cave floor—are found in such deposit, in short, as to betoken an animal not long gone. The historic period to which the animals now enumerated belonged may be referred to roughly as from the invasion of Cæsar, 55 B.C., to the time when the last of the creatures became extinct. The evidence now to be adduced can refer only to a period extending from the date just mentioned to 500—1000 A.D. Some year in the interval of these latter dates marks that of the extinction of the Brown Bear in Britain (Harting). In fact, the Brown Bear and the Reindeer are the links between Historic and Prehistoric times. The first is found in Roman refuse-heaps and in our local caves, side by side with remains of animals introduced by the Romans. Of this huge creature an almost perfect skull was found in the Arnside Cavern by the late John Ruthvin, when on a geological ramble with Sedgwick. Its remains have been found at Helsfell, too, and at Whitbarrow, and we know from documentary evidence that it occurred in the vast Caledonian Forest which stretched over an area much less local than the name would imply, and certainly comprehended Cumberland and

Westmoreland. The valleys of that part which we now call the Lake District were covered with wood, an area of eighteen miles hereabout being described as 'a goodly greate forest, full of woods, red deer and fallow, wild swine, and all manner of wild beasts.' These extended themselves until they became merged in the greater Caledonian Forest, which was still more extensive and wild. It was from these woods that Bears were taken to Rome to be baited; and they also contained Wolves, Wild Boars, and Wild Cattle.

One of the most important of the animals which existed in immediate prehistoric times was the Urus of Cæsar, gigantic remains of which have been found from time to time in bogs and fluviatile deposits. Remains of this Urus (*Bos primigenius*) have lately been found during the excavations for the Silloth New Docks, about 17 ft. from the surface of the ground, and embedded in gravel. Part of these remains consisted of an enormous *humerus*, weighing nearly 6 lbs. Professor Goodchild has recorded the existence, in Westmoreland, of a fine specimen of a skull of a gigantic *Bos*, which also belongs to this species. It was dug from a moss near Brough, and is said to have been one of two skulls which were found together, with their horn-cores interlocked in such a way as to suggest that they were mired whilst engaged in fighting. A large horn-core belonging to the same gigantic species was also found in the moss next to Sunbiggen Tarn. These constitute the whole of the local occurrences, the remains found at Helsfell being referred to *B. primigenius* by mistake. That the Urus was contemporaneous with man must be admitted, as relics of the two have been found together in various fluviatile deposits; and this is confirmed by the fact that there exists an almost perfect skeleton of the Urus, together with a skull of the same species, in which latter is embodied a Neolithic Celt (Harting).

It still remains a mystery as to whether the Wild White Cattle of this country are descended, as some affirm, from the aboriginal wild breed of the British forests—the Urus of Cæsar, or whether it has, at some period long remote, been imported from abroad and since become feral. The weight of scientific opinion, however, seems to favour the view that these wild white cattle were descended from the Urus, either by direct descent through wild animals from the Wild Bull, or less directly through domesticated cattle, deriving their blood principally from him (Harting). But our concern is not so much with the origin of the race of these cattle, as with a local herd of them. This was at Naworth Castle, in Cumberland, and what little is known of it is from the 'Household Book' of Lord William Howard, and from the 'Sandford MS.' From these sources we gather that the wild cattle were introduced in 1629, from Martindale Forest, near

Thornthwaite, where at that time (Mr. Harting suggests) they probably roamed in a state of nature. The herd, however, did not remain here very long, for in 1675 it had ceased to exist, having been destroyed, it is suggested, during the Parliamentary Wars. Sandford describes Naworth as formerly having about it 'pleasant woods and gardens; ground full of fallow deer, feeding on all somer tyme; brave venison pasties, and great stores of reed deer on the mountains, *and white wild cattle with black ears only*, on the moores'

The next nearest herds to us were those at Barnard Castle and Bishop Auckland, in Durham; Drumlanrig Castle, Dumfriesshire; Hoghton Tower, Middleton Park, and Whalley Abbey, in Lancashire; and Burton Constable and Gisburne Park, in Yorkshire.

It need hardly be said that the wild cattle were white, with black ears and muzzles, many of them having shaggy manes.

Before coming to the other members of our great extinct fauna, it may be well to diverge for a moment to look at the primitive forests in which the animals lived. It is difficult at this length of time to realise the physical constitution of the Lake District when there roamed over it the animals next to be enumerated. Its utter wildness, its wastes, its shaggy woods, its morasses and far-spreading forests made its unreclaimed area a terror and a dread to the few travellers of the times. In a word, it was one vast forest and fell. On the banks of the more secluded streams the timid Beaver constructed its dam, and on the hills pastured the Wild White Cattle of the period. Vast herds of Deer of three species trooped through the tangled woods, and on the margins of the reedy meres wallowed Wild Boars. Somewhat earlier the Bear had kept the rocky fastnesses of the mountain side, and even now the skulking Wolf was a roaming marauder—a terrifier of the primitive folk who a little later took up their abode in those early unreclaimed wilds. This state of things obtained at a time when the creatures enumerated held almost undisputed sway. The forests for the most part flanked the mountain ranges, stretching sometimes to their summits. Many of them were impenetrable; and especially does this refer to the tangled woods of the valleys. The chases, the forests of which they were part, the swamps and morasses, constituted three-fourths of our local area; and from our present location and onward to the Borders, formed perhaps the wildest forests of all. It is essential to refer to this state of things for the better understanding of the subject. To return again to the animals.

There was discovered some years back (Goodchild), in alluvium, at the bottom of the Ressondale Valley, the skull of an adult Beaver. The value of the 'bear' finds has been referred to, but this, perhaps,

is the most valuable discovery of all. It is the only instance of the Beaver's remains being found in the North of England, and one of the three cases of its occurring in the country at all. And as remains, documentary evidence is almost as rare. In the 10th century the Beaver is mentioned as being found in Wales, but the time of its plenty must be reckoned at and prior to the time of the Roman invasion, for then it was that the country was comparatively opened up. Before these rude onslaughts the Beaver would surely retire, for of all timid and secluded creatures this is the most so. The last historical mention of the Beaver brings us to within a few years of the close of the 12th century, though it probably lingered on in Scotland to the 14th.

From the latter part of the 17th century to the earliest times of which history takes cognizance, the Wild Boar has played an important part in British field-sports. A royal beast of chase, it was preserved as the quarry of kings. Monarchs reserved it as their own by special right, and the nobles of the land have hunted it through every period of our history. 'Reserving all eyries of Hawks . . . Wild Boars and their kind'—this is the characteristic claim of the king in granting tracts of land or forest, and the above reservation is from such a grant in Cumberland. In the Lake District the Wild Boar abounded, and we have evidence of its former tenancy of every description. It was found in Inglewood Forest, in the woods about Naworth, by the shores of Grasmere, and, from the names, probably in Grisdale and on Wild Boar Fell. Frequently the remains and tusks of the Wild Boar have been dug up in the local peat mosses, and especially about the margins of the tarns. Although twenty places claim the notoriety, it is now generally agreed, and that, too, upon the best evidence, that the last Wild Boar was killed in Westmoreland. A very few miles from Kendal there exists to-day a wide tract of uncultivated land, abounding in morass and swamp. Wild-fowl, Black-game, and Pine Martens are its only tenants; dwarf birch, scrub oak, and stunted blackened logs covering much of its surface. Everywhere is treacherous bog and yellow, peaty water. Beech and oak flourish upon its upland confines, and the whole scene is one which might well constitute a Wild Boar's paradise. The spot is wild and desolate enough to-day, but two centuries ago must have been more so. It is here, by Gilpin Bridge, over Gilpin Beck, that one of the Gilpins of Kentmere Hall killed the last Wild Boar. The date of the occurrence carries us back to the reign of Charles II, and there is no reason to doubt its accuracy. *No one* claims to have killed the last Wild Boar at any time subsequent to this.

In the bone-fissures of the district the remains of Wolves are exceedingly numerous. Some fairly perfect skulls have been found, one of which is unusually large. In times past, among the woods of the fells, packs of Wolves simply swarmed. The Wolf survived in the northern counties and in Scotland much longer than in the south of the country—to the middle of the 17th century, in fact; and in Ireland even twenty years later. So that the Wolf was the last to survive of all the great extinct animals. A skulking marauder, it found harbour among the thickets of the wooded hills, where few cared to follow it. Its form, less bulky than that of the Bear or the Reindeer, coupled with its crafty wariness, rendered it less conspicuous than other wild creatures. And these facts may account in some measure for its late survival. When in summer and autumn the woods abounded with game, the ravages of Wolves were both less felt and noticed than in winter. At the latter season it was that the packs of these animals banded themselves together, and became at once a terror and a dread to the sparsely scattered populations. All ordinary means of extermination failed, and the Wolf reigned through severe winters as a terrible power for evil to be guarded against, even in many of the ordinary outdoor occupations of the period. Wolves had their dens, to which they dragged their prey and reared their young, among the smaller caves and rocks of the thickets, and it was when these latter were produced, that circumstances best offered for their destruction; and thus it is that we find in the records kept by the religious houses of the time the items of Wolves' heads, upon which prices were set. Those items were the equivalents to the entries of the heads of Foxes, Badgers, Martens, Wild Cats, Eagles, and Ravens of a later period, or even of our own day. The Wolf-occurrences in the two counties are so numerous that we cannot enumerate them.

The remains of Red Deer and Roe occur in enormous quantities, especially the first. Both are indigenous, though the Fallow Deer was introduced from the continent by the Romans, and the few remains found are probably those of animals which, after their first introduction, reverted to a feral condition. The pronged Roe and the Fallow Deer trooped the old woods, whilst the Red Deer stuck to the mountains. These last were much larger than the semi-domestic ones which to-day still survive on Exmoor and our own Martindale fells—as the bones and antlers dug up from time to time testify.

Wild Cats, Badgers, Otters, and Martens abounded everywhere, as did the Golden and White-tailed Eagles, Kites, and all the larger birds of prey.

The following short table will at once show the finds that have been made in the district, with the date of the extinction of the various species:—

The Urus, gigantic wild ox, about the dawn of the historic period.		A.D.
Brown Bear	... circa	500—1000
Reindeer „	1200
Beaver „	1100—1200
Wolf „	1680
Wild Boar „	1620 (Dawkins).

The Cave Bear and the Grizzly became extinct in prehistoric times, and the so-called Irish Elk immediately afterwards. The dates of the extinction of the minor animals are unimportant and comparatively recent.

NOTES—ORNITHOLOGY.

Bittern in Lincolnshire.—On 7th January I had the opportunity of examining a Bittern (*Botaurus stellaris*) which had been that day brought up from the marsh by a man named Vickers, by whom it was shot the day before at West Saltfleetby, a village near the coast, about eight miles from Louth.—H. WALLIS KEW, Louth, 8th January, 1887.

Gannet occurring inland near Masham.—On the 2nd inst. a male Gannet (*Sula bassana*) in remarkably fine immature plumage was captured by one of the Swinton watchers, at Wathermarshe, immediately outside the park. It was first seen on the ground, and being unable to rise was chased into a building and caught. It was in good condition, apparently uninjured; the digestive organs empty. Doubtless it had lost its way in the recent thick weather, and wandered from the sea, thirty miles distant from here. It is the first recorded occurrence of the Gannet in this neighbourhood. Hooded Crows arrived 4th inst. Redwing arrived 9th inst.—TOM CARTER, Burton House, Masham, October 12th, 1886.

Gannet inland near Harrogate.—A fine immature specimen of the Gannet (*Sula bassana*) was picked up by a farmer in a field at Crimble (just under the viaduct), near Harrogate, during the month of October 1886. The man, in going through the field, observed a speckled bird lying on the grass. He thought it was a dead hen, and was going to pass it by, but noticing its long wings and large beak, he examined it more closely, and found a strange bird, which he thought would look well stuffed, and so by a lucky chance it was preserved. The bird was quite warm when picked up, and had evidently been shot at, as, when skinned, a few shots were found in the body. The wings from tip to tip measured 6 ft., and the bird is nicely preserved. It is, I think, the first instance of its occurrence in this district.—RILEY FORTUNE, Alston House, Harrogate, December 18th, 1886.

Greenshank and Storm Petrel near Wakefield.—I wish to record the occurrence, within six miles of Wakefield, of the Greenshank (*Totanus canescens*), immature, on August 19th; also the Storm Petrel (*Procellaria pelagica*), mature male, October 5th, both brought me for preservation. The gentleman who shot the Petrel had his attention drawn to it by a flock of about 60 Lapwings giving chase in a noisy and disturbed manner. I have also received from North Yorkshire a fine hen Pheasant (*Phasianus colchicus*) assuming the plumage of the male. It would be interesting to know if such birds ever lay eggs and rear young as ordinary ones.—GEO. PARKIN, Wakefield, December 22nd, 1886.

Whitby Bird-notes.—During the first week in September three Sanderlings (*Calidris arenaria*) and one Redshank (*Totanus calidris*) were obtained at Whitby, and six Dotterel (*Eudromias morinellus*) at Robin Hood's Bay. On the 6th four Dotterel were shot at Whitby, and on the 25th a Storm Petrel (*Procellaria pelagica*) was seen in Whitby Harbour. On the 27th a Great Spotted Woodpecker (*Dendrocoptes major*) was shot in Mulgrave Woods.—THOMAS STEPHENSON, Whitby, October 15th, 1886.

Fork-tailed Petrel at Formby.—On the 11th of October I exhibited at a meeting of the Microscopical and Natural History Section of the Manchester Literary and Philosophical Society, a male Fork-tailed Petrel (*Thalassidroma leachii*) which was shot, along with a number of others, by my friend, Mr. T. D. Sykes, on October 5th, 1885, during a gale of wind from the north-west, at Formby, Lancashire. They were rather awkward to obtain, owing to their flying amongst the breakers, and, when hit, falling into the water and getting washed out to sea. It was not very easy to shoot at them sufficiently far off, not to blow them to pieces, for they did not seem to have the least fear. My friend says they flew like black butterflies amongst the waves, quite close to him, and if he had only had a landing net he could easily have procured some by this means. The specimen I possess was only slightly shot in the pinion of one of its wings, but it did not make any effort to escape, and when he picked it up and put it on his hand, it walked round, and seemed quite happy and contented, only uttering a call-note something like the hissing sound made by some species of Bats, and which is rather ventriloquial. Their tameness does not arise from exhaustion, for they were, without exception, all fat and plump.—FRANCIS NICHOLSON, Oakfield, Ashley Road, Altrincham.

Remarks on Mr. John Watson's Notes on the Eagles of the Lake District.—It is interesting to learn from Mr. John Watson that he has data of recent occurrences of the Osprey in the Lake District; for, of the five bona fide occurrences noted in the 'Birds of Cumberland,' only one refers to the Lake District, although Capt. Kinsey Dover and the other ornithologists resident in the south of our county have always loyally assisted the zoological recorders of the Scientific Association of the two counties. I do not wish to criticise Mr. John Watson's views, especially as an epitome of the conclusions I arrived at in consultation with Mr. W. Duckworth has been in the hands of ornithologists for the last six months. But the readers of the *Naturalist* must not suppose that the avifauna of the Lake District has been 'neglected' by everyone except Mr. John Watson, as that writer's opening remarks would seem to indicate.

As I have stated in the introduction to the 'Birds of Cumberland,' articles on the birds of the Lake District were contributed to the *Zoologist* of 1865, 1867, and 1878, by ornithologists of no less high standing than Messrs. John Cordeaux, Howard Saunders, and W. A. Durnford, followed in 1879 by an excellent paper from my friend Dr. Parker, of Gosforth. The contents of these papers and all other trustworthy records were examined by myself, I believe exhaustively, more than a year ago; and probably the only local bird list that I have not yet seen is that of the late Dr. Gough, about which I corresponded with his relatives unsuccessfully.

Mr. John Watson incidentally endorses the views I have expressed as to the former occurrence of the Golden Eagle, but does not allude to the *crux* of the question. The one fact which militates against the former occurrence of the Golden Eagle in Cumberland as a resident, is that no mention of the species occurs in Dr. Heysham's list of Aves in the county history. I can only account for its omission by supposing that Dr. Heysham was doubtful (in 1797) as to whether the Golden Eagle was really resident in the Lake District.

With regard to Mr. John Watson's statement that the White-tailed Eagle nested at Whitbarrow Scour in 1849, I must say 'credat Judæus' until Mr. Watson furnishes us with some authority for the statement. If the statement be thoroughly reliable, it is of first-rate importance, and if the facts rest on authority, ornithologists should be in a position to weigh their value.—H. A. MACPHERSON, November 1st, 1886.

THE LICHENS OF WESTMORELAND.

JOSEPH A. MARTINDALE,

Staveley, near Kendal, Westmoreland.

(Continued from the *Naturalist* for 1886, p. 324.)

62. **Cladonia pityrea** (Flk.); Nyl., Scand., p. 50 (excl. syn. *decorticata* Flk.; vide Nyl. in Flora, 1873, p. 299); Crombie in Grevillea, xi, p. 112.
On the ground, Staveley Head.
Var. **hololepis** (Flk.); Crombie, l.c.
At the base of larch trees near Staveley.
63. **Cladonia fimbriata** (L.); Nyl., Syn., p. 194; Crombie in Grevillea, xi, p. 112.
Common. Kentmere, Staveley.
64. **Cladonia subcornuta** Nyl. in Flora, 1874, p. 318; (*Cl. fibula* v. *subcornuta* Crombie in Grevillea, xi, p. 112).
On earth, pales and trees, near Staveley. Common.
65. **Cladonia gracilis** (L.); Nyl., Syn., p. 196; Crombie in Grevillea, xi, p. 112).
On earth, Cliburn Moss. Probably common.
66. **Cladonia cervicornis** (Ach.); Nyl., Syn., p. 197; Crombie in Grevillea, xi, p. 112.
On earth and stones. Common. Kentmere, Sleddale, Mardale, Patterdale.
67. **Cladonia lepidota** f. **hypophylla** Nyl., Scand., p. 54; (*Cl. degenerans* v. *hypophylla* Crombie in Grevillea, xi, p. 113).
On earth in the fissures of rocks. Red Screes. Helvellyn.
68. **Cladonia furcata** (Huds., Flora Angl., p. 453); Nyl., Syn., p. 205, tab. i, fig. 3; Crombie in Grevillea, xi, p. 113.
Craggy Park, Staveley; and elsewhere. Probably common.
69. ***Cladonia racemosa** (Hffm.); Crombie in Grevillea, xi, p. 113; (*Cl. furcata* v. *racemosa* Nyl., Syn., p. 206).
Kentmere, Staveley. Probably common.
Var. **recurva** (Hffm.).
Near Red Tarn, Helvellyn.
70. **Cladonia pungens** (Ach., Prod., p. 202, *Cl. furcata* v. *pungens* Nyl., Syn., p. 207); Crombie in Grevillea, xi, p. 113.
On wall-tops, Kentmere. Probably common.

71. **Cladonia squamosa** (Hffm.); Nyl., Syn., p. 209, tab. vi, figs. 29-30; Crombie in Grevillea, xi., p. 114.
Common at the bases of larch trees and on earth. Kentmere, Staveley, and elsewhere.
72. **Cladonia cœspiticia** (Pers.); Nyl., Syn., p. 310, tab. vii, fig. 27; Crombie in Grevillea, xi, p. 114.
Common on earth and decayed trees. Barrowfield Wood, Staveley, Kentmere and Troutbeck.
73. **Cladonia cornucopioides** (L.); Nyl., Syn., p. 220; Leighton, Lich. Flora, p. 62; (*Cl. coccifera* Crombie in Grevillea, xi, p. 114).
Very common on walls and earth.
74. **Cladonia deformis** (L.); Nyl., Syn., p. 222; Crombie in Grevillea, xi, p. 114.
Gathered by Mr. Robertson in Westmoreland, *vide* Leighton, Lich. Flora, p. 63.
75. **Cladonia digitata** (L.); Nyl., Syn., p. 222; Crombie in Grevillea, xi, p. 114.
On trees, near the ground. Staveley.
76. **Cladonia macilenta** (Ehrh.); Nyl., Syn., p. 223 pro parte, tab. vi, figs. 24-26; id., Lapp., p. 179; Crombie in Grevillea, xi, p. 114.
On peaty earth and among mosses. Staveley, Kentmere, and elsewhere. Common.
- Var. **polydactyla** (Flk.).
Kentmere.
- Var. **carcata** (Ach.); *vide* Leighton, Lich. Flora, p. 64.
- Var. **ostreatiformis** Leight.
On a mossy trunk near Staveley.
77. **Cladonia bacillaris** (Ach., Syn., p. 266); Nyl., Lapp., p. 179; Crombie in Grevillea, xi, p. 115 (*Cl. macilenta* pro parte, p. 223).
On peaty earth, Staveley Head.

XXIII. CLADINA Nyl.

78. **Cladina sylvatica** (Hffm.); Nyl., Lapp., p. 176; Crombie in Grevillea, xi, p. 115 (*Cladonia rangiferina* v. *sylvatica* Nyl., Syn., p. 212).
Common on heathy ground, everywhere.
- Var. **tenuis** in similar places.

79. **Cladina uncialis** (L.); Nyl., Lapp., p. 111; Crombie in Grevillea, xi, p. 115 (*Cladonia* Nyl., Syn., p. 215).

On heaths. Common.

I have given, I regret to say, very little attention to the *Cladoniae*. When the district is properly searched for them, several other species will most surely be added to the Westmoreland list.

Tribe VII. ROCCELLEI Nyl.

From our northern latitude, and want of sea-border, the species of *Rocella* are not components of our flora.

Tribe VIII. SIPHULEI Nyl.

[**Thamnolia vermicularis** (Sw.) will most probably be found on some of our mountains, but I have not succeeded in detecting it, though I have searched for it frequently. According to Leighton, Lich. Flora, p. 75, it has been gathered on Skiddaw, in Cumberland.]

Tribe IX. RAMALINEI Nyl.

XXIV. RAMALINA Ach.

80. **Ramalina calicaris** (Hffm.); Nyl., Syn., p. 293, pro parte; id., Mon. Ram., p. 33; Leighton, Lich. Flora, p. 83.

On trees, Barrowfield Wood, Levens Park, Staveley, Lowther Park, and elsewhere.

Var. **subampliata** Nyl., Mon. Ram., p. 34; Leighton, l. c., p. 84.

Lowther Park.

81. **Ramalina farinacea** (L.); Nyl., Mon. Ram., p. 34; Leighton, Lich. Flora, p. 84; *R. calicaris* f. *farinacea* Nyl., Syn., p. 294.

On trees, Levens Park, Staveley, Lowther Park.

82. **Ramalina fraxinea** (L.); Nyl., Mon. Ram., p. 36; Leighton, Lich. Flora, p. 85; *R. calicaris* f. *fraxinea* Nyl., Syn., p. 294.

On trees, Staveley, Levens, Lowther.

Var. **calicariiformis** Nyl.

Near Staveley.

83. **Ramalina fastigiata** (Pers.); Nyl., Mon. Ram., p. 39; Leighton, Lich. Flora, p. 86; *R. calicaris* f. *fastigiata* Nyl., Syn., p. 294; Larb., Lich. Herb., 237.

84. *Ramalina pollinaria* Ach., Syn., p. 298; Nyl., Mon. Ram., p. 52; id., Syn., p. 296; Larb., Lich. Herb., 208.
On trees, Lowther Park.
85. *Ramalina subfarinacea* Nyl.; Hue, Add. Nova., p. 32; *Ramalina scopulorum* v. *subfarinacea* Crombie in Journ. of Bot., March 1872; Leighton, Lich. Flora, p. 89; Larb., Lich. Herb., 323.
On walls, Staveley and Crossthwaite.

Tribe X. USNEEI Nyl.

XXV. *USNEA* (Dill.) Ach.

86. *Usnea hirta* (L.); Nyl. in Lamy, Lich. du Mont Dore, p. 25; *Usnea barbata* f. *hirta* Nyl., Syn., p. 267; Leighton, Lich. Flora, p. 76.
On trees. Generally distributed.
87. *Usnea dasygoga* (Ach., Meth., p. 312); Nyl. in Lamy, Lich. du Mont Dore, p. 25; *Usnea barbata* f. *dasygoga* Nyl., Syn., p. 268; Leighton, Lich. Flora, p. 76.
On trees. Generally distributed.
88. *Usnea plicata* (L.); Nyl. in Lamy, Lich. du Mont Dore, p. 25; *Usnea barbata* f. *plicata* Nyl., Syn., p. 268; Leighton, Lich. Flora, p. 76.
On trees. Generally distributed.
The *Usneæ* in Westmoreland are generally small, poorly developed, and most commonly barren, so that it is often very difficult to refer specimens to their proper species.

Tribe XI. CETRARIÉI Nyl.

XXVI. *CETRARIA* (Ach.) Nyl.

89. *Cetraria Islandica* (L.); Nyl., Syn., p. 298, tab. viii, fig. 32; Leighton, Lich. Flora, p. 91.
On the ground, Cliburn Moss, where it was first pointed out to me by my friend, G. Stabler. It occurs also on the summit of Sca fell, just outside the county boundary.
90. *Cetraria aculeata* (Schreb.); Nyl., Syn., p. 300; Leighton, Lich. Flora, p. 92.
On rocks, walls, and earth; common throughout the district.

XXVII. *PLATYSMA* (Hffn.) Nyl.

91. **Platysma ulophyllum** (Ach., Meth., p. 297); Nyl., Scand., p. 82; *Platysma sæpincola* v. *ulophyllum* Nyl., Syn., p. 309; Leighton, Lich. Flora, p. 95.
On fir trees near Staveley; apparently rare.
92. **Platysma pinastri** (Scop.); *Platysma juniperinum* v. *pinastri* Nyl., Syn., p. 312; Leighton, Lich. Flora, p. 97.
Gathered once on a larch tree in Ravenscar Plantation, near Staveley.
93. **Platysma glaucum** (L.); Nyl., Syn., p. 313, tab. viii, fig. 35; Leighton, Lich. Flora, p. 97.
One of the commonest lichens of the district, often covering trees and pales to the almost entire exclusion of anything else, and frequently forming large patches on rocks. Always barren.

Tribe XII. PARMELIEI Nyl.

XXVIII. *EVERNIA* (Ach.) Nyl.

94. **Evernia furfuracea** (L.); Nyl., Syn., p. 284; Leighton, Lich. Flora, p. 82.
On trees, pales, and walls. Common.
95. **Evernia prunastri** (L.); Nyl., Syn., p. 285; Leighton, Lich. Flora, p. 82.
On trees; very common.

XXIX. *ALECTORIA* (Ach.) Nyl.

96. **Alectoria jubata** (L.); Nyl., Syn., p. 280; Leighton, Lich. Flora, p. 80.
On trees and rocks. Not very abundant, and always barren.
97. **Alectoria bicolor** (Ehrh.); Nyl., Syn., p. 279; Leighton, Lich. Flora, p. 78.
Among moss on a wall near Brow Foot, Staveley.

XXX. *PARMELIA* (Ach.) Nyl.

98. **Parmelia caperata** (L.); Nyl., Syn., p. 376; Leighton, Lich. Flora, p. 114.
On trees. Generally distributed, but not very abundant, and rarely fertile.

99. **Parmelia conspersa** (Ehrh.); Nyl., Syn., p. 391; Leighton, Lich. Flora, p. 124.
On slate rocks and walls in lowland places. Very common. The varieties **stenophylla** Ach. and **insidiata** Anzi, or a form resembling it, occur here and there along with the type.
100. **Parmelia Mongeotii** Schär., En., p. 46; Nyl., Syn., p. 392; Leighton, Lich. Flora, p. 125 (as a form of *conspersa*).
Very rare in South Westmoreland, where I have only gathered two small specimens on slate stones near Staveley.
It occurs very abundantly on red sandstone just north of the Eamont (Cumberland), and will most probably be found on the Westmoreland side of the river.
101. **Parmelia crinita** Ach.
Var. **ciliata** (DC.); Stiz., Lich. Helv., p. 54. (*Parmelia perlata* v. *ciliata* Nyl., Syn., p. 380; Leighton, Lich. Flora, p. 120. *P. proboscidea* Taylor, Fl. Hib., 2, p. 143; *vide* Nyl., l. c.)
Somewhat frequently met with in isolated specimens on slate-stone walls, but nowhere abundantly, and always barren. Staveley, Kentmere, Langdale.
102. **Parmelia perlata** (L.); Nyl., Syn., p. 379. Leighton, Lich. Flora, p. 119.
On rocks and walls. Generally distributed in the same districts as the preceding, and, like it, always barren.
103. **Parmelia tiliacea** (Hffm., En., p. 96, tab. xvi, f. 2); Nyl., Syn., p. 382; Leighton, Lich. Flora, p. 121.
On trees. Levens Park, Staveley, Kendal, Lowther Park, Tirrill. Fairly common, but rarely fertile.
104. ***Parmelia scortea** (Ach., Syn., p. 197); Nyl. in Flora, 1872, p. 426. *P. tiliacea* v. *scortea* Leighton, Lich. Flora, p. 122.
On a mossy wall between Kendal and Staveley. Apparently very rare.
105. **Parmelia revoluta** (Flk., D.L. 15; Nyl., Syn., p. 385; Leighton, Lich. Flora, p. 129); Nyl. in Flora, 1869, p. 289; Stiz., Lich. Helv., p. 55.
On stone walls and slaty rocks. Staveley, Winster.
106. **Parmelia Borreri** Turner; Nyl., Syn., p. 389; Leighton, Lich. Flora, p. 122.
On trees. Fairly common, but always barren. Levens Park, Staveley, Kendal.

107. **Parmelia saxatilis** (L.); Nyl., Syn., p. 388; Leighton, Lich. Flora, p. 126.
 Very common everywhere on rocks, trees, and pales.
108. ***Parmelia sulcata** Tayl. in Fl. Hib., p. 145; *P. saxatilis* v. *sulcata* Leighton, Lich. Flora, p. 126.
 On stone walls and trees. Generally distributed, but not so abundant as *P. saxatilis*. Levens Park, Lowther Park, &c. Very abundant on walls near Cliburn.
109. ***Parmelia omphalodes** (L.); Nyl. in Flora, 1872, p. 548; Stiz., Lich. Helv., p. 56; *P. saxatilis* v. *omphalodes* Nyl., Syn., p. 388; Leighton, Lich. Flora, p. 127.
 On rocks and stones on all the higher hills. High Street, Red Screes, Helvellyn, High Cup Nick, and occasionally found at lower elevations, as at Moor How, near Staveley. Var. **panniformis** Schär. occasionally occurs along with the type.
110. **Parmelia exasperata** (Ach., Syn., p. 320); Nyl., Syn., p. 396; Leighton, Lich. Flora, p. 115 (as variety of *P. olivacea*).
 On trees; rare. Near Staveley.
111. **Parmelia prolixa** ***Delisei** (Dub.); Leighton, Lich. Flora, p. 129.
 On a rock near Staveley Park in tolerable plenty, and in fine condition as to the thallus, but barren.
112. **Parmelia isidiotyla** Nyl., in Flora, 1875, p. 8.
 In considerable abundance on walls near Cliburn. I have also gathered it on walls near Penrith (Cumberland).
113. **Parmelia fuliginosa** (Fr. in Dub., Bot. Gall., p. 602); Nyl. in Flora, 1868, p. 346; Leighton, Lich. Flora, p. 123.
 Very common on rocks and walls in the slate and sandstone districts, and occurring also on trees along with the var. *latevirens* (Fw.).
114. **Parmelia subaurifera** Nyl. in Flora, 1873, p. 22; Lich. Herb., 210.
 Pretty generally distributed on trees. Staveley, Lowther Park, Levens, and occasionally on walls, as at Kendal and near Cliburn.
115. **Parmelia tristis** (Web.; Nyl., Syn., p. 307; Leighton, Lich. Fl., p. 94; both the latter as *Platysma triste*).
 Sparingly on most, perhaps on all, of the higher mountains and in the higher parts of the valleys. High Street, Long Style in Mardale, Red Screes, and Helvellyn.

116. *Parmelia lanata* (L.); Nyl., Syn., p. 398; (*Alectoria lanata* Leighton, Lich. Flora, p. 80).

On rocks by the side of Red Tarn, under Helvellyn, and also near the summit. This latter station is in Cumberland, a very short distance from the line dividing the counties.

117. *Parmelia physodes* (L.); Nyl., Syn., p. 400; Leighton, Lich. Flora, p. 116.

On trees, rocks, and stone walls. Like *Platysma glaucum*, this is one of the commonest lichens of the district, often covering wide spaces to the exclusion of everything else. The form *recurva* Leighton, and the varieties *labrosa* Ach. and *platyphylla* Ach., occur also along with the type.

- [*Parmelia vittata* Ach.; Nyl. in Flora, 1875, p. 106; Leighton, Lich. Flora, p. 117 (as var. of *P. physodes*).

I believe I once gathered this species in Mardale, but my specimens are unfortunately lost. At any rate, it must be rare in the district, or I should have met with it again.]

Tribe XIII. STICTEI Nyl.

Sub-tribe I. EUSTICTEI Nyl.

XXXI. *LOBARIA* (Hffm.) Nyl.

118. *Lobaria pulmonacea* (Ach., L. A., p. 449; Syn., p. 233); Nyl. in Flora, 1877, p. 233; (*Sticta pulmonacea* Nyl., Syn., p. 351; *S. pulmonaria* Leighton, Lich. Flora, p. 111.)

On trees in most parts of the county, as in Levens Park, Underbarrow, Staveley, Ambleside, and Lowther Park.

Sub-tribe II. STICTINEI Nyl.

XXXII. *STICTINA* Nyl.

119. *Stictina limbata* (Sm., E. Bot., 1104); Nyl., Syn., p. 346; Leighton, Lich. Flora, p. 108.

On trees near Staveley, near Ambleside, and in Barrowfield Wood. Very sparingly, poorly developed, and barren.

120. *Stictina fuliginosa* (Dicks.); Nyl., Syn., p. 347; Leighton, Lich. Flora, p. 109.

Near Ambleside (Sir J. E. Smith). On shady rocks under Nab Scar, Rydal. Barren.

121. *Stictina sylvatica* (L.); Nyl., Syn., p. 348; Leighton, Lich. Flora, p. 109.

On rocks in Naddle Forest, Mardale. Barren.

SPIDERS OBTAINED IN NORTH LINCOLNSHIRE, 1886.

H. WALLIS KEW, F.E.S.

Hon. Sec. to Louth Naturalists' Society, Louth.

So little attention has been paid to these animals that it may be well to record the following sixty-eight species, as a contribution towards a list of the Spiders of North Lincolnshire, to which I hope to be able to make many additions at the end of another season.

Most of the species included in the present list have been found in Louth and the adjoining villages. Louth is situated on the eastern border of the Wolds, where in many places the chalk is much covered with boulder clay. Skirting the Wolds near Louth there are numerous small woods, known respectively as Muckton, Burwell, Haugham, Maltby, Jenney, and Legbourne Woods, which are evidently remnants of the great ancient forest which formerly covered the country below the Wolds.

A little collecting has also been done at Mablethorpe, Saltfleet, and Saltfleetby, which are marsh-villages drained by slow-flowing ditches and bounded on the east by the broad sandhills of the coast.

The Rev. O. Pickard-Cambridge, whose courteous help I gratefully acknowledge, has examined my captures. One specimen at least of all the following has been through the hands of Mr. Cambridge, with the exception of *Epeira scalaris* and *Zilla atrica*. *Epeira scalaris* cannot be mistaken for any other British Spider, nor can *Zilla atrica* if the palpi of the male are noticed.

DYSDERIDES.

Dysdera cambridgii Thor. One specimen of this formidable Spider was brought to me in May from a chalk-pit in Louth.

Harpactes hombergii Scop. Plentiful under the flaking outer bark of sycamores near Louth. Also taken on the Mablethorpe sandhills.

Segestria senoculata L. Several specimens taken in May from beneath the bark of some dead wood in a hedge on Hubbard's Hills, near Louth.

DRASSIDES.

Drassus blackwallii Thor. About houses in Louth. More than once noticed crawling on the walls of bedrooms at night.

Drassus lapidicolens Walck. Not rare near Louth. Also taken at Mablethorpe.

- Clubiona holosericea** DG. Common near Louth, between leaves, under bark, and on the lower branches of trees.
- Clubiona brevipes** Bl. Several specimens taken under bark of a dead ash at Burwell Wood, December 1885.
- Clubiona compta** Koch. Maltby Wood.
- Anypheana accentuata** Walck. Beaten from oak, Burwell Wood.

DICTYNIDES.

- Dietya uncinata** Westr. Taken by beating bushes in July near Louth.
- Amaurobius fenestralis** Stroem. This is one of the commonest spiders in the Louth district in outhouses, between bricks of old walls, and under bark, especially that of sycamores. Also plentiful at Mablethorpe. *Amaurobius similis*, which is said to occur much more plentifully in buildings than the present species, has not yet been detected in the vicinity. Specimens of *Amaurobius fenestralis* from the cellar at 7, Lee Street, have been through Mr. Cambridge's hands.
- Amaurobius ferox** Walck. One or two specimens have been taken near Louth during the year.
- Var. **Amaurobius (Ciniflo) mordax** Bl. One specimen approaching this variety, near Louth.

AGELENIDES.

- Cryphœca silvicola** Koch. Two or three specimens taken during a ramble through Burwell and Haugham Woods, with Mr. Roebuck, on 15th April, 1886.
- Cœlotes atropos** Walck. This large Spider is found plentifully in the wooded parts of the Louth district under stones, logs of wood, and loose bark. After sunset on 1st May a specimen was taken from under a dead crow (*Corvus corone*) on the keeper's tree in Maltby Wood.
- Tegenaria derhamii** Scop. Abundant in outbuildings and cellars in Louth.
- Agelena labyrinthica** Clk. This fine Spider is very common, for a short distance, on the sandhills at Saltfleetby; it also occurs, though a little less plentifully, at Mablethorpe, where its extensive web stretches over the marram grass and lower parts of the sea buckthorns.

THERIDIIDES.

- Theridion sisypium** Clk. Very common on furze and other bushes in various parts of the Louth district.

- Theridion denticulatum** Walck. On neglected windows in Louth, also noticed about the dead bodies on the keeper's tree, Maltby Wood. The pale brownish egg-cocoons were noticed in the corners of windows in July.
- Theridion varians** Hahn. Taken, with *Zilla x-notata*, between the iron railings of the Baptist Chapel, Eastgate, Louth.
- Theridion bimaculatum** L. Taken in August on furze bushes, Lincoln Road, near Louth.
- Phyllonethis lineata** Clk. Very common near Louth, both with and without carmine markings.
- Steatoda bipunctata** L. Plentiful in Louth in the corners of neglected windows and about out-buildings. In June three specimens were noticed on the outside of a building facing the sea at Mablethorpe, one of which was winding up an *Otiiorhynchus ovatus* L. in silken lines.
- Neriene rufipes** Sund. On a bramble bush, Mill Lane, Louth.
- Neriene rubens** Bl. On furze, Lincoln Road, near Louth, August.
- Walckenaera acuminata** Bl. Haugham chalk-pit, near Louth, April.
- Pachygnatha degeerii** Sund. Taken while dragging and beating in several localities in the Louth district. Large numbers found in November sheltering within inverted sheep-troughs on a pasture-field near Louth.
- Linyphia minuta** Bl. In crevices of tree-trunks near Louth.
- Linyphia socialis** Sund. Welton Vale near Louth.
- Linyphia insignis** Bl. Welton Vale.
- Linyphia bucculenta** Clk. One under stone on the lower green-sand at Donington, near Louth. Several taken on sandhills, Mablethorpe.
- Linyphia clathrata** Sund. Hubbard's Valley, near Louth.
- Linyphia montana** Clk. Common.
- Linyphia hortensis** Sund. Maltby Wood.
- Ero thoracica** Wid. Several specimens on furze, Lincoln Road, near Louth, August.

EPEIRIDES.

- Meta segmentata** Clk. Abundant.
- Meta merianæ** Scop. Common in the tunnels formed by brick bridges crossing streamlets and drains near Louth and at Mablethorpe.
- Tetragnatha extensa** L. Fairly plentiful in the Louth district. In July it was very abundant, with *Epeira cornuta*, in webs amongst the long grass by the sides of a drain near the sea at Saltfleet, the webs being only just above the surface of the water at high-tide.

- Zilla x-notata** Clk. Abundant about buildings, and between iron railings in the streets of Louth. Both this and the next species are plentiful in the garden at 7, Lee Street, *Zilla atrica* spinning its webs amongst the ivy covering the walls, and *Zilla x-notata* confining itself to the buildings.
- Zilla atrica** Koch. Abundant on furze and other bushes near Louth, and also on the sea buckthorns at Mablethorpe. Mr. Blackwall mentions 'buildings' among the haunts of this Spider, but, like Mr. Cambridge, I have never found it in such a situation; on two occasions, however, I have seen its webs (identified by male examples of the Spider) on wooden railings or gates away from foliage.
- Epeira cucurbitina** Clk. One beaten from oak, Burwell Wood, June.
- Epeira diademata** Bl. Common throughout the Louth district, being especially abundant on the shrubs in the Louth Cemetery.
- Epeira scalaris** Walck. This large and beautiful Spider was taken in September by the road-side at Authorpe, and in Burwell Wood near Louth.
- Epeira cornuta** Clk. Plentiful by the sides of the marsh-drains at Mablethorpe, Saltfleet, and Saltfleetby; also on the banks of the Louth Canal.
- Epeira quadrata** Clk. This beautiful Spider is very plentiful on the coast sandhills at Mablethorpe. Also taken near Louth and in Burwell Wood. At Mablethorpe many of the toils contained remains of grasshoppers.
- Epeira umbratica** Clk. Found abundantly throughout the Louth district concealed under loose bark during the day, and in the centres of their large orbicular snares after dark at night.

THOMISIDES.

- Misumena vatia** Clk. One taken, in May, while preying upon a fly on leaves of nettle, Maltby Wood.
- Xysticus cristatus** Clk. Common. On one occasion when beating I noticed this Spider while in the net seize and carry off a *Lycosa nigriceps*.
- Xysticus audax** Koch. Obtained by beating in Muckton and Maltby Woods.
- Xysticus lanio** Koch. Maltby Wood.
- Xysticus ulmi** Hahn. Maltby Wood.
- Oxyptila atomaria** Panz. Several obtained by beating furze, Lincoln Road, near Louth, August.
- Oxyptila praticola** Koch. Several beaten from furze bushes, Lincoln Road, August.

Philodromus aureolus Clk. Common.

Tibellus oblongus Walck. Plentiful throughout the Louth district amongst grass. In May, among the herbage on the hedge-banks in Mill Lane, Louth, these Spiders were often noticed seated on the midribs of leaves of *Rumex obtusifolius*, where a kind of protective resemblance operated, owing to the similarity of the elongate body of the Spider to the midrib of the leaf. One thus situated was observed to be preying upon a *Philodromus*. In July this species was very plentiful among the strong grass on the coast sandhills at Saltfleet.

LYCOSIDES.

Ocyale mirabilis Clk. Taken on the steep banks of Grisel-bottom, Burwell Wood. Also at Well Vale, near Alford, and on the Lincoln Road, near Louth.

Pirata piraticus Clk. Margins of a drain, Mablethorpe.

Trochosa picta Hahn. Taken, though not very commonly, on the sandhills at Mablethorpe.

Trochosa ruricola DG. A specimen taken in December 1885 in its winter quarters—a cavity under the bark of a tree-stump at Cawthorpe, near Louth. The only other specimen I have met with as yet was taken after dark, in April, on a wall in Crow Tree Lane, Louth.

Trochosa terricola Thor. Several specimens taken in spring near Louth; also at Mablethorpe.

Tarentula miniata Koch. Taken at Mablethorpe, in June. This Spider has hitherto only been recorded for one locality in England—Southport, Lancashire. It is also found in Scotland.

Tarentula pulverulenta Clk. Taken at Mablethorpe in June.

Lycosa amentata Clk. Common.

Lycosa lugubris Walck. Haugham Wood.

Lycosa proxima Koch. Common.

Lycosa nigriceps Thor. Beaten plentifully from furze, Lincoln Road, near Louth. Also taken in an old chalk-pit on the London Road, near Louth.

SALTICIDES.

Epiblemum scenicum Clk. Common on walls and gates, Louth and Mablethorpe.

Epiblemum cingulatum Panz. Common about wooden railings and posts in the neighbourhood of Louth and near the sea at Saltfleetby.

Attus pubescens Fabr. Taken in a room at 7, Lee Street, Louth.

Var. **Attus sparsus** Bl. Louth, one specimen.

BOOK NOTICES.

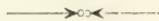
The Structure and Life-history of the Cockroach (*Periplaneta orientalis*): **An Introduction to the study of Insects.** By L. C. Miall, Professor of Biology in the Yorkshire College, Leeds; and Alfred Denny, Lecturer on Biology in the Firth College, Sheffield. London: Reeve & Co., 8vo, cloth, pp. 224, price 7/6.

The authors of such a book as this, treating of a special department of zoology and mainly of one zoological form, and seeking to furnish an introduction to the study of insects, have no ordinary difficulties to face. To the popular writer on natural history, or the specialist labouring at a monograph, the way is comparatively clear; but in such a work as the present the needs of very different classes of readers have to be met. The general reader, knowing little or nothing of zoology, but anxious to learn something about insects, will be attracted by the title of such a book as this; while the scientific student will be disappointed if, upon opening its pages, he finds that the authors have omitted minute details, and have avoided those theoretical questions to which morphological studies infallibly lead. To fulfil requirements so diverse as these is no easy task, and the authors of the present volume have succeeded admirably. Professor Huxley had already shown, in his exquisite little work on the Crayfish, that it was possible to write a book interesting and profitable to general as well as scientific readers, and this was no small advantage to the present authors, who, indeed, refer in their preface to that deservedly popular treatise. Following similar lines, the present book will, we are sure, secure a place of its own, and while it will find its way rapidly into biological laboratories, it will be perused with hardly less interest by non-professional readers.

Familiar as the Cockroach is—too familiar, most housemaids would agree—few readers will take up this book without learning very much that is new to them. There is ample evidence of patient and accurate work, with an occasional correction of errors current in text-books; but in addition to this, the authors have laid under contribution much of the scattered literature, referring directly or indirectly to the family *Blattina* and their Orthopterous allies. Over a hundred figures are given, some of which have appeared before, but a large proportion of which are new and of high excellence. We think, however, that a few additional diagrammatic figures would have been useful, even more so, sometimes, than the drawing of an actual preparation. Thus the sections of the alimentary canal are of great value, as illustrative of the points in the text; but only the very careful reader will appreciate the force of the statement on p. 115, that

the stomodæum and proctodæum are epiblastic invaginations, while the mesenteron is hypoblastic—the extraordinary extent of the epiblast infolding, orally and aborally, not being sufficiently conveyed by the words ‘the mesenteron of the Cockroach is very short.’ The condition in these Arthropods is indeed precisely the reverse of that in higher forms—the epiblast invagination being in Vertebrates reduced to its smallest limits, while almost the entire length of the alimentary tract is lined by hypoblast. The diagrammatic figures of the mouth-parts in various insects, as well as Mr. Newton’s well-known figures, will be of great utility to the student; indeed, the illustrations, as a whole, are clear, bold, and well executed, and merit the highest praise. It is, of course, impossible to refer to the various parts of the book seriatim, and we must pass over the opening chapters treating of the classical researches of Malpighi, Swammerdam, and other pioneers in insect anatomy, the zoological position of the Cockroach, and the chapter on its food, habits, &c., which contains many interesting facts. The account of the exoskeleton is, perhaps, the best chapter, as it is also the longest, and anyone who will turn these pages to practical account by examining—book in hand—the Cockroach itself, and following systematically the account given, will accomplish a task in Insect Morphology as thorough and complete as it will be pleasurable. We notice that while the dorsal and ventral divisions of the thoracic segments are named, the usual designations of the segments themselves—viz., pro-, meso-, and meta-thorax—are omitted, although the last name does occur on p. 62. Chapters V and VI treat very fully of the muscles and nerves—the histological figures being noteworthy—while the curious facts brought together under the heading ‘Muscular Force of Insects’ will interest many for whom much of the book will be unattractive detail. Chapter VIII, on Circulation and Respiration, is also a good piece of work, and it includes a brief account of respiratory movements by Prof. Plateau, of Ghent. Reproduction and Development occupy two chapters which should have been amongst the most valuable and interesting in the book; but they are somewhat disappointing, and Mr. Nusbaum’s brief account of the formation of the embryonic layers, &c., is less full and satisfactory than we could have wished, while the section on Animal Metamorphoses calls for revision. The chapter on the Genealogy of Insects is far too brief for so profound a topic, and does not sufficiently exhibit the importance of those features in *Peripatus*, which point not merely to an ancestral kinship of Tracheates and Annelids, but are leading some zoologists to favour the inclusion of Arthropods and Annelids in one large group of metamerically segmented animals, the Arthropoda being more nearly

related to Annelids for the most part, than many Annelids are to each other. The concluding chapter on the Cockroach of the past is full of interesting facts, and will prompt many to regard this Insect with less disgust, though it be an intruding foreigner, as being the representative of an ancestral line extending back to the Palæozoic age, and apparently without suffering any degeneration, for Mr. Scudder tells us that none of the fossil Cockroaches attained the dimensions of the largest existing species. Certain slight defects of a verbal character have struck us, such as the recurrence of the objectionable word 'suarish,' and the startling verb 'parallelise,' occurring on p. 77, while we think that the sentence on p. 20, ending with the adverb, 'horribly,' should be re-cast, and that *Periplaneta*, or at any rate its abbreviation, *P.*, should be prefixed to '*orientalis*' on p. 20, such a colloquialism of entomologists being hardly admissible here. Prof. Miall's writing is usually so felicitous and graceful that such slight blemishes as we have named, and there are others, are somewhat surprising. We cannot forbear to point out how the usefulness of the book would be increased by the addition of an index, while a few pages of practical instruction, as an appendix, would make it still more a book necessary for the student in the laboratory, for whom we presume the work is largely intended. That it will be read with interest and delight in a far wider circle than that increasing class, the students in our Zoological Laboratories, we feel confident; and the excellent typography, paper, &c., contribute still further to the good qualities of a work which we cannot but regard, both on account of its purpose and execution, as a worthy successor to Prof. Huxley's '*Crayfish*.' We certainly cannot doubt that this will be by far the most popular and widely-used of the '*Studies in Comparative Anatomy*' which are associated with Prof. Miall's name.—E.E.P.



Classification of the Vegetable Kingdom, showing the position therein of the British and some of the larger Exotic Natural Orders of Plants. Compiled by J. D. Siddall. Chester; printed by G. R. Griffith.

This is a small broadsheet, containing, as its name describes, a classified arrangement of the principal natural orders of plants. There are twenty-two columns, under which are ranged the following: kingdom, sub-kingdom, group, class, division, sub-division, natural order, number of genera and species, the same of British, typical examples, characters of stems and leaves, shape of flowers, number, cohesion and adhesion, of sepals, petals, stamens, and carpels, number of loculi, and of ovules, placentation, character of seed, and fruit, general remarks, and geographical distribution. Besides

Naturalist,

this enormous amount of matter condensed into the briefest symbolism, room is found for a sufficiently complete list of definitions, and for one or two miniature chapters on vegetable physiology, in which the maximum of information has been packed into the minimum of space. The whole appears to have been compiled with great accuracy, and, so far as we have verified it, with a singular freedom from slips. Opinions of course must always differ as to the specific value of varying forms, and the statement that there are only forty-three British species belonging to the order Rosaceæ, is not deduced from the last edition of the London Catalogue. Exceptions also can always be found to any briefly generalised negation, such, for instance, as that none of the Orchideæ are found on 'cold mountains'; but these are points hardly worthy of notice. Taken altogether, the compilation gives an admirable conspectus of the Vegetable Kingdom, and is likely to be of much use to all who have to teach, and all who have to learn, systematic botany. It is printed on thin, but serviceable paper, and the only suggestion which we can make is that it might also be issued in larger type and on a larger sheet.—H.E.F.

—>∞<—

Transactions of the Leeds Naturalists' Club and Scientific Association, 1886. Leeds; pp. 88; 2s. 6d.

For the last seven years the Leeds Naturalists' Club has not been dormant, still less latent, for the reports bear witness of quiet work within its own circle, but to the outer world, at least, it has been silent. The issue of a volume of Transactions is not only evidence of a considerable accession in membership, but also, we trust, an earnest of increased activity in scientific research. Besides the Sixteenth Annual Report, the volume contains abstracts of papers and other proceedings, which have been condensed, no doubt very fairly, but in some cases with a brevity that is more than tantalising. It seems a pity that the space given to the Diary of Natural History observations, most of which are of the smallest scientific value, could not have been occupied by verbatim reports of some of the papers, as, for example, that of Mr. Roebuck on his specialty, or Mr. Paul on Fertilization. The construction of such a diary as that which occupies fifteen pages of the Transactions may be an admirable exercise in observation for young people, but it is hardly worth publication in a volume of "Transactions." We are puzzled to discover what purpose is meant to be served by such records, for instance, as that *Lychnis diurna* (evidently a favourite with the diarists), was observed on the 11th, 16th, and 23rd of May; that *Stellaria holostea* was gathered on May 16th and 26th, or that *Dactylis glomerata* was seen in flower on June 27th, and *Lapsana*

Feb. 1887.

communis on the day following. A happy ambiguity clothes the records of the Water Crowfoot and the Dog Rose, which are safely noted as *Ranunculus aquatilis* and *Rosa canina*. We should like to verify the discovery of the 'Holly Fern' at Howstean, and the locality of *Vicia lutea* (mis-spelt, by-the-way) on May 30th. The 'Spotted Orchis' is not '*O. mascula*,' the 'Oxlip' at Copgrove is scarcely likely to be the true '*P. elatior*,' unless cultivated, and the ? which follows '*Allium ampeloprasum*' as the synonym for 'Wild Garlic' may no doubt be doubled. We notice that the plant records, at least, are not confined to West Yorkshire, but apparently extend at random to districts of quite different climatic and geologic conditions. There is a good deal of typographical carelessness in the proper names, especially the botanical ones. *Dodecatheon media* is a probable misprint for *D. Meadii*, and might easily be pardoned if it were not the sixth in as many successive lines. We are glad to notice the commencement of a Flora of Phanerogamous plants and a list of the Algæ of West Yorkshire. As the former is only carried to the end of the Cruciferæ, we trust it is a pledge that the next volume of Transactions will appear in less than another seven years.—H.E.F.

NOTES AND NEWS.

At the anniversary meeting of the Entomological Society of London, January 19th, 1887, the following gentlemen were elected as officers and council for 1887:—President, Dr. David Sharp, F.Z.S.; Treasurer, Mr. Edward Saunders, F.L.S.; Secretaries, Mr. Herbert Goss, F.L.S.; and the Rev. W. W. Fowler, M.A., F.L.S.; Librarian, Mr. Ferdinand Grut, F.L.S.; and as other members of council, Messrs. Robert M'Lachlan, F.R.S., Gervase Mathew, R.N., F.L.S., George T. Porritt, F.L.S., Edward B. Poulton, M.A., F.G.S., Osbert Salvin, M.A., F.R.S., Henry T. Stainton, F.R.S., Samuel Stevens, F.L.S., and J. Jenner Weir, F.L.S., F.Z.S. —><

At the November meeting of the Entomological Society of London the following gentlemen were elected Fellows, viz., Mr. Peter Cameron, of Sale, Cheshire; Mr. F. Archer, of Crosby, Liverpool; and others. Mr. E. B. Poulton exhibited a mass of minute crystals of formate of lead, caused by the action of the secretion of the larva of *Dicranura vinula* upon suboxide of lead. He stated that a single drop of the secretion had produced the crystals which were exhibited; and he called attention to the excessively high percentage of formic acid which must be present in the secretion, and to the pain, and probable danger, which would result from being struck in the eye by the fluid which the larva had the power of ejecting to a considerable distance. Mr. J. W. Slater read a paper on 'The relations of insects to flowers,' in which he stated that many flowers which gave off agreeable odours appeared not so attractive to insects as some other less fragrant species; and he stated that Petunias, according to his observations, were comparatively neglected by bees, butterflies, and Diptera. Mr. Distant, Mr. Stainton, Mr. Weir, Mr. Stevens, and the President took part in the discussion which ensued, and stated that in their experience Petunias were often most attractive to insects. Mr. Stainton referred to the capture by himself of sixteen specimens of *Sphinx convolvuli* at the flowers of Petunias in one evening in 1846. Jonkeer May, the Dutch Consul-General, asked whether the reported occurrence of the Hessian Fly (*Cecidomyia destructor*) in England had been confirmed. In reply Mr. M'Lachlan stated he believed that several examples of an insect thought to be the Hessian Fly had been bred in this country, but that everything depended upon correct specific determination in such an obscure and difficult genus as *Cecidomyia*.

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Land and Freshwater Shells of Whitby District.—H. POLLARD.

Annotated List of the Land and Freshwater Mollusca of Lincolnshire.

List of Lancashire Land and Freshwater Mollusca.—R. STANDEN.

Bibliography for 1885 (continuation) and 1886.

Natural History of Lincolnshire.—The next instalment of this is to be upon the Mammalia, by JOHN CORDEAUX. Schedules have been prepared for obtaining information: one will be sent to any one willing to furnish notes.

Short Notes.—It is the wish of the Editors to give in each number about a page of short notes in each of the various subjects of which the *Naturalist* takes cognisance. To this end they rely upon their friends keeping them well supplied. At present short notes on Botany, Entomology, Palæontology, Microscopy, Conchology, &c., are particularly desired.

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W. Hillhouse.—8vo., 1887. [Messrs. Swan, Sonnenschein & Co.
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159 pages. [The Author.
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8vo, 320 pages. [The Club.
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Free Carminic Acid for colouring microscopical preparations.—Geo. Dimmock.—
8vo, 4-page reprint, 1884. [The Author.
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[The Author.
Belostomidae and some other Fish-destroying Bugs.—8vo, 8-page reprint, 1886.
[The Author.
The Journal of Conchology.—Jan. 1887.—No. 5, vol. v. [Mr. J. W. Taylor, Ed.
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Broom Close, Kendal.

It has been my good fortune, within the last twelve months, to discover several rare mosses in Westmorland, which are new to the county and the Lake District generally. I trust that a short account of them will be of interest to the botanical readers of the '*Naturalist*.'

Grimmia anodon B. & S. A very small patch of this moss was found, last May, near Kendal. It was growing on a railway bridge. The bridge in question is built of large blocks of limestone, and it was on one—and one only—of these blocks that it grew. Small as was the patch of the moss, it had, nevertheless, abundant and perfect fruit. It is curious that this species should never have been found before in a neighbourhood where there is so much exposed limestone rock.

Grimmia commutata Hübn. This was found in January of this year, growing upon a large rock at Rydal Lake, and forming extensive patches of a bluish-green colour. I have observed this moss growing in plenty in Norway, and there, as at Rydal, it seems to prefer large rocks which are liable to be at times submerged.

Grimmia anomala Hampe. This occurs in several places in the Lake District, being somewhat plentiful around Kendal and Windermere. It has also been noticed at Grasmere, and in other places in the neighbourhood. In habit and general aspect this species greatly resembles *Grimmia hartmani*, with which it has doubtless been confused. It is most improbable that, had not such been the case, a moss which is by no means uncommon should have been so long overlooked in a well-worked country. It is, however, only in wet weather that the characteristic gemmæ are conspicuous, and then, to a botanical eye, they afford an easy means of distinguishing this *Grimmia* from other species. *Grimmia hartmani*, moreover, is by no means common in the Lake District.

We are indebted to the acuteness of Mr. Boswell for the identification of this species with *Grimmia anomala* Hampe. A description will be found in Schimper's '*Synopsis M. Eur.*' Ed. ii, p. 270.

Bryum mühlenbeckii B. & S. This moss was found last July in the Longsleddale Valley. It was growing on a wet rock. The

silvery-green (not purple) colour of the tufts, and their softness to the touch, served sufficiently well to enable one to distinguish it at first sight from *Bryum alpinum*. It ought to occur in many places in the district.

Here again thanks are due to Mr. Boswell for the final determination of the species.

Cinclidium stygium Swartz. Although not so rare as some other Lake District mosses, it is interesting to know that this notable plant grows in Westmorland. It was found in a wet, peaty place, in small quantity, on the Howgill Fells, near Tebay. It may be added that it was in a fertile state.

Hylocomium umbratum Schreb. This occurred at Grasmere in December last. It grows in tolerable abundance in a wood, in company with *Hylo. squarrosum*, *loreum*, and *splendens*. The Grasmere form of the moss is smaller and less branched than usual, and the colour is dark green.

NOTE—FUNGI.

Hygrophorus sciophanus Fr. near Kendal.—This species grew plentifully last month in groups on dry heathy places on the hills near this.—C. H. WADDELL, Kendal, 15th November, 1886.

NOTE—HYMENOPTERA.

Cheshire Sawflies.—At the meeting of the Microscopical and Natural History Section of the Manchester Literary and Philosophical Society, November 8th, 1886, Mr. Peter Cameron, F.E.S., exhibited *Nematus fagi* Zadd., a sawfly unrecorded as British, from Sale, where the larvæ were found feeding on a beech hedge. He also stated that he had been experimenting with *Eriocampa annulipes* (whose larvæ were very destructive to the beech and hawthorn hedges at Sale during the last summer) and had succeeded in getting virgin females to lay eggs from which he had reared some males. At the meeting on December 6th, he exhibited *Blennocampa fuliginosa* Schrank (*non* Klug)=*aterrima* Klug—from Chobham. It has not been found in Britain since it was discovered 40 years ago by the present Marquis of Ripon.—JOHN BOYD, Hon. Sec.

NOTE—HEMIPTERA.

Acanthosoma hæmorrhoidalis washed up on the coast of Lincolnshire.—Not long since, while looking at a case containing a general collection of insects belonging to Mr. Robert Garfit, of this town, I noticed a female specimen of *Acanthosoma hæmorrhoidalis*, and remarking that the bug was tolerably abundant in the neighbourhood, he told me that a boxful of them had been given him some years ago, one autumn, by Mr. Bucknall, of Hogsthorpe, a shoemaker with a taste for natural history, who had found them washed up on the seashore at Mumby Chapel 'by bucketfuls' all along the beach. Has a migratory habit been previously noted in this or any other of our Heteropterous Hemiptera?—JAS. EARDLEY MASON, Alford, 10th January, 1887.

NOTE—LEPIDOPTERA.

Lycæna agestis in Upper Wharfedale.—A short time ago my friend Mr. Soppitt gave me a little butterfly for determination, which I was glad to recognise as *L. agestis*. It was taken at Grassington last July, thus adding another locality for this uncommon Yorkshire species.—J. W. CARTER, Valley St., Bradford, January 31st, 1887.

Naturalist,

LEPIDOPTERA, ETC., ON THE NORTH-EAST COAST OF YORKSHIRE, IN AUGUST 1886.

GEO. T. PORRITT, F.L.S.,

*Huddersfield; Fellow and Member of Council of the Entomological Society of London;
Author of the Yorkshire List of Lepidoptera; etc.*

FROM the 11th to 25th August last I spent on the north-east coast of our county, from the 13th to 23rd having the company of Mr. George C. Dennis, of York. We did our best to work out the lepidopterous fauna of the districts between and around Saltburn and Redcar, making the former place head-quarters. This we found very convenient, as trains ran very frequently throughout the day to Marske and Redcar, and what was equally important, trains also returned from Redcar to Saltburn sufficiently late at night to enable us to thoroughly work the sand-hills there with our lamps after dark. Our night-collecting was chiefly done on the sand-hills from Marske to Redcar, and in a pretty ravine, having a thick and varied undergrowth of plants and shrubs, at Saltburn; whilst our day-work, besides these localities, included the woods beyond the Saltburn Pleasure Gardens, on the way to Skelton. One day was also devoted to the extensive woods of Sir Charles Lowther, several miles inland from Redcar; and on another day a rather profitless journey was made to Skinningrove. The district altogether proved very disappointing so far as lepidoptera were concerned, for although some interesting species—on account of their local variation, etc.—were taken, nothing of any rarity turned up. As this part of the county seems to have been worked very little by Yorkshire lepidopterists, we have thought it advisable to give a list of all the species we remember to have noticed, those marked with a * being previously unrecorded for the district.

Pieris rapæ, *Satyrus janira*, and *Lycæna alexis*, common; **Hepialus sylvinus*, very small specimens; *Euchelia jacobææ*, larvæ abundant on the sandhills; *Rumia crategata*, *Metrocampa margaritata*, common; *Odontopera bidentata*, larva; *Crocallis elinguaris*, common; *Amphydasis betularia*, larva; *Boarmia repandata*, an almost smoky black form on the cliffs; *B. rhomboidaria*; *Acidalia scutulata* and *A. bisetata*, common; *A. incanaria*, abundant; *A. aversata*; *Abraxas grossulariata*; *Larentia didymata*, abounded everywhere; **L. pectinaria*; *Hypsipetes elutata*, the black form not uncommon in the wood at Saltburn; **Melanthia rubiginata*, Saltburn; *Melanippe fluctuata*; *Camptogramma bilineata*, abundant; *Cidaria russata*, dark form; *C. immanata*, common and in nice variety; *C. fulvata*; *Eubolia mensuraria*, abundant, one very dark

form; **E. bipunctaria*, Saltburn; **Leucania conigera*; *L. impura* and *L. pallens*, both plentiful, and the variety *ectypa* of the latter common; *Xylophasia polyodon*, abundant; *Charæas graminis*; *Apamea oculea*, nice varieties; *Miana literosa*, abundant, the specimens often large and beautifully marbled; *Caradrina cubicularis*, abundant and well marked; *Agrotis velligera*, common; *A. nigricans*, not uncommon, but a black form I took at Southport on the opposite coast the year previous, and which is there in fair proportion, seemed to be absent; *A. tritici*, abounded at ragwort flowers on the sandhills, and was one of the most interesting species, being both in size and colour most variable—I picked out, I think, the prettiest and most variable series I ever saw; *Tryphæna interjecta*, taken on ragwort, tansy, and thistle flowers at Saltburn; *T. orbona* and *T. pronuba*, both common and variable; *Noctua umbrosa*, common at ragwort flowers; *N. xanthographa*, abundant, and very variable in colour; **Plusia chrysitis*; *Mania typica*; *Pionea forficalis*; *Scopula lutealis*, very abundant; *Scoparia ambigua*; *S. cembræ* and *S. angustea* (*coarctalis*), Skinningrove; *Crambus tristellus* and *C. culmellus*; *C. geniculellus*, not uncommon at Redcar, but nearly over; *Anerastia lotella*, Redcar; *Tortrix rosana*, *T. heparana*, *T. unifasciana*, and *T. viridana*; **Peronea comparana*, and *P. variegana*, Saltburn; *Dictyopteryx bergmanniana*; *Sericoris lacunana*, common; **Sciaphila pascuana*, not uncommon, previously only recorded from the West Riding in the county; **Grapholita trimaculana*; **G. penkleriana*, abundant; *Pædisca occultana* and *P. solandriana*, both common; *Xylophasia fabriciana*, abundant; *Xanthosetia zoegana*, common; **Aphelia pratana*, abundant; **Tinea pellionella*, abundant; **Hypolepia radiatella*, variable; **Harpieryx nemorella* and **H. harpella*, both common; **Phibalocera quercella*; **Depressaria costosella*; *D. liturella*, abundant; **D. assimilella*; **D. hypericella*, abundant; **D. angelicella*, common; *D. applanella*; *D. douglasella*, several—only one specimen was previously recorded for the county; **D. weirella*, plentiful, and new to the county list. All the species of *Depressaria* were taken on tansy flowers in the ravine at Saltburn. *Gelechia rufescentella*, not uncommon on the sandhills; **G. mulinella*, not uncommon; *G. expolitella* (*politella*), late, and the specimens very worn, but I think I am right in determining them as this species, of which I had taken scores some weeks earlier on our own moorland hills; *G. maculella* and *G. tricolorella*, both common on ash trunks, etc., at Saltburn; **Chelaria conscriptella*, common in the wood at Saltburn; *Æcophora pseudo-spretella* and *Endrosis fenestrella*; *Argyresthia nitidella*, everywhere; *Lithocolletis cramerella*, abundant in oak trees; **Pterophorus dichrodactylus*—this interesting species was

abundant among its food-plant, tansy, which grew luxuriantly in large patches in the ravine at Saltburn; *P. serotinus* (*bipunctidactylus*), Saltburn.

But probably the best insect taken during our stay was one of the Neuroptera, a specimen of *Chrysopa tenella*, the smallest and perhaps the rarest of our British Lace-wing Flies. Unfortunately, I did not know the species at the time, or probably could have found more. I think I beat it out of the trees in the wood adjoining the Saltburn Pleasure Gardens. Other Neuroptera taken included *Chrysopa flava*, *Hemerobius micans*, and *H. humuli*, the latter common; and of Trichoptera, *Limnophilus affinis* was abundant among rushes in a ditch at Redcar; *Micropterna sequax* equally so in a 'rushy' hollow on the cliffs near Marske; whilst *Stenophylax latipennis*, *Limnophilus hirsutus*, *L. sparsus*, and *L. vittatus*—the last commonly—also occurred.

NOTES—LEPIDOPTERA.

Variation in Lepidoptera from various localities.—At the meeting of the Entomological Society of London, on the 1st December, 1886, Mr. Howard Vaughan exhibited a long series of *Gnophos obscurata*, comprising specimens from various parts of Ireland, North Wales, Yorkshire, Berwick-on-Tweed, the New Forest, Folkestone, Lewes, and the Surrey Hills. The object of the exhibition was to show the variation of the species in connection with the geological formations of the various localities from which the specimens were obtained. Mr. R. Adkin exhibited specimens of *Cidaria reticulata*, recently bred by Mr. H. Murray, of Carnforth, from larvæ collected by him near Windermere, on *Impatiens noli-me-tangere*. Mr. Adkin said that as the food-plant was so extremely local, and consequently difficult for Mr. Murray to obtain, he had endeavoured to get the larvæ to feed on some other species of balsam, including the large garden species, usually known as Canada balsam, but that he had not succeeded in doing so. Mr. E. B. Poulton observed that this statement tended to confirm the remarks he made at a recent meeting of the Society on the subject of the habits of lepidopterous larvæ with reference to their food-plants. Mr. G. T. Porritt exhibited forms of *Cidaria suffumata* from Huddersfield, including one very similar to that taken at Dover by Mr. Sydney Webb (Proc. Ent. Soc. 1886, p. xxv), and one still more extreme, having only the basal mark and the central stripe, with a slight streak at the tip, brown, the remainder of the wings being perfectly white. He also exhibited a series of small bilberry-fed *Hypsipetes elutata* from Huddersfield, showing green, red-brown, and black forms.—H. Goss, Secretary, Entomological Society.

Catocala fraxini in North Lincolnshire.—It was, I think, in Sept. 1875 that I heard from my mother living at Hogsthorpe, a village near Alford, in a letter, that a large moth had been found under an ash-tree in the yard of the gasworks there, and duly consigned to the killing bottle of Mr. Bucknall, a shoemaker who did a little collecting. I wrote for it at once. To my great surprise and pleasure it proved to be a male *Catocala fraxini*. My mother shortly afterwards told me that when brought to her by the gasman the wings were soft and crumpled, so that, as she had seen me do with other moths, she allowed it to crawl up something upright till they had expanded and become dry. I regret that I have mislaid the diary containing the precise date of the capture. The insect is, of course, one of my greatest treasures, as it was undoubtedly bred on the tree under which it was found.—R. GARFIT, Alford, 10th January, 1887.

MICRO-ZOOLOGY AND BOTANY OF ASKERN.

REV. FRANCIS H. ALLEN,

Vicar of Moss, near Askern.

THE ponds, ditches, and drains which abound in this neighbourhood are simply teeming with microscopic life; but, alas, in this out-of-the-way place, with only a $\frac{1}{4}$ -inch objective and no library of reference to assist me, it is quite impossible for me to follow the example of my forefather, and name every individual that comes under my observation. Before, however, giving a list of those I have succeeded in identifying, I should like to remark that never during the twelve years that I have resided in these parts have I come across a living *Mellicerta*, though I have found their cases without number. Why is this? I have searched for them at all times and seasons. Secondly, although most of the objects now to be enumerated are distributed pretty plentifully throughout the district, yet certain of them seem confined to special habitats. My list is as follows:—

Confervoideæ.—*Batrachospermum* (Haywood and Wrancar Drain), *Botrydina vulgaris*, *Coccolchloris brebissonii*, *Spirulina jenneri*, *Spirogyra*, *Ulva bullosa*, *Volvox globator* (abundant. Thorpe Brickyard Pond, disused). **Desmidiaceæ.**—*Cosmarium margaritifera* (Askern Pool and effluent drain), *Closterium* (Haywood and Wrancar Drain), *Pediastrum boryanum* (Thorpe Brickyard Pond, disused). **Diatomaceæ.**—*Cocconeis pediculus*, *Cocconema lanceolatum*, *Diademesis confervaceæ*, *Diatoma vulgare* (these three in Askern Pool and effluent drain), *Fragilaria capucina*, *Gomphonema acuminatum*, *Meridion circulare*, *Nitzschia sigmoidea* (these four in Haywood and Wrancar Drain, last also in Askern Pool and effluent drain), *Sphinctocystis solea*, *Gyrosigma lacustre*, *Stauroneis phœnicenteron*, *Synedra splendens* (these two in Askern Pool and effluent drain). **Entomostraca.**—*Canthocamptus minutus* (Thorpe Brickyard Pond, disused), *Cyclops quadricornis* (Haywood and Wrancar Drain), *Daphnia*. **Infusoria.**—*Acinera acuta*, *Actinophrys sol* (Askern Pool and effluent drain), *Amœba diffluens* (Haywood and Wrancar Drain), *Amphileptus fasciola*, *Arcella vulgaris*, *Aspidisca lynceus* (Askern Pool and effluent drain), *Chætonotus larius*, *Dileptus folium* (these two in Haywood and Wrancar Drain), *Coleps hirtus* (Askern Pool and effluent drain), *Diffulgia proteiformis*, *Epistylis anastatica*, *Euglena pyrum* and *E. viridis*, *Himantophorus charon* (Thorpe Brickyard Pond, disused), *Ichthydium podura*, *Kerona mytilus* (Askern Pool and effluent drain), *Loxodes bursaria*, *Stentor mülleri* (Shirley Pool), *Peridinium cinctum*, *Phialina viridis*, *Stylonichia histrio* (these two in Askern Pool and effluent drain), *Trachelocerca olor* (Thorpe

Brickyard Pond, disused), *Urostyla grandis*, *Uvella virescens*, *Vorticella nebulifera* (these three in Askern Pool and effluent drain), *Vaginicola crystallina*. **Polypi and Polyzoa.**—*Hydra viridis* and *H. vulgaris*, *Plumatella repens* (pond in four-acre glebe field belonging to Rev. F. W. Peel, between Owston and Burghwallis). **Rotatoria.**—*Brachionus amphicerus*, *Floscularia ornata*, *Lepidella emarginata*, *Lindia torulosa* (these two in a pool belonging to Mr. Townsend, of the South Parade Baths, Askern), *Megalotrocha flavicans*, *Melicerta ringens* (cases only, Thorpe Brickyard Pond, in abundance), *Monocerca rattus*, *Pterodina patina* (Shirley Pool), *Philodina erythrophthalma*, *Rotifer vulgaris* (Askern Pool and effluent drain), *Stephanoceros eichornii* (once only, Thorpe Brickyard Pond, disused).

NOTES—PALÆONTOLOGY.

Post-tertiary deposits at Boston.—[The Rev. E. Maule Cole, President of the Geological Section of the Yorkshire Naturalists' Union, has received the following communication from Mr. W. H. Wheeler, C.E., who is superintending the excavations being made at Boston, Lincolnshire, for the new dock and outfall of the river.]

'Below a surface deposit of alluvium we came upon beds of peat and sand containing remains of large trees and a great deal of birch bark, the silvery appearance of which was as bright as if it had recently been cut down. Some of the oak when first taken out was so soft that an impression could be made on it with the fingers. On exposure it hardened and in time became as hard as ebony, and if turned in the lathe took a beautiful polish. Below the peat was a thick layer of boulder clay, largely interspersed with chalk, which gave it a grey appearance. Below this was a deposit of boulder clay of a lead colour, or nearly black. In this was a great number of septaria. This lower layer was evidently of entirely different formation from the former. Both contained large numbers of ice-scratched boulders of various rocks. I collected between thirty and forty specimens of different rocks. Mixed about in the upper layer of Boulder Clay were pockets of gravel and sand. The sand varied in colour from almost white to red.—W. H. WHEELER, Boston, December 1886.

Discovery of a Fossil Tree at Ilkley.—The specimen was first reported by Mr. Pease, a visitor at Ben Rhydding, and as a record of the same was desirable, I and my friends (Messrs. Brownridge, F.G.S., and Hoffman Wood, F.G.S.) have visited the locality for that purpose. It is in a quarry just under the bold escarpment which overhangs the valley, and close to the celebrated 'Cow and Calf' rocks. The stone is of the 'Third Grits' in the Millstone Grit series, known also as the Addingham Edge Rock. This rock is evenly bedded, tabular, and of considerable thickness, and in one of the vertical faces of the rock just uncovered there lies horizontally the straight cylindrical stem of a small fossil tree. The length at present exposed is 9 ft. 2. in., with a diameter of 12 in. at one end and 9 in. at the other. Both ends are buried in the solid rock. When first revealed it was covered with a black carbonaceous bark, but relic hunters possessing more idle curiosity than love for science have removed it very completely. Now that the bark has been removed, there can be seen small ridges on the surface running round the tree, at distances from each other varying from 1½ in. to 3 in., and also at the thinner end can be faintly discerned small hollows as if caused by excrescences upon the bark, these are irregular in position. To determine the species of this fossil it would be necessary to have transverse, radial, and longitudinal sections of it, and these cannot be obtained from its imperfect state; moreover, specimens from the Millstone Grit do not generally retain much of their structure. However, it is probable that it is a small drifted specimen of those fossil conifers known as *Dadoxylon*.—S. A. ADAMSON, November 11th, 1886.

SOME FOOTPRINTS IN THE SNOW.

JOHN CORDEAUX, M.B.O.U.,

Great Cotes, Ulceby, Lincolnshire.

INTERESTING facts may be acquired with reference to the numbers and local distribution of the terrestrial mammalia frequenting any district by taking notice of their footprints in the snow. Once in the late storm, early in January, fresh snow fell sufficient during the afternoon and evening to obliterate all previous traces of beast and bird, and on the next morning, during a walk of some hours' duration, I was careful in taking notes on the many fresh tracks of wild creatures, traced in lines of greater or less distinctness, on the smooth and level tablet.

The prints of the Long-tailed Field-mouse (*Mus sylvaticus*) were very numerous, more particularly about the banks of old hedges. Their small rabbit-like trails crossed and re-crossed the footpaths, and the many bare spots littered with bits of root or grass indicated pretty plainly where they had scratched down in search of food. A cast-away pink paper, in which some groceries had been wrapped, was 'charmed' into little fragments. Field-mice travel very considerable distances; their tracks are very numerous in our turnip-fields, and also on unploughed stubble land. They appear to progress more by a series of hops and bounds than actual running, the prints of the fore feet rather wide apart with those of the hind brought well up to the front, so as to appear as but one impression, the spaces between each group of prints varying from four to ten inches, according to the pace at which they have been moving. The trail of the tail also is clearly indicated in the loose snow. How frequently in their exposed wanderings over the snowy carpet must these small creatures be grasped and carried aloft in the nude talons of an owl which has, phantom-like, descended from above! And how readily must the owl secure a supper when the supply of Mice, to judge from their prints, is so large!

Infinitely more cautious in his movements is the Short-tailed Field-vole (*Arvicola agrestis*). I find the holes where they have burrowed up through the snow in damp meadows, particularly in those spots where the worthless water-grass grows in thick felt-like masses. Their prints form a double line, the sides being paralleled, and I rarely find more than three inches between each group of four. This indicates a slow and cautious progress. The prints also not unfrequently show a rapid retreat to the holes.

The prints of Shrew Mice are somewhat similar, but smaller, and with a distinct tail-trail, which is not apparent in the former species. They appear to wander considerable distances from hedge-sides, and burrow in the snow, and through and about heaps of dead leaves or collected rubbish.

I find tracks of the Stoat (*Mustela erminea*) far more frequent than those of the Weasel (*M. vulgaris*). The Pole-cat (*M. putoria*) is by no means exterminated. There are to-day hunting-lines of three distinctly shown along the banks of watercourses. These show they hunt leisurely, with frequent digressions to examine tufts of grass, and the thickets of dead willow herbs and yellow rushes. They search also any hollow beneath the bank and the underside of snow cornices. Sometimes we see where the creature has suddenly broken into a gallop with spaces measuring from twenty-four to twenty-eight inches between each bound.

The warm springs and 'blow-wells,' with their fringe of broken-down and withered reeds, on which snow rests in broad patches, offer special attractions, in the never-freezing water, to the pilgrims of the night. Here are long straight trails of the Water-hen (*Gallinula chloropus*), each foot put down exactly in front of the last, the hind claws showing an alternate right and left inclination; their prints mostly lead to the willow beds, and to a stack of coarse marsh hay, which is tracked all round in a score of places.

Returning to the well we find paddlings of both Teal (*Querquedula crecca*) and Mallard (*Anas boscas*), and dirty trails of Water Voles (*Arvicola amphibia*), littered with fragments of nibbled flags. Foxes (*Canis vulpes*) have been here, and the Fomart (*Mustela putoria*), too, has searched in and out of nook and corner. On an isolated tussock a Heron (*Ardea cinerea*) has had his stand, perhaps for hours, and there are indications in certain scattered fronds of duck-weed on the snow that the watch has been not without some success.

Passing in a straight course through the willows are the round cleanly-marked pads of a Cat—a creature not suspected as haunting this lonely spot. Here, too, on the outskirts, and following a tiny rill, almost concealed from view by watercress and brooklime, are the prints of a Woodcock (*Scolopax rusticula*). The tracks of numerous Partridges (*Perdix cinerea*) intersect in many directions. The birds are now, doubtless, well within the centre of the willows.

Along the back-water drain, for more than a mile, are the paddings of a Fox. How leisurely the varmint has moved, frequently stopping to look round, or to cunningly break through the snow cornice with nose and paws. Here the tail feathers of a Snipe (*Gallinago caelestis*), and there those of a Fieldfare (*Turdus pilaris*),

amidst a paddle of soil-stained footprints, suggest that Reynard has not returned quite supperless to the gorse. Crossing the trail of this at right angles, is the double line of a brace of Foxes running at full swing side by side as if on a joint expedition. Another had been following a Hare (*Lepus europæus*), and in full view, to judge from the enormous bounds the latter had made.

Foxes not only travel great distances, but they have regular beats, which they follow night after night. They haunt isolated corn stacks in fields, about which the snow is soon beaten into hard paths by their tramlings. Here they take mice, which in the evening and night venture towards the outside, and rake out also any half-starved Starlings or Thrushes which have crept in beneath the fringe of lower straws.

Where recent floods have deposited banks of mud and sand in the 'beck,' there is quite a network of lines on the frozen snow to be unravelled, from the big footprints of the gaunt Heron (*Ardea cinerea*) to the slender hair-like markings traced by the feet of the Grey Wagtail (*Motacilla melanope*).

Of Hedgehog (*Erinaceus europæus*) and Mole (*Talpa europæa*) we find no traces, except the dark heaps of fresh soil cast up in the night above the snow, and the former we may be sure is now snugly rolled up in dead leaves and grasses in hedgerow bottoms or plantations.

Crossing a plot of swedes, I counted, without once diverging from a straight line, upwards of one hundred roots more or less excavated. In some instances little more than the outer rind was left. That Fieldfares had done much of the mischief I have not a doubt. The hundreds of tell-tale footprints about the bulbs all belonged to them. Many also rose, and I shot one old bird with his head buried in the root, and his beak filled with yellow pulp. Neither had Hares or Rabbits first attacked the roots, and thus given countenance to the hungry birds; some roots were quite freshly attacked, with a hole pierced through the smooth rind such as a gimlet would have made. Rooks and Wood Pigeons also will do much damage to swedes during a long storm.

NOTE—ORNITHOLOGY.

Varieties of Common Wild Duck and Peregrine in Notts.—Two very beautiful varieties of Common Wild Ducks (*Anas boschas*) were taken in December last in the Decoy at Park Hall, and kindly given me by Mr. Hall; they were male and female. The following is a description of male: head and neck, white, with a patch of green under each eye; back, white; wings, white; coverts, brown grey; tail, normal, but two of curled feathers white; breast, white, with band of salmon grey across; thighs, salmon grey. Female: a pale slate all over with edgings of feathers bright sandy colour; wings, slate; speculum, pale grey; one normal feather on back. Peregrine Falcon (*Falco peregrinus*). A very fine specimen of this grand bird, a female, was shot on January 3rd by one of the guns shooting on the Park Hall estate. This bird will also be added to my collection.—J. WHITAKER, Rainworth Lodge, Notts., January 24th, 1887.

LOCAL SPECIMENS OF RARE BIRDS IN THE
MUSEUM AT NEWCASTLE-ON-TYNE.

J. T. T. REED,

Ryhope, near Sunderland, co. Durham.

THE collection of birds in the Museum of the Natural History Society at Newcastle-on-Tyne is very rich in specimens which have been obtained in various parts of the British Isles. It would be useless to say anything in praise of the splendid collection which Mr. Hancock formed and presented to the Society, as Mr. Hancock's fame as an ornithologist and taxidermist is well known. The following are a few of the specimens which have been obtained in those counties to which the pages of the *Naturalist* are devoted.

White-tailed Eagle. *Haliaëtus albicilla* L. Only one local specimen in the Museum. It was captured near Morpeth in January 1830. Presented by Mr. John Moore. Stuffed by Mr. Wingate. This specimen was in the Old Museum, and is not one of the Hancock Collection.

Osprey. *Pandion haliaëtus* L. Three local specimens.

Near Morpeth, 9th October, 1830. Female.

Newburn, shot, May 1830. Mature Male.

Heworth, shot, 1841. Female.

Honey Buzzard. *Pernis apivorus* L. Several specimens from various parts of the northern counties. The following are a few of the more interesting.

Washed up at Whitburn, near Sunderland, 27th August, 1835.

Mature male. Dark Plumage.

Beadnell, Northumberland, shot, 18th August, 1832. Mature female. Pale variety.

Blyth Sands, found by Mr. Hancock, 22nd September, 1841.

Dark variety.

Newbiggin, near Hexham; two young birds just left nest, 24th August, 1841.

Near Catterick, Yorkshire, found dead. First plumage.

Rough-legged Buzzard. *Archibuteo lagopus* Gm.

Bishop Auckland. A stoat was in stomach when shot. Female.

Obtained near Whitby, 3rd November, 1875. Female.

Alston, 6th November, 1839. The bones of this specimen have been taken out, cleaned, and put back again. Male.

Black Kite. *Milvus migrans* Bodd.

Alnwick Park, caught in trap, May 1867. This is the *first* British specimen on record. Mature male.

Montagu's Harrier. *Circus cineraceus* Mont.

Morpeth Common, shot, July 1829. A very fine specimen.

Wolsingham Park, Durham, 1835. Two young birds.

Northumberland. A dark variety shot in 1835. Mature male.

Peregrine. *Falco peregrinus* Tunst.

Hartley Bates, Northumberland, 2nd September, 1852. Female in first plumage.

Hepple-Coquet. Shot by Captain Noble, November 1883. Female.

Red-footed Falcon. *Tinnunculus vespertinus* L.

Near South Shields, shot, October 1836. Mature Male.

Goshawk. *Astur palumbarius* L.

Near Keilder, Northumberland, killed, October 1849. Male, in nest plumage, much worn.

Great Spotted Cuckoo. *Coccyzus glandarius* L.

Near Bellingham, shot, 5th August, 1870. The only specimen captured in England.

White-winged Crossbill. *Loxia leucoptera* Gm.

Brampton, Cumberland, obtained November 1845.

Red-necked Nightjar. *Caprimulgus ruficollis* Temm.

Killingworth, Northumberland, shot, 5th October, 1856.

Purchased of game dealer the day after it was shot.

Yellow-browed Warbler. *Phylloscopus superciliosus* Gm.

Northumberland coast, opposite Bates' Island, shot by Mr. Hancock. This is the *first* British specimen.

Pallas's Sand-Grouse. *Syrhaptes paradoxus* Pall.

Clarence, Teesmouth, shot, 1863. Two specimens. Purchased at Mr. Oxley's sale at Redcar.

Great Bustard. *Otis tarda* L.

Cumberland, 8th March, 1854. Female. Purchased in 1874 at Col. Coulson's sale, at Blenkinsop, by Mr. Pattinson, and presented to Mr. Hancock, 5th December, 1875.

Baillon's Crake. *Porzana bailloni* Vieill.

On the Derwent near Swalwell; shot, 12th July, 1874.

Obtained from Mr. Scott, of Blydon.

Pigmy Curlew. *Tringa subarquata* Guld.

Town Moor, Newcastle-on-Tyne, shot, 7th September, 1836. First plumage.

Blyth, shot in September, 1843. First plumage.

- Ruff. Machetes pugnax** L.
Prestwick Car, obtained in 1834. Female.
- Green Sandpiper. Helodromas ochropus** L.
Jesmond, near Newcastle-on-Tyne; found dead 19th August, 1865. First plumage.
Ouseburn, obtained 25th July, 1836. Female, in first plumage.
Richmond, Yorks., 10th August, 1840. First plumage.
- Greenshank. Totanus canescens** Gm.
Prestwick Car, 18th August, 1831. First plumage.
Whitby Sands, 1843. First plumage.
- Crane. Grus communis** Bechst. Specimen from the Old Museum.
Dyke House Farm, near Hartlepool; shot in May, 1865, by Mr. J. Smith. Presented by Mr. J. E. Robson, of Hartlepool.
- Little Bittern. Ardetta minuta** L.
Blaydon, shot, 12th May, 1812. Mature male. Presented by Sir M. W. Ridley. This specimen is the one from which *Bewick* made his cut.
River Petterel, Carlisle; specimen, in first plumage, caught by a dog, 1850.
- Bittern. Botaurus stellaris** L.
Gosforth Lake, 10th November, 1863.
Bedlington, 1833.
- Spoonbill. Platalea leucorodia** L. Only one local specimen.
Holy Isle, Northumberland; shot, May, 1857.
- Leach's Petrel. Procellaria leucorrhoea** Vieill.
Newcastle-on-Tyne; specimen captured 300 yards above the bridge, 1830.
- Black Tern. Hydrochelidon nigra** L.
Stockton, 1837. Young in first plumage.
Northumberland coast, captured, 1830. Mature bird.
- White-winged Black Tern. Hydrochelidon leucoptera** Schinz.
Clarence, mouth of the Tees; shot on marsh. Mature bird.
Purchased at Mr. Oxley's sale at Redcar, 1871.
- Bewick's Swan. Cygnus bewicki** Yarr.
Prestwick Car. It was shot out of a flock of forty in January 1829. The first specimen noticed in England by Mr. Hancock. Male.
Haydon Bridge, shot, 7th September, 1829. Female. Named *Bewick's Swan* from this specimen.
- White-fronted Goose. Anser albifrons** Scop.
Prestwick Car, shot. Mature female.

Velvet Duck. *Edemia fusca* L.

North Sunderland, July 1846. Female.

Northumberland, 1834. Young female.

Great Auk. *Alca impennis* L.

Though the collection contains two specimens of the Great Auk, they are not local ones, but in the case which contains the Great Auk from the Allan Museum there is an upper mandible of a Great Auk, which was discovered in 1878 with a lot of bones of various kinds in a cave at Whitburn Lizards, near Sunderland.

There seems to be little doubt that the Farne Islands were at one time a breeding place for this now extinct bird.

NOTES—ORNITHOLOGY.

Ringed Guillemots near Redcar.—I made a rather lucky shot on the 14th inst. from a boat off Redcar, killing four Guillemots with two shots from a 12-bore, two with each barrel. On picking them up I found three were the Ringed variety, the fourth one being the ordinary form of *Lomvia troile*. Guillemots and Razorbills (*Alca torda*) have been very abundant off the coast during the past week.—T. H. NELSON, Apsley House, Redcar, January 15th, 1887.

Water-rail near Louth, Lincolnshire.—A specimen of this bird (*Rallus aquaticus*) was sent to me on 22nd December which had been shot the day before by Mr. R. Chatterton's keeper on the river Bain, some seven miles south-west of Louth.—H. WALLIS KEW, Louth, December 30th, 1886.

Blackbird laying in Thrush's Nest.—An instance of the above came under my notice in April last. I was rambling over the Sewage Farm and Oakdale Estate, Harrogate, and on coming near a holly-bush a Blackbird (*Turdus merula*) flew out; thinking that it would have a nest near at hand, I looked for it, and was very much astonished to find that the Blackbird had deposited its eggs (four in number) in the nest of a Thrush. I mentioned this to Mr. A. W. Thomas, the owner of the estate, and he informs me that one of his sons had informed him of a similar instance occurring during the previous year on this estate. Mr. W. Storey, of Pateley, also informs me that he has noticed cases of the Blackbird laying in Thrush's nest in Nidderdale.—F. R. FITZGERALD, Harrogate, Dec. 20th, 1886.

Albino Birds observed near Harrogate.—I do not know of the following albinos having previously been recorded. A pied specimen of the Blackbird (*Turdus merula*) has for the last three years frequented Harlow Moor. A pied Sparrow (*Passer domesticus*) has been observed for some months in one of the main thoroughfares—Parliament Street. In the summer of 1884, Mr. J. Simpson, of Birk Crag, shot a perfectly white Skylark (*Alauda arvensis*). During the same year Mr. Hy. Heaton shot, in the fields adjoining the Hydropathic Establishment, a smoky-white Starling (*Sturnus vulgaris*), the bill and legs of which are of a pinkish-white colour. On the 3rd inst. Mr. R. Wood, Oatlands, Harrogate, informed me that he had on the previous day observed frequenting his stack-yard a pied Robin, the back and tail of which were perfectly white, the remaining parts being of the usual colour.—F. R. FITZGERALD, Harrogate, January 5th, 1887.

Birds at Flamborough.—The late gales have brought several rare birds from the far north. When at Bridlington the other day, I saw two Great Northern Divers (*Colymbus arcticus*) at Mr. Barkley's, bird stuffer, who informed me that they were shot in Bridlington Bay; also Black Guillemot (*Uria grylle*) shot at same time, Monday, January 4th. Mr. J. T. Woodhouse, of Flamborough, when walking on the beach after one of those great storms saw living on the rocks in a very sickly state a Great Northern Diver, which he picked up and brought to me. The Glaucous Gull (*Larus glaucus*) has also appeared on our coast.—MATTHEW BAILEY, January 11th, 1887.

**ORNITHOLOGICAL NOTES
FROM LINCOLNSHIRE AND NORFOLK.**

OLIVER V. APLIN,
Bloxham, near Banbury, Oxon.

IN November last my brother and I spent two days at Freiston Shore, Lincolnshire, and then three weeks in Norfolk. The following are some notes on the birds we met with. At Freiston on the 16th and 17th Dunlins (*Tringa alpina*) were numerous on the mud-flats, and we saw several large 'clouds,' also one good-sized lot of Knots (*T. canutus*), a few Ringed Plovers (*Ægialitis hiaticula*) and Curlew (*Numenius arquata*), and a good many Redshanks (*Totanus calidris*) in the creeks; nine Herons (*Ardea cinerea*) in company passed us flying seawards on the 17th, and there were a few Snipe (*Gallinago caelestis*) on the Saltings; we heard of no Golden Plover (*Charadrius plumvialis*) on the arable land, but seven passed over, going south, on the morning of the 16th, with several small flocks of Peewits (*Vanellus vulgaris*). Grey Crows (*Corvus cornix*), of course, predominated, but I noticed a good many Black ones (*C. corone*). Of Ducks we saw only five Mallard (*Anas boschas*) flying along a little way out. Eleven Brent Geese (*Bernicla brenta*) flew over our heads early in the morning of the 17th when we were at the end of Boston New Cut, on the bank of which a flock of fully five hundred Snow Buntings (*Plectrophanes nivalis*) were feeding, about one in ten being white birds. A Merlin (*Falco aesalon*) in brown plumage was beating along the bank. There was a large flock of Twites (*Linota flavirostris*) at that end of the marsh, and great numbers of Linnets (*L. cannabina*) all over it; three Goldfinches (*Carduelis elegans*) passed overhead coming from north-east on the 16th. Rock Pipits (*Anthus obscurus*) were pretty common in the creeks, Meadow Pipits (*A. pratensis*) in great numbers, and the marsh seemed full of Skylarks (*Alauda arvensis*). Wild-fowl of all kinds seem to have been very scarce on the east coast this autumn.

We went afterwards to Cromer, Cley, and Yarmouth, and the gunners at the last two places all agreed upon this. At Cley we found a good many Shorelarks (*Otocorys alpestris*), Rock Pipits (*Anthus obscurus*), Twites (*Linota flavirostris*), and two flocks of Snow Buntings (*Plectrophanes nivalis*), also a few Grey Plovers (*Squatarola helvetica*), consorting chiefly with the Knots (*Tringa canutus*), four Turnstones (*Streptilas interpres*), and a Purple Sandpiper (*Tringa striata*) on the 23rd, the fine open weather, however, making everything very wild. On the 19th we saw an immature Great Northern Diver (*Colymbus glacialis*) on the wing off

Salthouse, and on the 20th a small Diver, probably the Black-throated (*C. arcticus*), from the pure shining white of its neck and breast, was feeding near the sewer mouth at Cromer. On the 28th three Red-throated Divers (*C. septentrionalis*) were in the same place, one of them retaining a good deal of warm brown colouring on the throat; another was observed there on the 29th, on which day two Scoters (*Edemia nigra*) passed, flying north-west. On the 21st a small brown Skua, probably Richardson's (*Stercorarius crepidatus*), passed near the end of the pier. The neighbourhood of Yarmouth seemed deserted by birds; along the Denes I saw a few Snow Buntings (*Plectrophanes nivalis*)—looking dark against the frozen snow, Meadow Pipits (*Anthus pratensis*), and four Shorelarks (*Otocorys alpestris*); but two visits to Breydon resulted in our seeing only a few Gulls and a little party of Twites (*Linota flavirostris*) on one of the 'ronds' on the north side. I believe a few bunches of fowl came down on the morning of the 4th, but the only birds shot on the water during the week we were there (November 30th to December 8th) were a Wigeon (*Mareca penelope*) and a Coot (*Fulica atra*). Neither could I find any Ducks or Waders in the market. Hickling Broad, too, had little to show, for we saw only two Teal (*Querquedula crecca*), a Heron (*Ardea cinerea*), a lot of Great Black-backed (*Larus marinus*) and some Black-headed Gulls (*L. ridibundus*), a small unidentified wader looking a good deal like a Phalarope, and a few other birds, the Reed Bunting (*Emberiza schæniclus*) being a very frequent and characteristic small bird. We beat the 'ronds' along both sides of the Bure one afternoon without seeing a single Snipe (*Gallinago caelestis*), though better ground could not be imagined. I fancy that more could have been done at Cley during the severe weather, for on the morning of the last day we were there (November 27th) thirty-one Ducks in one bunch, seventeen in another, and five Wigeon (*Mareca penelope*) flew in from the sea.

I omitted to mention that in Potter Heigham Sound a bird, which we believe to have been a Bearded Tit (*Panurus biarmicus*), flitted across from one reed bed to another, just in front of our boat. From its long tail and general appearance it could have been nothing else, but we did not get another sight of it, as it disappeared at once among the tall reeds; the fowler we had with us said at once he thought it was a 'Reed Pheasant.'

NOTE—ORNITHOLOGY.

Land-rail at Barton-on-Humber.—To-day (December 8) I saw a Land-rail (*Crex pratensis*) in a game-shop in this town, and on inquiry was told that it had been shot at Barton, in Lincolnshire, across the river, on Monday, December 6. The bird was in very poor condition.—E. W. WADE, Hull, December 8, 1886.

Naturalist,

ORNITHOLOGICAL NOTES FROM REDCAR IN 1886.

T. H. NELSON, M.B.O.U.,
Bishop Auckland.

IN May a male Bittern (*Botaurus stellaris*) was shot near Middlesbrough. During the latter part of this month and the first half of June several Shellducks (*Tadorna cornuta*) were seen near Redcar, and I heard of the discovery of a nest on the sand-hills, but could not ascertain whether any young birds were observed afterwards. On the 12th of June I heard a Sandwich Tern (*Sterna cantiaca*) calling off Redcar Pier, and on the 14th I saw four Little Gulls (*Larus minutus*) flying past the same place. On the 29th of July four Swans were observed at sea flying north-west in the early morning; on Sunday, August 1st, I was on Coatham Pier about 3 p.m., when eight Swans flew over my head within a few yards; they were going towards the Tees mouth, where, during the next few days, they were all shot. One of them has been preserved by Mussell, of Middlesbrough, who tells me it is the Mute Swan (*Cygnus olor*). Judging by newspaper reports there appears to have been a considerable flight of these birds early in August, no doubt all of them referable to this species, and escaped from some private waters. It was said they had been seen crossing the sea from the direction of Norway, but on what authority this statement was made I cannot say. August 2nd, three Lesser Terns (*Sterna minuta*), and on the 4th an adult Sandwich Tern (*S. cantiaca*), were shot on Coatham sands. I was out at sea on the 5th, when a bird passed to the north-west which I am positive was an Avocet (*Recurvirostra avocetta*); it flew within 100 yards of the boat, and I think there is no doubt as to its identity. September 10th, seven Turtle Doves (*Turtur communis*) were seen on Coatham hills; one was afterwards shot and preserved by a local taxidermist. On the 12th five Pomatorhine Skuas (*Stercorarius pomatorhinus*) were observed flying overhead at Deighton Manor, near Northallerton, about 25 miles from the coast. About this date an immature Peregrine Falcon (*Falco peregrinus*) was shot near Saltburn-by-the-Sea.

By the middle of October the autumn migration had fairly set in; Larks (*Alauda arvensis*), Gold-crests (*Regulus cristatus*), Blackbirds (*Turdus merula*), and most of the regular winter migrants were constantly arriving. The first Fieldfares (*Turdus pilaris*) were seen on the 9th; Woodcock (*Scolopax rusticula*) on the 11th; and Short-eared Owl (*Asio brachyotus*) on the 16th; while Hooded Crows (*Corvus cornix*) were very late in making their appearance; I did not observe any until the 20th. Generally they arrive during the first week of October.

On the 14th I was out in a boat with Mr. Emerson, of Redcar, when we noticed great numbers of sea-birds—Gulls, Gannets (*Sula bassana*), Skuas, Guillemots (*Lomvia troile*), and Razorbills (*Alca torda*). The Gulls were principally Kittiwakes (*Rissa tridactyla*), and on several occasions they perfectly swarmed in the air above us when we had one down on the water. Guillemots and Razor-bills passed continuously to the south-east in small bodies of from three or four to fifteen or twenty, and all around us for miles we could see birds flying.

Amongst others, we shot an adult Gannet (*Sula bassana*), three Richardson's Skuas (*Stercorarius parasiticus*), one adult and two immature, and a male Great Skua (*S. catarractes*); the latter is a rare bird in this district; Mussell tells me he has never before had one through his hands. It is many years since there was such a remarkable abundance of bird-life off Redcar; I never before remember having seen such a quantity and variety at one time; several of the fishermen said they had not seen so many Skuas since the great flight on December 14th, 1879, exactly seven years before. We were obliged to come ashore after little more than an hour's shooting, or no doubt we should have bagged more Skuas and Gannets. We saw, and fired at, a Pomatorhine Skua (*Stercorarius pomatorhinus*), and the next day I saw several of this species flying over the rocks before a south-east gale. I think it is quite probable that the commotion amongst the birds at sea might be attributed to the impending storm; the Guillemots particularly seemed to be in great haste, hurrying away as though for dear life. I have frequently noticed that sea-birds appear to possess a remarkable instinct as to weather probabilities, and there seems to be a great deal of truth in the saying that 'to be a successful wild-fowl shooter a man should be a weather prophet.' On the 15th a strong south-east gale was blowing; many Gulls and Skuas passed over the rocks to the north-west, as also a few Ducks; on the same day I saw a large flock of Green Plover (*Vanellus vulgaris*) coming from seaward and flying high to the south-west. On the 16th a Red-throated Diver (*Colymbus septentrionalis*), with part of the red throat-patch remaining, was shot off East Scar. On the 18th the wind was strong from the north-east with heavy rain; I shot an immature Common Tern (*Sterna fluviatilis*), a late bird, near East Scar, and shortly after noticed several Velvet Scoters (*Edemia fusca*) swimming outside the breakers; two rose and flew past over the sands, when I secured one of them; in the afternoon I shot another Velvet Scoter from Redcar Pier; it came ashore with the flowing tide and proved to be a young male. On the 19th the weather was still stormy; Ducks, Larks (*Alauda arvensis*), Woodcock (*Scolopax rusticula*), Owls, Gold-crests (*Regulus cristatus*), and other

small birds crossed in considerable numbers. I shot another Velvet Scoter from the pier, out of a bunch of five, but it dived and did not re-appear. In the afternoon a young male Scaup (*Fuligula marila*) was shot near the pier by my friend, Mr. W. Pyman of Whitby. On the 20th great numbers of Hooded Crows (*Corvus cornix*) and Larks (*Alauda arvensis*) arrived. On the 21st Mr. Pyman and I were out in a boat at West Scar, where we secured a young male Long-tailed Duck (*Harelda glacialis*) and wounded another which escaped by diving and getting amongst the heavy seas outside. On the same day two female Long-tails were shot at East Scar; Hooded Crows and Ducks passed during the morning. On the 22nd there was a great rush of Larks all day, with a few Hooded Crows. On the 23rd I saw a Great Northern Diver (*Colymbus glacialis*) outside Salt Scar, but could not approach within a hundred yards of it. In the early part of November another Peregrine Falcon was shot, and about the same time Mr. A. E. Pease, M.P., killed a female Goosander (*Mergus merganser*) in a small runner near Guisborough. About the middle of the month Mr. R. Fox Chilton shot a very large female Great Northern Diver (*Colymbus glacialis*) at the Tees mouth; he informed me that it weighed close upon 12 lbs., which I can quite believe, judging from the great size of the bird; Mussell says it had an inch of fat under the skin. A female Merlin (*Falco æsalon*) was shot at Redcar early in December. There has evidently been a flight of Shore Larks (*Otocorys alpestris*) on the coast; twelve or fifteen were killed during the first week in December; on the 10th two were shot on Coatham sands, and on the 11th Mr. Emerson shot three at the same place. I examined ten or a dozen examples and found them to be all young birds.

NOTES—ORNITHOLOGY.

Great Grey Shrike in Nidderdale.—As I was traversing the road in the vicinity of New York, on Saturday, January 14, a Great Grey Shrike (*Lanius excubitor*) was observed to pass across about twenty yards in advance, on its way from one wooded portion of land to another.—W. C. CLARKSON, Pateley Bridge, January 14, 1887.

Hawfinch and Pink-footed Geese at Harrogate.—On Jan. 24th Mr. A. Rowling brought me a fine male specimen of the Hawfinch (*Coccothraustes vulgaris*) which he had shot that day in the grounds of old High Harrogate College. A pair of these birds had been noticed frequenting these grounds for three weeks previous. This is the first authentic instance of their occurrence in the town. I think the late John Grange shot one in the Spa Grounds a few years ago, but there is, as far as I know, no record of the fact. On January 4th, 1887, I saw a specimen near the Irrigation Farm. We may now class these birds among our residents in this district, as they have nested for the past two seasons in the grounds of Ripley Castle.

On January 10th I saw three Pink-footed Geese (*Anser brachyrhynchus*) on the Irrigation Farm.—RILEY FORTUNE, Alston House, Harrogate, Jan. 26th, 1887.

AN UNRECORDED OCCURRENCE OF THE GOLDEN EAGLE IN YORKSHIRE.

HERBERT PRODHAM,
Allerston, near Pickering.

ON reading the article about Eagles in the November number of the *Naturalist*, it occurred to me that perhaps the last Golden Eagle seen in this part of Yorkshire was one shot by Tom Fewster, a neighbour's son and school-fellow of mine, at Helwath, the upper end of Harwood Dale, and about ten miles from Scarborough, in the winter of 1850-51. I remember Fewster calling with the bird in a basket at my father's house the morning following its capture—it was alive, and apparently little the worse—on his way to Hackness Hall, to present it to our landlord, Sir John Johnstone. It so happened that the meet of the hounds was at Hackness Hall, and Squire Hill, of Thornton, the owner and master of the hounds, so much coveted the bird that he was allowed by Sir John to have it; and it was said at the time that, ardent sportsman as he was, so pleased was he with his prize, that he had little thought for the hounds that day.

Thinking that some particulars of this bird would be of interest, I called the other day on Mr. Hill, of Thornton, and he kindly supplied me with the following:—‘The bird,’ he writes, ‘when brought home by his father's whip, was found to be only half pinioned, and it fully recovered the use of its wing. A large cage was built for it, and it lived in captivity for over fifteen years, and, when in good plumage and apparently the best of health, was one morning found dead. When captured, Mr. Hill says, it was evidently a young bird, having black bars at the end of its tail, and a whitish rump. The tail is said to become wholly black or dark coloured (in nature) in the third year. In this one, in confinement, the tail gradually increased from the tip upwards in colour, only becoming uniformly black the year it died. The bird was fed twice a week only. on rats, rabbits, and birds, and occasionally a hedgehog, and was not ‘very good,’ except to the man who fed him.’

Mr. Hill had the bird set up by Graham, of York, and I may add that it now adorns his choice collection of stuffed animals.

NOTE—ORNITHOLOGY.

Occurrence of the Hawfinch in Wensleydale.—On January 8th the Hon. W. O. Powlett, Wensley Hall, sent me for preservation a fine specimen (female) of the Hawfinch (*Coccothraustes vulgaris*), which was caught in the garden by means of a wire sieve. Last year, he says, the gardeners finding the birds so destructive to peas killed seven or eight. They had apparently been bred in some of the woods near.—EDWD. CHAPMAN, Carperby, Bedale, February 1st, 1887.

Naturalist,

**NOTES ON DECAPODOUS CRUSTACEA
FOUND AT REDCAR.**

REV. W. C. HEY, M.A.,

*St. Olave's Vicarage, York; President of the Conchological Section of the Yorkshire
Naturalists' Union, and Honorary Curator in Conchology and Coleoptera
to the York Museum.*

WHEN I have been collecting shells at Redcar, I have usually kept my eyes open for anything in the way of Lobsters, Crabs, and Shrimps that might happen to turn up. As very little attention seems as yet to have been given to these creatures, so far as the Yorkshire coast is concerned, these notes (which apply exclusively to Redcar) may perhaps be worth a place in the *Naturalist*. I am aware that some other species have been met with in that neighbourhood; these notes are simply the record of my own observations.

Hyas araneus L. Far the commonest 'Spider Crab' so far as Redcar is concerned. It is abundant in rock-pools near low-water mark on both East and West Scars, though as it is very sluggish and consequently liable to carry a forest of sea-weed, &c., upon its carapace, it is not very easy to detect. Stomachs of fishes taken at Redcar are often literally crammed with this species.

Hyas coarctatus Leach. Readily distinguished from the former species by the greater comparative breadth of the fore part of the carapace. It appears to be a deep-water species, as I have never met with it except on the fishermen's lines and in fishes' stomachs.

Cancer pagurus L. The Common Edible Crab. Very frequent on the Scars under stones and in crevices of the rock. Individuals may frequently be met with in such dark places which have just cast their carapace and are perfectly soft to the touch.

Pirimela denticulata Mont. A beautiful little Crab and a very scarce species. I once took a single specimen on West Scar.

Carcinus mænas Penn. The Common Dog Crab. Very abundant between tide-marks.

Portunus variegatus Penn. This pretty dappled swimming Crab is cast up upon the sands very plentifully—sometimes in numbers perfectly extraordinary—although Bell considers it one of our scarcer species.

Portunus depurator Leach.—The Cleanser Swimming Crab is often cast up upon the beach. It is also frequently met with in the stomachs of fishes.

- Portunus pusillus** Leach. I have only found this species in the stomachs of Haddock.
- Ebalia pennantii** Leach. After a severe storm in winter, when the sea-bottom seemed literally turned out upon Redcar beach, I took a single dead specimen of this interesting little species.
- Corystes cassivelaunus** Penn. Thrown up in quantities on the sands. The curious markings of the carapace bear a ghastly resemblance to the human features, and have gained this crustacean the name of 'Masked Crab.' The first pair of claws in the male are developed to an enormous size, but whether for fighting purposes (like the horns of some mammals) or to give a securer hold of the female (like the dilated forefeet in *Dytiscus*) does not appear to be ascertained.
- Lithodes maia** Leach. A grand specimen of this terrific-looking creature was brought in in a fishing-boat one day when I was on the shore at Redcar. Another specimen taken in the same neighbourhood I secured for the Yorkshire Museum.
- Pagurus bernhardus** L. The Hermit Crab. Very common in rock-pools, inhabiting shells of *Trochus cinerarius*, *Purpura lapillus*, &c. Large specimens from deep water make themselves at home in the shells of *Buccinum undatum*.
- Porcellana longicornis** Penn. At spring-tides this little Crab may be taken abundantly on West Scar, under stones, at dead low-water mark. It shares with the *Ophiocomas*, the disagreeable habit of throwing its limbs off in the most reckless manner if handled otherwise than most gingerly.
- Galathea squamifera** Leach. At dead low-water mark on West Scar, in company with the last-named species.
- Homarus vulgaris** Edw. The Redcar Lobsters appear small beside the productions of the south coast.
- Crangon vulgaris** Fab. The Shrimp; very common in shallow water.
- Pandalus annulicornis** Leach. I have met with this species in the bottoms of boats which have been fishing in deep water. The same boats contain *Natica alderi*.

In the pools of brackish water near the slag-banks, a small Shrimp abounds, which appears to resemble *Palæmon leachii* Bell, but I do not feel certain about the identification.

NOTE—CONCHOLOGY.

Scalariform Planorbis spirorbis near Bingley.—On the 22nd January I obtained a living scalariform monstrosity of *Planorbis spirorbis* from a ditch near Bingley. In shape it resembles the frustum of a cone, its altitude being equal to its greater diameter increased by one half.—J. A. HARGREAVES, Baildon Woodbottom, Shipley, February 1st, 1887.

BOOK NOTICES.

An Elementary Text Book of British Fungi. W. Delisle Hay, F.R.G.S. London: Swan, Sonnenschein, Lowrey & Co., 1887. 8vo; illustrated with 59 plates and 5 tables.

The comparatively small band of mycological students in Great Britain naturally watch with eager interest the appearance of any fresh book bearing upon their favourite study; hence, for some months past Mr. Hay's work has been anxiously looked for by them. It consists of a handsome octavo volume of some 238 pages, printed in a good readable type, and illustrated with 64 plates.

In the preface the author says: 'It has never been my privilege, as yet, to meet with any person versed in mycology from whom I could derive instruction.' He is therefore entitled to our sympathy, for not only is the subject one of acknowledged difficulty but all the mycologists we know are emphatic in their statements as to the benefit they have derived from attending the classical Fungus Forays of the Woolhope Club, as well as the Scottish, the Epping Forest, and the Yorkshire Union Meetings. The work comprises twelve chapters and two appendices. In the chapter on the general features of fungi the author divides these plants for the purposes of his book into two groups, the one including 'all substantial, comparatively large and fleshy fungi' being comprehended under the name Mushrooms, while the title 'Moulds' is employed to cover all minute forms.

In the fifth chapter a detailed account is given of all terms employed in the description of the Hymenomyces; this occupies some fourteen pages, so that the student has now what has long been wanted in our hand-books, a complete glossary of terms. This is one of the most valuable chapters in the book.

The eighth chapter contains a comprehensive catalogue of 221 Esculent British Fungi, with full descriptions of each species; we however find included amongst them *A. caesareus*, *Polyporus tuberaster* and *P. corylinus*, which are not British. Many of the species which the author includes amongst the Esculent British Fungi we hardly expected to find so placed, although it is only right to say that, though included, they are not recommended by him—for example *Agaricus sinuatus*, *A. laccatus*, *A. squarrosus*, *A. acerbus*, *A. bombycinus*, *Lactarius piperatus*, *L. theiogalus*, *L. torminosus*, *L. turpis*, *Panus conchatus*, *P. torulosus*, *Paxillus involutus*, *Russula cyanoxantha*, *R. furcata*, *Hydnum auriscalpium*, *Boletus cyanescens*, *B. pachypus*, *Polyporus fomentarius*, *P. giganteus*, *P. squamosus*, *P. sulfureus*, etc.

Far be it from us to dispute with one who, 'as far as toadstool eating goes,' believes he has 'a right to speak with authority,' but we venture to think some of the above-named species would prove

uncomfortably warm to the palate, as *Lactarius piperatus*, *L. turpis*, *L. torminosus*, etc., while others would prove a trifle tough, as *Polyporus fomentarius* and *Hydnum auriscalpium*. The following chapter treats of the chemistry and toxicology of fungi, and in it are fortunately given some suggestions as to the treatment of cases of fungus poisoning. Then follows a catalogue, with full descriptions, of fifty-three species of British Poisonous Fungi. In appendix A the preparation of fungi for the table is treated of, and appendix B contains 133 culinary receipts.

The book contains a complete index of all species referred to in it, but unfortunately the scientific names are not placed alphabetically. The alphabetical arrangement of the vulgar names is not of much use to the ordinary student of mycology, for these names are most of them unfamiliar to him. Some of them are rather striking, as, for example, Bavarian Sprout (*Panus torulosus*), Blusher (*Ag. rubescens*), Crocodile (*Ag. lacrymabundus*), Field Darkie (*Ag. grammopodius*), Rat's Paw (*Clavaria cinerea*), Sickener's Sister (*Russula fragilis*), Water Skin (*Ag. rhodopolius*), Yellow Reptile (*Ag. sulfureus*). As an illustration of the inconvenience of employing the English names for fungi, we may quote the calendar for July, during which month the following esculent species are said by the author to be in season. 'The Bisotte, the Blusher, Bolets, the Chanterelle, Clavarias, Elfcups, the Grisette, Inkcaps, the Kidney, the Oaktongue, the Orchelle, the Oread Parasols, the Paxil, Pratelles, the Red Milk, the Spindleshank, the Stumptuft, the Verdette, the Virgin, and the Wood Blewitt.'

The illustrations consist of the well-known figures of Cooke's Hand-book, and are of course of great value in themselves; we would suggest, however, that in the next edition of Mr. Hay's book, fig. 3 on plate xv, and fig. 1 on plate xxxi be reversed, for in this edition they are unfortunately printed upside down.—C.B.P.

Geology of the District between Market Weighton and the Humber.

By F. Fielder Walton, L.R.C.P. (Lond.), M.R.C.S., etc. Hull: Charles Henry Barnwell, Bond Street, 1886, 8vo, pp. 24.

The author of this paper has written a useful little pamphlet on the narrow band of Liassic and Oolitic beds which is exposed on the west side of the wolds from Market Weighton to the Humber. He seems to be personally acquainted with the district in question, and his observations on the quarries and railway cuttings in the various rocks are of more value than the information which he has gleaned from mere bookwork. His notes on the 'Kellaways' beds are specially instructive. There are, however, several corrections to be made if the paper is to be of permanent use. On page 5 the term Jurassic ought to be used instead of Oolitic. Jurassic includes the

Lias and Oolites. On the same page the Mammoth is alluded to as if existing throughout the Tertiary period, whereas it only appeared at the close, in Pleistocene times. The Lias is stated to form the cliffs between Robin Hood's Bay and Whitby, but the more important Liassic cliffs from Sandsend to Saltburn are not noticed. Pentacrinite stems are said to be plentifully washed up on the Holderness coast—which is doubtful—and to be derived from the cliffs near Whitby, which is not the case. The Pentacrinites belong to the Lower Lias, which is only exposed in Robin Hood's Bay. The chief source of supply of pentacrinite fossils is at Whitton, near the mouth of the Trent. The *majority* of mammalia found in the Purbeck beds are said to be marsupial. In fact, they *all* are. No placental mammal whatever existed till after Eocene times. A somewhat extraordinary statement is made on page 18, that 'the Wealden is another division of the Oolitic system.' On the contrary, it belongs to the Cretaceous. The freshwater beds of the Wealden were contemporaneous with the marine beds of Speeton, and both belong to the Neocomian. It is extremely doubtful if the Speeton Clay appears at all in the district between Market Weighton and the Humber. We may almost predicate with certainty that it does not. The black chalk (why called carbonaceous clay?) alluded to on page 21, has been traced over a large area of the Wolds, and probably forms a division between the grey and white chalk. It may be seen on the face of the cliff at Bempton. On the whole, we recommend the paper, and highly commend the object of the writer. The worst fault is the punctuation, which can easily be remedied.—E.M.C.



Hand-book of Practical Botany. By E. Strasburger (Professor of Botany in the University of Bonn). Edited from the German by W. Hillhouse (Professor of Botany in Mason College, Birmingham). London: Swan, Sonnenschein & Co., 1887.

Of the numerous German text-books of science which have of late years appeared in the English tongue, perhaps none will be more appreciated by the English student than Professor Hillhouse's edition of Strasburger's excellent little hand-book of Practical Botany.

Until quite recently the total absence of any work on 'practical' structural botany in the English language, formed one of the most conspicuous lacunæ in our scientific literature. This gap was to a considerable extent diminished about a couple of years ago by the appearance of Messrs. Bower and Vines' 'Course of Practical Instruction in Botany,' but there is still room for Professor Hillhouse's

work, for, although the former is of the greatest value to students who are fortunate in receiving instruction in a properly equipped laboratory—yet, to the private worker who has not these advantages, Strasburger's 'Hand-book' is likely to produce more profitable results, both on account of its numerous illustrations and the charmingly lucid style which must render it intelligible to the greatest novice.

As an introduction to the volume, is given a general outline of the appliances necessary for the practical study of the minute structure of plants. Then, after a description of the construction and manipulation of the compound microscope, the student is introduced to the subject proper by the examination of a simple object—starch grains being chosen,—and here all important details as to methods of preparation and requirements for clear definition of the object are enumerated. The work assumes on the part of the worker entire ignorance as to the use of instruments, etc., and instruction in numerous matters of technique is given in the early chapters simultaneously with the investigation of such subjects as aleurone grains, crystalloids, movements of protoplasm, colouring matters, structure of tissues, etc. The cryptogams receive a fair share of attention, and the chapters dealing with the structure and reproduction of Ferns, Mosses, Fungi, and Algæ will be of much use. A section devoted to Bacteria is of special interest and value, for here is given not only an excellent concise account of the different developmental 'forms,' but the methods of research and 'culture' are so admirably and clearly enunciated, that the student would have little difficulty in prosecuting research for himself. The book closes with a chapter on 'cell-division,' which will be especially acceptable, coming as it does from such an eminent authority on the subject as the author of 'Zellbildung und Zelltheilung.'

In a work of such limited dimensions the descriptions are necessarily brief and to the point, but there is quite enough to enable the diligent student to acquire a tolerably extensive knowledge of vegetable structure and methods of work. It is an advantage of no mean importance to be initiated into methods of research which have been employed with such conspicuous success by one of the greatest living masters of the subject. Another noteworthy useful feature is the list of materials required for study, which is given at the head of each chapter, and it will be noticed that these are mostly selected from objects which can be obtained without difficulty. The translator is perfectly correct in stating that the work has no counterpart in the English language, and we predict for it a hearty reception in this country.—A.D.

Lord Lilford's Coloured Figures of the Birds of the British Islands.

We have received parts iii and iv of this work, containing excellent figures of the

White's Thrush.	Martin.
Reed Warbler.	Sand Martin.
Marsh Warbler.	Alpine Swift.
Wood Wren.	Scops Owl.
Icterine Warbler.	Little Owl.
Swallow.	Hobby.
Dartford Warbler.	Tree Creeper.
Goldcrest.	Nutcracker.
Long-tailed Titmouse.	Woodlark.
Coal Titmouse (2 plates).	Sparrowhawk (3 plates).
Wren.	

It is not our custom to allude to the price of works submitted for review, but would remind our ornithological readers that the most satisfactory pictures of British Birds extant are being issued at the trivial price of 9½d. each.—W.E.C.

British Stalk-eyed Crustacea and Spiders. By F. A. A. Skeus.

Small 8vo, 128 pages—1887. London: Swan, Sonnenschein & Co. Price 1s.

Pond Life: Insects. By Edward A. Butler, B.A., B.Sc. Small 8vo, 128 pages—1886. London: Swan, Sonnenschein & Co. Price 1s.

These two little volumes form part of Messrs. Swan, Sonnenschein & Co.'s 'Young Collector' series, and are in point of merit quite equal to their predecessors, and we are not sure that it would not have been better to separate the Crustacea and Spiders—the latter being entirely terrestrial, and the former almost entirely marine in habitat. The volume on Pond-life is more popular in style than the others of the series, and contains no technical tables beyond a list with character of the orders of insects.

Swallow-tails and Skippers. By Darley Dale; with a coloured frontispiece by Miss Lucy Francis. London: The Religious Tract Society, 8vo, pp. 158.

This little volume gives, in the form of a narrative, an account of a season's collecting of butterflies by the boys of a small school, and conveys in pleasant language some of the elementary facts concerning butterflies. Is it to be inferred from speaking of *Colias Edusa* being absent from Sussex, and of *Papilio machaon* being taken in the larva state near Bristol, that the fictions are not intended to be regarded as confined to the narrative?

Our Pets and Companions; Stories illustrating Kindness to Animals. By Mary Kemble Martin. London: The Religious Tract Society, not dated, 4to, pp. 96, profusely illustrated.

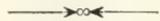
This is an excellent book to place in the hands of children, and the very numerous woodcut illustrations are worthy of much praise.

NOTES AND NEWS.

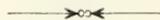
The numerous naturalists in Yorkshire who number Mr. Thomas Lister, of Barnsley, amongst their friends or acquaintances, will probably be interested in knowing that he was presented with his portrait by the members of the Barnsley Naturalists' Society, at an influentially attended meeting held Feb. 15. The portrait, which is a faithful representation of the veteran ornithologist, has been executed in carbon by Mr. Gothard, of Barnsley. Dr. Lancaster, in making the presentation, spoke highly of the services rendered to the Society by Mr. Lister during the past twenty years, for fourteen of which period he occupied the chair, and also of his readiness at all times to give to young naturalists the benefit of his many years' experience. Messrs. J. Hutchinson, S. Broadhead, and Wm. E. Brady followed to the same effect. Mr. Lister, in returning thanks, expressed it as his wish that the portrait should always be hung in the meeting-room of the Society, in whose meetings he had taken a pleasurable and active part for so many years.



At the February meeting of the Entomological Society of London, Mr. Francis Galton, F.R.S., read a paper on 'Pedigree Moth-breeding as a means of verifying certain important Constants in the General Theory of Heredity.' In this paper Mr. Galton suggested the institution of a system of experimental breedings, to be continued for several years, with the object of procuring evidence as to the precise measure of the diminution of the rate at which a divergence from the average of the race proceeds in successive generations of continually selected animals. Mr. Frederic Merrifield read a paper (by way of an appendix to Mr. Galton's paper) entitled 'A proposed method of breeding *Selenia illustraria*, with the object of obtaining data for Mr. Galton.' Mr. M'Lachlan said he considered the fact that *S. illustraria* was dimorphic an objection to its selection for the experiments proposed by Mr. Galton, and he suggested that the Common Silkworm Moth, or some other large Bombyces, would be more suitable to Mr. Galton's purposes. Prof. Meldola called Mr. Merrifield's attention to some observations on *Selenia illustraria* by Dr. Knaggs, in vol. iii of the Ent. Mo. Mag., which had some bearing on the projected experiments; and he remarked that although, for some reasons, the species selected was well adapted for testing Mr. Galton's conclusions, he believed that the fact of the moth being seasonally dimorphic was likely to introduce disturbing elements into the experiments which might influence the results.



We notice in a Southport newspaper lately sent us that our valued contributor, Dr. J. W. Ellis, who is Recorder of Economic Entomology for the counties of Lancashire and Cheshire, wishful to be of use to the agriculturists of those counties, is prepared to advise as to the best or the least expensive methods of counteracting insect-attacks on agricultural produce, and we would take this opportunity of suggesting to our readers how easily they could forward the work by calling attention to it in their local newspapers.



The Yorkshire Boulder Committee has commenced its work by sending to each Society affiliated with the Yorkshire Naturalists' Union a schedule of inquiries relative to boulders, whether they occur isolated or in groups. The desire of the Committee is to have the character of its work widely known and practically done throughout the county, and therefore any reader of the *Naturalist*, being aware of the existence of any boulder or groups of the same in Yorkshire, should report this to the Secretary, who will at once supply a schedule upon which to record particulars. The Committee consists at present of Professor Green, M.A., F.R.S. (Leeds), Chairman; Mr. C. D. Hardcastle (Leeds), Vice-Chairman; Rev. E. Maule Cole, M.A. (Wetwang); Professor Miall, F.G.S. (Leeds); Messrs. J. E. Bedford (Headingley); C. Brownridge, F.G.S. (Horsforth); S. Chadwick (Malton); W. Cheetham (Horsforth); J. W. Davis, F.G.S. (Halifax); John Hill (Morley); B. Holgate, F.G.S. (Hunslet); W. Horne (Leyburn); J. R. Mortimer (Driffield); T. Tate, F.G.S. (Leeds); J. W. Woodall, F.G.S. (Scarborough); and S. A. Adamson, F.G.S. (52, Wellclose Terrace, Leeds), Secretary.

LEPIDOPTEROUS FAUNA OF LANCASHIRE AND CHESHIRE.

JOHN W. ELLIS, L.R.C.P., L.R.C.S.E., F.E.S.,

Liverpool; Honorary Secretary, Lancashire and Cheshire Entomological Society.

Fam. *DELTOIDÆ*.

ZANCLOGNATHA, Led.

Zanclognatha (Herminia) nemoralis, Fab. = **grisealis**, Hubn.
Generally distributed.

Lanc.—Common at Kirkby and Hale (C.S.G.); Preston district, generally distributed, but not common (J.B.H.); Simmonswood Moss (G. A. Harker).

Ches.—Alderley district, abundant (H.H.C.); Bidston, not uncommon (C.S.G.); Bromborough Wood, occasionally (W.J.); Eastham and other woods in Wirral; Chester (A.O.W.); Eastham Wood (J.W.E.).

Zanclognatha (Herminia) tarsipennalis, Tr. Not nearly so frequent as the preceding species.

Lanc.—Aigburth (W.J.); Greenbank, near Liverpool (C.S.G., J.W.E.); Windermere (J.B.H.).

Ches.—Alderley district, common (H.H.C.); Wallasey (J.C.M.); scarce throughout Wirral (A.O.W.).

HYPENA, Tr.

Hypena proboscidalis, L. Common and generally distributed throughout Cheshire and South Lancashire, but becoming scarcer in the north.

HYPENODES, Guen.

Hypenodes albistrigatus, Haw. Recorded from Wallasey, a single specimen only, by J. Cosmo Melvill, F.L.S.

Hypenodes costæstrigalis, Steph. Recorded from the Lancashire side of Windermere (J.B.H.); and as being plentiful at Bidston and Prenton, near Birkenhead (J.F.B., C.S.G.).

THOLOMIGES, Led.

Tholomiges turfosalis, Wocke. Very local.

Lanc.—Pilling Moss, sometimes abundant, flying about 7 p.m. (J.B.H.).

Ches.—Wybunbury, near Crewe (J.C.M.); Crewe and Delamere Forest (Stainton's Manual, ii, 129).

RIVULA, Guen.

Rivula sericealis, Scop. Scarce and local.**Lanc.**—Grange (S.J.C.); Hale (J.B.H.); Manchester (Stainton's Manual, ii, 130).**Ches.**—Ledsham (A.O.W.); Wallasey (J.C.M.).

Fam. NYCTEOLIDÆ.

NOLA, Leach.

Nola cucullatella, L. Fairly common all over the district.**Nola confusalis**, Herr.-Schäff. = **crystalalis**, Dup. Recorded from one locality only in each county, viz.—Grange (J.B.H., Ent. Mo. Mag., x, 40) and Puddington, Cheshire (J.F.B.).

SARROTHRIPA, Curt.

Sarrothripa revayana, W.V. Recorded from Grange (J.B.H.); and as occurring in plantations near the coast (Cheshire?) by C. S. Gregson.

Fam. CHLÆPHORIDÆ.

HALIAS, Tr.

Halias prasinana, L. Local and scarce.**Lanc.**—Bolton (W.J.); Hale (C.S.G.); Silverdale (J.C.M.).**Ches.**—Delamere (N.C.); Wirral, scarce (J.F.B.).

Fam. BREPHIDÆ.

BREPHOS, Ochs.

Brephos parthenias, L. Recorded only from the birch-wood, Woolton, near Liverpool, May 1849 (C.S.G.); and Delamere Forest (F.N.P.).

GEOMETRIDÆ.

Fam. DENDROMETRIDÆ.

ELLOPIA, Tr.

Ellopia prosapiaria, L. = **fasciaria**, W.V. Frequent in fir-woods, and generally distributed.**Lanc.**—Chat Moss (J.C.); Longridge, not common (J.B.H.); near Ribchester (J.B.H., Ent., xiii, 105); Silverdale (J.C.M.).**Ches.**—Alderley (H.H.C.); Bidston Hill (C.S.G., W.J., J.W.E.); Delamere Forest (S.J.C., G. Harker, F.N.P., A.O.W.); Delamere Forest and Rudd Heath (J.C.); Prenton (C.S.G.); Prenton, Ness, and Burton (A.O.W.).

METROCAMPA, Latr.

Metrocampa margaritaria, L. Common and generally distributed.

ODONTOPERA, Steph.

Odontopera bidentata, Clerck. Common and generally distributed.

EUGONIA, Hubn.

Eugonia quercinaria, Hufn. = *angularia*, W.V. Recorded as rare at light in the Manchester district (J.C.).

Eugonia erosaria, Borkh. Scarce.

Lanc.—Chat Moss (J.C.); Hale (C.S.G.).

Ches.—Bidston and Upton (C.S.G.); Dunham Park (J.C.); taken by Mr. Almond at Tranmere and Rock Ferry (A.O.W.).

Eugonia fuscantaria, Haw. Scarce.

Lanc.—Manchester district, rare at light (J.C.); Walton, near Liverpool (C.S.G.).

Ches.—Bidston (C.S.G.); North Birkenhead and the Upton Valley, scarce (A.O.W.).

Eugonia alniaria, L. = *tiliaria*, Borkh. Generally distributed but nowhere common.

Lanc.—Aigburth, near Liverpool (J.W.E., W.J.); Chat Moss and Risley Moss (J.C.); Chat Moss and Simmonswood Moss (W.J.); Crosby and Simmonswood Moss (G. A. Harker, F.N.P.); Huyton (S.J.C., J.W.E.); around Manchester, but not common (J.C.); Old Swan, near Liverpool (C.S.G.); Preston, formerly common, but now scarce (J.B.H.).

Ches.—Chester (A.O.W.); Birkenhead (J.F.B.).

SELENIA, Hübn.

Selenia lunaria, W.V. Generally distributed, but nowhere common.

Lanc.—Chat Moss and Simmonswood Moss (W.J.); Pendlebury, rare (J.C.); Preston, not common (J.B.H.); Dutton, near Ribchester (Id., Ent., xiii, 105).

Ches.—Bramall and Cheadle Hulme (H.H.C.); Delamere Forest (F.N.P.); Puddington and Rock Ferry, scarce (A.O.W.).

Selenia bilunaria, Esp. = *illunaria*, Hübn. Common and generally distributed throughout both counties.

PERICALLIA, Steph.

Pericallia syringaria, L. Rare and local.

Lanc.—Hale and Warbreck Moor, near Liverpool (C.S.G.); Longridge (J.B.H.) and Dutton, near Ribchester (Id., Ent., xiii, 105); Manchester district, very rare (J.C.).

Ches.—Alderley, rare (H.H.C.); Chester, Denhall, Ince, and Newton (A.O.W.).

HIMERA, Dup.

Himera pennaria, L. Generally distributed, but not usually common.

Lanc.—Aigburth (J.W.E., W.J.); Aigburth and West Derby (C.S.G.); Manchester district, not common (J.C.); Preston, rare (J.B.H.); Prestwich, rare (J.C.M.); Sefton Park, Liverpool (F.N.P.).

Ches.—Alderley district (H.H.C.); Birkenhead, Chester, Eastham Wood, Ness, and Puddington (A.O.W.).

CROCALLIS, Tr.

Crocallis elinguaris, L. Generally distributed and moderately common.

EURYMENE, Dup.

Eurymene dolabraria, L. Rare and local.

Lanc.—Grange, rare (J.B.H.).

Ches.—Alderley, rare (H.H.C.); Delamere Forest, Dunham Park, and Knutsford, rare (J.C.); Eastham Wood, taken by Mr. Almond (J.F.B.); Rock Ferry (C.S.G., A.O.W.); Wallasey, at light (J.C.M.).

EPIONE, Dup.

Epione apiciaria, W.V. Generally distributed throughout both counties, but not common.

Lanc.—Bootle and Seaforth (W.J.); Chat Moss, on the railway bank, not common (J.C.); Crosby, scarce (G. A. Harker); Dutton, near Ribchester (J.B.H., Ent., xiii, 105) and Preston, rare (Id. in litt.).

Ches.—Alderley, rare (H.H.C.); Bowdon (J.C.M.); Chester, Denhall, Puddington, Rock Ferry, and Wallasey (A.O.W.); Wallasey (W.J.); Tranmere, a single specimen captured (C.S.G.).

VENILIA, Dup.

Venilia macularia, L. Very local, being recorded only from Grange (J.B.H., Ent. Mo. Mag., vii, 62), though now much rarer than formerly (in litt.); Silverdale and Delamere (J.C.M.).

MACARIA, Curt.

Macaria alternata, W.V. Recorded only from one locality, Newby Bridge, near Windermere (J.B.H.).

Macaria notata, L. Recorded as rare in the neighbourhood of Alderley, Cheshire (H.H.C.).

4 MAR 1887

Naturalist.



The Entomologist's Monthly Magazine.

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THE NATURALIST.

The Editors hope to publish the following papers within the next few months:—

Lepidopterous Fauna of Lancashire and Cheshire (Geometræ continued).
—JOHN W. ELLIS, F.E.S.

Land and Freshwater Shells of Whitby District.—H. POLLARD.

Annotated List of the Land and Freshwater Mollusca of Lincolnshire.

List of Lancashire Land and Freshwater Mollusca.—R. STANDEN.

A Naturalist's Ramble on the Farne Islands.—T. H. NELSON, M.B.O.U.

A Naturalist's Visit to Chillingham Park.—T. H. NELSON, M.B.O.U.

Bibliography for 1885 (continuation) and 1886.

Natural History of Lincolnshire.—The next instalment of this is to be upon the Mammalia, by JOHN CORDEAUX. Schedules have been prepared for obtaining information: one will be sent to any one willing to furnish notes.

Short Notes.—It is the wish of the Editors to give in each number about a page of short notes in each of the various subjects of which the *Naturalist* takes cognisance. To this end they rely upon their friends keeping them well supplied. At present short notes on Botany, Entomology, Palæontology, Microscopy, Conchology, &c., are particularly desired.

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A
MONTHLY JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

WM. DENISON ROEBUCK, F.L.S.,

AND

WM. EAGLE CLARKE, F.L.S.,

MEMBER OF THE BRITISH ORNITHOLOGISTS' UNION.



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NIGHTINGALE IN YORKSHIRE.

Mr. Wm. Eagle Clarke, 18, Clarendon Road, Headingley, is completing his account of the Nightingale as a Yorkshire Bird, for immediate publication, and will be glad to receive full particulars of its distribution and abundance, and the regularity of its appearance in all parts of the county. Solitary instances of occurrence are desired.

Improved Egg Drills (2 sizes) and Metal Blowpipe with instructions 1/3 free. 'Hints on Egg Collecting and Nesting,' illustrated, 3½d. free. Birds' Skins, Eggs (side-blown and in clutches with date), Lepidoptera, Ova, Larvæ, and Pupæ, Artificial Eyes, and all kinds of Naturalists' Requisites. Lists, one stamp. All specimens, &c., sent out 'on approval.'

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Macaria liturata, L. Generally distributed, but not common.

Lanc.—Chat Moss (J.C., W.J.); Dutton, near Ribchester (J.B.H., Ent., xiii, 105); Hale and Lydiate (C.S.G.); Longridge (J.B.H.); Silverdale (J.C.M.).

Ches.—Alderley, Rudd Heath, and Delamere (J.C.); Bidston Hill (W.J.); Delamere Forest (C.S.G., J.C.M., F.N.P.); Prenton, scarce, and Haddon Wood (A.O.W.); Parkgate in 1873 (W.G.).

URAPTERYX, Leach.

Urapteryx sambucaria, L. Generally common throughout Cheshire and South Lancashire, becoming scarcer northwards.

RUMIA, Dup.

Rumia luteolata, L. = *cratægata*, L. Abundant everywhere.

ASPILATES, Fr.

(**Aspilates ochrearia**, Rossi = *citraria*, Hübn. Though recorded as having been captured in Delamere Forest by Mr. Leather (A.O.W.), this locality requires further confirmation.)

Aspilates strigillaria, Hübn. Common on the mosses.

Lanc.—Chat Moss (J.C., J.C.M., W.J., and R. S. Edleston, Zool. 1845, 1220); moss near Grange (J.C.M.); Pilling Moss (J.B.H.); Risley Moss (J.C.).

Ches.—Carrington Moss, Rudd Heath, and Staley-brushes (J.C.); Delamere (J.C., F.N.P.).

SCODIONA, Boisd.

Scodiona belgiaria, Hübn. Heaths and mosses.

Lanc.—Chat Moss (J.C., W.J., J.C.M.); Pilling Moss and Longridge Fells (J.B.H.); Simmonswood Moss (C.S.G.).

Ches.—Bidston Hill, scarce (W.J., A.O.W.); Carrington Moss (J.C., J.C.M.); Delamere Forest, scarce (Geo. A. Harker, F.N.P.); Lindow Common, local (J.C., H.H.C.); Storeton, near Birkenhead (C.S.G.).

PHASIANE, Dup.

Phasiane petraria, Hübn. Somewhat local, though common where it does occur.

Lanc.—Recorded only from Silverdale (J.C.M.) and Chat Moss (J.C.).

Ches.—Barnston Heath (W.G.); Bidston Hill (W.G., W.J., A.O.W.); Delamere, abundant (G. A. Harker, F.N.P.); Dunham Park, Lindow Common, and Rudd Heath (J.C.); Eastham Wood (C.S.G., F.N.P., A.O.W., J.W.E.).

NUMERIA, Dup.

Numeria pulveraria, L. Local.

Lanc.—Brockholes Wood, near Preston (J.B.H.); Hoghton Tower, near Blackburn (J.C.); Silverdale (J.C.M.).

Ches.—Bowdon, rare (J.C.); Delamere (S.J.C.); Claughton, Tranmere, Rock Ferry, Eastham Wood, Ness, and Newton Lane, Chester (A.O.W.); Prenton, Oxtan, and Storeton (C.S.G.).

CABERA, Tr.

Cabera pusaria, L. Common and generally distributed.

Var. **rotundaria**, Haw., recorded from Dutton, near Ribchester (J.B.H. *in litt.* and Ent. xiii, 242).

Cabera exanthemata, Scop. Common and generally distributed.

BAPTA, Steph.

Bapta temerata, W.V. Local.

Lanc.—Botany-bay Wood, near Worsley (J.C.); Hale (C.S.G.); Grange, Preston, etc. (J.B.H.).

Ches.—Chester, captured by Miss Smith (A.O.W.); Delamere Forest, common near the Blue-cap Inn (J.C.M.); Eastham Wood (C.S.G., A.O.W.).

Bapta bimaculata, Fab. = **taminata**, W.V. The only locality from which it has been recorded is Grange (J.B.H. *in litt.* and E.M.M., xvii, 70).

ZERENE, Tr.

Zerene adustata, W.V. The only localities I have for this species are both in Lancashire, viz., Grange (J.B.H.) and Silverdale (J.C.M.).

ABRAXAS, Leach.

Abraxas sylvata, Scop. = **ulmata**, Fab. Rather local, but usually abundant where it does occur.

Lanc.—Bolton (W.J.); Little Crosby, formerly abundant (G. A. Harker); Croxteth (C.S.G.); Ince-Blundell Woods, very abundant (J.W.E., F.N.P.); Manchester district, but local (J.C.); Preston, Hoghton, and Windermere—a leaden-coloured variety occurs near Withnell (J.B.H.); Silverdale (J.C.M.).

Ches.—Generally distributed through Cheshire (A.O.W.); Sutton, common in Elm woods, and Storeton, occasionally (W.G.).

Abraxas grossulariata, L. Abundant everywhere. For interesting varieties, ranging from almost white to nearly black, of this protean species, no collection surpasses that of Mr. C. S.

Naturalist,

Gregson, whose specimens are chiefly the selection of many years' continual breeding of large numbers of this insect. Some of these specimens are figured in 'Mosley's Illustrations of Varieties of Lepidoptera,' while the figures of aberrations of this species in 'Newman's British Moths' are from the same source.

Abraxas (Lomaspilis) marginata, L. Common and generally distributed through both counties.

HIBERNIA, Latr.

Hibernia defoliaria, L. Local, but usually abundant where it occurs.

Lanc.—Crosby, scarce (G. A. Harker); Prestwich (J.C.); Preston (J.B.H.).

Ches.—Alderley district (H.H.C.); Bidston, Eastham, Upton, Birkenhead, Ledsham (A.O.W.); Delamere, Dunham Park, and Tatton Park (J.C.); Eastham Wood, abundant (J.W.E., F.N.P.); Wallasey and Bowdon (J.C.M.).

Hibernia aurantiaria, Esp. Rather local.

Lanc.—Aigburth and West Derby (C.S.G.); Preston (J.B.H.); Prestwich (J.C.).

Ches.—Delamere and Tatton Park (J.C.); Denhall and Puddington, scarce (A.O.W.); Dunham Park (J.C., J.C.M.); Bowdon (J.C.M.).

Hibernia progemmaria, Hübn. Abundant everywhere. In Mr. Joseph Chappell's collection is a very singular monstrosity of this species. The specimen is gynandromorphous, having wings on the right side and being apterous on the left, but the singularity of the specimen is that the left antenna is pectinated (indicating the male sex), while the right is filiform. The specimen was captured at Staley-brushes.

Hibernia leucophearia, W.V. Generally distributed wherever oak abounds.

Lanc.—Preston (J.B.H.); Prestwich (J.C.).

Ches.—Alderley and Bramall (H.H.C.); Eastham Wood, very common (C.S.G., W.G., J.W.E., F.N.P.); Dunham Park and Tatton Park, common (J.C.); Prenton, Patrick Wood near Bromborough, Ness, Puddington, and Delamere (O.A.W.).

Hibernia rupicaprararia, W.V. Local.

Lan.—Crosby, scarce (F.N.P.); Preston (J.B.H.); Stretford, near Manchester (J.C.).

Ches.—Bowdon (J.C.); Bromborough (G. A. Harker, J.W.E.); Chester and Delamere (A.O.W.); Eastham (F.N.P., W.G., J.W.E.).

SELIDOSEMA, Hübn.

Selidosema plumaria, W.V. Recorded only from a very few localities, and those only in Lancashire, viz., Pilling Moss, not rare (J.B.H.); near Preston (J.B.H. in Zool. 1845, 1085); Rainford Moss, and upon a small moss near Eccleston (C.S.G.).

THAMNONOMA, Led.

Thamnonoma Wavaria, L. Abundant wherever currants are grown.

FIDONIA, Tr.

Fidonia piniaria, L. Common in fir-woods throughout both counties.

Fidonia atomaria, L. Abundant on all the heaths and mosses.

Fidonia clathrata, L. Very local.

Lanc.—On the sides of railway-banks near Carnforth, not uncommon (J.B.H.).

Ches.—Delamere and Puddington (A.O.W.).

GNOPHOS, Tr.

Gnophos obscurata, W.V. Local on heaths.

Lanc.—Banks of the Wyre, near Fleetwood (J.B.H.).

Ches.—Bidston (W.G., W.J., J.C.M., A.O.W., J.W.E.); Burton, Wallasey, and Tranmere (A.O.W.); Heswall and Storeton (W.G.); near Prenton (C.S.G.); Wallasey (W.J., F.N.P.).

HEMEROPHILA, Steph.

Hemerophila abruptaria, Thunb. Not common.

Lanc.—Hale, and occasionally in other parts of the Liverpool district (C.S.G.).

Ches.—Alderley district, very rare (H.H.C.); Chester, Upton, Tranmere, Rock Ferry, Ness (A.O.W.).

BOARMIA, Tr.

Boarmia liehenaria, Hübn. Very local, occurring usually in the neighbourhood of old orchards.

Lanc.—Preston, rare (J.B.H.).

Ches.—Prenton, Hooton, Frankby, Spital (C.S.G.); Frankby and Prenton (A.O.W.).

Boarmia repandata, L. Common and generally distributed. In the Entomologist, v, 73, Mr. Gregson writes: 'Around Lytham the specimens have always a yellowish suffused appearance, markings not defined. In South Lancashire and Cheshire they appear as a family of sweeps—rich, dark, smoky, suffused specimens, having the zigzag posterior marginal line distinctly defined.'

- Boarmia rhomboidaria**, W.V. Common and generally distributed.
- Boarmia roboraria**, W.V. Very scarce, being recorded only from Dunham Park (J.C., J.B.H.).
- Boarmia biundularia**, Borkh. = **laricaria**, Doubl. Local.
Lanc.—Preston, Longridge, etc. (J.B.H.); Prestwich and Worsley (J.C.).
Ches.—Petty Pool Wood, Delamere Forest (S.J.C., F.N.P.).
- Boarmia crepuscularia**, W.V. Local.
Lanc.—Botany-bay Wood, Worsley (J.C.); Hale (C.S.G.); Longridge (J.B.H.).
Ches.—Alderley, occasionally (H.H.C.); Hooton (C.S.G.); Rudd Heath (J.C.).
- Boarmia consonaria**, Hübn. One locality recorded in each county, viz., Newby Bridge, near Windermere (J.B.H.), and Upton, near Birkenhead, a single specimen only (C.S.G.).
- Boarmia extersaria**, Hübn. Mr. Hodgkinson records the capture of a single specimen at Newby Bridge, at the foot of Windermere.
- Boarmia punctularia**, Hübn. Local, and nowhere common.
Lanc.—Chat Moss, Hoghton Tower (J.C.); Croxteth and Knowsley (C.S.G.); Preston (J.B.H.); Silverdale (J.C.M.).
Ches.—Bramall (H.H.C.); Delamere (S.J.C.); East Cheshire, on the authority of N. Greening (A.O.W.).

BISTON, Leach.

- Biston strataria**, Hufn. = **prodromaria** (W.V.). Generally distributed through both counties, but nowhere common.
Lanc.—Preston, rare (J.B.H.).
Ches.—Alderley, rare (H.H.C.); Bidston (C.S.G.); Bowdon and Dunham Park (J.C.M.); Dunham Park and Tatton Park (J.C.); Delamere (J.C., C.S.G., Ent., vi, 452); Eastham Wood, occasionally (W.G., W.J., A.O.W., T. Galliers, Ent. Weekly Intell., 1860, i, 19).
- Biston pilosaria**, W.V. Common and generally distributed.
- Biston hispidaria**, W.V. Recorded only from Dunham Park, Cheshire (J.C., J.B.H., R. S. Edleston, Zool., i, 176).
- Biston zonaria**, W.V. Coast sand-hills of Cheshire and Lancashire, probably introduced into the latter county. This species was discovered by the late Mr. Nicholas Cooke in 1833 (although his brother, Mr. Benjamin Cooke, had found a pupa in 1832) on the New Brighton sand-hills.

AMPHIDASIS, Tr.

Amphidasis betularia, L. Generally distributed and fairly common in Cheshire and South Lancashire, especially on the moss lands, but becoming scarcer northwards. The black variety (*Doubledayaria*, Mill.), is the prevailing form.

PSEUDOTERPNA, Hübn.

Pseudoterpna pruinata, Hufn. = **cytisaria**, W.V. Local, the localities recorded being, with two exceptions, in Cheshire.

Lanc.—Morecambe and Silverdale, not common (J.B.H.).

Ches.—Bidston (F.N.P., W.J., C.S.G., A.O.W., J.W.E.); Claughton Fir-wood, Haddon Wood, Ness (A.O.W.); Tatton Park and Delamere Forest (J.C.).

GEOMETRA, L.

Geometra papilionaria, L. Generally distributed, but apparently nowhere very common.

Lanc.—Chat Moss (J.C., W.J.); Didsbury (J.C.M.); Dutton, Preston, etc., not common (J.B.H.); Woolton (C.S.G.).

Ches.—Alderley and Cheadle Hulme (H.H.C.); Bidston Hill (C.S.G., A.O.W.); Delamere Forest (S.J.C., J.C.); Dunham Park and Knutsford, rare (J.C.); Eastham Wood, occasionally (W.J.); Hartford (F.N.P.); Rock Ferry, Ledsham, Ince (A.O.W.).

NEMORIA, Hübn.

Nemoria strigata, Müll. = **thymiaria** Guen. Very local, and not common where it does occur.

Lanc.—Aigburth (W.J.); Fleetwood and near Lytham (J.B.H.).

Ches.—Bidston (F.N.P.); Chester, and in Wirral occasionally (A.O.W.); Parkgate (W.G.); Wallasey (J.C.M.).

Nemoria lactearia, L. Common, and generally distributed.

ACIDALIA, Tr.

Acidalia subsericeata, Haw. Rather local.

Lanc.—Barlow Moor and Withington, not common (J.C.); lanes round Manchester formerly (J.B.H.); Humphrey Head, near Grange (J.B.H.).

Ches.—Bidston (C.S.G., A.O.W.); pasture lands near Leasowe sand-hills (C.S.G.); Wallasey (W.G., J.C.M.).

Acidalia holosericeata, Dup. The only recorded locality for this species is 'below Bidston Plantation, looking towards Moreton, in plantations where the ground is swampy' (C.S.G.).

Acidalia circellata, Guen. Very scarce.

Lanc.—Chat Moss, rare (J.C., J.B.H.), probably extinct, the wood where it occurred having been destroyed by fire.

Ches.—Bowdon; specimens collected here by Mr. R. S. Edleston are in the collection of Mr. J. Cosmo Melvill.

Acidalia humiliata, Hufn. = **osseata**, W.V. Local.

Lanc.—Barlow Moor, common (J.C.); banks of the Wyre, not rare (J.B.H.).

Ches.—Hedges near Leasowe sandhills (C.S.G.); Wallasey (W.J., J.C.M.).

Acidalia dimidiata, Hufn. = **scutulata**, (W.V.). Common, and generally distributed.

Acidalia trigeminata, Haw. Recorded only from Barlow Moor and Irlam, but not occurring there commonly (J.C.).

Acidalia bisetata, Hufn. Common and generally distributed.

Acidalia inornata, Haw. Scarce.

Lanc.—Bolton (W.J.); Chat Moss (R. S. Edleston, Zool., 1845, 1220); Preston (J.B.H.).

Ches.—Staley-brushes, rare (J.C., J.B.H.).

Acidalia aversata, L. Abundant everywhere.

Acidalia muricata, Hufn. = (**Hyria**) **auroraria**, Borkh. Very local, and only on the mosses.

Lanc.—Chat Moss (W.J., J.C., J.C.M.); Heysham Moss and Pilling Moss (J.B.H.); Risley and Rixton Mosses (J.C.).

Ches.—Carrington Moss and Lindow Common (J.C.M.).

Acidalia emarginata, L. Very local, being recorded only from Barlow Moor and Irlam (J.C.) and Bidston (W.J.).

Acidalia rubiginata, Hufn. = **rubricata** W.V. Taken by the late Mr. Joseph Sidebotham at Ashton-on-Mersey (J.C.).

Acidalia marginepunctata, Goeze = **promutata**, Guen. Recorded only from Silverdale (J.B.H.).

Acidalia incanata, L. Local.

Lanc.—Grange (S.J.C.); Lytham and Preston (J.B.H.); Liverpool district, occasionally (C.S.G.); Prestwich (J.C.M.).

Ches.—Bidston Hill (A.O.W.); Meols (J.W.E.); Tranmere (W.G.); Wallasey (J.C.M.).

Acidalia fumata, Steph. Plentiful on all the moss-lands.

Acidalia remutata, Hübn. Generally distributed and fairly common.

Acidalia imitaria, Hübn. Generally distributed and fairly common.

Acidalia ornata, Scop. Recorded as rare on Chat Moss (J.C.).

TIMANDRA, Dup.

Timandra amataria, L. Uncommon, and recorded only from localities in Cheshire, viz.:—Backford (W.G.); Ness, Puddington, Chester, Ince (A.O.W.); lane leading from Liscard to Wallasey Church (J.W.E.).

ZONOSOMA, Led.

Zonosoma (Ephyra) porata, Fab. Delamere Forest, rare (J.C.) is the only locality of which I have information.

Zonosoma punctaria, L. Very local.

Lanc.—Hale (C.S.G.).

Ches.—Bidston and Eastham (C.S.G.); Eastham Wood (A.O.W.); Dunham Park and Delamere, common (J.C.).

Zonosoma trilinearia, Borkh. Scarce, the localities recorded being the Silverdale and Middlebarrow woods (J.C.M.) in Lancashire, and Dunham and Tatton Parks (J.C.) in Cheshire.

Fam. PHYTOMETRIDÆ.

ANISOPTERYX, Steph.

Anisopteryx æscularia, W.V. Rather local.

Lanc.—Aigburth (W.J., J.W.E.); Manchester district, common (J.C.); Preston (J.B.H.).

Ches.—Dunham Park and Bowdon (J.C.M.); Chester (A.O.W.); Delamere Forest (F.N.P., A.O.W.); Eastham Wood (W.G., F.N.P., J.W.E.).

ODEZIA, Boisd.

Odezia atrata, L. = *chærophyllata*, L. Local, but common where it does occur.

Lanc.—Bolton (W.J.); Pendleton (J.C.); Prestwich hills (J.C.M.); Withnell (J.B.H.).

Ches.—Bramall and Knutsford (J.C.).

STERRHA, Herr.-Schäff.

Sterrha sacraria, L. Of very occasional occurrence, localities recorded being:—

Lanc.—A specimen captured by Mr. S. J. Capper near his residence, Huyton Park, near Liverpool, in August 1867 (Ent., iii, 347).

Four specimens taken in the Liverpool district by a local collector (C.S.G., Ent., iii, 347). Some of these are probably the Cheshire specimens taken by Mr. E. L. Ragonot (see next page).

One captured in the Freemasons' Hall, Manchester, September 5th, 1872 (J. T. Carrington, E. M. M., ix, 139).

Ches.—Ness (A.O.W.).

One on August 16th, at Wallasey, and one on August 21st, 1867, at Poulton, captured on ragwort flowers,—another specimen at the latter locality being lost (E. L. Ragonot, E. M. M., iv, 131).

One at Wallasey (C.S.G., E. M. M., v, 129).

ANAITIS, Boisd.

Anaitis plagiata, L. Local, and not common.

Lanc.—Bolton (W.J.); Bury (J.C.); Chat Moss (J.C.M.); Childwall (C.S.G.); Longridge (J.B.H.).

Ches.—Bowdon, Knutsford, Delamere, Marple, not common (J.C.).

Anaitis paludata, Thumb. = **Carsia imbutata**, Hübn. Common on the moors and mosses.

CHESIAS, Tr.

Chesias spartiata, Fuessl. Local, and not common.

Lanc.—Bury and Staleybridge (J.C.); Crosby, one specimen at light (F.N.P.); Preston (J.B.H.).

Ches.—Alderley district (H.H.C.); Delamere (A.O.W.); Bromborough and Hooton (C.S.G.).

(**Chesias oblata**, Fab. = **obliquaria**, W.V. The record of its occurrence in Delamere Forest by Mr. A. O. Walker requires to be verified.)

LOBOPHORA, Curt.

Lobophora polycommata, W. V. Recorded only from Grange (J.B.H.).

Lobophora viretata, Hübn. Very scarce, being recorded only from Grange (J.B.H.) and from Sandal Heath and Goss Moss, near Alderley (H.H.C.).

Lobophora carpinata, Borkh. = **lobulata**, Hübn. Local.

Lanc.—Botany-bay Wood near Worsley, and Atherton, rare (J.C.); 'not uncommon in the woods round Kirkby and Simonswood' (C.S.G.).

Ches.—Delamere Forest (S.J.C., J.B.H., F.N.P., and C.S.G., Ent., vi, 452).

Lobophora halterata, Hufn. = **hexapterata**, W.V. Recorded by Mr. Alfred O. Walker, probably on the authority of Mr. Brockholes, from Puddington and Ness.

Lobophora sexalisata, Hübn. The only instance I have of the occurrence of this species in either county is the record of the capture of a specimen in Croxteth Woods by Mr. Gregson.

ORTHOLITHA, Hübn.

- Ortholitha (Eubolia) palumbaria**, W.V. Abundant on heaths and mosses throughout both counties.
- Ortholitha limitata**, Scop. = **mensuraria**, W.V. Common and generally distributed.
- Ortholitha cervinata**, W.V. Scarce.
Lanc.—Preston, rare (J.B.H.).
Ches.—Bidston (C.S.G.); formerly not uncommon in Clifton Park, Birkenhead (A.O.W.); Hoylake (W.J.).
- Ortholitha bipunctaria**, W.V. Mr. Gregson records the occurrence of this species at Hoylake, at the mouth of the Dee, in July 1845.
- Ortholitha badiata**, W.V. Generally distributed, and fairly common.
- Ortholitha comitata**, L. Local.
Lanc.—Crosby (G. A. Harker); Pendleton and Irlam (J.C.); Preston (J.B.H.); Southport (W.J.).
Ches.—Alderley district (H.H.C.); Bowdon (J.C.); Egremont and Rock Ferry (C.S.G.); near Wallasey Church (J.W.E.); Wallasey, Denhall, and Chester (A.O.W.).

MESOTYPE, Hübn.

- Mesotype virgata**, Hübn. = **Eubolia lineolata**, W.V. Common on the Lancashire and Cheshire sand-hills wherever the yellow bed-straw (*Galium verum*) is plentiful.

PHIBALAPTERYX, Steph.

- Phibalapteryx fluviata**, Hübn. = **gemmaria**, Hübn. Scarce.
Lanc.—One specimen captured on the Birkdale sand-hills, August 24th, 1878 (J.C.M., H. Dent, Ent., xi, 282); Hale (S.J.C.); Manchester district, rare (J.C.); Preston, a single specimen (J.B.H.).
Ches.—Birkenhead, a specimen taken by Mr. Diggles in October 1857, and recorded in the proceedings of the Northern Entomological Society (Zool. (1858), xvi, 5771). Wallasey sandhills, a single specimen (W.J.); and a specimen captured by Mr. E. R. Curzon, in the presence of the writer, on the border of the sand-hills near Wallasey village, September 30th, 1880 (Y. Nat., i, 394).
- Phibalapteryx vittata**, Borkh. = **lignata**, Hübn. Scarce, being recorded from Bidston Marsh and Otterspool (C.S.G.); Charlton flat near Stretford, Ashton-on-Mersey, Warburton, and Heatley, not common (J.C.); Bidston Marsh, Ness (A.O.W.); Preston (J.B.H.).

SCOTOSIA, Steph.

Scotosia dubitata, L. Generally distributed, though scarcely common.

Scotosia undulata, L. Local, and nowhere common.

Lanc.—Botany-bay Wood at Worsley (J.C.); Preston and Windermere (J.B.H.).

Ches.—Delamere Forest (J.C.); Eastham Wood (C.S.G.); East Cheshire (A.O.W.).

Scotosia vetulata, W.V. Recorded only from Grange, where it is stated to be not rare (J.B.H.).

COLLIX, Guen.

Collix sparsaria, Hübn. Recorded from Cheshire only, and probably both records refer to the same locality, viz.;—Delamere Forest (S.J.C.) and East Cheshire, on the authority of N. Greening (A.O.W.).

LARENTIA, Tr.

Larentia reticulata, W.V. The only known locality for this beautiful species is Windermere, where it has been taken by Messrs. Gregson and Hodgkinson.

Larentia silaceata, W.V. Rather local.

Lanc.—Bolton, Bury, and Hoghton Tower (J.C.); Hale, Ditton, and Rainhill (C.S.G.); Preston (J.B.H.).

Ches.—Delamere Forest (F.N.P.); East Cheshire (A.O.W.); Marple (J.C.).

Larentia suffumata, W.V. Local.

Lanc.—Bolton (W.J.); Chat Moss, Worsley, and High Leigh (J.C.); Dutton, near Ribchester (J.B.H., Ent., xiii, 105); Huyton (S.J.C.); Preston (J.B.H.).

Ches.—Alderley Edge (H.H.C.); Chester and Wirral (A.O.W.); Delamere Forest (C.S.G., Ent., vi, 452); Eastham Wood (C.S.G., W.J.).

Larentia prunata, L. Local.

Lanc.—Bury and Staleybridge (J.C.); Hale and Crosby (C.S.G.); Prestwich (J.C.M.); Windermere (J.B.H.).

Ches.—Burton and East Cheshire (A.O.W.); Marple and Stockport (J.C.).

Larentia testata, L. Common on the moors, mosses, and coast sand-hills.

Larentia populata, W.V. Local, but usually common where it does occur.

Lanc.—Longridge (J.B.H.); Staleybridge and Irlam (J.C.) Toppings Turton, near Bolton, on heath flowers (J. W. Baldwin, Y. Nat., i., 387).

- Ches.**—Alderley (J.C.); Delamere (F.N.P.); Staley-brushes (J.C.M., R. S. Edleston, Zool., 1845, 1220); Storeton Quarry (C.S.G.).
- Larentia associata**, Borkh. = *dotata*, Guen. Local.
Lanc.—Crosby (F.N.P.); Preston, rare (J.B.H.); Withington and Pendlebury (J.C.).
Ches.—Alderley (H.H.C.); Bowdon (J.C.); Puddington and Denhall (A.O.W.); Wallasey (W.G.).
- Larentia pyraliata**, W.V. = *dotata*, L. Somewhat local.
Lanc.—Irlam, Pendleton (J.C.); Preston (J.B.H.); Sefton Park, Liverpool (J.W.E.).
Ches.—Alderley, common (H.H.C.); Barnston (W.G.); Bowdon and Knutsford (J.C.); Chester district, common (A.O.W.); Delamere (F.N.P.).
- Larentia fulvata**, Forst. Common and generally distributed.
- Larentia firmata**, Hübn. Fir-woods, tolerably common all over both counties.
- Larentia variata**, W.V. Common in all fir-woods.
- Larentia simulata**, Hübn. Recorded from Hamp's Fell, near Grange (J.B.H.).
- Larentia corylata**, Thunb. Local.
Lanc.—Chat Moss and Prestwich (J.C.); Grange (J.B.H.).
Ches.—Alderley district, common (H.H.C., J.C.); Delamere Forest (F.N.P.); Eastham Wood (W.J.); Marple (J.C.); Puddington, scarce (A.O.W.).
- Larentia truncata**, Hufn. = *russata*, W.V. Common and generally distributed.
- Larentia immanata**, Haw. Common and generally distributed.
- Larentia viridaria**, Fab. = *pectinitaria*, Fuessl. = *miata*, W.V. Common and generally distributed.
- Larentia galiata**, W.V. Local, but common where it does occur.
Lanc.—Humphrey Head and the Lancashire coast (J.B.H.).
Ches.—Alderley and Cheadle Hulme (H.H.C.); Staley-brushes (J.C., R. S. Edleston, Zool., 1845, 1220); Wallasey, abundant (J.W.E.); Burton and Ness (A.O.W.).
- Larentia unangulata**, Haw. Local, and not usually common.
Lanc.—Bolton (W.J.); Lytham and Wyre district, not rare (J.B.H.).
Ches.—Bowdon, not common (J.C.); Flaybrick Hill and Noctorum (C.S.G.); Flaybrick Hill, Ledsham, Puddington, and Tranmere (A.O.W.).
- Larentia montanata**, W.V. Abundant everywhere.

- Larentia ferrugata**, Clerck. Generally distributed, but scarcely common.
- Larentia unidentaria**, Haw. Common everywhere.
- Larentia ocellata**, L. Common and generally distributed.
- Larentia olivata**, W.V. Not common.
Lanc.—Bolton Moors (W.J.); Silverdale (J.C.M.); Withnell (J.B.H.); woods on the Lancashire side of Windermere (C.S.G., Ent., iv, 316).
Ches.—Bidston, taken by Mr. Almond (A.O.W.); Staley-brushes, rare (J.C.).
- Larentia tæniata**, Steph. Very local, being found only in North Lancashire, viz., woods on the Lancashire side of Windermere (C.S.G., J.B.H.); Silverdale (J.B.H., and J. Sidebotham, Ent., x, 8).
- Larentia designata**, Hufn. = **propugnata**, W.V. Local.
Lanc.—Barton Moss, Chat Moss, and Stretford (J.C.); Preston (J.B.H.); Wavertree (C.S.G.).
Ches.—Carrington Moss and Dunham Park (J.C.); Chester and Wirral (A.O.W.); Cloughton and Saughall (C.S.G.); Delamere Forest (S.J.C.).
- Larentia fluctuata**, L. Abundant everywhere.
- Larentia bicolorata**, Hufn. = **rubiginata**, W.V. Common and generally distributed, the variety **plumbata**, Curt., occurring in several widely-distant localities, as Ormskirk (W. R. Kifford, Ent., v, 227); Preston (J.B.H.); Fleetwood (J.B.H. in E. M. M., ix, 162); Ledsham (A.O.W.).
- Larentia siterata**, Hufn. = **psittacata**, W.V. Very local.
Lanc.—Grange (J.B.H.); Knowsley and Speke (C.S.G.).
Ches.—Eastham Wood (C.S.G.).
- Larentia miata**, L. Very local.
Lanc.—Crosby (F.N.P.); Grange and Lancaster (J.B.H.).
Ches.—North Birkenhead and East Cheshire (A.O.W.).
- Larentia bilineata**, L. Very abundant.
- Larentia tristata**, L. Scarce, the only localities recorded being Chat Moss (J.C.M.); near Stoneyhurst (J.B.H., Ent., xii, 204; Castle Mill, scarce (J.C.).
- Larentia subtristata**, Haw. Common and generally distributed.
- Larentia hastata**, L. Scarce and local.
Lanc.—Chat Moss (J.C.M., J.C.).
Ches.—Alderley (H.H.C.); Delamere (J.C.).
- Larentia albicillata** L. Rather local, and not usually common where it does occur.

- Lanc.**—Chat Moss (J.C., R. S. Edleston, Zool., 1845, 1220); Halewood and Hale (C.S.G.); Hoghton Tower (J.C.); Preston (J.B.H.); Silverdale (J.C.M.).
- Ches.**—Alderley, rare (H.H.C.); Delamere (S.J.C., J.C.); Marple (J.C.); Eaton Park, near Chester (A.O.W.).
- Larentia derivata**, W.Y. Local and not common.
- Lanc.**—Hoghton Tower, not common (J.C.); Preston, rare (J.B.H.).
- Ches.**—Alderley (J.C.); Bidston Hill, occasionally (W.J.); Cheadle Hulme (H.H.C.); Delamere (C.S.G., Ent., vi, 452); between Oxtton and Prenton (C.S.G.); Tranmere, scarce, and Ledsham, common (A.O.W.).
- Larentia impluviata**, W.V. Common and generally distributed. At Longridge a dark form prevails, while near Preston it is much greener (J.B.H.).
- Larentia literata**, Don. = *ruberata*, Freys. Local, but fairly common where it does occur.
- Lanc.**—Liverpool district (F.N.P.); Longridge (J.B.H.).
- Ches.**—Wallasey sandhills (W.J., G. T. Porritt); Bidston Marsh (A.O.W.); Macclesfield, rare (J.C.).
- Larentia sordidata**, Fab. = *elutata*, Hübn. Common everywhere.
- Larentia didymata**, L. Common everywhere.
- Larentia multistrigaria**, Haw. Common and generally distributed.
- Larentia cæsiata**, W.V. Common on the Lancashire moorlands, as Bolton Moors (W.J.); Bury (R. Kay, Ent., ix, 158); Toppings Turton, near Bolton, on heath flowers (J. W. Baldwin, Y. Nat., i., 387); Longridge (J.B.H.). Also rare at Alderley (H.H.C.), and abundant at Staley-brushes (R. S. Edleston, Zool., 1845, 1220).
- Larentia salicata**, Hübn. Local.
- Lanc.**—Bolton Moors (W.J.); Silverdale (J.C.M.); Withnell, and on the coast near Fleetwood (J.B.H.).
- Ches.**—Bidston Hill and Storeton (C.S.G.); Staley-brushes (J.C.).
- Larentia affinitata**, Steph.
- Lanc.**—Manchester district, generally distributed but not common (J.C.); Preston, not rare (J.B.H.).
- Ches.**—Wallasey, occasionally (W.J.).
- Larentia alchemillata**, L. Local.
- Lanc.**—Chat Moss, uncommon (J.C.); Preston (J.B.H.).
- Ches.**—Alderley, common but local (H.H.C.); Chester? (A.O.W.); Patrick Wood, near Bromborough Mill (A.O.W.); Wallasey, rare (J.C.M., W.J.).

- Larentia decolorata**, Hübn. Common everywhere.
- Larentia albulata**, Steph. Common wherever the food-plant of the larva—Yellow-rattle (*Rhinanthus crista-galli*)—grows.
- Larentia blandiata**, W.V. Mr. Hodgkinson informs me that he once saw a specimen at Accrington, said to have been captured there by the possessor.
- Larentia ericetata**, Curt. 'C. S. Gregson met with this near Hawks-head' (J.B.H.).
- Larentia unifasciata**, Haw. Local and scarce.
Lanc.—Preston (J.B.H. *in litt.* and E. M. M., iv, 154); near Fleetwood (J.B.H. in E. M. M., x, 118); Lytham (J.B.H.).
Ches.—Wallasey sand-hills, scarce (N. Cooke, C.S.G.).

OPORABIA, Steph.

- Oporabia dilutata**, W.V. Common everywhere.
- Oporabia filigrammaria**, Herr.-Schäff. Common on the moorland districts of Lancashire. It was first recorded as British, under the name of *porata*, by R. S. Edleston, in the Entomologist for 1856.

CHEIMATOBIA, Steph.

- Cheimatobia brumata**, L. Abundant everywhere.
- Cheimatobia boreata**, Hübn. First recorded as British by Benjamin Cooke in Zoologist, 1850, p. 2749, a female having been captured at Petty Pool Wood, Delamere Forest, in October 1848. It has since occurred there in abundance, and has also been recorded from Chat Moss and Staley-brushes (J.C.) and Bidston birch-plantations (C.S.G.).

HYDRELIA, Hübn.

- Hydrelia cambrica**, Curt. = **Venusia cambricaria**. Very local, occurring only in Lancashire, viz., Longridge, where it was formerly abundant (J.B.H.); Hoghton Tower, not common (J.C.); and Windermere, scarce (J.B.H.).
- Hydrelia Blomeri**, Curt. Recorded only from Lancashire, the localities given being Brockholes Wood near Preston, and Hoghton Woods (J.B.H.).
- Hydrelia sylvata**, W.V. Local.
Lanc.—Chat Moss (R. S. Edleston, Zool., 1845, 1220); Preston, now rare, but formerly abundant (J.B.H.); Silverdale (J.C.M.); Worsley, rare (J.C.).
Ches.—Bromborough Woods (C.S.G.); Castle Mill and Delamere (J.C.); East Cheshire (A.O.W.).

Hydrelia candidata, W.V. Local.

Lanc.—Chat Moss (J.C.); Preston (J.B.H.); Silverdale (J.C.M.).

Ches.—Bidston and Wallasey, scarce (A.O.W.); Bollin Valley, near Castle Mill, and Marple (J.C.); Delamere Forest (J.C.M.); Eastham and Hooton (C.S.G.).

Hydrelia luteata, W.V. Fairly common, but local.

Lanc.—Chat Moss (J.C., R. S. Edleston, Zool., 1845, 1220); Preston, among alder (J.B.H.).

Ches.—Bidston (C.S.G.); Bramall, local but common (H.H.C.); Burton and Puddington, scarce (A.O.W.); Marple (J.C.); Delamere (J.C., S.J.C.).

Hydrelia obliterated, Hufn. = **heparata**, W.V. Local.

Lanc.—Chat Moss (J.C., R. S. Edleston, Zool., 1845, 1220); Preston (J.B.H.); Prestwich (J.C.).

Ches.—Bidston (C.S.G.); Bramall (H.H.C.); Burton, Rock Ferry, and Puddington, not common (A.O.W.); Marple and Delamere (C.S.G.).

EUPITHECIA, Curt.

Eupithecia centaureata, W.V. Common everywhere.**Eupithecia venosata**, Fab. Local.

Lanc.—Crosby sand-hills (W.J.); Humphrey Head, near Grange (J.B.H. *in litt.* and Ent. Mo. Mag., vii, 67); Rusholme, near Manchester, rare (H.H.C.).

Ches.—Denhall, one specimen (A.O.W.); Hilbre Island, at the mouth of the Dee, common (F.N.P., W.G., A.O.W., J.W.E.).

Eupithecia subnotata, Hübn. Not common.

Lanc.—Preston and Longridge (J.B.H.).

Ches.—Birkenhead, Denhall, and Wallasey (A.O.W.); Prenton (C.S.G.).

Eupithecia linariata, W.V. Local, recorded only from Cheshire.

Ches.—Bidston (W.J.); Delamere (J.C.); New Brighton (J.B.H.); Bidston and Tranmere (A.O.W.); Wallasey (F.N.P., J.W.E.).

Eupithecia pulchellata, Steph. Local.

Lanc.—Chat Moss (W.J.); Dutton, near Ribchester (J.B.H., Ent., xiii, 105); Prestwich (J.C.); Longridge, and abundant in gardens at Morecambe, among snap-dragons (J.B.H.).

Ches.—Alderley, common (H.H.C., J.C.); Delamere, Dunham Park, Knutsford, and Castle Mill (J.C.); Prenton Mount Wood, Rock Ferry, Ness, and Burton (A.O.W.).

Eupithecia rectangularata, L. Common and generally distributed wherever there are old orchards.

Eupithecia debiliata, Hübn. Recorded from Chat Moss by Charles Campbell (Zool., 1862, p. 8209).

Eupithecia succentaureata, L. Local.

Lanc.—Crosby (G. Harker); Lytham and Fleetwood (J.B.H. in litt. and E. M. M., x, 118).

Ches.—Bidston (A.O.W.); Bromborough (W.J., J.W.E.); Dunham, rare (J.C.); Wallasey (F.N.P., J.C.M., W.J., J.W.E., A.O.W.).

Eupithecia scabiosata, Bork. = **subumbrata**, W.V. Recorded only from Grange (J.B.H.).

Eupithecia subfulvata, Haw. Local.

Lanc.—Barlow Moor and Irlam, common (J.C.); Lytham and near Fleetwood (J.B.H. in litt. and E. M. M., ix, 162); Dutton, near Ribchester (J.B.H., Ent., xiii, 105).

Ches.—Bowdon (J.C.); Bromborough (W.J.); Burton (A.O.W.); Alderley district, common (H.H.C.); Wallasey (W.J., F.N.P.).

Eupithecia nanata, Hübn. Common wherever heath grows.

Eupithecia innotata, Hufn. (? **fraxinata**, Crewe). Scarce.

Lanc.—Lytham (J.B.H.).

Ches.—One at Styall (J.C.); a few on the sand-hills (C.S.G.).

Eupithecia fraxinata, Crewe. Recorded by Mr. Chappell from Prestwich, Withington, Rusholme, and Stretford, all near Manchester, and from Preston by Mr. Hodgkinson.

Eupithecia pygmæata, Hübn. Not common.

Lanc.—Preston, Grange, etc. (J.B.H.); Liverpool district (C.S.G.); near Bury (J.C.).

Ches.—Castle Mill (J.C.); Dee marsh near Puddington (A.O.W.).

Eupithecia tenuiata, Hübn. Not common.

Lanc.—Bury, rare (J.C.); Liverpool district, 'where sallows are plentiful' (C.S.G.); Preston (J.B.H.).

Ches.—East Cheshire, on the authority of N. Greening (A.O.W.).

Eupithecia plumbeolata, Haw. Local. Bury, Mereclough, Prestwich, rare (J.C.); not uncommon among *Myrica gale* on the mosses (C.S.G.); Pilling Moss, plentiful among *Myrica gale* where *Melampyrum arvense* grows (J.B.H. in litt. and E. M. M., ii, 186).

Eupithecia valerianata, Hübn. = **viminata**, Doubl. Recorded only from Windermere (J.B.H.); Pilling Moss (J.B.H. in E. M. M., ii, 186); and East Cheshire (A.O.W.).

Eupithecia isogrammata, Tr. Grange, among clematis (J.B.H.).

Eupithecia satyrata, Hübn. Local.

Lanc.—Grange, Silverdale, &c. (J.B.H.); Manchester district, generally distributed (J.C.); Simmonswood Moss (C.S.G.).

Ches.—Burton, and near Birkenhead (A.O.W.); Bowdon (J.C.M.).

Eupithecia helveticaria, Boisd. Recorded as rare at Grange by Mr. Chappell.

Eupithecia castigata, Hübn. Common but local.

Lanc.—Grange, Silverdale, &c. (J.B.H.); Liverpool district, common (C.S.G.).

Ches.—Alderley, abundant (H.H.C.); Hartford (F.N.P.); Wirral (A.O.W.).

Eupithecia lariciata, Freyer. Local.

Lanc.—Longridge, among larches (J.B.H.); near Stoneyhurst (J.B.H. in Ent., xii, 204).

Ches.—Alderley, local (H.H.C.); East Cheshire (A.O.W.).

Eupithecia trisignaria, Herr-Schäff. Recorded only from Preston and Windermere (J.B.H.).

Eupithecia virgaureata, Crewe. Tolerably common.

Lanc.—Grange, Lytham, &c. (J.B.H.); Crosby (W.J.).

Ches.—Bidston Hill (W.J.); Staley-brushes, not common (J.C.); Wallasey, common (W.J., G. Harker, F.N.P., J.W.E.).

Eupithecia vulgata, Haw. Abundant everywhere.

Eupithecia albipunctata, Haw. Recorded from Barton, Castle Mill, and Knutsford (J.C.); and from near Manchester (Charles Campbell in E. M. M., v, 280).

Eupithecia absynthiata, Clerck. Common and generally distributed.

Eupithecia assimilata, Doubl. Local.

Lanc.—Eccles (J.C.); Preston (J.B.H.); Dutton near Ribchester (J.B.H. in Ent., xiii, 105).

Ches.—Bowdon, Baguley (J.C.); ragwort flowers on the Cheshire (and Lancashire) coast (C.S.G.); Wirral (A.O.W., W.G.); East Cheshire (A.O.W.).

Eupithecia minutata, Guen. Fairly common wherever heath grows, as on the moors and mosses.

Eupithecia expallidata, Guen. Recorded only from Grange (J.B.H.).

Eupithecia pimpinellata, Hübn. Local.

Lanc.—Grange (J.B.H.); Manchester district, not common (J.C.).

Ches.—East Cheshire (A.O.W.); Wallasey (J.W.).

Eupithecia constrictata, Guen. Rare.

Lanc.—Grange (J.B.H., E. M. M., vii, 67); Silverdale (J.B.H. in litt.).

Eupithecia indigata, Hübn. Local, all the localities recorded being in Cheshire, viz.:—Alderley, Lindow Common, Dunham Park, Rudd Heath, Delamere and Chat Moss (J.C.); Bidston (W.J., J.W.E.); Prenton and Storeton (C.S.G.); Prenton, Ness, and Burton (A.O.W.).

Eupithecia abbreviata, Steph. Generally distributed and fairly common in oak woods.

Eupithecia exiguata, Hübn. Common and generally distributed.

Eupithecia sobrinata, Hübn. Recorded from Grange and Preston (J.B.H.).

Eupithecia pumilata, Hübn. Tolerably common.

Lanc.—Preston, Grange, etc. (J.B.H.).

Ches.—Bidston Hill and New Brighton, among gorse (C.S.G.); Bidston (W.J., A.O.W.); Claughton fir-wood and Haddon Wood (A.O.W.); Alderley district, common (H.H.C.); Delamere, abundant (C.S.G., Ent., vi. 452); Wallasey (G.T.P.).

NOTES AND NEWS.

The length to which the two valuable and interesting articles we print this month extend compels us to hold over numerous short notes which we had hoped to insert. The account of the very successful annual meeting of the Yorkshire Naturalists' Union at Dewsbury also stands over, together with notices of several important recently-published books.

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We regret to hear of the death of Mr. Joseph Jackson, of Settle, which took place suddenly on the 9th December last. Mr. Jackson was the discoverer of the famous 'Victoria Cave,' so named because the discovery took place in the year of Her Majesty's accession to the throne.

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We have received the second part (lately published) of the Transactions of the Leeds Geological Association, edited by our friend Mr. S. A. Adamson, F.G.S., the honorary secretary to the Society, to whom it owes in great measure the prosperity it has enjoyed during the past few years.

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We are pleased to hear of the establishment under favourable auspices of a new society at Skipton-in-Craven, under the title of 'The Craven Naturalists' and Scientific Association.' The subscription is to be 2s. 6d. for ordinary and 10s. 6d. for honorary members, and Mr. C. C. Smith was appointed secretary. The appointment of other officers was deferred to a meeting on the 28th March.

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One who has never tasted *Clitopilus prunulus* does not know what a delicious morsel is; so our mycologists say.

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The 'Globe' was some time ago responsible for the following brilliant example of newspaper science:—

'WHAT IS IT?—Ornithologists will hasten to Lincolnshire to obtain a view of the remarkable bird which a shepherd in that county has just captured. None of the local authorities can tell its name. It is about the size of a turkey, but is not a turkey, inasmuch as it can swim. For the same reason it can hardly be, as some of the Lincolnshire folk are said to imagine, a vulture. Anyhow it is a *rara avis*, though not in the least like a black swan.'

A NATURALIST'S RAMBLE ON THE FARNE ISLANDS.

T. H. NELSON, M.B.O.U.,

Bishop Auckland and Redcar.

HAVING made arrangements with some friends for a visit to the Farne Islands, we accordingly met at the Central Station, Newcastle, one fine morning early in June, and, after a pleasant journey of about an hour and a half, arrived at Belford, where a conveyance in waiting carried us to Bamburgh, five miles distant. We had secured quarters at the 'Crewe Arms,' a most comfortable hotel, where, I may here say, we received every attention during our stay from Miss Arthur, the amiable hostess. In the evening, Cuthbertson, the boatman from North Sunderland, came along to receive instructions for taking us out to the islands on the morrow, and having satisfactorily settled that business, we took a stroll through the village to have a look at the Castle and the surrounding neighbourhood.

Bamburgh is a beautifully-situated little place, built in the form of a triangle, with a grove of trees in the centre, and the church, in the grave-yard of which is the tomb of Grace Darling, at the corner of the Belford Road. At the top of the village is the ancient manor-house, familiar to readers of 'Dorothy Forster,' whilst one can almost imagine that the opening scene of the story is laid in the kitchen of the 'Crewe Arms.' The grand old Castle, Ida's Keep—in former ages a fortress of might, now a house of charity—towering aloft on a high basaltic rock, stands between the village and the sea, like a huge lion keeping guard over the inhabitants of the hamlet.

We walked up the carriage drive on the south-east of the Castle, where there is a magnificent view of the coast fringed with yellow sands; Holy Island, with the ruins of Lindisfarne Priory looming in the distance to the northward, and the Farnes lying out seaward to the north-east. The latter consist of a group of low basaltic islets, some dozen or fifteen in number, extending over an area of about three miles by three and a half; some of them are mere isolated rocks, others are partly covered with a coarse herbage, but, excepting the Inner Farne, none of them supply any means of sustenance to the persons connected with the lighthouses or the preservation of the countless thousands of sea-birds which assemble there in the breeding season. The nearest island, the Inner Farne, is two miles from the mainland; adjoining it are the East and West Wide-opens and the Knoxes; then, crossing a channel a mile and a half wide, where at times the tide runs with fearful rapidity and, meeting the wind, raises a very nasty sea, we come to the Staples with the Pinnacles,

the North and South Wawmses, Big Harcar, Clove Car, and Brownsman. A mile and a half to the south-east of the Staples lies the Crumstone, the breeding resort of numerous Seals; and, at an equal distance to the north-west is the Megstone, a barren rock sacred to the Cormorants. The Outer Farne or Longstone, the most northerly of the group, is five miles from the shore. It was here that the Darling family lived; and from here the heroine Grace and her father ventured forth across the stormy waters to the rescue of the passengers and crew of the ill-fated 'Forfarshire.' It is only by visiting the scene of the wreck, and witnessing the angry seas raging round the islands, that one can form any idea of what a truly dangerous adventure old Darling and his daughter embarked upon on that stormy morning in September 1838. Since then the old lighthouse has been pulled down, and on its site is now erected a more modern structure, with all necessary appliances for lighting and warning vessels from these dangerous rocks.

The flash of the light on the Outer Farne reminding us that it was time to turn in, we repaired to our quarters at the inn, disturbing swarms of rabbits in crossing the links below the Castle.

Next morning we drove along to North Sunderland, three miles to the south-east of Bamburgh, where we found our boatman awaiting us on the quay by the little harbour. North Sunderland is a small fishing village, where, in the herring season, a considerable trade is carried on, the preparations for which we saw were already commencing. 'An ancient and fish-like smell' pervades the place, not of an agreeable character to nostrils unaccustomed to such odours. One of my companions remarked to the boatman that the stench was very offensive, and was met by the reply—'Oh, it's just a fine healthy smell!' On that point we agreed to differ; however, we were soon seated in our coble, the 'Lindisfarne,' a large roomy craft, partly decked for'ard, and, after piloting our way amongst the boats in the harbour, soon found ourselves in the open sea, scudding before a fair wind in the direction of the islands. Our crew consisted of three, all told: Cuthbertson; an old salt, whose name I forget; and William Darling, Grace's nephew.

Very few birds were observed till we passed the Inner Farne, and then a few Guillemots (*Lomvia troile*) and Puffins (*Fratercula arctica*) showed themselves, dotted about on the water; opposite the Wide-opens a flock of noisy, screaming Terns (*Sterna macrura* and *S. cantiaca*) were hovering about like so many large butterflies, busily engaged amongst the herring-soil near the surface; and on the nearest islands we saw Lesser Blackbacked and Herring Gulls (*Larus fuscus* and *L. argentatus*). As we crossed the channel between the

islands and neared the Staples the numbers of the birds increased until we arrived opposite the Pinnacles, when the water seemed to be perfectly alive with Guillemots and Puffins; diving as our boat approached, they reappeared behind us when we had passed; others were flying overhead in all directions, the Puffins looking very comical as they passed close above us. On some of the outlying rocks and on the islands groups of Gulls were sitting, chiefly the Lesser Blackbacks, in mature plumage, although some were in the second and third years' dress. A few Eiders (*Somateria mollissima*) were swimming between the islands, but they did not suffer a near approach. Cuthbertson told us that there was a King Eider (*S. spectabilis*) in the neighbourhood; he had seen it several times during the spring, but we did not catch a sight of this rarity during our visits.* A Manx Shearwater (*Puffinus anglorum*) flew past us near the Pinnacles, the only one we saw, although we were told they were not uncommon in the autumn.

After three-quarters of an hour's sail we reached the Outer Farne, and landed in a little bay near the lighthouse. This island is a long, low, rugged reef of rocks, destitute of herbage, and swept by every winter storm, a dreary abode for the light-keepers, of whom there are always three stationed here, a fourth being on shore, off duty. After inspecting the lighthouse and the 'Syren' fog-horn, we crossed over to the north or seaward side of the island, where, on a bank of shingle, we found a colony of Sandwich and Arctic Terns nesting. There were very few perfect eggs to be seen, owing to a storm a day or two previous, during which the sea had washed over the nesting-ground and broken most of the eggs; I counted at least twenty Sandwich Terns' eggs destroyed in this manner, and there was further evidence of the violence of the storm to be seen in the timbers of a schooner, wrecked near the Terns' colony. In addition to the Terns' nests, one of our party found an Oystercatcher's (*Hæmatopus ostralegus*) nest, with one egg.

On leaving the Longstone we directed our course for the middle group of islands, soon landing on the Staples, where, after ascending a gentle slope, we reached the top of the island, almost covered with white campion in full bloom. The soil here is of a spongy, peaty nature, in many places perforated with holes in which the curious little Puffins, with their orange-coloured legs and beaks, were nesting. Being wishful to take a Puffin's egg, I put my arm down one of the holes, and very soon found the tenant was at home; fortunately

* I notice in the *Zoologist* for February 1886, p. 76, that a male King Eider, in all probability the same bird as mentioned above, was killed at the Farnes in April 1885.

I wore a leather glove, or my hand would have suffered from the sharp ploughshare-like beak of the angry bird. Towards the east side the island rises to a height of about forty feet, and is there bare of soil; a chasm some twenty feet wide intervenes between the island and four flat-topped rocks, each apparently about twenty to thirty feet square—some one remarked that they looked as though a giant had taken a huge axe and split a slice from the edge of the island, and then divided the detached portion into quarters—the tops of these rocks, the far-famed ‘Pinnacles,’ were literally covered with Guillemots, sitting as close together as they could pack, each bird brooding over its solitary egg. We could detect a few Razor-bills (*Alca torda*) and Ringed Guillemots amongst the crowds of birds in front of us, while down the sides of the Pinnacles, on every accessible ledge, a graceful little Kittiwake (*Rissa tridactyla*) was sitting on its nest. The Guillemots took little notice of our presence, but bowed and chattered incessantly, keeping up an uninterrupted conversation amongst themselves. Visitors are not allowed to climb the Pinnacles, and this feat can only be accomplished by means of a ladder; but the watcher periodically takes the eggs during certain weeks of the breeding season. The eggs of the Kittiwakes can only be reached by means of a net placed at the end of a long pole, and, according to what we heard from the watcher, they are not often disturbed.

Thinking we could not find a more romantic or suitable spot for luncheon, we had the hamper brought up from the boat, and, seating ourselves on the rocks facing the Pinnacles, proceeded to refresh the inner man.

The sight of the birds on the Pinnacles is one well worth the journey to the Farnes to see, and although there are other bird-nurseries where more rock-breeding fowl are to be seen, yet I doubt if, at any place on the English coast, their habits can be studied from a closer point of view than on the Staples. There we were, seated within a few yards of this noisy, moving mass of Guillemots, so near that we could throw a biscuit amongst them, and yet, apparently undisturbed by our presence, they sat contentedly on their eggs and pursued their daily avocations as though no one were near. There was a constant stream of arrivals and departures going on, each new comer being greeted with loud croaks, whether of welcome or disapprobation we could not determine. All the time we remained on the Staples swarms of Puffins flew round us in a most eccentric manner, describing large circles; seemingly never tiring, they pursued each other round and round the south side of the island, apparently enjoying themselves immensely. I presume they meant it for play; indeed, it reminded me very much of the manner in which Swifts

amuse themselves on fine summer evenings in chasing one another round old buildings. One Guillemot we noticed in the water had a very light grey head, and would have been a prize for a collector of varieties. Probably disturbed by the noise of our talking, a pair of Rock Doves (*Columba livia*) flew out of a cave below the rocks on our right, but, as the place seemed quite inaccessible, we did not attempt to look for the nest. One of our party, who is an artist, made an excellent water-colour sketch of the Pinnacles, and after luncheon and a pipe of the fragrant weed, we proceeded towards the adjoining island, passing on the way innumerable nests of the Lesser Blackbacked Gulls; these were scattered about in all directions, between the fissures of the rocks and amongst the sea-pinks and other plants which thrive on the higher part of the Staples; nests, indeed, they could scarcely be called, a few pieces of grass or bents, collected together, being all the efforts at architecture the birds had made. The eggs were of various shades of ground-colour, from light green to dark brown, spotted and blotched with brown and black, and varied from one to three in number. The owners of the nests, amongst which we observed a few Herring Gulls, rose at our approach and settled behind us as we advanced, so that we had a flock of birds always before and behind us on the ground, and another wheeling above in the air and greeting us with their hoarse laughing-like cries; the contrast between the black backs, beautiful snow-white breasts, and yellow legs and bills of these birds was very striking, and added a peculiar charm to the scene not soon to be forgotten.

The channel between the islands was now dry, and we walked across the rocks, slippery with sea-weed, on to the Brownsman, where, in an old tumble-down cottage, the watcher and his family reside. The Brownsman appears to be a favourite breeding-place for the Eider Ducks; we found more than a dozen nests with the female birds sitting close, the drakes being out at sea, in small parties of three or four, on the north side of the island. Several of the ducks were remarkably tame, and allowed us to go within a yard or two of their nests before they moved; one bird, sitting near the house, was evidently a favourite with the children, who fed her while we were standing close by. We examined some of the nests and found they were made of rough grass or sea-weed outside, put together in a loose and clumsy manner, and lined with down, plucked from the birds' breast. Each nest had its full complement of four olive-green eggs, lying snugly packed amongst the down, which is of a dingy brown colour, and *not white*, as many people imagine; the lining of one nest will fill a man's hat, and is so elastic that it can easily be compressed

within the grasp of one hand. When the Eider leaves her nest of her own accord, she conceals the eggs by pulling the down over them, but, as we had disturbed the birds, of course they had not had time to make all secure, and therefore the eggs were fully exposed to view. In the course of our rambles on the Brownsman, a flock of Terns rose from a patch of grass on the south side, where we found a number of nests within a small compass, though very few eggs were to be seen; probably the keeper had been round that morning, for on the other islands we found plenty of Terns' nests with full clutches of three eggs. Those breeding on the Brownsman were, so far as we could determine, *Sterna macrura*. A few pairs of Oystercatchers (*Hæmatopus ostralegus*) were sitting on some of the outlying rocks, and we heard others whistling in the vicinity, but, although we searched diligently, no eggs were found on this island, and, in all probability, the nests were on some of the smaller islets near the Wawmses.

Our next move was to the Wawmses, adjacent to the Brownsman. The soil on these islands is of a similar character to that on the Staples—soft spongy peat, honeycombed everywhere with the burrows of the Puffins, which were here in thousands. They appeared to be all around us—on the water, on the rocks, in the air, and in the ground; every now and again they would dart from the burrows beneath our feet, flying off like bullets towards the sea, or sometimes, not getting well on the wing, they would tumble about head-first in a most ludicrous manner. Lesser Blackbacked Gulls, with a few Herring Gulls, were also nesting here, and on our landing, they all rose in the air, flying round our heads, laughing and screaming in quite a deafening style. The scene of bustle and animation on these islands is difficult to describe; what with the Puffins darting about in all directions and the great Gulls wheeling and shrieking around us, we were glad to sit down on the rocks for a while to allow the excited creatures time to calm down a little.

The North and South Wawmses are connected by a narrow reef of rocks, bare at low-water, and across this we walked from one island to the other, where we found the same species of birds breeding, Puffins innumerable, with a few Gulls' nests amongst the crevices of the rocks. The eggs of the Puffins, white in a natural state, were dyed a deep chocolate colour from the nature of the peaty soil at the bottom of the burrows. One egg only is laid by each bird, and, although sometimes we found two together, there can be no doubt that they had been laid by different birds.

It was now getting late, and we decided to defer visiting the other islands until another opportunity; so, embarking in our good coble,

we made for Bamburgh, where, as there was no surf on the shore, Cuthbertson landed us in safety.

The next morning when we looked out we saw there was a strong north-easter blowing, and, on going up to the Castle, a grand sight presented itself to our view; great waves were rolling in and bursting on the shore with a deafening roar, while, as far as the eye could see, the 'white horses' were chasing each other shorewards, driven in by the fury of the gale. On the Inner Farne, at short intervals, a volume of spray shot high above the lighthouse. At the time we were puzzled to account for this phenomenon, but learnt afterwards that it was the 'Churn' at work, and I may as well explain the meaning of it at once:—On the north-west side of the island there is a deep cavernous fissure in the rock communicating with a perpendicular shaft at the inner end, and at low and half tide, when a sea-wind is blowing, the waves are driven into this cave with such great violence as to send a vast column of foam and spray through the 'Churn' high up into the air, often to a height of eighty or a hundred feet, and visible at a great distance.

As there was no prospect of getting out to the islands in the face of the sea then running, we started, after breakfast, for a walk to Holy Island, five miles distance, passing the Stag rocks on our way, where we disturbed a party of Curlews; on the links beyond these rocks the broken shells of several Eiders' eggs were found, apparently the work of some truant schoolboys whom we saw on the beach below. I went down to question them about the broken eggs, and saw they had two Eider ducklings only a few days old. The account of their capture was a rather curious one. It appears that the boys had seen an old Eider with a brood of young ones on the shore, which, on being observed, immediately made for the sea, and, as the mother was trying to get out through the surf with the little ones on her back, a heavy breaker washed two of them off and drove them ashore, where they were easily caught. I purchased the little creatures, took them home when we left Bamburgh, and kept them in the garden, feeding them on mussels and barley-meal, but they gradually pined away and died in the course of a month. Shelducks, on the contrary, are easily reared, and become very tame. I once procured a pair at Waren Water, and kept them in the garden for some time; one died, but the other made a companion of a Bernicle Goose, and was a great favourite with all the household; every day at meal-times it came up to the dining-room window, and would even come into the room for a piece of bread or potato, sometimes persuading the Bernicle to follow it.

At Waren Water, a mile north of Bamburgh, an arm of the sea runs inland for a considerable distance, at low-tide leaving an extensive tract of mud and sand, forming a capital feeding-ground for shore birds and wild-fowl, while at high-water Seals frequently come up the Waren in pursuit of Salmon, and Eiders and Terns often resort thither in search of food. The Coastguard stationed here kindly ferried us across to the sands on the other side of the little estuary, where Ross Links, a long range of sandhills, bordering on the beach, extend as far as the Beacons opposite Holy Island; these links are closely protected, and swarm with Rabbits, while several pairs of Shelducks (*Tadorna cornuta*) have their nests in the rabbit-burrows. We saw an early brood of these handsome birds, attended by the old duck, which seemed very anxious to get her young ones to a place of safety.

I had made the acquaintance of the tenant of Ross Farm, who gave us permission to walk along the links, but we soon saw that our movements were closely watched, and a keeper accosted us before we had gone far; after satisfying him that we had no intention of disturbing the ducks and rabbits, he accompanied us to the Beacons, where his house is situate, and where he showed us several broods of Shelducks hatched under hens in separate enclosures amongst the sand-hills. After examining the keeper's live-stock we went down to the beach near the Beacons, and our artist friend made a sketch of Holy Island. While we rested here eight Herons (*Ardea cinerea*) flapped lazily overhead, going in the direction of Fenham Flatts, and a Lesser Tern (*Sterna minuta*) flew quickly past towards the sea, making us institute a search for a nest on the shingly beach; we could not find any, however, nor do I think the Lesser Tern breeds here now, although Mr. Hancock found about a dozen pairs nesting between Bamburgh and Holy Island in 1832 (see 'Birds of Northumberland and Durham').

Some fishermen who had observed us rowed across the channel to take us to Holy Island, but we found nothing of ornithological interest, although, no doubt, an archæologist would be well repaid by the inspection of the old Castle and the ruins of Lindisfarne Priory. Holy Island is really an island only at certain times of the tide, and at one point it is possible to walk on foot across to the mainland. On the south-west are Fenham Flatts, an immense expanse of mud and sands, covered by the sea at high-tide, a favourite place for shore birds, and in the winter season the resort of innumerable wild-fowl. After spending an hour or two on the island we returned to Bamburgh by road, on the way looking into a wood, where we disturbed a Long-Eared Owl (*Asio otus*) in his afternoon siesta.

The following day, although the wind had abated, there was still a heavy ground-swell running, and we decided on having a drive to Chillingham to see the Wild White Cattle.

The day after our visit to Chillingham the sea had gone down sufficiently to allow us to get out to the islands again. We landed on the Inner Farne, the largest of the group, containing an area of about sixteen acres, partly covered with short grass. On the landward side it presents a bold front of basaltic cliffs, rising to a height of seventy or eighty feet, while on the north-east the ground gradually falls to the water's edge, where there is a landing-place. It was to this island that the holy St. Cuthbert retired from the world, and lived the life of a hermit for nine years ; evidence of his occupation of the place still remains in the chapel, even now in a good state of preservation, where there is a monument to the memory of Grace Darling. A tradition exists that St. Cuthbert tamed the Eiders and trained them to build near his oratory, whence they derive one of their names, 'St. Cuthbert's Ducks,' but we found no sea-birds breeding here at the time of our visit. The other buildings on the island are the Tower, a square-shaped building, built by one of the Priors of Durham, and, on the landward side, the two lighthouses, occupied by the light-keeper and his family.

I may mention here that the islands are leased by an association having for its object the preservation of the birds breeding there—a most desirable aim, and one which it is to be hoped will be strictly carried out. Members of the association are allowed to live in the Tower for certain periods, and I can imagine no more delightful manner for an ornithologist to spend a holiday than to picnic on the islands in the breeding season, given pleasant companions and fine weather, for without the latter it is often impossible to land on the middle islands, and many a visitor who disembarked when the sea was calm has had to remain for days before he could be taken off again. A gentleman whom we met at Bamburgh told us he had once gone out to the Longstone for a few days' seal-shooting, when a storm coming on the night of his arrival kept him a prisoner in the lighthouse for more than a week. During one stormy winter, Cuthbertson, who is the Trinity House relief man, had to wait for thirteen weeks before he could get out with provisions for the relief of the light-keepers. The scene on the Longstone during a storm must indeed be grand and awful in the extreme ; great seas hurl themselves over the rocks, strike the lighthouse, leap up its sides, and throw vast clouds of spray, even up to the lantern, for the time hiding from view the hundred other columns of water which shoot up into the air amongst the other islands. Seaward nothing is to be

seen but a vast tract of angry waters, and to the landward side the waves are beaten into sheets of foam, seeming as though in their rage they would tear the rocky islands from their foundations. In the channels the seas rush through with mighty force and speed, and it is sheer madness to venture with a boat into the raging vortex of angry waters. I remember on one occasion going to the Staples to shoot in August when the sea was so calm that we had to row the coble in going out, but during our stay on the island an easterly wind sprang up, and blowing against a strong flood-tide, raised a very awkward sea, so that when we set off on our return journey towards evening, although the ballast was piled to one side and we sat well up to windward, the boat shipped so many seas that we were all wet through before we had gone half a mile across the channel towards the Inner Farne.

A narrow channel separates the Inner Farne from the Wide-opens, and after crossing this we landed on slippery boulders, covered with seaweed, over which we scrambled till we got a safer footing on the grass. There we found Arctic Terns breeding in great numbers, the nests being placed on a small plateau near the centre of the island; so numerous were they in places we had to exercise great care in walking for fear of breaking the eggs. I have frequently heard that the Common Tern was to be found on the Farnes—Mr. Hancock says it was very abundant there at the time of his visits—and we accordingly carefully watched the parent birds, as well on the Wide-opens as on the Longstone and Brownsman, but could not satisfactorily identify any of the smaller Terns with *Sterna fluviatilis*, and, as it is impossible to discriminate between the eggs of the two species without seeing the birds, we were unable to satisfy ourselves that any of the eggs we saw belonged to the Common Tern. I had also been led to believe that the Roseate Tern (*Sterna dougalli*) bred on the islands; not only our boatman, but other people on the mainland with whom I conversed on the subject, told me they were certain this species was still to be seen on the Farnes. No doubt it did breed there at one time, and possibly still may do so, but I am quite convinced that my informants do not know the difference between a Roseate and a Sandwich Tern, and of this I had abundant evidence on three separate occasions.

While watching the birds flying about us, our attention was attracted by the excited clamour of alarm-notes amongst some Sandwich Terns fishing out at sea, and we perceived a dark-plumaged bird, Richardson's Skua (*Stercorarius crepidatus*) in close pursuit of one of the Terns; the latter was screaming with terror, twisting and turning, doubling and darting about, in its endeavours to evade its

enemy, which followed the poor bird in all its movements with the persistence of a weasel on the track of a hare. The pursuer and pursued had gone far out to sea at one time, but they eventually made direct for the island where we were, and we had a fine view of the chase. The Skua was pressing the Tern very hard, and when nearly over the Wide-opens the poor Sea-Swallow, thoroughly exhausted, and unable any longer to keep up the flight, disgorged a newly-caught fish. This was all the Skua wanted, and, leaving the pursuit, he pounced down upon the fish, catching it before it reached the water, and flew off to an adjoining rock, there to sit and keep a look-out for another opportunity of pursuing his piratical profession. I thought it rather unusual to see a Skua so far south in June; on the Yorkshire coast we do not as a rule observe them until August or September, when the Terns and smaller Gulls are following the herring-shoals.

Near to, but apart from, the Arctic Terns' colony on the Wide-opens were about a dozen nests of the Sandwich Terns; the old birds of both species loudly resented our intrusion on their domains, flying screaming excitedly over our heads during the time we remained near their nests. Every now and again one would dart down and fly past with a swish, nearly touching our hats, then, gracefully rising, rejoined the screeching throng overhead. The harsh, grating cry of the Sandwich Tern, when once heard, is never likely to be forgotten, and can be distinguished at a very great distance; I have frequently heard it at the Tees' mouth in the autumn, although the birds were not within sight, and I knew they must be at least a mile away from where I was standing. Two or three pairs of Eiders had their nests amongst the rough grass on the Wide-opens, as also several Lesser Black-backed Gulls, and we heard the whistling of an Oystercatcher and the shrill piping of a pair of Ringed Dotterels, causing us to make a diligent search for their nests, in which we were rewarded by finding the Oystercatcher's with three eggs, on a bed of shingle near high-water mark.

We next walked across the rocks to the Knoxes, where there is a large colony of Sandwich Terns, consisting of some fifty or sixty pairs, one of the most interesting sights of the Farnes. The nests were arranged within a very small circumference, and contained eggs of great diversity of colour, varying from white, with small brown spots, to light brown, blotched with darker brown and black. Like the Terns on the adjacent island, the owners of the nests hovered screaming in the air above our heads, seemingly in a state of great excitement. We were requested not to remain near the nests longer than was necessary, as the Sandwich Terns desert their eggs on a very

slight provocation, so, after impressing the scene on our memories, we took boat for the Megstone or Cormorant Island, lying to the northward.

As we drew near we could see the old Cormorants (*Phalacrocorax carbo*) sitting on the top of the rock like sentinels, and they all flew off in a body when we got within about two hundred yards of the place.

The position of the Megstone, which is simply a high barren rock, renders it a difficult place to land on if any sea is running, but we, fortunately, had comparatively calm weather, and disembarked at the foot of the rock without any trouble. The higher portion of the island, where the nests are placed, is completely whitened over with accumulations of excreta from the birds, and the odour arising from this cause, together with putrid and half-digested fish, disgorged by the birds while feeding their young, combined with the decomposing sea-weed of which the nests are made, may be better imagined than described. We made a hurried survey of the rock, where there were about forty or fifty nests, large clumsy conical structures, about two feet high, made of sea-weed, containing young birds in every stage of growth and hideousness, from those newly hatched to others almost ready to fly. Only three nests had eggs, for the Cormorant is an early breeder, and probably the eggs we saw were laid by birds whose nests had been robbed of the first or second laying. I think one clutch belonged to a Green Cormorant (*Phalacrocorax graculus*), of which there are one or two pairs supposed to nest on the Megstone.

We were all glad to turn our backs on the Cormorant Island, and ran back to have another look at the Pinnacles. When we arrived there we found most of the Guillemots on the water, very few birds being on the rocks, and, on going over to the Brownsman, the keeper told us he had been taking the eggs that morning, thus accounting for the rocks being deserted.

The keeper showed us three large baskets full of Guillemots' eggs, fresh from the Pinnacles, and we therefore took advantage of the opportunity to select as many as we required of the best marked specimens. There were also a few examples of Razor-bills' eggs, but they bore a very small proportion to the number of the Guillemots'. On going up to the house we obtained some very fine specimens of both kinds in various shades of colour, which were promptly produced from a drawer where a selection of the best specimens was kept. There were all kinds and varieties of Guillemots' eggs, from light green to dark chocolate; one was of a most curious shape, somewhat like a small soda-water bottle, and of a uniform

shade of light green. I wished to purchase it, but the keeper refused to sell, even at a high price, although I managed to secure an almost pure white egg of the Guillemot. We had noticed two or three Ringed Dotterel (*Ægialitis hiaticula*) near the water's edge, and on asking if he had any eggs, the keeper took one from a small box. He evidently prized it very highly, but I was scarcely prepared to pay the price he demanded—half-a-crown!

Three Turnstones (*Streptilas interpres*) were sitting on the edge of the island facing the Staples, as we walked down to the boat, but I hardly think they would be nesting there, although Mr. J. E. Harting once showed me an egg, almost undisputably that of a Turnstone, which had been taken on the Farnes.

Our visit being now at an end we re-embarked and set sail for North Sunderland, where we arrived with our treasures after half-an-hour's pleasant sail.

It may be as well to remind intending visitors that it is necessary to obtain permission to land on the islands, and I believe the rules of the association are very strict and rigidly enforced.

For the purposes of easy reference I will append a list of the birds found breeding there at the time of our visit. These comprised:—

Sandwich Tern (<i>Sterna cantiaca</i>).	Kittiwake (<i>Rissa tridactyla</i>).
Arctic Tern (<i>Sterna macrura</i>).	Eider Duck (<i>Somateria mollissima</i>).
Common Tern (<i>Sterna fluviatilis</i>) (probably).	Oystercatcher (<i>Æmatopus ostralegus</i>).
Guillemot (<i>Lomvia troile</i>).	Ringed Dotterel (<i>Ægialitis hiaticula</i>).
Razor-Bill (<i>Alca torda</i>).	Common Cormorant (<i>Phalacrocorax carbo</i>).
Puffin (<i>Fratercula arctica</i>).	Green Cormorant (<i>Phalacrocorax graculus</i>) (very probably).
Lesser Blackbacked Gull (<i>Larus fuscus</i>).	
Herring Gull (<i>Larus argentatus</i>).	

There are also a few Rock Pipits' (*Anthus obscurus*) nests to be found in the crevices of the rocks, and occasionally one or two pairs of Shelducks (*Tadorna cornuta*) lay their eggs in the burrows on one of the islands.

A very fine series of Imperial size photographs of the Farnes and the birds breeding there, and also of the Chillingham Cattle, has been taken by Mr. Wm. Green, of Berwick-on-Tweed, and I can heartily recommend these to the notice of any persons desirous of possessing faithful pictures of the islands. It would be difficult to say which of the series is best, but the Guillemots on the Pinnacles, Cormorants on the Megstone, Eider on the nest, Gull's nest, and Sandwich and Arctic Terns' nests are excellent; while the groups of the Wild White Cattle are admirable reproductions of the animals, and well worth seeing.



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The Editors hope to publish the following papers within the next few months:—

Notes on the Blackheaded Gull in North Lancashire.—J. A. JACKSON.

Obituary Notice of Alfred Roberts.—J. WHITAKER, F.Z.S.

Land and Freshwater Shells of Whitby District.—H. POLLARD.

Annotated List of the Land and Freshwater Mollusca of Lincolnshire.

List of Lancashire Land and Freshwater Mollusca.—R. STANDEN.

Bibliography for 1885 (continuation) and 1886.

Natural History of Lincolnshire.—The next instalment of this is to be upon the Mammalia, by JOHN CORDEAUX. Schedules have been prepared for obtaining information: one will be sent to any one willing to furnish notes.

Short Notes.—It is the wish of the Editors to give in each number about a page of short notes in each of the various subjects of which the *Naturalist* takes cognisance. To this end they rely upon their friends keeping them well supplied. At present short notes on Botany, Entomology, Palæontology, Microscopy, Conchology, &c., are particularly desired.

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NOTES ON THE BLACK-HEADED GULL NEAR GARSTANG.

J. A. JACKSON,

Warrington.

(Read before the Warrington Field Club, February 18th, 1887.)

THE district my remarks refer to is mainly comprised within a radius of six or seven miles of the little town of Garstang in North Lancashire. Taking the town as a centre, you will observe on the map that the sea-coast is not very far away, say five miles, to the north-west, and about the same distance to the east runs a range of hills, rising on the Yorkshire border to a height of 1,700 feet. These hills, unfortunately, do not show up on an ordinary map, but form a most important feature in the appearance of the country. The land near the hills is mainly stiff heavy soil, most of it 'green side up,' as generally expressed, or in other words, used for grazing purposes, for which it is well suited. More towards the west and the sea-coast extends the Fylde district, which is mostly reclaimed moss-land, and a great part of it used for potato-growing, for which the light black soil seems admirably adapted.

When flying, the head of the Black-headed Gull (*Larus ridibundus*) appears quite black, and has earned for it the title of 'petch' (or 'patch') in the district I refer to.

I will now proceed to put before you a few remarks as to the habits, etc., of this Gull as seen near Garstang, where for a part of the year it is a regular and welcome visitor. It first makes its appearance with us about the middle of February, a few pairs appearing flying over the ploughed fields. At this period the plumage is as follows—head and neck, white; all the under-plumage, white slightly tinged with rose; upper plumage, bluish ash; primaries white, edged with ash, and broadly tipped with black. About three weeks later, the dark brown colour on the head and upper part of the neck is fully developed, and it is about this time they first make their appearance in quantity at the breeding-ground. The birds are now much more plentiful, and follow the plough on the low-lying peaty lands most assiduously, evidently searching eagerly for food in the newly-turned furrows. As the spring advances, the birds are not to be seen so plentifully, except in an evening, when they often come into the grass fields in large flocks. At times some of them ascend high into the air, and judging from their rapid evolutions, are engaged in pursuing some insect prey. The birds are now busy at the great business of their lives, namely, making their nests and rearing their

young, which they do in thousands at a place near Cockerham, known for miles around as the 'Gull Moss,' of which, possibly, a short account may be of interest. I may state here that for many years, at least fifteen, a large number of these birds bred regularly in a small tarn on the hills above Scorton. The expanse of water was not large, and the nests were made on the islands and around the edges of the tarn. Latterly, the number has grown less every year, and last summer I could only see a single pair frequenting this tarn during the breeding season. I am unable to account for this decrease unless the colony near Cockerham has a more advantageous situation in some way, and the birds have migrated thither, perhaps, because it is some four miles nearer the shore. It is a rather striking fact that although this small tarn will be some 500 feet above the sea-level, the ground on one side of it is of a mossy character, and has growing on it ling, heath, and cranberry, just the same as are to be found on the 'Gull Moss.' I have also taken the moth *Cársia imbutata* there. The 'Gull Moss' is situated some three miles from the coast, and the ground is very similar in character to Woolston Moss near Warrington. There is still a large patch of the moss uncultivated, although a certain breadth is brought under the plough each year; the horses used in the fields wearing wide boards on their feet to prevent them sinking in the soft soil. However, as the Gulls are now well looked after and preserved by the land-owners during the breeding season, no doubt enough space will be left for them to breed on.

When approaching the moss, the most noticeable feature is the flatness of the country, the fields being divided from each other by deep dykes or ditches, in place of walls or hedges. As we proceed we pass long rows of turf or peat piled up to dry, after being cut for fuel, and round stacks of it are to be seen scattered about. As we get on to the real wild moss, we find (unless the weather has been very dry for a long time) that water soon flows into each of our footsteps, as from a wet sponge. On this part of the moss flourish the Round- and Oblong-leaved Sundews, also Cranberry, the beautiful Andromeda, and Bog Myrtle or Sweet Gale, which has such a strong scent when crushed in the hand, or when you walk through a clump of it. Ling covers most of the dryer parts of the moss, and the two common Heaths are plentiful. Often, too, if we walk far across the moss, a Viper may be seen neatly coiled round; but they usually make off as fast as possible.

On the moss also, the following Butterflies and Moths are to be seen—*Satyrus tithonus*, *Chortobius davis*, *Anarta myrtilli*, *Chelonia plantaginis*, *Carsia imbutata*, *Hyria auroraria*, *Crambus margaritellus*, besides a host of other common species, both large and small.

Red Grouse and a few Stonechats may be seen about here, as well as numerous other common birds. By the time we have progressed so far, the keeper will have emerged from his hut and joined us; and we will now go forward with him, and inspect the nesting ground of the Gulls. The keeper estimates the number of birds at 20,000, and judging by the noise and general appearance, he does not overestimate them. At a little distance the ground looks white with birds, they are so closely gathered together. As we draw near, the birds nearest us rise from the ground and come screaming towards us, some of them diving down in angry menace at our heads, coming so close that the rush of their wings is almost alarming; and it requires some little faith to assure us that they will not dash against our faces, they come so fiercely to the attack. The ground actually used for nesting upon has become quite altered in appearance, from the effects of the guano deposited on it by the birds. In place of ling a coarse tussocky grass has sprung up, and amongst this the nests are formed, and the young may be seen running about, although they keep 'squat,' or hide if we come very near. The nest has no claim to our admiration, being simply a hollow scratched on the top of a tussock of grass, with sometimes a few straws laid round about. The eggs, of which the full complement appears to be three, vary a good deal in size, colour, and markings. The young, when first hatched, are covered with a gray down, mottled with darker markings, and seem to leave the nest and run about and hide under the tufts of grass almost as soon as hatched. There are numerous remains of small crabs lying round the nests, so these evidently form part of the food brought by the old birds. The young are some time before they can fly, and when they do so, are easily distinguished from the old birds by their gray colour. From inquiries made at the 'Gull Moss' I find that the time of incubation is a little over three weeks. The old birds bring small fishes from the shore and grubs from the fields as the principal food for the young ones. These Gulls begin to lay eggs in the middle of April, and are about the breeding-ground till the middle of July. Numbers of them at times visit the fields during the summer, but after the middle of July we only see odd birds when driven inland by stress of weather until winter is over, and we can again enjoy the sight of their graceful flight over the fields.

From information given by Seebohm and Yarrell this bird seems to have a wide geographical range, being found all over Europe, in Egypt, and on the shores of the Mediterranean. Seebohm says that the nests when placed in wet situations are large piles of material to keep the eggs above the water. These birds probably breed when two

years old, and the plumage seems to vary a little until the third or fourth year.

Yarrell says that this bird breeds in Sweden, Russia, and Siberia. Another well-known breeding-place in Lancashire is Walney Island, near Barrow-in-Furness.

These Gulls have had to move their nesting-ground more than once. Mitchell says that a colony once occupied the site of the present town of Fleetwood. In recent times, also, they were driven from Pilling Moss by its cultivation, to the locality they now occupy, and which it may be hoped they will not be obliged to leave for a long time to come.

NOTES—ORNITHOLOGY.

Leach's Petrel in Lincolnshire.—On the 6th January I received a male specimen of the above named bird (*Procellaria leucorrhoa*) which had been captured near Skegness on the Lincolnshire coast. Mr. Cordeaux, in his 'Birds of the Humber District,' speaks of it as a rare bird.—F. B. WHITLOCK, Bank, Nottingham.

Barn Owl Feigning Death.—During the past winter I had a beautiful live specimen of the Barn Owl (*Strix flammea*) brought to me, which had been captured in a hollow tree near Harrogate. For several days it refused food, and being afraid of it dying, I forced some meat down its throat; after swallowing several pieces, its claws clenched together, the legs and body stiffened, the eyes closed, the head fell back, and to all appearance it had suddenly died. At first I thought I had choked it, but upon giving a second glance at the stiff body in my hands I observed the breast heaving up and down with the regularity of a very much alive bird. It then struck me what the rogue was doing. I laid it down on its back, side, and belly alternately, and even hung it up by the legs, without making it move a muscle. I then put it down and made a pretence of departing. I shut the door with a noise, and looked round, when I saw the rascal's eyes gently opening; as soon as he observed me watching him he closed them again. I then went out altogether and returned in about three minutes, when Mr. Owl was as lively as ever. Several friends have witnessed this trick since. Although perfectly aware of the habit of Tits shamming death, I never yet heard of an Owl performing the same trick.—RILEY FORTUNE, Harrogate, April 5th, 1887.

ORNITHOLOGICAL NOTES FROM NORTHUMBERLAND AND DURHAM DURING 1885.

RILEY FORTUNE,
Alston House, Harrogate.

As a supplement to Mr. Alfred Chapman's note on the Pied Fly-Catcher (*Muscicapa atricapilla*) nesting in Northumberland, perhaps a few instances of it nesting in Northumberland and Durham during 1885 will not be uninteresting.

During 1885 I visited many parts of Northumberland and Durham, and one of the most noticeable events was the great influx of Pied Flycatchers; we saw them in a great many parts, and found the nests at the following places in May and June: near Lucker, in Northumberland, where we saw the birds for the first time on May 10th. The nest we found on May 31st; also at Gosforth Park and Jesmond Dene (suburbs of Newcastle-on-Tyne), Shotley Bridge, and Winlaton were also favoured localities; and we also found it nesting on the estate of Lord Ravensworth, near Gateshead-on-Tyne. The nests, with one exception, were built in holes in trees, the exception being at Lucker, where the nest was built in a hole in the wall of a cow-house. The nests were almost entirely built of grasses, and, as Mr. Chapman mentions, they appear to frequent the open parts in preference to the thickly covered places.

Near Ravensworth I also found the nest of the Reed Warbler (*Acrocephalus streperus*) on June 8th. The nest and eggs I have in my possession.

The Redshank we also found nesting on the Hallington Moors in Northumberland, and we also obtained some eggs of the same bird, from a fisherman at North Sunderland; they had been taken in the neighbourhood.

At Gosforth Park, where there are a good number of Swans (*Cygnus olor*), a female Hooper (*Cygnus musicus*) mated with a male Mute Swan; they built a nest, and either four or six eggs (the exact number I forget) were laid. One of these eggs, I believe, was obtained by Mr. John Hancock, and the others were taken by some person unknown. A fine male Pochard (*Fuligula ferina*) was also shot at Gosforth Park; it is now in the possession of Mr. Hancock.

A Woodcock's nest with four young ones was found on the Ravensworth Estate, and another up the valley of the Derwent; this latter nest was taken, and the young exhibited for some time in the rooms of the Literary and Philosophical Society at Newcastle.

At Axwell Park, in the valley of the Derwent, the Hawfinch nested, as it has now done for some years.

A fine specimen of the Honey Buzzard, a male, was shot in Northumberland during 1885, and sent to W. Charlton, of Newcastle, for preservation, where I saw it. The note, with exact 'data,' I have unfortunately misplaced.

The Grasshopper Warbler nested at Burneside; a friend of mine, a well-known Newcastle oologist, obtained two sets of eggs from that locality, and also a 'clutch' of Magpies', containing the unusual number of nine eggs.

LAND AND FRESHWATER SHELLS IN THE NEIGHBOURHOOD OF WHITBY.

H. POLLARD,

Late Secretary, Leeds Naturalists' Club.

THE Whitby district affords an interesting and wide field of investigation to the conchologist. It consists of the valley of the Esk, a considerable amount of moorland, undercliff, beach and scaur. Of these the undercliffs have as yet yielded the largest number of species. In the valley of the Esk there appears to be a scarcity of molluscan life, and in the Esk itself up to the present time, the only valuable species occurring is the Pearl Mussel (*Unio margaritifer*), and its variety *sinuata*. The moorlands, also—and this is probably on account of their geological formation and physical features—seem to contain but a very limited number of species, and those of the commonest type and ordinary occurrence. The undercliffs, on the contrary, are rich in conchological treasures. The species, however, are, as a rule, very small in character, and require much care and patience in the collection of them.

Regarding the conchology of the beach and scaur, no comment is here made, the specimens being marine, and not coming within the range of the paper.

The most important mollusc yet collected in the Whitby district is the variety *alba* of *Bulimus obscurus*, which was secured in 1879, amongst hedgerow type specimens, in the Factory Fields, which lie to the right in ascending Bagdale. The record is but the second for Yorkshire, it having in the first instance been taken twelve years previously at Grimbold Crag, near Knaresborough, by Mr. Beevers. The occurrence of this variety so unexpectedly, and in such an unlikely locality, shows that no place should be despised or overlooked in collecting. The records of shells given in this list are all that have to date been made public, so if any collector is able to supplement them, his notes will be of much value and interest. To avoid the repetition of any record, the earliest known is inserted, all those subsequent being omitted.

The initials Y.N.U. refer to an excursion of the Yorkshire Naturalists' Union, which took place on August 3rd, 1885, and in which the Rev. W. C. Hey, Messrs. Baker Hudson, William Coates, and W. Denison Roebuck represented the conchological section; the excursion being reported in the *Naturalist* for October 1885, p. 348.

- Arion ater** L. Yellow variety just outside of Whitby in 1879 (Henry Crowther); black examples at Mallyon Spout, Wheeldale, 1880 (W. Denison Roebuck); and Egton Bridge, August 1885 (Y.N.U.); and red specimens on West Cliff in 1885 (H.C.).
- Amalia marginata** Müll. Plentiful, amongst grass at the base of a wall, a little beyond the North-Eastern Railway Station, in 1883 (H. Pollard).
- Limax flavus** L. Abundant at Bagdale in 1878 (H.C.); and particularly common on walls at Bog Hole in 1883 (H.P.), many of the specimens varying in intensity of ground-colour, but not sufficiently so to warrant varietal names being given.
- Limax agrestis** L. West Cliff, 1883 (H.P.), Egton Bridge, 1885 (Y.N.U.); and probably common throughout the district.
- Limax maximus** L. Very plentiful in Bagdale in 1879 (H.C.); in walls at Bog Hole, July 1883 (H.P.); and Egton Bridge, 1885 (Y.N.U.).
- Succinea putris** L. Common in a ditch in the Factory Fields, May 1877, and in another near the bottom of Fitz Steps, 1881 (H.P.); Ruswarp, 1878 (H.C.); and on the undercliffs, 1885 (Y.N.U.).
- Succinea putris** var. **drouetia**. Common amongst type specimens in a ditch in the Factory Fields in 1883 (H.P.).
- Succinea putris** var. **limnoidea**. Abundant in marshy places on slopes of the West Cliff in 1883 (H.P.).
- Vitrina pellucida** Müll. One example found on the West Cliff in 1883 (H.P.).
- Zonites cellarius** Müll. West Cliff, May 1877, and Egton Bridge, 1879 (H.P.); Wheeldale, 1880 (W.D.R.); and about Whitby Abbey, 1885 (Y.N.U.).
- Zonites alliarius** Miller. At Saltwick, in 1877, and on West Cliff, in 1878 (H.C.); a few specimens at Aislaby, in 1879 (H.P.); Mallyon Spout, 1880 (W.D.R.); and around Whitby Abbey, 1885 (Y.N.U.).
- Zonites nitidulus** Drap. West Cliff and Saltwick, 1877 (H.P.); Egton Bridge, 1879 (H.P.); Wheeldale, 1880 (W.D.R.); and Whitby Abbey, 1885 (Y.N.U.).
- Zonites purus** Ald. Robin Hood's Bay, 1878 (H.C.); and a few specimens on slopes of West Cliff, in 1883 (H.P.).
- Zonites crystallinus** Müll. West Cliff, 1878 (H.C.); and Mallyon Spout, 1880 (W.D.R.).
- Helix aspersa** Müll. Very common in lanes and hedgerows, 1877 (H.P.); and about Whitby Abbey and the undercliffs, 1885 (Y.N.U.).

- Helix aspersa** var. **undulata** Moq. Two specimens, approaching this variety, collected amongst type in 1883 (H.P.).
- Helix nemoralis** L. Abundant on cliff slopes and in most hedgerows and lanes, in 1877 (H.P.), the banding and ground-colour being extremely varied.
- Helix nemoralis** var. **hybrida** Poiret. Several specimens taken with *Helix nemoralis* and *H. hortensis* in the Factory Fields and Love Lane, in May 1877 (H.P.).
- Helix hortensis** Müll. Common in hedgerows in the Factory Fields and Love Lane, May 1877 (H.P.), the banding, etc., being as varied as in *H. nemoralis*.
- Helix arbustorum** L. One specimen taken in a garden, amongst nettles, at Ruswarp, in 1877 (H.P.); and plentiful on the undercliffs near Newholm Beck, in 1883 (H.P.).
- Helix concinna** Jeffreys. Several obtained on slopes of West Cliff, in 1883 (H.P.); and about Whitby Abbey and the undercliffs, in 1885 (Y.N.U.).
- Helix hispida** L. Common on West Cliff and in hedgerows, 1877 (H.P.); near Arncliffe Woods, 1878 (H.C.); and about Whitby Abbey, 1885 (Y.N.U.).
- Helix fusca** Mont. In the woods at Cruckley Gill in 1879 (H.C.).
- Helix sericea** Müll. Two specimens taken on West Cliff in 1878 (H.C.).
- Helix virgata** DaCosta. Slopes of West Cliff, 1878 (H.C.).
- Helix caperata** Mont. West Cliff, 1878 (H.C.); and particularly common at Upgang, in 1883 (H.P.).
- Helix caperata** var. **bizonalis**. One specimen collected with type at Upgang, in 1883 (H.P.).
- Helix caperata** var. **fulva** Moq. Upgang, with type, 1883 (H.P.).
- Helix caperata** var. **ornata** Picard. As abundant as type on West Cliff, in 1878 (H.C.).
- Helix ericetorum** Müll. Several obtained on West Cliff, near Upgang, in July, 1883 (H.P.).
- Helix ericetorum** var. **minor**. Several found with type, on West Cliff, in July 1883 (H.P.).
- Helix ericetorum** var. **alba** Charp. One with type on West Cliff, in 1883 (H.P.).
- Helix rotundata** Müll. West Cliff, 1877 (H.P.); near Arncliffe Woods, 1878 (H.C.); Mallyon Spout, 1880 (W.D.R.); and Whitby Abbey, 1885 (Y.N.U.).
- Helix pulchella** Müll. On slopes of West Cliff, 1878 (H.C.); and in 1883 (H.P.).

- Helix pulchella** var. *costata* Müll. West Cliff, with type, 1878 (H.C.); and in 1883 (H.P.).
- Bulimus obscurus** Müll. Common in hedgerows, in the Factory Fields, in May 1877 (H.P.).
- Bulimus obscurus** var. *alba*. One specimen taken with type in hedgerow in the Factory Fields, 1879 (H.P.). This is only the second record for Yorkshire.
- Pupa umbilicata** Drap. Plentiful near Ruswarp in 1878 (H.C.).
- Pupa marginata** Drap. One specimen found on slopes of West Cliff, in 1883 (H.P.).
- Clausilia rugosa** Drap. Collected rarely near Ruswarp, in 1878 (H.C.); commonly a short distance from Sleights Station, in 1883 (H.P.); and in abundance near Sandsend, in August 1886 (H.P.).
- Clausilia laminata** Mont. Reported by Mr. J. T. Sewell as occurring in beech-woods.
- Cochlicopa lubrica** Müll. West Cliff and Saltwick, May 1877 (H.P.); and near Whitby Abbey, August 1885 (Y.N.U.).
- Cochlicopa lubrica** var. *lubricoides* Fér. West Cliff, 1878 (H.C.); and in August 1883 (H.P.).
- Pisidium amnicum** Müll. Amongst freshwater algæ in a pond near Saltwick, in 1879 (H.C.).
- Pisidium pusillum** Gmelin. In a pond near Saltwick in 1879 (H.C.); and Whitby, August 1885 (Y.N.U.).
- Unio margaritifera** L. Abundant in the river Esk, near Lealholm Bridge, in 1878 (H.C.); and at Cruckley Gill, in 1879 (H.C.).
- Unio margaritifera** var. *sinuata* Lam. Sparingly, with type, in river Esk at Lealholm Bridge, in 1878, and at Cruckley Gill, in 1879 (H.C.).
- On collecting this mussel in the Esk, in 1885, Mr. Henry Crowther noticed that nearly every specimen had a parasitic worm in the oval portion of the digestive tract.
- Planorbis nitidus** Müll. Reported by Mr. J. T. Sewell to occur in the Abbey Pond, but I have not yet searched there for it (H.P.). Messrs. Coates, Hudson, and Roebuck, when fishing the Abbey Pond in August 1885, found only the next species (*Pl. nautilus*).
- Planorbis nautilus** L. Abundant in the Abbey Pond, it being apparently the only molluscan inhabitant, August 1885 (Y.N.U.); coast near Whitby (J.W. and G.R. in Part viii, Series C, 1885, Trans. Yorks. Nat. Union).
- Planorbis complanatus** L. On the coast near Whitby, in 1875 (G. Roberts, in Trans. Yorks. Nat. Union, Part ix, Series C, 1886).

Limnæa peregra Müll. In a pond at Saltwick; a small horse-trough at Robin Hood's Bay; and on specimens of *Unio margaritifera* taken from the Esk near Lealholm Bridge, in 1878 (H.C.); in a ditch near Ruswarp, the specimens being of peculiar shape: a pond at Bluebank, near Sleights; and a horse-trough at Goathland, 1879 (H.P.); a pond near the Saloon, a horse-trough at Upgang, and a ditch near Dunsley, in 1883 (H.P.); in damp places on the undercliffs, in 1885 (Y.N.U.); and at Egton Bridge, in 1885 (H.C.).

Limnæa peregra var. **ovata** Drap. In a large pond at Hawsker, being apparently the only occupant, 1878 (H.C.); two specimens in a ditch at Ruswarp, 1883 (H.P.); and several near Sleights, 1883 (H.P.).

Limnæa peregra monst. **decollatum** Jeff. In a horse-trough near Saltwick, in 1879 (H.C.).

Limnæa truncatula Müll. Near Ruswarp, 1878 (H.C.); abundant in a ditch near Larpool, in 1879 (H.P.), the specimens being very fine and elongated; and in a ditch at Lealholm Bridge, in 1879 (H.P.); common on slopes of West Cliff and roadside at Sneaton, 1883, and one specimen in Upgang Beck, 1883 (H.P.).

Ancylus fluviatilis Müll. Plentiful on specimens of *Unio margaritifera* taken in the river Esk, near Lealholm Bridge, in 1878 (H.C.); plentiful at Mallyon Spout in 1880 (W.D.R.).

Ancylus lacustris L. Specimens are exhibited in Whitby Museum, which were secured in Mulgrave Park.

NOTES—ORNITHOLOGY.

Puffins in the Humber in February.—It may be interesting to record the fact of two Puffins (*Fratercula arctica*) shot by myself on the Humber, near Hessele, and within half a mile of each other, one killed February 4th, the other February 14th, in winter plumage. Their measurements are:—No. 1: height, 10½ ins.; tip to tip of wing, 22 ins.; length of beak, 1¼ ins.; depth of beak, ¾ in. No. 2: height, 10¾ ins.; tip to tip of wing, 23 ins. Colour of beak, dusky, with one slight ridge rather lighter: tarsus, pale flesh colour. One female, by dissection shows that she has laid an egg, which proves it is not a young bird. The other was shot in the ovary, and the fact of its having laid egg cannot be proved. Both are females. The sides of face or head of both are 'sooty,' and eyelids without horny plates. Mr. Stuart, the bird-stuffer here, is setting them up for me, and he tells me in his experience he has never seen them in winter plumage before.—H. J. ROBINSON PEASE, St. Mary's House, Beverley, March 4th, 1887.

Occurrence of Common Buzzards near Whitby.—I have lately got a pair of very fine Common Buzzards (*Buteo vulgaris*) (male and female); both were trapped in Mulgrave Woods this winter.—WALTER H. S. PYMAN, Moss Brow, Whitby, March 15th, 1887.

Redshank in Northumberland.—In May 1885, when on a visit to the Farne Islands, the fishermen showed me some eggs of the Redshank (*Totanus validirostris*), which they had obtained near North Sunderland a day or two previous (to May 31st). Last year, 1886, I had at least ten sets of Redshanks' eggs sent to me from Northumberland: they had been taken near Hallington Reservoirs, at which place there is a small gully.—RILEY FORTUNE, Harrogate, Mar. 8th, 1887.

BALÆNOPTERA MUSCULUS AT SKEGNESS.

THOMAS SOUTHWELL, F.Z.S.,

Author of the 'Seals and Whales of the British Seas'; etc.

ON Sunday, the 3rd April, at 6.30 a.m., a Whale was observed inside the Skegness middle sand, in such a position that there was little probability of its escaping out to sea; baffled in all directions in its attempts to regain the open waters, it made straight for the shore, and came into violent contact with the pier-head, thereby seriously injuring the side of its head and one of its flippers; after this its capture became comparatively easy, and it was driven ashore and secured. Then followed the usual sickening scene of torture, and it was not till some hours after that the wretched animal's life was clumsily brought to a close. It cannot be too often repeated that a well-directed shot or two in the region of the heart will speedily deprive even these giant creatures of life.

On seeing the usual announcement in the papers of the stranding of a 'Greenland Whale' I wrote to Mr. Storr, of Skegness, who was chiefly instrumental in its capture, and he very kindly replied to my questions to the best of his ability, but as from some of his remarks and measurements I thought it possible the animal might prove to be Rudolphi's Rorqual (*B. borealis*), I availed myself of the first opportunity of going over to Skegness in order to settle the question, and was not a little disappointed at seeing a young female of the Common Rorqual (*B. musculus*). It lay on the sands just below high-water mark and close to the town of Skegness, in a position very unfavourable for close examination, and from the wash of the water partly buried in the sand; but its attenuated appearance, the length of its exposed flipper, and the colour of its baleen at once indicated its species.

The only remarkable feature was the unusually light colour of the baleen. The anterior third of the plates were very short and nearly white, the second third showed an increasing amount of slate-colour as the plates became longer, and the posterior third were of the normal dark slate, viewed with darker and lighter streaks of the same on the exterior, but the colour did not extend so far as usual towards the interior margin. The whole of the fringe which clothes the inner margin of the plates was very light in colour, in fact, nearly white, very little of the usual buff tinge being observable. Whether this want of colour was a mark of juvenility, or to be accounted for by individual variation, I cannot say, but as the animal was only 47 feet

in length, and therefore not more than two-thirds grown, it could not have been a very aged individual.

From the position in which it lay, as well as from its having been partially eviscerated, there was some excuse for the confused sketch of the 'Greenland Whale' which appeared in the *Illustrated London News* of the 16th inst.

The last I heard of the Whale was that it had been sold by auction for thirty guineas, the purchasers being Messrs. Caley & Fulton, of Hull, who were at that time trying to get it afloat for removal to the metropolis of the Humber.

NOTE—ORNITHOLOGY.

Great Grey Shrike near Harrogate.—On January 12th I saw a beautiful specimen of *Lanius excubitor* on Harlow Heath, Harrogate. I watched the bird for a long time, it allowing a near approach, and I could easily have shot it had my gun been with me.—RILEY FORTUNE, Harrogate, March 8th, 1887.

Obituary Notice.

ALFRED ROBERTS.

'ON the 6th of February last, at King Street, Scarborough, ALFRED ROBERTS, in the 75th year of his age.'

This announcement was received by everyone who knew him, with regret; he was widely known in the scientific world as a first-rate naturalist. Born at Brigg, in Lincolnshire, where he began life as a cabinetmaker, by hard work he rose to be Curator of the Scarborough Museum, which post he held for many years with great credit. He died after forty years of residence in Scarborough, leaving many friends but no enemies. Mr. Roberts was a true type of nature's gentleman—upright, kindly-hearted, and ever ready to help or give instruction, which he always did in the most unassuming manner. He was a true lover of nature in all its branches, showing equal interest in the setting of a butterfly or mounting the lordly eagle. He was a first-class taxidermist, and one whom many and noted men were glad to call friend; in former days a constant visitor at Walton Hall, where he was always received by 'The Squire' with every mark of friendship; and many were the hours that Waterton spent in the little red house in King Street, talking on subjects which were dear to the hearts of both; and I don't think anyone ever spent half an hour with him without coming away feeling that he had added to his knowledge of natural history. After three years of illness he has passed away, leaving in Scarborough a gap which will take some filling in the hearts of his friends: a gap which never will be filled. As one of the latter I am proud to subscribe these few lines to his memory.—J. WHITAKER, Rainworth, Notts.

Naturalist,

THE YORKSHIRE BOULDER COMMITTEE'S SCHEDULE.

[We have pleasure in reprinting the directions given in the Schedules which are furnished by the Yorkshire Boulder Committee, in order that they may be on permanent record as an indication of the nature of the work which the Committee is instituted to perform. The Committee for 1887 consists of the following gentlemen:—Prof. A. H. Green, M.A., F.R.S., Leeds, Chairman; Mr. C. D. Hardcastle, Leeds, Vice-Chairman; Prof. L. C. Miall, F.G.S., Leeds; Rev. E. Maule Cole, M.A., Wetwang; Mr. J. E. Bedford, Leeds; Mr. C. Brownridge, Assoc.M.Inst.C.E., F.G.S., Horsforth; Mr. S. Chadwick, Malton; Mr. J. W. Davis, F.G.S., Halifax; Mr. Ald. John Hill, Morley; Mr. B. Holgate, F.G.S., Hunslet; Mr. Wm. Horne, Leyburn; Mr. James Spencer, Halifax; and Mr. Thomas Tate, F.G.S., Leeds; with Mr. S. A. Adamson, F.G.S., Leeds, as Hon. Sec.]

YORKSHIRE NATURALISTS' UNION.

YORKSHIRE BOULDER COMMITTEE

(In connection with the BOULDER COMMITTEE of the BRITISH ASSOCIATION).

If there are in your district any (A) ISOLATED ERRATIC BLOCKS or BOULDERS, or (B) GROUPS OF BOULDERS—*i.e.*, Masses of Rock, evidently transported by natural agency from some locality more or less remote—please return this paper, with answers to the following queries, and also, where possible, a hand-specimen of the rock reported upon, to SAML. A. ADAMSON, F.G.S., Secretary to the Yorkshire Boulder Committee, 52, Wellclose Terrace, Leeds.

(A) ISOLATED BOULDERS.

Queries.—1. What is name of the parish, estate, and farm, on which Boulder is situated, adding nearest town and county, and any particular enabling its position to be marked on the Ordnance map?

2. What are dimensions of Boulder, in length, breadth, and height above ground?

3. Is the Boulder rounded, subangular, or angular?

4. If the Boulder is long-shaped, and has not been moved by man, what is direction by compass of its longest axis?

5. If there are any natural ruts, groovings, or striations on Boulder, state—

(a) Their length, depth, and number.

(b) The part of Boulder striated, *viz.*, whether top or sides.

(c) Whether the striations are in the direction of the longer axis, or at what angle to it?

6. What is the nature of the rock composing the Boulder? If it is of a species of rock differing from any rocks adjoining it, state locality where, from personal observation, you know that a rock of the same nature as the Boulder occurs, the distance of that locality, and its bearings by compass from the Boulder.

7. If Boulder is known by any popular name, or has any legend connected with it, mention it.

8. What is the height of Boulder above the sea?

9. Is the Boulder indicated on any map, or does it make any boundary of a county, parish, or estate.

10. If there is any photograph or sketch of the Boulder, please say how Committee can obtain it?

11. Is the Boulder connected with any long ridges of gravel or sand, or is it isolated?

12. Upon what does the Boulder rest?

(B) GROUPS OF BOULDERS.

Though there may be no one Boulder in your district so remarkable as to deserve description, there may be groups of Boulders.

Queries.—1. What is the name of the parish, estate, or farm on which they are situated, adding the nearest town, and county, and any particular enabling their position to be marked on the Ordnance map?

2. What are the dimensions of the smallest and largest Boulders of the group?

3. Are the Boulders rounded, subangular, or angular?

4. If any large Boulder of the group (which has not been moved by man) is long-shaped, what is direction by compass of its longest axis?

5. If there are any natural ruts, groovings, or striations on any Boulder, state—

(a) Their lengths, depth, and number.

(b) The parts of the Boulder striated, viz., whether top or sides.

(c) Whether the striations are in the direction of the longer axis, or at what angle to it.

6. State

(a) localities where rocks undoubtedly of the same nature as the Boulders occur. [Be careful to ascertain that none of the Boulders have been brought from a distance by human agency.]

(b) The distances of those localities and their bearings by compass from the Boulders.

7. What is the nature of the rocks composing the Boulders; and in what proportions do the Boulders of the various rocks represented in the group occur?

8. What is the height of the group above the sea?

9. Over what area does the group extend, and what number of Boulders are there in the group or per acre?

10. Are the Boulders exposed on the surface, or are they surrounded by any deposit? Add any observations explanatory of the position in which the Boulders are found.

**THE YORKSHIRE NATURALISTS' UNION:
ANNUAL MEETING AT DEWSBURY.**

THE twenty-fifth annual meeting, held this year at Dewsbury, on Monday, the 14th March, was a most successful one, thanks to the exertions of the members of the Dewsbury Society. There was a very large attendance of the Members and Associates from all parts of the county. By kind permission of the Committee of the Dewsbury Co-operative Society, rooms in their buildings were placed at the disposal of the Union. The proceedings commenced at 3.30 p.m., when the General Committee met in the Library for the transaction of the Union's business. The chair was occupied by the President, the Rev. W. H. Dallinger, LL.D., F.R.S., etc., and in addition to the official representatives of thirteen societies, there were present a large proportion of the officers of the Union and the permanent members of the Committee. The minutes of the preceding annual meeting having been read and confirmed, two societies which had made application—the Ackworth School N. H. S., and the Leeds Y. M. C. A. Nat. Club—were unanimously admitted into the Union. The election (also unanimous) as new Members of the Union, of Mr. W. W. Booth (Leeds), Mr. John H. Bromley (Leeds), Rev. Canon J. Ingham Brooke, M.A. (Rector of Thornhill), Mr. William Cash, F.G.S. (Halifax), Rev. Robert Fisher, M.A. (Vicar of Sewerby), Mr. F. R. Fitzgerald (Harrogate), Mr. Riley Fortune (Harrogate), Mr. John Gerrard (Wakefield), Mr. Thomas Grant (Pocklington), Mr. Percy H. Grimshaw (Burley-in-Wharfedale), Mr. T. S. Hall (Wetherby), Mr. C. D. Hardcastle (Leeds), Mr. T. H. Nelson, M.B.O.U. (Redcar), Mr. R. Reynolds, F.C.S. (Leeds), Rev. C. Fullerton (Vicar of Lund), and Mr. Samuel Walker (York)—then took place. It is the privilege of the General Committee to add to its own number ten permanent members, and this privilege was utilised, Messrs. S. H. Bennett (Rotherham), John Braim (Pickering), E. P. P. Butterfield (Wilsden), John Grassham (Leeds), Percy Lund (Bradford), H. M. Platnauer, B.Sc., A.R.S.M. (York), John Stears (Hull), M. H. Stiles (Doncaster), Edward Tindall (Knapton Hall), and William Whitwell (London), all of them gentlemen to whom the Union has been indebted from time to time—being chosen.

The Annual Report was then read, as follows:—

25th ANNUAL REPORT.—The Yorkshire Naturalists' Union has now existed for a quarter of a century, and it is matter for congratulation that the success which has marked its operations during the past decade still continues unabated, and that the Union—the oldest of its kind in the kingdom—is at the present time in a flourishing and vigorous condition. Much of this success is attributable to the fact that its executive and its officers have never failed to bear in mind that the

primary object of the Union is systematic and persistent investigation directed towards a sound and accurate knowledge of the natural history and the physical features of the county. To the results of these investigations are the transactions exclusively devoted, and to the furtherance of this end the excursions are planned.

The Meetings held during the year have been four in number; the places visited being:—Askern, Thursday, 20th May; Flamborough, Whit-Monday, 14th June; Pateley Bridge, Saturday, 17th July; and Pickering, Bank Holiday Monday, 2nd August. [We omit the detailed description of the excursions, which have all been reported in our pages.] On each of these occasions the Union was placed under great obligation to the landed gentry of the county for the kind and generous manner in which its investigations were facilitated and encouraged, and in this connection it is a source of gratification to record that during the whole series of about sixty excursions which have been made during the past decade, there has been but one solitary instance of a refusal to grant the permission applied for.

A fifth meeting had been planned for the end of September, to take the form of a Fungus Foray, but an unfortunate clashing of dates with those arranged by the Scottish Cryptogamic Society, and other unforeseen circumstances, rendered it desirable to postpone it for another year, when your Executive have every confidence in its proving a more than ordinarily successful gathering.

The Societies which constitute the Union now number 32, being a decrease of two from last year. Two societies—the Rastrick and Brighthouse Naturalists' Society and the Scholes Botanical Society—have severed their connection with the Union by resignation, and two others—the Scarborough Scientific Society and the Selby Naturalists' Society—are reported as having practically ceased to exist. On the other hand, two strong societies—the Cleveland Naturalists' Club with 61, and the Harrogate Naturalists' Society with 54 members—have been admitted, and it may be observed that applications have been received from two other societies for admission for the coming year.

The statistics which the secretaries of the various local societies have been good enough to furnish in accordance with precedent show that the number of associates is now 1,915, which, added to the members, makes a total for the Union of 2,290 members and associates.

The Membership of the Union, as distinguished from that of the local societies it includes, stands at about the same figure as last year, 375. With the view of facilitating an increase, a nomination-form has been printed on the blank page of the circular of the present annual meeting, and it is hoped that this will be extensively used. The number of members is not as large as it ought to be for so important a county or as the utility of the researches undertaken by the Union demands, and the Executive would be glad to have assistance from all who feel interested in promoting the work for which the Union exists, in raising the number of members to a considerably higher figure than that at which it now stands.

Finance.—The financial statement will show that the position of the Union is in a sound and healthy condition.

The Local Treasurers have proved themselves to be, as in former years, a much valued help to the Central Executive, in giving members a convenient method of discharging their obligations to the Union, and the best thanks of the Union are due to these gentlemen.

The Publications of the Union have been as heretofore.

The Transactions.—Part 9, referred to in the last report, has been issued to the members, and Part 10 is in the printer's hands. It will contain some instalments of the lists of Yorkshire Birds, Coleoptera, and Mollusca, of more than usual interest and value.

Lees' West Riding Flora.—In accordance with agreement, the manuscript and copyright of the West Riding Flora were placed in the hands of the Union by its author last April. The manuscript was immediately put in the printer's hands. The work of correcting the proofs has been actively proceeded with during the year, and is now drawing near a conclusion. Circulars asking for subscriptions to the book will shortly be issued, and it is expected that the Flora itself—which will extend to more than 600 pages, and which includes lists,

not only of the flowering plants, but of all the cryptogams, and chapters on lithology and climatology, with a map, will be published during the course of the spring or early summer.

Sections.—The work of the various sections has been carried on during the year with the same amount of energy and success as heretofore, and the Union is indebted to its sectional officers for much of the success of the various meetings.

A new section has been added to the list, for the investigation of forms of life, both animal and vegetable, which need the use of the microscope as an adjunct to their study. Relief will thus be afforded to the Botanical section (by whom much good work has always been done in this direction) and to the various zoological sections under whose cognizance these lower forms formerly came.

Committees of Research.—During the past few months steps have been taken for stimulating systematic research into specific subjects, with the result that proposals will be brought before the General Committee this day for the appointment of a Yorkshire Boulder Committee and a Yorkshire Marine Zoology Committee. The former is intended to co-operate with and assist the committee appointed by the British Association for the purpose of recording the distribution and occurrence of boulders and erratic blocks; while the latter will have for its object the organisation of means for ascertaining the forms of animal life which inhabit the Yorkshire coast and neighbouring seas, a vast field of inquiry in which so far there is but little on record. Both subjects are such as cannot be dealt with at the excursions, and which need special attention.

British Association.—At the meeting of the British Association the Union was officially represented, the delegate being this year the Rev. E. Ponsonby Knubley.

The Library of the Union has been very largely increased by donations, some of them of very considerable importance. Particular mention should be made of a valuable donation from Mr. Basil T. Woodd, of Conyngham Hall near Knaresborough, of a set of 27 volumes of the 'Zoologist,' and to him the thanks of the Union have been presented.

The growing extent of the Union's Library has engaged the attention of your Executive, who have had pleasure in appointing Mr. Charles Brownridge to act as Librarian, and it will be proposed that the General Committee henceforth add to the list of general officers an honorary librarian, with a seat on the executive.

The books and other property of the Union are deposited in a room at the Leeds Mechanics' Institute, by the kindness of the Committee of the Institute, to whom the Union are also under great obligation for allowing Executive meetings to be held in their Board-room free of charge.

The Executive will be pleased to receive donations of suitable books, especially such as bear upon the objects and investigations which the Union exists to facilitate; and particularly of copies of works and papers published or written by its members.

The Secretariate.—Your Executive have had under consideration the considerable amount of labour which has of late fallen upon your Honorary Secretaries in respect of the management of the Union's business and the editorial supervision of its publications, and have decided to recommend to the General Committee the appointment of two Assistant Secretaries, for which posts two occupants have been found in the persons of Messrs. Percy H. Grimshaw and W. Cecil Scott, both of Leeds.

The Presidency.—Your Executive have offered the Presidency for the coming year to Sir Ralph Payne-Gallwey, Bart., of Thirkleby Park, near Thirsk, a resident in the county and well known through his publications as a keen and highly-accomplished field-naturalist. The post has been accepted by him, and the Union is thus again fortunate in securing for its President a gentleman in whose hands the dignity of the office will be as worthily maintained as it has been by his distinguished predecessors.

The audited Balance Sheet was then presented, and showed the Union to be in a very satisfactory condition. After discussion the report and balance sheet were adopted, on the motion of Dr. H. C. Sorby, F.R.S., seconded by Mr. John Emmet, F.L.S.

The Excursion programme for 1887 was then resolved upon, as follows :—

Saltburn ; Whit-Monday, 30th May.

Thirkleby Park, for Gormire Lake (by invitation of the new President) ;
July (date to be afterwards arranged).

Sedbergh ; Bank Holiday Monday, 1st August.

Welton Vale ; Saturday, 27th August.

Fungus Foray ; at Leeds, in September.

Proceeding to the election of officers for 1887, it was first resolved to create the office of Hon. Librarian, with an ex-officio seat on the Executive. It was then announced that Sir R. Payne-Gallwey, Bart., M.B.O.U., etc., had accepted the offer of the presidency which had been made to him. The two retiring Hon. Secretaries (Messrs. W. Denison Roebuck, F.L.S., and W. Eagle Clarke, F.L.S., both of Leeds), were re-elected ; and Messrs. Percy H. Grimshaw (Burley-in-Wharfedale) and W. Cecil Scott (Leeds) were chosen as Hon. Assistant Secretaries ; and Mr. Charles Brownridge, Assoc.M.Inst.C.E., F.G.S., as Hon. Librarian. The Rev. W. Fowler, M.A. (Liversedge), and Messrs. J. W. Davis, F.S.A. (Halifax), G. C. Dennis (York), John Emmet, F.L.S. (Boston Spa), C. P. Hobkirk, F.L.S. (Dewsbury), B. Holgate, F.G.S. (Leeds), H. T. Soppitt (Bradford), and J. J. Stead (Heckmondwike), retiring members of the Executive, were re-elected, and Messrs. S. A. Adamson, F.G.S. (Leeds), and W. Cash, F.G.S. (Halifax), were chosen for the two remaining seats on the Executive. Messrs. J. E. Bedford and C. D. Hardcastle were chosen Auditors.

It was then resolved to appoint a Yorkshire Boulder Committee, to co-operate with and assist the Boulder Committee of the British Association, with Prof. A. H. Green, M.A., F.R.S. (Leeds), as Chairman, and Mr. S. A. Adamson, F.G.S. (Leeds), as Secretary.

It was also resolved to appoint a Committee to promote investigations into the Marine Zoology of the Yorkshire coast, with Dr. H. C. Sorby, F.R.S. (Sheffield), as Chairman, and Mr. W. Eagle Clarke, F.L.S. (Leeds), as Secretary.

A resolution was then proposed by Mr. J. W. Addyman, B.A. (Leeds), requesting the Executive to consider the constitution of the General Committee, with a view of securing the due representation of all classes of members of the Union thereon. This was accepted on behalf of the Executive and voted.

The General Committee then adjourned. The sections thereupon met and elected their officers as follows :—

Vertebrate Zoology.—Rev. E. Ponsonby Knubley, M.A., M.B.O.U.,
Staveley Rectory, president ; Mr. James Backhouse, junr., M.B.O.U.,
York, secretary (re-elected).

Conchology.—Rev. W. C. Hey, M.A., York, president ; Messrs. J. D. Butterell,
Beverley, and John Emmet, F.L.S., Boston Spa, secretaries (all re-elected).

Entomology.—Mr. F. N. Dobrée, Beverley, president (re-elected); Messrs. G. C. Dennis (re-elected) and S. Walker, both of York, secretaries.

Botany.—Mr. F. Arnold Lees, Heckmondwike, president; Mr. P. F. Lee, Dewsbury, and M. B. Slater, Malton, secretaries (both re-elected).

Geology.—Rev. E. Maule Cole, M.A., Wetwang, president; Messrs. S. A. Adamson, F.G.S., Leeds, and S. Chadwick, Malton, secretaries (all re-elected).

Micro-Zoology and Botany.—Dr. H. C. Sorby, F.R.S., Sheffield, president; Mr. J. M. Kirk, Doncaster, secretary (both re-elected).

Afterwards tea was served in the Wesleyan School-room in Wellington Road, and at 7 p.m. the Annual Public Meeting of the Members and Associates was held in the Industrial Hall, when there was a very large attendance. The chair was taken by the president, Dr. Dallinger, who, after the annual report had been read and the excursion programme announced for the benefit of the members generally, delivered the annual address. He took for his subject, 'My latest Lenses, and their most recent Work,' and the lecture was illustrated by a large number of lantern-slides. During the delivery of the address the chair was occupied by Mr. C. P. Hobkirk, F.L.S., president of the Dewsbury Naturalists' Society. A vote to the president was adopted on the motion of Dr. Sorby, seconded by the Mayor of Dewsbury (Mr. Ald. T. B. Fox); and afterwards a similar compliment to Mr. Hobkirk and the Dewsbury Society, on the proposition of Dr. Dallinger and the Rev. W. Fowler.

In connection with the visit of the Union to Dewsbury, the local society had organized an excellent conversazione, which engaged the attention of the members and friends for the remainder of the evening. This included a grand display of more than fifty microscopes, numerous stereoscopes, collections of agates, plants, shells, minerals, coins, birds' eggs, photographs, etc. Among the more special exhibits, Dr. Sorby showed a series of his own drawings of river and coast scenery in East Anglia, and a fine series of some of the most exquisite drawings of lepidopterous larvæ by the late William Buckler, which are to be published by the Ray Society.

NOTES AND NEWS.

We are very pleased to see the evidence of scientific vigour in Thirsk, as evidenced firstly by the successful establishment of the Thirsk and District Naturalists' Field Club, which held its first annual meeting on the 4th of April, and secondly by the appearance of *The Falcon*, a well-written and eminently useful monthly periodical of local information of all kinds. We note that local natural history and the proceedings of the natural history societies in the North Riding of Yorkshire occupy a fair share of the attention of the conductor of *The Falcon*, which thoroughly deserves appreciation and success.

BOOK NOTICES.

The Coleoptera of the British Isles. By the Rev. W. W. Fowler, M.A., F.L.S. Vol. I: Adepaga—Hydrophilidæ. 8vo. London: L. Reeve & Co. 1887.

Probably no branch of entomology has a better claim to popularity than the study of British Beetles; for Beetles possess, in a marked degree, three characteristics dear to every collector. They possess great beauty of form and colouring (be not incredulous, ye haters of all creeping things!); they are easily preserved, and that without losing their graceful shapes or bright colours; and they may be collected at all seasons of the year, and in all kinds of localities. Break the ice of the pond in January and put in your net, and you will find Beetles in it; beat the leafing trees and blooming hedges in spring, and Beetles fall from them; sweep the dense-grown banks or the clover fields in midsummer, and Beetles will swarm in your net; shake the mosses and fallen leaves and damp fungi in autumn, and Beetles will come tumbling out, often in myriads. On the dry, sandy shore, in the crevices of the sea-cliffs, under almost every stone, in seaweed, rotten stump, fresh dung, dead sheep, decaying hedgehog (magnificent climax!), beetles, beetles everywhere!

And yet, with all these advantages to recommend the study of Beetles, British coleopterists have hitherto remained few in number. And this melancholy state of affairs is in a great measure to be explained by the fact that whereas good books in most branches of science swarm, no manual on British Beetles—at once handy, complete, and scientific—has hitherto existed. Stephens has long been obsolete; Rye's little book, charming in its way, is no more than a mere introductory treatise on the subject; while Cox's 'Handbook of Coleoptera' (welcome as it has been for lack of something better) is a disappointing production. His system of description appears easy, but in practice too often utterly breaks down, while the almost total lack of habitats and localities creates one of those vacuums which both nature and her true votaries alike abhor.

Hence the first instalment of Mr. Fowler's new work on the British Coleoptera will certainly be received with open arms by every entomologist, for it supplies a crying want, and promises, moreover, to supply it exceedingly well.

The general system of the book is excellent. A short synopsis of each genus is first given, to facilitate the naming of specimens, but the danger of relying too much on such an artificial system is fully

recognised, and a complete description of each species follows. The 'dichotomous' system will never prove a success in such a branch of science as the Coleoptera, though in dealing with some genera it is very useful.

The author has given great attention to those two most important subjects—habitats and localities. Since the distribution of species has at last begun to receive the attention it demands, all scientific entomologists have come to regard specimens without localities as only a degree removed from specimens without legs; and no work which did not pay due regard to distribution could in these days expect or deserve a favourable reception. For our own part, we should not have been sorry if a slight hint as to the extra-British distribution of each species had also been given—as is done, for example, in Hooker's 'Student's Flora'; but no doubt the author was frightened of swelling the bulk of his volumes, while it is also doubtful how far sufficient materials are at hand to give such an addition a very high value. The study of the distribution of species has thrown such great light upon some of the greatest problems of science that it is really impossible to overrate its importance or exaggerate its interest.

Mr. Fowler has given, it is clear, very close attention to the question of classification—a most vexed one—in this particular branch of entomology. It is not probable that any system finally acceptable to the scientific world can be put forward with our present materials. Our author seems to have acted with great judgment both in this matter of classification and also in that of nomenclature, accepting such changes as were clearly improvements or corrections, and rejecting all such as had less cogent recommendations.

The proof of the pudding is in the eating, and those who come fresh to the study of the Coleoptera will perhaps be the best judges of the value of Mr. Fowler's book as an aid to their work; but they must not find fault with it if they are often puzzled and mistaken in the identification of their specimens. The book does not call itself 'the Study of the Coleoptera made Easy; or a Simple Guide to Naming Beetles'—no book bearing such a title ever will, or ever can, be published. We hope these volumes will encourage very many to take up a most delightful and most neglected study, but let them obtain their first general ideas, if possible, from sight of a good collection, or, at any rate, get their first captures named by a competent entomologist. Then they may find themselves in a position to use with profit this much needed and admirable work upon the British Coleoptera.—W. C. HEY.

The Origin of Mountain Ranges, *considered Experimentally, Structurally, Dynamically, and in Relation to their Geological History.*

By T. Mellard Reade, C.E., F.G.S., F.R.I.B.A. 1886, London. 8vo, xviii and 359 pp. and xlii plates.

The well-known ex-President of the Liverpool Geological Society must be congratulated on the boldness of conception and thoroughness of treatment evinced in this his latest contribution to dynamical geology. He brings to bear upon this much-vexed problem, or series of problems, the experience of a civil engineer as well as the observation of a geologist, and applies the test of numbers to his speculations whenever such a check is possible.

The author does not enter very fully into the theories held by most writers on the subject of mountain ranges. For a good historical review of the question we may consult Professor Heim's great work *Mechanismus der Gebirgsbildung*, which is also the best exponent of the current theory ascribing the phenomena of mountain-building to lateral crushing of the earth's crust, caused by the secular contraction of the interior. The inner portion of the globe is constantly losing heat and therefore contracting, while the exterior probably suffers little or no diminution of temperature. Accordingly the interior of the earth must shrink away from the crust, and the weight of the latter will produce in it enormous tangential or lateral thrusts, resulting in local yielding by compression, folding, and upheaval. Mr. Mellard Reade regards this theory as inadequate to explain the appearances seen in mountain ranges, and offers an entirely different hypothesis.

He begins by pointing out the variability of temperature actually observed in the earth's crust. The rise of temperature with increasing depth varies from 1° F. in 28.1 feet to 1° in 157.2 feet, and there is every reason to suppose that the rate at any given spot is subject to variation. Assuming an average rise of 1° F. for every 60 feet, the temperature at a depth of 30 miles would probably be approaching the melting point of surface rocks; but owing to the immense pressure the rocks would not be fused. In supposing the globe to be solid throughout, the author is in accord with the physicists and, perhaps, the majority of geologists. He, however, allows to the rocks at this and greater depths that power of slowly changing form or 'flowing' under unequal strains which has been so much discussed under the name of 'plasticity.'

After some experiments on sheets of metal and blocks of stone, showing that variations of temperature may produce permanent deformations, we come, in Chapters V and VI, to a consideration of the principal geological phenomena associated with mountain ranges.

Here, as elsewhere in the volume, the illustrations are drawn largely from the valuable publications of the United States Government, but the mountain systems of the Old World and of South America are also discussed. The point chiefly urged is that the upheaval of a mountain range has always been preceded by the deposition of a great thickness of sediment over the area in question.

This is the starting point of the author's theory. Babbage, in 1834, showed that the addition of sediment to any part of the earth's crust must cause a rising of the isogeotherms in the portion of the crust immediately below, or, in other words, must raise the temperature of the subjacent rocks and cause them to expand. The author points out that since lateral expansion would be impossible, folding would ensue, and the whole of the expansion would take effect upwards. The vertical expansion of the mass would therefore be about three times that due to a mere linear expansion as calculated by Babbage. The author develops this theory, showing how the deep-seated rocks would 'flow' laterally and vertically, being forced upward by their expansion, and lifting the newer rocks above them. These latter would undergo but little vicissitude of temperature, and would be subjected to a stretching action owing to the thrust from below. This force would take effect along lines of weakness, the axes of anticlinals, and the arched strata would be continually drawn out at the expense of their thickness as the lower rocks were forced up into the loops of the folds. According to this view, the calculations that have been made to determine the amount of lateral compression undergone by such a district as the Alps would be fallacious, since they assume the original length of the strata to be the same as their present length measured over all the folds. Reversed faults are ascribed by the author to the same compressive forces as the folds and flexures; normal faults to a subsequent contraction and partial settling of the district.

In Chapter IX the author examines his theory with the help of numerical data, taking for the expansion of the rocks the mean result of his own experiments, viz., 2.77 feet *per* mile for a rise of 100° F. He then attempts to show that the 'secular contraction' theory breaks down under numerical tests.

The author next proceeds to apply his hypothesis in detail to explain the characteristic features of mountain structure, beginning with the evidences of repeated compression in the Archæan or Pre-Cambrian rocks. We note a leaning towards what may be called the Archæan heresy, when he expresses the opinion that the occurrence of gneiss and 'true schist' in great masses is *primâ facie* evidence that they are older than the oldest Palæozoic rocks.

Chapter XVI contains descriptions of some very interesting examples of contortions in bedded rocks, illustrated by numerous plates. These include the contorted Carboniferous Limestone of Draughton, Yorkshire, the folded Silurian beds of Wigtonshire and of Aberystwith, and the curiously contorted schists or 'gnarled beds' of Anglesey. The author inclines to regard these last as Archæan, as claimed by Dr. Hicks and Dr. Callaway (the citation of Professor Hughes' name in this connection must be an oversight); and he agrees with these geologists, in opposition to Sir A. Ramsay, in regarding the foliation as indicative of bedding. In any case these rocks afford striking instances of the various ways in which a rock-mass may yield to lateral pressure.

The next succeeding chapters deal with the various types of mountain structure exhibited in the Western States of America, and so ably deciphered and described by the surveyors; these confirm the author's theory of the formation of folds by 'compressive extension.'

The author goes on to consider the connection between vulcanism and mountain building. He finds the source of the volcanic ejectamenta in the intensely heated and expanding plastic rocks, which on approaching sufficiently near to the surface, become fluid by relief of pressure, and may be forced out as lavas. The author quotes the general conclusion arrived at by Captain Dutton from his extensive study of the volcanic rocks of the High Plateaux of Utah: 'Volcanic phenomena are brought about by a local increase of temperature within certain subterranean horizons.'

The larger bendings of the earth's crust, involving the elevation and subsidence of extensive regions, are ascribed to fluctuations of temperature in portions of the deep-seated interior far below the thirty-mile zone; but it is not made very clear that any adequate cause exists for internal changes of temperature, other than the uniform secular cooling which is usually held to account for the movements in question. The author suggests chemical recombinations, and also the removal of matter from the interior by discharges of lava; but changes of level are now in progress in such countries as Scandinavia, where no volcanoes have existed for long periods.

The author next shows that evidence of lateral movement is not confined to highly plicated rocks, quoting in illustration his own observations on the Trias of Cheshire, etc., where approximately horizontal slickensides attest more or less movement in a lateral direction.

Chapter XXIV deals with slaty cleavage and foliation. It was long ago shown by Mr. Sharpe that rocks which possess the characteristic structure of slaty cleavage have experienced a lateral compression of their mass, in the direction perpendicular to the cleavage

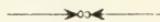
planes, with usually some expansion along the cleavage-planes in the direction of their dip. This compression has effected either a flattening of the individual fragments constituting the rock, or, as shown by Dr. Sorby, a re-arrangement of flat or elongated fragments into positions nearly perpendicular to the compression, *i.e.*, parallel to what are now cleavage-planes. This peculiarity of internal structure gives the rocks their tendency to split into parallel plates quite independent of any original lamination. This simple theory of cleavage, which attributes it to the effect of lateral compression (not merely lateral pressure), explains the fact, originally noticed by Sedgwick, that the general strike of the cleavage-planes in a district is parallel to the main axes of disturbance. Mr. Mellard Reade, however, laying stress on the fact that the cleavage is found to be unaffected by, and therefore posterior to, the flexures of the rocks, seems inclined, like Mr. Fisher, to refer the structure to 'a constantly-sustained pressure for long periods and an after-relief.' To our mind the actual lateral compression of the rocks to a considerable extent is proved by the distortion of the included fossils, and Prof. Haughton has calculated the amount of compression in a number of cases from measurements of their distorted forms. The origin of foliation is a much more debatable question. The author apparently believes that foliation is superinduced in the rocks upon pre-existing structural planes—bedding, cleavage, or fluxion-surfaces due to pressure. He omits to notice the evidence obtained in recent years in Saxony, Norway, Austria, and America, besides Sutherland and Cornwall, that foliation may be produced in crystalline rocks by crushing or 'flowing' caused by mechanical forces.

The next chapter treats of earthquakes, which are here supposed to be due to sudden horizontal expansion or contraction, or to deeper-seated cubical contraction to which the overlying rocks can adjust themselves only by subsidence. It is remarked that those countries suffer most from earthquakes in which the newest deposits are best developed.

The remainder of the volume is devoted chiefly to working out the general theory already indicated. The author regards mountain-making as a slow process, accomplished by repeated expansions and contractions of the underlying rocks. We think he does not succeed in accounting very satisfactorily for the characteristic linear, or at least axial, structure of mountain ranges; nor, again, in establishing their permanence, for we should expect as a logical complement to his theory, that denudation would have the effect of lowering the isotherms in the subjacent portion of the crust, and so causing contraction and subsidence.

A chapter is devoted to speculations on the future of mountain building; another traces concisely the physical and geological history of the British Isles as contained in the 'record of the rocks'; and the book concludes with a short summary of the author's theory.

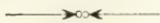
Whatever degree of adhesion one may be prepared to give to Mr. Mellard Reade's propositions—and perhaps we should apologise for criticising them at all on the strength of so brief an abstract—the reader cannot fail to be interested in the great questions broached, and to admire the ingenuity with which the leading principles are followed into their various applications. The plates, both original and reproductions, are well chosen and well executed, and the explanations of them are clear.—A.H.



Reviews of several books must perforce stand over, including one of Mr. Ridgway's 'Colour,' of which we shall have occasion to write in terms of high appreciation, a notice of the second edition of Mr. H. B. Woodward's 'Geology of England and Wales,' and of Mr. Saunders' new 'List of British Birds.'

NOTES AND NEWS.

With reference to the paragraph from the *Globe* newspaper, as quoted in the April number of the *Naturalist*, p. 115, it may amuse some of our readers to learn that the mysterious Lincolnshire bird was—as we hear from Mr. Cordeaux—a young Gannet, in the dark and spotted plumage.



It will be of interest to many readers to know that the Folk-Lore Society include in their publications such works as one on the Folk-Lore and Provincial Names of Birds, from the pen of the Rev. C. Swainson, which appeared a year or two ago.



The Elizabeth Thompson Science Fund, established by Mrs. Elizabeth Thompson, of Stamford, Connecticut, 'for the advancement and prosecution of scientific research in its broadest sense,' now amounts to \$25,000. As accumulated income is again available, the trustees desire to receive applications for appropriations in aid of scientific work. This endowment is not for the benefit of any one department of science, but it is the intention of the trustees to give the preference to those investigations *which cannot otherwise be provided for*, which have for their object the advancement of human knowledge or the benefit of mankind in general, rather than to researches directed to the solution of questions of merely local importance. Applications for assistance from this fund should be accompanied by a full statement of the nature of the investigation, of the conditions under which it is to be prosecuted, and of the manner in which the appropriation asked for is to be expended. The applications should be forwarded to the Secretary of the Board of Trustees, Dr. C. S. Minot, Harvard Medical School, Boston, Mass., U.S.A. The new grants will probably be made in May, 1887. The following grants have been made:—\$200 to the New England Meteorological Society for the investigation of cyclonic movements in New England; \$150 to Samuel Rideal, of University College, London, England, for investigations on the absorption of heat by odorous gases; \$75 to H. M. Howe, of Boston, Mass., for the investigation of fusible slags of copper and lead smelting; \$500 to Prof. J. Rosenthal, of Erlangen, Germany, for investigations on animal heat in health and disease; \$50 to Joseph Jastrow, of the Johns Hopkins University, Baltimore, Md., for investigations on the laws of psycho-physics.

LANCASHIRE LAND AND FRESHWATER MOLLUSCA.

R. STANDEN, M.C.S.,

Swinton, near Manchester.

I CORDIALLY agree with Mr. Geo. Roberts in his remarks in the number of this Journal for June 1886, as to the desirability of a fuller account of the Mollusca of the county being compiled than has hitherto been published. I feel sure if all our Lancashire conchologists would set to work with a will, and give us the results of their investigations, our knowledge of the Molluscan Fauna of this large county would be considerably increased. Mr. Dyson's work on the 'Shells of the Manchester District' (published 1850) is a capital little manual in its way, but in relation to the whole of the county his details of local distribution are of necessity somewhat incomplete, and very many of the localities he gives have been blotted out by the encroachments of the builder and other causes. The co-operation of conchologists in working remote or little known localities is to be desired, and would certainly lead to tangible results.

In conjunction with my friend, Mr. W. H. Heathcote, of Preston, we are endeavouring to become more fully acquainted with the Land and Freshwater Shells of North, South, and West Lancashire, and so far we have ascertained several localities, not given in Dyson's List, for some of the rarer species and varieties. Mr. F. C. Long, of Burnley, has kindly placed in my hands his list of Shells collected in East Lancashire, and sent me specimens of the various species collected by him; while Messrs. R. D. Darbshire and T. Rogers, of Manchester, and others, have also very willingly placed their notes and observations at my disposal, and I am indebted to these gentlemen for the valuable assistance they have rendered in helping to make the list more complete. Quotations and localities copied from their lists are indicated by their initials immediately following. I have also added extracts from Mr. David Dyson's List of 1850, and from that compiled by Mr. John Hardy in 1865.

With one or two exceptions, every locality given—other than those copied from the above-named lists—has been visited by myself and Mr. Heathcote in company during the past three years, and we have to acknowledge the kind aid of Messrs. J. W. Taylor, T. D. A. and S. C. Cockerell, F. G. Fenn, and B. Tomlin, in determining varieties of which we were somewhat doubtful.

Sphærium corneum L. More or less common in almost every sheet of water examined. Very fine in the Leeds and Liverpool Canal at Hesketh Bank, at Birch, Prestwich, Newsham, Goosnargh, and Farrington. Canal, Burnley (F.C.L.).

‘Pits in Moss-lane, Greenheys. These are the only pits in the neighbourhood that I am acquainted with containing the true *Cyclas cornea*’ (Dyson’s List, 1850).

‘Pits, common; very fine in pits at Seedley and Chorlton-cum-Hardy’ (Hardy’s List, 1865).

I am sure that the occurrence in 1841–46 was never abundant (R.D.D.).

var. **flavescens** Macgill. Occurs in ponds at Newsham, Redscar, Penwortham, and in the canal at Burnley (F.C.L.).

var. **nucleus** Stud. Three specimens from pond at Worsley.

var. **pisidioides** Gray. Pond at Clayton, near Manchester (T.R.).

Sphærium rivicola Leach. Remarkably fine, and locally abundant, in the Leeds and Liverpool Canal at Tarleton; also in the same canal at Burnley (F.C.L.).

‘Bolton Canal. Canal at Reddish’ (Hardy’s List, 1865).

‘Plentiful in the Leeds and Liverpool Canal at Burnley’ (Dyson’s List, 1850).

It is curious that Dyson did not find this shell near Manchester. I recollect exulting in finding it for the first time about 1860 in the Gorton Canal. I never saw it in 1841–46. At that time the canal at Warrington was our nearest locality (R.D.D.).

Sphærium lacustre Müll. Abundant in canal at Tarleton, in ponds at Birch, and less common at Goosnargh, Crossens, Newsham, and Drinkwater Park, Prestwich. Pond near Burnley (F.C.L.).

‘Canals, pits, etc., throughout the entire district. Very plentiful and variable’ (Hardy’s List, 1865).

‘Found a little above St. Luke’s Church, Cheetham Hill, in a pit in the hollow of Clarke’s Fields, on the right-hand side of the footpath leading to Blackley. It is also found in some pits behind the Bull and Punchbowl, on the Stretford Road, just below the Botanical Gardens; and in the mud of the pits adjoining Ordsall Clough. There are a few in the Nine Pits, Chorlton Fields, of a transparent bluish colour. These are among the rarest shells in this neighbourhood’ (Dyson’s List, 1850).

In 1841–46 this species was a scarce one, and a prize, though to be found over a good range south of the town, in pits amongst the rushes and grass roots (R.D.D.).

Dyson also describes this species under the name of *Cyclas calyculata* Jenyns, and says it is 'Found in almost every pit in this neighbourhood.' He further adds, 'Gray places this species as a variety of *C. lacustris*; I have often found this shell with *Cyclas cornea*, in ponds where there has not been a single specimen of *C. lacustris*, when *C. cornea* has been in abundance, and *C. calyculata* the same; therefore, I should think it is more likely to be a variety of *C. cornea* than *C. lacustris*, and am of opinion that there is sufficient reason to consider it a distinct species.'

var. **brochoniana** Bourg. Very abundant, fine, and beautifully clean in ponds at Penwortham, Farrington, and near Lumb Colliery, Clifton. Type absent in each locality, but *Sph. corneum* very abundant.

1866. Pond at Cheetwood (T.R.).

Sphærium ovale Fér. Mr. F. C. Long has sent me fine 'dead shells' of this species, taken by him from mud thrown out by the dredger in the Leeds and Liverpool Canal, near Burnley.

Canal at Pendleton (T.R.).

'Bolton Canal' (Hardy's List, 1865). 'Found by Mr. T. Kelsall.'

Very fine in a lodge used for condensing steam near Gorton. My first find, May 1860, was considered a fine find, and new. The shell was soon found along the canal to Stockport and Hatherlow, and in other cotton canals (R.D.D.).

Pisidium amnicum Müll. Plentiful in canal at Tarleton. A few in canal at Clifton, and in ponds at Grimsargh and Fulwood. I have taken a few remarkably fine specimens from the Lancaster Canal at Woodplumpton.

'Canal at Reddish. Bolton Canal at Stalybridge, occasionally in the old river-bed at the overflow weir near Stretford, probably brought down by the rain in floods' (Hardy's List, 1865).

'Found in Dallam Brook, Little Sankey, near Warrington, in the mud; and in the river Lune at Lancaster, a little above the aqueduct, in the sandy mud at the roots of grass' (Dyson's List, 1850).

Pisidium fontinale Drap. Abundant and very fine in ponds at Birch, and near Eccles. Fine, but not plentiful, in canals at Tarleton and Newsham; occurs sparingly in ponds about Prestwich, Swinton, Goosnargh, and Crossens. Park Lane, near Burnley (F.C.L.).

var. **henslowana** Shepp.

Canal at Agecroft (T.R.).

'In a pit at Hale Moss' (Hardy's List, 1865).

'Found in an old pitstead on the new road from Ardwick to Gorton; in another in Hough-end-Clough, on the left-hand side of the middle bridge, amongst the weeds and in the mud' (Dyson's List, 1850).

Moss Lane pits, amongst grass roots (R.D.D.).

This variety is given as a distinct species in the lists of Hardy, Dyson, and Darbishire, viz., *Pisidium henslowianum* Jenyns.

var. **pulchella** Jenyns. A few in a pond in Eccles Fields.

'Pits in Hough-end-Clough, amongst grass and dead leaves at the margin. Near Withington Workhouse, and in many other places' (Hardy's List, 1865).

var. **cinerea** Alder.

'Found at Reddish, and in the drain crossed by the road from Chorlton Chapel to Jackson's Boat' (Hardy's List, 1865).

Pisidium pusillum Gmel. Generally distributed. Especially plentiful at Farrington, Grimsargh, Prestwich, and Crossens. Few ponds or other sheets of water are without this species. Burnley (F.C.L.).

Remarkably large and abundant in a ditch at Swinton (T.R.).

'Pits and wet places near Jackson's Boat, Hough-end-Clough, Seedley, etc.' (Hardy's List, 1865).

Dyson does not give a Lancashire locality for this species. He, however, gives *Pisidium obtusale* Pfeiffer (which equals *P. pusillum* var. *obtusalis* Lam.) as 'in some pits adjoining Ordsall Clough. The only locality I know for this species' (1850).

Pisidium nitidum Jen. Plentiful in a small pond near Lytham. Park Lane, near Burnley (F.C.L.).

Pits at Clayton (T.R.).

var. **globosa** Jeff. Several occurred in the Lytham pond.

Common in a ditch at Swinton (T.R.).

Unio tumidus Phil.

'Found in Dallam Brook, near Warrington, and in Little Sankey Mill-pool' (Dyson's List, 1850).

Dyson gives the above localities as for *Unio ovalis* Gray, which equals *U. tumidus* var. *ovalis* Mont.

Very beautiful specimens occur in the canal at Barton, near Manchester (T.R.).

Unio pictorum L. Several fine specimens have been taken by Mr. F. C. Long from the canal at Burnley.

Unio margaritifer L.

'In the autumn of 1849 I visited the river Lune. At a place called Caton, about five miles from Lancaster, I found these

shells in abundance. They can be seen from the banks of the river when the water is clear, and lie between the stones in the mud with the ends pointing up' (Dyson's List, 1850).

Anodonta cygnea L. Common at Prestwich, and in many ponds about Goosnargh, Farrington, Penwortham, and Whittingham. Very abundant in the Preston Corporation Reservoir at Grim-sargh. Some fine specimens occur in the canals at Tarleton, Carnforth, Newsham, Brock, and Clifton. Very large in the dams and Botany Bay Wood at Worsley.

'Canals, pits, and ponds throughout the district' (Hardy's List, 1865).

'Found in the Park Canal, a large sheet of water in Cheetham; in Ardwick pond; in the canal at Hollinwood; in Dallam Brook, near Warrington, and in most of the ponds in this neighbourhood, in the mud. Very fine in a circular piece of water at Smedley, near the Old Hall' (Dyson's List, 1850).

I think each one of the Moss Lane ponds called Twenty Pits (or Nine Pits), had its own variety (R.D.D.).

var. **incrassata** Shepp.

Pits at Chorlton, near Manchester (T.R.).

var. **zellensis** Gmel.

'Pits near Moss Lane' (Hardy's List, 1865).

var. **rostrata** Rossm.

Pits at Chorlton, near Manchester (T.R.).

Anodonta anatina L. Rather rare in Leeds and Liverpool Canal at Tarleton, and near Burnley (F.C.L.). Mr. Heathcote took a specimen at Tarleton, which closely corresponds with var. *complanata* Rossm. Very plentiful in several ponds at Whittingham, near Preston.

'Cotton pits. Bolton Canal. Very fine in a mill lodge near Gorton' (Hardy's List, 1865).

Dreissena polymorpha Pall. Common on sides of bridges in the Lancaster Canal, especially at Woodplumpton, where it is unusually fine, and some curiously distorted specimens occur. Some small but well-marked specimens occur in the river Brock, attached to large stones.

Abounds in thousands on submerged tree-roots in a reservoir belonging to the Lowerhouse Printworks, near Burnley (F.C.L.).

Very abundant in canal at Bardsley (T.R.).

'Old brick-pits, Longford. Canals at Reddish and Bolton' (Hardy's List, 1865).

'These shells are found in most of the large waterpipes which supply Manchester, from the waterworks at Beswick. Finding

this to be the case, I was induced to examine the reservoir at Beswick, and was much surprised to discover that the embankment stones at about three feet deep were literally covered with them' (Dyson's List, 1850).

In Hardy's and Dyson's localities; often eroded; all small. Canal at Hatherlow (R.D.D.).

Neritina fluviatilis L. Common and very fine on sides of canal bridge at Newsham, near Preston.

'Very common in the river Lune at Lancaster. In a kind of by-wash at the end of Lady's-walk, near the town, there is an embankment, where these shells adhere to the stones, the water flowing over them. Here the collector may walk upon the dry stones and gather them with ease. Some five miles up the river rather finer specimens are found upon the stones at the bottom of the stream, which is only about two feet deep' (Dyson's List, 1850).

Paludina contecta Mill. Very abundant and fine in ponds at Birch, and main drains, Southport. Fairly plentiful at Rufford. Occurs in canal at Rosegrove (F.C.L.).

Now not uncommon in many pits near Manchester, in every case probably introduced (T.R.).

'Canals, pits, etc.; general throughout the district, but not common' (Hardy's List, 1865).

There was a great rush to Southport in 1844-46, and many were colonised by collectors and dealers (to my knowledge) in canals near Manchester, at Twenty Pits, Greenheys, and cotton pits, Chorlton. Dyson's Southport shells were certainly *P. contecta*, and not *P. vivipara* (R.D.D.).

Paludina vivipara L. A few at Rufford, and in main drains behind Southport. Several specimens were taken at Birch in company with *P. contecta*, all probably introductions.

'Canal at Reddish, near Brookbank' (Hardy's List, 1865).

Bythia tentaculata L. Abundant in canals at Tarleton, Bedford-Leigh, Newsham, Clifton, and Burnley (F.C.L.); and in ponds at Grimsargh, Prestwich, Eccles, Crossens, and many other localities. From Grimsargh and Newsham it is beautifully clean, but very small. From most of the other localities it is generally very much eroded, and thickly covered with an incrustation.

'Canals, pits, and streams. Abundant in many places' (Hardy's List, 1865).

'In two pits in Chorlton Lane, and in the pits on Heywood's Farm, Moss Lane. Found in thousands in the main drains near Southport, and in the ditches on Freckleton Marsh, where the

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specimens in both places are very fine and clean. The following is from a scientific correspondent (Mr. J. Walling) residing near the spot described :—“ Haweswater, or Hazewater, is a small lake or tarn situate in the township of Silverdale, in the parish of Warton, in the county of Lancaster. Its extent is about twelve acres, and its depth varies from thirty to forty feet. The water is very clear and without any admixture of seawater. The shells thrown up at the north side of the tarn are all *dead*, without epidermis, but perfect in form, and purely white ; and there can be little doubt that living specimens exist in vast numbers at the bottom of the water. The tarn is surrounded on all sides, except the north, by peat-bog, which rests upon a layer of shells from two to three feet thick. A vertical ridge of rock forms the northern boundary of the tarn, having a sloping beach formed principally of the shell in question. There is a smaller tarn very near, called Little Hazewater, very deep, but containing very few shells. The people in the neighbourhood use these shells for strewing on flagged floors instead of sand ; and the deeper layers, which are finely pulverised, are used instead of lime for whitewashing, being a very pure white ” (Dyson’s List, 1850).

var. **excavata** Jeff. Canal, Molyneux, 1886 (J. A. Hargreaves).

monst. **decollatum** Jeff. Common at Birch, Prestwich, Redscar, and Tarleton.

Valvata piscinalis Müll. Abundant in canals at Tarleton, Clifton, Newsham, Carnforth, and Stonyholme, Burnley (F.C.L.). Common at Crossens in the main drains. Canal at Church, and Rufford (H. Stephenson).

Common in the Gorton Canal (T.R.).

‘Canal at Reddish. Ditch at Clayton Vale. Bolton Canal’ (Hardy’s List, 1865).

‘Very common in the main drains of the marsh behind Southport ; in the ponds at Freckleton, at the entrance of the marsh ; in the neighbourhood of Burnley, particularly in the lodge at Margerison’s Printworks, upon the leaves of the *Stratiotes*’ (Dyson’s List, 1850).

Very fine at Blackpool, in main drains (R.D.D.).

var. **subcylindrica** Jeff. Not uncommon at Tarleton.

Valvata cristata Müll.

Common in drains at Ainsdale, near Southport (T.R.).

Planorbis lineatus Walker. Common in Drinkwater Park, Prestwich. Rather rare in ponds at Goosnargh, Whittingham, Farrington, and Birch. Plentiful in canal at Clifton.

Pits at Clayton, near Manchester (T.R.).

'Found in the ponds near Blackpool, amongst weeds and on the mud' (Dyson's List, 1850).

Planorbis nitidus Müll. Occurs at Prestwich, Goosnargh, Farrington, Fulwood, Penwortham, and Walton-le-dale, but is uncommon. Stonyholme, Burnley (F.C.L.). Pond, Green Drive, Lytham (J. A. Hargreaves).

'Pits in the neighbourhood of Chorlton, Pendleton, &c.; not uncommon in the district' (Hardy's List, 1865).

Frequent (R.D.D.).

var. **albida** Nelson. Pond near Walton-le-dale; rare.

var. **minor** Jeff. Some specimens from the Clifton Canal were thus named for me by Jeffreys himself (T.R.).

Planorbis nautilus L. Swarms in a ditch at Charnock Moss, near Preston, on *Fontinalis antipyretica*. Plentiful on water-cress in a ditch at Goosnargh, and unusually fine in a pond at Whittingham. From the latter locality Mr. Heathcote has taken six beautiful scalariform specimens.

Pits at Clayton, near Manchester; and very fine at Newton Heath (T.R.).

'Hough-end-Clough, Gorton, &c. Amongst leaves in pits. Common' (Hardy's List, 1865).

'Found in most of the old pits on the coast, from Ormskirk to Southport and Preston, and in the ponds about Freckleton, where, in a very small pond at Naze House, they are particularly fine and clean' (Dyson's List, 1850).

Not uncommon in pits on leaves of flags (R.D.D.).

var. **crista** L. Common in a pond at Whittingham.

Planorbis albus Müll. Plentiful at Goosnargh, Prestwich, Swinton, Worsley, Birch, Farrington, Newsham, Tarleton, Crossens, Carnforth, and in several ponds around Burnley (F.C.L.). Unusually large in a pit at Pendlebury. Ponds about Haslingden (H. Stephenson).

'Pits near the river opposite Barlow Wood. Near Withington, and in many other places' (Hardy's List, 1865).

'Ponds in Prestwich Wood, on the leaves of *Nymphæa alba*' (Dyson's List, 1850).

Planorbis glaber Jeff. (= **P. parvus** Say). Mr. F. C. Long has sent me several specimens of this, which he has recently taken in a lodge at Burnley, in company with *P. dilatatus*.

'Taken in a pit in Hough-end-Clough by Mr. Jas. Walkden' (Hardy's List, 1865).

Planorbis dilatatus Gould. Mr. Thos. Rogers informs me that this species is now very abundant in the Gorton Canal, and thousands, which had congregated in the interstices of a wall, were last year destroyed by the wall being repaired and 'pointed.' Mr. F. C. Long has recently discovered it in great abundance in a pond near a paper mill at Burnley. Mr. Thos. Rogers says 'these are larger and stronger in the shell than any' he has taken.

Planorbis spirorbis Müll. Not very plentiful about Birch, Prestwich, Swinton, Crossens, and Farrington. Plentiful at Hesketh, where a fine scalariform, and several curiously distorted specimens were taken by Mr. Heathcote. It occurs in vast abundance in some narrow ditches at Farrington. Ightonhill, Burnley (F.C.L.).

'Pits, &c., plentiful. In many places abundant' (Hardy's List, 1865).

'Found in nearly all the old pits near Cheadle; also in the ditches of Moss Lane, Greenheys; and in the neighbouring pits of Heywood's Farm; in all which localities they are very clean. Also in Hough-end-Clough' (Dyson's List, 1850).

Planorbis vortex L. Tarleton, Birch, Pendlebury, Worsley, Clifton, Newsham, Crossens, and Banks, but is not quite as common as the preceding species.

'Common throughout the district, amongst the vegetation of pits, &c.' (Hardy's List, 1865).

'There is scarcely a pit in Chorlton Fields that does not contain this species, and the same may be said of other pits in almost every direction out of Manchester. It is common in the ditches on Freckleton Marsh' (Dyson's List, 1850).

var. **compressa** Lloyd. One at Farrington, 1887.

Planorbis carinatus Müll. Very plentiful in Drinkwater Park, Prestwich. Not common at Birch, Clifton, Tarleton, and Newsham. Occurs in canal at Burnley (F.C.L.).

Plentiful in pits at Newton heath (T.R.).

'Common throughout the district, in pits and ditches' (Hardy's List, 1865).

'In an old pitstead, Harpurhey; in the Nine Pits, Chorlton Fields. Common in many ponds all about Manchester' (Dyson's List, 1850).

Planorbis complanatus L. Common in the mill dam, Cadley, near Preston, where some fine specimens measuring nearly an inch in diameter have been obtained by Mr. Heathcote. A few specimens have been obtained at Prestwich, Burnley Canal (F.C.L.), and Clifton. Haslingden (H. Stephenson).

Very fine in pits near Eccles (T.R.).

'Common in similar places to the last species' (Hardy's List, 1865).

'Found in most of the pits in Chorlton Fields, and behind the Bull and Punch-bowl, where it is common. In the pits on the roadside of this neighbourhood there are some very fine specimens, and also in some ponds about Cheetwood' (Dyson's List, 1850).

var. *rhombea* Turt. Occurs plentifully in a pond near Lumb Colliery, Clifton. Canal, Burnley (F.C.L.).

Planorbis corneus L. Very abundant and fine in a small pond at Birch. Occurs in canal at Burnley (F.C.L.). Probably introduced.

A good deal of colonisation used to be practised from pond to pond, and from a distance. *P. corneus* was, I think I may say, *not* to be found in this district in 1841-46 (or 1860?). It is now common in the canal at Gorton—most likely a dealer's colony (R.D.D.).

var. *albinos* Moq. Some beautiful specimens obtained from the Birch locality.

Planorbis contortus L. Rather common at Charnock Moss and Ashton-on-Ribble, but is rare at Prestwich, Newsham, Goosnargh, and Swinton. Plentiful at Glazebury. Mill Dam, Blackburn, 1886 (J. A. Hargreaves). Ponds about Haslingden (H. Stephenson).

'Channel of the overflow weir on the Mersey, near Stretford' (Hardy's List, 1865).

'Found in a ditch at Preston, which runs zigzag under the first southern railway bridge. Also in a ditch at Warton, on the road leading to Naze, where they are abundant' (Dyson's List, 1850).

Very abundant, and fine, at Blackpool (R.D.D.).

Physa hypnorum L. Plentiful at Penwortham, Tarleton, Crossens, and Worsley. Very fine at Walton-le-dale, and Ainsdale, near Southport. Abundant, but very small, in some of the ditches at Farrington. Ightonhill, Burnley (F.C.L.). Swarms in the Lancaster Canal at Newsham, near Preston. Occurs at Glazebury. Common about Altham (H. Stephenson). Common in small pond at Ansdell, Lytham. A very beautiful form (J. A. Hargreaves).

'Pits, etc., in many places. Plentiful in small pools after rain in spring' (Hardy's List, 1865).

'Found in the ditches of Moss Lane, Greenheys, and in holes in the adjoining fields. Common in an old pitstead on the left-

hand side of the new road from Ardwick leading to Gorton' (Dyson's List, 1850).

Frequent and fine in Moss Lane Pits (R.D.D.).

Common in pits at Clayton, near Manchester (T.R.).

var. **major** Charp. Not uncommon at Tarleton.

Physa fontinalis L. Somewhat rare at Tarleton, Redscar, and Crossens; but very plentiful and fine at Penwortham, Walton-le-dale, and Worsley. Numerous, but very small, in the canal at Newsham. Pond at Lytham. Canal at Molyneux, 1886 (J. A. Hargreaves). Canal, Church, near Accrington (H. Stephenson).

Plentiful in pits at Greenheys (T.R.).

'Plentiful in ditches near Jackson's Boat' (Hardy's List, 1865).

'Very fine at Moss Mill, Dean Lane, Newton Heath, at the bottom of the hill close to the Leeds Railway Bridge (at the Failsworth end) in a gote, or water, which supplies the works; and in the pits on Heywood's farm, Moss Lane' (Dyson's List, 1850).

Frequent and fine in Moss Lane Pits (R.D.D.).

var. **oblonga** Jeff. Is not uncommon at Walton-le-dale.

var. **albina** Jeff. Taken at Farrington, by Mr. Heathcote.

Limnæa peregra Müll. This variable species is abundant nearly everywhere in the different localities we have searched.

'Sometimes found in merely damp places. As variable as it is common' (Hardy's List, 1865).

'Nearly every clay-pit in Cheetham has a distinct variety, and there is scarcely a sheet of water anywhere that does not contain it. At Blackley and Crumpsall it is very fine; and in all the pits in Chorlton Fields, in Beswick Waterworks, at Reddish, Gorton, and Droylesden, it is common. In Dallam Brook, near Warrington, occurs a variety of a reddish-brown, with highly raised striæ' (Dyson's List, 1850).

A variety very 'auricularian' occurs in Moss Lane Pits (R.D.D.).

var. **ovata** Drap. Plentiful at Prestwich, Worsley, Swinton, Burnley Canal (F.C.L.), and Penwortham. It is remarkably fine at Birch.

var. **oblonga** Jeff. Pond in Rooden Lane, Prestwich. Only a very few found: type absent. The pond is used as a cinder-tip, and contains no other species of shell. Mr. Heathcote has taken one specimen of this variety at Grimsargh, near Preston.

var. **candida** Porro. Some nice specimens have been taken from the canal at Newsham.

var. **solemia** Zgl. I took some grand specimens of this var. last year, from a pool at Birkdale, Southport. The locality is, I regret to say, being destroyed by the construction of a new public park upon the site.

var. **boissii** Dup. Abundant in a ditch on the north of Southport. monst. **decollatum** Jeff. A few taken at Farrington.

A very dwarfed form of *peregra* occurs at Grimsargh, in a small pond, the result, probably, of over-crowding and scarcity of food. A very similar form also occurs in a pond at Glazebrook, in company with *P. spirorbis*. The pond is very small and shallow, and filled with a dense growth of Bulrush.

Limnæa auricularia L. Rather rare. Pond at Newsham. Canals at Tarleton and Burnley (F.C.L.). Canal at Church, near Accrington. Fine, large, and clean in Mill Pond at Blackburn, 1886 (J. A. Hargreaves). Canal and ponds at Haslingden, and Church (H. Stephenson).

‘Pits, etc., in many places, chiefly on the eastern side of Manchester’ (Hardy’s List, 1865).

‘Very fine in Beswick Reservoir, and in some pits in Dirty lane, Cheetham; pits behind Ardwick Station, and near the Borough Jail, and in most of the pits and lodges in the hollows near Newton. In the Leeds and Liverpool Canal at Burnley it is very fine. In some pits near Lancaster it is of a very elegant shape, far surpassing any found elsewhere. This shell is common and variable’ (Dyson’s List, 1850).

Gorton Canal. Very fine in a condensing lodge near Gorton (water warmed) (R.D.D.).

Limnæa stagnalis L. Very abundant in Drinkwater Park, Prestwich; all the specimens are peculiarly distorted, probably owing to influx of water from adjacent bleachworks. A few in canals at Clifton and Burnley (F.C.L.). Plentiful in Mill Lodge at Withnell, near Chorley, and at Hoghton. Haslingden and Church (H. Stephenson).

‘Very fine in pits near Moss Lane’ (Hardy’s List, 1865).

‘There are five or six pits close to the Beswick Waterworks, each of which contains a distinct variety of this shell; one variety has a reddish-purple pillar, and is very large. I have not seen this variety elsewhere. The other varieties, however, are common in most of the pits between Ashton and Manchester. There is a pit on the left-hand side of the highroad from Ardwick to Gorton that contains a shell which answers well to Gray’s description, having a cut-glass-like appearance.

At Moss Mill, Dean Lane, Newton Heath, at the Failsworth end of the gote that supplies the works, it is very fine and large; also, in the ponds about Formby' (Dyson's List, 1850).

L. stagnalis was not in certain pits in Moss Lane, 1841-46, but abundant in 1860, and afterwards died out (R.D.D.).

Limnæa palustris Müll. Common at Farrington, Ashton, Newsham, Penwortham, Tarleton, and Crossens. A dwarf form occurs plentifully in a pond at Grimsargh. Canal at Burnley (F.C.L.). 'Ditches and stagnant pools. Plentiful in the district' (Hardy's List, 1865).

'In the pits behind the Bull and Punchbowl, and in pits on the roadside near Chorlton; and near Beswick Waterworks. Old pitsteads in Chorlton Fields. It is also common in the neighbourhood of Preston' (Dyson's List, 1850).

Common: of a medium coarse form (R.D.D.).

var. *roseolabiata* Jeff. Not uncommon at Penwortham; plentiful at Clifton. Occurs at Grimsargh.

Limnæa truncatula Müll. Very plentiful in pond at Swinton. A few at Cadley, Farrington, Birch, Crossens, Ightonhill near Burnley (F.C.L.), and Tarleton. Very fine in Prestwich Clough, and in a small pond near Lytham. Canal and ponds, Haslingden (H. Stephenson). One with spiral bands (see 'Journal of Conchology,' October 1885) at Ashton, near Preston.

'Pits near St. John's Church, Broughton, near Manchester; and in ponds at Cheetham Hill' (Hardy's List, 1865).

'Clay pits on the Cheetham Hill Road, near the Catholic Chapel, and in the ditches and shallow waters near Beswick Waterworks. Common at Lytham' (Dyson's List, 1850).

A few large ones in a pit near Moss Lane. Plentiful on wet rocks, With Gill, Chaigeley (R.D.D.).

Occurs on a wet wall at Agecroft (T.R.).

var. *microstoma* Drouet.

Abundant in a ditch near Southport (T.R.).

Limnæa glabra Müll. Occurs in a pond at Birch, and near the Lumb Colliery, Clifton. Two specimens from canal at Church (H. Stephenson).

'Common in pits and ditches in Chorlton Fields, and in many other places' (Hardy's List, 1865).

'Pitstead on the new road from Ardwick to Gorton. Common in the ditches of Moss Lane, and in holes in the adjoining fields. Also near Liverpool' (Dyson's List, 1850).

Notably common in 'swashes' in fields after heavy rains (R.D.D.).

var. **elongata** Jeff. Not uncommon at Clayton, near Manchester (T.R.).

Ancylus fluviatilis Müll. Brooks at Grimsargh and Chipping; and in river Ribble at Clitheroe; but is not plentiful. Very abundant in one portion of the brook at Goosnargh. Occurs at Simonstone and near Burnley (F.C.L.). Haslingden, and Whalley district, common (H. Stephenson). Stream, Love Clough, near Rawtenstall (J. A. Hargreaves).

'In stream running into Hough-end-Clough, and in river Mersey at Didsbury. Bolton Canal, etc.' (Hardy's List, 1865).

'Brook running through Hough-end-Clough, and almost anywhere on the banks of the Leeds and Liverpool Canal—very fine' (Dyson's List, 1850).

Extremely fine in a brook at Rivington, where no other shell occurred (R.D.D.).

Ancylus lacustris L. Very plentiful in a small pond at Elston, on dead stems of rushes and 'toadpipes' (*Equisetum*). The shells were so numerous as to give the rushes the appearance of very prickly briars. In a pond at Haslingden (H. Stephenson).

Pits at Clayton, South Manchester (T.R.).

'Adhering to the stems of *Typha* and other water plants in most of the deeper pits' (Hardy's List, 1865).

'These are somewhat abundant in the ponds about Freckleton and Lytham, and are attached to aquatic plants' (Dyson's List, 1850).

Common and fine in pits, Moss Lane, on leaves of flags and on dead sticks (R.D.D.).

var. **albida** Jeff. Two specimens obtained from the Elston pond.

Succinea putris L. Not uncommon in two localities at Goosnargh; a few occur at Newsham, Tarleton, and near Burnley (F.C.L.). Plentiful at Ashton-on-Ribble. Haslingden, and Whalley district (H. Stephenson).

Canal bank, Droylesden (T.R.).

'Wet places on margins of drains, Hough-end-Clough, Barlow Wood, and other places. Common' (Hardy's List, 1865).

'Hough-end-Clough, in the damp parts. There are several old pits grown over with weeds in the same locality, where it abounds. Several varieties are found on the banks of the Mersey, at Jackson's Boat, one of which is *S. gracilis* Alder. In a wood, nearly a mile from Eccles, is found a variety nearly as clear as glass' (Dyson's List, 1850).

Not a common shell, though found in several places (R.D.D.).

Succinea elegans Risso. Common on canal bank at Hollowforth, near Preston, and at Cadley; a few on canal bank, Burnley (F.C.L.). Some specimens taken by Mr. Heathcote and myself, in a ditch at Tarleton, have been referred to *S. pfeifferi* Rossm., a form intermediate between *S. putris* and *S. elegans*.

Vitrina pellucida Müll. Common on the grassy cliffs north of Blackpool; on the Southport sand-hills near the Battery; and near the shore at Morecambe and at Carnforth; a few on the old Tramway, Preston, and at Farrington, also at Grimsargh and Leagram. Common at Haslingden, and Whalley (H. Stephenson).

'Woods and hedge-banks throughout the district' (Hardy's List, 1865).

'Common under decayed leaves in Hough-end-Clough; met with on the banks of the Mersey near Stretford, at the roots of trees amongst the grass. Also on the Bury Road, opposite Heaton Park, on the hedge backing; and in most of the woods about Preston' (Dyson's List, 1850).

Woods south of Manchester; rare, 1841-46 (R.D.D.).

Zonites cellarius Müll. Occurs in very limited numbers in many localities around Preston, and at Prestwich, Birch, Swinton, Leagram, Worsley, Southport, Goosnargh, and Burnley (F.C.L.). Haslingden (H. Stephenson).

'Damp woods, hedge-banks, etc., under turf and stones; common' (Hardy's List, 1865).

Abundant in a cellar at Greenheys (R.D.D.).

var. **compacta** Jeff. A few specimens taken at Penwortham.

Zonites alliarius Mill. Ribble Valley, near Preston, Goosnargh, and Morecambe, common. A few taken in Prestwich Clough, at Birch, and Swinton, and on the Blackpool Cliffs. Burnley (F.C.L.). Whalley district (H. Stephenson).

var. **viridula** Jeff. Abundant in the Ribble Valley.

Zonites glaber Stud. Gardens about Preston, Farrington, and Swinton, rare.

Zonites nitidulus Drap. Found not uncommonly at Newsham, Grimsargh, Penwortham, and Morecambe, at foot of old walls, and on several garden rockeries at Swinton and Prestwich.

'Woods, hedge-banks, and shady places throughout the district' (Hardy's List, 1865).

'Common under stones on the banks of the Irwell at Throstle Nest; and in the woods at Hough-end-Clough; also at Preston, Lancaster, etc.' (Dyson's List, 1850).

- Zonites purus** Alder. Near Burnley (F.C.L.), rare.
 'Hough-end-clough, Barlow Wood, and Didsbury' (Hardy's List, 1865).
 Wood at Chorlton, 1844-46 (R.D.D.).
- Zonites radiatulus** Alder. A few specimens obtained at foot of walls at Swinton, Goosnargh, and Carnforth.
 At foot of old wall, Eccles (T.R.).
 'Damp places in fields and woods near to Jackson's Boat; and at Chorlton-cum-Hardy' (Hardy's List, 1865).
- Zonites nitidus** Müll. Mr. F. C. Long has taken this species near Burnley, in limited numbers.
 'Taken in Hough-end-Clough, and vicinity, by Mr. James Walkden' (Hardy's List, 1865).
- Zonites excavatus** Bean.
 'Barlow Wood and Hough-end-Clough' (Hardy's List, 1865).
 'Found in Heaton Park under a log of decayed wood. I have not found it in any other locality' (Dyson's List, 1850).
- Zonites crystallinus** Müll. At foot of old garden walls at Pendlebury, Farrington, and near Burnley (F.C.L.), rare. Haslingden, Baxenden, and Whalley, common (H. Stephenson).
 'Barlow Wood, Hough-end-Clough, and other places. Not common' (Hardy's List, 1865).
 'Found near Lancaster, in the fields and woods, among the moss and leaves, and at Hough-end-Clough, under decayed leaves' (Dyson's List, 1850).
- Zonites fulvus** Müll. Taken near Burnley, by Mr. F. C. Long. Whalley and Baxenden (H. Stephenson). Clitheroe (J. A. Hargreaves).
 'Under dead leaves, Hough-end-Clough; Barlow Wood; at Doghouse Farm, near Oldham; Bolton Road, near Stand, etc.' (Hardy's List, 1865, as *Helix fulva*).
 'Heaton Park, under a log of decayed wood. I have not found it in any other locality. Rare' (Dyson's List, 1850).
 Wood near Chorlton Fields. Rare (R.D.D.).
- Helix aculeata** Müll. Under stones at Carnforth; rare. Whalley (H. Stephenson).
 'Hough-end-Clough, under fallen bark. Rare in this district' (Hardy's List, 1865).
 'Found about Lancaster, in the woods, under stones and decayed leaves' (Dyson's List, 1850).
- Helix aspersa** Müll. Plentiful at Preesall, Walton-le-dale, Newsham, Woodplumpton, near Morecambe, and Carnforth; and in several

gardens south of Preston. Ribchester, and occasionally at Whalley (H. Stephenson).

'Hough-end Farm-yard walls (dead shells). Boggart Hole Clough. Rare in this immediate neighbourhood' (Hardy's List, 1865).

var. **minor** Moq. Morecambe and Woodplumpton, uncommon.

Helix nemoralis L. Very abundant on the sandhills along the coast from Formby to Fleetwood and Morecambe, and met with at Goosnargh, Grimsargh, and other places around Preston, etc., but is nowhere plentiful inland. Very scarce about Haslingden; 'I have only taken six specimens during the last twenty years' (H. Stephenson).

'Common at Chorlton about garden fences. At Preston, Lytham, Southport, Formby, etc.; and at Naze Point they frequently occur of a brown colour, and occasionally the same colour striped' (Dyson's List, 1850).

var. **roseolabiata** Taylor. Two specimens in a garden at Didsbury.

I have found several very fine single-banded specimens in a clough near Baxenden (H. Stephenson).

var. **albolabiata** V. Mart. One taken at Newsham.

var. **bimarginata** Moq. Not uncommon at Newsham, Southport, and Burnley (F.C.L.).

var. **libellula** Risso. The chief 'band-vars.' of this variety we have hitherto recorded are here placed in the order of their comparative rarity, beginning with the commonest first:—12345, 00000, 10345, (12)3(45), 123(45), 00300, (123)(45), 00345, 103(45), 023(45), (12)(34)5, 12345, 12345, 123(45), (12345), and many others. Localities:—Goosnargh, Newsham, Brock, neighbourhood of Preston, and all along the coast-line already indicated; also Burnley and neighbourhood (F.C.L.). Frequent in district between Accrington and Clitheroe (H. Stephenson).

var. **rubella** Moq. In all above localities, and also rarely, but very fine, at Whittingham; a pale but very beautiful form of 00000 occurs abundantly at Rossal. The following are the principal band-vars. met with:—00300, 00345, 00000, 10345, 12345, (12)3(45), (123)(45), 1(23)(45), (12)345, 00340, 00300, 12345. Accrington and Clitheroe district, common (H. Stephenson).

var. **castanea** Moq. 00000 occurs at Goosnargh, Penwortham, Clitheroe, and Farrington.

It is also not uncommon about Burnley (F.C.L.), together with 10345, 12345, and 12345.

- var. **olivacea** Gassies. One specimen of (12)(345) from Goosnargh. Prequent about Whalley (H. Stephenson).
- Helix hortensis** Müll. Not common along the coast, but fairly so in several inland localities, yet is rather a local species. Very common in district around Whalley, Ribchester, Clitheroe, and Padiham (H. Stephenson).
- ‘Hedge-banks, road-sides, etc. Pretty common in many places. Chorlton Chapel’ (Hardy’s List, 1865).
- ‘Middleton road opposite Heaton Park, upon the hedge-backings. Here is a variety, amongst about a dozen others, nearly white, with transparent bands; rare. Found also near Preston’ (Dyson’s List, 1850).
- It is very odd that I never found any but a few ‘dead shells’ of this species or *H. nemoralis*. The larger Helices seem to have vanished from the Chorlton district—partly by very numerous collectors having worked, and partly by poisoning of the herbage (R.D.D.).
- var. **fuscolabiata** V. Mart. 00000, Newsham, and Southport. Rare.
- var. **minor** Moq. Whalley (H. Stephenson).
- var. **lutea** Moq. 00000, 12345, (12)(345), 12(34)5, common at Newsham. About Southport, Goosnargh, and Burnley (F.C.L.), 12345 and 00000 are the only forms yet met with.
- var. **incarnata** Moq. Several specimens of 00000 taken at Goosnargh and Newsham.
- var. **lilacina** Taylor. One specimen of 00000 taken at Newsham.
- var. **olivacea** Taylor. One at Whalley (H. Stephenson).
- var. **arenicola** Macgill. Several specimens from Newsham and Heaton Park.
- Helix arbustorum** L. Common on sides of river Brock, and in the neighbourhood of Burnley (F.C.L.). Found about Whalley (H. Stephenson).
- ‘Barton Moss Lane, Flixton; and banks of the Mersey. Not very plentiful’ (Hardy’s List, 1865).
- ‘Common in the neighbourhood of Jackson’s Boat; and plentiful at Preston on the old tram-road’ (Dyson’s List, 1850). Chorlton-cum-Hardy (R.D.D.).
- var. **pallida** Taylor. Occurs on banks of Brock.
- var. **flavescens** Moq. Occurs on banks of Brock. Clitheroe (J. A. Hargreaves).
- var. **conoidea** Westerl. Clitheroe (J. A. Hargreaves).
- Helix rufescens** Penn. Common at Goosnargh, Newsham, Ashton-on-Ribble, Penwortham, and Morecambe. Common at Carnforth. Burnley (F.C.L.).

' Found on the Liverpool Road, near Preston, where they are common ; and at Burnley and Lancaster ' (Dyson's List, 1850).
 var. **rubens** Moq. Not uncommon at Goosnargh and Penwortham.
 var. **alba** Moq. Several fine specimens taken at Newsham and Penwortham. Whalley (F.C.L.).

Helix concinna Jeff. Not uncommon at Whalley (F.C.L.).

Helix hispida L. Farrington, Newsham, and Tarleton, not common. Locally abundant at Penwortham, Grimsargh, Morecambe, and Leagram. Clitheroe (F.C.L.). Whalley (H. Stephenson).

' Under stones and dead leaves in woods. Plentiful, both the normal form and the variety *H. concinna* ' (Hardy's List, 1865).

' Hough-end-Clough ; on most of the hedge-backings near Heaton Park ; and in Chorlton Fields ' (Dyson's List, 1850).

var. **albida** Jeff. A few at Penwortham and Morecambe.

Helix virgata Da Costa. Not uncommon on the sand-hills at Southport and Rossal, but poor in varieties. The only noticeable variety met with is var. *lutescens* Moq., which is not uncommon at Rossal Point.

Helix sericea Müll. Clitheroe (J. A. Hargreaves). Found about Whalley (H. Stephenson).

' Found at Hough-end-Clough, and on the banks of the Irwell, under stones, and among the grass ' (Dyson's List, 1850).

Helix fusca Mont. Whalley (H. Stephenson).

' Hough-end-Clough, and Barlow Moor Woods, under fallen sycamore leaves ' (Hardy's List, 1865).

' Hough-end-Clough, in damp shady places, but is not very abundant ' (Dyson's List, 1850).

Helix caperata Mont. Very plentiful on Southport sand-hills and at Morecambe ; a few on Heysham Road, near Morecambe (F.C.L.). Very fine at Fleetwood (T.R.). Clitheroe district (H. Stephenson).

' I have occasionally met with a few dead ones near Chorlton on the sandy hedge-backings ' (Dyson's List, 1850).

A few ' dead shells ' at Chorlton (R.D.D.).

var. **gigaxii** Charp. Near Morecambe. Uncommon.

var. **ornata** Pic. Rather common on the northern side of Southport, and at Morecambe. Very beautiful specimens.

Helix ericetorum Müll. Occurs near Southport, but rare. Two found in the Park, Preston ; probably introduced with some plants. Carnforth, rare.

Helix rotundata Müll. Common almost everywhere.

' Hough-end-Clough, and upon all the hedge-backings on the roads out of Manchester ; it is also found at Burnley and Preston ' (Dyson's List, 1850).

var. **turtoni** Flem. Near Burnley (F.C.L.).

var. **alba** Moq. One fine specimen taken at Farrington.

Helix rupestris Drap. Grange-over-Sands, several specimens; also at Morecambe. A few taken near Carnforth. Clitheroe district (H. Stephenson).

Helix pulchella Müll. Rather common under stones near Morecambe. Carnforth, rare. Whalley (H. Stephenson).

‘Taken in woods near Mode Wheel Cemetery by Mr. T. Kelsall’ (Hardy’s List, 1865).

Taken once in a wood near Chorlton Fields (R.D.D.).

var. **costata** Müll. Six specimens taken near Morecambe.

Helix pygmæa Drap.

‘Taken in Barlow Woods by Mr. Jas. Walkden’ (Hardy’s List, 1865).

‘Found near Lancaster, inhabiting ditches and wet places, among dead leaves’ (Dyson’s List, 1850).

Bulimus obscurus Müll. Common at Ightonhill, Burnley (F.C.L.). Carnforth, uncommon. Clitheroe (J. A. Hargreaves). Church, near Accrington, and Whalley; common (H. Stephenson).

Pupa umbilicata Drap. Plentiful under houseleek at Whittingham. A few on walls at Morecambe, and Ashton-on-Ribble. Common at Carnforth.

‘Hough-end farm-yard’ (Hardy’s List, 1865).

Pupa marginata Drap. Common on the sand-hills north of Southport, and near Burnley (F.C.L.).

var. **albina** Menke. Two specimens found at Southport. Several specimens taken on the Southport sand-hills.

Vertigo antivertigo Drap.

‘Two specimens taken in Barlow Wood by Mr. J. R. Hardy’ (Hardy’s List, 1865).

Vertigo pygmæa Drap.

‘Near Ashley Mill, and at the back of the Ashley Road under dead leaves’ (Hardy’s List, 1865).

Balea perversa L. Whalley district (H. Stephenson). Near Chatburn (J. A. Hargreaves).

‘Taken on trunks of trees near the Bolton Canal by Mr. Jas. Walkden’ (Hardy’s List, 1865).

‘Common in the orchards, upon apple-trees, all about Freckleton, near the river Ribble; also upon the willows in the garden at Naze House, a few miles from Lytham’ (Dyson’s List, 1850).

Clausilia rugosa Drap. Very abundant on damp walls at Ashton-on-Ribble. A few on walls at Penwortham, Farrington, and near Burnley (F.C.L.). Whalley (H. Stephenson). Grimsargh, rare.

Carnforth. One with spiral bands and extra denticle at Ashton, Preston. Whalley (J. A. Hargreaves).

'Along the Bolton Canal at Stand; near Disley, etc.' (Hardy's List, 1865).

Clausilia laminata Mont. Fine on old walls near Strine's Works (R.D.D.). Whalley district (H. Stephenson). Grimsargh, uncommon. Clitheroe (J. A. Hargreaves).

var. **albinos** Moq. Clitheroe, 1886 (J. A. Hargreaves).

Cochlicopa tridens Pult. Not uncommon near Clitheroe (F.C.L.). Whalley (H. Stephenson).

Cochlicopa lubrica Müll. Occurs at Goosnargh, Ashton, Tarleton, Newsham, Fulwood, Ribbleton, Penwortham, and on the Southport sand-hills, but is uncommon. Rather plentiful about Morecambe and Burnley (F.C.L.). Haslingden (H. Stephenson). Common near Carnforth.

'Plentiful throughout the district' (Hardy's List, 1865).

'Found amongst the grass and moss upon the hedge-backings, on the Droylesden Road; on the banks of the Irwell, under stones; Chorlton Fields, and upon the Middleton Road, under the fences between White Smithy Bar and Heaton Park (Dyson's List, 1850).

I never found *Zua* plentiful (R.D.D.)

var. **ovata** Jeff. Occurs near Burnley (F.C.L.).

var. **hyalina** Jeff. One specimen taken at Morecambe. A few at Goosnargh. One specimen from Burnley (F.C.L.).

var. **lubricoides** Fér. Taken at Farrington. One specimen from Burnley (F.C.L.).

Carychium minimum Müll. I observed a great number of this species a few years ago, on some decayed posts being pulled out of the ground in a stackyard at Goosnargh, but unfortunately all the specimens I then procured have been destroyed, and subsequent search has been without success. Not uncommon near Burnley (F.C.L.). Very abundant under logs at Charnock Moss, near Preston. A few found at Grimsargh. Common about Haslingden (H. Stephenson).

'Woods, under dead sticks, etc. Hough-end-Clough and Barlow Wood' (Hardy's List, 1865).

Having but recently taken up the study of Slugs, we can but at present record:—

Arion ater L. Common about Preston, Swinton, and Burnley (F.C.L.).

Arion hortensis Fér. Common wherever we have collected; also in the Burnley district (F.C.L.).

'Much less common than the preceding species. Gardens at Didsbury, Chorlton-cum-Hardy, etc. Rarely seen after mid-summer' (Hardy's List, 1865).

Amalia gagates Drap. Common in a garden at Swinton. A few specimens taken at foot of walls at Southport, and Ashton-on-Ribble.

Limax maximus L. Common at Swinton. But few met with about Preston.

Limax flavus L. Occasionally met with about Preston and Swinton.

Limax agrestis L. Very common everywhere.

Limax arborum B.Ch.

'Northenden Lane, Didsbury, in a belt of wood, 1860' (Hardy's List).

One specimen in a cellar at Greenheys, 1841-6' (R.D.D.).

Mr. Heathcote has taken some splendid specimens of *Zonites draparnaldi* in his greenhouse at Preston, and I have taken one fine shell in my own fernery, which may have come in some foreign ferns sent to me by him, and it is probable all are importations. *Sphaerium lacustre*, *Paludina contecta*, *Byth. tentaculata*, *Planorbis carinatus*, *Planorbis complanatus*, *Planorbis corneus*, *Limnæa stagnalis*, and *Limnæa glabra* have been introduced by Mr. Heathcote in quiet ponds about Farrington, from localities near Manchester which seem doomed to destruction at no distant period. All these are increasing rapidly in their new homes, and may even now be termed abundant. *Helix pisana* has been planted in considerable numbers in seemingly favourable situations, amongst the Southport sand-hills, by Mr. Heathcote. Mr. T. Rogers tells me he has often tried to colonise it, but has hitherto failed, owing, he considers, to birds preying upon it.

NOTE:—Hough-end-Clough ('ouse-end-clough') was (alas!) a lovely little woody water-course, cut down below the flat of the surrounding country south of the town, full of plants, insects, and molluscs.

In Dyson's List, and Hardy's, Chorlton means Chorlton-cum-Hardy, a township abutting on the north side of the Mersey. Since 1860, most of the waters hereabouts have been dyed and poisoned, and most of the grass and hedge-backings have been seriously poisoned by smoky rain, and have been sadly less congenial to plants, insects, and shells. In 1841-6, I searched all this southern district very well; and again about 1860. I think the ponds had become much less pure and fruitful (R.D.D.).

AMONGST THE YORKSHIRE OOLITES.

S. A. ADAMSON, F.G.S.

A FIELD excursion of the Leeds Geological Association was held on Easter Monday, in the neighbourhood of Malton. The locality has long been of surpassing interest to geologists, from the beauty and variety of its innumerable fossils, and from the splendid geological sections to be found in quarries and cuttings. The leaders for the day were Messrs. Samuel Chadwick and M. B. Slater. From North Grimston Station the way was taken down the line to the quarry where the 'cement stone' is obtained. This is of great commercial value, this hard stone yielding a good hydraulic mortar, and sold as 'blue lias lime,' this, of course, being an erroneous expression; still the character and the appearance of the beds have a great resemblance to some of the lias beds of the south of England; indeed, when the Rev. P. B. Brodie visited this section, he stated that had he been suddenly put down in this quarry, without knowing the locality, he should have imagined he was at Lyme Regis. This cement stone is a very hard, compact, argillaceous limestone, with here and there partings of soft calcareous shales. This stone evidently owes its origin to the denudation of the coral rag, to which it is unconformable, as well as to the Kimeridge clay above. The dip is but slight in this quarry, but lower down, nearer the railway, it rapidly increases. These beds are really equivalent in geological sequence to the upper calcareous grit further north, but, of course, are widely different from a lithological point of view. From this quarry the ascent of North Grimston Wold was made, passing over the Kimeridge clay and arriving at the white chalk. The red chalk is also present between these two formations, but no section of this was noted. In a quarry on the wold a fine section of the flint-bearing or lower chalk was examined. Here the familiar tap of the hammer was soon heard, and many flint nodules broken to examine the beautiful fossil sponges they contain. It is a most interesting bit of geology to observe how the silica, once held in solution in the cretaceous ocean, has segregated around these ancient sponges, and preserved them so perfectly and so beautifully, as we may see by the lens. Some large and good specimens of the characteristic *Inoceramus* were obtained. Some very peculiar markings in the chalk were attentively examined. They appeared to be of a long, needle-shaped, partially fibrous nature; but it was impossible by the aid of a pocket lens to determine conclusively whether they were

'slickensides'—that is, polished surfaces arising from the slipping, and therefore grinding, of the chalk (similar to those we see so often in the coal measures)—or whether it was a form of incipient crystallisation; or, again, all that is left of some low form of animal life. Some good examples were brought away for careful examination afterwards by the microscope. Arrived at the summit of the hill, a magnificent expanse of country presented itself, affording a good opportunity for the Rev. E. Maule Cole, M.A., to describe the general contour and physical geology of the district. To the left were Acklam Wold and other hills of the chalk, passing northward the Oolitic hill of Langton Wold, then succeeded the Howardian Hills and a view of Ryedale, whilst to the extreme right could be seen the moorlands and Tabular Hills. This striking panorama was further enhanced by the cloudless sky and bright sunlight. Descending, the Wharram Road was taken in the direction of North Grimston, and on the road-side a small outcrop of coral rag was noted. The party now arrived at the large North Grimston Limestone Quarries on either side of the Wharram Road, which present such a full section of the coral rag proper or Upper Coralline Oolite. This section (said to be the finest development of coral rag in England) is so valuable that a brief description in descending order may be quoted for reference:—'Buff-coloured limestones with yellowish markings; beds of white stone, seldom hard and crystalline like the series below. Indications of corals moderate; flints rare. Beds less shelly than lower series. The foregoing have a thickness of about 20 feet. Then succeeds a thin parting of soft yellowish brash, followed by about 17 feet of white sparry and compact limestones in strong, massive blocks, which become largely charged with flint, especially about 6 feet above the base of the series. The great shell bed in this part of the section is about 3 feet thick, and is a mass of splendid fossils, all of them the finest and largest of their kind. In the west end of the lower quarry, on the south side of the road, the urchin beds are well developed. These beds were observed to dip rapidly to the south, probably a dip of about 25 degrees.' The line of railway was now pursued to Settrington, and in the cutting here and there some good sections of coral rag and coralline oolite, part of the old coral reef, were disclosed. The quarry near Settrington Station was then examined. Here the upper part is coral rag, resting upon coralline oolite. Professor Green secured at this quarry a good specimen of *Isastræa*. Return was then made by rail to Malton. Passing through the town, the site of the old Roman camp was visited, and the section in the railway-cutting of the ancient refuse heap or midden was pointed out. The noted section

of coralline oolite at the Pye Pits Quarry, close to the town, was next visited. This has long been famous as a hunting-ground for fossils, and on this occasion its reputation was kept up by some good discoveries, comprising teeth of fishes, a large belemnite, some fine *Chemnitzia*, *Lima*, etc. A very short distance from this quarry occurs a gravel pit, to which the party was conducted. This is a section of the dry river valley which bisects the town of Malton. Its materials have evidently been produced by the denudation of the adjacent oolitic hills, being composed of water-worn oolitic pebbles of various sizes and sand. The latter, being examined by a lens, could be seen to be largely made up of the characteristic oolitic grains. This section contained perhaps the finest example of current bedding it has ever been the fortune of the members to behold ; it certainly should be photographed. Another interesting matter connected with this section is that an old flint implement (a Celt) was found here in situ, so that, as has been said, it is possible that palæolithic man may have seen the river flow on the west side of the Roman Camp.

The museum of the Malton Field Naturalists' Society was then inspected. The most notable and perfect specimens of the fossils of the district had been most carefully worked out, named, and classified by the indefatigable curator, Mr. S. Chadwick. It seemed incredible that such a splendid collection could be accomplished by one individual, but it is the result of years of unremitting and persevering labour. To recount the beautiful and typical specimens of the life-history of the Malton district in oolitic and cretaceous times, as here presented to us, would occupy much space, but a few should be specially named. A fine set of fossil fruit from the Malton quarries, exhibiting very distinctly the general character of fruit, both in the kernel, shell, and outer rind ; they have been named *Carpolithes conicus*. The *Aptychus* (or operculum) of *Ammonites perarmatus* ; this is peculiarly valuable, being seldom met with in situ ; some rare ammonites, from the lower calcareous grit ; a fine set of Neocomian or Speeton clay fossils, so difficult to obtain ; a set of palatal teeth of *Gyrodon* ; a large set of *Lima pectiniformis* ; a number of fine examples of that beautiful fossil, *Cidaris florigemina* ; a large specimen of *Pygurus hausmanni* ; a splendid set of corals ; a rare collection of fossil sponges ; bones and teeth of Saurians, etc., etc. In addition to these unique and invaluable geological specimens, the museum contains also a fine botanical collection by Mr. Slater, prehistoric remains, minerals, coins, recent shells, British marine birds, and birds of prey, etc. Such a remarkable museum should receive the attention and obtain the support of every inhabitant of Malton ; it should be esteemed the pride and glory of the town. The members then proceeded to

Mr. Slater's warehouse to view a giant Ammonite. This colossal specimen is 4 feet in diameter, and the breadth of the outer whorl close to the mouth is 21 inches. So far as at present known, the species of Ammonite is extremely rare, the British Museum only having a portion of one. This specimen is the largest cretaceous Ammonite known, and is named *A. leptophyllus*. It was found in a pit in the flint chalk on Thixendale Wold. It has been carefully mounted in cement by Mr. S. Chadwick, and set in a frame. We were informed the weight of this specimen is about 3 cwt. The members and Malton friends then had tea, at the conclusion of which Professor Green, F.R.S., expressed his appreciation of the kindness of Messrs. Chadwick and Slater in conducting so successfully such a rich and practical field excursion. He emphasised strongly the value of the Malton Museum, stating it was one of the best he had seen; it was of the greatest possible value to the inhabitants, and reflected the utmost credit upon the hard-working and painstaking curators. Messrs. C. Brownridge, F.G.S., and the writer, also expressed similar opinions. The privilege was then granted of viewing Mr. Chadwick's private collection at his residence at Norton. He exhibited a number of groups of beautifully shaped sponge spicules from the chalk. These minute fossils under the lens revealed a great variety of wonderful forms. As Mr. Chadwick has made the study of fossil sponges his special line of research, he was good enough to review the various forms, classifying and explaining them. His collection of Cretaceous and Oolitic fossils comprise literally thousands of fine and typical specimens, and it would require a special excursion even to hurriedly glance over them.

NOTE—ENTOMOLOGY.

Yorkshire Neuroptera and Orthoptera.—I am anxious during the present and several future seasons to work up the Neuroptera and Orthoptera of our county as much as possible, with a view to publishing a list of species, with their localities, etc., and shall be very grateful to all entomologists (or other naturalists) who, when out collecting their own particular groups of objects, will kindly kill and pin (of course they need not trouble to set them) one or two or three specimens of any species they may come across, and send them to me at the end of the season—or oftener if it be not too much trouble. The families in the Neuroptera wanted are the *Libellulidae* (Dragon-flies), *Perlidae* (Stone-flies), *Sialidae*, *Raphidiidae* (Snake-flies), *Osmiidae*, *Hemeroptidae*, *Chrysopidae* (Lacewing-flies), *Contigopterygidae*, *Panorpidae* (Scorpion-flies), and the *Trichoptera* (Caddis-flies). The two other British groups, *Psocidae* and *Ephemeridae* (May-flies), I do not propose to touch at present. The Orthoptera include the *Forficulidae* (Earwigs), *Blattidae* (Cockroaches), *Acrididae* (Grasshoppers and Locusts), and the *Achetidae* (Crickets), all of which, with the exception of the several universally abundant and distributed species, are wanted.—GEO. T. PORRITT, Greenfield House, Huddersfield, May 18th, 1887.

THE EARLY BOTANICAL WORK OF THE LATE
WILLIAM WILSON.

JAMES CASH,
Manchester.

(Read at a meeting of the Manchester Cryptogamic Society, 21st March, 1887.)

IN a former paper on Mr. Wilson's early botanical work I mentioned the fact of his having corresponded with the Messrs. Sowerby, who were engaged in the year 1830, and subsequently, in the publication of the Supplement to English Botany. Mr. Wilson illustrated and described various plants, then new to Britain, for that work. He furnished the specimens, for illustration, of *Woodsia ilvensis* from Twl-ddu—'the Botanical Garden of Snowdon'—and also those of *Hymenophyllum wilsoni*, accompanying the latter with some descriptive comments. Appended to the description appears the following note by Mr. Wilson:—

'So very different in aspect is this truly distinct species from the far more elegant *H. tunbridgense* that no botanist who has had the good fortune to see them luxuriantly growing in company in the rocky woods that border the wild and sequestered upper lake of Killarney would hesitate to pronounce them two species. It was there that in the summer of 1829 I became first acquainted with the true *Hymenophyllum tunbridgense*, and had at once the gratification of clearing up my doubts concerning the spurious kind, with which as the common *Hymenophyllum* of North Wales, Cumberland, and Perthshire, I had long been imperfectly familiar, and also of unexpectedly adding another fern to the British Flora.'

A writer in the *Oldham Chronicle* of January 11th, 1879 ('Royton: its self-taught men') claims for John Mellor the credit of first detecting the difference between the two British species of *Hymenophyllum*. He says: 'Previous to his (Mellor's) acquaintance with Mr. Wilson the British "*Hymenophyllum*" consisted of one species—*tunbridgense*. . . . Mellor having found it growing in a cave at Seal Bark, Greenfield, pointed out to Mr. Wilson the absence of wings of the rachis, the different habit, etc., of some portion of the Greenfield species. Wilson and Mellor subsequently visited Greenfield together, and the former being convinced of a sufficient specific distinction, conveyed the information to Hooker, who gave it the name of *Wilsoni*.' It is unfortunate that the date of this visit to Greenfield is not given. I will only observe, with reference to the matter, that it is extremely improbable that Mr. Wilson visited Greenfield before his tour in Ireland in 1829, and Mr. Wilson himself

tells us, as above quoted, that it was in Killarney in that year that he had the gratification of 'clearing up his doubts' respecting the 'spurious kind' (of *Hymenophyllum tunbridgense*), which afterwards received from Hooker the name of *H. wilsoni*.

I have evidence, however, of Mr. Wilson having visited Greenfield in 1832, for there is an entry in his journal of such a visit on the 15th of June in that year. The fact is mentioned, too, of his having seen 'Two species of *Hymenophyllum*—chiefly *H. wilsoni*, fr.' He was not accompanied by Mellor on that occasion.

It was after writing the above that, in looking through some of Mr. Wilson's papers, preserved in the Warrington Museum, I came upon some details, written by himself, concerning this very trip. Those details have been jotted down on the back of a letter, dated 14th June 1832, received from Mr. William Christy; and, as the excursion took place on June 15th, Mr. Wilson appears to have lost no time in recording his impressions. I was so interested in this record that I copied it verbatim:—

'Friday, June 15th, 1832.—At Greenfield, in Saddleworth, in company with Mr. Crozier and Jethro Tinker. (Greenfield five miles from Stalybridge. At bottom of the valley is a pretty good public-house, "King William IV.") Ascending towards the public-house (called "Bill's o' Jacks") at the road side on left-hand, gathered *Myosotis repens*, *Gnaphalium dioicum*; and, on fir-trees at the right-hand, a yellow Peziza with a white border, profusely scattered on the trunks and branches. From "Bill's o' Jacks" we crossed a wide tract of peat-bog, swampy from the recent rains, to the narrow head of the valley, where, on the left, we arrived at Seal Bark, the station for *Hymenophyllum*, consisting of huge loose blocks of grit-stone piled loosely upon each other into a hollow, which they have not completely filled. Above, there is a craggy rock, from which the masses have been detached. In the vacancies underneath the loose blocks was found *Hymenophyllum wilsoni*. We saw *Hymenophyllum tunbridgense* in a very small deep hole, at a greater elevation, under the first rocky knoll. This station has been long known to Jethro; and this season we could find very little of either species, and it was much withered and blackened.

'In Seal Bark I saw *Jungermannia taylori*, *J. reptans* (very large), and *trilobata*; *Weissia recurvata* (ripe), *Weissia striata* (over-ripe); *Bryum marginatum* (over-ripe), *Bryum elongatum* (under-ripe); a *Salix* (male) like *caprea*, but more hoary (= *S. lanata*). Higher up the valley is a cascade: here *Hypnum commutatum* grew, in fruit, ripening. Ascending the steep, towards our inn, gathered fertile *Didymodon flexifolium*, fine, but over-ripe; thence to the high-

road and crossing towards Delph, found *Rubus chamæmorus*, but not in many spots. Two large patches seen barren, injured by frequent firing of the heather. *Hypnum flagellare* is in a small rapid, very near to "Bill's o' Jacks," lower down the vale. I was told also of *Lycopodium alpinum* lower down, but we did not see it (William Hobson, seedsman, Hulme, near Manchester, cousin to Edward Hobson, confirmed this account, which was given by Jethro). Edward Hobson has found near Seal Bark, but in another ravine, *Diphyscium foliosum*. In some spots *Tortula tortuosa* may be found in fruit.

'*Arbutus uva-ursi* has become scarce in Greenfield, more plentiful near Kinderscout, and at the head of the valley near to Stalybridge, called the Brushes. In the Brushes (which is a wooded valley near Stalybridge) is found plenty of *Weissia nuda* [*Discelium nudum*] on the bare clayey banks by the stream. Higher up on the left (two miles), on the remains of a ruined reservoir hereabout and, according to Jethro, in the goit, among gravel, is abundance of *Dicranum squarrosum*, in fruit, with a little *Hypnum stramineum*, in fruit. William Hobson (who was apprenticed to a gardener at Dukinfield) says the latter was found by him in a bog-pit near there, and the *Dicranum* is in dripping spots in various places similar to what produced my specimens in Wales. *Jungermannia minuta* was found hereabout. Hobson's specimens are intermixed with *Dicranum flexuosum* or some similar species. *Hypnum aduncum* bears fruit thereabout (var. *revolvens*).

'*Weissia nuda*, according to Jethro, is common about Stalybridge, and is on the river-side below the village. *Phascum serratum* in fields about. *Lathræa* in Longdendale. (Crozier finds this at roots of poplar trees near Eccles, river-side, opposite Trafford Hall.) William Hobson tells me *Hypnum medium* [*Leskea polycarpa*] is found at roots of trees at Shayforth, near Middleton (Shawforth?—three miles north of Rochdale); also *Tetraphis ovata* in plenty in broken places about roots of trees.

'*Phascum crispum* and *P. axillare* were found together on lumps of clay in a new ditch going along the footway from Hulme to Chorlton, by Hobson and his cousin.

'William Hobson is going to America in August to settle near Philadelphia. He is making out a list of habitats for Scholes, the banker (not Bree, as stated by Crozier). Scholes is a zealous botanist, a correspondent of Greville, and will print the list. Crozier says Edward Hobson was first a Culpepperite—used to go to Cotterill Clough with an old botanist, named Dewhurst, and another young man. A new moss being sent by Hobson from Cotterill Clough to Dr.

Hooker produced a correspondence, and Dr. Hooker calling soon after in Manchester presented Hobson with a copy of his work on the *Jungermannia* and a good simple microscope. Mr. Sergeant was the principal patron of Hobson. (W. Hobson says Edwin Sergeant has the only fruited specimen of *Jungermannia tomentella* from Cotterill Clough, except one which Edward Hobson had in his own specimen book, and which has been cut out, with other good things, by some who have borrowed the book.)

‘Edward Hobson was well acquainted with Caley. He (Hobson) was unwearied in his pedestrian trips, disregarded refreshment, would stay till dark, sometimes exhausting the patience of his companions. Jethro said he was excessively abstemious, and not to be deterred by rain or tempest. *Orthotrichum riculare* said to grow near Stalybridge; also *Fontinalis squamosa*, in fruit. *Splachnum mnioides* we saw sparingly at Seal Bark.

‘Jethro was born in Staly Brushes. William Hobson first found *Dicranum squarrosus* there.’

In the month of May 1831, Mr. Wilson had a short tour in Derbyshire, and, by desire of Mr. J. E. Bowman, visited Youlgreave for the purpose of gathering *Encalypta streptocarpa* in fruit. It will do no harm to mention, at this distance of time, that the locality where grew the fertile plant was in Lathkil Dale, upon the site of an old limekiln. A few capsules were also found on an old wall close to Conksbury Bridge. Anyone who may desire now to find the fertile plant in that the earliest recorded Derbyshire habitat, will search in vain, for the moss does not bear fruit there, and at the date of my last visit, June 1879, there was very little even of the barren plant. Only a few capsules, at most, were ever found, and these, as will appear from the correspondence I am about to read, were watched over and nursed with as much solicitude as if they had been infants struggling into life.

In the course of the journey here referred to, Mr. Wilson gathered at Rowter rocks *Cynodontium bruntoni* and *Grimmia tricophylla*, and in the cavern there he observed the ‘shining moss’ which had been an object of so much interest to Mr. Bowman, and the nature of which, and its relation to *Schistostega osmundacea*, Mr. Wilson, by his accurate observations, was enabled sometime afterwards to determine. On his return homeward he botanised near Buxton, and gathered, on the 13th May, *Seligeria pusilla*, with which were mixed some plants of *Brachyodus trichodes*; also *Bartramia gracilis*, very fine; *Jungermannia pubescens*, *J. hyalina*, c. fr.; *J. pumila*, c. fr.; and *Tortula tortuosa* with setæ. Next day he gathered *Didymodon flexifolius*, very probably in Greville’s old station, which was

one of the earliest recorded, 'on the moors above Buxton, on the Manchester Road.' He gathered also specimens of *Draba incana* and *Polemonium cæruleum*. *Mnium serratum* and *M. rostratum* were observed, both in fruiting condition. Mr. Wilson also gathered on this journey (for the first time in Britain) the rare *Seligeria acutifolia*. This species was detected some time afterwards by Professor Lindberg among specimens sent to him by Mr. Wilson of *Seligeria pusilla*.

As Mr. Bowman's is a distinguished local name* I may mention, at this stage, that he introduced himself to Mr. Wilson, in May 1830, by letter, as one who had long been devoted to Botany, and who had lately taken up the study of the Cryptogamia. Mr. Bowman said that Mr. Wilson had long been known to him by name, and when he (Mr. Bowman) was in Glasgow in November of the preceding year Dr. Hooker spoke in such flattering terms of his correspondent that he determined to avail himself of the first opportunity that presented itself for an introduction, and to request the favour of Mr. Wilson calling upon him the first time that he visited North Wales. Mr. Bowman intended to have a week's botanising among the Snowdon mountains, and nothing, he said, would give him more pleasure than to be favoured with Mr. Wilson's company. Mr. Bowman offered to accompany Mr. Wilson to several good stations for cryptogamic plants in the immediate neighbourhood of his residence.

Mr. Wilson reciprocated Mr. Bowman's friendly disposition, and in replying, sent him specimens of *Daltonia splachnoides*, gathered in the previous autumn at Killarney, and took occasion at the same time to inquire respecting the true *Cistopteris* (or *Cystea*) *dentata* of the English Flora, reported to grow at Dinas Bran. He also offered to supply Mr. Bowman with duplicates from his own collection.

Mr. Bowman's reply is rather lengthy, but as it is of some interest, I make no apology for reproducing it:—

The Court, near Wrexham,

19th June, 1830.

MY DEAR SIR,—Your friendly letter of the 7th inst. gave me the greatest pleasure, as it assured me I should not have been deemed an intruder had I been able to make my proposed call on my way through Warrington. I was somewhat annoyed by being compelled to remain in Chester till after the race was over, as in such sports I could never take the slightest interest, particularly as it was part of my plan to return out of Derbyshire, through Birmingham, to see my boys at Hazlewood School.

*At the date of this letter he was living at Wrexham; subsequently, upon retiring from business, he removed to Manchester, and became a member of the Manchester Literary and Philosophical Society, and a frequent contributor to its proceedings. He was also one of the founders of the Manchester Geological Society.

I spent the day on which your letter was written very delightfully on the Breidden Hills, Montgomeryshire, whither I went purposely to collect a lot of *Potentilla rupestris* and some other rarities for my friends Dr. Hooker and Dr. Greville, who had expressed a wish for them. I brought away between 70 and 80 specimens of the *Potentilla*, which, though the only known British station, grows profusely on particular portions of the hill; a lot of *Lychnis viscaria*, *Geranium sanguineum*, and *Bartramia arcuata* in fruit. These, having in view a private opportunity of sending them to Scotland, have since fully occupied me in drying, etc., but having this morning despatched my parcels I hasten to reply to your letter. In the first place I am happy to find there is some prospect of your being able to accompany me on my projected Snowdonian ramble. From your extensive knowledge of Snowdonia I will leave you to fix the plan for that ramble, promising that my friend Salwey, of Oswestry (a learned lichenist), recommends me to examine some excellent old woods near Bettws-y-coed, where he has found some rare lichens, and to go from thence to Capel Curig. It may also be well to state, as we are not yet personally known to each other, that on these occasions I always regard conveniences and accommodations as of secondary importance, and prefer an inferior inn near a good station to a better at some distance, to save time and labour in walking to and fro. I hope soon to hear you have arranged all these matters. I believe I shall not be limited to time on the journey, and conceive the coaches between Holyhead and Shrewsbury will afford us all the helps we want between our pedestrian rambles.

You have anticipated my intention, had I called on you in Warrington, of offering you anything my herbarium contains which will be interesting. It always gives me great pleasure to be able to furnish any brother botanist with specimens, and many of the best in my own collection have been communicated by others. I need not therefore say how much I felt gratified and obliged by your very liberal and friendly offer which will afford me opportunities of adding your name to those already in my herbarium. With respect to what I can supply, be they few or many, they shall be freely at your service, and if you will bring with you your list of desiderata I will fill up so many of the number as I can; or if you can point out any place in Chester where they may be left, I will look a few out and send them there at once by private hand. I have duplicates of the Breidden plants named in the first page, and though you are doubtless rich in mosses, it may be in my power to supply some through the liberality of Dr. Greville, who, when I was in Edinburgh last year, gave me most of the British species I had not previously gathered. The beautiful and rare *Daltonia splachnoides* you so kindly enclosed is a great acquisition, and I beg to offer you, in this, a morceau of the no less rare and beautiful *Schistostega pennata*, gathered by me this spring in Rowter Cavern, Derbyshire, the station of the shining moss I described in the 'Magazine of Natural History.' I can supply you more liberally when we meet; also with the Castle Dinas Bran fern, which I believe is *Cystea* (or *Cystopteris*) *dentata*, though I have doubted it. I think all the characters in the English Flora cannot be relied on, particularly the distinction drawn between this species and *C. fragilis* as to the decurrent or non-decurrent leaflets, and the relative size of the fronds of each, which seems to be governed more by situation than by permanent specific differences. I have also what I believe to be *Cystopteris fragilis* from the same station, which may have caused the confusion. I have not seen Hooker's British Flora, but have sometimes doubted whether *C. fragilis* and *dentata* should be considered more than varieties.

By the way, I am sorry to learn from my friend Edward Forster, of Hale End (a most accurate and acute discriminator of species), that the British Flora shows marks of very great haste; indeed, Greville pointed out to me two or three blunders while the work was going through the press. It is a pity so excellent a botanist, and of such high authority, should be so careless; but he has sadly too many things on hand to hope any of them can sustain the character of his unvalled monograph on the Jungermannia.

We have what I believe to be *Aspidium angulare* copiously in a beautiful wood near my residence, as well as in Wynnstay Park, growing intermingled with *A. aculeatum*; and I have perceived many specimens with the leaflets more or less curved, stalked, and decurrent; and, indeed, a series of the gradations of these characters from one species to the other might be selected so as to justify doubt of

their specific difference. I know, however, that Forster considers them distinct. I named above the singular 'shining moss' I noticed in the 'Magazine of Natural History,' and which none of my botanical friends knew anything about. It was one principal object of my late journey into Derbyshire (where I usually pay an annual visit to an elderly maiden relative) to make further observations upon it, and I am happy to say I have satisfied myself both as to its true form and the cause of its extraordinary brilliancy, which is very striking. I believe it to belong to the algæ (a tribe of which I know nothing), as it consists of innumerable articulations of a perfectly globular form and highly pellucid nature, each of them no larger than the seed of a moss, but each acting as a globular lens to condense the light that falls upon it, just as the glass globes filled with coloured fluid in a druggist's window transmit their concentrated light to the eye placed in the angle of incidence tinged with the peculiar colour of the fluid. This proves it to be transmitted through the fluid, not reflected from its surface; in fact this tiny vegetable owes its splendour to the same law of optics which lights up the emerald or the ruby, and is truly a vegetable emerald. As the former account was drawn up from specimens that had been dried and subsequently moistened, some doubts remained which I thought it well to clear up by a supplementary notice, which I sent the other day, accompanied by a more accurate sketch, and which will probably be inserted in a succeeding number; but the explanation given in the first account of the cause of the resplendent appearance is quite correct. I have asked Dr. Greville to give it a name.

It has often struck me on passing through Delamere Forest that it must possess some favourable spots for mosses and bog plants; but I never had an opportunity of examining it. I should much wish to do so with you any time when you are going there, if you will let me know, and appoint a rendezvous. Indeed, I am so young a student in Cryptogamic Botany that, excepting very near home, I have explored but few places. I have long been attached to phanerogamous plants, though for many seasons, owing to the want of intercourse with kindred minds to stimulate, I have suffered botany to lie in abeyance and pursued other branches of natural science. I have also been long an enthusiastic admirer of the minuter portions of insects and vegetables, as displayed in the microscope, and have a tolerable collection of such objects. The exquisite beauty of many of the mosses and Jungermanniæ, of course, had not escaped my notice, and I often took shame to myself not to know them scientifically; nor was it till the spring of last year that I determined to put my shoulder to the wheel and study them. I had not then twenty good specimens of cryptogamic plants, the ferns excepted, and already my collection may be said to be pretty extensive, and is daily on the increase. The whole of my leisure, which I am thankful is not scanty, is occupied in this truly delightful field, where labour and exertion are unalloyed pleasure, and where at every step there is so much to admire and to contemplate. Nor have I been entirely unsuccessful in the way of discovery during my short career, though I cannot boast, with you, of having added a new phanerogamous plant to our native flora, and, that to the confusion of Welsh botanists, upon our own hills too!

I trust soon to hear when I may have the pleasure of seeing you here to look over my collection, and anticipate much pleasure from future intercourse; for however much, from early impressions and habits, we may happen to differ on other subjects—for what two minds ever thought alike on many topics?—still it is certain there is some ground that may be considered as common to both, and that of sufficiently ample space to occupy us both.

With thanks for your kind letter and offers of assistance,

Believe me, my dear Sir,

Your very sincere friend,

J. E. BOWMAN.

On the 21st June Mr. Wilson again wrote to Mr. Bowman, and sent him specimens of *Hypnum crassinervium*, and other mosses. He spent a large part of the autumn of 1831 in the principality, chiefly in Anglesey and the neighbourhood of Bangor.

One of the subjects mentioned by Mr. Bowman in his letter of the 19th June was the supposed identity of a fern from Dinas Bran with *Cystea* (or *Cystopteris*) *dentata*. Mr. Wilson tried to settle this point, and he records in his journal, under date March 31st, 1831, that he examined attentively all the specimens which had been sent him of *Cystopteris dentata*, *C. fragilis*, and *C. alpina*, but that he was 'engaged half the day to little purpose.'

Upon his return from Derbyshire in the spring of that year, Mr. Wilson wrote Mr. Bowman, giving an account of his journey, and also the results of his observations on the lid of *Schistostega*; and in a subsequent letter (19th May), having established the identity of the 'shining moss' with *Schistostega*, he made known that fact also to his esteemed correspondent.

I now propose to give a few excerpts from Mr. Bowman's letters to Mr. Wilson between March 1831 and October 1833, so far as they are of interest especially in relation to matters previously referred to.

Mr. Bowman wrote, 26th March, 1831—

. . . . I first began to dabble in botany in 1807. For the first ten years I knew only a few common plants, and I did not preserve a single specimen; and for twenty years it was not my fortune to come into personal contact with any one who could be called a botanist, or to whom I could apply for a solution of my difficulties or the correction of my errors. . . . The mistletoe certainly grows in Wynnstay Park (and also between us and Chester, near the Dee, as I am led to believe), but principally on the lime and crab. I have never observed it myself on the oak, though my friend Pickering, Sir Watkin Wynn's agent—an intelligent man, though no botanist—has told me that he has seen it there. I will require him to point it out, and at all events will preserve you male and female specimens and seeds in the winter. My friend Dovaston has sown it on various trees in his garden, but says it will not succeed on the resinous or fir tribe. I have heard Dovaston remark that after the radicle has shot into the bark of the stock it makes no progress outwardly for a season or two, till it has fully established itself. May not this be the case with those you consider as dead?

This allusion to the mistletoe has reference to a passage in a letter of Mr. Wilson, to the effect that he had been making experiments in the planting of mistletoe seeds, but that these seeds had been 'two years planted, and were now probably dead and gone.' It may be of interest in this connection to state that in the summer of 1884 I had the gratification of walking through the garden of Bruch Cottage, Mr. Wilson's residence for so many years, near Warrington, and observed the mistletoe growing in three separate places—upon the common apple, upon the white beam-tree (*Pyrus aria*), and upon the common hawthorn (*Crataegus oxyacantha*)—all, no doubt, the result of Mr. Wilson's experiments at various times upon the germination of the seeds. The time when the seeds were sown is uncertain—hardly, I should think, so far ago back as the year

1829.* The plants, however, though stunted, appeared to have been in a state of growth for a considerable period. I found they were being carefully preserved, along with some other relics of Mr. Wilson's botanical tastes, by the present obliging occupant of the house and grounds, Mr. Richardson.

Mr. Bowman wrote on 10th June, 1831:—

I was much delighted with your discovery of the identity of the 'shining moss' with *Schistostega*, and grateful for the tiny specimen which proved it, and the drawings which accompanied it. This fact, at least, must be communicated to the readers of the 'Magazine of Natural History,' who will perhaps then say they have had enough of the subject. . . .

I began to feel anxious to receive from Mr. H. Bowman, of Youlgreave, the specimens of *Encalypta streptocarpa*, which I requested him to send me via Manchester as soon as he had gathered them, and the more so as I have some fears lest the long fit of dry weather since I was in Derbyshire may have prevented the capsules from swelling and ripening, for on this depends the proper exhibition of its curious twisted structure. In a letter soon after I received yours, to Miss Bowman, I enclosed a note to Henry, requesting him now and then to wet the piece of tufa to counteract as much as possible the bad influence of the dry atmosphere. I also told him of the other piece of tufa you had placed beside it, and requested him to watch if it showed any signs of capsules during the ensuing autumn or winter. . . .

I am happy to inform you that a reference to the little *Weissia* I gathered last spring in this neighbourhood, as *W. calcarea*, soon proved it to be the more rare *W. pusilla*. I was not long in re-visiting the limestone rocks or in finding it there in considerable plenty, occupying moist shady crevices quite shut out from the sun. I collected a good deal, some with good teeth to the peristome. The leaves are very characteristic, being lanceolate (in the barren plant subulate), the nerve in both running to the point, but not thickening upwards nor occupying the entire upper half or rather one-third of the leaf, as in *W. calcarea*, but with an evident margin or continuation of the leaf up to the point, when highly magnified.

19th July, 1831.

About the time your last letter arrived I received from Mr. Bowman, of Youlgreave, the fertile specimens of *Encalypta streptocarpa* I had left in his care, and I know you will join me in regretting that the capsules have not in a single instance filled properly, nor fully acquired that coiled or twisted character so peculiar to the species and so well developed in the few ripe ones I gathered myself, and part of which I left for you. We must, therefore, prize the latter more highly till we are fortunate enough to meet with a fresh supply, which is uncertain. Mr. Bowman says he watered them several times, according to my directions, and in watching them from time to time found that the heads of the capsules disappeared, so that though they were not in the state I had described to him, they would be when gathered, he thought it best to secure them. Insects or small birds may perhaps have bitten them off; but I am inclined to attribute the imperfect swelling and ripening of the capsules to the very dry warm atmosphere of May and June. Those I gathered had acquired maturity in the more natural and favourable circumstances of the winter and early spring months, and perhaps a certain degree both of cold and moisture is necessary to full maturity. He

* The following entries occur in Mr. Wilson's journal:—'Mistletoe, 1829: Planted a number of berries which were about to germinate on the apple-tree at Paddington, on which there is already one plant. Also on apple-tree nearer the house. Also on a *Pyrus aucuparia* tree on the east side of the house.'

1830: 'These seem all to have failed.'

March 1839: 'A number of berries were sown at least three years ago. Many of these attached themselves to the bark of the apple-tree, and in the course of last year, after being long quiescent, withered away. About two or three have during last autumn and the winter put forth cotyledons.'

promises me to watch the stones at the foot of the lime-kiln, and inform me if any fresh crop of capsules is produced. What he has sent me are small and green; yet some of them had sufficiently exhibited the twisted structure to characterise the species independent of the foliage; and though they are not so numerous as I could wish, you must consider (as I do) half of them as your own.

3rd November, 1832.

I was in Derbyshire the end of last April. I found from twenty to thirty capsules of *Encalypta streptocarpa* in an unripe state on the two lumps of tufa under the old lime-kiln in Lathkil Dale on which I found them last year, but not one on the new piece you rolled there. I left them in charge of Mr. Henry Bowman, but they had made no progress at Midsummer when my daughter was there. She brought me a few, and left the rest to their fate. I also found about six more capsules near the top of the wall close to the Conksbury Bridge, but not one lower down the wall and nearer the water, though the moss was there unusually abundant and luxuriant. From this I infer that the very moist atmosphere and the partial seclusion from light and circulation of air is not favourable to its fructification. I visited Rowter, and replenished my stock of *Schistostega*, *Didymodon* (*Cynodontium*) *bruntoni*, etc., and got a few more capsules of *Weissia* (*Seligeria*) *pusilla*, but do not recollect anything else that was interesting.

24th October, 1833.

I spent about a fortnight in Derbyshire in August, whither Mrs. Bowman accompanied me, and being with friends and the weather very unsettled, I could not devote much time to botany. Mr. H. Bowman had gathered for me in May about a dozen capsules of *Encalypta streptocarpa*, which, like the former, had not ripened kindly; but there was none on the piece of tufa you had rolled under the lime-kiln. . . . I saw abundance of *Hypnum rugosum* in Dovedale, but all barren; and gathered *Mentha rubra*, *M. viridis*, and *M. piperita*, and what I suppose will prove a hairy variety of *M. rubra*; *Verbascum nigrum*, *Polemonium caruleum*, *Galeopsis ladanum*, and a species of *Carduus*, which I shall believe to be new to our Flora till I am told to the contrary either by yourself or some other competent botanist. . . . Soon after our return out of Derbyshire we went into Wales. At the upper end of Llanberis lower lake I found a solitary clump of *Mentha rotundifolia*, and on the margin of Capel Curig lower lake noble specimens of *Campanula hederacea*, both in flower and fruit.

NOTE—CONCHOLOGY.

Mollusca of Coniston and Carnforth, Lancashire.—On April 6th I had two hours at Carnforth, and met with the following species of Mollusca:—*Limax agrestis*, *Vitrina pellucida*, *Zonites cellarius*, *Z. radiatulus*, *Z. purus*, *Helix aspersa*, *H. nemoralis*, *H. aculeata*, *H. ericetorum*, *H. rufescens*, *H. pulchella*, *H. rotundata*, *H. rupestris*, *Bulimus obscurus*, *Cochlicopa lubrica*, *Pupa umbilicata*, *Vertigo edentula*, *Clausilia rugosa*, and vars. *dubia* and *tumidula*. One each of *H. rufescens* and *Vitrina pellucida* showed traces of spiral banding. The greater number of the above occurred on the summit of the limestone hill called Warton Crag. It may be interesting to note that all the *Clausilia rugosa* on this hill belonged to the var. *dubia*, while all those in the valley were typical. I should like to know whether the var. *dubia* is ever found in other than elevated localities.

On the following days I took several species near Coniston. *Valvata piscinalis*, *Physa fontinalis*, and *Limnæa peregra* var. *lacustris* are fairly abundant in the Lake, and *Ancylus fluviatilis* occurs in most of the larger streams. *Arion ater* and a fine example of var. *albolateralis* (is this not also an inhabitant of hilly districts?), *A. bourguignati*, *Limax agrestis*, *L. lævis*, and *L. arborum* were the slugs seen. The land-shells were *V. pellucida*, *Zonites alliarius*, *Z. nitidulus*, *Z. radiatulus*, *Z. excavatus*, *Z. fulvus*, *Z. crystallinus*, *H. aspersa*, *H. nemoralis*, *H. hispida*, *H. rotundata*, *Pupa umbilicata*, *Clausilia rugosa*, and *Cochlicopa lubrica*. I happened to put two living *L. peregra* in a box with the slugs, and found, on looking at them the next day, that they had been entirely devoured, leaving the shells clean and empty!—S. C. COCKERELL, Bedford Park, W., April 24.

BOOK NOTICE.

A Nomenclature of Colors for Naturalists, and Compendium of Useful Knowledge for Ornithologists, By Robert Ridgway, Curator, Department of Birds, United States National Museum. With ten coloured and seven plates of outline illustrations. Boston : Little, Brown & Co. 1886. 8vo. Price, Four Dollars.

The work now before us supplies a great desideratum, and supplies it well. One of the chiefest wants experienced by naturalists of all classes is a fixed standard to which they may conform the descriptions given in the books they use. Hitherto, the experienced hand has been reduced to the necessity of forming ideas (more or less correct within a somewhat wide range) as to the central shade or type of each colour, from his own familiarity with the objects described, but even this knowledge is vague and hazy, and in the case of beginners these fruits of experience are not available. To help beginners in Entomology, Messrs. Kirby and Spence in their classical work adopted the plan—and an admirable plan it is, too—of adding to their description of a shade or colour the citation of an example, or natural object which exhibits it more or less typically. But much more than this is required. We need as close an approach to an absolute or fixed standard as the imperfections of human vision and the defective nature of the pigments available for representing the shades defined will allow. The difficulties inherent to the task have deterred naturalists from undertaking to supply the great want, as inspection of Mr. Ridgway's bibliographical chapter (which extends to two pages only and enumerates but seven titles) amply demonstrates. Mr. Ridgway's book aims at the satisfaction of the want by giving a series of coloured plates, in which he avoids entirely the use of impermanent and fugitive pigments, thus materially enhancing, not only the value of his plates, but the difficulty of representing the shades required. The success achieved is, however, remarkable, and the fineness of the gradations is such as to make it possible to bring about a fairly satisfactory degree of certainty in nomenclature. The value of the coloured plates is increased by the explanation facing each, which states definitely the colours to be used in compounding each shade depicted. The first plate is a coloured diagrammatic representation of 'Primary' and 'Secondary Combinations'; the second gives 20 shades of blacks and grays; the third gives 23 shades of cool or gray-browns; the fourth, 21 shades of warm or reddish-browns and light pinks; the fifth has 15 shades of yellowish browns and buffs; the sixth has 22 oranges and yellows; the seventh gives 21 shades of red; the eighth, 20 shades of purple; the ninth, 23 shades of blue; and

the tenth, 21 of green. The plain plates are devoted to representations of the various forms of markings found in describing birds. Thus the eleventh plate represents a diagrammatic bird, showing the naming of the various parts of the body and limbs; and the twelfth represents in the same way two birds' heads, the lower diagram defining various markings and streaks. The thirteenth gives wings; the fourteenth and fifteenth, feathers and their markings; and the sixteenth represents the various forms assumed by eggs. The seventeenth plate is very useful to all naturalists, inasmuch as four distinct scales of measurement (English inches and sixteenths; English inches and twentieths; millimetres; and French inches and duodecimal lines) are shown in juxtaposition.

The work itself comprises two parts with subdivisions. After an introduction, and a preface to Part I., the author treats on the 'principles of colour and general remarks,' defining terms and proposing a schedular arrangement. Next comes a practical chapter, treating of the colours required by the zoological or botanical artist, pointing out what pigments are sufficiently durable to be relied upon, and giving directions as to producing tints and shades by admixture. A most useful comparative vocabulary of colours is next given, showing the names of a vast number of shades in the English, Latin, German, French, Spanish, Italian, Norwegian, and Danish tongues. The bibliography follows, and then comes a glossary of technical terms used in descriptive ornithology. Finally, are given a series of useful tables for the inter-conversion of millimetres and English inches.

The book is intended to serve a practical end, and is therefore distinctly and entirely practical in its character. It is exclusively intended for naturalists as a standard of uniformity, and it is in no sense whatever a work for physical or chemical investigators of the subject. We are accordingly spared the dissertations and speculations which we should naturally have expected in a book upon the subject of colour in general. The work, therefore, commands the sympathy and the respect of naturalists, to whom a work on colour is but another tool with which to make their own peculiar work more perfect. It is somewhat unfortunate that the latter portion of the book should have been made to appear as if it were exclusively or even specially intended for ornithologists, and if the author had made it simply a glossary of terms in natural history, it would have been no less useful to ornithologists than it is now. We may, however, point out to our readers that, in spite of the seeming ornithological restriction, the very numerous definitions of terms and markings, and the comparative tables of measurements, are of universal application, and of great use to all who have occasion to consult technical descriptions.

Naturalist,



1 JUN 1887

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The Journal, edited by Mr. J. W. TAYLOR (who may be addressed c/o Taylor Brothers, the Steam Colour Printing Works, Hunslet Road, Leeds), is the organ of the Conchological Society, to whose members it is supplied in return for the subscription of 5s. per annum.

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The NATURALIST.

IT being the wish of the Editors to make the journal the recognised organ for information concerning the natural history of the North of England, they hope to rely on Naturalists keeping them supplied with articles and short notes from time to time.

BOOKS RECEIVED.

- The Midland Naturalist, No. 114, for June 1887. [The Editors, Birmingham.
The Young Naturalist, Part lxxxx, for June 1887. [Mr. J. E. Robson, Editor.
Science Gossip, No. 270, for June 1887. [Messrs. Chatto & Windus, Publishers.
The Naturalists' World, vol. 4, No. 42, for June 1887. [Mr. Percy Lund, Editor.
Nottingham Naturalists' Society.—Transactions and 24th Report, 1886.—4to, 76 pages and plates. [The Society.
Glasgow Natural History Society.—Proceedings and Transactions, vol. 1 (new series), part iii, 1885-86. [The Society.
Natural History Journal, vol. xi, No. 95, June 1887. [Messrs. J. E. Clark and B. B. Le Tall, Editors.
The Zoologist, for June 1887, No. 126. [Mr. J. E. Harting, Editor.
Grevillea, for June 1887, vol. xv, No. 76. [Dr. M. C. Cooke, Editor.
Notarisia, commentarium phycologicum.—Anno ii, No. 6, Aprile 1887. [Dottori G. B. de Toni e David Levi, Redattori.
The Wesley Nat., vol. i, No. 4, for June 1887. [The Wesley Scientific Society.
T. Mellarde Reade—Notes on a bed of Freshwater Shells and a Chipped Flint lately found at the Alt mouth, and other papers. 8vo reprint, 8 pages and plates. [The Author.
A. Harker—Reviews of Rosenbusch's Mikroskopische Physiographie der Massigen Gesteine, Reade's Origin of Mountain Ranges, and Bulletin No. 28 of the U.S. Geol. Survey. Three 8vo pamphlets. 1887. [The Author.
James Kynoch—The Wild Flowers of Barmouth and neighbourhood, 2nd edition, enlarged. 1887, 8vo, 10 pages. [The Author.
James Kynoch—The Shells of Barmouth and neighbourhood. One page reprint, 1887. [The Author.
The Fossil Fishes of the Chalk of Mount Lebanon, in Syria, by J. W. Davis (Scient. Trans. Roy. Dub. Soc., vol. iii, No. 12). [The Society.
On the cause of iridescence in clouds, by Prof. G. J. Stoney (Scient. Trans. Roy. Dub. Soc., vol. iii, No. 13). [The Society.
On New Zealand Coleoptera, with descriptions of new genera and species, by Dr. David Sharp (Scient. Trans. Roy. Dub. Soc., vol. iii, No. 11). [The Society.
Royal Dublin Society—Scientific Procs., vols. v, pts. 3, 4, 5, and 6. [The Society.
Natural History Transactions of Northumberland, Durham, and Newcastle-on-Tyne, vol. ix, part 1, 1887, 223 pages. [The Tyneside Club.
Handbook of Middlesbrough and District, being notes historical, industrial, scientific, 1881, cloth, 93 pages, with geological maps and sections. [W. H. Burnett, publisher.

Yorkshire Neuroptera and Orthoptera.—I am anxious during the present and several future seasons to work up the Neuroptera and Orthoptera of our county as much as possible, with a view to publishing a list of species, with their localities, etc., and shall be very grateful to all entomologists (or other naturalists) who, when out collecting their own particular groups of objects, will kindly kill and pin (of course they need not trouble to set them) one or two or three specimens of any species they may come across, and send them to me at the end of the season—or oftener if it be not too much trouble. The families in the Neuroptera wanted are the *Libellulidae* (Dragon-flies), *Perlidae* (Stone-flies), *Sialidae*, *Raphidiidae* (Snake-flies), *Osmyliidae*, *Hemerobidae*, *Chrysopidae* (Lacewing-flies), *Coniopterygidae*, *Panorpidae* (Scorpion-flies), and the *Trichoptera* (Caddis-flies). The two other British groups, *Psocidae* and *Ephemeridae* (May-flies), I do not propose to touch at present. The Orthoptera include the *Forficulidae* (Earwigs), *Blattidae* (Cockroaches), *Acerididae* (Grasshopper and Locusts), and the *Achetidae* (Crickets), all of which, with the exception of the several universally abundant and distributed species, are wanted.—GEO. T. PORRITT, Greenfield House, Huddersfield, May 18th, 1887.

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A VISIT TO RAINWORTH LODGE.

OLIVER V. APLIN, M.B.O.U.,

Bloxham, near Banbury, Oxon.

To many readers of the *Naturalist* the name of Rainworth will be familiar as the head breeding-quarters of certain species of ducks in the northern counties of England, and as the repository of many a rare and historical specimen stored up in the collection at the Lodge. To some, as to the writer, it will call up recollections of pleasant days spent among the beauties of a truly wild and extremely interesting country, in the haunts of rare birds, and in the company of the genial naturalist host, who spared no trouble to show them every object of interest to be seen in the neighbourhood—and they are manifold—and whose knowledge of the habits of birds, gained in the field during a constant residence in the county he has known from boyhood, gave an additional charm to many a long ramble ‘over the forest’ or ‘round the ponds.’ To describe Rainworth thoroughly would require a whole number of the *Naturalist*. I propose, therefore, to give a short account of a few days spent there in April 1886, supplemented with some notes made during a former visit in August 1883.

And first a few remarks upon the nature of the country, and of the Lodge itself, which may be not inaptly termed the Selborne of the northern counties. Rainworth is situated on the outskirts of Mansfield Forest—a division of the great Sherwood—some four miles from Mansfield town, and two from Blidworth, the nearest village. The house (dating from the time of Doomsday Book) is built in a little hollow, and is thus sheltered from the cutting east wind, which blows over the forest in no gentle manner. In front of the house is the pond, some 300 yards long, and forty wide at the broadest part, with an island reached by a rustic bridge just in front of the hall windows; at the date of my visit a Swan was sitting on her bulky nest among the rhododendron bushes, and a Wild Duck had eggs a few yards from her. The lower end of the pond is sheltered from the road by a line of bushes and pollard trees, on the opposite side of the water is a thick bank of shrubbery and rhododendrons, and beyond that is a small water-meadow, and then the ground rises to the arable fields above. If you follow up the pond to the end you will debouch on to the trout stream which feeds it, and on to the water meadows above, but here we leave the grounds proper, and must retrace our steps. Immediately on our left before turning is the ‘Warbler Wood,’ a rising plantation of young fir and larch, with thick

undergrowth; it resounded with the silvery song of innumerable Willow Wrens, and later in the season would be filled with the melody of many a member of the *Sylvia*. Behind the house, the ground rises sharply to the gardens, where stands the Starling tower, a kind of pigeon-house on a pole, which can accommodate twenty-two pairs of *Sturnus vulgaris*, and is usually 'quite full in the season.' We then come to a long plantation in which birds breed in hundreds, among others the Nightingale, which has nested for three seasons. Old tins, boxes, draining-pipes, and various other receptacles are hung upon the trees, and form nest-sites for Tits, Hedge Sparrows, Robins, Flycatchers, etc. Here, then, we have every want of bird life fully supplied, and well they take advantage of it, and of the protection afforded them. We are indeed in the home of birds; probably in few houses in England can you sit at dinner with the windows open and hear the Snipe 'drumming,' while the Nightjar flits by under the rose-arches within five yards of the table. From my window, about midnight, I could hear the Coots clanking noisily, and now and then a Duck would quack—pitch-dark as it was; and I awoke in the morning to hear the Chiffchaff hard at work not many yards from my head, while Moorhens were feeding about the grounds like so many barn-door fowls. On the pond are some semi-domesticated Wild Ducks, belying their name in the extreme tameness they exhibit—some even taking bread from my hand a few minutes after I arrived. Coots, too—perhaps the wildest of all wild fowl—will take bread thrown to them. Writing to me during the severe weather of January last (1887), Mr. Whitaker says:—'The Coots are so tame that when I feed the tame Wild Ducks three or four rush out of the water and fight with the ducks for Indian corn within three yards of my feet, six or seven Moorhens keeping on the outside of the drove.' Moorhens are, of course, abundant, and the Tufted Duck breeds on the island almost every year; when there in August I examined a nest from which a brood had been hatched out shortly before. As we stood upon the rustic bridge one August evening, about eight o'clock, watching the Trout rising all over the water, and listening to the night-cries of the Pewits from the surrounding fields, a sudden rush of wings overhead announced that flight time had arrived, and nine Shovellers passed over. The ducks flight down these ponds at nightfall, coming from the waters at Newstead, etc., and afford grand sport in winter to a gun posted here—a luxurious mode of wild-fowling which will commend itself to the imagination of those who when following this diversion are constrained to stand by the hour in a swampy position in the middle of some bleak water-meadows, with the prospect of stumbling home

over the fields in the dark afterwards. Before leaving the Lodge I may mention an interesting instance of the same pair of birds probably returning to a former nesting-place. In 1883 I saw hanging from the roof of the garden porch an earthenware saucer, in which a pair of Swallows had reared their young that year, and writing to me early in May last, Mr. Whitaker says:—'Yesterday afternoon the pair of Swallows that have nested in the porch for three years came, and at once flew in; no bird that had not nested there would ever know the place, and this looks as if they paired for life, as last year the two came together.' The pond is well stocked with Trout, and recently the American *Salmo fontinalis* and some others have been introduced. I saw here a very curious fish—an Albino Trout; it was of a dull white, and had a most unnatural appearance. It had been seen for some time, but steadfastly refused to look at a fly, and has never been landed.

With regard to the country round, we have three principal features: first, a long chain of ponds lying in a great hollow, partly connected by a stream and various stretches of bog-land, and forming roughly a circle of some three or four miles in circumference; secondly, stretches of woodland; and thirdly, the open heathery forest. There is also a large amount of cultivated ground, the fields being very large. If we follow up the trout stream from the head of the Lodge pond we come to the Cave pond, and then entering the wooded grounds of Fountain Dale, pass successively the Black, the Middle, and Golden Hill ponds; keeping straight on we reach Harlow Wood, and beyond this cross the road to Thieves' Wood, together covering 850 acres; turning to the right and passing through the wood, after crossing some arable fields (noticing on our way a monolith, where of old the Forest Rents were collected), we come to the Triangular pond, the Red Bog and Bradder's Dam, and so into the road again, a mile or so to the west of the Lodge. Starting again from the house, immediately over the road, and separated only by this from the home pond, is the Wash dyke, a small pool with very thick beds of flags and rushes, and a very favourite breeding-haunt of fowl; this again is divided only by a bank from the 'L' pond, a large sheet of water in the shape of the letter from which it takes its name, this bending round has its end but a short distance from Bradder's Dam, and almost completes the circle. How suitable this sort of country is for fowl may well be imagined. Mansfield Forest extends north and east for many miles, and is covered with wide stretches of heather, bracken, and gorse, interspersed with small plantations; latterly a large amount of ground has been planted with larch, the trees being now from two to three feet high. Several ponds,

one of large extent, are scattered over the forest. The view from the higher ground at the back of the Lodge is extremely fine, and seen on the bright clear air of Easter Sunday, the distance covered by the eye was immense. You looked over stretches of umber-brown heather, varied with the brighter brown of the dead bracken and patches of dark-green gorse; over broad plantations of young larch, just putting on a tinge of delicate green; over great arable fields and clumps and masses of dark wood, on over Edwinstowe Church, into the misty distance and the hills beyond Retford. A little to the right on the eastern horizon Lincoln Cathedral stood out clearly and sharply defined against the sky-line five and thirty miles away. Starting out on Sunday afternoon, we had not been out of the house five minutes before a pair of Shovellers, a single male, and a pair of Teal rose from the Wash-dyke, while a pair of Mallard did not deign to rise from a two-foot ditch at one side. We walked up the hill to get a view of Bradder's Dam, over which two Black Terns were hawking as we drove past from the station the evening before, but they had left in the night. We then turned up the little rapid stream (which later in the season would be shadowed over with the long graceful fronds of the Lady Fern, and brightened with purple Fox-gloves), finding a Pewit's nest by the way, discriminating between the male and female by their different flight, and spotting the latter as she rose from a bed of *Carex*. Arrived at Fountain Dale, we spent a pleasant afternoon examining the beauties of the place; a striking beauty here is the rhododendron, which thrives grandly in the sandy peat, one bush growing on a sloping bank was perhaps ten yards across, and another, hardly less in extent, must have been a dozen feet high. The Spanish Chestnut flourishes here, but not so the Horse Chestnut, perhaps the only tree, save the Elm, which does not attain exceptional dimensions in this natural arboretum. The middle pond held four pairs of Tufted Ducks, whose snowy flanks showed up beautifully on the water darkened by the gloomy evening and the shade of the black Scotch Firs. We renewed our acquaintance with the little ruined chapel where King Richard caroused with the 'curtal Friar,' and the spring under which he cooled his heated brain next morning, also with the monument erected on the spot where the last of the outlaws was slain by one of the King's keepers, 4th February, 1608; Leake was the keeper's name, and he lies buried in Blidworth Churchyard, as a tablet in the old church testifies. Strolling home, we saw on the Cave pond a pair of Shovellers floating quietly under the bank; they presently rose, and circling round, pitched again but a short distance from us. At Fountain Dale a Common Buzzard alighted at the hall door a few

years ago; the Knot, in summer dress, was shot by the pond side, and a Gannet was caught by a Fox, doubtless after a sharp tussle. The next morning, driving back from Mansfield, we went out of our way to visit a bit of original woodland, a part of Birklands at Berry Hill. A real old English forest, with scattered oaks, a few Scotch firs, and open glades with plenty of bracken, among which we saw a pair of Red-legged Partridges; oak scrub in places. Later in the day we drove over Mansfield and Clipstone Forests. Ascending along the cart-tract through the heather to Ratcher Hill, as the pony took it easily over the soft springy soil, we saw a Wheatear and some Whinchats; and hereabouts in August, when the bloom of the heather threw a purple flush over what was brown enough now, we came upon a Ring Ouzel, a bird which occasionally breeds there. A little further on, at Sunrise Hill, a Stonechat sat 'chatting' on a sprig of gorse; and just below, from a patch of recently-burnt ground, up got two Grey Hens, their grey tints contrasting well with the warmer brown as they skimmed low over the heather to drop near a patch of gorse. These were well worth seeing, for the old stock of forest Black Game is getting exceedingly scarce, and you might search for days without seeing a bird. There is a fine pair in the collection at Rainworth. Vicar's Dam, a large pond at the bottom of a hollow, terminating at one end in a large bed of rushes, held nothing by reason of the presence of fishermen. On a former visit I saw a Tufted Duck and two Little Grebes, while from a pole-trap on a sharply-rising bank a Sparrow Hawk, flapping wildly, dangled at the end of the chain; at the foot of the pole lay the remains of two Cuckoos, which, with Nightjars, often fall victims to these deadly contrivances. We passed on down some water-meadows, Whinchats swarming under a warm sheltered bank, and turned towards home. A pair of Red-legged Partridges were seen on Clipstone Forest, and from the broad arable fields on our homeward way the cries of breeding Pewits resounded on all sides. A sandy lane brought us into the road near a cutting of the Great Northern Railway, where the Sand Martins have an extensive colony. A lingering party of eight Fieldfares were feeding in a field by the side of the lane, a rather late date (April 26th). On reaching home we found Mr. W. Eagle Clarke had arrived, and the following day's ramble was in his company.

Wishing to gain some idea of the number of breeding pairs of Tufted Ducks and Shovellers, we determined to make a complete tour of the ponds during the day. The Wash Dyke and 'L' pond were taken first. In some boggy ground here grows the little Round-leaved Sundew (*Drosera rotundifolia*), of insectivorous pro-

pensities; also the beautiful Wax Heath (*Erica tetralix*). A Teal, neat in form and plumage, sat like a cork on the water, from which he sprang with the quickness and ease peculiar to these diminutive ducks; and under the shelter of some dead flags squatted a fine old male Shoveller—quite the most beautifully-coloured of any of our wild fowl, with his dark-green head, white-mottled back, and bright chestnut flanks. The 'L' pond is beautifully kept up, a broad bank of smooth turf bordering the water, in places backed with clumps of rhododendrons, which in other parts come down to the water's edge. A turf or sod bank is thrown up along some portions of the bank for the convenience of the guns when the ducks are shot, and this affords means for the naturalist to stalk close up to the fowl. A few hurried lines in my note-book run somewhat as follows:—'Walking in a stooping posture under shelter of the sod bank, the hot sun roasting our backs, we came close on to eight pairs of Tufted Ducks. The hen Tuftie always rises first (and this, Mr. Whitaker says, is invariably the case), followed by her partner, who is ever closely in attendance on the water, a yard or two in the rear; the cry on rising is 'curr-ug.' A Kingfisher darted along under the bank, wending his way probably to the Sand Martins' burrows. A few minutes later three Mallards rose, and we crawled up to a pair of Shovellers: these have, on rising, a monosyllabic note, of which the word 'tuck' in a low guttural tone gives a pretty good idea; the somewhat rosy tint of the duck's bill is noticeable, and the curious shape, too, of the bill can be seen in flight; the shape of the bird, also, is peculiar, the wings appearing to be set very far back. A female Sparrow Hawk soared overhead in the brilliant sky, the Heron 'fraaked' from the wooded slopes of Bishops Hill behind us, whence came also the 'coo' of the Ring Doves, and the clap-clap of their wings.' The Tufted Duck pairs in March, but breeds late, not going to nest until the end of May or the first week in June. The nest is placed on the bank close to the water, sometimes under the shelter of a bush (that on the Lodge island is generally under a rhododendron), and is formed of grass and a few rushes. It lays from eight to thirteen eggs, and has sometimes been seen with twelve or thirteen young. In August 1883, I saw on this water four broods of young still in down, numbering nine, eight, five, and four, and making, with the old ducks and four drakes by themselves, thirty-four birds in sight at once. I remarked that they sought safety by keeping to the middle of the water, instead of in the shelter of the reeds, trusting to their powers of diving, at which accomplishment the young were quite adept, constantly going under for food. An old drake, too, wishing to increase the distance between himself and his human observers,

chose rather to proceed down the pond by a succession of dives, and certainly went faster than he would have done by swimming. To the gastronomic excellence of these inland-fed Tufted Ducks I can personally testify; they have none of the strong fishy flavour usually pertaining to diving ducks. For a long time the Shovellers managed to elude observation at the actual time of nesting, and no eggs were taken in the county until last year (1886), when a clutch of nine was discovered by Mrs. Whitaker, some of which have been added to an interesting collection of eggs taken entirely upon the shooting. The colour of the nest down of this species had, however, been described in the latest work on British Birds, from a nest from which young had been hatched out the year before. Many species of ducks have been killed on this water besides those mentioned, Wigeon (which come in large companies), Golden Eyes, Pochards, Scaups, and Scoters; and of rare birds observed or procured there may be mentioned the Osprey, Bittern, Grey Phalarope, and Spoon-bill. A Widgeon lingered here during the summer of 1883; on August 5th, when walking round with Mr. Whitaker and Mr. E. Bidwell, the bird rose from some rushes, and flying up the water, pitched again, when we had a good opportunity of examining it; it was a male, of course in the ferruginous dress of summer, and showed no signs of being an injured bird, as it rose with perfect ease.

We now returned to the house to utilise an hour or two's rest in examining the collections, beginning with the birds in the hall. The hall is one in a thousand; a flight of steps leads through a little glass porch, always gay and sweet with flowers, into a square room-like hall, and you see at once that you are in the home of a naturalist. The floor strewn with skins of various beasts, and the walls lined from floor to ceiling with cases of birds, interspersed with drawings of noted specimens, photographs of Great Auks, autograph letters of departed bird-men, and everything that can delight the hearts of the survivors. From the windows you see the pond, with the island not a dozen yards off, and look out from among the stuffed specimens on to the Coots and ducks disporting themselves in life and freedom. A goodly fire-place there is on one side, and pleasant it is to draw up by night the large black-oak chairs of the settle order each side the hearth, and while enjoying a final smoke, to chat leisurely upon ornithological subjects, surrounded by British-killed Sand Grouse, Squacco Herons, Harlequin Ducks and Sabine's Gulls, pied Woodcocks, cream-coloured Shags, and white Sparrow Hawks, and many another *rara avis* and *lusus naturæ*, whose mounted skins look down through their glassy eyes from all sides. But to return to these same

birds. The most remarkable among the historical specimens of British-killed rarities are examples of the Iceland Falcon, Orkney, 1876; Red-footed Falcon, Bridlington, 1865; Scop's Owl, Renwick, 1875; Black-breasted Dipper, Southwell, Notts.; Arctic Bluethroat, adult male, Aberdeen, 1872; and two of the birds procured at Cley, Norfolk, in the autumn of 1884; Alpine Chough, Oxon, 1881; Alpine Swift, Finchley, 1860; Egyptian Nightjar, Thieves' Wood, Notts., 1883; Squacco Heron, Notts., 1871; Buffle-headed Duck, adult male, Bridlington, 1864-5; Harlequin Duck, Filey, 1862; Sabine's Gull, Bridlington, 1875; Ivory Gull, Aberdeen, 1874; Sooty Shearwater, Flamborough, 1881, and Wilson's Phalarope, Sutton Ambian, Leicestershire. The presence of so many noted Yorkshire specimens will always make the collection interesting to the naturalists of that county, while the Egyptian Nightjar, Wilson's Phalarope, and Alpine Chough are the only representatives of those species at present recorded in Great Britain. The wonderful collection of abnormal varieties numbers 78 species and 235 specimens, all procured in Great Britain. When all are interesting it is difficult to name any particular specimens, but perhaps the following may be cited as of peculiar rarity:—Red-backed Shrike, pure white albino, white Sparrow Hawk, white Spotted Flycatcher, white Nightingale, brown, white, and slate-coloured Magpies, white, yellow and gray, and light brown and black Woodcock, 'hairy' variety of the Moorhen, 'Sabine's' Snipe, sandy Razor-bill, and cream-coloured Shag. The next best thing, perhaps, to having a Great Auk in your collection is to have a good model, and the Rainworth collection has lately been enriched with a good piece of workmanship by Lee, of Thirsk, copied from the bird in the York Museum.

After lunch we continued our round of the ponds. At Bradder's Dam a pair of Shovellers occupied either end; beyond this lays the Red Bog, a belt of swampy ground merging into quaking bog in places, and clothed with rushes, carex, cotton grass, and with here and there clumps of willow and alder, and in the drier portions wax-heath, needle green-weed, and bilberry. The yellow musk of our greenhouses grows in masses in parts of the bog, to all appearance in a wild state; how the seeds got there originally—for it is far from any house—is unknown. At the upper end we flushed a Snipe, a permanent resident here. Leaving the Triangular pond, upon which were another pair of Shovellers, we crossed some arable fields and turned into Harlow Wood, where among the big oaks we noticed the Wood Wren. Harlow is over 300 acres, and is a remarkably fine piece of woodland. Woodcock breed here, and may be seen in the dusk fighting down the rides. In 1883 we examined a nesting-spot,

and the shells of the eggs from which the young had hatched out. Large holly-bushes abound, and form a sure find for a 'cock,' which find beneath the low spreading branches of glossy leaves a secure and sufficiently darksome retreat during the hours of daylight. Crossing the road we come to Thieves' Wood, over 400 acres of younger growth than Harlow, some 300 acres of which consists of a fine plantation of Spanish Chestnut. At a spot where the rides intersect at the edge of the wood is a stone bearing the following inscription:—'This stone was placed here by J. Whitaker, of Rainworth Lodge, to mark the spot where the first British specimen of the Egyptian Nightjar was shot by A. Spinks, gamekeeper, on June 23rd, 1883. This is only the *second* occurrence of the bird in Europe.' Soon after we came upon the abode of the aforesaid Spinks. If you are careful to keep out of range of his watch-dog's chain, the unsuspected and abnormal length of which is apt to prove a pitfall to the unwary, you may in the season inspect various rising broods of young Pheasants and Partridges, and here in 1883 some Capercaillies were hatched out from eggs from Taymouth Castle; the young birds, however, did not thrive. Pursuing our course towards Fountain Dale, and seeing by the way signs of Spinks' handiwork in the shape of sundry gibbeted Hoodies, which are very common in winter, we added a few more pairs of ducks to our register, and found we had accounted for fourteen pairs of Tufted Ducks and eleven pairs of Shovellers—a good breeding stock.

We left the next day, and going into Mansfield experienced in the fullest manner the way the rain can come driving over the forest before an easterly wind. As we passed Mansfield Reservoir—a fine sheet of water 70 acres in extent—in the train, a Black Tern skimmed over the wavelets lashed up by the wind, and a Cormorant flapped heavily over the mimic sea; while of a pair of Pewits swooping about at the upper end, one bird was strongly marked with white on the back and wings; thus the last bird of interest we saw before leaving the district was a 'variety.'

NOTE—BOTANY.

Calamagrostis stricta Nutt. in **Yorkshire**.—When looking through some plants in my friend Mr. F. J. Hanbury's herbarium, I was pleased and surprised to find a sheet of a *Calamagrostis* from Yorkshire named '*Arundo Calamagrostis*,' the old name for *C. lanceolata*, which it certainly was not. He kindly allowed me to bring it away with me for determination. I have no doubt it is *C. stricta* Nutt. (*Deyeuxia neglecta* Kunth.). The label is a partly printed one, and runs thus: 'ex herb. H. Ibbotson. *Arundo Calamagrostis*. Hab., Castle Howard Woods, York. Coll. July 1844.' I hope someone will search this locality next July and August. It is a most interesting addition if it can be re-found.—A. BENNETT, Croydon, Surrey, June 1st, 1887.

GEOLOGY OF THE SKIPTON AND ILKLEY RAILWAY.

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IT is obviously necessary that when a new railway is in process of construction in any locality that the geologists of the district should be on the alert to increase their practical knowledge by visiting and carefully examining the various sections revealed in the progress of the work. Such an opportunity was presented by the new line intended to traverse the district between Skipton and Ilkley, and the members of the Leeds Geological Association were very anxious to avail themselves of it. Permission being readily granted by Mr. C. S. Wilson, C.E., engineer to the line, to inspect it, this was done, and, in addition to this privilege, the members expanded the route, so that the whole geology of South Craven, with the complex disturbances of the strata, so famous to geologists, was studied. Commencing at the Skipton end of the line, it may be well to give a few details of the railway itself. The new line from Skipton to Ilkley joins the main Midland line a little west of Skipton Station and on the Carlton side, thence passing over two new platforms to be built, and over the Eller Beck by an arch; it is carried over the main line by a bridge composed of a girder span and three arches, over the Keighley road and Leeds and Liverpool Canal by girder bridges, and then skirts the base of Skipton Moor. This is to save going through the town and to obtain increased length, the gradients being 1 in 85 and 1 in 90 up to the tunnel. A new road from Skipton Station towards Carlton is being constructed, which crosses the Broughton road and all the lines of rails by two girder spans a little west of the station. This supersedes the present level crossing. The work is very heavy up to two and a half miles, there being eighteen bridges besides the tunnel; in addition, the cuttings, as will be shown shortly, being cut through stiff boulder clay or till, have been most difficult work. This deposit of till is not only stiff, dense, and tough in a remarkable degree, but contains countless blocks of stone, scattered up and down without regard to size or weight. Some of these blocks are rounded, others have their angles just blunted, and many are ice scratched or polished. It may well be imagined what a formidable obstacle till is to the railway engineer and what laborious work for the navvy. The first cutting, about 120 yards long, with a maximum depth of six feet; the second, about 750 yards long, its greatest depth being 41 feet, are cut

through this very stiff boulder clay. Then succeed two more cuttings, Nos. 3 and 4, with embankments between; No. 3, about 90 yards in length and about two feet deep; No. 4, about 200 yards in length with a greatest depth of 16 feet, also through boulder clay. After passing along a lofty embankment we arrive at cutting No. 5, which forms the entrance to the tunnel. It is about 120 yards long, and very deep, being at the mouth of the tunnel 60 feet in depth. This is likewise through this obstinate boulder clay. Along the sides of the cutting were huge heaps of the boulders which had been extracted; they were carefully looked over, but appeared to be nearly all constituted of local gritstones and mountain limestone. This boulder clay rests directly upon the limestone, and a section was seen showing the junction very finely, the limestone dipping at an angle of about 55 degrees. Where the boulder clay had been entirely removed the weathered surface of the limestone was exposed, and this showed well the corrugations arising from denudation, so familiar upon limestone surfaces. When making this cutting a pot-hole was discovered in the underlying limestone; when found, it was full of peat and silt, but was excavated and drained for a depth of six feet, and then filled up with stone. The tunnel, which was entered but for a very short distance, as blasting operations were in progress, will, when completed, be 220 yards in length, and lies about due north and south. The strata met with thus far in excavating the tunnel are: boulder clay and limestone, limestone, boulder clay interbedded with gravel and silt, and again limestone, through which they were now driving. From the top of the tunnel (which runs under the western spur of Haw Bank Quarry) a magnificent and expansive view was obtained, right in front being Embsay Crag, with the pretty village of Embsay nestling beneath; sweeping eastwards came Halton Heights, with the thickly-wooded hamlet of Halton East; further on, Simon's Fell and Beamsley Beacon. Turning to the south-east could be seen one of the long ridges of Skipton Moor; on the opposite side of the Skibeden Valley (along which the direct road from Skipton to Ilkley runs, thence through Draughton, by Chelker Reservoir, and down into Addingham), westwards, the horizon could be seen bounded by Pendle Hill and Longridge Fell, in Lancashire; working round northwards we had the gritstone peaks of Flasby Fells and Rylstone Fell, till the circuit was completed by Crookrise and Deer Gallows on Embsay Moor—one of those majestic stretches of landscape which enables the geologist to grasp the physical features around him. A short walk brings one to the other entrance to the tunnel, which is approached by Cutting No. 5a, a little over 600 yards in length, and greatest depth 60 feet (at the

mouth of the tunnel). The lowermost bed was again the stiff, blue, stony till, overlaid by fine loamy sand, showing bedding planes, some being cross-bedded, this being capped by another clay, the latter being probably re-arranged glacial beds. This cutting occasioned considerable outlay from the cost of draining and strengthening the slopes with dry rubble counterposts. The railway was now left for a short time, the cutting being ascended, and a detour made by a long subterranean passage into the famous Haw Bank Quarry (commonly called Skipton Rock). This quarry is worked by the Leeds and Liverpool Canal Company, and the limestone, which is used for iron smelting, road metal, etc., is taken along a tramway (worked by steel wire ropes from the engine-house at Embsay) down to a branch of the canal behind Skipton Castle, and there tipped into boats. The section displayed in this immense quarry is of absorbing interest to the geologist, not only from its stupendous size, but also that it reveals so clearly the stratification on the north side of the great Skipton anticlinal. The height of the quarry is 255 feet, and the strata, which are composed of dark grey and blackish limestones, with thin beds of black shale intervening, dip at the western end of the quarry from 40 to 55 degrees W.N.W. Proceeding eastwards, the dip increases until it reaches 80 degrees, that is, nearly vertical. This is one of those majestic examples of geological phenomena never to be forgotten by the beholder. At the south side of the anticlinal ridge of Haw Bank was seen the Skibeden Quarry. Here the same beds of dark grey, blackish compact limestone were observed, precisely similar to those of Haw Bank in composition. It will be remembered that at Haw Bank, just at the other side of the ridge, the beds had a rapid dip to W.N.W. Here at Skibeden, the exposed limestone dipped sharply to the S.E., or just in the contrary direction. Nothing could more conclusively prove that here we saw part of the opposite bend of the anticlinal. This is owing to the great disturbances which have altered the original lie of the carboniferous rocks in Craven, the effect of which we see in the complicated system of faults, known collectively as the Craven Fault. In South Craven the anticlinals bring up the limestones between the shales and grits of the Yoredale and millstone grit series. The synclinals on each side of the valley, forming the hills, are composed of course of the latter rocks. The fact of the anticlinals usually forming valleys, whilst synclinals form high ground between them, seems at first sight somewhat paradoxical; but, as Topley and others point out, the synclinals, being compressed and compact, are apt to resist denudation, whilst anticlinals, from their being broken up or fissured at the summit, would be readily acted

upon by atmospheric agencies. Thus, says Geikie, 'that which in geological structure is a depression, has by denudation become a great mountain, while what is an elevation has been turned into a valley.' Mr. J. E. Bedford states that the period of these disturbances has been fixed between the end of the Carboniferous and the beginning of the Permian formation, during the period of denudation existing between the two eras. The railway was now resumed, which had been carried from Cutting No. 5a upon a low embankment nearly a mile in length. In one part a deposit of peat had been met with, and in other parts soft silty clay, which caused the foundations of four bridges near Embsay to be very costly, it being necessary to sheet pile, and excavate to a considerable depth. Embsay Station will be on the side of this embankment, immediately below the village of that name. For about 900 yards further the railway runs in a shallow cutting and along another embankment, till we reach Cutting No. 6, a little over 1,000 yards in length, with a maximum depth of 31 feet. This was cut through gravels, sands, and clays at each end; but in the centre, under Holywell Lane, arose a boss of limestone. This is the summit of the line, the level of the rails at this part being 513 feet above the sea, the fall to Skipton Station being 183 feet, and to Ilkley 201 feet. A little to the north of this was observed a small quarry of limestone, which presented a contorted appearance. A shallow embankment, about 700 yards in length, was now crossed, having boggy land on either side. Here a peat deposit about 14 feet in thickness had been met with, and thus another engineering difficulty had to be faced. Thus branches of trees have been spread on the ground, and interlaced, to prevent, if possible, the embankment breaking through the harder crust of warp and earth overlying the peat. Cutting No. 7 was now traversed, about 1,100 yards in length, and a greatest depth of 14 feet. This was mostly cut through clays, gravel, and sand. At Draughton Bottom another detour from the railway was made, and close to the line on the south a new quarry of limestone has been opened, which has proved to be a good stone for building. The hill was then ascended to view that section which is, by common consent, the most remarkable geological feature in South Craven, and as such ranks amongst the chief in the whole county. Seen casually by an ordinary observer, entirely innocent of geological knowledge, it at once produces feelings of astonishment; but to a geologist it becomes a kind of scientific shrine, worthy of a long pilgrimage to behold. It certainly should be carefully preserved, so that future students may have the benefit of it. This section is in a quarry behind the Matchless Inn, at Draughton, a name which the members

thought had also a special fitness for the section. The strata of the earth's crust are sometimes disturbed and bent into folds; the basins or troughs of these undulations are called synclinals, the saddles or ridges have the name of anticlinals. Now, in this quarry at Draughton, within a distance of some 30 yards, the beds of limestone bend, without breaking, into two sharp anticlinals, with corresponding synclinals, that is, roughly speaking, in the shape of an inverted W; to give a better idea of the extent of this contortion, it may be stated that these beds dip respectively, beginning at the left or north side of the section, 60 degrees N.W., 52 degrees S.E., 75 degrees N.W., and 10 degrees S.E. The rock thus bent is the mountain limestone, very similar in composition to the Skipton Rock already named. As Mr. J. E. Bedford has so concisely pointed out, there are three great leading causes to account for this splendid example of contortion—firstly, immense lateral pressure; secondly, the slow and very gradual operation of the same; and thirdly, the pressure during this crumpling of a vast thickness of overlying strata, since removed by denudation. These causes have brought about what we here see—the hard limestone, originally horizontal, bent without breaking into these sharp folds in so short a distance like so much paper. On the north side of the quarry was observed a splendid example of ‘slickensides,’ or the smooth surface of one side of a fissure, caused by friction; it was finely polished, and the groovings or striæ were remarkably distinct. A little way from this section a hurried glance was taken of the Wheelam Rock Quarry, where is another fine example of contorted limestone beds. The limestone here has a dip of 65 degrees S.S.E., but inside the quarry the beds tilt up again, and form a striking example of a synclinal or trough. The railway was again resumed, and an embankment traversed, about 1,000 yards in length, under which was found, in foundations for bridges and culverts, hard black and brown shales. A short walk brought the party to a point where the line passes through the lower side of a quarry, belonging to the Duke of Devonshire, and worked for limestone, this being used for road metal, and also some being burnt for agricultural purposes. This quarry, known as the Hambleton Rock, is famous for presenting, on a majestic scale, evidence of the great geological disturbance already referred to. Here again, the mountain limestone, originally laid down in deep and tranquil water in a fairly horizontal position, has been contorted in a most extraordinary manner. On the eastern side of the quarry could be seen the various beds of shale and limestone (which were very distinctly laminated) dipping to the N.W. at an angle of about 40 degrees, then turning at a sharp angle and becoming vertical. The beds were seen to

continue thus vertical to the west side of the quarry, and, indeed, near the summit of the section in one spot were noticed even to turn over a little upon themselves, thus actually reversing the order of deposition. The dark-coloured limestone was seen to be traversed by innumerable veins of calcite, which were noticed, generally speaking, to be approximately transverse to the surface of the beds. An embankment was now passed over about a quarter of a mile in length, on which will be situated the Bolton Bridge Station, distant from the Devonshire Arms about three-quarters of a mile. The cutting No. 9 was then entered, about 400 yards in length. The greatest depth of it is 31 feet, and here we arrive at the next division of the Carboniferous formation—the Yoredale rocks. These consist largely of black shales, but contain also beds of earthy and sandy limestones and sandstones. In this particular cutting the beds observed were black shales (dipping to the S.E. at an angle of 25 degrees), and a little further on were noted some beds of black limestone, which had thus been stained by decomposed organic matter, most probably fish remains, for, on breaking pieces off, a peculiar fetid smell was felt, somewhat resembling that from petroleum. The dip soon caused these strata to disappear, their place being taken by a drab-coloured fine-grained gritstone, full of detached specks of mica. This was evidently a good and valuable stone, as it had been used for bridges, etc. We then emerged upon an embankment about 350 yards in length, and this point was an excellent vantage ground for a fine view of the heather-clad and lofty grit summit of Beamsley Beacon, also of the beautiful valley of the Wharfe and Bolton Woods. Another cutting about 300 yards long will at this point have to be made for the further progress of the line, but is not yet commenced. We now arrived at the deep, well-wooded ravine of Lob Gill, cut through the Yoredale shales by the action of a small rivulet. Here and there the shales were exposed, weathering into their original state of clayey mud. The ravine will eventually be crossed by a viaduct of five arches, at a height of 70 feet above the bed of the stream. The cutting No. 10a was now traversed, about 300 yards in length, with a maximum depth of 26 feet. The black shales were here observed to be slickensided. Layer after layer was detached, all presenting the same fine glossy polish. The movement of the mass must therefore have been general. Slickensides are often found traversing beds in the neighbourhood of a fault, but in this case the beds of shale having a sharp dip, this effect would probably be produced by the beds of shale slipping upon each other. Another short embankment, about 200 yards in length, was then crossed to cutting No. 11, about 250 yards in length, with a maximum

depth of 17 feet. For about 70 yards at the Skipton end of the cutting a yellow clay was noted, filling up a depression in the strata. Then the gritstones re-appeared, the latter becoming, as we passed, more shattered in their character, and containing concretions or nodules largely charged with iron. When broken, these nodules displayed quite a number of concentric coats. In this cutting, also, nearer the Ilkley end, the sandstone was observed interbedded with shales, the former, in one good example, stretching like a tongue into the latter. Crossing another embankment, a little over 300 yards in length, we entered cutting No. 12, about 530 yards long, with a maximum depth of 10 feet. This was cut through a yellow stony clay, but no large boulders were seen. An embankment, nearly 600 yards in length, had now to be traversed to reach cutting No. 13, which was entirely cut through boulder clay. It had a length of 300 yards, and its greatest depth was 22 feet. Some large boulders of encrinal limestone, with ice scratches, had been taken out of this clay, and also others of gritstone, some yellowish, some various shades of a red colour. An embankment some 500 yards in length brought the party to the point where the railway crosses the main street of Addingham by a bridge of 52 feet span. We now went a short distance into a cutting which will be eventually 1,300 yards long, to note the boulder clay through which it is cut. It is of two characters, the upper being a yellow clay, containing principally blocks of local gritstone; the lower division being a stiff, dark-blue, most tenacious till, containing a quantity of rounded and subangular blocks of limestone and sandstone, many of the former being ice-scratched. The blocks of limestone were observed to be much more numerous in the lower division than in the overlying yellow clay. The few remaining cuttings in the Ilkley direction are also through similar clays, some showing the junction in a more marked manner, but they do not call for any detailed notice. The copious information supplied by Mr. Wilson, the engineer to the line, and the careful and skilful leadership of Mr. C. Brownridge, F.G.S., on both occasions, alike deserve unstinted praise.

NOTE—BOTANY.

The Fly Orchis near Wetherby.—Early this month (June) I had a walk to West Woods, Bramham, passed along the rich (botanically) old straggling Dalton Lane, with its wealth of roadside brushwood and rare plants, such as Columbine, Barberry, Buckthorn, Spindle Tree, Meadow Rue (*Thalictrum flexuosum*), and the grass *Melica nutans*, found some pure white Hyacinths in the wood, and on a dry heathy bank at the north end of the wood, whilst picking up a few pink specimens of the Milkwort, great was my delight to stumble on four or five specimens of the Fly Orchis (*Ophrys muscifera*). I may say that for several years I have made annual visits to these woods, but have never before noticed this rare and curious orchid.—J. JACKSON, Wetherby, June 14th.

COLEOPTERA OF THE LIVERPOOL DISTRICT.

JOHN W. ELLIS, L.R.C.P., L.R.C.S.E., F.E.S.,

Liverpool; Honorary Secretary, Lancashire and Cheshire Entomological Society.

PART XI:—LONGICORNIA.

(Read before the Lancashire and Cheshire Entomological Society, April 25th, 1887.)

THE beetles belonging to the group Longicornia have received the popular name of 'longhorns' from the extreme length of these appendages, more especially in the male sex, in the typical species of the group. In *Astinomus ædilis*, for instance, a species found occasionally in the pine forests of Scotland, the antennæ are four or five times the length of the body, and when the beetle flies, are carried trailing behind it. The group is one very rich in species, including many of the giants of the insect world, such, for instance, as the great *Prionidæ* and Harlequin beetles of America. In Britain, however, the group is very poorly represented, only about fifty-five species being included in the latest catalogues, and while some of these are extremely rare, others have most probably been introduced from the continent of Europe or from North America in timber. The insects live in their larval state, often for several years before arriving at maturity, in the interior of trees, doing great damage to the wood, and not confining themselves to the bark and surface layers of the wood, as is more frequently the case with other timber-feeding beetles. Depending as they do, then, for sustenance on trees, more especially oak, willow, and the species of *Pinus*, they are more frequently found in the neighbourhood of the larger woods and forests, and in a sparsely-timbered district like ours their occurrence in numbers or in variety of species cannot be expected; and, indeed, I am at present only able to record seven species as having been captured in the neighbourhood, though I feel sure that careful examination of the Eastham and Bromborough woods on the Cheshire side of the river, and of those at Croxteth on the Lancashire side, would add many species to our local fauna.

The perfect insects are in the habit of sunning themselves on flowers, more especially on those of the larger Umbelliferæ, but also on the clusters of *Spiræa ulmaria* (meadow-sweet) and mountain-ash, and on such plants when growing in the rides or on the outskirts of woods is the best place for the collector to obtain 'long-horns.'

Fam. *CERAMBYCIDÆ*.

AROMIA, Serv.

Aromia moschata, L. The Musk Beetle, a species which has received this cognomen from the powerful odour, of roses rather than of musk, which is diffused from the living insect, occurs sparingly in our neighbourhood. In its larval state it lives in the timber of old willows, upon or about which trees the perfect beetle may be found in the summer. The late Thomas West used to take it freely in old willows near Crosby, and though these trees have now been destroyed, it still occurs both in the Crosby and Formby districts, and also, as I have been informed by Mr. Gregson, in similar situations in the lanes about Wallasey.

CLYTUS, Fab.

Clytus arietis, L. Several of the more conspicuous 'long-horn' beetles have received popular names, and this, from its yellow-banded black body, is frequently known as the 'Wasp Beetle.' The perfect insect may occasionally be observed sunning itself on railings and gate-posts, in which it has fed during the larval state. I have met with it several times about Bromborough, and I once captured a (possibly imported) specimen in Stanley Street, Liverpool.

Fam. *LAMIADÆ*.

LEIOPUS, Serv.

Leiopus nebulosus, L. Mr. Wilding and myself have each met with single specimens of this species in Eastham Wood.

POGONOCHERUS, Serv.

Pogonocherus pilosus, Fab. (= **hispidus**, Thoms.). I have a single specimen of this species, captured in Eastham Wood in May 1883.

Fam. *LEPTURIDÆ*.

RHAGIUM, Fab.

Rhagium inquisitor, L.

Rhagium bifasciatum, F.

Both these species are occasionally met with in Eastham Wood and in the fir-plantations about Bidston and Storeton.

GRAMMOPTERA, Serv.

Grammoptera ruficornis, F. A small species recorded from Rock Ferry and Eastham (obtained from hawthorn blossom in June 1862) by Mr. F. Archer.

PART XII:—EUPODA.

In the Tetramerous division of the Coleoptera—comprising those beetles which always possess four tarsal joints to each foot, and in which the third joint is bilobed—are included the Longicornia, just alluded to, and the group which next engages our attention, the Eupoda, a group which contains a large number of species of small or moderate size, all of phytophagous habits, and usually having the antennæ filiform and the joints so shaped as to make the organ appear like a string of beads, whence the name *Monilicornia* adopted for the group by some authors. The beetles of this group are marked out into four very distinct (and several less distinct) families, viz., the *Donaciadæ*—beetles averaging about half-an-inch in length and always inhabiting water plants, on the leaves of which they may frequently be found sunning themselves in early summer; the *Chrysomelidæ* or ‘golden-apple’ beetles, remarkable all the world over for the brilliancy of many of the species, though few even of the tropical forms exceed in beauty, though they may excel in size, our somewhat local *Chrysomela graminis* or the very scarce Snowdonian *C. cerealis*; the *Halticidæ*, most of which vie with a lively domestic insect in their powers of leaping, hence the name ‘turnip-flea’ bestowed on two of the members of the genus *Phyllotreta*; and the *Cassididæ*, a small family of most singular structure, which has gained for the individuals the very characteristic name of ‘tortoise’ beetles.

About 240 species of this group are contained in the British lists, and of these I am able to record 47 as having occurred in our own neighbourhood, a number which could be much increased by systematic evening sweeping, for the majority of the species frequent low herbage.

Fam. *DONACIADÆ*.

DONACIA, Fab.

Donacia bidens, Ol. I once took this species in profusion in a pond between Liscard and Wallasey, where it was sunning itself on the leaves of a species of *Potamogeton*.

Donacia sagittariæ, F. I once took a single specimen of this species by sweeping water plants in a drain between Hall Road and Hightown stations.

Donacia sericea, L. Recorded from Rock Ferry by Mr. Archer (diary).

Fam. *CRIOCERIDÆ*.

ZEUGOPHORA, Kunze.

Zeugophora subspinosa, Fab. Abundant on aspens and poplars about Formby.

LEMA, Fab.

- Lema cyanella**, Fab. Frequently taken by road-side sweeping among mixed herbage.
- Lema melanopa**, L. Occurs sparingly with *L. cyanella*; rather more frequently about Dibbinsdale and Bromborough.

Fam. *CLYTHRIDÆ*.

CRYPTOCEPHALUS, Geoff.

- Cryptocephalus aureolus**, Suffr. Recorded by Mr. F. Archer as 'Common on the New Brighton sand-hills (on sunny days only) in the flowers of *Hieracium pilosella* and dandelion, May and June' (Liverpool Nat. Scrap-book, p. 169). Also captured at Wallasey by Mr. Wilding.

Fam. *CHRYSOMELIDÆ*.

CHRYSOMELA, L.

- Chrysomela staphylæa**, L. Frequent among flood-refuse on the Hightown and Aigburth shores; also at Eastham (J.W.E., R.W.).
- Chrysomela hæmoptera**, L. I captured a pair of this species under a stone behind the Leasowe embankment in October 1885.
- Chrysomela polita**, L. Occasionally about Eastham, frequently found hiding under clods of earth in the fields through which the path from Bromborough to Eastham Ferry runs.
- Chrysomela hyperici**, Forst. I have taken a single specimen in Eastham Wood, where it was hibernating at the foot of a tree.

GASTROPHYSA, Redt.

- Gastrophysa polygoni**, L. Common and generally distributed.
- Gastrophysa raphani**, Fab. I once met with this pretty species among flood-refuse on Bidston Marsh.

PHÆDON, Latr.

- Phædon tumidulum**, Germ. Frequently obtained by road-side sweeping.
- Phædon cochleariæ**, Fab. (= **betulæ**, W.C.). Plentiful beneath moss on the bridges over the Fender on Bidston Marsh, in late autumn, and also elsewhere occasionally by sweeping.

PHRATORA, Redt.

Phratora vitellinæ, L. Very abundant on willows and osiers, especially about Hightown and Formby. Near Ormskirk this species causes great damage by destroying the osiers used for basket-making.

PRASOCURIS, Latr.

Prasocuris marginella, L. Frequent in damp places about Liscard and Wallasey, where it is usually obtained by sweeping (J.W.E., R.W.).

Prasocuris phellandrii, L. Liscard, in a damp place, by sweeping (J.W.E.); 'in profusion in a ditch on the other side of the embankment of the straight *lode* on Bidston Marsh, April 1862' (F. Archer, diary).

Prasocuris beccabungæ, Ill. With the above (F.A., diary).

ADIMONIA, Laich.

Adimonia tanaceti, L. Recorded from New Brighton sand-hills, in October, by Mr. Archer (Liverpool Nat. Scrap-book, p. 168).

Adimonia suturalis, Thoms. In profusion among heath at Bidston and on Oxtan Common.

AGELASTICA, Redt.

Agelastica halensis, L. Abundant during August and September among *Galium verum* on the Wallasey sand-hills. Also at Hoylake, on the Warren.

LUPERUS, Geoff.

Luperus betulinus, Fourc. I took a single specimen of this species at Wallasey in July 1883.

Fam. HALTICIDÆ.

CREPIDODERA, All.

Crepidodera transversa, Marsh. Crosby (F. Archer, diary); on herbage on the banks of the Alt at Hightown, abundant on several occasions (J.W.E.).

Crepidodera ferruginea, Scop. Abundant everywhere.

Crepidodera aurata, Marsh. I have a specimen taken by sweeping at Bromborough.

Crepidodera modeeri, L. Crosby (R.W.); Wallasey (J.W.E.).

MANTURA, Steph.

Mantura rustica, L. New Brighton, May 1860 (B. Cooke, diary); Wallasey and Crosby (J.W.E.).

PHYLLOTRETA, Fondr.

Phyllotreta undulata, Kutz. Abundant by road-side sweeping (I have not yet found *the* turnip-flea *par excellence*, *P. nemorum*, in this district. Its place as a turnip-leaf feeder is probably supplied here by the species under notice).

Phyllotreta sinuata, Steph. I have met with this species at Bromborough and Leasowe.

Phyllotreta tetrastigma, Com. Taken by myself at Leasowe, October 1885.

PLECTROSCELIS, Redt.

Plectroscelis concinna, Marsh. Common by sweeping among road-side herbage.

THYAMIS, Steph.

Thyamis lurida, Scop. Frequent by road-side sweeping at Spital, Bromborough, etc.

Thyamis fuscicollis, Steph. I have taken this species at Aigburth and Spital.

Thyamis melanocephala, Gyll. Wallasey (J.W.E.).

(**Thyamis cerina**, Fondr. I have a specimen of a *Thyamis* which I collected at Wallasey, and which I refer to this species, but am not quite sure as to the correctness of my diagnosis.)

Thyamis tabida, Panz. (= *jacobæa*, W.C.). Very abundant on the Crosby and Wallasey sand-hills, on ragwort.

Thyamis ochroleuca, Marsh. Hightown, a single specimen only.

PSYLLIODES, Latr.

Psylliodes chrysocephala, L. Crosby.

Psylliodes marcida, Ill. I have taken this species on several occasions by sweeping at Wallasey.

Psylliodes cupro-nitens, Forst. Wallasey, a single specimen only.

Psylliodes affinis, Payk. Usually abundant on the Hightown and Wallasey sandhills.

Psylliodes picina, Marsh. I took this species freely on a single occasion at Formby.

APTEROPEDA, Redt.

Apteropeda graminis, Panz. I once took this pretty little species at Bidston.

SPHÆRODERMA, Steph.

Sphæroderma cardui, Gyll. Abundant on thistles at Crosby (R.W.) and Hightown (J.W.E.).

Fam. *CASSIDIDÆ*.

CASSIDA, L.

Cassida vibex, L. (= *rubiginosa*, Müll.). Recorded from Hightown, September 1862 (F. Archer, diary).

Cassida sanguinolenta, Fab. I have taken this species on the Aigburth clay-banks, and also on the sand-hills at Wallasey.

Cassida obsoleta, Ill. Southport, September 1864 (B. Cooke, diary).

PART XIII:—PSEUDOTRIMERA.

The small but pretty insects comprised in this group are known to every one, not in England alone, but on all parts of the continent, as 'lady-cows' or 'lady-birds,' and they form a family now classified as a portion of the great group of Clavicornes, but which were formerly separated under the name given above, from their possessing apparently only three joints in each tarsus—the number being really, however, four, the minute third joint being concealed in the bilobed second.

The group is not rich in species, only forty-five being included in the British list, and of these I am able to record nineteen as having occurred in this district. The larvæ of these insects have to be reckoned among the agriculturists' best friends, for they, and it is said also the perfect 'lady-cows,' feed on aphides or plant-lice, devouring in a short time immense quantities of these injurious insect pests.

Fam. *COCCINELLIDÆ*.

HIPPODAMIA, Muls.

Hippodamia mutabilis, Scrib. Sometimes very abundant on the coast sand-hills on both sides of the river.

COCCINELLA, L.

Coccinella obliterata, L. I have several times met with this very distinct species at Eastham and Storeton.

Coccinella bipunctata, L. Very abundant everywhere, and so variable as to be a perfect puzzle to beginners.

Coccinella variabilis, Fab. Very abundant in Eastham Wood, at Bidston and Stourton, and on birches on Simmonswood Moss.

Coccinella 11-punctata, L. Very abundant, especially on the sand-hills.

Coccinella 7-punctata, L. This, the large seven-spot lady-bird, used to be very common in the immediate vicinity of Liverpool, especially on the ground behind Wavertree Park, where the exhibition now stands, but I have only met with it very sparingly during the last ten years.

Coccinella oblongo-guttata, L. A very beautiful and variable species, which occurs in abundance in the Storeton fir-plantations.

Coccinella ocellata, L. Occasionally along with *C. oblongo-guttata* at Storeton.

Coccinella 18-guttata, L. Abundant with the two preceding species.

Coccinella 14-guttata, L. I have a single specimen of this species which I took several years ago, I believe, at Bidston.

Coccinella 22-punctata, L. This pretty little species occurs abundantly during some seasons, and is scarcely met with in others. Wallasey (J.W.E., J.H.S.); Spital and Eastham (J.W.E.).

MICRASPIS, Redt.

Micraspis 12-punctata, L. Not common. Bidston (J.W.E.) and Thurstaston (J.H.S.).

CHILOCHORUS, Leach.

Chilochorus renipustulatus, Scriba. Bidston Hill, on a single occasion (J.W.E.).

Chilochorus bipustulatus, L. Bidston Hill (J.W.E.); Hightown, September 1862 (F. Archer, diary).

PLATYNASPIS, Redt.

Platynaspis villosa, Fourc. I took a specimen of this rare species in flood-refuse on the bank of the Alt at Hightown in May 1882.

SCYMNUS, Kug.

Scymnus frontalis, Fab. New Brighton, May 1860 (B. Cooke, diary); Wallasey (J.W.E.).

Scymnus discoideus, Ill. Common on pines at Storeton, Bidston, and on Simmonswood Moss.

RHIZOBIUS, Steph.

Rhizobius litura, F. Common on the sand-hills and by sweeping road-side herbage.

COCCIDULA, Kug.

Coccidula rufa, Herbst. Common at the roots of grass and by sweeping road-side herbage.

**THE YORKSHIRE NATURALISTS' UNION
AT SALTBURN.**

THE opening meeting of the year 1887 was fixed for Saltburn-by-the-Sea on Whit-Monday, the 30th of May, and was well attended by members and associates. Two lines of route were marked out—one along the coast, in which ornithologists and geologists co-operated; while the other, which pursued the course of the Skelton Beck from Guisborough to Saltburn, commanded the attention of the numerous botanists, the few entomologists, and the unusually strong array of conchologists. All joined in the afternoon at the Parochial Hall, which the vicar and churchwardens had kindly placed at the Union's disposal.

After tea and the usual sectional meetings, the general meeting was opened at 6 o'clock, the Rev. E. Maule Cole, M.A., vice-president, in the chair. Time being short, the minutes were taken as read. Two new societies—the Craven Naturalists' Association (Skipton) and the Thirsk Natural History Society—were then unanimously admitted into the Union. The list of new Members, who were then elected, included the Rev. A. St. Clair R. Brooke (Slingsby Rectory), Mr. A. Craig-Christie, F.L.S. (secretary of the Scottish Natural History Club, Edinburgh), Mr. Charles Crossland (Halifax), Mr. E. B. Emerson, B.A., J.P. (Redcar), Mr. Ald. John Hill (Morley), Mr. Baker Hudson, M.C.S. (Redcar), Rev. J. H. Mackie, M.A. (Sedbergh), Mr. J. B. Manning (Governor of H.M. Prison, Wakefield), Mr. J. M. Meek (Redcar), Mr. W. H. S. Pyman (Whitby), Mr. William Robinson (Sedbergh), Mr. Frank Rowntree (York), Mr. Thomas Tate, F.G.S. (Leeds), Mr. J.W. Watson (Redcar), and Rev. Arthur Watts, F.R.G.S., F.G.S. (Bede College, Durham). The roll of societies in the Union was then called, showing that representatives from twelve of them (Cleveland, Driffield, Harrogate, Hull, Leeds (four societies), Malton, Practical N.S., Ripon, and York) were present. It was then resolved that Mr. C. P. Hobkirk, F.L.S., Dewsbury, be requested to represent the Union at the Manchester meeting of the British Association. It was resolved next, on the motion of Mr. Clarke, seconded by Mr. J. C. P'Anson, F.G.S., that the Kendal Natural History Society be invited to take part in the excursion to Sedbergh. It was then resolved, on the motion of Mr. Chas. Brownridge, F.G.S., Leeds, seconded by Mr. S. Jefferson, Leeds, and supported by Mr. W. Eagle Clarke, F.L.S., that the thanks of the Union be voted to Lord Zetland for permission to visit his estates, to the Vicar and Churchwardens of Saltburn for the use of their Parochial Hall, and to the gentlemen who had led the various parties during the day. The sectional

reports were then taken, so far as the very limited time remaining allowed of its being done.

The Vertebrate Section report was furnished by Mr. James Backhouse, jun., M.B.O.U., the secretary to the section, who had, however, to leave before the meeting took place. He stated that in all 45 species of birds were observed: 28 Residents and 17 Migrants. As the district has not been at all thoroughly searched ornithologically, we herewith append a complete list of those species observed on the excursion, as a reference to facilitate future research. Had the day been somewhat finer, it is probable that a better list would have been the result, but the prevailing mist rendered observation difficult. The list is as follows:—*Residents*: Blackbird, Song Thrush, Missel Thrush, Dipper, Chaffinch, Greenfinch, Yellow Bunting, Hedge Accentor, House Sparrow, Skylark, Pied Wagtail, Grey Wagtail, Long-tailed Tit, Great Tit, Blue Tit, Cole Tit, Creeper, Wren, Rook, Jackdaw, Starling, Pheasant, Ring Dove, Stock Dove, Common Gull, Herring Gull, Kittiwake, Cormorant. *Migrants*: Wheatear, Whinchat, Sedge Warbler, Blackcap, White-throat, Chiffchaff, Willow Warbler, Wood Warbler, Grasshopper Warbler, Tree Pipit, Swallow, Martin, Sand Martin, Swift, Spotted Flycatcher, Cuckoo, Common Sandpiper.

In the absence of the officers of the Conchological Section, Mr. Baker Hudson reported that a total of 31 land mollusca had been taken during the day, *Limnæa peregra* being the only freshwater species observed. On the arrival of the party at Saltburn, at ten o'clock, and pending the departure of the Guisborough train at 11-40, a short examination of the sea-banks below the Zetland Hotel was made, the results being *Limax agrestis*, type and var. *sylvatica*, *Helix nemoralis*, *H. hispida*, *H. caperata*, and *Zua*. On arriving at Guisborough the party started for a wood named 'Tocketts,' where some little halt was called, and the following were met with:—*Arion ater* and var. *marginata*, *A. hortensis* and var. *subfusca*, *A. bourguignati*, *Limax agrestis*, *L. arborum*, and *L. lævis*—this latter abundantly. Under fallen timber, and in the damper portion of the wood, *Zonites alliarius*, *Z. nitidulus*, *Z. purus*, *Z. crystallinus*, *Z. fulvus*, *H. rotundata*, *Clausilia rugosa*, *C. laminata*—these two fairly abundantly. A single specimen each of *Helix aculeata* and *Vertigo edentula* came to hand, and *Carychium* was common wherever there was moisture. Leaving 'Tocketts,' the route was taken along Skelton Beck to Howl Bridge, between which and Skelton Mill, in addition to the species already mentioned, the following were taken:—*Limnæa peregra* (in pool near Howl Bridge), *A. ater* vars. *palescens* and *succinea*, *A. subfuscus* (fine), *Limax agrestis* var. *nigra*, *Vitrina*, *Zonites*

cellarius, *Helix arbustorum*, *H. sericea*, and *Succinea putris*. Entering the Saltburn Woods below Skelton Mill, *Helix hortensis* var. *lutea* ooooo turned up, whilst *Pupa umbilicata*, *Helix concinna*, and *Azeca* were met with, though not in any abundance. The following may be said to be common throughout the dale:—*Clausilia laminata*, *Helix rotundata*, *Helix arbustorum*, *Helix sericea*, and *Limax lævis*.

Mr. Hudson stated that the finding of *Helix hortensis* confirmed a previous record of his, and further extended the range of the species in the district; his present records, all made within the past six years, are Thornaby near South Stockton, near Stokesley (road-side), Airey-holme Wood near Great Ayton, near Skelton (road-side above woods), and Saltburn Wood.

For the Entomological Section there was no report given at the meeting, the president of the section (Mr. N. F. Dobrée, of Beverley) having to leave by an early train. Not very much was done, however, the principal note being by Mr. John Braim, of Pickering, who had taken the larvæ of *Pterophorus dichrodactylus* in stems of tansy, and had taken some other insects of less note.

For the Botanical Section, Mr. Matthew B. Slater, cryptogamic secretary, the only officer of the section present, reported that the botanical members started from Guisborough, whence they followed the course of the stream, which winds down the valley and empties itself into the sea at Saltburn; Mr. R. Barnes, superintendent of the Public Gardens at Saltburn, acting as guide. Mr. Barnes having now resided some few years in the district, was able to lead the botanists to the most likely localities for finding plants in flower at this early season. Unfortunately, a dense fog prevailed during the whole of the day, and only a glimpse of the beautiful wooded scenery of the lower part of the glen could be obtained; sufficient, however, to enable members to judge how fine the landscape would have been with bright and sunny weather. Saltburn was reached about 5 p.m., when the various gatherings were looked over, the result being that about eighty flowering plants were recorded as seen in flower. The following list comprises some of the rarer plants seen:—*Helleborus viridis*, *Cardamine amara*, *Myrrhis odorata* (fine masses of this beautiful umbellifer met with, growing by the stream-side), *Petasites vulgaris*, *Glaux maritima* (growing on the coast), *Cochlearia officinalis*, *Myosotis sylvatica*, *Atropa belladonna* (not in flower), *Mentha viridis* (a large patch of this, the ordinary Spearmint of gardens, seen growing by the stream-side, evidently thoroughly naturalized), *Lamium purpureum* (this common plant was growing in abundance by the hedge-sides, whilst its near congener, *Lamium album*, a plant so common on our limestone soils, was not seen, and

is apparently wanting in the district), *Orchis mascula* (the only orchid seen), *Iris fetidissima* (a patch of this rare plant seen growing in the glen; not in flower, however, at this early season), *Asperula odorata*, *Prunus padus*. Large masses of *Allium ursinum* and *Scilla nutans* were growing under the trees in the woods, in some places almost to the exclusion of all other vegetation. Owing to the long continuance of easterly winds, vegetation has been much retarded this spring, and only a few of the earliest flowering grasses were met with in bloom, including *Melica uniflora*, *Bromus mollis*, *Anthoxanthum odoratum*, *Alopecurus pratensis*, *Poa annua*, *Lolium perenne*. The common Hart's-tongue (*Scolopendrium vulgare*) was the only fern observed. The finely-wooded glens of the district, however, must be the homes of some of the rarer British ferns, which would be met with during the autumnal months.

The district is particularly rich in Mosses and Hepatics; a ramble, however, of a few hours down one valley is quite inadequate to gain much knowledge of the plants of the country in this branch of botany. Fortunately, Mr. R. Barnes is a good bryologist, and having resided some few years at Saltburn, has searched some portions of the country well during the past two years, and he has succeeded in gathering some of our rarest British mosses. The following list includes such as he has kindly sent specimens of from his collections, all obtained by him in the surrounding neighbourhood:—

MOSESSES.

- | | |
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| <i>Campylostelium saxicola</i> W. & M.,
Kilton Wood. | <i>Trichostomum crispulum</i> Bruch, Easington Gill. |
| <i>Eucladium verticillatum</i> L., Rushpool. | <i>Trichostomum tophaceum</i> Brid., Easington Gill. |
| <i>Pottia lanceolata</i> Dicks., near Marske Mill. | <i>Trichostomum littorale</i> Mitt., Kilton Wood. |
| <i>Anium subglobosum</i> B. & S., Codhill Bog. | <i>Ptychomitrium polyphyllum</i> Dicks., Slape Wath. |
| <i>Didymodon flexifolius</i> Dicks., Easby Moor. | <i>Ditrichum homomallum</i> Hedw., High Cliff. |
| <i>Bartramia ithyphylla</i> Brid., Spanghorn. | <i>Ditrichum flexicaule</i> Schwg., Hunt Cliff. |
| <i>Andreaea petrophila</i> Ehrh., High Cliff, Guisborough. | <i>Racomitrium aciculare</i> L., Moorsholm Mill. |
| <i>Brachyodus trichodes</i> W. & M., Rushpool. | <i>Orthotrichum saxatile</i> Brid., Marske Mill. |
| <i>Gymnostomum tenue</i> Schrad., Easington. | <i>Orthotrichum rivulare</i> Turn., Kilton Beck. |
| <i>Barbula aloides</i> Koch, Marske Mill. | <i>Schistostega osmundacea</i> Dicks., near Guisborough. |
| <i>Dichodontium pellucidum</i> L., do. | <i>Fissidens viridulus</i> Wils., Saltburn. |
| Do. var. <i>serratum</i> , Kilton Glen. | <i>Fissidens exilis</i> Hedw., Saltburn. |
| <i>Dicranella squarrosa</i> Schrad., High Cliff. | <i>Fissidens crassipes</i> Wils., Liverton Beck. |
| <i>Dicranella schreberi</i> Hedw. var. <i>elata</i> , Kilton Glen. | <i>Fissidens incurvus</i> Schwg., Saltburn. |
| <i>Dicranella rufescens</i> Turn., Kilton Glen. | <i>Sphagnum fimbriatum</i> Wils., Lounsdale. |
| <i>Dicranum fuscescens</i> Turn., near Guisborough. | |
| <i>Dicranum palustre</i> Brid., Codhill Bog. | |

<i>Sphagnum tenellum</i> Ehrh., Hutton Moors.	<i>Eurhynchium pumilum</i> Wils., Kilton Wood.
<i>Pterygophyllum lucens</i> Sm., Easington Gill.	<i>Eurhynchium teesdalii</i> Sm., Liverton Beck.
<i>Neckera crispa</i> L., Easington Gill.	<i>Eurhynchium swartzii</i> Turn., Saltburn.
<i>Heterocladium heteropterum</i> Bruch, Kilton Beck.	<i>Hycomium flagellare</i> Dicks., Rushpool.
<i>Thuidium blandovii</i> W. & M., near Gainford on the Tees.	<i>Rhynchostegium confertum</i> Dicks., Saltburn.
<i>Climacium dendroides</i> L., in fruit on Guisborough Moor.	<i>Rhynchostegium depressum</i> Bruch, Kilton Wood.
<i>Camptothecium nitens</i> Schreb., Codhill Bog.	<i>Amblystegium sprucei</i> Bruch, near Croft-on-Tees.
<i>Camptothecium lutescens</i> Huds., Saltburn.	<i>Limnobium palustre</i> L., Liverton Beck.
<i>Brachythecium plumosum</i> Sw., Kilton Beck.	<i>Hypnum stramineum</i> Dicks., Guisborough Moor.

The fine shady glens will, no doubt, be the home of many British Hepaticæ, a few of which were gathered during the ramble. These minute plants, however, require careful microscopic examination to determine them accurately, for which task time has not yet been found, so the list of these must remain for a future record.

For the Geological Section the Rev. E. M. Cole gave the meeting a brief sketch of the day's ramble. The more detailed account afterwards furnished by Mr. S. A. Adamson, F.G.S., secretary of the section, was as follows:—The excursion was under the leadership of the Rev. E. Maule Cole, M.A., president of the section, and there was a good attendance of members. Inconvenience was experienced at times from the thick sea fog which floated landwards, filling the valleys and obscuring at intervals the summits of the cliffs, accompanied also by a cold, drizzling rain; but the determination of enthusiastic geologists is not quenched by these matters, and therefore the only impression was that the excursion was being held in November or February instead of Whitsuntide. The railway journey from Saltburn to Kettleless was particularly enjoyed from the grandeur of the scenery passed through, and from the practical evidence displayed of denudation in the deep valleys and gorges excavated in the Liassic shales by the long-continued action of running water. This was particularly noticeable in the neighbourhood of Lofthouse and Easington. On arrival at Kettleless the train was left, and the way taken by winding paths to the shore. The top of the cliff is capped by sandstones of the Lower Oolite, succeeded by those beds containing bands of impure siliceous ironstone known as 'the dogger' or 'top bed,' followed by the main bed of alum shale or zone of *Ammonites communis*. In the upper part of the alum shale the compact calcareous nodules known as cement doggers, and used in the manufacture of hydraulic cement, are

found. The ruins of the alum works and the heaps of calcined débris at Kettleless, as at Boulby, Loftus, and other places on the coast, all speak of the total extinction of an industry which had existed in this district since the days of Queen Elizabeth. Thus for centuries the alum shales of the Lias had been the only source whence alum was produced, and it was only when the enterprise of modern chemists discovered that from coal shales, and by utilising the ammoniacal liquor from gasworks, that much speedier and cheaper results were obtained, that this monopoly perished. Naturally, the long use of the shales of the zone of *A. communis*, as above, has greatly altered the contour and the colouring of the cliffs in many places, for the refuse thrown over has made terraces and mounds with a reddish hue. In an exposure of the shale at this point Mr. Chadwick discovered a fine piece of fossilised wood, showing in section the structure very plainly. Descending, the harder shales of the zone of *A. serpentinus* followed, also the compact bituminous rock, running in bands, or found in cheese-shaped masses, between which the beautiful and familiar mineral known as jet is found ; these beds receive from this cause the name of jet rock. A good opportunity was here offered of observing the stratification and the circumstances under which jet is discovered, as a heading was being driven into the cliff about 8 feet high and about 5 feet broad at the entrance, but much larger inside, and the worker most laboriously hewing away, and industriously searching for jet. One of the nodules was broken, showing the interior to have been filled with bitumen, since hardened into jet, and radiating in numerous cracks or crevices irregularly from the centre. The shales of this zone are not only very bituminous, but are also strongly charged with iron pyrites ; thus, when exposed to the air, as in the cliffs, they will spontaneously ignite, and sometimes burn for years. At different points on the coast, high up in the cliffs at inaccessible elevations of two or three hundred feet, high red patches of calcined shales were seen, resulting from these natural fires. Then succeeded the grey shales of the zone of *Ammonites annulatus*, which, on the present occasion, did not reveal any fossils, although in the balls of argillaceous limestone, which occur here and there, may be found the ammonite which gives its name to the zone. At the base of the cliff the beds constituting the main seam of the ironstone series or zone of *Ammonites spinatus* were noticed. Mr. Chadwick also reported having seen on the beach a large travelled boulder of Shap Fell granite, about 3 feet 6 inches in diameter. The party now skirted the picturesque bay of Runswick, guarded by low cliffs of boulder clay, the latter filling up an ancient valley of preglacial

times. Landslips of greater or less magnitude were noticed *en route*. Just below the village were noticed upon the shore four blocks of Shap Fell granite, varying in diameter from 3 feet to 2 feet. Passing the village of Runswick, the contour of the cliffs changed again. Instead of the receding and easily denuded cliffs of boulder clay, in which the springs and streamlets from the land, aided by the ever-advancing waters of the ocean, make such havoc, thus enabling the Bay of Runswick to gradually but surely extend its area upon the land, the precipitous cliffs of the Lias again appear, having at their base in some places heaps of huge boulders of oolitic sandstone detached from above, in others wide flats of slippery shales extending below low-water mark. Some abandoned ironworks north of Runswick were seen, and we were told their ruin was occasioned in one night by a landslip. In the cliffs, just above the ironworks, there is a fault with a down-throw of about fifty feet to the east. The shales of *A. serpentinus* overlaid the beach near this point, and Mr. S. Jefferson extracted from their face some large crystals of iron pyrites or sulphuret of iron, perfect octahedrons in shape. Several species of ammonites were also noted, but they were of too brittle a character to be brought away as specimens. Mr. Chadwick, ever on the alert in his special subject, fossil sponges, was successful in finding a small specimen in this locality. Special search was made for a single specimen even of an *Aptychus*, or operculum of an ammonite, but without avail. The works at Port Mulgrave were next passed, where a drift is driven into the cliff and large quantities of the valuable Cleveland ironstone obtained. The immense heaps of this material to be seen presented a good opportunity for studying the character and appearance of this valuable mineral. It was of a decidedly oolitic structure, bluish-grey in colour, and evidently porous. By analysis this rock has been described as a carbonate of protoxide of iron, which could not have been deposited in the sea in its present form, and Dr. Sorby concludes, after a minute and deeply interesting examination of every feature connected with this rock, that the Cleveland stone was a kind of oolitic limestone interstratified with clays containing a large amount of oxide of iron and organic matter, which, by their mutual reaction, gave rise to a solution of bicarbonate of iron—that this solution percolated through the limestone, and removing a large part of the carbonate of lime by solution, left in its place carbonate of iron. The sandy micaceous 'grey shales' of *A. annulatus* now appeared, occupying the shore line between Port Mulgrave and Brackenberry Wyke. Many belemnites were exposed upon these shales, and Mr. C. Brownridge, F.G.S., secured a good specimen where the guard projected from a nodule at the end ; the

latter, upon being skilfully broken, revealed the alveolus, a conical cavity containing the phragmacone, divided by thin transverse plates into a series of air chambers. Mr. Hawkesworth and other members obtained amongst other fossils, good specimens of *Pecten æquivalvis* and *Protocardium truncatum*; a fossil fragment of a shell was also obtained, which, not being perfect, occasioned much discussion, but was probably one end of *Dentalium elongatum*. As Old Nab was approached, the ironstone or zone of *A. spinatus* reappeared, and formed a rugged terrace, quickly rising, however, into the cliff. Large quantities of small branching fossil fucoids, interlacing and crossing in infinite multiplicity, covered the surface in many places. The soft sandy shales of the upper part of the zone of *A. margaritatus* next appeared, occupying the scars, and forming the lower part of the cliff between Old Nab and Staithes. Near this part Mr. Brown-ridge found a remarkably fine specimen of *Ammonites ferrugineus*. There are clay ironstone nodules embedded in these shales, which are very fossiliferous, but time did not permit the hammers to be brought into play. On arriving at Staithes, the shore was left, and the way pursued through that picturesque but not over-fragrant village to the railway station for the return journey to Saltburn.

The meeting closed with a vote of thanks to the chairman, and soon after seven o'clock the members were on their way homewards.

NOTES AND NEWS.

Mr. James W. Davis, of Halifax, has recently published, through the medium of the Scientific Transactions of the Royal Dublin Society, a bulky and elaborate account of 'The Fossil Fishes of the Chalk of Mount Lebanon, in Syria,' which runs to 180 quarto pages, and is illustrated by 25 well-executed lithographic plates.

A meeting of the Yorkshire Boulder Committee was held on the 9th June, at Leeds, under the presidency of Prof. Green, F.R.S. After discussing the work of the Committee, and passing two standing orders for future guidance, a number of boulder reports were examined and passed, including the following: 'The Bulmer's Stone, Darlington,' 'The Pierce Bridge Block,' and 'The Sadberge Block,' all by Dr. R. Taylor Manson, Medical Officer of Health, Darlington; 'The Greystone, Leeds,' by Mr. C. D. Hardcastle, President of the Leeds Geological Association; and 'Strap Granite Blocks at Scarbro', by Mr. J. H. Phillips, Secretary to the Scarbro' Scientific and Archæological Society. The discussion of other reports was adjourned to a future meeting. Details of the above reports will duly appear in the *Naturalist*. It may be stated that Prof. Green carefully examined each report personally before the meeting, to ensure its accuracy. One part of the adjourned business was a valuable detailed report by Mr. G. W. Lamplugh, of Bridlington, upon the Coast Boulders between Bridlington and Danes' Dyke, intended to be the first of a series of similar reports. Geologists and readers of the *Naturalist* interested in this work, and knowing of any boulders in their particular district, are desired to communicate with the Secretary to the Committee (S. A. Adamson, F.G.S., 52, Wellclose Terrace, Leeds), who will at once furnish schedules for observations to be recorded upon. It is desirable, too, that such information should not be delayed, in order that it may be presented at the forthcoming meeting of the British Association at Manchester.

Naturalist,

2 JUL. 1887



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BOOKS RECEIVED.

- Science Lectures delivered before the Sunday Lecture Society, Newcastle-upon-Tyne—Small 8vo, cloth, 1887. [Mr. Walter Scott, Publisher.]
Science Gossip, No. 271, for July 1887. [Messrs. Chatto & Windus, Publishers.]
Penzance Nat. Hist. Society.—Report and Transactions, 1886-87. [The Society.]
Scottish Naturalist, No. xvii, for July 1887. [Prof. J. W. H. Trail, Editor.]
The Young Naturalist, Part xci, for July 1887. [Mr. J. E. Robson, Editor.]
The Midland Naturalist, vol. x. No. 115, for July 1887. [The Editors, Birmingham.]
The Wesley Naturalist, No. 5, for July 1887. [Wesley Scientific Society.]
Journal of Microscopy, vol. vi, part 23, July 1887. [Mr. Alfred Allen, Editor.]
Manchester Microscopical Society.—Annual Reports, 1883-4, 1884-5, 1885, and 1886. [The Society.]
The Essex Naturalist, Nos. 5 and 6, May and June 1887. [The Essex Field Club.]
Liverpool Naturalists' Field Club.—Proceedings for 1886-87. [The Club.]
The Smithsonian Report for 1885, Part i. [The Smithsonian Institution.]
Transactions of the Wagner Free Institute of Science of Philadelphia, vol i, May 1887. [The Institute.]
On the Discovery of a Stone Implement in Alluvial Gravels at Barnsley, by S. A. Adamson. Two-page reprint, 8vo, 1887.

Yorkshire Neuroptera and Orthoptera.—I am anxious during the present and several future seasons to work up the Neuroptera and Orthoptera of our county as much as possible, with a view to publishing a list of species, with their localities, etc., and shall be very grateful to all entomologists (or other naturalists) who, when out collecting their own particular groups of objects, will kindly kill and pin (of course they need not trouble to set them) one or two or three specimens of any species they may come across, and send them to me at the end of the season—or oftener if it be not too much trouble. The families in the Neuroptera wanted are the *Libellulidæ* (Dragon-flies), *Perlidæ* (Stone-flies), *Sialidæ*, *Raphidiidæ* (Snake-flies), *Osmylidæ*, *Hemerobidæ*, *Chrysopidæ* (Lacewing-flies), *Coniopterygidæ*, *Panorpidæ* (Scorpion-flies), and the *Trichoptera* (Caddis-flies). The two other British groups, *Psocidæ* and *Ephemeriidæ* (May-flies), I do not propose to touch at present. The Orthoptera include the *Forficulidæ* (Earwigs), *Blattidæ* (Cockroaches), *Acrididæ* (Grasshopper and Locusts), and the *Achetidæ* (Crickets), all of which, with the exception of the several universally abundant and distributed species, are wanted.—GEO. T. PORRITT, Greenfield House, Huddersfield, May 18th, 1887.

Improved Egg Drills (2 sizes) and Metal Blowpipe with instructions 1/3 free. 'Hints on Egg Collecting and Nesting,' illustrated, 3½d. free. Birds' Skins, Eggs (side-blown and in clutches with date), Lepidoptera, Ova, Larvæ, and Pupæ, Artificial Eyes, and all kinds of Naturalists' Requisites. Lists, one stamp. All specimens, &c., sent out 'on approval.'

J. & W. DAVIS (Naturalists), DARTFORD, Kent.

THE 'BLUE STONE' BOULDER, LOUTH, LINCOLNSHIRE.

W. HAMPTON, F.C.S., AND H. WALLIS KEW, F.E.S.,
Hanley. *Louth.*

THE Louth 'Blue Stone' is a subangular boulder of a blue-black colour, about 32 inches in height and about 145 inches in girth, estimated to weigh from four to five tons, which has existed in Louth for centuries, and now rests in the yard of the 'Blue Stone Printing Office' in Mercer Row.

This boulder is, doubtless, a natural monolith of glacial times; its surface, however, does not exhibit definite striae. Unfortunately, its natural position is unknown, but considering its large size and great weight, the presumption is that it was originally found in the immediate neighbourhood of Louth.

After preparing and examining a large number of microscopical sections, we consider the stone to be a typical Dolerite. It consists of crystals of Plagioclase felspar (Labradorite); Augite, very fresh and in large crystals; Titaniferous Iron; a greenish-looking decomposition product (which may or may not represent former Olivine); and brownish stains, which are probably due to the oxidation of the Iron. As the result of our examination did not exactly agree with the conclusions arrived at by one who had previously examined the stone, a section was submitted to Dr. Bonney, who says:—"The slide contains Plagioclase felspar, probably Labradorite; Augite; Iron Oxide (Ilmenite); and a greenish mineral of secondary origin, probably indicating the former presence of a ferro-magnesian-silicate. The replacing mineral is so indefinite in its character that I can hardly venture to give it a name. The structure of the rock is "Ophitic." It is merely a question whether we should call the rock a dolerite or a diabase. It is not a very typical diabase, but is a slightly altered dolerite. So practically your determination is accurate. In Scotland there are many dolerites in this condition, where one man would call them dolerites and others diabases."

Formerly standing at the corner of Mercer Row—the principal street in Louth—this boulder became a great nuisance as a rendezvous for loafers and idlers, on which account it was removed, at a considerable expense, to the premises above-mentioned. These premises were in old time a large county inn, of which the 'Blue Stone' formed the material sign, and there is still in Louth a public-house, known as the 'Blue Stone Inn,' which has a rough

representation of the boulder for its sign; there is also a tradition to the effect that it was once in use as a Druidical altar stone on Julian Bower, a locality not far distant from its present position. Chapter xix of Bayley's 'Notitiæ Ludæ,' 1834, is devoted to the 'Blue Stone,' from which the following extract may perhaps be amusing:—'Conjecture is endless, and the positive opinions of men who have given some attention to the subject are very numerous and unsatisfactory. Some think a land flood, others an influx of the sea, others the Noachic flood [!] to have caused the presence of this stone here.'

NOTES—ORNITHOLOGY.

Flamborough Bird Notes.—The season for the arrival of some of our summer visitants was very far advanced this year before they made their appearance here. The cold wintry weather no doubt accounts for that. The first to arrive was the Pied Wagtail (*Motacilla lugubris*), March 1st; several Yellow Wagtails (*Motacilla raii*), April 24th; Swallows (*Hirundo rustica*) and the Lesser Whitethroat (*Sylvia curruca*), April 29th. I have been informed of two or three Wheatears (*Saxicola ananthe*) seen; I have not seen any, nor the Redstart (*Ruticilla phœnicurus*) up to this date. The Blackbirds, Thrushes, Linnets, etc., have appeared very plentifully.—MATTHEW BAILEY, Flamborough, May 2nd, 1887.

Flamborough Bird Notes.—Since writing to you, May 2nd, we have had the summer migrants in abundance. Wheatears (*Saxicola ananthe*), Redstarts (*Ruticilla phœnicurus*), Pied Flycatchers (*Muscicapa atricapilla*), Ring Ousels (*Turdus torquatus*), Stonechats (*Saxicola rubicola*), also the Whinchats (*S. rubetra*).—MATTHEW BAILEY, Flamborough, May 12th, 1887.

Flamborough Bird Notes.—Several Turtle Doves (*Turtur auritus*) seen about the Headland, May 14th; also a pair of Hooded Crows (*Corvus cornix*), believed to breed here, May 21st. I saw one male Snow Bunting (*Plectrophanes nivalis*), May 28th, a very rare occurrence in summer. The first Swift (*Cypselus apus*) seen June 4th. A flock of Wild Geese (Canadian) passed over the Headland, June 9th; seen again, June 11th. I have been informed of several Dotterel (*Eudromias morinellus*) having been seen in the neighbourhood of Speeton, May 24th.—MATTHEW BAILEY, Flamborough, June 13th, 1887.

Great Spotted Woodpecker and Hawfinch near Harrogate.—This bird, which has always been regarded as rare and local, has been fairly numerous during this last winter. The first specimen that came under my notice during the winter was shot on Harlow Moor, on November 30th, by Mr. R. Fortune. During the latter end of December one was shot at Goldsborough, and others have since been shot. This bird has been observed at Ripley, Plumpton, Harewood, and on several occasions lately I have seen it in the gardens of the Hydropathic Establishment, Harrogate. During the summer I have seen it at Ripley, where, I believe, one or two pairs breed yearly. Amongst other rare birds that I have noticed in the Hydropathic grounds are the following:—Pied Flycatcher (*Muscicapa atricapilla*), a specimen of which was obtained by the gardener in June of last year and brought to me to identify; it is now in my possession. On Friday last (February 25th) I saw a pair of Hawfinches (*Coccothraustes vulgaris*) in the grounds. Mr. Basil T. Woodd, of Conyngham Hall, wrote me last week concerning this bird, as follows:—During last winter several Hawfinches used to come and feed on the crumbs thrown out of my window, and I have reason to believe that some of them nest in the higher parts of my grounds.—F. R. FITZGERALD, Harrogate, March 1st, 1887.

**OCCURRENCES OF
BANKS' OAR-FISH, THE SUN-FISH, AND THE OPAH
ON THE YORKSHIRE AND DURHAM COASTS.**

REV. E. H. SMART, B.A. Oxon.,

Vicar of Kirby-in-Cleveland, Yorkshire.

I AM indebted to the kindness of Mr. William Jones, of Scarborough, for the following account of a very rare visitor to our shores—a specimen of the Hawkins' Gymnetrus or Banks' Oarfish.

'It was washed ashore on the rocks at Flamborough Head, and was observed by three fishermen splashing about in a pool on the shore, close to the edge of the sea, on February 18th, 1884. Being afraid that it might be taken back into the sea by the then flowing tide, one of the men threw a large stone at it, which struck it on the head and damaged it considerably. After dragging it out of the way of the incoming tide, its captors, being anxious to keep it alive, placed it in another pool, where it soon began to revive, and they thought it was going to prove their master and escape into the sea. When they attempted to get hold of it, it became somewhat violent, and, to use the fishermen's own words, "strake out like a horse." Its length was 13 feet 6 inches, and its greatest girth 3 feet. It was preserved and mounted (a work of considerable difficulty, owing to its extreme brittleness) by Mr. E. V. Thompson, taxidermist, of Scarborough, and is the only specimen known to have been successfully preserved. I was allowed to examine the liver and stomach; the former was about 33 to 36 inches long, and was of a beautiful pink colour, and although the fish had been dead for seven days before it was opened, there was not the slightest smell or sign of decomposition.

'The contents of the stomach, as seen through a very powerful microscope, consisted of small shells and insects not discernible by the naked eye, and my examination of the whole internal structure of the fish convinced me that it lived by suction. The skin appeared to the naked eye of silvery brightness, like that of a newly-caught herring; but, examined through the microscope, it looked like pearls set in silver. When I saw it first, the fish had lost its oars or pectoral fins, but the stumps were there, about $4\frac{3}{4}$ inches long. I have shown the oars in a sketch which I made, also the head plumes, but these had been broken by the fishermen in carrying the fish up the cliff, and they afterwards found one on the beach. A more beautiful specimen of a fish I never saw.'

‘On the same day that this Oar-fish was taken at Flamborough, a Sun-fish was captured in North Bay at Scarborough, 52 inches by 32; this was also preserved by Mr. Thompson, and is still in his possession. It is a very good specimen.’

Couch states in his article on the Oar-fish that the first example on record in England is said to have been obtained at Whitby in January 1759. He also mentions another occurrence of this fish on the Yorkshire coast, at Filey, in 1796. This last specimen was 13 feet long. In Couch’s illustration of this fish it is represented as having some horn-like projections at the lower extremity of the dorsal fin near the tail, which are wanting in Mr. Jones’ sketch.

I heard lately of a Sun-fish having been taken at Runswick this last summer.

A specimen of a very rare fish, the Opah or King-fish, was captured recently near Hartlepool; it had been left by the tide in a pool on the beach. It unfortunately found its way on to a fish-monger’s slab, instead of into a case at a museum. Quoting Couch again: ‘the Opah inhabits the deeper waters of the North Sea, from which it does not often emerge. The general colours are splendid, red and green, with tints of purple and gold dotted over with round silver white spots.’ The capture of an Opah off Flamborough Head, in February 1849, is recorded in the ‘Zoologist.’

NOTE—LEPIDOPTERA.

Variation in *Hybernia progemma*.—At the April meeting of the Entomological Society of London, Mr. George T. Porritt exhibited a large number of specimens of this species, bred from moths collected at Huddersfield last spring. All the females and a large proportion of the males were of the dark variety *fuscata*, which formerly was almost unknown in Yorkshire, but which now seemed likely to replace the paler and original type. Mr. Jenner Weir and Lord Walsingham both remarked that the number of melanic forms appeared to be on the increase in the north, and suggested explanations of the probable causes of such increase.—H. Goss, Hon. Sec.

NOTE—MOLLUSCA.

Mollusca near Ashley, Cheshire.—In Mr. Standen’s list of Lancashire Mollusca, Ashley is quoted from Hardy as a locality for *Vertigo pygmaea*. This should have been omitted, as Ashley is in Cheshire; and it is one of the very few spots in the Cheshire plain outside the river valleys that produce land-snails in any abundance. Besides *V. pygmaea*, in a wood and marsh some four acres in extent by Ashley Hall, there occur *Vitrina pellucida*, *Succinea elegans*, *Zonites alliarius*, *Z. cellarius*, *Z. nitidulus*, *Z. purus*, *Z. radiatulus*, *Z. excavatus*, *Z. fulvus*, *Z. crystallinus*, *Helix aculeata*, *H. hispida*, *H. rotundata*, *Cochlicopa lubrica* and var. *hyalina*, and *Carychium minimum*, the last-named being found in hundreds last year hibernating in rotten wood under the bark of an old stump in the marsh, in company with *Zonites crystallinus*. In addition to these, *Limnaea peregra* and *truncatula*, and *Arion ater*, *A. hortensis*, *Limax agrestis*, with vars. *tristis* and *sylvatica*, *L. arborum*, and *L. brunneus* inhabit the wood.—J. G. MILNE, June 8th.

A VISIT TO CHILLINGHAM PARK.

T. H. NELSON, M.B.O.U.,

Bishop Auckland and Redcar.

ON one of the days of our visit to Bamborough for the Farne Islands, although the wind had abated, there was still a heavy ground-swell running, making it impossible to go out to the Islands, and we resolved upon having a drive to Chillingham, twelve miles to the westward, to see the famous Wild White Cattle in Lord Tankerville's park. After passing Belford the ground rose rapidly for two or three miles, when it is high above the sea-level, and a magnificent view presented itself in all directions. Towards the north-east lay Bamborough and its lordly Castle, with the Islands dotted about on the surface of the blue ocean; the rocky shore, ornamented with feudal castles, extended far on either side; while Holy Island could plainly be seen to the northward. A little further on we reached Chatton Moor, bleak and bare, undisturbed save by the crow of an old cock Grouse, the plaintive whistle of the Golden Plover, standing motionless on a clump of peat, or the weird scream of the Curlew—fit inhabitants of the wild moorlands. For miles on our right extended the cloud-capped Cheviots, whilst before us was the lovely valley of Glendale, rich in historic remains: Jeavinger Bell, the old border castles of Ford and Wark, and the field of Flodden—all were pointed out to us, and we then fully realised that we were amidst the scenes of border warfare, so famous in the ballads and legends of Northumbria. Turning to the south, we caught a glimpse of Chillingham Park. The road now descended into the valley, and, passing through Chatton, we crossed the Till, and soon arrived at Chillingham. The Castle is pleasantly situated on slightly rising ground in the valley above the river Till, with the village nestling under its shelter. The park is on the southern side, some part of it in the valley on a level with the Castle, but it gradually opens out and rises in terraces until it ascends the hill, the top of which, called Ross Castle, is included within the walls. Towards the centre, and near the western boundary of the park, is Robin Hood's Bog, a large marshy tract in one of the woods, extending over several acres, and called the 'Cattle's Sanctuary,' to which they retreat when danger threatens. The park contains a great variety of pasturage, and is well timbered and watered, making it eminently suitable for the residence of the wild creatures inhabiting its domains. No record exists of the time of its enclosure, but, as the greater portion of the Castle dates from the reign of Henry III. it is probable that the park was enclosed, and the Cattle with it, about that period.

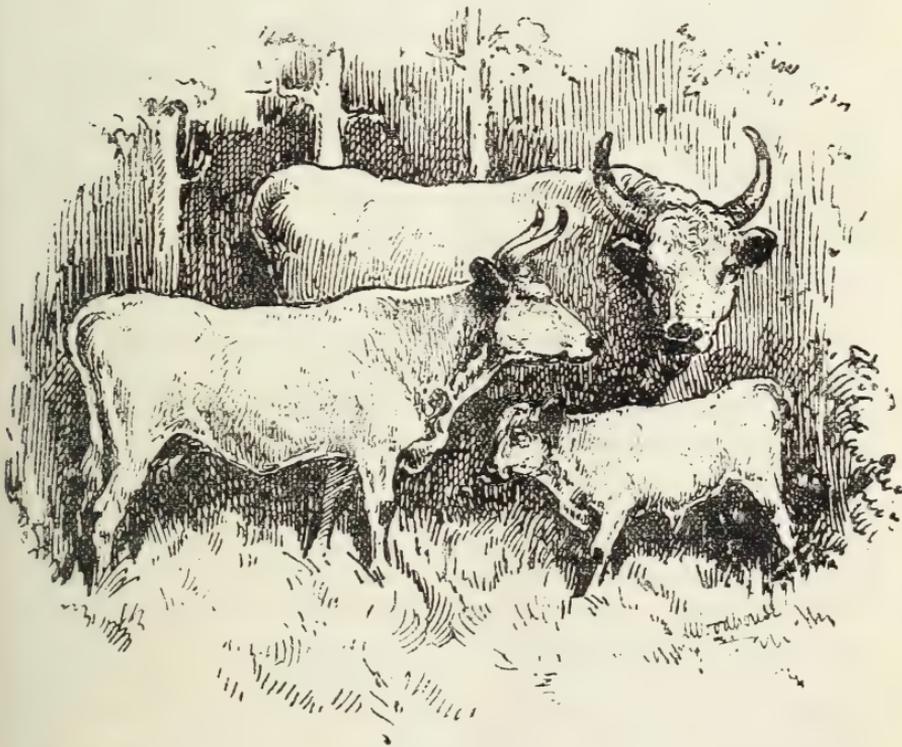
The late Lord Tankerville, writing in 1838, says:—*

‘I must premise that our information as to the origin of the Cattle is very scanty. All that we know or believe in respect to it rests in great measure on conjecture, supported, however, by certain facts and reasonings which lead us to believe in their ancient origin, not so much from any direct evidence as from the improbability of any hypothesis ascribing to them a more recent date. I remember an old gardener, of the name of Moscrop, who died many years ago at the age of 80 or more, who used to tell of what his father had told him as happening when a boy relative to these Wild Cattle, which were then spoken of as wild cattle, and with the same sort of curiosity as exists with respect to them at the present day. In my father’s and grandfather’s time we know that the same obscurity as to their origin prevailed, and if we suppose (as, no doubt, was the case) that there were old persons in their time capable of carrying back their recollections to the generations still antecedent to them, this enables us at once to look back to a pretty considerable period during which no greater knowledge existed as to their origin than at the present time.’

Strangers are not allowed to go into the park without an attendant, and we therefore sought out the head-keeper, Mitchie, who accompanied us as our guide. Passing through the grounds near the Castle, we entered into the park, and took our way towards a small hill, over which Mitchie said we might probably see some of the Cattle. On cautiously creeping up to the top and looking over, we saw three old Bulls lying below us, and had a very good view of them through Mitchie’s telescope and our field-glasses, at comparatively close quarters. They were magnificent-looking animals, of a creamy-white colour, with brown muzzles, and the insides of the ears of a reddish tinge. Their heads were adorned with large scimitar-shaped horns—most formidable-looking weapons, with which we had no desire to form a closer acquaintance. Mitchie told us that these old Bulls had become separated from the herd, and were living apart from them at present; when they rejoined their companions a fight would ensue, continuing until the supremacy of one or the other was established. The Bulls did not appear to be alarmed at our presence, but we did not venture nearer to them, and returning to the foot of the hill, we made a detour, so as to avoid passing near to them, and emerged upon an open plain, where a large herd of fallow deer were feeding. On the slope of the opposite hill, between two woods, about half a mile distant, our guide pointed out the main herd of Cattle, between sixty and seventy in number, including Bulls of various ages, Cows and Calves. We had to

* ‘The Wild White Cattle of Great Britain,’ by the Rev. Jno. Storer.

content ourselves with looking at them through the telescope, as the presence of strangers is liable to cause a stampede, during which the Calves might get crushed to death. In addition to the Wiid Cattle, the park contains two large herds of Red and Fallow Deer, a heronry in one of the woods, and winged game of several species—Pheasants, Partridges, and Black Game. Mitchie now took us to an enclosure, and showed us an ingeniously contrived trap, where the Cattle are occasionally secured for breeding purposes, being crossed with shorthorns. This trap is about twenty feet in length by ten in width, with a gate at each end ; these are kept open, and the Cattle



are induced to come through by food being placed in the Park beyond ; after a few days, and when they have become familiarized with this, the keepers conceal themselves in the plantation close by ; an arrangement of ropes is fastened to the spring catches which keep the gates open, and, when the animal wanted is passing through between the gates, one of the keepers pulls the ropes ; the springs release the gates, which are quickly closed, and the beast is fairly caught ; he is then fettered with ropes, and taken into a sort of paddock called 'the hamel.' Mitchie told us that on one occasion a desperate scene occurred in connection with the trapping operations :

a young Bull was caught in the trap, and a Cow with him; the latter immediately began to bellow so furiously that the whole herd came galloping to her rescue, with heads up, and looking so determined, that the keeper was obliged to open the gates and release the captives, or the enraged animals outside would have demolished the concern: the young Bull would never go into the trap again. There were three of the Cattle confined in the hamel, and we inspected them through the rails at only two or three yards' distance; they appeared to be very shy, and looked at us with wondering eyes, retiring to the far corner of the enclosure; they did not seem to be savagely inclined, probably being rather more accustomed to the sight of human beings than their kinsmen in the Park.

Some interesting accounts of the habits of the Cattle are given in Mr. Storer's book, before-mentioned:—'The late Lord Tankerville says, "These Cattle have pre-eminently all the characteristics of wild animals, with some curious and amusing peculiarities. They hide their young and feed in the night, basking or sleeping during the day. They are fierce when pressed, but generally speaking, very timorous, moving off on the appearance of anyone, even from a great distance; yet this varies very much in different seasons of the year, and according to the manner in which they are approached. In summer I have been for several weeks at a time without getting a sight of them—they, on the slightest appearance of anyone, retiring into a wood, which serves them as a sanctuary; on the other hand, in winter, when coming down for food in the inner park, and being in constant contact with people, they will let you almost come among them, particularly if on horseback. But they have a thousand peculiarities. They will be sometimes feeding quietly, when, if anyone appears suddenly near them, they will be struck with a sudden panic and gallop off, running one over the other, and never stopping till they get into their sanctuary. They have a peculiar cry, more resembling that of a wild beast than that of ordinary Cattle. When they come down into the lower part of the park, which they do at stated hours, they move like a regiment of cavalry, in single file, the Bulls leading the van; and when in retreat the Bulls bring up the rear."'

Lord Ossulton, now Lord Tankerville, was witness to a curious way in which they took possession, as it were, of some new pasture recently laid open to them. It was evening, about sunset. They began by lining the front of a small wood, which seemed quite alive with them, when all of a sudden they made a dash forward all together in line, and charging close by him across the plain, they then spread out, and, after a little time, began feeding.

Mr. Hindmarsh, in 1838, says :—

‘No sight could be more beautiful than they were when we saw them retreating in regular order into their forest sanctuary. Their perfect symmetry, pure white colour, and fine crescent horns, render them, when moving in a body, a very imposing object. When they calve they hide the young for a week or ten days, and if any person should happen to approach the hiding-place, the calves clap their heads close to the ground and lie in form like a hare.’

Lord Ossulton, in 1850, says :—

‘It is not always safe to approach within sight or smell when the cows are rearing the calves, as they will then assume the offensive against an intruder without hesitation.’

In 1873 Mr. Chandos-Pole-Gell, and Mr. Booth of Warlaby, visited Chillingham ; the former gentleman remarks :—

‘As far as I could judge their form bore most resemblance to the unimproved Yorkshire Cow of former days, on a smaller scale ; but this especially struck me in the shape of the hind-quarters, which I thought were long in proportion to the size of the animal. The hair also seemed somewhat similar to shorthorn cattle, and this opinion was further confirmed by Sir E. Landseer’s pictures at the Castle. I have sometimes seen Black Welsh Cattle not unlike the Chillingham breed, and the horns in this case were finished in the same way, but not set on the head in the same peculiar manner,—as if they were constantly expecting an attack from some enemy ! In these opinions Mr. Booth concurred.’

Numerous stories are told of the fierce nature of the Cattle, and the hair-breadth escapes and accidents in connection with the shooting and trapping of the animals. On one occasion Lord Ossulton went on horseback to give the quietus to a Bull which had been shot at, and, it was supposed, mortally wounded. The animal charged furiously at him, and before the horse could be turned round, he was gored and disembowelled ; he galloped away for some distance, and then fell dead. Lord Ossulton himself was in great danger from the enraged Bull, but, fortunately, the attendants attracted the beast’s attention to themselves, and his lordship made good his escape. ‘The Death of the Bull,’ a picture painted by Sir E. Landseer, now in the dining-room of the Castle, represents an encounter which nearly proved fatal to one of the park-keepers, who had trapped a Bull which charged at the fence and nearly got through, when it was confronted by the man and his dog ; the Bull rushed at them, tossed the keeper into the air, and commenced to gore him with its formidable horns ; another keeper ran to the Castle for Lord Ossulton’s assistance, and he was soon on the scene

with his dog "Bran," which immediately assailed the Bull and tore at his heels, thus drawing his attention from the wounded man, whom, meanwhile, his rescuers contrived to assist into a cart. The man had five ribs broken, and, when he had been taken to a place of safety, the rescuing party returned to the Bull, and fired at it from behind a fence, but it was not until six or seven bullets entered the animal's head (one of them passing through his eye) that he fell dead. During the whole time it never flinched or changed its ground, merely shaking its head on receiving the shots.

In addition to the foregoing incidents, Mitchie told us of several encounters and adventures with the Cattle, which occurred at various times during his keepership; and he also gave us a graphic description of the Prince of Wales's visit to Chillingham in 1872, when His Royal Highness shot the 'King Bull' from the cover of a hay cart. We left the park by the southern boundary, after a most enjoyable and memorable visit to this romantic spot, and returned to Bamborough well pleased with our excursion.

The illustration is from a sketch made by my friend Mr. Wm. Woodhouse, of Morecambe, based upon some of Mr. Green's fine photographs.

Obituary.

Thomas Wilson.—Many readers will deeply regret to learn of the death of Thomas Wilson, of Holgate, York, which occurred on the 17th April, aged 51 years. He was one of the oldest of the York entomologists, having been a collector of lepidoptera for over thirty years. His attention, however, was chiefly given of late years to the Tenthredinidæ, of which he leaves a good collection. His contributions to the *Naturalist* were numerous, and he was engaged up to a short time of his death with a list of the Macro- and Micro-Lepidoptera of York and district. He leaves a widow and five children.—SAML. WALKER.

NOTES AND NEWS.

At the annual meeting of the Leeds Geological Association held on the 16th June, the report showed that an eminently practical and successful year had been passed through. The roll of members had advanced in numbers most remarkably, being about 60 per cent. higher than at this period last year. This was accounted for in several ways. The excellence of the papers and lectures given by experienced geologists in the session just closed no doubt resulted in a vast amount of practical knowledge being received; the field excursions, ten in number, have been very popular, as shown by the large attendance, which has been more than double that of last session. These excursions in the field are the backbone of any geological association, and knowing this, the council have paid special attention to this branch of work. These excursions have all been under the careful direction of geologists well acquainted with the districts visited, and thus the information received and the experience gained has been of the utmost value. The second issue of the Transactions met with a good reception from kindred societies and geologists, and to this publication may be attributed much of the success the Association is achieving. The election of the Executive for the ensuing year resulted as follows:—President, C. D. Hardcastle (re-elected); Vice-Presidents, J. E. Bedford, T. W. Bell, Wm. Cheetham, and B. Holgate, F.G.S.; Treasurer, J. H. Bromley; Librarian, C. Brownridge, F.G.S.; Council, Professor Green, F.R.S., C. Brownridge, F.G.S., W. H. Gill, Ald. John Hill, and E. Hawkesworth; Auditors, W. Denison Roebuck, F.L.S., and A. E. Nichols; Secretary, S. A. Adamson, F.G.S., 52, Wellclose Terrace, Leeds (re-elected fourth time).

YORKSHIRE NATURALISTS AT GORMIRE LAKE AND THIRKLEBY PARK.

THE second excursion of the Yorkshire Naturalists' Union for the year 1887 was held, in response to the special invitation of the President, Sir Ralph Payne-Gallwey, Bart., at Gormire Lake and at his fine seat at Thirkleby Park. The weather throughout the day was of the brilliantly fine character which has prevailed throughout June and July, and the resultant very dry condition of the ground was unfavourable to some branches of research, and equally favourable to others. Nearly all the members and associates who had possessed themselves of the President's invitation to dinner, about 120 in number, arrived at Thirsk Junction Station between nine and ten o'clock in the forenoon. Here conveyances were in readiness for all who had ordered seats beforehand from Mr. W. Gregson, who had kindly undertaken the charge of that part of the arrangements, and to whom the Union was accordingly highly indebted. The start was made about ten, and soon after eleven the whole party were at Gormire, having passed through Thirsk and Sutton-under-Whitstonecliffe on the way. The remarkably picturesque and beautiful situation of the Lake, one of the very few large sheets of water which the county of York possesses, was a surprise to most of the members, who had never anticipated being introduced to so lovely a spot. For about two or three hours the visitors scattered themselves over the whole of the little depression in which Gormire lies, visited the neighbouring woods, ascended the steep escarpments of the Hambleton Hills or the lower heights of the low hills which shut in the valley on its western side, and investigated its flora and fauna with more or less and varying success. Some who wished to investigate the Lake itself had a large boat pushed out into deep water, only to find, alas, that it leaked very rapidly, and the attempt had to be abandoned. At two o'clock the conveyances were again in requisition, and the party were driven to Thirkleby Park, the decoy being visited on the way.

At half-past three dinner was served in the spacious riding-school, the President and host occupying the chair. His genial chairmanship, and the most kind and assiduous attentions paid to the members by Lady Gallwey, who assisted in seeing after their comforts personally, will not be forgotten by any who were present. In addition to Sir Ralph and Lady Gallwey, there were also present the Hon. G. E. and Lady Louisa Lascelles, Captain and Lady Cecilia Turton, Mr. Abel Chapman, and other friends specially invited to meet the Union. At the close of dinner, the Rev. William Fowler, M.A., the senior vice-president of the Union, proposed the health of

the host, and in doing so referred to his attainments as a naturalist and sportsman, and also to his descent from Sir Thomas Frankland, distinguished for his botanical knowledge about the close of last century.

The President, in reply, said it had afforded him the greatest pleasure to see the members of the Union there that day, and to take part in the instructive and delightful morning which they had had. He considered that observation and useful record were to the naturalist far more than mere talk. The field naturalists' part of natural history was the practical foundation of all natural science. The scientific part came afterwards, but the one could not exist without the other, and they were mutually helpful to one another. The outdoor part was the pleasantest, especially in such glorious weather as they had had that day. Nothing could be more instructive and enjoyable than the remarkable ramble they had had in that beautifully wild country round Gormire. He had never seen Gormire look more beautiful. Naturalists admired scenery as much as those who raved so much about it, but they recognised the fact that that admiration was not of much use unless they looked below the surface. They wanted to know what it consisted of—whether in regard to animals, plants, geological formations, or insect-life. They found in that scenery, every rock, every bird, every fish, every plant, every animal—in fact, everything animate or inanimate—had a history of its own, about which volumes had been written, and more might be with advantage. He honestly pitied the man who never looked below the surface, and who did not try to read the lessons of nature which lay at his feet.

After the conclusion of the sectional meetings, which were appropriately and pleasantly held under the shadow of some of the noblest trees in the park, the general meeting was held, with the President in the chair. The minutes having been duly passed, eight new members were elected, in the persons of Mr. Abel Chapman, M.B.O.U., of Silksworth Hall, Sunderland, Mr. C. B. Crawshaw, of Dewsbury, Mrs. Emmet, of Boston Spa, Mr. John King, of Leeds, Mr. A. G. More, F.L.S., F.R.S.E., M.R.I.A., the eminent curator of the Museum of Science and Art at Dublin, the Rev. Annesley Powys, M.A., vicar of Meanwood, Mr. T. F. Ward, of Middlesbrough, secretary of the Cleveland Naturalists' Club, and Dr. J. Mitchell Wilson, of Doncaster. Two Societies were next admitted into the Union by a unanimous vote, on the motion of Mr. W. N. Cheesman, seconded by Mr. T. F. Ward; these were the Middlesbrough Junior Naturalists' Club and the Brighthouse Friends' Schools Botanical Society. The Rev. W. Fowler, M.A., then assumed the chair while

a vote of thanks to the President, proposed in characteristically felicitous language by the Rev. W. C. Hey, M.A., and seconded by the Rev. Annesley Powys, was unanimously and enthusiastically passed. The President briefly replied, after which Mr. A. Craig-Christie, F.L.S., of Edinburgh, proposed and Dr. Erskine Stuart, of Staincliffe, seconded a vote of thanks to Mr. C. H. F. Bolckow for permission to visit Gormire, to the leaders of parties, and to Mr. W. Gregson for taking charge of the conveyance arrangements. This was unanimously voted, and the reports of sections were then taken.

For the Vertebrate Section, its secretary, Mr. James Backhouse, jun., of York, reported that comparatively few birds of special interest had been observed. In all, 48 species were noted, 32 being residents and 16 migrants. A Heron and a pair of Common Sandpipers were observed at Gormire Lake, and a Ring Ousel in the immediate neighbourhood, whilst Swifts in some considerable numbers might be seen flying in and out of holes in the scars above, indicating that they have nested there this year.

Among mammals nothing of note was observed, except that one or two members had the pleasure of examining a young Badger at Thirsk, which had been caught a day or two before near Kirby Knowle, and is now in the possession of Mr. Lee, of Thirsk.

Meanwhile, the Decoy which Sir Ralph has recently formed in a plantation near the Park had been visited. Here our host explained the structure and purposes of a decoy, and graphically described the mode of working it; putting the decoy-dog through those evolutions before and behind the screens which are so strangely fascinating to all ducks, and leads them to their destruction. This decoy and the one at Hornby Castle are now the only ones in use in Yorkshire.

The president of the Conchological Section (the Rev. W. C. Hey, M.A., of York) reported that in Gormire Lake he had met with only four species, viz.—*Planorbis albus* (rather fine), *Planorbis nautilus*, *Physa fontinalis* (very small), and *Pisidium pusillum*. In a pond near Gormire Mr. Dennis found *Limnæa glabra*, *L. peregra*, and *Sphærium corneum*. These are not the usual associates of *L. glabra*, which is rarely unaccompanied by *Physa hypnorum* in Yorkshire. The long-continued drought has driven land-shells far from the surface. In the wood above Gormire Mr. Hey had met with living specimens of *Helix lapicida*, *H. rotundata*, *Zonites alliarius*, *Pupa umbilicata*, and *Clausilia rugosa*, and dead specimens of *Helix arbustorum*, *H. hortensis*, and *H. hispida*. Mr. H. T. Soppitt met with *H. rufescens* and *Pisidium fontinale*. *H. aspersa* was also taken, by Mr. W. Cash, F.G.S. The only slug seen was *Limax agrestis*.

For the Entomological Section its president, Mr. N. F. Dobrée, of Beverley, reported that the Lepidoptera seen at Gormire included a very good pale variety of *Argynnis aglaia* and *Polyommatus agestis*; *P. alsus* was also pretty certainly seen, though not captured; *Macroglossa stellatarum* was in some quantity; *Anthrocera filipendule*, *Gnophos obscurata*, *Anaitis plagiata*, *Hydrocampa nymphæalis*, *Pyrausta purpuralis*, *Eupithecia pulchellata*, *Leucania impura*, and *L. pallens* were also taken. Great expectations were entertained on seeing the ground that *Miana exposita* would be found, but the drought appeared to have burnt up its food-plant. A number of beetles were also found.

The president of the Botanical Section (Dr. F. Arnold Lees, of Heckmondwike) presented a brief report on the work done during the day. Upwards of 100 flowering plants were noticed in bloom, but the great heat militated alike against comfort and exertion; whilst the brief time allowed for the sectional meeting (held under the trees in the park), together with the absence of the phanerogamic secretary, combined to frustrate a systematic roll-call of all the common as well as notable species observed. Most of the species named in the circular from stations long known, and already recorded in the pages of 'North Yorkshire,' were gathered by one or other of the botanists, ably guided to their special localities by Mr. William Foggitt, through whom, too, was reported the only new vice-county record for North-east Yorkshire which the meeting brought forth. The plant was *Potentilla argentea* L., gathered on the new red sandstone at Breckenbrough, east of the Wiske stream (the dividing line between vice-counties 62 and 65), and some three miles west of Thirsk. Next to this the most important observation made was that of the singular hair-clothed *Veronica parmularia* Tur. & Poit., from a pool near Gormire; and, singular to say, reported as found growing intermixed with the perfectly glabrous 'type'—*V. scutellata*—a fact that makes it difficult to account adequately for the very distinct aberration it presents, upon any theory of special conditions due to local environment; and, seeing that its special characters have remained constant under cultivation, lends probability to suggested specific distinctness. The 'Gormire bramble,' recorded in 'North Yorkshire' under the name of *Rubus nitidus* (= *R. lindleianus* Lees), was observed to be very abundant on the sandy stony soil of the slopes above the lake, and noted to have a peculiar facies, due to its neat habit of growth, small neat quinate leaflets, and racemose hairy panicle of flowers, with patent sepals and narrow lilac-gray petals. It certainly belongs to the *rhamnifolius* group as defined by Hooker in Student's Flora (3); but it presents features linking it to *Rubus*

hemistemon Müll. and *R. cordifolius* W. & N. of the *affinis* section, and *R. calvatus* of the *villicaules*. No special name has been given it, although Mr. J. G. Baker himself says it is not quite like any form known to him; and further, *R. lindleianus* (*nitidus* Bell Salt.) is said in Stud. Flo., 118, to be unknown on the continent, i.e., not correlatable with any continental type. Under these circumstances it seems a pity that it has no scientific cognomen; to remove which disability and connect the name of John Gilbert Baker by one more (and that a natural) link with his native county, for the botany of which he has done so much, it is proposed (by F. A. Lees) to name it *Rubus bakeri* (provisionally, at any rate, until shown to be identified with some form already named), and to give it this title, not as a distinct species, but as a variety of the *Rubus affinis* of English authors (said by Mr. Baker to be essentially the same super-species as *R. montanus* Wirtg.), intermediate between *R. nitidus* Weihe (of the *suberecti* section) and *R. carpinifolius* Weihe (and Bab. Man.), to which rather than to *R. lindleianus* its racemose narrow panicle and hairy rachis approximates it.

The other plants noticed in stations *not* given in 'North Yorkshire' were *Chara fetida* var. *atrovirens* (Decoy pond, Thirkleby), of which the wild and decoy ducks were said to be very fond; *Typha angustifolia* and *Carex vesicaria* (Decoy); *Pyrus communis* (hedge, bird-sown, near Whitestonecliff); *Hypericum humifusum* and *Erythraea centaurium*, in dry places; and *Scolopendrium vulgare*, on Whitestonecliff; whilst the colonising casual, *Diplotaxis muralis*, with its large branched state *babingtonii*, was seen to be getting well established on waste ground by the sidings at Thirsk Station, on which for thirty years or more its near ally, *D. tenuifolia*, has been known to exist.

Among the moisture-loving mosses, as among shells, little could be done, since nearly everything was dried up. One Bog-moss (*Sphagnum papillosum* type) was found in the bog at Gormire (north end); and the remains of *Seligeria recurvata*, *Brachyodus trichodes*, with *Grimmia trichophylla*, by the Whitestonecliff, and one fungus, *Entoloma sericea* Bull., growing amid wet bog-moss—an unusual habitat for a pascual species.

The report of the Geological Section was given by Mr. S. A. Adamson, F.G.S., one of the sectional secretaries, who stated that for a short distance from Thirsk the flat Keuper marls were passed over, then a long slightly undulating surface, gradually increasing in altitude, of the Lower Lias succeeded before reaching the secluded village of Sutton-under-Whitestonecliff. A more decided ascent was now made, and on the left a quarry was noted, showing a splendid section. This is the Cleaves Quarry, and the Dogger has

been largely worked here. The top bed is a very ferruginous massive sandstone. The geologists now divided, one section proceeding to Gormire Lake, the other making a detour to the right in the direction of Hood Grange. A little distance from the ancient fish-pond is a small quarry, showing a good section of the Inferior Oolite. Had time permitted a good selection of typical fossils might have been secured. Mr. Chadwick, however, obtained a fine *Terebratula maxillata*, and Dr. Watts a small echinoderm, known as *Holctypus depressus*. The limestone here has a bluish colour when freshly broken, but this, on exposure to the atmosphere, changes to a yellowish or orange tint. This quarry is capped by a covering of drift, from which smoothed and striated pebbles of basalt and other rocks were extracted. The remarkable and lofty outlier of Hood Hall was now skirted. This hill is a veritable treasure-ground for geologists, as sections may be studied beginning with the Lower Calcareous Grit, which caps its summit, down through the Oxford Clay and Kellaways Rock, the Estuarine Series and the Dogger, to some laminated shales of the Upper Lias. In addition to its geological importance, it is a strikingly prominent feature in the landscape, standing out, as it were, like a sentinel before the mighty cliffs of Hambleton. The bold escarpment of Roulstone Scar was now ascended; here the party again divided, and whilst some, in spite of the tropical heat, attained the top, others examined the base of the vertical cliff, and the talus. Roulstone Scar juts out sharply at the corner where the escarpment trends away to the south-east. The Hambleton Hills are, of course, well known as the western end of the great tabular range of hills which extends from the coast at Scarborough to this part. The ascent showed the same stratification as that of Hood Hill. Passing over the Estuarine shales and sandstones, the hard Kellaways Rock was noted; then succeeded the slopes of the Oxford Clay, crowned by lofty precipices of the Lower Calcareous Grit. The overpowering heat occasioned many halts, which were utilised by viewing the magnificent landscape which was spread before the delighted eye. To the west lay the broad central vale of York, bounded in the far distance by the familiar forms of Pen Hill in Wensleydale, and of Great Whernside in Coverdale. Over this wide expanse towns and villages could be seen dotted here and there, and the far off railway could be descried by the smoke of the rushing trains. Height succeeded height and hill followed hill as far as the horizon stretched until lost in the solar glare. The view southwards embraced the valley from Thirsk to Malton, closed in by the Howardian range of hills. This valley is remarkable, as it is due to two great east and west trough faults which have depressed the

beds. According to the Government Survey, the line of the northern fault is very clear to the south of Byland Abbey, where the soft sandstones of the Estuarine series and the black Kimeridge shales are seen within a short distance of each other on either side. To the south of Kilburn the jet shales of the Lias are thrown against the Upper Calcareous Grit, and judging from the thickness of strata removed, the throw of the fault at this spot cannot be much less than 1,000 feet. At Thirkleby the Rhœtic beds are on the same level as the Gray Limestone of the Lower Oolites. Another effect of these great faults has been to shift the outcrop of the various beds; thus, for instance, the Rhœtic beds and Lower Lias which should be south of Thirkleby, are found some miles to the westward, on the west of Topcliffe. The time at disposal was too brief to allow of many fossils being found, but Mr. Chadwick secured good specimens of *Belemnites abbreviatus* and *Gryphæa bilobata*. The detachment which investigated Gormire Lake and its vicinity reported in similar terms on the strata they had seen. The origin of this lake has been said by various writers to be due to a landslip, but this is a debatable point. As Mr. Addison remarked, the lake is underlaid by some soft shaly beds, and possibly, as he suggests, the subsidence, instead of slipping of the rocks, may have originated it. The lake is encompassed by higher ground, so that it is a basin without any visible outlet for the water, but by means of swallow-holes on the side next to White Mare Cliff, the surplus water is supposed to be carried for several miles till it joins the river Rye. Still, it must be remembered that where harder rocks overlie clays or shales, landslips are common, and these occurrences have, from this cause, been numerous in the Oolitic and Chalk hills. Thus, when the solid rocks slipped over the shales or clays, the latter, being exposed, would present an impervious basin for the accumulation of water from the mountain springs, and the talus or débris on the sides would dam up any outlet. It should be stated that the geologists were much indebted to the Rev. Frederic Addison, M.A., of Thirsk, for the ample and valuable information he so readily supplied. It may be suggested that a practical investigation into the origin of Gormire Lake would be good and useful work for the Thirsk Natural History Society.

For the Section for Micro-Zoology and Micro-Botany, its secretary, Mr. J. M. Kirk, of Doncaster, reported that *Floscularia cornuta*, *Stentor mulleri*, *Milnesium tardigrada*, *Actinophrys sol*, and *Amæba diffluens* (large) were found in Gormire Lake. After long examination, nothing else was found but such as occur in any pond at this time of the year. The water was crowded with the commoner diatoms.

At the conclusion of the sectional reports, the Rev. W. Fowler called attention to the publication of Dr. F. Arnold Lees' new 'Flora of West Yorkshire,' and urged its claims for support from the members of the Union. Mr. W. Denison Roebuck, F.L.S., followed on the same subject, quoting the encomiums passed upon the work by Mr. J. Gilbert Baker, F.R.S., the eminent botanist, himself a native of Thirsk, and an ex-president of the Union, and stating that the executive relied upon the public spirit of members and of Yorkshiremen to make the issue of the 'Flora' a complete success.

The ordinary meeting having broken up, Sir Ralph invited his visitors to witness the flight of one of his trained falcons. After a few elegant gyrations—neglecting for the moment the attraction afforded by the lure—the Peregrine dashed into the centre of a party of rooks some little distance off, scattering them in an amusing manner, and having singled out her quarry, killed it in fine style, much to the satisfaction of the members, who had a fine view of the chase.

The members now dispersed—some to inspect the house and the collections of preserved specimens, of which Sir Ralph has a fine series, containing many varieties of his own obtaining; others to see the lake and the wild-fowl enclosures. Regarding the wild-fowl, it has never been our lot to examine such an interesting living collection. There were Wigeon in full summer plumage—a phase in which they can be but rarely seen in Britain; Wigeon, chicks and half-grown; Gadwall, half-grown; Tufted Ducks, a brood; Pochards, half-grown; and a pair of Shell-ducks. These proved extremely interesting to the ornithologists of the party, who devoted not a little attention to their examination.

The botanists found much to admire in the grounds, among other objects being two very fine Cedar-trees, planted in the time of Sir Thomas Frankland (Sir Ralph's grandfather) by the celebrated naturalist, Sir Joseph Banks, who, along with Sir W. J. Hooker and others, was a visitor in the days when the talented botanist, Sir Thomas, was master of Thirkleby. A fine old oak close to the house was also much appreciated for its symmetrical proportions, and for its great size, its foliage diameter—if we may so term it—being about thirty-six yards.

Concerning the wild-fowl that breed at Thirkleby, Sir Ralph kindly gave the following interesting information:—

The Wigeon, of which there are now about forty, are the result of two sittings of eight eggs each obtained from the north of Scotland in 1885. From these eggs ten birds were hatched and brought up in

a yard with tame ducks. They were subsequently turned down on a small lake of one and a half acres in the park, which together with some wood and high brushwood is enclosed by a four-foot wire netting, giving a space of four acres in all. The first year the Wigeon made three nests in the brushwood and as far from the water as they could get. Each nest contained seven eggs, which, as soon as the hen bird commenced to line her nest with down, were taken and put under bantams. These hatched out at the rate of five apiece, and within a day of the regulation three weeks from date of setting. This spring the Wigeon laid twenty-four eggs, and there are now at Thirkleby twenty young ones, so tame that they will feed from the hand, though almost full grown. We are not aware of any other part of England where Wigeon are successfully reared except at Thirkleby, especially in considerable numbers. Besides Wigeon we saw about a score of young Gadwall, hatched from eggs obtained from Lord Walsingham's meres in Norfolk, very fine young birds, but with few distinctive marks at present, except their extremely long and light-coloured bills and cheeks. Some of the most interesting among the young water-fowl were a fine brood of Tufted Duck, nor should we omit to mention some young Pochards. One pair of old Pochard laid no less than twenty-eight eggs on an island in the lake at Thirkleby this spring. Nearly all these eggs had birds in them, but unfortunately several were unable to chip the shell owing to the upper mandible being half-an-inch shorter than the lower one, an imperfection which would have prevented the birds from feeding had they even hatched out, and which deformity Sir Ralph attributes to their parents having belonged to one nest. It is curious that the Pochard only laid in their third year. The Wigeon commence laying the last week in May, the Pochard a fortnight earlier. Tufted Duck are the latest of all ducks to lay at Thirkleby, and do not commence to do so till the middle of June. Suitable food is a great necessity, Sir Ralph tells us, in the matter of laying when Wigeon are concerned. The Wigeon on the lake never having laid more than seven eggs to a nest, though in the Decoy on another piece of water, one duck Wigeon made two nests last June, one nest containing ten eggs all with birds in them, eight of which are now alive. This fecundity is, we are informed, probably attributable to the weed (*Chara fetida* var. *atrovirens*) which grows so profusely in the Decoy, and which the Wigeon are never tired of pulling and eating. Shell Duck have not done well at Thirkleby, and have never nested. In 1885, Sir Ralph obtained from North Holland eighty eggs of this duck, but though he succeeded in rearing fifty per cent. of them, only two are now alive. To return to the Wigeon, we must say we take great

interest in Sir Ralph's efforts to domesticate this beautiful duck. He now has nearly twenty couple of them, all either old birds which have nested, or else young ones, which are pretty sure to do so. Sir Ralph has been at great trouble to domesticate Teal and Pintail in the same way, but without any success, and he assures us that he considers it perfectly useless attempting to induce wild caught water-fowl (excepting the common Wild Duck) to nest in confinement. Sir Ralph has some capital instantaneous photographs at Thirkleby of his wild-fowl, and has even done a tame Falcon soaring overhead with such accuracy that even a broken feather in one of her wings is distinctly visible, and he hopes in due course to obtain one of a Falcon in the act of stooping at a Pheasant or Rook—a by no means impossible feat when we consider what wonderful command Sir Ralph had established over the Hawk which he flew before the members.

About seven o'clock the members drove to Thirsk Junction, highly pleased with their day's enjoyment.

NOTE—GEOLOGY.

Dedication of a Boulder Stone.—The Queen, as is locally well-known, is Countess of Sadberge, and the inhabitants of this interesting village determined that one part of their jubilee proceedings should be the dedication of a large boulder. A short and impressive service was held at the village church, from whence Mr. Wooler, J.P., of Sadberge Hall, escorted by the local yeomanry, proceeded to the village green, where the boulder has been placed. The Rev. J. W. Baron, rector of Sadberge, gave a short sketch of the history of Sadberge, saying that in former days it was a place of much importance; Richard Cœur de Lion was Count of Sadberge, and being inspired with a religious furor to join the Crusades, sold the countships and lordships of Sadberge, with the King's Castle, to Bishop Pudsey of Durham for £14,000. From thenceforth till 1836 the countships of Sadberge attached to the Bishops of Durham, when in that year, by the property of this See being taken from the ecclesiastics, the countship reverted to the Crown. Thus William IV became Count of Sadberge, the title of Countess being now held by Her Majesty. Mr. Wooler then unveiled the stone, and gave a very interesting outline of the glacial period, by which means the block was now at Sadberge. The following song, 'All Round the Boulder Stone,' composed by the Rev. R. M. Moorsom, formerly rector of Sadberge, was then heartily sung. We have not space for more than one stanza, which runs as follows:—

Hail to the stone that in triumph advances
 Forth from his bed in the sand and the clay;
 Gather around him with song and with dances,
 Welcome the monster to light and to day.
 Hail to our mighty stone!
 Fit for a monarch's throne!
 Ages and ages he's lived all alone.

The Hussars fired a *feu-de-joie* over the stone, thus completing the ceremony. Upon the stone a brass plate is affixed, with an inscription relating to the circumstances of its discovery and dedication. Details of the above boulder have been furnished by Dr. R. Taylor Manson, of Darlington, to the Yorkshire Boulder Committee, by whom they have been passed, and already forwarded to the Secretary of the Boulder Committee of the British Association, who has warmly acknowledged the same. These particulars will shortly appear in the *Naturalist*.

**MATERIALS TOWARDS A
LIST OF THE LAND AND FRESHWATER MOLLUSCA
OF LINCOLNSHIRE.**

W. DENISON ROEBUCK, F.L.S.

FIVE years ago all that was known of the terrestrial and fluviatile mollusca of the great county of Lincoln might have been summed up in a brief enumeration of fifteen specific names. We are now able to give—as the result of work done in 1883, 1884, 1885, 1886, and 1887—a goodly list of no less than eighty-eight distinct species, besides numerous varieties, and the outcome of the investigations made, notwithstanding the smallness of the area from which they come, shows that the county of Lincoln is one of the richest and most prolific in animal life of the English shires.

The area which alone has been at all thoroughly and systematically searched is a small parallelogram between the coast and the wolds which extends from Saltfleetby to Anderby and from Louth to Claxby. These two, the long sides of the parallelogram, measure no more than about twelve miles each, while the other two, the short sides (Saltfleetby to Louth and Anderby to Claxby), measure about eight miles and six miles respectively. Within this limited area occur a very large proportion of the species recorded in this paper. Outside of it, records are few and scanty, investigations have been but intermittent and seldom.

The pioneer of conchological research in Lincolnshire was Dr. Martin Lister, who was himself most probably of Lincolnshire relationship, allied to the Listers of Burwell Park, near Louth, as may most reasonably be surmised from the fact that the two Lincolnshire records given in his treatise of English shells, published in 1678, are for *Cyclostoma* and *Zonites fulvus* as occurring in Burwell Woods, a locality in which they have both been re-discovered of late years by Mr. H. W. Kew.

The next published record dates one hundred and seventy-five years later. Mr. E. J. Lowe, in 1853, published an account of the 'Conchology of Nottinghamshire,' in which he recorded four species from Grantham, Lincolnshire—*Helix aspersa*, *H. nemoralis*, *H. pulchella*, and *Carychium*.

Five years subsequently Mr. Bellars, in his Illustrated Catalogue of British Shells (1858), added *Helix hortensis* (from Croyland) to the Lincolnshire fauna.

The next addition was *Helix hispida* var. *subglobosa* from Brocklesby, recorded by Dr. Jeffreys in the first volume of his 'British Conchology' (1862).

The ninth addition to the list was *Anodonta cygnea*, recorded for Bottesford by Mr. R. Tate, in his work on British Mollusks (1866).

In 1868, in a note in 'Science Gossip,' Mr. Thomas Ball, a well-known conchologist (pity he never published a list!), recorded *Physa hypnorum*, *Planorbis nitidus*, and *Paludina contecta*, all from Brigg.

The thirteenth addition was that of *Helix virgata* in its sinistrorse form, recorded by Dr. Jeffreys in his fifth volume (1869), as found by Mr. Ball at New Holland.

In the 'Field' for 1874, Mr. Hawkins recorded *Helix cantiana* for Honington in an interesting note, afterwards reproduced by Harting in his 'Rambles in Search of Shells' (1875).

The fifteenth (and last of the pre-1883 records) was that of *Helix arbustorum* var. *alpestris*, recorded for Lincoln by Mr. J. T. Lightwood (in 'Nat. Hist. Notes,' 1882).

So much for printed records: the subsequent investigations, of which for the most part the results are here published for the first time, will be more conveniently treated according to the various districts in which they were made.

The Louth and Alford parallelogram—the best worked area in the county—naturally demands priority of attention. I had the good fortune to spend the 14th, 15th, and 16th of April, 1886, with my friend Mr. J. E. Mason, of Alford, in active investigation of the neighbourhood of Louth, Alford, Tothby, Rigsby, Ailby, and Well Vale, the Burwell, Muckton, Maltby, and Haugham Woods, and the coast sand-hills at Huttoft, Anderby, and Sutton-in-the-Marsh. During the years following, Mr. Mason has collected for me at Sloothby, Chapel, Greenfield, Claxby, Bilsby, Farlesthorne, Well, Rigsby, and other places near Alford, with great success; and Mr. H. W. Kew has devoted himself with great assiduity and remarkable results to the work of investigation about Louth, Saltfleetby, Saltfleet, Raithby, Maltby, Haugham, Burwell, Welton Vale, North Somercotes, South Elkington, Grimoldby, Theddlethorpe, Grainthorpe, Hallington, Brackenborough, Belleau Springs, Authorpe, Acthorpe, Tathwell, Swaby Vale, Fenney Wood, Hubbard's Valley, Sutton, and Mablethorpe. Outside of this area he has collected at Cleethorpes, at Benniworth Haven, and at Donington-on-Bain. No one else seems to have worked this area, except that a number of drift-shells have been collected at Sutton-in-the-Marsh by Mr. B. Sturges Dodd.

The records for all other parts of the county are but scanty. Mr. W. Eagle Clarke was my companion on the 14th of April, 1883, in working the marsh-drains about Wroot, at the junction of the three counties of Lincoln, York, and Nottingham, when a number of fresh-water forms were collected in the Gravel and Black Bank Drains.

In Mr. W. Nelson's collection there are specimens from Haxey, from Owston, and from Scotton Common, and in Mr. Taylor's collection are several specimens collected by Mr. T. Beulah, the able and well-known conchologist of Brigg.

For New Holland there is but a solitary book-record, and the same is to be said of Bottesford. There is a single Scawby shell in Mr. Thomas Rogers' collection, and several Brigg records figure to the credit of Mr. Ball. For Brocklesby there is but one, a book-record. Grimsby, Great Cotes, and Cleethorpes are represented by a very few records set to the credit of Mr. W. Eagle Clarke, Mr. Kew, and the late James Hardy of Manchester. For Caistor I have a single record from Mr. W. Eagle Clarke, and for Gainsborough one from Mr. P. F. Lee. We know nothing for the Market Rasen district beyond a few large Helices brought for me from Glentham by Mr. C. H. Bothamley. For Lincoln city and environs we have a few records from various naturalists, including the Rev. W. W. Fowler. For Skegness there are one or two records from Mr. C. T. Musson, and from Wainfleet a single species was sent by the Rev. A. H. Cooke. All these localities are in the Northern Division of Lincolnshire.

The Southern Division has scarcely received attention at all. I myself paid a flying visit of a few hours to Ancaster (near Sleaford) on the 17th April, 1886, and there is a single book-record for the neighbouring village of Honington; and on the 7th March, 1887, Mr. C. T. Musson paid a similar visit to Anwick, a village about as far to the East of Sleaford as Ancaster is to the West; at both places several species were met with. Grantham is represented—in addition to the book-records—by a single record made by Mr. R. Walker, of Leeds. In the extreme southern angle of the county Mr. Edward Collier has collected several species at Uffington (close to Stamford), and in July 1886, Mr. Thomas W. Bell brought various water-shells from Crowland Wash. Between Lincoln City and Bracebridge Mr. C. T. Musson collected a number of fresh-water species from rejectamenta, in December 1884; and on the 8th September of the same year Mr. Geo. Wingate and I spent a day in collecting in the vicinity of Boston and Skirbeck, on both banks of the Witham, and therefore in both divisions of the county.

The present list is (so far as the small-type portion of it goes) an 'authenticated' list. That is to say, it is an exact and literal transcript from the record-books of the Conchological Society, and all the records with the mark ! affixed have been authenticated or verified as to specific determination by Mr. J. W. Taylor, one of the Referees of the Society. The large-type matter is the generalization based upon the small-type records which follow. In the

case of a list for a county like Lincolnshire, which has so long lain waste for want of workers, I hold it to be of high importance to draw a clear distinction between what is known and what is surmised, hence the distinctive types used. Some time in the future, when all Lincolnshire has been investigated as well and as systematically as Yorkshire and Nottinghamshire have been, a resident conchologist can write a large-type list of its fauna, without giving in small type the evidence upon which he founds it; but that time has not arrived yet.

The distinction between 'North' and 'South' Lincolnshire is necessitated by our conforming to the Conchological Society's system of 'vice-counties,' adopted bodily from Mr. Watson's well-known botanical system. The dividing-line is the River Witham from Boston up to Lincoln, continued by the Foss Dyke from Lincoln city to the western or Nottinghamshire border of the county.

The number of species recorded for the county is 88, of which 81 are recorded for North Lincolnshire, and 54 for South Lincolnshire. The number of species common to both divisions is 47, while 34 North Lincolnshire species are not yet recorded for the South, and only seven South Lincolnshire species still remain for discovery in the North.

The 88 species include 11 slugs, 39 land and 38 fresh-water shells.

We need not enumerate all the British species which are as yet unrecorded for Lincolnshire, but it will certainly be well to direct attention to some of those more likely than most to be found. No species of *Testacella* has yet turned up, and there is no other slug which may be expected to occur, unless an example of the very rare *Limax cinereo-niger* should perchance be found. It is possible to expect *Helix fusca*, while *Succinea elegans*, *Helix aculeata*, *Vertigo anti-vertigo*, *Azeca*, *Achatina*, and *Acme* will almost certainly reward careful research in suitable habitats. Of fresh-water species it is surprising that *Dreissena* has not been found in the canals, and *Valvata cristata* in numerous localities, and it is quite within the bounds of possibility that *Limnæa glutinosa* may some day reward the careful searcher. Beyond these any additional species will be of the nature of a great good fortune, and the principal work that now remains to be done for Lincolnshire conchology is to investigate other districts as closely as Louth and Alford have been, and to place the results of all investigations on permanent record.

The nomenclature of this list is in conformity to the Conchological Society's List of British Mollusca; the arrangement accords more with older systems, and with my own idea of the sequence of the genera.

Arion ater (L.).

Common in the neighbourhood of Louth, Alford, and Grimsby. Not yet on record for the Southern division of the county.

North Lincolnshire.—Sloothby, one, half-grown, type, August 4th, 1886! (J. E. Mason). Farlesthorne, several, not quite adult, May 25th, 1887! (J. E. Mason). Great Cotes, October 5th, 1883! one brought (W. E. Clarke).

Arion ater var. brunnea Roeb.

A common variety, recorded for one or two localities near Louth.

North Lincolnshire.—Grisel Bottom, Burwell Woods, common, September 4th, 1886! (H. W. Kew). **Sub-var. brunneo-pallescentis** (ms. var., very pale brown), Louth, adult, August 31st, 1886! (H. W. Kew).

Arion ater var. nigrescens Moq.

A not uncommon form, though only once recorded.

North Lincolnshire.—Louth, one, approaching *albolateralis*, October 5th, 1886! (H. W. Kew).

Arion subfuscus Fér.

Not by any means so frequent in its occurrence as the other species of the genus. Recorded from the Louth and Alford districts only.

North Lincolnshire.—Maltby Wood, near Louth, one, April 24th, 1886! (H. W. Kew). Farlesthorne, one, May 25th, 1887! (J. E. Mason).

Arion hortensis Fér.

Abundant and widely distributed about Louth, Alford, and near Ancaster.

North Lincolnshire.—Rigsby Farm, near Alford, common, April 14th, 1886! (W.D.R.). Ailby, a few, April 14th, 1886! (W.D.R.). Well Vale, near Alford, a few, April 14th, 1886! (W.D.R.). Tothby Farm, near Alford, a few, juv., April 14th, 1886! (W.D.R.). Burwell Wood, near Louth, one, very juv., April 15th, 1886! (W.D.R.). Haugham Wood, near Louth, one, adult, April 15th, 1886! (W.D.R.). Sloothby, several, immature, August 4th, 1886! (J. E. Mason). The Park, Bilsby, near Alford, two juv., May 5, 1886! (J. E. Mason). Greenfield Wood, Aby parish, several juv., June 8, 1887! (J. E. Mason).

South Lincolnshire.—Ermine Street, north of Ancaster Railway Station, a few, April 17th, 1886! (W.D.R.).

Arion hortensis var. subfusca C. Pfr.

North Lincolnshire.—Sloothby, one, adult, foot deep-orange, August 4th, 1886! (J. E. Mason).

Arion hortensis var. pallida.

North Lincolnshire.—Farlesthorne, several, juv., May 25th, 1887! (J. E. Mason).

Arion bourguignati Mab.

This is abundant and well-distributed in the neighbourhood of Louth, Alford, and Boston. In South Lincolnshire it has been noted near Boston and Ancaster. Frequents open country more than *A. hortensis*, which is partial to cultivated and rich land.

North Lincolnshire.—Tothby Farm, one, April 14th, 1886! (W.D.R.). Ailby, a few, April 14th, 1886! (W.D.R.). Well Vale, a few, April 14th, 1886! (W.D.R.). Sutton-in-the-Marsh, one, April 16th, 1886! (W.D.R.). Burwell, one, April 15th, 1886! (W.D.R.). Muckton Chalk-pit, one, April 15th, 1886! (W.D.R.). Skirbeck, near Boston, one, very small, September 8th, 1884! (W.D.R.).

South Lincolnshire.—Ermine Street, north of Ancaster Railway Station, a few, April 17th, 1886! (W.D.R.). Near Boston, one, small, September 8th, 1884! (W.D.R.).

***Amalia gagates* (Drap.).**

Very common at Alford, where the majority of the specimens are referable to the variety, only one example of the type having as yet occurred. Not reported from any other district, though it will probably be eventually found all along the sea-board of the county.

North Lincolnshire.—Parsons Lane, Alford, one nearly black, may be considered type, May 16th, 1886! (J. E. Mason).

***Amalia gagates* var. *plumbea* Moq.**

North Lincolnshire.—Alford, one adult and one juv., September 4th; several, September 8th, 1885! (J. E. Mason). Garden, Sycamores, Alford, one, September 8th, 1885! (E. N. and H. F. Mason).

***Amalia marginata* (Müll.).**

This species has occurred singly on two occasions—in North Lincolnshire at Louth, and in South Lincolnshire near Boston.

North Lincolnshire.—Louth, one, May 21st, 1886! (H. W. Kew).

South Lincolnshire.—Near Boston, one, small, September 8th, 1884! (W.D.R.).

***Limax arborum* B.-Ch.**

Found sparingly in a few places in the vicinity of Louth. Not yet reported elsewhere in the county.

North Lincolnshire.—Maltby Wood, near Louth, typical, a few under a log, April 15, 1886! (W.D.R.). Lincoln Road, Louth, one, small, at foot of a wall, April 24th, 1886! (H. W. Kew).

***Limax flavus* L.**

We have as yet only one record for this species, which may, however, be eventually expected to occur plentifully elsewhere in cellars and outhouses.

North Lincolnshire.—Wall, Lincoln Road, Louth, two, pale-lemon colour, April 24th, 1886! (H. W. Kew).

***Limax agrestis* L.**

This—the common or gray field-slug—is a pest everywhere in the neighbourhood of Grimsby, Louth, Alford, and Sutton. In South Lincolnshire it is on record for Boston and Ancaster districts.

North Lincolnshire.—Maltby Wood, near Louth, several, April 15th, 1886! (W.D.R.). Huttoft, near Alford, a few, April 15th, 1886! (W.D.R.). Muckton Wood, near Louth, a few, April 15th, 1886! (W.D.R.). Great Cotes, one, October 5th, 1883! (W. E. Clarke). Tothby Farm, near Alford, common, April 14th, 1886! (W.D.R.). Well Vale, near Alford, several, April 14, 1886! (W.D.R.). Farlesthorne, several, May 25th, 1887! (J. E.

Mason). Ailby, near Alford, common, April 14th, 1886! (W.D.R.). Sutton-in-the-Marsh, near Alford, numerous, April 16, 1886! (W.D.R.). Rigsby Farm, near Alford, abundant, April 14th, 1886! (W.D.R.). The Park, Bilsby, near Alford, numerous, May 5, 1886! (J. E. Mason). Claythorpe, plentiful, July 6th, 1887! (J. E. Mason).

South Lincolnshire.—Ermine Street, north of Ancaster Railway Station, a few, April 17th, 1886! (W.D.R.). Near Boston, a few, September 8th, 1884! (W.D.R.).

Limax agrestis var. *sylvatica* Moq. non Drap.

As abundant and widely distributed as is the typical form.

North Lincolnshire.—Alford, one, September 4th, 1885! (J. E. Mason). Tothby Farm, common, April 14th, 1886! (W.D.R.). The Park, Bilsby, one, very light in colour of markings, May 5th, 1886! (J. E. Mason). Rigsby Farm, very abundant, April 14th, 1886! Ailby Farm, common, April 14th, 1886! (W.D.R.). Well Vale, near Alford, several, April 14th, 1886! (W.D.R.). Muckton Wood, near Louth, a few, April 15th, 1886! (W.D.R.). Claythorpe, two, July 6th, 1887! (J. E. Mason).

South Lincolnshire.—Ermine Street, near Ancaster Railway Station, a few, April 17th, 1886! (W.D.R.).

Limax agrestis var. *tristis* Moq.

North Lincolnshire.—Tothby Farm, near Alford, a few, April 14th, 1886! (W.D.R.).

Limax agrestis var. *albida* Pic.

North Lincolnshire.—Claythorpe, one, juv., pure snow-white, July 6th, 1887! (J. E. Mason).

Limax lævis Müll.

This active and pretty little slug has occurred once or twice near Louth, and at Sutton-in-the-Marsh.

North Lincolnshire.—Muckton, chalk-pit, one, April 15th, 1886! Haugham Wood, near Louth, one, April 15th, 1886! (W.D.R.). Sutton-in-the-Marsh, one, April 16th, 1886! (W.D.R.).

Limax maximus L.

The records for this species and its varieties are not as yet very numerous, and they refer so far to the Louth and Alford districts only, and in South Lincolnshire to those of Boston and Ancaster.

North Lincolnshire.—Well Vale, one, typical, juv., April 14th, 1886! (W.D.R.). W. N. Mason, farmer, of Rigsby, had noticed this species in his cellar in winter (W.D.R., 4, 86).

South Lincolnshire.—Near Boston, one, small, length 43 mm., September 8th, 1884! (W.D.R.).

Limax maximus var. *cinerea* Moq.

North Lincolnshire.—Alford, one, adult, 112 mm. long, with a few light-coloured spots on shield, September 4th, 1886! (J. E. Mason) Louth, September 18th, 1886! (H. W. Kew).

Limax maximus var. *fasciata* Moq.

North Lincolnshire.—Haugham Wood, near Louth, one, April 15th, 1886! (W.D.R.). Wall, Lincoln Road, Louth, several, immature, April 24th, 1886! (H. W. Kew). Parson's Lane, Alford, one, adult, April 16th, 1886! (W.D.R.).

***Limax maximus* var. *cellaria* D'Arg.**

North Lincolnshire.—Alford, gardens at the Sycamores, April 14th, 1886! (W.D.R.). Wall, Crow Tree Lane, Louth, one, 5½ inches, April 24th, 1886! (H. W. Kew).

South Lincolnshire.—Ancaster village, two, nearly adult, April 17th, 1886! (W.D.R.).

***Succinea putris* (L.).**

Not uncommon in various localities near Louth, Alford, Sutton-in-the-Marsh, and Boston. Not yet recorded for the Southern division of the county.

North Lincolnshire.—Tothby, near Alford, plentiful and small on the vegetation in a cattle-pond, April 14th, 1886! (W.D.R.). Skirbeck, near Boston, one, September 8th, 1884! (W.D.R.). Louth Canal, a few, April 15th, 1886! (W.D.R.). Sutton-in-the-Marsh, numerous by the pools at foot of the sandhills, April 16th, 1886! (W.D.R.). Sutton, a few! (H. W. Kew, 16, iv, 87). Theddlethorpe, small, a few! (H. W. Kew, 16, iv, 87). Farlesthorne, one, May 25th, 1887! (J. E. Mason).

***Vitrina pellucida* Müll.**

A common species, recorded for one South Lincolnshire locality, and in the North for various places round Louth, Alford, and Sutton.

North Lincolnshire.—Muckton Wood, near Louth, one, April 15th, 1886! (W.D.R.). Grimoldby, one! (H. W. Kew, 13, v, 87). Sutton-in-the-Marsh, a few at foot of sandhills, land-side, April 16th, 1886! (W.D.R.). Anderby, near Alford, plentiful, dead, by side of coast drains, April 16th, 1886! (W.D.R.). Well Footpath, near Alford, numerous, April 26th, 1886! (J. E. Mason). Chapel, August 19th, 1886! (J. E. Mason). Well Vale Chalk-pit, one, April 14th, 1886! (W.D.R.). Well Vale, near Alford, numerous, April 14th, 1886! (W.D.R.). Sandhills, Chapel, parish of Mumby Chapel, a few dead, July 5th, 1886! (J. E. Mason). The Park, Bilsby, near Alford, a few, May 5th, 1886! (J. E. Mason). Greenfield Wood, Aby parish, one, June 8th, 1887! (J. E. Mason). Hubbard's Valley, near Louth, several! (H. W. Kew, 13, v, 87).

South Lincolnshire.—Anwick, near Sleaford, two, March 7th, 1887! (C. T. Musson).

***Zonites cellarius* (Müll.).**

Common and generally distributed about Louth, Alford, and Boston, and in the Southern division at Ancaster, Anwick, and Uffington. Both the recorded varieties are from Ancaster.

North Lincolnshire.—Among chalk débris at Claxby, near Alford, a few, September 16th, 1885! (J. E. Mason). Well Vale Chalk-pit, a few, April 14th, 1886! (W.D.R.). Well Footpath, Alford, one, April 28th, 1886! (J. E. Mason). Well Vale, near Alford, numerous, April 14th, 1886! (W.D.R.). Muckton Wood, a few, April 15th, 1886! (W.D.R.). Skirbeck, near Boston, one, September 8th, 1884! (W.D.R.). Farlesthorne, one, May 25th, 1887! (J. E. Mason). The Park, Bilsby, near Alford, one, May 5th, 1886! (J. E. Mason). Sloothby, near Alford, one, August 4th, 1886! (J. E. Mason). Chapel, one juv., dead, August 19th, 1886! (J. E. Mason). Claythorpe, two, July 6th, 1887! (J. E. Mason). Sandhills, Chapel, in parish of Mumby Chapel, July 5th, 1886! (J. E. Mason). Haugham Pasture, near Louth, one, (H. W. Kew, 13, v, 87). Grimoldby, one! (H. W. Kew, 13, v, 87). Welton Vale, near Louth! (H. W. Kew, 13, v, 87). Belleau, near Alford, one, juv.! (Id.). Tathwell, near Louth! (Id.).

South Lincolnshire.—Ermine Street, north of Ancaster Railway Station, numerous, April 17th, 1886! (W.D.R.). Anwick, near Sleaford, a few, March 7th, 1887! (C. T. Musson). Ancaster village, numerous, April 17th, 1886! (W.D.R.). Uffington (E. Collier, 1884; specimens not seen).

Zonites cellarius var. albinus Moq.

South Lincolnshire.—Ermine Street, north of Ancaster Railway Station, with type, numerous, April 17th, 1886! (W.D.R.).

Zonites cellarius var. complanata Jeff.

South Lincolnshire.—Ancaster village, one, with type, April 17th, 1886! (W.D.R.).

Zonites allarius (Mill.).

Only one record.

North Lincolnshire.—Sutton, a few! (H. W. Kew, 16, iv, 87).

Zonites glaber (Stud.).

A common species in various woods in the Louth district, and found also at Cleethorpes.

North Lincolnshire.—Haugham, Burwell, and Maltby Woods, numerous, April 15th, 1886! (W.D.R.). Cleethorpes, three! (H. W. Kew, 16, iv, 87). Haugham Pasture, near Louth, one! (H. W. Kew, 13, v, 87). Plantation near Fenney Wood, Louth! (H. W. Kew, 13, v, 87).

Zonites nitidulus (Drap.).

Common and generally distributed near Louth and Alford. Found also at Cleethorpes, and in South Lincolnshire at Ancaster, Anwick, and Uffington.

North Lincolnshire.—Among chalk débris at Claxby, near Alford, a few, September 16th, 1885! (J. E. Mason). Muckton Wood, two, April 15th, 1886! (W.D.R.). Haugham Wood, near Louth, two, April 15th, 1886! (W.D.R.). Tothby, near Alford, a few, April 14th, 1886! (W.D.R.). Burwell, and Burwell Wood, one each, April 15th, 1886! (W.D.R.). Well Vale, near Alford, April 14th, 1886! (W.D.R.). Muckton Chalk-pit, near Louth, a few, April 15th, 1886! (W.D.R.). Well Vale Chalk-pit, a few, April 14th, 1886! (W.D.R.). Well Footpath, Alford, one, April 26th, 1886! (J. E. Mason). The Park, Bilsby, near Alford, a few, May 5th, 1886! (J. E. Mason). Chapel, two, August 19th, 1886! (J. E. Mason). Sloothby, near Alford, August 4th, 1886, a few! (J. E. Mason). Claythorpe, one, July 6th, 1887! (J. E. Mason). Haugham Pasture, one! (H. W. Kew, 13, v, 87). Grimoldby, one! (H. W. Kew, 13, v, 87). Cleethorpes, one! (H. W. Kew, 16, iv, 87). Greenfield Wood, Aby parish, one, June 8th, 1887! (J. E. Mason). Hubbard's Valley, near Louth, one! (H. W. Kew, 13, v, 87). South Elkington brick-field, near Louth! (Id.)

South Lincolnshire.—Uffington, on fallen trees! (E. Collier, ix, 85). Ancaster village, numerous, April 17th, 1886! (W.D.R.). Anwick, near Sleaford, a few, March 7th, 1887! (C. T. Musson). Ermine Street, north of Ancaster Railway Station, a few, April 17th, 1886! (W.D.R.).

Zonites purus (Ald.).

Found in a few places near Alford. Not yet recorded for the Southern division.

North Lincolnshire.—Tothby, near Alford, one, April 14th, 1886! (W.D.R.). Grimoldby, one! (H. W. Kew, 13, v, 87). Well Vale, near Alford, April 14th, 1886! (W.D.R.).

Zonites purus var. margaritacea Jeff.

Commoner than the type. Occurs in a few places near Alford and Louth, but not yet reported for South Lincolnshire.

North Lincolnshire.—Well Vale, near Alford, a few, April 14th, 1886! (W.D.R.). Haugham Pasture, near Louth, one! (H. W. Kew, 13, v, 87). Maltby Wood, near Louth, one, April 15th, 1886! (W.D.R.). Hubbard's Valley, a few! (H. W. Kew, 13, v, 87).

Zonites nitidus (Müll.).

Only once recorded.

North Lincolnshire.—Canal-banks near Louth, several, April 15th, 1886! (W.D.R.).

Zonites radiatulus (Ald.).

Has occurred several times about Brigg, Donington-on-Bain, Alford, and Louth, but has not so far been reported for other districts.

North Lincolnshire.—Brigg! (T. Ball). Donington-on-Bain, common! (H. W. Kew, 19, viii, 86). Greenfield Wood, Aby parish, one, June 8th, 1887! (J. E. Mason). Banks of canal near Louth, one, April 15th, 1886! (W.D.R.). Plantation near Fenney Wood, Louth! (H. W. Kew, 13, v, 87). Welton Vale, near Louth, a few! (Id.).

Zonites crystallinus (Müll.).

A common species. Has occurred in the Louth and Alford districts. No record as yet for the Southern division.

North Lincolnshire.—Among chalk débris at Claxby, near Alford, one, September 16th, 1885! (J. E. Mason). Hubbard's Valley, near Louth, a few! (H. W. Kew, 13, v, 87). Well Vale, near Alford, numerous, April 14th, 1886! (W.D.R.). Welton Vale, near Louth, one! (H. W. Kew, 13, v, 87). Maltby Wood, near Louth, one! (Id.).

Zonites crystallinus var. complanata Jeff.

North Lincolnshire.—Louth Park, near Louth, one! (H. W. Kew, 7, vi, 87).

Zonites fulvus (Müll.).

The first record of this pretty little shell as a Lincolnshire species is by Dr. Martin Lister, who, in 1678, stated that he had found it more than once in moss at the roots of large trees in Burwell Woods in Lincolnshire, yet the creature was very scarce. (In musco ad grandium arborum radices in fylvis Burwellenfibus agri Lincolnienfis non semel eam inveni: est tamen admodum rara bestiola). This interesting record was confirmed in 1886 by Mr. Kew finding it again in Burwell Wood. It is, however (as Dr. Lister expressed it), a 'rara bestiola' yet, both in Burwell Wood and Greenfield Wood, although plentiful enough in the beautifully wooded and picturesque dell called Well Vale, near Alford. Not recorded as yet for South Lincolnshire.

North Lincolnshire.—Martin Lister (Hist. Animalium Angliæ, 1678, p. 123) says : —‘I have found it more than once in moss at the roots of large trees in Burwell Woods in Lincolnshire, yet the creature is very scarce.’ Greenfield Wood, Aby parish, one, June 8th, 1887! (J. E. Mason). Well Vale, near Alford, numerous, one specimen very fine, April 14th, 1886! (W.D.R.). Haugham Pasture, near Louth! (H. W. Kew, 13, v, 87). Plantation near Fenney Wood, Louth! (H. W. Kew, 13, v, 87). Maltby Wood, near Louth, one! (Id.). Burwell Wood, one! (H. W. Kew, 7, vi, 87).

Helix aspersa Müll.

An abundant species and generally distributed in the Louth, Mablethorpe, Sutton, Alford, Boston, Lincoln, Caistor, and Gainsborough districts, as also in South Lincolnshire about Grantham, Ancaster, Boston, and Anwick. Only two noteworthy varieties have as yet been recorded.

North Lincolnshire.—Sand dunes, Skegness! (C. T. Musson, February 1884). The Sycamores, Alford, September 9th, 1885! (J. E. Mason). Tothby Road, Alford, numerous, April 14th, 1886! (W.D.R.). Farlesthorne, one, May 25th, 1887! (J. E. Mason). Well Vale, near Alford, chalk-pit, one, April 14th, 1886! (W.D.R.). Lincoln, one! (C. T. Musson, February 1884). Skirbeck, near Boston, a few, September 8th, 1884! (W.D.R.). Rigsby, a few, juv., March 3rd, 1887! (Isabel Mason). Sloothby, near Alford, numerous, August 4th, 1886! (J. E. Mason). Skegness, plentiful, 1874! (C. T. Musson). Sandhills, Chapel, parish of Mumby Chapel, July 5th, 1886! (J. E. Mason). Claythorpe, one, July 6th, 1887! (J. E. Mason). Rejectamenta of Main Drain, Chapel, one juv., August 20th, 1886! (J. E. Mason). Mablethorpe, one! (H. W. Kew, April 1887). Sutton-in-the-Marsh, common, April 16th, 1886! (W.D.R.). Caistor, one juv., October 6th, 1883! (W. E. Clarke). Muckton, near Louth, one, April 15th, 1886! (W.D.R.). Rigsby farmyard, near Alford, April 14th, 1886! (W.D.R.). Greenfield Wood, Aby parish, two, June 8th, 1887! (J. E. Mason). Near Gainsborough, on *Urtica dioica*, two juv., August 11th, 1883! (P. F. Lee).

South Lincolnshire.—Grantham (E. J. Lowe, 1853). Grantham, one brought! (R. Walker, April, 1884). Ancaster village, plentiful, April 17th, 1886! (W.D.R.). Near Boston, one, September 8th, 1884! (W.D.R.). Ermine Street, north of Ancaster Railway Station, plentiful, April 17th, 1886! (W.D.R.). Anwick, near Sleaford, several, March 7th, 1887! (C. T. Musson).

Helix aspersa var. *exalbida* Menk.

North Lincolnshire.—Mablethorpe Sandhills, common; one denuded specimen sent! (H. W. Kew, 19, viii, 86).

Helix aspersa var. *grisea* Moq.

North Lincolnshire.—Cleethorpes, specimens in the collection of the late J. Hardy, sen., September, 1885!

Helix nemoralis L.

Common and widely distributed about Louth, Alford, Market Rasen, and Owston Ferry, and in South Lincolnshire at Anwick. The earliest records are for Grantham (E. J. Lowe, 1853), and Croyland (Bellars, 1858), both in the South. The colour- and band-variations recorded are numerous, and one form-variation has been noted.

- North Lincolnshire.**—Owston Ferry, J. Whitwham! (in coll. W. Nelson). Chapel, a few, August 19th, 1886! (J. E. Mason). Sandhills, Chapel, parish of Mumby Chapel, July 5th, 1886! (J. E. Mason). Glentham, near Market Rasen, August 1879! (C. H. Bothamley). Hallington, one! (H. W. Kew, April 1887). Somercotes, one, libellula 123,45 and one 02345! (H. W. Kew, 16, iv, 87). Hubbard's Valley, one adult, libellula 00000! (H. W. Kew, May 1887). Rejectamenta of main drain, Chapel, August 20th, 1886! (J. E. Mason). Roadside near Acthorpe, Louth, libellula 12345, 00340, rubella 00000, and carnea 02345! (H. W. Kew, 13, v, 87). Railway-bank, Donington-on-Bain, one, libellula 00000! (H. W. Kew, 7, vi, 87).
- South Lincolnshire.**—Croyland (Bellars, 1858). Grantham (Lowe, 1853). Anwick, near Sleaford, libellula 02345, 12345, 12345, 02345 juv., 00300 juv., one each, March 7th, 1887! (C. T. Musson). Anwick, near Sleaford, one adult, dead, libellula 12345! March 7th, 1887! (C. T. Musson).

***Helix nemoralis* var. *conica* Pasc.**

- North Lincolnshire.**—Grisel Bottom, Louth, one, carnea 12345! (H. W. Kew, 19, viii, 86): one lutea 00000! (Id., April 1887).

***Helix hortensis* Müll.**

A very scarce species in Lincolnshire, occurring only very sparingly in one or two woods near Louth. For South Lincolnshire it has long been on record as found at Croyland (Bellars, 1858).

- North Lincolnshire.**—Grisel Bottom, Burwell Wood, one, lutea 12345! (H. W. Kew, 7, vi, 87). Haugham Pasture, near Louth, lutea 12045 and 00000, one each, broken!—none found alive yet (H. W. Kew, 19, viii, 86).
- South Lincolnshire.**—Croyland (Bellars, 1858).

***Helix hortensis* var. *pallida* T. D. A. Cockerell.**

- North Lincolnshire.**—Burwell and Haugham Wood (H. W. Kew, 19, viii, 86).

***Helix arbustorum* L.**

Local, found in a few places near Louth, Alford, and Lincoln. All the specimens in the last-named locality are of the pale variety with band, the type not occurring there. The only record for the Southern division is a note of Mr. E. Collier's that he has found it at Uffington near Stamford.

- North Lincolnshire.**—Well Vale, near Alford, numerous, April 14th, 1886! (W.D.R.). Haugham Wood, near Louth, one, April 15th, 1886! (W.D.R.). Hubbard's Valley, one, dead, distorted! (H. W. Kew, 13, v, 87). Roadside, Acthorpe, near Louth, one! (H. W. Kew, 13, v, 87). Grisel Bottom, Burwell Wood! (H. W. Kew, 7, vi, 87).
- South Lincolnshire.**—Uffington, near Stamford (E. Collier, specimens not seen).

***Helix arbustorum* var. *flavescens* Moq.**

- North Lincolnshire.**—Hubbard's Valley, near Louth, one! (H. W. Kew, 19, viii, 86). Haugham Pasture, near Louth, one! (H. W. Kew, 13, v, 87).

***Helix arbustorum* var. *cincta* Tayl.**

- North Lincolnshire.**—Well Vale, near Alford, with type, a few, April 14th, 1886! (W.D.R.). Wragby Road, Lincoln, very abundant! (W. W. Fowler, April 1886).



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Bibliography for 1885 (continuation) and 1886.

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BOOKS RECEIVED.

- The Scottish Naturalist, No. xvii, for July 1887. [Prof. J. W. H. Trail, Editor. Notarisia, Anno ii, No. 6, Luglio 1887. [G. B. de Toni e David Levi, Redattori. Science Gossip. No. 272, for August 1887. [Messrs. Chatto & Windus, Publishers. P. Fox Lee.—The Flora of Dewsbury and Neighbourhood, 8vo reprint, 24 pages, 1887. [The Author. Watson Botanical Exchange Club.—3rd Ann. Rept., 1886-7. [P. F. Lee, Distributor. Osmond W. Jeffs.—The Calday-Grange Fault, West Kirby, 8vo reprint, 4 pages, photograph and plan. [The Author. Osmond W. Jeffs.—The Geological History of Storeton Quarry; and Geological Note on the Bromborough Excursion; 8vo rept., 8 pp. and plate, 1887. [Author. Harold A. Jeffs.—The Nettle-Sting, and other Plant Hairs, 8vo reprint, 1 page, 1887. [Author. The Manx Note-Book—No. 11, July 1887. [Mr. A. W. Moore, Editor. Société Royale Malacologique de Belgique.—Procès-verbaux, Année 1887, 8feuilles. [La Société. The Journal of Conchology, vol. 5, No. 7, July 1887. [Mr. J. W. Taylor, Editor. Osmond W. Jeffs.—Occurrence of Copper in the Keuper Sandstone at the Peckforton Hills, Cheshire—8vo, 5-page reprint. [Author. Liverpool Science Students' Association.—Ann. Rept., March 1887. [Association. Revue Bryologique, 14^e Année, 1887, No. 4. [Mons. T. Husnot, Redacteur. The Young Naturalist, Part xcii, for August 1887. [Mr. J. E. Robson, Editor. The Midland Naturalist, vol. x, No. 116, for Aug. 1887. [The Editors, Birmingham. The Essex Naturalist, No. 7, for July 1887. [The Essex Field Club.

Yorkshire Neuroptera and Orthoptera.—I am anxious during the present and several future seasons to work up the Neuroptera and Orthoptera of our county as much as possible, with a view to publishing a list of species, with their localities, etc., and shall be very grateful to all entomologists (or other naturalists) who, when out collecting their own particular groups of objects, will kindly kill and pin (of course they need not trouble to set them) one or two or three specimens of any species they may come across, and send them to me at the end of the season—or oftener if it be not too much trouble. The families in the Neuroptera wanted are the *Libellulidæ* (Dragon-flies), *Pertlidæ* (Stone-flies), *Sialidæ*, *Raphidiidæ* (Snake-flies), *Osmylidæ*, *Hemerobidæ*, *Chrysopidæ* (Lacewing-flies), *Coniopterygineæ*, *Panorpidæ* (Scorpion-flies), and the *Trichoptera* (Caddis-flies). The two other British groups, *Psocidæ* and *Ephemeriidæ* (May-flies), I do not propose to touch at present. The Orthoptera include the *Forficulidæ* (Earwigs), *Blattidæ* (Cockroaches), *Acrididæ* (Grasshopper and Locusts), and the *Achelidæ* (Crickets), all of which, with the exception of the several universally abundant and distributed species, are wanted.—GEO. T. PORRITT, Greenfield House, Huddersfield, May 18th, 1887.

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***Helix arbustorum* var. *alpestris* Ziegl.**

This variety is on record as found 'on the banks of the Witham' (J. T. Lightwood in Nat. Hist. Notes, July 1882, s.s. ii, 96), but which bank is not stated, thus inducing uncertainty as to which division of Lincolnshire the record applies.

***Helix cantiana* Mont.**

Only recorded for two localities in North and one in South Lincolnshire. The latter instance is interesting enough to be repeated in the words of the original record. Mr. John Hawkins wrote in 'The Field' of January 24th, 1875, as follows:—'Two years since, when taking a friend to inspect the Roman camp at Honington, while searching for shards of old pottery, I found *Helix cantiana*. As it was in the winter season, only dead shells were procurable. Upon my next visit I was fortunate enough to discover two or three live specimens. I could hardly believe at first that the Kent snail should occur in Lincolnshire, and was inclined to attribute the finding it to any cause but the true one. However, descending into the valley, and hunting in a dyke for some geological specimens among the stony *débris*, I found a whole colony of these *Helices*, and on comparing them with specimens brought from the Undercliff, Isle of Wight, I found them quite the equals of these in every respect. Since that time I have procured them on the line of the old Roman road which intersects our heath district, and there is no doubt that they occur all along the stony district of Lincolnshire.' Not having access to 'The Field' of that date, I have copied the above extract from Harting's 'Rambles,' p. 79.

North Lincolnshire.—Near Scotton Common, J. Hebden (specimens in coll. W. Nelson). Lincoln, numerous, by roadside, three miles from the city, Rev. A. G. Musson (C. T. Musson). In a lane near Lincoln, several, April 1882 (J. T. Lightwood in Nat. Hist. Notes, July 1882, s.s., ii, 96).

South Lincolnshire.—Honington (see extract given above).

***Helix rufescens* Penn.**

Common where it occurs. It is on record for the neighbourhoods of Louth, Alford, Caistor, and Market Rasen, but not for any South Lincolnshire station.

North Lincolnshire.—The Sycamores, Alford, September 9th, 1885 (J. E. Mason). Canal-side, Louth, one, April 15th, 1886 (W. D. R.). The Park, Bilsby, near Alford, a few, May 5th, 1886 (J. E. Mason). Claythorpe, one, July 6th, 1887! (J. E. Mason). Sloothby, near Alford, a few, August 4th, 1886 (J. E. Mason). Caistor, several, October 6th, 1883 (W. E. Clarke). Hubbard's Valley, near Louth, two! (H. W. Kew, 13, v, 87.) Glentham, near Market Rasen, August 1879 (C. H. Bothamley). Welton Vale near Louth! (H. W. Kew, 13, v, 87).

***Helix concinna* Jeff.**

Not uncommon, and found in various parts of the country adjoining Alford, and at Donington-on-Bain. Not noted for the Southern division.

North Lincolnshire.—Among chalk débris at Claxby, Alford, several, September 16th, 1885! (J. E. Mason). Rejectamenta of Main Drain, Chapel, August 1886, one! (J. E. Mason). Tothby, near Alford, a few, April 14th, 1886! (W.D.R.). Donington-on-Bain, one! (H. W. Kew, 19, viii, 86). Farlesthorpe, one, May 25th, 1887! (J. E. Mason). Greenfield Wood, Ailby parish, a few, June 8th, 1887! (J. E. Mason). Rigsby, two, March 3rd, 1887! (Isabel Mason). London Road, Louth, one! (H. W. Kew, 7, vi, 87).

Helix hispida L.

An abundant species and well spread round Louth, Alford, Sutton-in-the-Marsh, and in South Lincolnshire at Anwick, Ancaster, and Uffington.

North Lincolnshire.—Among chalk débris, Claxby, near Alford, numerous, September 16th, 1885 (J. E. Mason). Mason's farm-yard, Rigsby, near Alford, two, one a large specimen, April 14th, 1886 (W.D.R.). Well Vale, near Alford, plentiful, April 14th, 1886 (W.D.R.). Tothby, near Alford, several, April 14th, 1886 (W.D.R.). Sides of canal at Louth, plentiful, April 15th, 1886 (W.D.R.). Well footpath, Alford, a few, April 26th, 1886 (J. E. Mason). Muckton Wood, near Louth, plentiful, April 15th, 1886 (W.D.R.). Haugham Wood, near Louth, a few, April 14th, 1886 (W.D.R.). Sutton-in-the-Marsh, sandhills, a few, April 16th, 1886 (W.D.R.). Sloothby, near Alford, a few, August 4th, 1886 (J. E. Mason). Burwell, near Louth, roadsides, plentiful, April 15th, 1886 (W.D.R.). The Park, Bilsby, a few, May 5th, 1886 (J. E. Mason). Haugham Pasture, near Louth, one! (H. W. Kew, 13, v, 87). Rejectamenta of Main Drain, Chapel, one, August 20th, 1886 (J. E. Mason). Farlesthorpe, one, May 25th, 1887! (J. E. Mason). Hubbard's Valley, near Louth, one! (H. W. Kew, 13, v, 87). South Elkington brick-field, near Louth! (Id.).

South Lincolnshire.—Uffington, near Stamford (E. Collier). Anwick, near Sleaford, March 7th, 1887! (C. T. Musson). Ancaster village, plentiful, April 17th, 1886 (W.D.R.). Ermine Street, north of Ancaster Railway Station, plentiful by the roadside, April 17th, 1886 (W.D.R.).

Helix hispida var. *subrufa* Moq.

North Lincolnshire.—Louth Park, near Louth, one! (H. W. Kew, 7, vi, 87).

Helix hispida var. *subglobosa* Jeff.

Jeffreys' 'British Conchology' (1862) is our sole authority for the inclusion of this variety, which is recorded in that work as found at Brocklesby (North Lincs.).

North Lincolnshire.—Brocklesby (Jeffreys, 1862).

Helix sericea Müll.

For this species we have but one record—for Ancaster, in South Lincoln.

South Lincolnshire.—Ancaster village, one, April 17th, 1886 (W.D.R.)

Helix virgata Da Costa.

For this species the only two records of the typical form are for the Southern division.

South Lincolnshire.—Ancaster village, one, April 17th, 1886! (W.D.R.). Anwick, near Sleaford, numerous, March 7th, 1887! (C. T. Musson).

***Helix virgata monst. sinistrorsum* Tayl.**

Dr. Jeffreys (in B.C., vol. 5, 1869) gives New Holland as a locality for this monstrosity, on the authority of Mr. Ball. This is our sole evidence for including the species as a native of the Northern division of the county.

***Helix caperata* Mont.**

Common on the coast sand-hills and in chalk-pits further inland, in the vicinity of Alford, Huttoft, and Sutton. Noted in the South at Ancaster and Uffington, in the latter place occurring on old trees.

North Lincolnshire.—Among chalk débris at Claxby, near Alford, one, September 16th, 1885 (J. E. Mason). Coast sandhills, Huttoft, near Alford, numerous, April 16th, 1886 (W.D.R.). Well Vale chalk-pit, near Alford, a few, April 14th, 1886 (W.D.R.). Sandhills, Chapel, parish of Mumby Chapel, a few, July 5th, 1886 (J. E. Mason). Sandhills by coast, Sutton-in-the-Marsh, a few, April 16th, 1886! (W.D.R.). Chapel, a few, August 19th, 1886 (J. E. Mason). Swaby Vale, near Alford, one! (H. W. Kew, 13, v, 87).

South Lincolnshire.—Uffington, on old trees, rather higher in the spire than the Derbyshire ones, not seen (E. Collier). Ancaster village, one, small, April 17th, 1886 (W.D.R.). Ermine Street, north of Ancaster Railway Station, a few, April 17th, 1886 (W.D.R.).

***Helix caperata* var. *ornata* Pic.**

Specimens approaching this variety found with the type on the Huttoft Sandhills, and at Swaby Vale near Alford.

North Lincolnshire.—Sandhills, Huttoft, near Alford, a few, aff. *ornata*, 16, iv, 86! (W.D.R.). Swaby Vale, near Alford, one! (H. W. Kew, 13, v, 87).

***Helix ericetorum* Müll.**

Found in several localities near Louth, Alford, and Saltfleet, and in South Lincolnshire near Ancaster. One of the Louth specimens was a near approach to var. *alba*.

North Lincolnshire.—Louth! (H. W. Kew, 1, 86). Sandhills, Huttoft, near Alford, one, dead, April 16th, 1886! (W.D.R.). Coast sandhills at Saltfleet, one! (H. W. Kew, 16, iv, 87). Well Vale, near Alford, numerous, April 14th, 1886! (W.D.R.). Welton, near Louth, one! (H. W. Kew, 13, v, 87).

South Lincolnshire.—Ermine Street, north of Ancaster Railway Station, April 17th, 1886, a few! (W.D.R.). Ancaster village, one, small, April 17th, 1886! (W.D.R.).

***Helix ericetorum* var. *alba* Charp.**

North Lincolnshire.—Louth, one, aff. *alba*! (H. W. Kew, January 1886). Chalky-bank end of Hubbard's Valley, Louth, one! (H. W. Kew, 7, vi, 87).

***Helix ericetorum* var. *minor* Moq.**

North Lincolnshire.—Swaby Vale, near Alford, one! (H. W. Kew, 13, v, 87).

***Helix rotundata* Müll.**

An abundant and generally-diffused species, found in numerous localities in the districts round Louth and Alford, and in South Lincolnshire has been noted at Ancaster and Uffington. The white variety is on record from Brigg.

- North Lincolnshire.**—Among chalk débris at Claxby, near Alford, a few, September 16th, 1885! (J. E. Mason). Well Vale Chalk-pit, near Alford, plentiful, April 14th, 1886! (W.D.R.). Grimoldby, one! (H. W. Kew, 13, v, 87). Well Vale, near Alford, plentiful, April 14, 1886! (W.D.R.). Tothby, near Alford, plentiful, April 14th, 1886! (W.D.R.). Haugham Wood, near Louth, a few, April 15th, 1886! (W.D.R.). Canal-side, Louth, April 15th, 1886! (W.D.R.). Maltby Wood, near Louth, a few, April 15th, 1886! (W.D.R.). Muckton Wood, a few, April 15th, 1886! (W.D.R.). Muckton Chalk-pit, a few, April 15th, 1886! (W.D.R.). Burwell, near Louth, roadsides, plentiful, April 15th, 1886! (W.D.R.). The Park, Bilsby, a few, May 5th, 1886! (J. E. Mason). Greenfield Wood, Ailby parish, a few, June 8th, 1887! (J. E. Mason). Sloothby, near Alford, a few, August 4th, 1886! (J. E. Mason). Haugham Pasture, one! (H. W. Kew, 13, v, 87). Hubbard's Valley, near Louth, one! (H. W. Kew, 13, v, 87). Welton Vale, near Louth! (Id.). South Elkington brick-field, near Louth! (Id.). Belleau, near Alford, one! (Id.). Louth Park! (H. W. Kew, 7, vi, 87).
- South Lincolnshire.**—Uffington (E. Collier, 1884: not seen). Ancaster village, plentiful, April 17th, 1886! (W.D.R.).

***Helix rotundata* var. *alba* Moq.**

North Lincolnshire.—Brigg! (T. Beaulah—specimens in coll. J. W. Taylor).

***Helix pygmæa* Drap.**

This minute species has turned up in two localities, near Brigg and near Louth, both in the Northern division.

North Lincolnshire.—Scawbery (T. Rogers, September 1885): evidently 'Scawby,' near Brigg (W.D.R.). Hubbard's Valley, four! (H. W. Kew, 13, v, 87).

***Helix lapicida* L.**

The only record is for Uffington, in the Southern division.

South Lincolnshire.—On trees, Uffington, near Stamford! (E. Collier, September 1885).

***Helix pulchella* Müll.**

Found in a few localities about Louth and Alford, also at Cleethorpes and Mablethorpe, and in South Lincolnshire at Grantham (E. J. Lowe, Conch. of Notts., 1853), Uffington, and Ancaster.

North Lincolnshire.—Cleethorpes (J. Hardy, sen.). Mablethorpe, a few! (Rev. W. W. Fowler, April 1886). Mablethorpe sandhills, common! (H. W. Kew, August 1886). Theddlethorpe, three (H. W. Kew, 16, iv, 87). Tothby, near Alford, April 14th, 1886! (W.D.R.). Swaby Vale near Alford, one! (H. W. Kew, 13, v, 87). Hallington, near Louth! (Id.).

South Lincolnshire.—Uffington, near Stamford, under the bark of some old trees that had lain some time in a pasture-field! (E. Collier, September 1885). Grantham (E. J. Lowe, Conchology of Notts., 1853).

***Helix pulchella* var. *costata* Müll.**

North Lincolnshire.—Grimoldby, two! (H. W. Kew, 13, v, 87).

South Lincolnshire.—Ancaster village, one, April 17th, 1886! (W.D.R.).

***Bulimus obscurus* (Müll.).**

Sparingly distributed in a few localities near Alford. In South Lincolnshire recorded for Ancaster.

- North Lincolnshire.**—Among chalk débris at Claxby, near Alford, one, September 16th, 1885! (J. E. Mason). Greenfield Wood, Ailby parish, one, June 8th, 1887! (J. E. Mason). Well Vale, near Alford, a few, April 14th, 1886! (W.D.R.). Claythorpe, one, July 6th, 1887! (J. E. Mason). Grisel-bottom, Burwell Wood, two! (H. W. Kew, 7, vi, 87).
- South Lincolnshire.**—Ancaster village, one, April 17th, 1886! (W.D.R.).

***Pupa marginata* Drap.**

Not uncommon in various localities on the coast sandhills, at Cleethorpes, Mablethorpe, and Chapel, and also recorded for Lincoln. Not yet reported for South Lincolnshire.

- North Lincolnshire**—Cleethorpes (J. R. Hardy, September, 1885). Mablethorpe, a few, 1881 (Rev. W. W. Fowler, April, 1886). Mablethorpe, common, with **var. edentula** (H. W. Kew, 19, viii, 86). Chapel, a few, 19, viii, 86 (J. E. Mason). Lincoln (W. Nelson's collection). Sandhills, Chapel, parish of Mumby Chapel, two, July 5th, 1886 (J. E. Mason). Haugham Pasture, near Louth! (H. W. Kew, 13, v, 87). Swaby Vale, near Alford, one! (Id.)

***Pupa umbilicata* Drap.**

Common in Well Vale, near Alford; Hubbard's Valley, near Louth; and at Mablethorpe. Not on record for the southern division.

- North Lincolnshire.**—Well Vale, near Alford, numerous, April 14th, 1886! (W.D.R.). Well Vale, common on trunks of maples (H. W. Kew, 19, viii, 86). Mablethorpe, common (H. Wallis Kew, 19, viii, 86). Hubbard's Valley, one! (H. W. Kew, 13, v, 87).

***Pupa umbilicata var. albina* Moq.**

- North Lincolnshire.**—Mablethorpe, 1881, one (Rev. W. W. Fowler, April 1886).

***Pupa umbilicata var. curta* Pasc.**

- North Lincolnshire.**—Grimoldby, near Louth! (H. W. Kew, 13, v, 87).

***Vertigo edentula* (Drap.).**

Recorded for two localities only, both in North Lincolnshire.

- North Lincolnshire.**—Broughton Wood, Brigg (T. Rogers, September 1885). Greenfield Wood, parish of Aby-with-Greenfield, June 8th, 1887! (J. E. Mason).

***Vertigo pygmæa* (Drap.).**

Recorded for two coast localities only, both in North Lincolnshire.

- North Lincolnshire.**—Mablethorpe, 1881, numerous (W. W. Fowler, April 1886). Sutton-in-the-Marsh, foot of sandhills, land side, edge of pools, one, April 16th, 1886 (W.D.R.).

***Balea perversa* (L.).**

Springly found in two places in the neighbourhood of Alford, where it occurs on ash-trees.

- North Lincolnshire.**—Rigsby, several, March 3rd, 1887! (Isabel Mason). Claythorpe, one, July 6th, 1887! (J. E. Mason).

***Clausilia rugosa* (Drap.).**

A common species, recorded for numerous localities in the Louth and Alford districts. The only record for the Southern division is of the var. *tumidula* at Uffington.

North Lincolnshire.—Muckton Chalk-pit, a few, April 15th, 1886! (W.D.R.). Burwell, one, April 15th, 1886! (W.D.R.). Well Vale, near Alford, numerous, April 14th, 1886! (W.D.R.). Sloothby, one, August 4th, 1886! (J. E. Mason). Well Vale Chalk-pit, near Alford, numerous, April 14th, 1886! (W.D.R.). Grimoldby, one! (H. W. Kew, 13, v, 87). Tothby, near Alford, a few, April 14th, 1886! (W.D.R.). Rejactamenta of Main Drain, Chapel, a few, August 28th, 1886! (J. E. Mason). Haugham Wood, near Louth, a few, April 15th, 1886! (W.D.R.). Haugham Pasture, one! (H. W. Kew, 13, v, 87). Rigsby, several, March 3rd, 1887! (Isabel Mason). Greenfield Wood, Ailby parish, a few, June 8th, 1887! (J. E. Mason). Hubbard's Valley, near Louth, one! (H. W. Kew, 13, v, 87). Louth Park, one! (H. W. Kew, 7, vi, 87).

***Clausilia rugosa* var. *tumidula* Jeff.**

South Lincolnshire.—Uffington, near Stamford, on old trees that had been felled and allowed to lie two or three years—a good number found of this variety! (E. Collier, September 1885).

***Clausilia laminata* (Mont.).**

Not uncommon in various woodland localities near Louth and Alford. Recorded also for Uffington in the Southern division.

North Lincolnshire.—Well Vale Chalk-pit, near Alford, numerous, April 14th, 1886 (W.D.R.). Well Vale, near Alford, numerous, April 14th, 1886 (W.D.R.). Haugham Wood, near Louth, numerous on a fallen tree, April 15th, 1886 (W.D.R.). Maltby Wood, near Louth, a few, April 15th, 1886 (W.D.R.). Haugham Pasture, a few! (H. W. Kew, 13, v, 87).

South Lincolnshire.—Uffington, near Stamford (E. Collier, September, 1885).

***Clausilia rolpheii* Gray.**

This interesting species has been found within the past few months in three distinct localities in a post-glacial ravine near Louth. The record is of great importance from the very limited and local distribution of the species in Britain. The nearest districts in which it occurs are Warwickshire and Gloucestershire.

North Lincolnshire.—Haugham Pasture, near Louth, one! (H. W. Kew, 13, v, 87). Maltby Wood, near Louth, one! (Id.). Grisel-bottom, Burwell Wood, near Louth, one! (H. W. Kew, 7, vi, 87).

***Zua lubrica* (Müll.).**

Not uncommon and a generally diffused species in the Louth, Alford, and Sutton districts, but has not as yet been placed on record for South Lincolnshire.

North Lincolnshire.—Among chalk débris, Claxby, Alford, one juv., September 16th, 1885! (J. E. Mason). Tothby, near Alford, under logs, farmyard, a few, April 14th, 1886! (W.D.R.). Chapel, one, August 19th, 1886! (J. E. Mason). Muckton Wood, near Louth, one juv., April 15th, 1886! (W.D.R.). Well Vale, numerous, April 14th, 1886! (W.D.R.). The Park, Bilsby, near Alford, May 5th, 1886, one! (J. E. Mason). Haugham Pasture,

one! (H. W. Kew, 13, v, 87). Haugham Wood, near Louth, one, April 15th, 1886! (W.D.R.). Banks of Louth Canal, Louth, two, April 15th, 1886! (W.D.R.). Sutton-in-the-Marsh, sandhills, one, dead, April 16th, 1886! (W.D.R.). Grimoldby, one! (H. W. Kew, 13, v, 87). Well foot-path, Alford, a few, April 26th, 1886! (J. E. Mason). Sloothby, near Alford, one, August 4th, 1886! (J. E. Mason). Greenfield Wood, Ailby parish, two, June 8th, 1887! (J. E. Mason). Rejectamenta of Main Drain, Chapel, a few, August 20th, 1886! (J. E. Mason). Welton Vale, near Louth, a few! (H. W. Kew, 13, v, 87). Swaby Vale, near Alford, one! (Id.). Burwell Wood, near Louth! (Id.). Louth Park! (H. W. Kew, 7, vi, 87).

Zua lubrica var. lubricoides Fèr.

North Lincolnshire.—Haugham Pasture, near Louth, one! (H. W. Kew, 13, v, 87). Hubbard's Valley, near Louth, one! (H. W. Kew, 13, v, 87).

Carychium minimum Müll.

Not uncommon in several stations in the Louth and Alford districts. The only evidence we have of its occurrence in South Lincolnshire is an old record for Grantham.

North Lincolnshire.—Well Vale, near Alford, plentiful, April 14th, 1886 (W.D.R.). Tothby, near Alford, a few, April 14th, 1886 (W.D.R.). Burwell Wood, near Louth, one, under a fallen tree, April 15th, 1886 (W.D.R.). Hubbard's Valley, numerous! (H. W. Kew, 13, v, 87). Haugham Pasture, near Louth! (H. W. Kew, 13, v, 87).

South Lincolnshire.—Grantham (E. J. Lowe, Conchology of Notts., 1853).

Cyclostoma elegans (Müll.).

This species is one of historical interest, having been first recorded for the county in 1678, when Dr. Martin Lister stated in the Hist. An. Angl. that he had found it in Yorkshire, and 'also at Burwell Woods, in Lincolnshire,' a locality in which after due search it was re-found in 1886 by Mr. Kew, who gives the precise locality as stated below.

North Lincolnshire.—At Burwell Woods (Martin Lister, Hist. An. Angl., 1678). Lincolnshire (Montagu, 1803). Grisel Bottom, Burwell Woods, steep banks, common (H. W. Kew, 19, viii, 86).

Neritina fluviatilis (L.).

This species has only as yet been recorded for one—a South Lincolnshire—station.

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, - December 1884 (C. T. Musson).

Paludina vivipara (L.).

Only on record for the Southern division.

South Lincolnshire—Rejectamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson). River, Lincoln, 1849! (J. Hardy, sen.).

Paludina contecta (Millet).

Not uncommon in various localities about Wainfleet, Lincoln, Saltfleetby, and Wroot (North), and about Lincoln, Anwick, and Crowland (South).

- North Lincolnshire.**—Wainfleet, abundant in the river! (A. H. Cooke, April 1883). Lincoln! (Coll. W. Nelson). Drains, Saltfleetby, common! (H. W. Kew, August 1886). Rejactamenta of Main Drain, Chapel, two, August 20th, 1886! (J. E. Mason). Gravel Drain, near Wroot, one, dead, April 14th, 1883! (W. Eagle Clarke).
- South Lincolnshire.**—Rejactamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson). Rejactamenta of dike, Anwick, near Sleaford, a few, March 7th, 1887! (C. T. Musson). Crowland Wash, July 1886! (T. W. Bell).

***Paludina contecta* var. *virescens* Jeff.**

- North Lincolnshire.**—Brigg (T. Ball).

***Bythia tentaculata* (L.).**

An abundant species in numerous stations about Wroot, Louth, Alford, and Boston, in the Northern division, and in the Southern at Lincoln, Boston, Anwick, and Crowland.

- North Lincolnshire.**—Plentiful in the Louth Canal. April 15th, 1886! (W.D.R. and H. W. Kew). Sloothby, near Alford, a few, August 4th, 1886! (J. E. Mason). Candy Hall Bridge, common! April 14th, 1883 (W.D.R.). Rejactamenta of Main Drain at Chapel, August 20th, 1886, a few! (J. E. Mason). Sutton, a few! (H. W. Kew, April 1887). Ditch alongside Black Bank Drain, common, April 14th, 1883! (W.D.R.). Theddlethorpe, one! (H. W. Kew, 16, iv, 87). Bradley's Paddock, Chapel, a few, August 16th, 1886! (J. E. Mason). Skirbeck, several, September 8th, 1884! (W.D.R.). Farleshorpe, a few, May 25th, 1887! (J. E. Mason). Ditches, Sampson's Lane, near Wroot, common, April 14th, 1883! water charged with iron (W.D.R.).
- South Lincolnshire.**—Rejactamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson). Near Boston, common, September 8th, 1884! (W.D.R.). Crowland Wash, July 1886! (T. W. Bell). Anwick, near Sleaford, rejactamenta of dikes, a few, March 7th, 1887! (C. T. Musson).

***Bythia tentaculata* var. *producta*. Menke.**

- North Lincolnshire.**—Bradley's Paddock, Chapel, one, August 16th, 1886! (J. E. Mason). Rejactamenta of Main Drain, Chapel, one, August 20th, 1886! (J. E. Mason).

***Bythia leachii* (Shepp.).**

Has occurred near Sutton, Mablethorpe, and Chapel, and in South Lincolnshire near Lincoln and Boston.

- North Lincolnshire.**—Sutton-in-the-Marsh, several in drains at land-foot of sand-hills! April 16th, 1886 (W.D.R.). Rejactamenta of Main Drain, Chapel, a few, August 20th, 1886! (J. E. Mason). Drains, Mablethorpe, two! (H. W. Kew, 19, viii, 86).
- South Lincolnshire.**—Rejactamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson). Near Boston, one, September 8th, 1884! (W.D.R.).

***Valvata piscinalis* (Müll.).**

Not uncommon in a few localities near Wroot, Sutton, Chapel, and Louth, and in the South near Boston and Lincoln.

- North Lincolnshire.**—Plentiful in the canal near Louth, April 15th, 1886! (W.D.R.). Gravel Drain near Wroot, one, April 14th, 1883! (W.D.R.). Black Bank Drain at Candy Hall Bridge! common, April 14th, 1883 (W.D.R.). Rejactamenta of Main Drain, Chapel, a few, August 20th, 1886! (J. E. Mason).

Ditch alongside Black Bank Drain, common, April 14th, 1883! (W.D.R.). Sutton, a few! (H. W. Kew, April 1887). Welton Vale, near Louth, dead! (H. W. Kew, 13, v, 87). Benniworth Haven, near Louth, two! (H. W. Kew, 7, vi, 87).

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson). Near Boston, one, September 8th, 1884! (W.D.R.).

Planorbis lineatus Walk.

Has been found in one locality.

North Lincolnshire.—Grainthorpe, near Louth! (Miss Longley, per H. W. Kew, 16, iv, 87).

Planorbis nitidus (Müll.).

Has been recorded for a locality in each division of the county.

North Lincolnshire.—A drain at Brigg (T. Ball, Science Gossip, 17, iv, 1866)—not seen.

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson).

Planorbis nitidus var. albida Nels.

North Lincolnshire.—Took about a dozen pure milk-white specimens with many of typical colour in a drain at Brigg (T. Ball, Science Gossip, 17, iv, 1866)—not seen.

Planorbis nautilius (L.).

Numerous in a few localities in the vicinity of Alford and Louth.

Not recorded for any other district.

North Lincolnshire.—Pond, Ailby, near Alford, numerous amongst *Lemna trisulca*, April 14th, 1886 (W.D.R.). Pools at land-foot of sandhills, Sutton-in-the-Marsh, numerous, April 16th, 1886 (W.D.R.). Pond at Raithby, near Louth! (H. W. Kew, 7, vi, 87). Pond in post-glacial valley by Haugham Wood, Louth, a few! (Id.).

Planorbis albus Müll.

Recorded in the North for Wroot, Louth, and Alford districts, and in the South for the vicinities of Lincoln and Crowland.

North Lincolnshire.—Canal near Louth, numerous on caddis-cases, and in the débris on the bank, April 15th, 1886! (W.D.R. and H. W. Kew). Rejectamenta of Main Drain, Chapel, one, August 20th, 1886! (J. E. Mason). On caddisworm cases, Black Bank Drain, Candy Hall Bridge, April 14th, 1883! (W.D.R.).

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson). Crowland Wash, July 1886! (T. W. Bell).

Planorbis spirorbis Müll.

Found in a few places near Louth, Alford, and Sutton, and in the Southern division near Boston.

North Lincolnshire.—Louth Canal, a few, April 15th, 1886! (W.D.R. and H. W. Kew). Sutton-in-the-Marsh, a few in the coast drains, with *vortex*, April 16th, 1886! (W.D.R.). Rejectamenta of Main Drain, Chapel, August 20th, 1886, a few! (J. E. Mason). Greenfield Wood, Ailby parish, two, June 8th, 1887! (J. E. Mason).

South Lincolnshire.—Near Boston, one, September 8th, 1884! (W.D.R.).

Planorbis vortex (L.).

More plentifully and widely distributed than the last. Recorded from numerous localities about Wroot, Louth, Alford, Sutton, and Chapel, also for Lincoln, Anwick, and Crowland in South Lincolnshire.

North Lincolnshire.—Plentiful in the Louth Canal near Louth, April 15th, 1886! (W.D.R.). Coast drains at land-foot of sandhills, Sutton-in-the-Marsh, plentiful, April 16th, 1886! (W.D.R.). Sloothby, near Alford, several, mostly juv., August 4th, 1886! (J. E. Mason). Bradley's Paddock, Chapel, August 16th, 1886! (J. E. Mason). Rejunctamenta of Main Drain, Chapel, numerous, August 20th, 1886! (J. E. Mason). Ditches, Sampson's Lane, common, April 14th, 1883! (W.D.R.). Gravel Drain near Wroot, one, April 14th, 1883! (Id.). Black Bank Drain at Candy Hall Bridge, April 14th, 1883! (W.D.R.). Theddlethorpe, a few! (H. W. Kew, April 1887). Sutton-on-Sea, numerous in drift at high-water mark! (B. S. Dodd, 4, xii, 86). Sutton, two! (H. W. Kew, April 1887).

South Lincolnshire.—Rejunctamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson). Anwick, near Sleaford, one, in rejunctamenta of dike, March 7th, 1887! (C. T. Musson). Crowland Wash, July 1886! (T. W. Bell).

Planorbis carinatus Müll.

Plentiful in various places in the vicinities of Wroot, Louth, Alford, and Sutton. Its South Lincolnshire localities are Lincoln and Anwick.

North Lincolnshire.—In the canal near Louth, plentiful, April 15th, 1886! (W.D.R. and H. W. Kew). Ditch alongside Black Bank Drain, common, April 14th, 1883! (W.D.R.). Rejunctamenta of Main Drain, Chapel, numerous, August 20th, 1886! (J. E. Mason). Ditches impregnated with iron, Sampson's Lane, near Wroot, common, April 14th, 1883! (W.D.R.). Ditches, Sampson's Lane, near Wroot, common, April 14th, 1883! (W.D.R.). Sutton-on-Sea, a few in drift at high-water mark! (B. S. Dodd, 4, xii, 86).

South Lincolnshire.—Rejunctamenta from between Bracebridge and Lincoln, December 1884 (C. T. Musson). Rejunctamenta of dike at Anwick near Sleaford, two, March 7th, 1887! (C. T. Musson).

Planorbis complanatus (L.).

An abundant and well-distributed species about Louth, Alford, and Sutton, and, in the South, about Lincoln, Boston, Anwick, and Crowland.

North Lincolnshire.—Sandhills, Huttoft, near Alford, plentiful in the drains, April 16th, 1886! (W.D.R.). Sloothby, near Alford, a few, both adult and juv., August 4th, 1886! (W.D.R.). Sutton, two! (H. W. Kew, 1886, iv, 87). The Park, Bilsby, near Alford, a few, May 5th, 1886! (J. E. Mason). Theddlethorpe, a few! (H. W. Kew, April 1887). Rejunctamenta of Main Drain at Chapel, numerous, August 20th, 1886! (J. E. Mason). Louth Canal, a few, April 15th, 1886! (W.D.R.). Bradley's Paddock, Chapel, August 16th, 1886! (J. E. Mason). Farlethorpe, a few, May 25th, 1887! (J. E. Mason). Sutton-on-the-Sea, in drift at high-water mark, a few sent! (B. S. Dodd, 4, xii, 86).

South Lincolnshire.—Rejunctamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson). Crowland Wash, July 1886! (T. W. Bell). Foss Dyke, collected by J. Whitwham! (W. Nelson). Foss Dyke, Lincoln! (Coll. W. Nelson). Near Boston, two, September 8th, 1884! (W.D.R.). Rejunctamenta of dikes, Anwick near Sleaford, a few, March 7th, 1887! (C. T. Musson).

Planorbis complanatus var. rhombea (Turt.).

North Lincolnshire.—Sutton-on-the-Sea, in drift at high-water mark, one or two sent! (B. S. Dodd, 4, xii, 86).

Planorbis corneus (L.).

Found in several places about Louth, Alford, and Sutton, also at Scotton Common, and in the South near Lincoln and Crowland.

North Lincolnshire.—Scotton Common, 1876, G. Taylor! (Coll. W. Nelson). Theddlethorpe, one! (H. W. Kew, April 1887). Sutton-on-Sea, in drift at high-water mark, one, juv.! (B. S. Dodd, 4, xii, 86). The Park, Bilsby, near Alford, one, bleached, May 5th, 1886! (J. E. Mason). Grainthorpe, near Louth, one! (Miss Longley, per H. W. Kew, 16, iv, 87).

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884, half-grown! (C. T. Musson). Near Lincoln! (J. Hardy, sen., September 1885). Crowland Wash, July 1886! (T. W. Bell).

Planorbis corneus var. albinus Moq.

South Lincolnshire.—Near Lincoln! (J. Hardy, September 1885).

Planorbis contortus (L.).

Recorded for various localities near Wroot, Sutton, Chapel, and Donington, and in the Southern division near Lincoln.

North Lincolnshire.—Rejectamenta of Main Drain, Chapel, one, August 20th, 1886! (J. E. Mason). Black Bank Drain at Candy Hall Bridge, April 14th, 1883! (W.D.R.). Sutton, one! (H. W. Kew, 16, iv, 87). Ditches impregnated with iron, Sampson's Lane, near Wroot, common, April 14th, 1883! (W.D.R.). Sutton-on-Sea, drift at high-water mark, two! (B. S. Dodd, 4, xii, 86). By-wash of river Bain at Donington, two! (H. W. Kew, 7, vi, 87).

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884 (C. T. Musson).

Physa hypnorum (L.).

Locally distributed, and recorded only for a couple of localities, both in the Northern division.

North Lincolnshire.—Thomas Ball recorded its being taken near Brigg (Science Gossip, January 1868, p. 17). Ditch near Hallington Beck, numerous! (H. W. Kew, 13, v, 87).

Physa fontinalis (L.).

Plentifully distributed about Wroot, Louth, Sutton, Alford, and Cleethorpes, all in North Lincolnshire, and on record for Lincoln in the Southern division.

North Lincolnshire.—Sutton-in-the-Marsh, a few in the coast drains, land-foot of sandhills! April 16th, 1886 (W.D.R.). Monk's Dyke, Louth, several, April 15th, 1886! (W.D.R.). Sloothby, near Alford, a few, juv., August 4th, 1886! (J. E. Mason). The Park, Bilsby, near Alford, May 5th, 1886! (J. E. Mason). Gravel Drain, near Wroot, two, April 14th, 1883! (W.D.R.). Ditches, Sampson's Lane, common, April 14th, 1883! also common in other ditches there impregnated with iron, April 14th, 1883! (W.D.R.). Rejectamenta of Main Drain, Chapel, August 20th, 1886, one, juv.! (J. E. Mason). Ditch alongside Black Bank Drain, common, April 14th, 1883! (W.D.R.). Theddlethorpe, a few! (H. W. Kew, April, 1887). Black Bank Drain at Candy Hall Bridge, common, April 14th, 1883! (W.D.R.). Cleethorpes! (H. W. Kew, April 1887). Farlesthorpe, one, May 25th, 1887! (J. E. Mason).

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson).

***Limnæa peregra* (Müll.)**

Abundant, variable, and well-diffused in the neighbourhoods of Wroot, Scotton, Lincoln, Cleethorpes, Louth, Alford, Sutton, and Boston, all in North Lincolnshire; also about Boston, Anwick, and Crowland in South Lincolnshire.

North Lincolnshire.—Scotton Common! (Coll. W. Nelson). Stream, Hubbard's Valley, near Louth! (H. W. Kew, November 1886). Skirbeck, near Boston, several, September 8th, 1884! (W.D.R.). Farlethorpe, plentiful, May 25th, 1887! (J. E. Mason). Pond by Louth Canal at Louth, one, April 15th, 1886! (W.D.R.). Monk's Dyke, Louth, numerous, thickly encrusted, April 15th, 1886! (W.D.R.). Louth Canal, numerous, April 15th, 1886! (W.D.R.). Sutton, a few! (H. W. Kew, 16, iv, 87). Coast sandhills, Sutton-in-the-Marsh, plentiful, April 16th, 1886! (W.D.R.). Foss Dyke, Lincoln! (W. Nelson). Coast drains, Anderby, near Alford, numerous, April 16th, 1886! (W.D.R.). Coast sandhills, Huttoft, near Alford, numerous, April 16th, 1886! (W.D.R.). Gravel Drain, one, April 14th, 1883! (W.D.R.). Ditch alongside Black Bank Drain, plentiful, April 14th, 1883! (W.D.R.). Lincoln, numerous! (C. T. Musson). Ditches impregnated with iron, Sampson's Lane, near Wroot, April 14th, 1883! (W.D.R.). Ditches, Sampson's Lane, near Wroot, April 14th, 1883, common in clear water! (W.D.R.). Black Bank Drain at Candy Hall Bridge, common, April 14th, 1883! (W.D.R.). Sutton, a few! (H. W. Kew, April 1887). Sloothby, near Alford, juv. numerous, August 4th, 1886! (J. E. Mason). Bradley's Paddock, near Chapel, several, August 16th, 1886! (J. E. Mason). The Park, Bilsby, near Alford, a few, May 5th, 1886! (J. E. Mason). Pond, Brackenborough! (H. W. Kew, November 1886). Sutton-on-Sea, drift at high-water mark, numerous! (B. S. Dodd, December, 1886). Claythorpe, one, July 6th, 1887! (J. E. Mason). Grimoldby, one, typical! (H. W. Kew, 13, v, 87).

South Lincolnshire.—Near Boston, numerous, September 8th, 1884! (W.D.R.). Crowland Wash, July 1886! (T. W. Bell). Anwick, near Sleaford, rejectamenta of dykes, several, March 7th, 1887! (Chas. T. Musson).

***Limnæa peregra* var. *ovata* Drap.**

North Lincolnshire.—The Park, Bilsby, near Alford, a few, May 5th, 1886! (J. E. Mason). Cleethorpes, numerous! (H. W. Kew, 16, iv, 87). Theddlethorpe, a few! (H. W. Kew, 16, iv, 87). Charles Street Brick-field, Louth, two! (H. W. Kew, 13, v, 87). Belleau Springs, near Alford, two! (Id.). Welton Vale, near Louth, one, somewhat distorted! (Id.). Benniworth Haven, near Louth! (H. W. Kew, 7, vi, 87).

***Limnæa auricularia* (L.).**

Recorded for Lincoln in the Southern division, and in two localities only in North Lincolnshire.

North Lincolnshire.—Sutton-on-Sea, one, juv., in drift at high-water mark! (B. S. Dodd, December 1886). Louth Canal, two! (H. W. Kew, 13, v, 87).

South Lincolnshire.—Rejectamenta from between Lincoln and Bracebridge, December 1884! (C. T. Musson). Foss Dyke, Lincoln! (W. Nelson's collection).

***Limnæa stagnalis* (L.).**

A not uncommon species in the vicinity of Wroot, Louth, Alford, Sutton, Owston, Scotton, and Lincoln, all in the North. Our only record for the South is for Crowland.

North Lincolnshire.—Monk's Dyke, Louth, very abundant, thickly encrusted, April 15th, 1886! (W.D.R.). Haxey! (Geo. Taylor). Pond, North Somercotes Warren, several, small! (H. W. Kew, April 1887). Warp drains near Owston! (J. Whitwham). Near Scotton Common! (Joseph Whitwham).

Sutton-on-the-Sea, in drift at high-water mark, a few juv.! (B. S. Dodd, December 1886). Sloothby, near Alford, one, very young, August 4th, 1886! (J. E. Mason). Foss Dyke, Lincoln! (W. Nelson). Gravel Drain, one, April 14th, 1883! (W. E. Clarke). Ditch alongside Black Bank Drain, one, April 14th, 1883! (W. E. Clarke).

South Lincolnshire.—Crowland Wash, July 1886! (T. W. Bell).

Limnæa palustris (Müll.).

Occurs in several North Lincolnshire localities, about Wroot, Louth, and Sutton, and in two Southern localities, Anwick and Crowland.

North Lincolnshire.—Pond by Louth Canal, numerous, April 15th, 1886! also a few in the canal close by! (H. W. Kew and W.D.R.). Farlethorpe, May 25th, 1887, a few, small (J. E. Mason). Sutton, one! (H. W. Kew, 16, iv, 87). Somercotes, two! (H. W. Kew, 16, iv, 87). Ditches, Sampson's Lane, common, April 14th, 1883! and one in a place impregnated with iron! (W.D.R.). Ditch alongside Black Bank Drain, a few, April 14th, 1883! (W.D.R.).

South Lincolnshire.—Crowland Wash, July 1886! (T. W. Bell). Rejementa of dikes, Anwick, near Sleaford, three, March 7th, 1887! (C. T. Musson).

Limnæa palustris var. *albida* Nels.

North Lincolnshire.—Pond by Louth Canal, with type, April 15th, 1886! (W.D.R.).

Limnæa truncatula (Müll.).

Occurs in several North Lincolnshire stations around Louth and Alford, and in the South near Ancaster.

North Lincolnshire.—Pond, Hall Wood, Authorpe, near Alford, numerous, April 15th, 1886 (H. W. Kew). Louth Canal, one, April 15th, 1886 (W.D.R.). Pond, Tothby, near Alford, a few, April 14th, 1886 (W.D.R.). Coast drains, land-foot of sandhills, Huttoft, near Alford, a few, April 16th, 1886 (W.D.R.). The Park, Bilsby, near Alford, a few, May 5th, 1886 (J. E. Mason). Well foot-path, Alford, April 26th, 1886, one (J. E. Mason). Grimoldby, near Louth, one! (H. W. Kew, 13, v, 87). Ditch near Hallington Beck, four! (H. W. Kew, 13, v, 87). Louth Park, one! (H. W. Kew, 7, vi, 87).

South Lincolnshire.—Road-side stream, Ermine Street, north of Ancaster Railway Station, two, April 17th, 1886 (W.D.R.).

Limnæa glabra (Müll.).

Has only been as yet found in a single locality—a pond near Lincoln.

South Lincolnshire.—Pool south of Lincoln, close to the railway, and not far off the Main Drain, never abundant, and possibly now destroyed by railway extension (Rev. W. W. Fowler, April 1886).

Ancylus fluviatilis Müll.

Two records only, both for the Louth district.

North Lincolnshire.—Stream, Hubbard's Valley, Louth (H. W. Kew, April 1886). Hallington Beck, near Louth! (H. W. Kew, 13, v, 87).

Ancylus lacustris (L.).

Has as yet been found in but one station, Ailby, near Alford.

North Lincolnshire.—Pond at Ailby, near Alford, plentiful on floating logs, April 14th, 1886 (W.D.R.).

Sphærium corneum (L.).

Plentiful in various localities in the neighbourhood of Louth and Alford, Sutton, Saltfleetby and Wroot; and in the South at Lincoln and Anwick.

North Lincolnshire.—Plentiful in the canal near Louth, April 15th, 1886! (W. D. R.). Sloothby, near Alford, two, August 4th, 1886! (J. E. Mason). Bradley's Paddock, Chapel, several, August 16th, 1886! (J. E. Mason). Alford! (J. E. Mason, April 1885). Dike near Railway Station, Saltfleetby, one! (H. W. Kew, 16, iv, 87). Ditch alongside Black Bank Drain, a few, April 14th, 1883! (W. D. R.). Sutton, one! (H. W. Kew, 16, iv, 87). Pond near Maltby Wood, several! (H. W. Kew, 13, v, 87). Large pond in post-glacial valley by Haugham Wood! (H. W. Kew, 7, vi, 87).

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson). Rejectamenta of dike, Anwick, near Sleaford, two, March 7th, 1887! (C. T. Musson).

Sphærium rivicola (Leach).

We have but a single record for this species, in South Lincolnshire.

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson).

Sphærium lacustre (Müll.).

Is on record for three stations only, all near Louth.

North Lincolnshire.—Pond, Raithby, near Louth, one! (H. W. Kew, 16, iv, 87). Benniworth Haven, near Louth, one, without cap! (H. W. Kew, 7, vi, 87). Pond in post-glacial valley by Haugham Wood, a few, juv.! (Id.).

Pisidium amnicum (Müll.).

We have but a single record—for the Southern division only.

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson).

Pisidium fontinale (Drap.).

Has occurred in both divisions of the county.

North Lincolnshire.—Pond at Raithby near Louth, one, juv.! (H. W. Kew, 16, iv, 87). Welton Vale, near Louth, one! (H. W. Kew, 13, v, 87).

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884! (C. T. Musson).

Pisidium roseum Scholtz.

North Lincolnshire.—Brick-pit, Donington-on-Bain! (H. W. Kew, 7, vi, 87).

Pisidium pusillum (Gmel.).

Occurs in several places near Louth and Alford, and in the South it is on record for Lincoln.

North Lincolnshire.—Rejectamenta of Main Drain, Chapel, one; also one on caddis-case, August 20th, 1886! (J. E. Mason). Greenfield Wood, Ailby parish, several, June 8th, 1887! (J. E. Mason). Pond, North Somercotes Warren, numerous! (H. W. Kew, 16, iv, 87). South Elkington brick-field, near Louth, several! (H. W. Kew, 13, v, 87). Pond at Grimoldby, near Louth, one! (Id.). Pond at Raithby, near Louth! (H. W. Kew, 7, vi, 87).

Pond near Maltby Wood, Louth, one ! (Id.). Pond in post-glacial valley by Haugham Wood, a few ! (Id.). Pond in Grisel Bottom, Burwell Wood, Louth ! (Id.).

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884 ! (C. T. Musson).

***Pisidium nitidum* Jen.**

We have several records for the Northern division, none at all for the Southern.

North Lincolnshire.—Pond, Ailby, near Alford, one, April 14th, 1886 ! (W.D.R.). Pond at Raithby, near Louth ! (H. W. Kew, 7, vi, 87). Pond in post-glacial valley by Haugham Wood, Louth, a few ! (Id.). Large pond in post-glacial ravine, Haugham Pasture, two ! (Id.).

***Unio tumidus* Phil.**

Of this species and its varieties we have records for one Southern and two Northern stations.

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884 ! (C. T. Musson).

***Unio tumidus* var. *radiata* Colb.**

North Lincolnshire.—Witham drainage, Lincoln, April 1840 ! (J. Hardy, sen.).

***Unio tumidus* var. *ovalis* (Mont.).**

North Lincolnshire.—In mud of wall of antique Roman structure at Lincoln ! (J. Hardy, sen.).

***Unio pictorum* (L.).**

On record for single instances in both divisions of the county.

North Lincolnshire.—Canal near Louth, a dead valve in the rubbish-heaps, April 15th, 1886 ! (W.D.R.).

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, young valves, December 1884 ! (C. T. Musson).

***Anodonta cygnea* (L.).**

The premier record in date is that for Bottesford (Tate's Brit. Moll., 1886), since which it has been noted for Burwell, Louth, and Well in the North, and for Lincoln in the South.

North Lincolnshire.—Very abundant at Bottesford-on-the-Trent, where the water is salt at high-tides (R. Tate, 1866, p. 31). Burwell Fish-pond, dead valves, April 15th, 1886 ! (W.D.R.). Louth Canal, abundant in the out-cast débris, April 15th, 1886 ! (W.D.R.). Benniworth Haven, near Louth, one ! (H. W. Kew, 7, vi, 87).

South Lincolnshire.—Rejectamenta from between Bracebridge and Lincoln, December 1884 ! (C. T. Musson).

***Anodonta cygnea* var. *zellensis* (Gmel.).**

North Lincolnshire.—Well Fish-pond, near Alford, dead valves, April 14th, 1886 ! (W.D.R.).

***Anodonta anatina* (L.).**

One record only attests the existence of this species in the county.

North Lincolnshire.—Greenfield Wood, Ailby parish, a broken shell, June 8th, 1887 ! (J. E. Mason).

It will be seen, on examination of the foregoing list, that the most important and significant fact it contains is the discovery of *Clausilia rolfii*, important inasmuch as this new district for it is so far distant from the very few English counties which the species has hitherto been known to inhabit and much further North than any one of them, and significant as showing the possibilities of a county which has been so little worked as Lincolnshire.

Since the appearance of the first portion of the list, specimens and information have been sent me by the Misses Laura and Katherine Mason, Messrs. J. Darker Butterell, J. W. Carter, J. Burt Davy, and J. A. Hargreaves; and Mr. George Roberts has done me the inestimable service of pointing out the existence of a list of North Lincolnshire Shells which, from having been published so long ago as 1864 in a very obscure journal, had quite escaped my researches.

It seems best, however, to let this paper stand as originally written, and to embody the additional facts thus brought to light in a supplementary paper, which I hope to issue in an early number, and in the preparation of which I trust that any readers who have specimens or information of any kind not included in the paper will kindly assist.

NOTES—MOLLUSCA.

Pisidium roseum in Yorkshire.—A specimen of this species was sent to me about a year ago by Mr. W. A. Gain, who had found it in the rejectamenta of a small stream near Bawtry, in the spring of 1886. The only previous Yorkshire record was for Bentley, near Doncaster.—JOHN W. TAYLOR, Leeds.

Helix arbustorum monst. sinistrorsum in Derbyshire.—When collecting *H. arbustorum* and its variety *flavescens* among nettles by the road-side in Ashwood Dale, near Buxton, on the 1st inst., I found a sinistral monstrosity of the variety, and as I believe this form of *H. arbustorum* has not been previously recorded for Great Britain, a note of my capture may be of interest to some of your readers. The typical form of the species and the var. *flavescens* were present in about equal numbers.—CHAS. OLDHAM, Sale, 5th August, 1887.

NOTE—BOTANY.

Chara fragilis var. fulcrata in Yorkshire.—In the stagnant pool of an old stone quarry at Sandal near Wakefield, I noticed in July last year, a fine fruiting *Chara*, which was evidently *Chara fragilis* Desv., but not typical. Acting as distributor in the early part of the present year for the Watson Botanical Exchange Club, I sent specimens to Mr. Arthur Bennett, F.L.S., of Croydon, the Referee for the Club, and he places the plant under *Chara fragilis* Desv. var. *fulcrata* Gant., a form not contained in Messrs. H. and J. Groves' revised list of the *Characeæ*, in the 8th Edition of the London Catalogue (1886), though it is fully set forth in their 'Review of the British Characeæ' in the 'Journal of Botany' for 1880 as characterised by very short bract-cells, and rudimentary stipulodes. *Chara fragilis* and its various forms are monœcious plants, the var. *fulcrata* 'resembling the fertile plant of *C. connivens*,' a diœcious *Chara*.—P. FOX LEE, Dewsbury, August 6th, 1887.

BOTANICAL NOTES
FROM NORTH-EAST YORKSHIRE.

F. ARNOLD LEES,

Heckmondwike; President of the Botanical Section of the Yorkshire Naturalists' Union.

I. *CARDUUS ACAULIS* IN NORTH-EAST YORKSHIRE.—I am pleased to be able to record the occurrence of the Stemless Thistle in District III—the Rye and Derwent river-basin—of North Yorkshire. This is a new record for vice-county 62; and interesting further in the fact that the discovery of it on the North Riding Oolite is an extension of our knowledge of its range up the east side of Britain by fully seventy miles—a degree of latitude! The credit of the ‘find’ is due to Mr. John B. Foggitt, who, with Mr. Albert Wilson, observed about fifty specimens of it scattered over the moor above Rievaulx Abbey, in Mid-August. *C. acaulis* is unmentioned in Baker’s ‘North Yorkshire,’ unrecorded still for South-East York (where, however, it will doubtless be turned up on the Chalk Wold or Oolite); and the sole West York station (Lindrick Common) is quite in the south of the county. On the west side of England it runs up to Cheshire.

II. THE CASTLE HOWARD *CALAMAGROSTIS*.—Whilst on the subject of North Yorkshire plants, although it is not my province, but Mr. Baker’s, I may say that through the kindness of Mr. M. B. Slater I have just had the opportunity of examining some specimens recently gathered in Gilla Leys, Castle Howard. In facies they are a pale-glumed, slender (? shade-grown) *C. lanceolata*, and I cannot see *C. stricta* (*D. neglecta*) in them. The keel of the pale glumes is smooth, not scabrous, and the hairs at their base are longer than the paleæ. Neither is there any trace of the rudimentary second flower, which is one great characteristic differentiating *C. stricta* from *C. lanceolata*. The Gilla Leys plant resembles *C. stricta* in its physiognomy in one respect—the panicle branches are semi-erect and shorter, less spreading, altogether less fine than in ordinary *C. lanceolata* such as grows in the open swampy thickets of Askham Bog, Potteric Carrs, etc. Of course there *may* be, or have been, both species at Castle Howard, and H. Ibbotson’s 1844 gathering, only generally, not precisely localised, may have come from Cum Hag or any other one of the several spots on record for *C. lanceolata* about there. But I apprehend that the explanation will rather have to be found in some inadvertent mis-apportionment of label to specimen or vice versa. Ibbotson collected much, and for sale, from 1845-60, and, I know, visited Oakmere, in Cheshire, where *C. stricta* grows, for he sold me the first specimens of that which I ever saw, whilst he as undoubtedly knew well the *C. lanceolata* of Askham, Doncaster, and Castle Howard.

No one who knew him would doubt his bonâ fides, but inebriety became his great failing latterly, and I have known him make much more obvious mistakes than the suggested one of labelling a *Calamagrostis stricta* as '*lanceolata*' when he knew the latter had often been gathered by him at Castle Howard. I feel confident from my knowledge of his quondam quick eye and acuteness in the field, that if he had gathered *C. stricta* at Castle Howard, in his earlier days especially, he would at once have said 'this is something new to me,' off type, or what not, and at once have investigated the matter. Mr. Arthur Bennett, too, in a communication just received, says that all the recently-gathered *Calamagrostis* from Castle Howard which he has seen is *C. lanceolata* only.

THE 'PINKY' OR 'SCALEY' OF THE YORKSHIRE ESK.

W. EAGLE CLARKE, F.L.S.

THIS fish is caught in the tidal water-way of the river Esk, between Whitby and Ruswarp (about three miles above Whitby), and is locally known both as the 'Pinky,' from the rich pink colour of its flesh, and the 'Scaley,' from the beautiful bright appearance of the scales, which are devoid of spots. It is chiefly taken during the months of February, March, and April, and the number captured each season varies considerably; this season Mr. Stephenson tells me that he has only heard of two instances—on the 21st of April and on the 10th of July. Since, however, as many as six of these salmonoids have been caught in the month of October, it is supposed by some that the fish remains in the river throughout the year. In weight they vary from a quarter of a pound to a pound. The general impression among the local anglers is that it is a Sea Trout of the second season—the absence of milt or roe in all the captured specimens being considered proof that it is an immature fish.

The fish alluded to as captured on the 21st of April was kindly forwarded to the writer, who submitted it to Dr. Day, the well-known author of the 'History of British and Irish Fishes,' for determination. Dr. Day reports that it is young Salmon Trout (*Salmo trutta*), twelve inches long and having 43 cæcal appendages; but since it had to be put in spirit to arrest decay in transit it was not considered by him a suitable specimen from which to give a detailed description, and he requests that another specimen packed in ice may be sent to him for that purpose. The writer begs to thank Mr. Thomas Stephenson, of Whitby, Dr. Day, and the Rev. E. H. Smart for their contributions towards this note.

NOTES ON ALGÆ COLLECTED AT GORMIRE
AND THIRKLEBY, WITH
NOTICE OF A NEW FORM.

W. BARWELL TURNER, F.R.M.S., F.C.S.

ALTHOUGH favoured on our late visit to the above places with charming weather, the recent fiery visitation from 'Jupiter Sol' was painfully apparent to naturalists of aquatic tendencies, who found their 'happy hunting grounds' at the margin of the Lake, and the sphagnum beds at the N.E. corner thereof, converted into semi-Saharas.

Under the circumstances no great 'find' was to be expected—much of our 'gatherings' being *mud*, pure and simple—yet a careful and extended search has yielded several notable things. One or two points in the gatherings made by the writer are rather curious, viz., that (excepting the large filamentous species of Confervæ and the Diatoms) the collection shows a fair number of Algal *species*, which, however, as *individuals*, are but few! The list, such as it is, shows that Gormire Lake, all the better for being land-locked and with rocky basin, is a very promising spot; and I trust that this may again be well worked under more auspicious weather.

The species noted are:—*Gonium pectorale*, *Oocystis agardhiana*, *Glæocystis ampla*, *G. vesiculosa*, *Botryococcus braunii*, *Chlorococcum gigas*, *Ophiocytium cochleare*, *Stichococcus bacillaris*, *Hydrocytium acuminatum*, *Pandorina morum*, *Polyedrium lobulatum*, sterile specimens of *Zygnema* and *Spirogyra* (undeterminable), *Zygonium ericetorum* α , and *Z. terrestre*.

DIATOMS.—Not determined. Vast numbers of small *Navicula*, and a few individuals of *Stauroneis* and *Pinnularia*.

DESMIDIEÆ—Gormire: *Cosmarium phaseolus*, *C. margaritifera*, *C. portianum*, *C. reniforme*, *C. pyramidatum*, *C. crenatum*, *C. cucumis*, *C. meneghinii*, *C. monomazum* β *polymazum*, *C. subcrenatum*, *C. anisochondrum*, *Docidium clavatum*, *D. ehrenbergii*, *D. truncatum*, *D. truncatum* β *crassum* (this form was described from Siberia by Boldt, in 'Sibir. Chloroph.', and last year I found it in abundance near Bowness, Windermere), ***D. truncatum* γ *labiatum*** var. nov. (this curious variety has, on either side, almost at end of frond, a kind of projection or 'lip'—*unde nomen*. This, which I have not observed in any other *Docidium*, is very peculiar, and seems to be a sort of link between this genus and *Tetmemorus*. It has been before seen by me in specimens from India and America), *Penium digitus*, *P. lamellosum*, *P. minutum*, *Closterium ehrenbergii*, *Cl. lanceolatum*,

Cl. acerosum, *Cl. dianæ*, *Cl. cornu*, *Cl. leibleinii*, *Cylindrocystis diplospora*, *Cyl. curtus*, *Arthrodesmus convergens*, *A. incus*, *Staurastrum gracile*, *St. orbiculare*, *St. tricornis*, *St. caspidatum*, *St. furcigerum*, *St. seabaldi*, *St. armigerum* (Bréb. = *St. pseudofurcigerum* Reinsch), *St. dejectum*, *Desmidiium swartzii*.

Decoy Pond: *Hyalotheca mucosa* and *Desmidiium swartzii*, both plentiful amongst the Chara.

Fountains in garden, Thirkleby Park: *Cosmarium botrytis*, *C. tetropthalmum*, *Closterium moniliferum*.

RUBUS PODOPHYLLUS IN ENGLAND.

P. FOX LEE,

Dewsbury: Phanerogamic Secretary to the Botanical Section of the Yorkshire Naturalists' Union.

LAST year I gathered near Dewsbury two forms of the Blackberry, one of which has proved to be a species not known before in England. I sent them for determination to Prof. C. C. Babington, M.A., F.R.S., who informed me that one of the specimens (from Soothill Wood) was 'very near to var. *festivus*' of *Rubus Lejeunei* Weihe, and that the other one was the interesting new English species, *Rubus podophyllus* Müll.

The last-named species I found fruiting luxuriantly in a copse at Soothill, and Prof. Babington's note concerning it is as follows:— 'Your specimen seems to be *podophyllus* in my opinion. It is published in the 'Journal of Botany' for January 1887, as found near Festiniog, North Wales (last year), by the Rev. W. Moyle Rogers. *Rubus podophyllus* was originally published by P. J. Müller as a native of the Vosges Mountains, in Boulay's Collection. It is in Genevier's book, and published as from the basin of the Loire.' In Babington's 'Supplement to Notes on Rubi' in the 'Journal of Botany' for January 1887, the following botanical description of *Rubus podophyllus* Müll. appears:—*Stem prostrate*, angular, with few clustered hairs and few setæ; prickles slender, rather unequal, declining from an oblong compressed base; leaves 5-3-nate, rather irregularly but finely serrate, with a few larger patent teeth, subpilose above, rather paler and hairy beneath; terminal leaflet oval-oblong, acuminate; panicle narrow, simple or subracemose, with short hairs and setæ, its lower branches racemose-corymbose, axillary few-flowered, its prickles slender, declining; sepals hairy, felted, setose, aciculate, reflexed; petals white, much narrowed below; stamens white, exceeding the greenish styles; carpels glabrous. It resembles some forms of *R. carpinifolius*, but that is arcuate-erect, and has few or no setæ.

YORKSHIRE AND WESTMORLAND NATURALISTS AT SEDBERGH.

THE sixty-eighth meeting of the Yorkshire Naturalists' Union was held at Sedbergh for the investigation of the Howgill Fells, Cautley Spout, the Crook of Lune, and the valleys of the Lune and Rawthey, and took place on the Bank-holiday Monday, which this year happened on the 1st day of August. The Kendal Natural History Society had cordially accepted the Union's invitation to participate in the excursion, and, being represented by several of their ablest members, the Yorkshiremen present benefited much by the skilled knowledge and genial companionship of their friends from over the border, amongst whom were the Rev. G. Crewdson, president, and Mr. J. Severs, secretary of the Kendal Society, together with Messrs. J. A. Martindale, George Stabler, and John Watson. On this occasion it was not a case of fighting between Yorkshiremen and Westmorland men such as took place this summer when the latter were perambulating a disputed boundary, but of keen emulation and friendly co-operation in the work of the day. Several of the best workers of the Union were present, and the botanical section was in unusually strong force. Three parties were formed, all of which started from the market-place at about 9.30 a.m. One party was mainly composed of geologists, whose line of route lay to the south of the Rawthey, and who were under the leadership of Mr. J. W. Davis, F.G.S. Another party was in charge of Mr. John Handley, of Briggflatts, near Sedbergh, and its special object was to see and gather *Meum athamanticum*, which grows in Howgill. A wagonette was filled and driven to Beckhouses, and on the farmer, Mr. J. Fawcett, being asked if they might go into his field and get some of it, he said 'Yes, if ye'll go roond be't yet an' net breck t'hedge,' which was agreed to very meekly. The plant was in fruit and growing on a bank in large quantities. In the hedge very near it was noticed *Hypericum dubium*. On returning was got a *Hieracium*, about which some difference of opinion was expressed; it turned out to be *H. crocatum*, not noticed before, and which made the tenth kind of *Hieracium* noted in the locality, and *H. cæsius* has been seen since, which makes eleven. Near Crosdale Beck one of the party saw *Rosa spinosissima*, quite new to the district and passed many a time by the local botanists. The party then followed that under Mr. Thompson's leadership, who had walked to Cautley Spout, but as most of them had climbed what is known as the Spout Tongue and returned to Sedbergh over the hills, we only saw a few ardent admirers of mosses and lichens who were still diligent in their

research ; our time being limited little more was done than to admire the wild grandeur of the scenery and return to Sedbergh. The main body of the members elected to accompany the Rev. W. Thompson, under whose guidance was visited Cautley Spout and the Rawthey Valley, returning over the Howgill Fells. Two conchologists, Messrs. Roebuck and Baker Hudson, deterred by the barrenness of the Silurian grits, proceeded due east, and spent the day to good purpose among the mountain limestones of the valley of the Clough and of Dovecote Gill, where the vicinity of limekiln débris afforded numerous captures. Dovecote Gill contains some 'caves'—more correctly speaking huge chasms—open at both ends and in several parts of the roof—down which ran the stream.

All parties assembled to a good tea provided at the White Hart Hotel by Mr. S. W. Walton, a brother-in-law of the famous Todmorden bryologist, John Nowell. Time did not admit of the holding of Sectional meetings, and what formal business there was, had to be transacted over the tea-table at the conclusion of the meal.

The chair was occupied by Mr. F. Arnold Lees, Heckmondwike, president of the Botanical Section. The minutes were taken as read, after which the Leyburn Literary and Scientific Society was unanimously admitted into the Union. The unanimous election of two new members—Mr. Abel Chapman, M.B.O.U., of Roker, near Sunderland, and Mr. John Farrah, of Harrogate—followed. The Rev. G. Crewdson then moved, Mr. W. Cash, F.G.S., of Halifax, seconded, and the meeting unanimously voted, the best thanks of the Union to the Rev. W. Thompson, Mr. John Handley, and Mr. J. W. Davis for their services as leaders of parties. The little time which remained not allowing of the regular series of sectional reports being given, was utilized by the leaders of parties giving a brief report of what had been seen ; but before this was done, Mr. Joseph Severs, the honorary secretary of the Kendal Society, in a brief and appropriate speech, expressed the thanks of his fellow-members, and their good-wishes to their Yorkshire friends.

It having been arranged that the sectional reports be sent to the Union secretaries, we give them here.

For the Vertebrate Section the report was furnished by Mr. James Backhouse, jun., M.B.O.U., secretary of the section, who stated that judging from the list of birds which was prepared for the excursion programme, Sedbergh must be a rich corner ornithologically, but though observers were numerous and the day was favourable, the list of species actually observed is but small. Three Ravens and a small party of Twites were recorded as having been observed on one of the high fells by Mr. Watson, of Kendal. The former still breeds every year

in the vicinity, though in gradually lessening numbers. Ring Ouzels and Wheatears were fairly abundant; whilst the low country in the immediate neighbourhood of Sedbergh produced a quantity of birds of the commoner kinds, including all three Wagtails, Dipper, etc., etc. Though the Whinchat was plentiful, we looked in vain for its cousin the Stonechat, which, though fairly common on the coast a little further to the north, appears to be scarce round Sedbergh, but abundant again in Wensleydale. The total number of species noted during the day was 35, of which only nine were summer migrants.

The report of the Conchological Section was prepared by Mr. Baker Hudson. The section had met with numerous species of land shells among the mountain limestone strata of the Dovecote Gill, including *Zonites fulvus*, *Azeca tridens*, *Helix rupestris*, *Vertigo pygmaea*, etc. The full list, which has not yet been completed, will be given in the October number.

No report was forthcoming for the Entomological and Micro-Zoological and Micro-Botanical Sections, from the absence of workers.

For the Botanical Section the report was furnished by its President, Mr. F. Arnold Lees, as follows:—

At the meeting after tea, press of time prevented a full enumeration of the floral notabilities of a district peculiarly rich in a botanical sense, because of the great diversity of surface and soil, augmented by the proximity of the main Lune stream (draining a wide mountainous area beyond Yorkshire boundaries), in the valley of which species normally foreign to (unlikely to occur naturally in) the district are to be found—originally brought into it by water-flow, or it might be deposited by glaciers, with the boulders, the main Lune valley being one of their routes,—but now, and for long (since the first record for *Meum* here dates back to Parkinson and Merrett's time, 1640–66), however they came, quite at home in an environment altogether acceptable to their needs. Botanico-geographically—geologically also—this strip of West Yorkshire, drained by a river the head waters of which originate on Barrowdale and Shap Fells, is a part of the Westmorland 'Lake country,' so that here, if anywhere, one would expect, on the banks and rocks of the main stream, to find species which occur higher up in the catchment area. Some, indeed, such as *Galium boreale*, *Sedum anglicum*, *Circœa alpina*, *Hieracium umbellatum* and *H. crocatum* have already been found; whilst others, such as *Hieracium pallidum*, *Polygonum viviparum*, *Equisetum variegatum*, etc., will doubtless reward a closer critical investigation in the future. Thus, not a few of the botanists present made acquaintance with species

they had never previously had the opportunity of seeing *in situ*, and, truly (from their point of view), no excursion of the Union was ever more successful or fertile in discovery. It was peculiarly enjoyable, too, for other reasons—the elements were propitious, and the spirit of fellowship in science was fostered by the presence of the Kendal naturalists from the adjoining county, with their cryptogamic specialists, Messrs. Martindale and Stabler, famous for their painstaking, original labours amid the Bryophytes and Lichens, who added not a little open-air instruction to the other pleasures of the day, and appreciably swelled the sum-total of those ‘results’ which constitute the *raison d’être* of the Union’s field-gatherings.

During the day, by one or other of the botanical parties, over eighty uncommon or local Phanerogams were observed. Most of these were, of course, of the montane type in distribution, some few of them—like *Prunus padus*, *Rosa mollis*, and *Geranium sylvaticum*—forming, by their ubiquity at lower levels, the salient feature of the vegetation; but two exceptions are specially noteworthy—the ‘colonist’ *Linaria minor (viscida)* plentiful amid the cinders of the railway track from Ingleton onwards, and *Rosa spinosissima* (characteristically a plant of calcareous soils or maritime sand-flats), a few bushes of which were noticed in the road-side hedge-bank near Howgill. The last named rose, with *Rosa mollis*, *Epilobium alsinifolium*, and the three *Hieracia*—*H. tridentatum*, *umbellatum*, and *crocatum*—seem to have been hitherto unknown to the local workers, since their names do not appear in the otherwise full list—‘*Florula Sedbergensis*’—compiled by the Rev. W. Thompson, with the co-operation of Mr. John Handley. The Spignel (*Meum athamanticum*), recorded nearly 250 years ago for the locality, was confirmed as occurring in some abundance, but local, in pastures and on broken banks over a restricted area having Beck-houses, near the Lune beyond Howgill, for its centre of dispersion. Being in fruit, the peculiar odour of this aromatic umbellifer, resembling the ‘cattle-spice’ preparations of Fenugreek (and like them due to Coumarin?), was very noticeable. Local farmers averred they knew not of any surviving employment of it in rural beast-pharmacy; but regarded it as a ‘nasty, stinking thing’ of ‘lile account’ which ‘yow’ and ‘kye’ alike left uncropped amid the pasturage. The great bulk of the species noted were, of course, already known, and entered for their stations in the ‘*Flora of West Yorkshire*,’ e.g., *Alchemilla alpina*, *Epilobium alsinifolium* (with its large form, *anceps* Fr.), *Saxifraga stellaris* and *Circæa alpina*; but the day’s labours resulted in the observance of five species new to (not down in) the *Flora* for that part of the Lune river-basin under examination.

These are : *Saxifraga aizoides* (gill between Winder and Crook Fells—J. Backhouse, jun.); *Galium boreale* (near the Lune bank); *Hieracium crocatum* Fr. (banks at Howgill); *Hieracium umbellatum* L. (Lune-side banks), and the little toad-flax (*Linaria viscida*) already alluded to, but this last is, properly regarded, adventive to the district. The 'Rusty-back' fern (*Ceterach officinarum*) shown at the meeting, was gathered by Mr. T. W. Edmondson on a farm-yard wall near the railway viaduct between Sedbergh and Lowgill, to reach which the Lune has to be crossed, so *that* was a few yards across the boundary, and in Westmorland. At Cautley 'Spout' the Film-fern (*Hymenophyllum unilaterale* Willd.) was seen growing in massed abundance (in shrivelled state) on rocks *many yards* away from the much reduced stream at *this* time—evidence both of the exceptional drought and the wide-spreading spray of the cascade when in its normal volume. When in spate, the 'force' must be without a rival in Yorkshire for height and grandeur.

With the assistance of the cryptogamic visitors, 89 Mosses, 21 Hepatics, and upwards of 50 Lichens were noticed—the majority, of course, already on record, but the following are worth mention by name as being hitherto unknown for the drainage district of the Lune : *Dichodontium flavescens*, *Dicranum palustre*, *Didymodon cylindricus* Br., *Grimmia trichophylla*, *G. commutata* Hüb. (G. Stabler, ms.), *Orthotrichum saxatile* Brid., and *Plagiothecium sylvaticum*. Of these the *Grimmia commutata* (Cautley) is not only new to the West Riding, but has never been recorded before for any part of Yorkshire. This is as yet, a name record only of Mr. Stabler's, set down in manuscript, amongst the names of others got during the excursion by him, but neither Mr. Slater nor Mr. West have seen specimens. It may thus be held to require confirmation ; this taking time, the result may not be stated here. Most of the other mosses observed were species of wide distribution, in mountainous regions especially, but mention may be made of some few of the rarities, previously known for the Lune basin, a confirming record for which can hardly be out of place : such were *Gymnostomum commutatum* (= *Barbula curvirostris* var., Braith. Mon.), *Trichostomum crispulum* (M. B. Slater), *Barbula revoluta*, *Orthotrichum rupestre*, *Blindia acuta*, *Bryum filiforme* Dicks. (= *B. julaceum*), *Mnium stellare*, *Polytrichum formosum*, *Hedwigia ciliata*, *Heterocladium heteropterum*, *Neckera pumila*, and *Hypnum eugyrium*. Among Hepatics the best species gathered were *Lejeunea calcarea* Lib. (in fruit), *Madotheca lævigata*, *Jungermania barbata*, *J. riparia* Tayl., *J. bantriensis* Hook., *Nardia emarginata*, *Trichocolea tomentella*, *Mylia taylori*, *Jungermania cordifolia*, and *Metzgeria conjugata*.

With regard to Lichens, it is hoped that it may be possible to publish a complete enumeration of those found, in a separate article (see p. 285 of this number), but this may be said here: at least ten species entirely new to the West Riding flora were discriminated by Mr. Martindale, and several others noted which are new to the Lune river-basin; among these are *Collemodium plicatile* Ach., *Parmelia sub-aurifera* Nyl., *Lecanora dicksonii* Ach., and *Pertusaria lactea* Nyl. A difficulty in stating precisely which are new altogether, and which only new to the district, arises from the names of Leighton's Lichen-Flora not being adopted by Nylander, Martindale, and later observers. Lichenology is at present in a peculiarly progressive stage, subversive of old and long-accepted ideas in many instances. Two striking examples may be cited *en passant*—it is now denied that the true 'Reindeer Moss' (*Cladina rangiferina*) is a native of England at all, what has been so called being said to be a form of *Cladina sylvatica*; and the common yellow lichen of limestone rocks passing under the name of '*Placodium murorum*,' as also the corticolous '*Parmelia olivacea*' of the same descriptive manual, are both declared to be very rare if not quite absent in England! what we have been styling by those names being made up of *Lecanora tegulare*, *L. sympagea*, etc., and *Parmelia fuliginosa*, *sorediata*, *exasperata*, and *sub-aurifera* respectively. Until order is evolved out of this chaos by some master-pen, local lichen-lists must inevitably lack pretension to finality.

A considerable number of Algæ, Diatoms, etc., were collected by Mr. West, home-examination of which has revealed the fact that two or three of the number—out of a total of over 25—are quite new to the West Riding list, voluminous (about 370 species) as it already is; the more noteworthy of these gatherings being *Edogonium princeps*, *Chlorococcum frustulosum*, *Hormiscia bicolor*, *Ceratoneis arcus*, *Mæso-tenium chlamydosporum*, and *Encyonema cæspitosum*.

Mr. S. A. Adamson, F.G.S., Leeds, as secretary of the Geological Section reported that a point of especial value in this excursion was the opportunity of personally examining and studying the oldest stratified rocks in the geological record which the county possesses, the Lower Silurian. The journey from Leeds to Sedbergh, in the early, fresh summer's morning, was full of interest to the geological eye, the many familiar spots in Craven looking brighter than ever. From Ingleton to Sedbergh the scenery presented a striking contrast, on one side the charming, well-cultivated valley of the Lune, on the other the stern and lofty Fells. The remarkable geological phenomena of this immediate district have to do with this contrast in the scenery. From Ingleton the railway passes over Permian strata, Coal Measures, Millstone Grit, Yoredale Rocks, Mountain Limestone, and Basement Conglomerate; but these are suddenly cut off on the

east by the great Pennine fault, and brought against the Coniston Grits of the Upper Silurian of Barbon and Middleton Fells. The geological section (which was well attended) under the guidance of Mr. J. W. Davis, F.G.S., F.S.A., also benefited by the experience of the Rev. G. Crewdson, of Kendal, and the topographical knowledge of Mr. Wadeson, of Sedbergh. The Rev. J. H. Mackie, of Sedbergh Grammar School (whose absence was much regretted) had sent down to the White Hart Hotel a box containing specimens of the rocks of the district, many of them containing typical fossils, and these were carefully inspected before proceeding on the excursion; they had been obtained from the Coniston grits, shales, and limestone. The party now set off, passing through the hamlet of Milnthorpe, leaving which, the path over the moors was taken, over the Riggs and Frostrow Fells; *en route* several small quarries were seen of the Coniston Grits, which are hard siliceous grits and sandy slates. These have been correlated with the Denbighshire flags and grits of the Wenlock series (Upper Silurian). The Riggs are formed by an anticlinal, for on ascending the dip was noticed to be N.N.W., but on passing over it was found to be S.W. The rough stone walls are generally worth examining by geologists, from the fact that their weathered sides often disclose good fossils; these received due attention as far as time would permit, but without much result. They were nearly all built of the Coniston grits, but here and there were noticed blocks of millstone grit, which, as was suggested, may have been brought into the valleys from Baugh Fell and other hills by glacial action. Following the path, the steep hill of Helm Knott was seen; the way for some distance led over boggy peaty ground, and although the present surface was treeless, yet here and there roots and stumps of large trees, black with age, were noted partly buried in the peat. The ascent of Helm Knott was now made, for the splendid view which stretched all around. To the west and north-west were seen the fells around Kendal and Shap, whilst behind towered the hills of Cumberland and Westmorland; beginning with Coniston Old Man, summit after summit followed rapidly to the northward. Right in front were the lofty, rounded heights of Howgill Fells, which owe their contour chiefly to glacial action. The valley of the Rawthey was seen, bounded on the east by the mighty mass of Baugh Fell; then a splendid view of the charming valley of Dent was obtained, with the pleasant little town of that name far below. The hills of Rysell, Whernside, and Gragreth were pointed out, the view closing with the steep slopes of the Middleton Fells. The day was particularly fine and clear, the sunlight being brilliant without haze; thus each point in the majestic landscape appeared in sharp relief. Mr. Davis also pointed out in

the distance where the Coniston Flags and Grits, by the great Pennine faults, are thrown abruptly against the Mountain Limestone. The descent was now made into Helm Gill, and by a precipitous path the bed of the stream was reached. This is a most interesting section, as here, by a fault running north and south, the Coniston Limestone is exposed, this being the oldest formation seen during the day. This limestone has from its fossils been correlated with the Bala and Caradoc beds of Wales, which were included by Prof. Sedgwick in the Upper Cambrian series. Murchison named them Lower Silurian; but Prof. Lapworth proposes to use the term Ordovician, from the name of the British nation, Ordovices. This fault separates the limestone from the shales and grits, but the former dips rapidly to the south-west, and soon disappears; in composition it alternates between a very hard crystalline dark blue limestone and crumbling shales. Careful search was made on both sides of the Gill for fossils, with good results. Fragments of black mica trap were seen here and there, and although not *in situ*, yet no doubt they had been detached from the trap dikes in Helm Gill. Helm Gill is one of the best places for a geologist we have yet seen. For the physical geologist there is the remarkable fault already alluded to; for the palæontologist the fossiliferous limestone and shales, with their rich harvest; and for the petrologist there is ample work in the investigation of the trap dikes. The Gill was ascended, then the path over the moors traversed, and crossing the Hawes and Sedbergh road, Dovecote Gill was visited, to view a small cavern. In the valley of the Rawthey some good exposures were noted of the Red Conglomerate or basement bed of the Carboniferous series. This is finely developed at and near Sedbergh, and consists of a mass of pebbles enclosed in a ferruginous matrix. This conglomerate rests unconformably on the inclined edges of the Coniston grits, and is overlaid conformably by the Carboniferous Limestone series; the pebbles contained have been chiefly derived from the grits and slates of the surrounding hills. For the origin and probable method of formation of these conglomerates, the reader must be referred to the account in 'West Yorkshire,' from the pen of Mr. Davis. The inspection of these beds seemed to be, with several of the party, the most interesting feature of the day's work. Return was now made to Sedbergh for tea at the White Hart Hotel. No sectional meeting was held, the return of the train being comparatively early. Amongst the fossils obtained during the day were included *Graptolites* (several species), *Orthoceratites*, *Trilobites*, *Orthis*, *Strophomena*, *Athyris*, *Favosites*, *Halysites*, and some magnificent examples of *Encrinites* (one exhibiting both stem and tentacles). The richness of the district made the day one of thorough enjoyment and practical benefit.

SEDBERGH DISTRICT LICHENS,

OBSERVED ON THE OCCASION OF THE AUGUST MEETING OF THE YORKSHIRE
NATURALISTS' UNION.

JOSEPH A. MARTINDALE.

THE district between Sedbergh and Cautley Spout is not very rich in Lichens, though it may be taken as certain that with more time than was at the disposal of the Botanical Section, a longer list of plants could be prepared. Some of the walls near the town would doubtless repay careful search, but these were passed quickly by in order to reach the 'Spout' as soon as possible. Still, several Lichens which might have been expected were not seen during the excursion, although carefully looked for. Among these may be mentioned *Lecidea periplaca* Nyl., which is abundant on slatestone walls to the north of Kendal. The plants observed during the excursion are, with few exceptions, those that are common in the Silurian districts of South Westmorland.

1. *Collemodium plicatile* (Ach.). On rocks in the bed of the Rawthey. [One old West Riding record; F. A. Lees.]
2. *Cladonia fimbriata* (L.). On walls near Sedbergh (W. West).
3. *Cladonia gracilis* Hffm. Near Cautley Spout.
4. *Cladina sylvatica* (Hffm.). Abundant near Cautley Spout.
5. *Evernia prunastri* (L.). Poorly developed. On trees.
6. *Evernia furfuracea* (L.) Mann. Wall, Low Haygarth (F. A. Lees).
7. *Parmelia caperata* (L.). Abundant on trees, near Sedbergh.
8. *Parmelia scorstea* (Ach.). Wall, Low Haygarth (F. A. Lees).
9. *Parmelia conspersa* (Ehrh.). On rocks and walls near Cautley Spout.
10. *Parmelia Borreri* (Turn.). On tree near Sedbergh.
11. *Parmelia saxatilis* (L.) and var. *furfuracea* Schär. Abundant.
12. *Parmelia fuliginosa* (Fr.). On rocks and trees, abundant. Several plants observed in fruit.
13. **Parmelia sub-aurifera* Nyl. Here and there on trees, but not well developed. [New to West Riding List; F. A. Lees.]
14. *Parmelia physodes* (L.). On rocks and trees.
15. *Peltigera canina* (L.). By the road-sides.
16. *Physcia parietina* (L.). Common.
17. *Physcia tenella* (Scop.). Not very abundant. On trees and walls.
18. *Physcia tribacia* (Ach.) A few specimens observed on a wall. [New to West Riding Flora; F. A. Lees.]

19. *Lecanora* (*Placodium*) *tegulare* (Ehrh.). A few bits associated with the preceding.
20. *Lecanora aurantiaca* (Lightf.). One specimen seen on a wall.
21. *Lecanora ferruginea* (Huds.). On sandstone parapets of a bridge.
22. *Lecanora pyracea* (Ach.). On rocks in the bed of the Rawthey. [New to Lune district of Riding; F. A. Lees.]
23. *Lecanora vitellina* (Ehrh.). On rocks and walls. Its var. *coruscans* also occurred.
24. **Lecanora dispersa* (Pers.). A few specimens on limestone in a wall. [New to West Riding Flora; F. A. Lees.]
25. *Lecanora subfusca* (L.). On trees.
26. *Lecanora subfusca* var. **campestris* (Schär.). On limestone stones in a wall.
27. *Lecanora sulphurea* Ach. On walls.
28. *Lecanora conizæa* Ach. A few poor specimens on larch-trees. [First record for Lune district of West Yorkshire; F.A.L.]
29. **Lecanora intricata* Schrad. Here and there on rocks and stones. [New to West Yorkshire Flora; F. A. Lees.]
30. *Lecanora atra* Ach. On rocks and walls. Not very abundant.
31. *Lecanora badia* Ach. Somewhat plentiful on rocks and walls.
32. *Lecanora ventosa* Ach. Two or three patches on rocks at the foot of Cautley Spout.
33. *Lecanora parella* (L.). Common on trees, walls, and rocks.
34. *Lecanora Dicksonii* (Ach.). Common on rocks and stones. [In the West Riding Flora for Ingleborough only; F.A.L.]
35. *Lecanora fuscata* (Schrad.). Here and there on walls.
36. *Pertusaria amara* (Ach.). (Sub *P. faginea*.) On trees.
37. **Pertusaria lactea* (L.). On rocks and walls. [New to West Riding List; F. A. Lees.]
38. *Lecidea cupularis* (Hedw.). On rocks at Cautley Spout (W. West).
39. *Lecidea lucida* (Ach.). On walls.
40. **Lecidea panæola* (Ach.) One specimen on rock at foot of the Spout, but not characteristic. [New to West Riding List; F. A. Lees.]
41. *Lecidea albocærulescens* Ach. On rocks near the Spout.
42. *Lecidea contigua* (Ach.). On walls and rocks.
43. *Lecidea crustulata* (Ach.). A few specimens on stones a little below the Spout.
44. **Lecidea speirea* (Ach.). On rocks at the Spout. [New to West Riding List; F. A. Lees.]

45. **Lecidea lactea** (Flk.). On a block of stone below the Spout. [**Lecidea macula** Tayl.? I am doubtful of my determination of this plant; but it agrees fairly well with Taylor's description, and with Nylander's description of *L. perustula*, which is said to be a synonym of it. I have not seen authentic specimens of either. Our plant occurred on a rock at the foot of the Spout. It looks like a small *L. fusco-atra*, and would have been set down by Leighton as a meagre form of his *L. nitida*, but that seems to be an aggregation of somewhat different things.]
46. **Lecidea fumosa** Hffm. One or two specimens on walls below the Spout. [New to Lune drainage-district of West Yorkshire; F. A. Lees.]
47. **Lecidea grisella** Flk. On walls of a bridge.
48. ***Lecidea coracina** Ach. On stones below the Spout. [New to West Riding Flora; F. A. Lees.]
49. ***Lecidea lavata** Ach. On stones by the stream-side. [New to the West Riding Flora; F. A. Lees.]
50. **Lecidea alboatra** var. **epipolia** (Ach.). On limestone in a wall
51. ***Lecidea chloroscotina** Nyl. On stones in the bed of the Rawthey. [New to West Riding Flora; F. A. Lees.]
52. **Lecidea geographica** (L.). Frequent near the Spout.
53. **Lecidea citrinella** Ach. A few small specimens on earth in the crevices of rocks at the foot of the Spout.
54. **Endocarpon miniatum** var. **complicatum**. On rocks at the Spout (W. West).

NOTES AND NEWS.

Thanks to the enterprise of the proprietor of 'The Field,' and to the ability of their investigator, Dr. Klein, F.R.S., the epidemic known as the Grouse Disease will soon be no longer a *res incognita*. Under the auspices of this well-known newspaper, Dr. Klein recently visited several moors affected by the epidemic, and was thus enabled to examine freshly-captured specimens of diseased birds, from which alone it was possible to hope to obtain a clue to the true nature of the disease. All the specimens dissected had the intestines more or less congested, and the liver or kidney—and, in some cases, the lungs also—discoloured. A careful microscopic examination of the blood and diseased tissues made it obvious that bacteria had nothing to do with the disease. But an examination of prepared sections of the liver proclaimed the existence everywhere in the arteries and veins of that organ of large numbers of corpuscles of a foreign nature and varied form, each of which is believed to be a *plasmodium* in an arrested phase of movement. The presence of these fungi in the blood vessels of the liver, and perhaps also in the vessels of the intestines, readily explains the condition of these organs in the affected specimens. We are glad to know that further investigation is to be devoted to this important discovery; and the distribution of these minute bodies in the birds, in the spore stage on the moors, and their mode of entry into the bodies of the animals, is to be carefully gone into.

BOOK NOTICE.

Outlines of the Geology of Northumberland and Durham. By G. A. Lebour, M.A., F.G.S. Newcastle-upon-Tyne, 1886; 156 pp. and v plates.

The present work is a new edition of the 'Outlines of the Geology of Northumberland,' enlarged in scope to include also the county of Durham, and with much new matter and numerous illustrations. It cannot fail to be of great service to the local geologist.

The geological formations are treated in order from above downward. The recent and sub-recent deposits are well given, though the Boulder Clays are rather summarily despatched. The Trias and Permian rocks are treated together, the arrangement of the strata above the Magnesian Limestone being necessarily conjectural owing to the want of exposures and the absence of fossils. These strata have a commercial interest due to the Salt Measures, which are discussed here, as are also the 'breccia-gashes' in the Magnesian Limestone, already described elsewhere by the author. The Carboniferous system is, of course, handled at length, four chapters being devoted to the description of the Coal Measures, the Ganister and Millstone Grit series, the Bernician rocks, and the Tuedian series respectively. These last two names are the heads of the author's divisions of the Lower Carboniferous. Mr. Hugh Miller's classification of these rocks, adopted by the Geological Survey, is given in an appendix. The small inliers of Silurian beds in Northumberland and Teesdale are enumerated in Chapter X. The next three chapters are devoted to the Igneous rocks of the district. The most important of these are the numerous dykes, which are here ranged in two sets according to their strike, E.-W. and N.E.-S.W.; the Whin Sill; and the augite-granites, quartz-felsites, and pyroxene-andesites of the Cheviots: the recent researches of Mr. Teall on these rocks are duly noticed. Next, extensive lists of Carboniferous fossils are given as materials for a palæontology of Northumberland. A chapter on faults and veins follows; then a short summary; and finally a brief description of the adjacent district of Yorkshire which contains the Cleveland ironstone.

The plates, which are well executed, include geological maps of Northumberland and Durham, and part of Cleveland.—A.H.

NOTE—COLEOPTERA.

Beetles at Sherwood Forest.—At the July meeting of the Entomological Society of London, Mr. A. C. Horner exhibited a *Rhizophagus* from Sherwood Forest, which appeared to belong to a new species; and several specimens of *Holopedina polyperi* Först., also from Sherwood Forest, where he had found it in company with, and probably parasitic on, *Cis vestitus*.—W. W. FOWLER, Hon. Sec.

3 SEP 1887

Naturalist,



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Information is at present specially required on the Slugs (*Testacella*, *Limax*, and *Arion*), of which living specimens from every district are desired.

THE NATURALIST.

The Editors hope to publish the following papers within the next few months:—

Interesting Geological Discovery at Wortley, Leeds.—C. BROWNIDGE, F.G.S.

Leafing of the Oak and Ash.—J. HAGGER.

List of Land and Freshwater Mollusca of Airedale.—H. T. SOPPITT and J. W. CARTER.

North of England Specimens in the British Museum—T. D. A. COCKERELL.

The Editors are open to receive suitable papers for insertion, particularly on Botany, Entomology, Ornithology, Geology, etc.

Bibliography for 1885 (continuation) and 1886.

Natural History of Lincolnshire.—The next instalment of this is to be upon the **Mammalia**, by JOHN CORDEAUX. Schedules have been prepared for obtaining information: one will be sent to anyone willing to furnish notes.

Short Notes.—It is the wish of the Editors to give in each number about a page of short notes in each of the various subjects of which the *Naturalist* takes cognisance. To this end they rely upon their friends keeping them well supplied. At present short notes on Botany, Entomology, Palaeontology, Microscopy, Conchology, &c., are particularly desired.

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A

MONTHLY JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

WM. DENISON ROEBUCK, F.L.S.,

AND

WM. EAGLE CLARKE, F.L.S.,

MEMBER OF THE BRITISH ORNITHOLOGISTS' UNION.



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Communications should be written on *one side* of the paper only, and should be sent as soon after the commencement of the month as possible.

Short Notes of important occurrences will be received up to the 20th of the month, and specially urgent ones even later.

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BOOKS RECEIVED.

- Mineralogical Magazine for July 1887 (vol. vii, No. 34). [The Mineralog. Society.
J. Cosmo Melville.—'Mollusca' and 'Insecta': Reprints from the Handbook for
the Manchester Meeting of the Brit. Assoc., 8vo, 10 and 28 pp. [Author.
New York Microscopical Society—Journal for Jan., April, and July 1887, vol. iii,
Nos. 1—3. [Society.
Nat. Hist. Journ., Sep. 15, 1887, vol. xi, No. 96. [J. E. Clark and B. B. Le Tall, Editors.
Naturalists' Monthly, Nos. 1 and 2, Sept. and Oct. 1887. [Dr. J. W. Williams, Editor.
Wesley Naturalist, No. 7, September 1887. [The Wesley Scientific Society.
Grevillea, vol. xvi, No. 77, September 1887. [Dr. M. C. Cooke, Editor.
Naturalists' World, vol. iv, No. 45, September 1887. [Percy Lund, Editor.
Science Gossip, No. 271, for Sept. 1887. [Messrs. Chatto & Windus, Publishers.
The Young Naturalist, Part xciii, for Sept. 1887. [Mr. J. E. Robson, Editor.
The Midland Naturalist, vol. x, No. 117, for Sept. 1887. [The Editors, Birmingham.
The Essex Naturalist, No. 8, for August 1887. [The Essex Field Club.

Yorkshire Neuroptera and Orthoptera.—I am anxious during the present and several future seasons to work up the Neuroptera and Orthoptera of our county as much as possible, with a view to publishing a list of species, with their localities, etc., and shall be very grateful to all entomologists (or other naturalists) who, when out collecting their own particular groups of objects, will kindly kill and pin (of course they need not trouble to set them) one or two or three specimens of any species they may come across, and send them to me at the end of the season—or oftener if it be not too much trouble. The families in the Neuroptera wanted are the *Libellulidæ* (Dragon-flies), *Perlidæ* (Stone-flies), *Sialidæ*, *Raphidiidæ* (Snake-flies), *Osmyidæ*, *Hemerobidæ*, *Chrysopidæ* (Lacewing-flies), *Contiopterygidae*, *Panorpidæ* (Scorpion-flies), and the *Trichoptera* (Caddis-flies). The two other British groups, *Psocidæ* and *Epheméridæ* (May-flies), I do not propose to touch at present. The Orthoptera include the *Forficulidæ* (Earwigs), *Blattidæ* (Cockroaches), *Acrididæ* (Grasshopper and Locusts), and the *Achetidæ* (Crickets), all of which, with the exception of the several universally abundant and distributed species, are wanted.—GEO. T. PORRIT, Greenfield House, Huddersfield, May 18th, 1887.

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ON THE FREQUENT OCCURRENCE OF WHINSTONE ERRATICS AT FLAMBOROUGH.

REV. E. MAULE COLE, M.A.,

*Vicar of Wetwang, East Yorkshire; President of the Geological Section of the
Yorkshire Naturalists' Union.*

THE vast number of erratic blocks of Whinstone on the top of the chalk cliffs in the neighbourhood of Flamborough is very remarkable. Some are still *in situ*, as the two boulders on the top of the con-tortions at Staple Nook; but the majority have been moved from the adjacent fields into the roads or nearest village. In Bempton Cliff Lane a group of eight has been lying by the roadside upwards of seventy years, being too large and hard to break for road-metal. The average size is about $3\frac{1}{2}$ ft. in length and width, and $1\frac{1}{2}$ ft. in depth. In the villages of Bempton and Buckton a great number of large size have been utilised for the foundations of cottages, for posts at the corner of the streets, and for steps, whilst others appear to have been placed on the roadside for seats. Innumerable smaller blocks have been built into the walls of gardens and houses. At Bridlington, round the Priory, a large number of Whinstone blocks, over 2 ft. high, have been reared at the corners of the streets, and many more may be observed at Flamborough. Such being the case, we are led to inquire into the probable origin of these erratics, and the path by which they travelled to their position on Flamborough Head.

The nearest basaltic dyke is that known as the Cleveland Dyke. This crops out at many places in the dales between Roseberry Toppin and Egton, and is specially noticeable where it crosses the Murk Esk near Grosmont. The dyke is visible on the surface of the moors from this point to Sleights Moor, where it finally disappears.

Is it probable that the blocks at Flamborough could have been derived from any of the localities above mentioned? It seems to me decidedly not. For in that case they must either have come down the valley of the Esk, or across the moors. Now the Esk runs due north at Whitby, and it seems pretty certain that the Boulder Clay which largely fills the valleys of the Esk and Murk Esk at their lower ends only was pushed *upwards from* the sea, so that it would not be possible for blocks of Whinstone from Grosmont to find their way *downwards to* the sea. Again, there is no trace of Boulder Clay in any of the dales south of the great anticlinal of the moorlands, nor any sign of glaciation, so that any notion of ice having brought the Whinstone blocks across the moors and tabular hills must be discarded. Whence, then, did they come? I was struck the other

day with the great height at which the basaltic dyke appears on the slopes of Roseberry, compared with its insignificant appearance on the great plain of the Tees. Now we know that a vast glacier from the Pennines joined the ice moving southwards along the East Coast of England at Tees mouth, bringing with it its load of shap-granite, which is found on the coast from Saltburn to Flamborough, and what more likely than that this ice-stream tore up the basaltic dyke, which might then have existed as a wall above the surrounding country, owing to its hardness and consequent resistance to ordinary denudation, and so supplied the large masses of Whinstone which are such a remarkable feature in the list of Flamborough boulders.

NOTE—DESMIDS.

Desmids of Gormire Lake.—Correction of Error.—In my note on the Desmidiæ of Gormire Lake in the September issue, I made a rather absurd mistake—therefore, for *Docidium truncatum* var. γ read *D. nodulosum* var. γ . However, on looking over some old sketches during the past week, I find a very similar variety of *D. truncatum* which I propose to call *D. truncatum* var. nov. γ *emarginatum*. In this the notched ends are quite as strongly developed as in the former case, and tend still further to show the close relationship between *Tetmemorus* and the non-verticillate *Docidia*. The variety is Canadian in habitat; and in the slide the normal form of *D. truncatum* does not appear.—W. BARWELL TURNER, Leeds, September 6th, 1887.

NOTES—ENTOMOLOGY.

Acronycta alni and other Moths near Scarborough.—On June 25th a fine specimen of *Acronycta alni* was captured in the neighbourhood of Seamer Beacon near Scarborough by Mr. J. Head. *Plusia interrogationis* has this season been fairly abundant on the moors, also *Heptamelis vellela* on Oliver's Mount.—J. H. ROWNTREE, Scarborough, August 27th, 1887.

Coleophora obtusella in Lincolnshire.—At the end of August, Mr. J. Eardley Mason, of Alford, sent me larvæ of this species, which he had found feeding commonly on seeds of rush near the sea-shore at Chapel, near Alford. It is only a recent addition to the British fauna, and as I believe it has hitherto only been found on the south coast, Mr. Mason's discovery is most interesting.—GEO. T. PORRITT, Huddersfield, September 15th, 1887.

Sirex juvenecus near Harrogate.—At the end of August, Mr. Riley Fortune sent me for determination an exceedingly fine female specimen of *Sirex juvenecus* which had just been found 'on growing grain' near Harrogate. Its commoner relative *Sirex gigas* is of not unfrequent occurrence, and I have repeatedly had it brought to me as a 'curious creature' from this district; but I only remember seeing one previous specimen of *juvenecus* in the county, which was many years ago brought to me, I think from one of the streets of Huddersfield.—GEO. T. PORRITT, Huddersfield, September 7th, 1887.

Hemerobius concinnus at York.—I took a fine specimen of this good neuropteran, the largest European species in the genus, at Warhill, near York, on July 18th last. Mr. G. C. Dennis and I were returning from a very successful day's collecting at Sandburn, when I found the specimen on a fir-trunk in the wood near Warhill railway station. Had time permitted of a more extended search probably more would have been secured.—GEO. T. PORRITT, Huddersfield, September 7th, 1887.

THE SOOTY SHEARWATER AT FLAMBOROUGH HEAD.

JAMES BACKHOUSE, JUN., M.B.O.U.,

*York; Secretary of the Vertebrate Section of the Yorkshire Naturalists' Union; and
Honorary Curator in Ornithology to the Yorkshire Philosophical Society's Museum.*

I HAVE just examined a pair of undoubted Sooty Shearwaters (*Puffinus griseus*) which were captured on the 23rd of August of this year a mile and a half or so off Flamborough Head, and have been beautifully preserved by Mr. Edward Allen, Feasegate, York.

They are adult male and female, and agree very well with the description given by Mr. Seebohm in his 'History of British Birds' (Vol. iii, p. 427), only that in the above-named specimens the back and upper tail-coverts chiefly are marked with pale brown, and the webs of the feet are distinctly flesh-coloured.

According to Mr. Seebohm, Yorkshire can already boast of nine specimens of this rare East Indian species, and how many more there are which have been considered as examples of the Greater Shearwater it is, of course, impossible to say. I notice that Mr. Saunders says (Yarrell, 4th edition, vol. iv, p. 17), that the first British specimen recorded was a Yorkshire one, shot at Boynton near Bridlington, in 1828, and exhibited four years later by Mr. Arthur Strickland, at a meeting of the Zoological Society of London.

Mr. Saunders further remarks:—'This specimen, which was then identified with *Puffinus fuliginosus* Kuhl, was subsequently figured on the same plate with an example of the Great Shearwater (*P. major*) by Gould, in his 'Birds of Europe,' under the impression that they belonged to the same species.'

In the 'Strickland Collection' of birds I found, the other day, a case containing a veritable Sooty Shearwater and a Greater Shearwater together—both under the one name of *Greater Shearwater*!

I naturally imagine that these specimens may be the identical birds figured by Gould, but as there is absolutely no record with the case, I have no means of discovering, and should, therefore, feel greatly obliged if any of your readers can enlighten me.

Whilst writing about Shearwaters, I should like to draw attention to the numbers of Manx Shearwaters (*Puffinus anglorum*), which have been shot in the county during the past month. I have seen a pair from Bridlington; have another myself (very old bird apparently) from Dunnington near York, and others also are reported from the coast. In the Dunnington bird, the legs are flesh-coloured on the inside and partly on the outside; inner and middle toes flesh-coloured; irides very dark hazel.

GEOLOGICAL PAPERS RELATING TO THE NORTH OF ENGLAND, READ AT THE MANCHESTER MEETING OF THE BRITISH ASSOCIATION.

AMONGST the papers read in the Geological Section bearing in some degree upon the Geology of the North of England may be cited the following: the Presidential Address by Dr. H. Woodward, F.R.S. (upon the present condition of geology, in his remarks upon palæontology, the value of the special work of Messrs. Davis and Vine being alluded to); Prof. Boyd Dawkins, on 'The Geography of the British Isles in the Carboniferous Period,' and on 'The Structure of the Millstone Grit in the Pennine Chain' (in the latter paper expressing his opinion that the ancient land from which the Millstone Grit was denuded was composed mainly of granite, but not altogether so, for evidence was found of schists); Mark Stirrup, F.G.S., on 'Foreign Boulders in Coal Seams' (on this paper a valuable discussion arose, joined in by Prof. Bonney, Dr. Crosskey, Dr. Blanford, Prof. Lebour, etc., when various opinions were expressed as to their presence in the coal, floating icebergs and mountain torrents being successively dwelt upon, whilst one speaker gravely alleged they were the ejectamenta of a volcano! A magnificent set of specimens accompanied this paper from various collieries in Lancashire, varying in weight from 166 lbs. downwards, the great majority being quartzites); Dr. G. J. Hinde, on 'The Organic Origin of the Chert in the Carboniferous Limestone Series of Ireland, and its similarity to that in the corresponding strata of North Wales and Yorkshire' (it was shown conclusively that this rock, which has been generally regarded as an inorganic deposit of silica direct from the sea-water, is, in reality, made up of the microscopic detached spicules of siliceous sponges. Having stated that these accumulations of minute spicules formed in some cases solid beds of rock, reaching a thickness even of nearly 700 ft., he said that sponges were thus more important as rock formers in the Carboniferous than in any other subsequent geological epoch); Robert Law, F.G.S., and James Horsfall, on 'The Discovery of Carboniferous Fossils in a Conglomerate at Moughton Fell, near Settle, Yorkshire' (the paper described the well-known conglomerate at the base of the Mountain Limestone); Dr. H. W. Crosskey, 'Report on the Erratic Blocks of England, Wales, and Ireland (the work of the Yorkshire Boulder Committee was duly reported and specially commended, being held up as an example to other counties); Prof. Carvell Lewis, on 'The Terminal Moraines of the Great Glaciers of England,' and on 'Some important Extra-Morainic Lakes in Central England, North America, and elsewhere during the period of maximum glaciation,' and on 'The Origin

of Extra-Morainic Boulder Clay' (these were, no doubt, the most original in idea and the boldest in theory of all the papers read before the section. The Professor, although from Philadelphia, had traversed and studied the whole of the North and East of England in detail for this paper. He argued that every glacier at the time of its greatest extension is bounded and limited by a terminal moraine. The glaciers which once covered Northern England were studied in detail, beginning with the East of England, and the North Sea glacier, the Wensleydale glacier, the Stainmoor glacier, the Aire glacier, and others were distinguished by characteristic boulders, and said to be defined by well-marked moraines. The minuteness of detail respecting Yorkshire and Lancashire, and the information given, was surprisingly great. In the second paper the Professor advanced from one argument to another until he announced his conclusion that the glacial phenomena of England are due neither to a universal ice-cap nor to a marine submergence, but to a number of glaciers bordered by freshwater lakes—that is, the glacier wall dammed up the rivers from the great watersheds of the west, constituting thus great freshwater lakes. These papers were stoutly controverted in discussion by numerous eminent English glacialists, one gentleman dogmatically denying any indication of a terminal moraine in the neighbourhood of Manchester, whereupon Prof. Lewis smilingly arranged forthwith an excursion to point it out!); J. W. Davis, on 'An Ancient Sea-beach near Bridlington, containing Mammalian Remains' (this valuable investigation, instituted by the Yorkshire Geological Society, received a grant of £20 from the British Association for the further examination of this section); Prof. Boyd Dawkins, on 'The Schists of the Isle of Man'; Prof. Lebour, on 'Thinolite and Jarowite' (the latter, a new mineral found in the muds of the river Tyne); Thomas Ward, on 'The History and Cause of the Subsidences at Northwich and its neighbourhood in the Salt Districts of Cheshire' (after giving the geology of the district and the history and progress of the salt trade, he related the cause of the subsidences, the continual removal of the beds of rock salt by solution and pumping, when the overlying strata suddenly fall into the cavities thus made); Prof. W. C. Williamson, F.R.S. (in the absence of Mr. Cash), 'Report on the Carboniferous Flora of Halifax' (it was stated that during the last year the researches had been less fruitful than usual in the neighbourhood of Halifax, but had been more successful in the surrounding districts. The most notable result had been in materially enabling them to determine with absolute certainty the fructification of the calamites); C. E. de Rance, 'Report on the underground waters in the Permeable Formations of England'; Prof. J. F. Blake, 'Description

of a new star-fish from the Yorkshire Lias' (Prof. Williamson doubted if this was a new discovery, being inclined to think this fish was a perfect specimen of the class one of which, imperfect, was found in the same locality many years ago, and by him placed in the Scarborough Museum); Prof. Otto Torell, on 'The Extension of the Scandinavian Ice to Eastern England in the Glacial Period'; Prof. Carvell Lewis, on 'The Terminal Moraine of the Irish Sea Glacier near Manchester' (this consisted of special and explanatory remarks upon an excursion which was immediately setting off).—S.A.A.

NOTES—BOTANY.

Linaria minor in Northumberland.—In the September number, p. 280, Mr. F. Arnold Lees records this little species as '*plentiful amid the cinders of the railway track from Ingleton onwards.*' What is the connection between this *Linaria* and railway tracks? Two or three years ago it appeared, and still flourishes, on a similar place among cinders at Beal Station, eight miles south from this town; and last year I found it in exactly similar locations at Velvet Hall, on the Kelso Branch, and at Marshall Meadows, on the North British line, where the track had been broken up on the formation of a short *deviation*. There is only one recorded station in this neighbourhood, and there it cannot now be found.—P. W. MACLAGAN, Berwick-on-Tweed, Sept. 7th, 1887.

Threatened extinction of *Sisymbrium Irio* at Berwick-on-Tweed.—As I have my pen in hand, I may mention that *Sisymbrium Irio*, found on the walls of this town by Mr. John Ray, in 1671, has been almost eradicated by the zeal of the authorities, who, three years ago, scraped and *pointed* the outer side of the ramparts. Last year I went with Prof. Babington to the spot where he and I gathered the plant in abundance half a century ago, but could not find a single specimen. This year there is one strong plant seeding as usual in profusion, so I hope to save it from extinction by scattering the seed in likely localities where it used to flourish.—P. W. MACLAGAN, Berwick-on-Tweed, September 7th, 1887.

A Mythical Moss.—Correction of Error.—Though scarcely surprised, indeed prepared to find it to be so, I regret to have to state that the supposed discovery of *Grimmia commutata* Hueb. at Cautley (see *Naturalist*, September, p. 281) is all a mistake. The error, however, is not mine, and for reputation's sake I am glad that I allowed *doubt* to be read plainly 'between the lines' in publishing the MS. record. The error must be set down to an inadvertence—a lapsus calami of Mr. M. B. Slater's. Mr. G. Stabler writes disclaiming any knowledge of the *Grimmia*; as, indeed, did Mr. West from the first. What makes the error more singular is that on receiving from Mr. Slater the list of the mosses found in the Sedbergh district, on August 1st—in which list the name *Grimmia commutata* Hueb. appears as 'plain as a pikestaff' following *G. apocarpa*—Mr. Slater replied that Mr. Stabler had given him the name as that of a moss gathered by Mr. West and his informant; and although I feared some error even then, it did not strike me that that other Cautley moss, in a quite different genus—viz., *Barbula curvirostris*, VAR. *commutata* Braith. was what Mr. Stabler had intended to give to Mr. Slater. Mr. Slater did not venture to suggest to me the omission of the reported 'find' altogether from my list, and I dare not do so 'on speculation' alone seeing that the authorities were in every way above suspicion. The matter carries a lesson with it, which must be my apology for detailing so minutely the facts of what must of course be held to be a simple but curious psychologic inadvertence. The error was not mine, and I did all I could to verify the record before publishing it. Having unfortunately appeared, a full explanation in the matter becomes imperative.—F. A. LEES, September 10th, 1887.

NOTES ON BRITISH LICHENS.

JOSEPH A. MARTINDALE,
Staveley, near Kendal, Westmorland.

THERE can be no doubt that there is still some considerable amount of confusion among those who in England devote attention to lichens with respect to several species which, from the antiquity of their names, might now be supposed to be well understood; and the writer of the report of the meeting of the Yorkshire Naturalists' Union at Sedbergh, which was published at pages 277-284 of the *Naturalist*, will have done good service if his remarks draw the attention of local collectors to the fact that under some ancient name, in several cases, three or four quite diverse plants are commonly united as a single species, and that, in some instances, the form regarded as typical is altogether different from that at first intended by the name. At the same time, the writer himself seems to labour under misconceptions, which may to some extent hinder the good he would otherwise do.

It certainly is not the case, for instance, that there is any practical difference between Leighton's conception of *Cladina rangiferina* (L.) and that of Dr. Nylander. There are, no doubt, some slight differences in their diagnoses of this plant and of its near ally *C. sylvatica* (L.), as appears from a comparison of the descriptions in Leighton's 'Lichen Flora,' pp. 66-67, and in Nylander's Synopsis, Vol. i, pp. 211-212, but these are, perhaps, more verbal than real. At all events, it is quite evident that Leighton not only accepts both plants as distinct forms, but that he agrees with Dr. Nylander in regarding their differences as specific, and such being the case, neither the one plant nor the other can by any means afford an example of a difference in the names adopted by these distinguished lichenologists. What confusion, therefore, exists at present in England with respect to these plants cannot proceed from the cause assigned by the writer of the report, but is chiefly due, I believe, to the fact that Hooker, in his 'English Flora,' and Taylor, in Mackay's 'Flora Hibernica,' completely ignored *C. sylvatica*, a plant which had been kept apart, at least as a variety, by almost every botanist but themselves since the time of Linnæus's 'Species Plantarum' (to say nothing of the more dubious recognition of it by Ray and Dillenius), and which had been regarded as a species by at least one writer of eminence—Hepp, in his 'Lichenen Flora von Warzburg.'

Where Leighton has indeed erred is in stating that *C. rangiferina* is the more common in England of the two; and it is surely inconsistent to say of plants that they are 'common,' and yet be able

to give such a very meagre number of stations as, in this instance, is recorded in his 'Lichen Flora.' So far, indeed, as this work is evidence, we might suppose both plants to be very uncommon, for he only notes two localities in England from which he had actually seen specimens of *C. rangiferina*, viz., in Yorkshire and Shropshire, and only one for *C. sylvatica*, viz., Market Rasen in Lincolnshire. He records, indeed, in another writing on the *Cladoniei*, published in the 'Annals and Magazine of Natural History,' November 1866, the occurrence of both species in Leicestershire, from whence he had received specimens sent by Mr. Bloxam.

This paucity of recorded stations may be taken as a proof how completely the form *sylvatica* had been ignored by British botanists, and *rangiferina* recorded wherever either plant was observed. Nor can we supply our lack of information from any other trustworthy source. Mr. Crombie, in his paper on the *Cladoniei* (Grevillea, vol. xi, p. 115), enters into no details as to their distribution, merely saying of *rangiferina*, 'Probably general and common, but certainly less so than the following species,' *sylvatica*, of which he says, 'General and abundant.'

No one has pointed out with any emphasis that there are districts in England where *rangiferina* appears to be absent, but such I believe to be the case. At any rate, I have not yet met with it in any part of Westmorland that I have searched; and as the Rev. W. Johnson does not record it in his list of the Lichens of Cumberland, we may suppose it to be absent from certain parts of that county also.

And now to turn to another plant, *Parmelia olivacea* (L.), mentioned in the report above alluded to. It is a very prevalent opinion that the large increase in the number of lichen species enumerated in later British Floras over the earlier ones, is entirely due to the making use for diagnostic purposes of minute differences of structure revealed by the microscope, or from reactions obtained by the use of chemicals. Now, though both these auxiliaries have most properly been made use of in the study of lichens, and a considerable number of species have been more accurately limited by their means, which, of course, has led to the recognition of species previously confounded in some supposed polymorphous plant, yet the opinion above mentioned is only partially true, especially as regards the foliaceous and fruticulose genera. The species now recognised which make up the *olivacea* group of *Parmelia* are a very fair illustration of this.

Eight species of the group are now known and recorded as members of the British flora, along with a few varieties. But so far from it being the case that their distinction from each other is due either to the microscope or chemical tests, only two of them have been named since 1830, and all of them had been described before

the publication of the third edition of the Lichen Flora of Leighton. The case is somewhat different if we consider the nine or ten members of the group which, though occurring on the Continent, have not yet been discovered within the limits of the British Isles. Of these latter the majority are new species, though all but two had been named before the appearance of Leighton's latest edition.

The eight British species, and the dates of their first recognition, are

- 1753. *Parmelia olivacea* (Linn., Species Plantarum).
- 1803. *Parmelia proluxa* (Ach., Methodus).
- 1810. *Parmelia exasperata* (Ach., Lich. Universalis).
- 1810. *Parmelia sorediata* (Ach., Lich. Universalis).
- 1829. *Parmelia Delisei* (Dub, Bot. Gall.).
- 1830. *Parmelia fuliginosa* (Fr., in Dub. Bot. Gall.).
- 1873. *Parmelia subaurifera* (Nyl., in Flora).
- 1875. *Parmelia isidiotyla* (Nyl., in Flora).

Now, since 1830, by which year six of these plants had been described, there have been published in England, Hooker's 'English Flora' (1833), Mackay's 'Flora Hibernica' (1836), Mudd's Manual (1851), and Crombie's 'Lichenes Britannici' (1870). Yet in Hooker's and Mackay's Floras only one plant is described styled '*olivacea*,' as if it was a homogeneous species, one and indivisible—not the slightest hint being given that it was made up of a number of very different forms. And it is to be observed that this apparent homogeneity of the species is not to be accounted for by the overwhelming preponderance of one form and the extreme rarity of the others, so that all or nearly all specimens collected belonged to that one form. Even as early as the time of Dillenius, four of the forms had been gathered, and were delineated in the 'Historia Muscorum' (1741), nay, even divided into two species, the first consisting of three varieties. The plants drawn on Plate 24, f. 77, according to Mr. Crombie, who has critically examined the Dillenian Herbarium, are *P. olivacea*, *P. fuliginosa* and *P. subaurifera*, while fig. 78 is *P. exasperata*.

In Mudd's Manual there was still only one species recognised, but to it were assigned two varieties—*aquiloides* (= *Delisei*) and *furfuracea* (= *fuliginosa*). In Crombie's 'Lich. Britannici,' *proluxa* and *exasperata* are recorded, in addition to *olivacea* and *fuliginosa*, but *Delisei* is omitted, probably being included in *proluxa*. When we come to Leighton's Flora, we find all the species except *sorediata*, *subaurifera*, and *isidiotyla*. In this work the five forms recognised are grouped in three species, *exasperata* and *proluxa* being regarded as varieties of *olivacea*. It is probable that *subaurifera* lies hid under *fuliginosa* and its variety, and very likely British specimens of *sorediata* and *isidiotyla* had not been seen by the author.

But now come the questions: What is the '*olivacea*' of these different works? and which of the species is intended by any record of '*P. olivacea*' we may find in them or in local lists of plants? And in trying to answer these questions we must remember that all the writers mentioned speak of their particular '*olivacea*' as quite a common plant. Well, a little reflection shows that a different answer must be given to the first question for most of these authors, and may be required for the second according to the date of the record. If we restrict ourselves to English and probably Irish plants, excluding Scotch ones altogether from consideration, we may safely say for all authors and records that true *olivacea* was never intended; for as Mr. Crombie has pointed out in his paper on '*P. olivacea* and its allies' (Grevillea, vol. x, p. 24) the true plant 'is essentially a boreal species which is met with only very rarely in the Scottish Highlands.' *P. sorediata* also has, so far as I know, not been gathered in South Britain, and *P. isidiotyla* only recently detected in Cumberland and Westmorland. Both of these, or at all events the latter, may be found to have a wider range, but it is very unlikely that any specimen of them had been seen by the earlier English botanists. We may, then, in all probability consider Hooker's and Taylor's '*olivacea*' to be an aggregate species made up of *exasperata*, *prolixa*, *Delisei*, *fuliginosa*, and *subaurifera*. Mr. Crombie states that *exasperata* was chiefly intended by earlier authors, and it is the plant figured in English Botany, 2180; but though widely distributed it cannot be said to be common, and it has even been called rare by Mr. Crombie himself (Lich. Brit., p. 35). Very likely it was held to be the most perfect development of the species, but certainly we require the addition of the others to justify the supposed common occurrence of their '*olivacea*.'

Mudd's '*olivacea*' is, of course, more restricted in consequence of his distinguishing *Delisei* and *fuliginosa* under separate names; and it seems to be probable that his type was made up of *exasperata*, *subaurifera*, and *prolixa*. The second of these plants is widely distributed and in some places very abundant, though frequently more or less atypical. Crombie's '*Lichenes Britannici*' is merely a list of species believed to compose the British lichen-flora. It was the first attempt, after a lapse of nearly twenty years from the publication of Mudd's Manual, to enumerate the lichens native to Britain, and was of great value at the time when it appeared. The stations recorded for each plant were, of course, in great part gathered out of previous writers, and no doubt *P. olivacea* was recorded in it as common in Britain on the faith of old statements, but these records, as we have seen, had reference to other plants.

It is more difficult to say what is the '*olivacea*' of Leighton's 'Lichen Flora,' so far as English plants are concerned. The stations given for it on the testimony of others may be passed over; but he records its occurrence in several places in Shropshire on his own authority. Now, as all the other forms then gathered in Britain appear under separate names, with the exception of *subaurifera*, which perhaps he referred to *fuliginosa* on the strength of the reaction with Ca.Cl., there actually remains nothing to which it can have any reference. It is most likely, however, that these Shropshire plants are corticolous (?) forms of *prolixa*; and if this conjecture be true, it will perhaps account for the words 'smooth . . . sometimes varnished' in the diagnosis he gives ('Lich. Flora', 3rd ed., p. 114).

In endeavouring to utilise old records of '*olivacea*,' for the purpose of studying the distribution of the various species, regard must, of course, be paid to the date of the record and to the author followed by the person recording the plant. I am afraid, however, that in most instances it will be quite impossible to determine accurately the plant unless access can be got to specimens in some herbarium.

Having thus somewhat cursorily considered the history of this group of plants, I would only further say that there is perhaps no group of lichens of which the species are more easily determinable, or which have so little tendency to run into one another. The question whether they should be considered distinct species or as varieties of one polymorphous plant, is one that each person will decide with reference to his own notions of the nature of species and varieties. We must remember, however, in respect to this, that not only have they each a fixed external character, but that the spores and spermatia differ in each, and to some extent the thalline structure. In fact except in colour they differ from each other in almost every character, and it seems to me that they are more distinct from each other than many species of moss genera, say *Sphagnum* or *Andreaea* or *Hypnum*, or of genera of phanerogams, say *Thalictrum* or *Potamogeton* or *Carex*, not to mention *Rosa*, *Rubus*, or *Salix*.

NOTE—FISHES.

Whitby Fish-notes.—On the 22nd November, 1886, two Ballan Wrasse (*Labrus maculatus* Bl.) were brought into Whitby, the largest of a green colour, the smallest deep reddish brown.

Yesterday (September 22nd), three of our fishermen caught a small specimen of the Short Sunfish (*Orthogoriscus mola*) on the top of the water outside the Rock Buoy off Whitby. I have not yet obtained its dimensions.—THOS. STEPHENSON, Whitby, 23rd September, 1887.

BOOK NOTICES.

The Geology of England and Wales: with Notes on the Physical Features of the Country. By Horace B. Woodward, F.G.S. 2nd ed., 8vo, 670 pages. London: Geo. Philip & Son, 1887.

The handsome volume before us does not merely add one more to the numerous manuals of geology which so frequently appear: it has a definite line of its own, being, as its title denotes, a geological guide to England and Wales. As such it is very complete, and comprises an enormous amount of material, including the most recent researches of local geologists. There is, however, a store of more general information, both interspersed with the local details and in the introductory and concluding chapters. A special feature is the insertion of brief historical and personal notes explaining the origin and application of our stratigraphical nomenclature, and summarising the conflicting views of different authorities on such debated questions as the classification of the Cambrian and Silurian, the Devonian, and the New Red Sandstone.

In all these points the present work shows considerable additions as compared with the first edition; so that, despite the omission of the promised account of the geology of the principal railway lines, which many amateurs will regret, the new edition attains goodly proportions.

After a section treating of introductory matters, the author begins with the Archæan system, which he includes under the Palæozoic group, and gives a succinct account of the pre-Cambrian rocks described by Dr. Hicks at St. David's (with Dr. Geikie's counter-statements), by Prof. Hughes in Carnarvonshire, by Dr. Callaway in Shropshire, etc. Next comes the Cambrian, the term being used in what we may call 'a strictly Sedgwickian sense,' i.e., to include all the strata from the base of the Harlech to the top of the Bala series. The development of these formations is described for the districts of North Wales, Shropshire, Pembrokeshire, and the Lake District. The Silurian system receives like treatment. The old Red Sandstone is divided in what is now generally admitted to be the most natural manner, the lower portion being linked with the Silurian, the upper with the Carboniferous. The Devonians of North Devon, which have received much attention from local workers, are described in detail; and the rocks of Torquay, Plymouth, and Cornwall are also treated. The author is of opinion that the Devonian rocks represent the Upper and Lower Old Red Sandstone and the gap between them.

The Carboniferous system is fully described under its various local types, and the coal-fields, including the culm-measures of Devonshire,

are separately treated. There is also a brief discussion of the possibility of coal occurring under the South-east of England, in the light of the information gained from deep borings. It may be remarked that, under the head of each system, a section is devoted to its most valuable economic and other products.

The author classes the Permian or Dyas and the Trias as one system under their original name of New Red Sandstone, and remarks the universal discordance between them and the underlying rocks. At the same time, the palæontological similarity between the Carboniferous and the Magnesian Limestone is pointed out.

Next we find the Jurassic strata fully treated. Tables are given to show the persistence of the ammonite-zones in the Lias, and the variations in the character of the Lower Oolites when traced from Dorset to Yorkshire. The author retains the divisions of the Upper, Middle, and Lower Lias, as used by most of the older geologists and by the Survey, in preference to that of Messrs. Tate and Blake. In the Middle and Upper Oolites the work of Messrs. Hudleston, Blake, and others is well summarised. Under the head of the Lower Cretaceous rocks we find both the Northern and Southern counties types of that division described in sufficient detail. Our author draws attention to the abuse of the term Neocomian, and indeed it would be well if this word, as well as many others, could be dropped out of English geological literature. In the Chalk the palæontological zones worked out by Barrois and others are given in a table. Many geologists will be of opinion that this is a case in which the use of zone-fossils has been rather unduly pushed.

After the usual treatment of the Eocenes of the London and Hampshire basins, and the Crags, etc., of the Eastern counties, thirty pages are devoted to the glacial deposits and their attendant phenomena. The interpretation of these is similar to that given by Prof. James Geikie, in his *Great Ice Age*.

The Pleistocene and Recent Alluvia come next, and then a section on Terrestrial Phenomena, such as Springs, Swallow-holes, Tufa, Caverns, Blown Sands, Soils and Beaches. The portion treating of Volcanic Phenomena has some petrological notes by Mr. Rutley, which are too brief to be of much service, and in a work which does not aim at being a text-book of general geology, might well have been omitted. There is also, however, a short but useful account of the chief localities of igneous rocks in England and Wales. It is, perhaps, vain to protest against the almost universal practice of writers of manuals, who, after describing the sedimentary rocks with due care in chronological order, group all the eruptive rocks together,

as if they were of no age at all. The geological date of even intrusive masses can, in most cases, be made out, either with certainty or with a high degree of probability.

A few pages are given to the subject of Mineral Veins, and an interesting discussion of Denudation and Scenery, with plentiful local examples, concludes the book. There are, however, two appendices, one being a synopsis of the Animal Kingdom, by Mr. E. T. Newton, and a very full index.

The hundred illustrations, gathered from a variety of sources, are judiciously chosen and well executed. There is also a folding geological map, prepared by Mr. Goodchild, which is clear, and seems fairly accurate. The accidental omission from this map of the South Yorkshire and Derbyshire coal-field has been remarked by another critic. Altogether, Mr. Woodward may be warmly congratulated on his work, which will prove useful alike to the local geologist, the teacher, and the traveller.—A.H.



Report on the Migration of Birds in the Spring and Autumn of 1886. By Mr. J. A. Harvie-Brown, Mr. J. Cordeaux, Mr. R. M. Barrington, Mr. A. G. More, and Mr. W. Eagle Clarke. Eighth Report (Vol. II, No. 3). Edinburgh: M'Farlane & Erskine. 1887. 8vo, 174 pages and map.

It is gratifying to notice the excellent work in course of accomplishment by the keepers of our lighthouses and light-vessels, and the Committee appointed by the British Association to report on the migration of birds are to be congratulated upon the energy which they have brought to bear upon the large amount of materials furnished by their observers during 1886. It is to be regretted that the reports for East and West coasts appear to be compiled without any reference to one another. Mr. Eagle Clarke alone has made clear the seasonal movements of the species (104) observed upon the West coast, with due reference to sudden rushes of birds.

Thus, while Mr. Cordeaux is content to state that in 1886, 'as in 1885, the main body of immigrants crossed in two great rushes, corresponding with the first and third weeks of October,' these movements being 'considerably earlier than the chief general movements of the preceding year,' Mr. Clarke neatly summarises the spring and autumn movements *with due reference to meteorological conditions*. The defect of all the reports, except that just mentioned, is that they leave the bewildered student to draw his own conclusions from the large mass of data referred to special species. What is really required is that a complete summary of the movements of

East and West coasts should be made, showing how the various movements opened, continued, and terminated over the whole of the British coasts. In this respect, geographical borders are highly mischievous.

The reports from Scotland are charming reading, and abound in personal touches from the hand of their genial compiler, but much unnecessary matter is included. The movements of *Whales* have nothing whatever to do with bird migration proper, nor indeed has the presence of a Bat at Fastnet chronicled by Mr. Barrington. Similarly, the breeding of common resident birds, such as the Sheldrake, should be rigidly excluded. We are far from despising the flotsam and jetsam of the reporters, but it should be published in other quarters than the Migration Report.

Having thus noticed the defects of the report, we would draw attention to Mr. Cordeaux's conclusions as to the arrival of birds 'at the mouths of the chief rivers, considerable stretches of high coast-line presenting poor or negative returns' (p. 51). Mr. Clarke's remarks with reference to the Irish coast are also deserving of special study (p. 117). During the past season the reporters have succeeded in a marked degree in obtaining wings of birds from light-vessels, as a consequence of which we learn that the Nightjar, Swift, and other unlikely birds have been traced on migration. As to movements of individual species, the most remarkable appears to have been that of the Chaffinch, observed in October at twenty-one stations, covering the whole of the East coast between the Farne and the Channel Islands. No rare birds are reported from Ireland, but the presence of such uncommon visitors as the Wryneck, Pied Flycatcher, and Black Redstart, should increase the zeal of the naturalists of the sister isle. Mr. Clarke is similarly unfortunate as to rarities, only a hypothetical Red-winged Starling (*Agelaius phoeniceus*) being reported from the Nash Lighthouse as having breakfasted a cat.

From the East coast we find reported the presence of no less a prize than the first British specimen (authenticated) of the Mediterranean Black-headed Gull, as well as a Purple Heron, and three Harlequin Ducks at the Farnes. From Sumburgh Head, N.B., was forwarded to Mr. Harvie-Brown the first Scottish example of the Yellow-browed Warbler (*Phylloscopus superciliosus*).

In conclusion, we would draw attention to the importance of every lighthouse and lightship on our coasts receiving personal visitations from the recorders or their deputies. In this respect a high standard of duty has been shown by Mr. Harvie-Brown, with excellent results.—H.A.M.

The Fungus Hunter's Guide. By W. Delisle Hay, F.R.G.S. (Swan, Sonnenschein, Lowrey and Co.)

This little work is intended for the use of amateur mycologists to answer a similar purpose to Hayward's 'Botanists' Pocket Book,' that is, to act as a sort of remembrancer whilst out collecting.

Beginners frequently experience no little difficulty in remembering the characters and even the names of the numerous Fungi which annually make their appearance. 'The Fungus Hunter's Guide' will to a certain extent help them, as the names and brief characteristics are given of many common Hymenomycetous Fungi, and a few others, together with a list of about seventy esculent species. The author seems to have had considerable experience amongst edible Fungi, judging from the numerous species that are marked 'E' (esculent). Many of these have hitherto been regarded as suspicious, and the properties of others were entirely unknown. We should imagine, however, that few will ever attempt to eat *Bulgaria inquinans*, *Tremella mesenterica*, and others that are mentioned. The author has gone out of his way in christening many of the species with new-fangled English names, the following of which are a few examples:—'The Sickener,' 'The Sickener's Sister,' 'The Deadly Angel,' 'The Slayer,' 'Hen-of-the-Woods,' &c. Such names as these can serve no earthly purpose, and would have been better left out.

The work is illustrated with the woodcuts from Cooke's 'Handbook,' but their source is not acknowledged, and an analytical key to the Agaricini is included, similar to if not identical with that of Mr. Worthington Smith's. The book is also interleaved with blank pages, for noting localities, &c. Altogether the work should be of service to those for whom it is intended.—H. T. S.

NOTE—ORNITHOLOGY.

Brent Goose at Harrogate.—On March 31st I saw a specimen of the Brent Goose (*Bernicla brenna*) near Harrogate. I was walking with a friend from Birk Crag, when suddenly I saw a large bird come off the reservoir at the bottom of Harlow Moor (it had evidently been frightened by some persons at the top side). Up went my glasses at once, and I had a splendid view, and as if to give me a still better opportunity for identifying it, the bird suddenly came right over our heads and not more than fifteen yards above us, so that we could easily distinguish it with the naked eye. After wheeling about for a short time it disappeared in the direction of Beaver Dyke. Perhaps some reader could explain the reason why a single specimen of this marine species should be found so far inland at so late a date. The weather at the time was certainly very stormy, and an unusual number of Gulls had been observed in the neighbourhood. No doubt the Goose and the Gulls had been driven inland by the stormy winds.—RILEY FORTUNE, Alston House, Harrogate, April 5th, 1887.

BIRD-NOTES FROM HELIGOLAND FOR THE YEAR 1886.

HEINRICH GÄTKE, C.M.Z.S.,

Honorary Member of the British Ornithologists' Union, etc.; Secretary to the Government of Heligoland.

[We have much pleasure in printing this most important contribution to European ornithology. Heligoland is well known to ornithologists as being the most important station in the Western Palæarctic Region for observing the migratory movements of birds, and it has been fully established that the movements recorded for that island are most intimately associated with those observed on our own coasts, and especially so with those of the Northern Counties of England.—EDS.]

1886.

January.

1st. —W., fresh; fog the whole day.

2nd. —W., fresh, misty; evening clear.

3rd. —W.N.W., feeble, clear; afternoon, fog; evening, misty, S.W., somewhat breaking through; night, boisterous, S.

4th. —W., moderate, overcast; early, rain.

Many Larks over the sea, southerly-east. *Larus minutus* daily, very many.

5th. —W., boisterous; snow, hail, rain, squalls, stormy, lightning, thunder!

6th. —N. 1°, pretty boisterous, clear, single clouds from N.; evening, N.E., stiller.

Alauda arvensis and *Otocorys alpestris*, the first pretty many, the latter scattered; *Plectrophanes nivalis*, a few small flights; *Scolopax rusticola*, three or four; *Gallinago caelestis* and *G. gallinula*, a couple; *Larus minutus*, extraordinarily many between both islands.

7th. —Early, still clear; later, W., feeble; evening, still.

Turdus merula, pretty many old cocks with yellow-beaks; *T. pilaris*, some; *Linota cannabina*, a flight of fifteen or twenty; *Linota flavirostris* and *L. linaria*, some; *Plectrophanes nivalis*, some.

8th. —S. by W., stormy, thick; afternoon, snow shower; evening, little stiller 3°.

Nothing; a few *Turdus merula* knocking about in the gardens.

9th. —E., still cloudy, 2°; noon, N.E., boisterous.

Nothing; *Turdus merula* still in the gardens; *Larus glacialis* [*? L. glaucus*], old bird obtained.

10th. —E., feeble, cloudy, 1°.

Few Crows, stragglers; *Alauda arvensis*; *Fringilla montifringilla*, some; *Linota flavirostris*, few; *Turdus merula*, some old males.

JANUARY (*continued*).

11th. —S.S.W., feeble, thick, cloudy, 1°; evening, snow shower.

Few; *Turdus merula* and *T. pilaris*, *Fringilla montifringilla* and *Coccothraustes chloris*.

12th. —E., still, 1°, overcast.

Some *Turdus merula* and *T. pilaris*, eating hawthorn-berries in garden; *Coccothraustes chloris*; one or two *Scolopax rusticula*.

13th. —S.S.W., boisterous, thaw.

Minimum *Strix scandinavica*; nothing else.

14th. —E., feeble, 1°, light, cloudy.

The above knocking about singly; *Coccothraustes chloris*, etc.

15th. —S.W., boisterous, thick; fog at night till early, at 9 o'clock 1°.

16th. —W., violent; early, fog; later on, cloudy; afternoon, clear, cold.

Plectrophanes nivalis, forty or fifty; *Coccothraustes chloris*, twenty or thirty, stragglers.

17th. —S.S.W., stormy; early, snowstorm; during day, thick; evening, clearing up with moon, stiller.

18th. —S., very violent, overcast.

19th. —W. and W.N.; early, a little rain and snow; later on, sunny; evening, S.W., slight.

Sturnus vulgaris, a few; *Turdus pilaris*, ten or twenty; *Alauda arvensis*, some, migrating; *Coccothraustes chloris* and *Parus major*, stragglers.

20th. —E., early, fog; later on, snow and rain, wind fresh.

21st. —E., still, misty, snow.

22nd. —E., still, thick, with snow; afternoon, less.

Very many *Otocorys alpestris* migrating, also *Linota cannabina*.

23rd. —E. and E. by S., fresher, some more frost.

Many *Linota cannabina*, *L. linaria*, *L. flavirostris*; fewer *Coccothraustes chloris*; very many *Carduelis elegans*, *Turdus pilaris*, and *T. merula*; few winter visitants.

24th. —E. by S., moderate, 2°, clear, fine.

25th. —S.E., fresh; early and night, sharp frost, 3° and more; noon, sudden thaw with damp coming down.

26th and 27th. —S.E., feeble till early, misty, fog, thaw.

28th and 29th. —S.W., feeble, thick.

Very many *Anthus obscurus*; few *Turdus pilaris* and *T. merula*.

30th. —S.W., fresh, rain; afternoon, clear.

Many *Anthus obscurus*.

31st. —S.S.W.—S., stormy, rain showers, snow.

Alauda arvensis, pretty many, S.—N.

February.

1st. —S.W., stormy; the whole night stormy, snow and hail, squalls.

Nothing.

2nd., 3rd., and 4th. —Shifting wind, feeble, snow.

5th. —Shifting wind; forenoon, snow, fog.

6th. —Clear, 3°; S.E. and E.S.E., feeble.

Nothing; night, three or four single Larks; *Turdus merula*, *T. pilaris*, stragglers.

7th. —2°.

Turdus merula, old, *Alauda arvensis*, N.E., both few.
Turdus merula during night.

8th. —S.E.—S.W., feeble.

Turdus merula, pretty many, old; *Fringilla montifringilla*, *Linota cannabina*, and *L. flavirostris*, pretty many.

9th. —S.S.W., still, 2°.

10th. —S.E., feeble, clear and fog interchanging; night, strong hoar-frost, 1 to 2°.

11th. —S.E., thick fog, hoar-frost.

12th. —Still shifting, 2°.

Many Larks on cliff.

13th. —S.S.E., fresh, 2°.

Many Larks, and 50 or 60 Starlings. The latter giving cause to believe that migration has already commenced.

14th. —S. and S. by W., feeble, thick, 1°.

15th. —S.E., feeble, thick, overcast.

Sturnus vulgaris, early, hundreds on the move; *Alauda arvensis* early, thousands migrating, W.—E., also during night.

16th. —Fog, 3°, S.E., moderate.

17th. —E.S.E., feeble, until 27th, E., moderate and slight, 1 to 3°, thick, overcast.

23rd, 24th, and 25th.

Many Larks, hundreds of thousands eastwards overhead and over sea. The last day by evening many returning westward. On the 27th one *Pratincola rubicola*.

28th. —E. and S.E., very violent, clear, 5°.

Nothing.

March.

1st. —E. and S.S.E., stormy, clear; early, 7° in evening; night very stormy.

2nd.—S.E., very stormy, force 9; early, clear; 11 a.m., thick, with snow, 8°; afternoon, snow shower; evening, still.

3rd. —E.N.E.; early, still, thick, 5°.

Erithacus rubecula, one with the fowls, many fights; *Fuligula marila*; single *F. ferina*; *Mergus serrator*; and *Cygnus musicus*.

4th. —N.N.W.—W.N., fresh, cloudy, thaw.

MARCH (*continued*).

- 5th. —N.N.W., feeble, clear, early ; later, the whole day still, quite clear, sunny, warm, but frost in shade.
Twenty-two Geese (*Anser segetum*) overhead.
- 6th. —E., still ; night and early, 2° ; afternoon, S.W., feeble, quite clear ; late afternoon, thick, some snow, above zero ; evening, clear.
Tinnunculus alaudarius, three ; *Corvus frugilegus*, fifteen or twenty ; *Alauda arvensis*, few ; *Anthus pratensis*, pretty many.
- 7th. —N.N.W., feeble, clear.
- 8th. —E., still, clear, fine, 2° ; afternoon, one hour fog.
A few *Corvus cornix* and *C. frugilegus*.
- 9th. —Still, clear, thick hoar-frost, 2° ; in night, 4°.
Alauda arvensis during night, very many, migrating low in spite of atmosphere being particularly clear with stars ; some at lighthouse ; *Vanellus vulgaris*, some.
- 10th. —S.E., feeble, overcast, 2° ; misty ; afternoon and evening, quite clear, E.
Nothing.
- 11th. —E., feeble, thick, overcast, 2° to 3° ; fog from 9 a.m. until 3 p.m., then overcast ; evening, clear.
- 12th. —E. and S.E., feeble, thick, 2° to 3° ; afternoon, sun, clear.
- 13th. —E., feeble, cloudy and sunny ; in night, little frost, 1°.
Sturnus vulgaris, some ; *Anthus obscurus*, tolerable.
- 14th. —E. and E. by N., still ; in course of day above zero, clouds and sunshine.
- 15th. —E. by N., fresh ; night, frost ; during day, little above zero.
- 16th. —E. by N., pretty violent ; night and early, pretty much snow, slight thaw ; evening, below zero.
- 17th. —E. and E. by S., 1° to 2°, wind fresh, overcast.
- 18th. —S.E., fresh ; night, 1° to 2° ; cloudy and sunny.
- 19th. —S.E., light, 3° to 4°, misty.
Corvus frugilegus, a fair number ; *C. cornix*, few ; *Sturnus vulgaris*, few ; *Alauda arvensis*, very many, but squatting here and meagre ; *Turdus viscivorus*, extraordinarily plentiful migration over the sea ; *Plectrophanes nivalis*, pretty fair, old birds.
- 20th. —S.S.E., feeble ; evening, W. by S. ; misty, 3° ; forenoon, mild, feeble, fine rain, thaw ; evening, fog.
Enormous migrations. *Falco æsalon*, some ; *Tinnunculus alaudarius*, some ; *Corvus frugilegus*, thousands ; *C. cornix*, fewer ; *Sturnus vulgaris* ; *Alauda arvensis* ; *Anthus pratensis* ; *Turdus merula*, few ; *T. musicus* and *T. iliacus*, some ; *Alauda arvensis*, hundreds of thousands ; *Otocorys alpestris*, some ; *Alauda arborea*, a few ; *Anthus*

MARCH (*continued*).

pratensis, very many; *A. obscurus*, fewer; *Linota cannabina*, several flights; *Charadrius pluvialis*, *Vanellus vulgaris*, and *Ægialitis hiaticula*, all very many; *Tringa alpina*, few; *Gallinago coelestis*, several; *Columba palumbus*, some. Extraordinarily strong migration over sea.

21st. —S.W., quite still; fog all night and day.

Alauda arvensis and *Charadrius pluvialis* migrating over fog, voices sounding down; *Corvus monedula* about thirty or forty. Evening from 9 o'clock very much migration over fog; Larks and *Ægialitis hiaticula*, *Charadrius pluvialis*, and *Vanellus vulgaris*; Larks caught at lighthouse.

22nd.—S., still, warm; fog very thick, whole night without interruption until afternoon at 3 o'clock, then very misty.

Corvus frugilegus, very many; *C. monedula*, fewer; *C. cornix*, none; *Sturnus vulgaris*, millions; *Turdus merula*, few; *Alauda arvensis*, many; *A. arborea*, some; *Anthus pratensis* and *A. obscurus*; *Linota cannabina*, many; *L. flavirostris*, some; *Coccothraustes chloris*, some; *Emberiza citrinella*, one fine male; *Charadrius pluvialis*, thousands; *Vanellus vulgaris*, also many; *Ægialitis hiaticula*, pretty many; *Scolopax rusticula*, one, not shot; *Tringa islandica*, some; *T. alpina*, several. From morning till evening abundant migration; *Numenius arquata*, some; one *Scolopax rusticula*.

23rd. —S.E., fresh; early, fog; afternoon, fog.

Corvus frugilegus, pretty many; *C. cornix*, few; *C. monedula*, some; *Sturnus vulgaris*, many; *Turdus merula* and *T. musicus*, some; *T. viscivorus*, one; *Motacilla lugubris* (?), two; *Anthus pratensis* and *A. obscurus*, not many; *Alauda arvensis*, very many; *Fringilla coelebs* (male) and *Linota cannabina*, pretty many; *Coccothraustes chloris*, *Plectrophanes nivalis*, and *Emberiza citrinella*, some; *Fringilla montana* [*Passer montanus*], twenty or thirty; *Charadrius pluvialis* and *Vanellus vulgaris*, many, also during night; *Ægialitis hiaticula*, some.

24th. —S.S.E.—E.S.E., fog; from 6 till 11 a.m. quite still; clear, warm, sunny.

Tinnunculus alaudarius and *Buteo*, one each; *Corvus frugilegus*, great masses about dawn; *C. cornix*, few; *Sturnus* in small flights; *Turdus merula* and *T. musicus*,

MARCH (*continued*).

scattered; *T. viscivorus*, one; *Erithacus rubecula*, some; *Motacilla lugubris*, some; *M. alba*, several; *Turdus pilaris*, some; *Anthus pratensis*, many; *A. obscurus*, pretty many; *Alauda arvensis*, pretty considerable migration; *Otocorys alpestris*, some; *Alauda arborea*, a couple; *Fringilla cœlebs*, *Linota cannabina*, pretty many; *Linota flavirostris*, a little flight; *Fringilla montana* [*? Passer montanus*]; *Scolopax rusticula*, shot; *Charadrius pluvialis*, *Vanellus vulgaris*, and *Ægialitis hiaticula*, pretty many, during night very many; also *Columba palumbus*, two or three.

25th.—S., feeble, clear, fine; night, hoar-frost and frost, light clouds from S.S.W.; evening, at nine, fog.

Falco æsalon and *Tinnunculus alaudarius*, some; *Corvus frugilegus*, *C. cornix*, *C. monedula*, extraordinarily many, millions, from early morning till evening, in such masses as it was impossible to estimate their numbers, and all round the islands as far as the telescope could range; *Sturnus vulgaris*, also very many; *Turdus merula*, *T. musicus*, and *T. iliacus*, pretty many; *Turdus viscivorus*, some; *Erithacus rubecula*, pretty many; *Accentor modularis*, very many; *Troglodytes parvulus*, very many; *Ruticilla titys*, a few fine males; *Motacilla alba*, very many; *Saxicola œnanthe*, some; *Anthus pratensis*, many; *A. obscurus*, fewer; *Alauda arvensis*, few; *Otocorys alpestris*, some flights; *Emberiza citrinella*, several; *Fringilla cœlebs*, *Linota cannabina* and *L. flavirostris*, tolerable; *Fringilla montifringilla*, some; *Charadrius pluvialis*, *Vanellus vulgaris*, and *Ægialitis hiaticula*, many; *Scolopax rusticula*, one; *Gallinago cœlestis*, one; *Columba palumbus*, some; *Anser* and *Anas*, very many migrating; *Regulus*, some.

26th.—S., still, fog; also all night; 9 a.m., thick, with rain; fog until 3 p.m.

Corvus frugilegus and *C. cornix*, but few on account of fog; *Turdus merula* and *T. musicus* tolerable, came down as it cleared up a little at 11 a.m.

27th.—S.W., fresh, thick, rain; evening, violent, chasing fog clouds.

Turdus merula and *T. musicus*, singly; *Erithacus rubecula*, *Accentor modularis*, *Motacilla*, *Anthus*, *Parus œeruleus*, one; a few *Scolopax rusticula*; *Columba œnas*, one. No migration at all.

MARCH (*continued*).

28th.—W., fresh; early, clear; 7 a.m., fog; 10 a.m., clear; whole day fog.

No migration. *Corvus cornix*, early, during one hour, pretty many overhead; *Turdus iliacus*, some; *Regulus cristatus*, some; *Fringilla cœlebs* and *F. montifringilla*, pretty many; *Rallus aquaticus*, one; *Scolopax rusticula* and *Gallinago cœlestis*, some; *Numenius arquata*, a few.

29th.—S.W., still, thick fog; 10.30. fog, frost, overcast, wind fresh.

Tinnunculus alaudarius, some; *Corvus cornix*, some flights; *Sturnus vulgaris*, pretty many; *Turdus merula* and *T. musicus*, some; *T. iliacus*, fewer; *Erithacus rubecula* and *Ruticilla titys*, some; *Sylvia rufa*, one; *Regulus cristatus*, some; *Pratincola rubecula*, one; *Troglodytes parvulus*, pretty many; *Accentor modularis*, some; *Emberiza citrinella*, one; *Fringilla cœlebs*, many; some *F. montifringilla*; *Anthus pratensis*, tolerable; *A. obscurus*, few; *Motacilla alba*, some; *Charadrius pluvialis*, *Vanellus vulgaris*, and *Ægialitis hiaticula*, few; *Tringa alpina*, some; *Scolopax rusticula*, some; *Fringilla montana* [*? Passer montanus*], still there.

30th.—W. by S., violent, clear; over-night very violent, with rain.

Falco peregrinus, one; *F. æsalon* and *Tinnunculus alaudarius*, some; *Corvus cornix* and *C. frugilegus*, not many; *Sturnus vulgaris*, a flight of fifty or sixty; *Turdus merula*, pretty many; *Erithacus rubecula* and *Accentor modularis*, some; *Regulus cristatus*, some; *Saxicola œnanthe*, males, few; *Motacilla alba* and *Ruticilla titys*, few; *Fringilla cœlebs*, many half-fine males; *F. montifringilla*, fewer; *Linota cannabina*, a few flights; *L. flavirostris*, a couple; *Fringilla montana* [*? Passer montanus*], still there, thirty or forty; *Scolopax rusticula*, ten shot; *Gallinago cœlestris*, some; *Vanellus vulgaris*, a couple.

31st.—S.W., very violent in night, stormy, with rain, thick; evening, better, clearer.

Nothing. *Tinnunculus alaudarius*, one; *Corvus*, none; *Sturnus*, none; *Columba palumbus*, one; *Scolopax rusticula*, a couple; *Tringa alpina*, some; *Podiceps minor*, one.

April.

1st.—W., violent, clear, cold.

Almost no migration whatever.

2nd.—S., very fresh, clear, cold.

Very little migration. *Falco peregrinus*, *F. æsalon*, and *Tinnunculus alaudarius*, few; *Corvus cornix*, some;

APRIL (*continued*).

Sturnus vulgaris, a few small flights; *Parus caudatus*?; *Turdus torquatus*, *T. merula*, *T. musicus*, and *T. iliacus*, very few; *Erithacus rubecula*, some; *Ruticilla titys*, some; *Saxicola œnanthe*, *Accentor modularis*, both few; *Regulus cristatus*, *Alauda arvensis*, *Fringilla œlebs*, and *Linota cannabina*, few; *L. flavirostris*, few; *Scolopax rusticula*, four or five shot; *Columba palumbus*, six or eight.

3rd.—S.—S.W., violent, fresh, clear; later, misty, W.; evening, stiller, fog.

Corvus cornix, pretty many; also *C. frugilegus*; *Sturnus vulgaris*, very many; *Turdus torquatus*, some; *T. musicus*, tolerable; *T. merula*, few; *Erithacus rubecula*, some; *Accentor modularis* and *Saxicola œnanthe*, tolerable; *Motacilla alba*, in masses; *M. flava*, some; *Anthus* not many; *Otocorys alpestris*, flight of twenty; *Emberiza citrinella* and *E. schœniclus*, some; *Fringilla œlebs* and *F. montifringilla*, few; *Linota cannabina* and *L. flavirostris* many; *Upupa epops*, several, also day before; *Columba palumbus*, ten to fifteen; *Scolopax rusticula*, none; *Totanus calidris* and *Tringa alpina* over-wintered; *Parus major* gone.

4th.—S.W., fresh, clear; night, heavy dew.

Almost no migration whatever. *Asio otus*, one; *Corvus cornix*, late afternoon, a few flights eastwards; *Parus cœruleus*, some; *Certhia familiaris*, one; *Otocorys alpestris*, *Motacilla*, etc., scattered.

5th.—S.W., fresh, clear; later, thick.

Nothing. A few *Parus cœruleus*; *Ruticilla phœnicurus*, one male; *Linota linaria*, one; *Carduelis elegans*, *Motacilla alba*, *M. flava*, and *Sylvia rufa*, one.

6th.—S.W., windy, fog.

During night much migration. *Turdus torquatus*, *Charadrius*, etc.; *Emberiza*, *Turdus merula*, and *T. iliacus*; a few *Vanellus vulgaris*.

7th.—W.N.W., fresh, clear, cold.

Nothing. *Hæmatopus ostralegus*, one, very fine, shot.

8th.—S.; night, stormy; early, thick, with rain; later, S.W.; evening, more S., with falling barometer.

Falco peregrinus, one; *Corvus cornix* and *C. monedula*, few; *Sturnus vulgaris*, few; *Turdus torquatus* and *T. musicus*, some; *Vanellus vulgaris*, pretty many; *Numenius arquata*, pretty many; *Scolopax rusticula*, one; *Columba*

APRIL (*continued*).

palumbus, some. Altogether almost no migration. During night, *Hæmatopus ostralegus*, *Vanellus vulgaris*, and *Numenius*; much migration.

9th. —W.S.W., fresh, clear, with showers, cold; afternoon, hail squalls.

Almost no migration at all. *Corvus cornix*, some flights; *Turdus torquatus* and *T. musicus*, quite singly; *Turdus pilaris*, also very few; *Ægialitis hiaticula*, one or two.

10th. —Early, W., still, clear, cool; afternoon, S.E., feeble, clear.

Falco æsalon, some; *Corvus cornix*, many migrating all day; *Sturnus vulgaris*, one small flight; *Turdus torquatus*, *T. iliacus*, and *T. pilaris*, some; *Otocorys alpestris*, tolerable overhead; *Motacilla alba*, several; *M. lugubris*, one; *Emberiza miliaria*, one; *Anthus*, few; *Scolopax rusticola*, some; *Gallinago cælestis*, some; *Columba palumbus*, two. Altogether almost no migration whatever.

11th. —E.N.E., fresh, feeble, overcast; later, N.N.E., fresh, rain.

Falco æsalon, some; *Tinnunculus alaudarius*, some; *Corvus* and *Sturnus vulgaris*, singly, stragglers; *Turdus torquatus* and *T. musicus*, very many; *T. pilaris*, fewer; *T. viscivorus*, some; *Erithacus rubecula*, *Phylloscopus trochilus*, and *Troglodytes parvulus*, pretty many; *Accentor modularis*, several; *Motacilla alba*, tolerable; *M. lugubris*, some; *Anthus*, few; *A. trivialis*, some; *Saxicola ænanthe*, pretty many, females; *Scolopax*, none at all; *Columba palumbus*, pretty many; *Cyanecula suecica* and *Daulius lusciniæ*. At night much migration of *Turdus torquatus* and *T. musicus*, *Charadrius pluvialis*, and *Numenius arquata*.

12th. —W.N.W., feeble, clear; afternoon, fog, cold, 1°.

Almost no migration whatever.

13th. —S.S.W., still, clear, cold, little above zero.

Falco æsalon and *Tinnunculus alaudarius*, some; *Corvus cornix*, tolerable; *Turdus merula*, *T. torquatus*, *T. musicus*, and *T. pilaris*, moderate; *T. viscivorus*, some; *Motacilla alba*, *Anthus pratensis*, *A. obscurus*, *Linota cannabina*, *Coccothraustes chloris*, *Saxicola*, *Vanellus vulgaris*, *Numenius arquata*, *Totanus ochropus*. Migration but slight.

14th. —N.W., cold.

Migration slight. *Corvus cornix*, *Turdus torquatus*, *T. musicus*, *T. pilaris*, *Motacilla alba*, *Anthus pratensis*,

APRIL (*continued*).

Alauda arvensis, *Otocorys alpestris*, *Saxicola œnanthe*, *Emberiza citrinella*, *Linota cannabina*, and some *Fringilla montifringilla*; *Crex pratensis*, some; *Scolopax rusticula*, ten or twelve caught.

15th.—N.N.W., windy, cold, overcast.

Tinnunculus alaudarius, some; few Thrushes; *Ruticilla phœnicurus*, two or three; *Saxicola*; *Motacilla lugubris*, one; *Alauda arvensis*, tolerable; *Otocorys alpestris*, twenty or thirty; two or three *Scolopax rusticula*; *Ardea cinerea*, one; *Upupa epops*, two.

16th.—N.N.E., fresh, cold.

Almost no migration whatever. *Phylloscopus trochilus*, *Ruticilla phœnicurus*, and *Motacilla alba*, few; *Saxicola*, scattered; *Alauda arvensis*, slight; *Otocorys alpestris*, tolerable, about fifty.

17th.—E.S.E., slight, sunny, warm; night, thunderstorm.

Falco æsalon, some; *Tinnunculus alaudarius*, several; *Saxicola*, *Alauda arvensis*, and *Otocorys alpestris*, tolerable; *Motacilla alba*, few; *Anthus pratensis*, tolerable; *Linota cannabina*, many; *Gallinago cœlestis*, a couple. On account of thunder-stormy atmosphere, little migration.

18th.—E., still, clouds from S.S.E.; afternoon, thunder-clouds, distant thunder; evening, rain.

Falco æsalon and *Tinnunculus alaudarius*, some; *Turdus torquatus* and *T. musicus*, few; *Motacilla flava*, some; *M. alba*, several; *Saxicola*, tolerable; *Otocorys alpestris*, fifteen or twenty; *Coccothraustes chloris*, tolerable; *Emberiza citrinella*, a couple; *Charadrius pluvialis*, some; *Totanus calidris* and *T. ochropus*, some. On account of thunder-stormy clouds, slight migration.

19th.—E., fresh, clear, cool, high clouds, S.E.

Pandion haliaetus, one; *Falco æsalon* and *Tinnunculus alaudarius*, pretty many; *Corvus cornix*, *C. frugilegus*, and *C. monedula*, strong migration; *Turdus merula*, *T. torquatus*, *T. musicus*, and *T. pilaris*, all pretty many; *Phylloscopus trochilus*, scattered; *Ruticilla phœnicurus*, several; *Accentor modularis*, pretty many; *Erithacus rubecula*, many; *Motacilla alba* and *M. flava*, many; *Otocorys alpestris*, fifty or sixty; *Fringilla cœlebs*, *Linota cannabina*, many; *Fringilla montifringilla*, few; *Anthus pratensis*, many; *Totanus calidris*, *Charadrius pluvialis*,

APRIL (*continued*).

Vanellus vulgaris, scattered; two or three *Scolopax rusticula*.

20th. —E., fresh, cold.

Pandion haliaetus, one; *Falco æsalon* and *Tinnunculus alaudarius*, several females; *Turdus*, *Saxicola*, *Anthus*, *Motacilla alba*, *Fringilla cælebs* and *F. montifringilla*, few each; *Scolopax rusticula*, two shot; *Gallinago cælestis*, two shot. Very slight migration.

21st. —E., early, fresh, cold, fine rain; evening, S., slight fog, warmer.

The above, but singly. *Lomvia troile* arrived on hatch-ledges in cliff; left again in afternoon. Fog during day hindering migration; during night very much migration at lighthouse, above fog.

22nd.—S., slight, later S.S.E., cloudy, cold.

Falco æsalon, some few; *Corvus cornix* and *C. monedula*, strong migration; *Turdus torquatus*, *T. musicus*, and *T. pilaris*, pretty many; *Phylloscopus trochilus*, *Erithacus rubecula*, and *Ruticilla phænicurus*, males, pretty many; *Motacilla alba* and *Anthus pratensis*, many; *A. trivialis*, fewer; *Fringilla cælebs*, *F. montifringilla*, and *Coccothraustes chloris*, many; *Columba palumbus*, some; *Ciconia alba*, one; *Hæmatopus ostralegus*, several; *Numenius arquata*, several; one *Scolopax rusticula* caught; *Lomvia troile* about daytime, on cliffs.

23rd. —E., slight, clear, cold.

Falco peregrinus, a couple; *F. æsalon* and *Tinnunculus alaudarius*, several; *Accipiter nisus*, some; *Turdus musicus*, *T. torquatus*, and *T. pilaris*, early, many; *Anthus trivialis*, several; *A. pratensis*, many; *Motacilla alba* and *M. flava*, many; *Phylloscopus trochilus*, *Erithacus rubecula*, and *Ruticilla phænicurus*, tolerable; *Emberiza citrinella*, some; *Fringilla cælebs*, *F. montifringilla*, and *Coccothraustes chloris*, pretty many; *Otocorys alpestris*, pretty many; *Regulus cristatus*, some; *Troglodytes parvulus*, scattered; *Charadrius pluvialis* and *Ægialitis hiaticula*, scattered; *Numenius*, pretty many; *Columba palumbus*, *Totanus glottis*, *T. calidris*, and *T. glareola*, some; *Hæmatopus ostralegus*, *Scolopax rusticula*, and *Gallinago cælestis*, few.

24th. —N.N.E., slight, clear, cold.

Slight migration. *Falco æsalon*, *Tinnunculus alaudarius*, Thrushes, *Sylvia ficedula*, *Motacilla alba*, and *M. flava*,

APRIL (*continued*).

few; *Anthus pratensis*, very many; *Otocorys alpestris*, many; *Fringilla*, few; *Crex pratensis*, some; *Scolopax rusticula*, four or five caught; *Hirundo rustica*, about twenty.

25th. —N., fresh, clear, cold.

Almost no migration whatever. Thrushes, Pipits, Wagtails, and Chaffinches, scattered.

26th. —N. and N.N.E., slight, light, overcast, cool.

Almost no migration whatever. Above very singly. *Erithacus rubecula*, few.

27th. —E.N.E., slight, light, overcast, cold.

Falco peregrinus, *F. æsalon*, and *Accipiter nisus*, some; *Corvus cornix*, pretty many; *Turdus musicus*, few, early and forenoon; *Erithacus rubecula* and *Phylloscopus trochilus*, scattered; *Motacilla alba*, few; *M. flava*, several; *Anthus pratensis*, *Otocorys alpestris*, *Fringilla cœlebs*, *Linota cannabina*, *L. flavirostris*, and *Coccothraustes chloris*, pretty many; *Fringilla montifringilla*, fewer. The whole month but few; *Emberiza hortulana*, the first appearance; *Muscicapa atricapilla*, male, the first; *Hirundo rustica*, pretty many; *Charadrius pluvialis* and *Squatarola helvetica*, some; *Scolopax rusticula* and *Totanus calidris*, very few; *T. ochropus*, some.

28th. —Early, N.W., quite still, clear; forenoon, warmer; afternoon, W., windy, cold.

Early and forenoon pretty strong migration. *Falco æsalon*, *Accipiter nisus*, *Corvus cornix*, *C. monedula*, *Turdus torquatus*, *T. musicus*, *Phylloscopus trochilus*, *Sylvia curruca*, *S. cinerea*, *Saxicola œnanthe*, *Pratincola rubetra*, *Anthus trivialis*, *A. pratensis*, *Motacilla alba*, *M. flava*, *Otocorys alpestris*, *Emberiza hortulana* (male), *E. miliaria*, *Coccothraustes chloris*, *Carduelis elegans*, *Hirundo rustica*, *Columba palumbus*, *Charadrius pluvialis*, *Ægialitis hiaticula*, *Vanellus vulgaris*, *Hæmatopus ostralegus*, *Totanus calidris*, *T. ochropus*, *Gallinula cœlestis*, and *Numenius*.

29th. —N.N.E., very fresh, very cold, high clouds from W., lower clouds from N.E.

Almost no migration. Some *Falco æsalon*, *Turdus musicus*, *Phylloscopus trochilus*, *Anthus pratensis*, *Saxicola*, and *Hirundo rustica*.

30th. —E.N.E., still, clear, warmer.

Little migration, as day before.

May.

1st.—N.W., violent, cloudy, cold.

Almost no migration. *Corvus cornix*, *Turdus musicus*, *Motacilla flava*, *Saxicola œnanthe*, *Pratincola rubetra*, *Ruticilla phœnicurus*, *Anthus pratensis*, *A. trivialis*; *Yunx torquilla*, two or three; two or three *Scolopax rusticula* and *Gallinago*; all very scattered.

2nd.—N.E., violent, cold, overcast; evening, stiller.

Falco peregrinus, *F. æsalon*, few Thrushes, *Motacilla flava*, *Saxicola œnanthe*, a few *Scolopax rusticula*. Almost no migration whatever.

3rd.—N.E., slight, clear, fine; cirri, E., middle high, scattered, clouds slow, W.

Falco peregrinus and *F. æsalon*, females, some; *Tinnunculus alaudarius* and *Accipiter nisus*, several; *Corvus cornix*, *C. frugilegus*, *C. monedula*, and *Turdus torquatus*, pretty many; *T. musicus*, fewer; *Phylloscopus trochilus* and *Ruticilla phœnicurus*, pretty many; *Sylvia cinerea*, fewer; *Accentor modularis*, tolerable; *Motacilla alba*, few; *M. flava*, *Anthus trivialis*, and *A. pratensis*, many; *Otocorys alpestris*, still pretty many, sixty or eighty; *Plectrophanes lapponica*, one or two; *Linota cannabina*, tolerable; *Carduelis elegans* and *Charadrius pluvialis*, some; *Numenius arquata*, many.

4th.—Still, clear, fine; night, hoar-frost; cirri, slow, N.E., single lower clouds, slow, W.

Early, little migration on account of hoar-frost; later in morning and forenoon, very lively. *Falco peregrinus*, two or three; *F. æsalon* (female) and *Tinnunculus alaudarius*, several; *Corvus cornix*, *C. frugilegus*, and *C. monedula*, lively migration; *Turdus musicus*, pretty many; *T. torquatus*, fewer; *Muscicapa atricapilla*, males, many; *Phylloscopus trochilus*, *Erithacus rubecula*, *Ruticilla phœnicurus*, *Accentor modularis*, *Saxicola œnanthe*, *Pratincola rubetra*, *Motacilla flava*, and *Alauda arborea*, some; *Otocorys alpestris*, still many; *Emberiza citrinella*, some; *E. hortulana*, *Yunx torquilla*, *Linota cannabina*, and *Coccothraustes chloris*, many; *Carduelis elegans*, some; *Columba palumbus*, about ten; *Numenius phæopus*, many, thirty-two in one chain; *Charadrius pluvialis*, some; *Ægialitis hiaticula* and *Hæmatopus ostralegus*, many; *Totanus calidris*, often; over-night much migration of *Numenius*, *Totanus*, *Hæmatopus*, *Charadrius*, etc.

MAY (continued).

5th. — Still, clear, fine, early heavy dew; afternoon, N.N.E., cool.

Falco peregrinus and *F. æsalon*, some; *Tinnunculus alaudarius* and *Accipiter nisus*, several; *Corvus cornix*, *C. frugilegus*, and *C. monedula*, many; *Turdus musicus*, pretty many; *T. torquatus* and *T. viscivorus*, some; *T. pilaris*, a few flights; *Muscicapa atricapilla*, male; *Ruticilla phœnicurus*, many; *Phylloscopus trochilus* and *Sylvia cinerea*, few; *Acrocephalus phragmitis*, some; *Motacilla alba*, few; *M. flava*, many; *Anthus trivialis* and *A. pratensis*, pretty many; *Otocorys alpestris*, several flights of fifteen or twenty; *Emberiza hortulana* and *E. schœniclus*; *Columba palumbus*, fifteen or twenty; *Totanus glottis*, *T. calidris*, *T. ochropus*, and *T. hypoleucus*, *Numenius phæopus*, *Scolopax rusticola*, two or three; *Saxicola œnanthe* and *Pratincola rubetra*.

6th. — N.E., still, clear, warm.

Strong migration. *Pandion haliaëtus*, *Falco peregrinus*, *F. æsalon*, *Tinnunculus alaudarius*, *Accipiter nisus*, *Corvus cornix*, *C. frugilegus*, *C. monedula*, *Turdus musicus*, *T. torquatus*, *T. pilaris*, *Muscicapa atricapilla*—a half of them females, *Phylloscopus trochilus*, *Ruticilla phœnicurus*, *Sylvia cinerea*, *S. atricapilla*, *Acrocephalus phragmitis*, *Locustella nævia*, *Saxicola œnanthe*, mostly females; *Pratincola rubetra*, *Motacilla alba*, some; *M. flava*, many; *Anthus trivialis*, many; *A. pratensis*, some; *Otocorys alpestris*, many flights overhead; *Emberiza hortulana*, *E. citrinella*, *E. schœniclus*, *Carduelis elegans*, some; *Hirundo rustica*, *Chelidon urbica*, *Columba palumbus*, pretty many; *Totanus calidris* and *T. hypoleucus*.

7th. — N., still, misty, overcast, clouds, E.N.E.

Strong migration. *Pandion haliaëtus*, *Falco peregrinus*, *F. æsalon*, *Tinnunculus alaudarius*, *Accipiter nisus*, *Turdus musicus*, *T. torquatus*, *T. pilaris*, *Muscicapa atricapilla*, many females; *Phylloscopus trochilus*, *Sylvia cinerea*, *S. hortensis*, *Ruticilla phœnicurus*, many females; *Acrocephalus phragmitis*, *A. palustris*, *Cyanecula suecica*, *Saxicola œnanthe*, *Pratincola rubetra*, the latter many; *Motacilla alba*, some; also *M. flava*, *Anthus trivialis*, many; *A. pratensis*, fewer; *Otocorys alpestris*, many overhead; *Emberiza hortulana*, *E. citrinella*, many; *Carduelis elegans*, several; *Troglodytes parvulus*, *Yunx torquilla*, *Hirundo rustica*, and *Chelidon urbica*, many; *Columba*

MAY (*continued*).

palumbus, up to twenty; *Turtur communis*, some; *Crex pratensis*, pretty many; *Totanus glottis*, *T. calidris*, *T. ochropus*, *T. glareola*, *T. hypoleucus*, *Numenius*, *Hæmatopus*, *Tringa*, etc. *Passer pusillus* Pall.

8th.—S., still, clear, warm, light high clouds from W.; evening, N., cold, 6° to 8°, fog.

Early and forenoon, very much migration, stronger than day before. Falcons, Thrushes, Pipits, *Cyanecula suecica*, *Sylvia hortensis*, *Acrocephalus palustris*, *A. phragmitis*, *Phylloscopus trochilus*, *P. sibilatrix*, *Muscicapa atricapilla*, many, mostly female; *Saxicola œnanthe*, fewer; *Pratincola rubetra*, many; *Otocorys alpestris*, still tolerably many; *Emberiza hortulana*, many; *E. citrinella* and *E. schœnicus*, some; *Yunx torquilla*, *Hirundo rustica*, *Chelidon urbica*, and *Crex pratensis*, pretty many; *Turtur communis*, four; *Totanus calidris*, *T. ochropus*, *T. glareola*, *T. hypoleucus*, *Ægialitis cantiana*, *Hæmatopus*.

9th.—N.N.W., fresh, clear, cold.

No migration. Scattered Thrushes, Pipits, *Saxicola œnanthe*, *Pratincola rubetra*, and *Otocorys alpestris*.

10th.—N.N.W., fresh, light, clouds, cold.

Almost no migration whatever. Some Falcons, Wag-tails, and Pipits.

11th.—N., violent, very cold, high clouds, W., lower, N.

No migration. Some small Falcons, Wagtails (*M. alba* and *M. flava*), *Anthus pratensis*, and *Pratincola rubetra*.

13th.—E.S.E., fresh, thick, clouds, S.; noon, rain.

Strong migration. *Pandion haliaëtus*, *Accipiter nisus*, *Falco subbuteo*, *Corvus cornix*, and *C. monedula*, tolerable; *Turdus musicus*, *T. torquatus*, and *T. pilaris*, many; *Muscicapa atricapilla* (female), *M. grisola*, *Sylvia hypolais*, *Phylloscopus trochilus*, *P. sibilatrix*, *Cyanecula suecica*, *Sylvia cinerea*, *S. hortensis*, *Erithacus rubecula*, *Phœnicurus rutililla*, and *Acrocephalus phragmitis*, all very many; *Saxicola œnanthe*, fewer; *Pratincola rubetra* and *Motacilla flava*, very many; *Otocorys alpestris*, also still many; *Alauda arborea*, many; *Emberiza hortulana*, many; *Yunx torquilla*, pretty many; *Caprimulgus europæus*, several; *Hirundo rustica* and *Chelidon urbica*, many; *Cypselus apus*, many; *Crex pratensis*, pretty many; *Endromias morinellus*, ten to fifteen; *Columba palumbus*,

May (continued).

several; *Turtur communis*, some; *Squatarola helvetica*, some; *Totanus glottis*, *T. ochropus*, and *Scolopax rusticula*, ten or twelve; *Ægialitis hiaticula*.

14th. —S. W., slight, warm, single clouds.

Very strong migration during early and forenoon hours. *Falco peregrinus*, *F. æsalon*, *Tinnunculus alaudarius*, *Accipiter nisus*, *Turdus musicus*, *T. pilaris*, *Muscicapa grisola*, *M. atricapilla*, *Cyanecula suecica*, *Ruticilla phoenicurus* (female), *Sylvia cinerea*, *S. hortensis*, *Phylloscopus trochilus*, *P. sibilatrix*, *Sylvia ficedula*, *Acrocephalus phragmitis*, *A. palustris*, *Motacilla flava*, *Anthus trivialis*, *Emberiza hortulana*, *Carduelis elegans*, *Hirundo rustica*, *Chelidon urbica*, *Cotile riparia*, *Cypselus apus*, *Columba palumbus*, *C. œnas*, *Turtur communis* (the latter pretty many), *Ægialitis hiaticula*, *Tringa alpina*, *Totanus calidris*, and *T. hypoleucus*.

15th. —W., violent, rain squalls, very cold.

No migration. Some *Saxicola œnanthe*, *Pratincola rubetra*, and Yellow Wagtails.

16th. —N. W., stormy, rain squalls, cold.

No migration. As above; a few *Anthus trivialis* and Snipes.

17th. —W., overcast; afternoon, rain, stiller, and warmer.

Little migration. *Pandion haliaetus*, *Falco æsalon*, *Tinnunculus alaudarius* (single female), and *Turdus torquatus*, some; *Sylvia cinerea*, some; *Pratincola rubetra*, some; *Saxicola œnanthe*, few; *Motacilla flava*, pretty many; *Anthus trivialis*, some; *A. pratensis*, somewhat more; *Hirundo rustica*, not many; *Totanus glottis*, two; *T. glareola*, several; *Ægialitis cantiana*, a couple; *Hematopus ostralegus*, several.

18th. —S. W., fresh, overcast, rain.

Very little migration. *Tinnunculus alaudarius* and *Accipiter nisus*, some; *Ruticilla phoenicurus*, *Sylvia cinerea*, *Acrocephalus phragmitis*, *Pratincola rubetra*, *Otocorys alpestris* yet about, twenty or thirty, late; *Emberiza hortulana*, several; *Motacilla flava*, pretty many; *Turtur communis* and *Crex pratensis*, some.

19th. —S., slight.

Much migration. *Tinnunculus alaudarius*, *Accipiter nisus*, *Falco subbuteo*, one; *Corvus cornix* and *C. monedula*, still pretty many; *Lanius collurio*, a couple; *Phylloscopus*

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- Botany of the Cumberland part of the Pennine Range.—J. GILBERT BAKER, F.R.S., F.L.S., etc.
- Lincolnshire Bog and Moorland Plants.—Rev. W. FOWLER, M.A.
- List of the Flora of Wensleydale.—JOHN PERCIVAL, B.A.
- Leafing of the Oak and Ash.—J. HAGGER.
- List of Land and Freshwater Mollusca of Airedale.—H. T. SOPPITT and J. W. CARTER.
- Interesting Geological Discovery at Wortley, Leeds.—C. BROWNRIDGE, F.G.S.
- Coal-Dust and Explosions in Coal-Mines—Rev. ARTHUR WATTS, F.G.S.
- Yorkshire Naturalists at Welton Vale, and on Hatfield Chace.
- North of England Specimens in the British Museum.—T. D. A. COCKERELL.

The Editors are open to receive suitable papers for insertion, particularly on Botany, Entomology, Ornithology, Geology, etc.

Bibliography for 1885 (continuation) and 1886.

Natural History of Lincolnshire.—The next instalment of this is to be upon the Mammalia, by JOHN CORDEAUX. Schedules have been prepared for obtaining information: one will be sent to anyone willing to furnish notes.

Short Notes.—It is the wish of the Editors to give in each number about a page of short notes in each of the various subjects of which the *Naturalist* takes cognisance. To this end they rely upon their friends keeping them well supplied. At present short notes on Botany, Entomology, Palæontology, Microscopy, Conchology, &c., are particularly desired.

ORNITHOLOGICAL PAPERS

Which have appeared in the 'Naturalist.'

- RED-BREASTED FLYCATCHER IN NORTHUMBERLAND—GEO. BOLAM.
- WINTER VISIT TO THE FARNE ISLANDS—Rev. H. H. SLATER, M.A., F.Z.S.
- ORNITHOLOGICAL NOTES FROM UPPER COQUETDALE—J. CORDEAUX, M.B.O.U.
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NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

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AND

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The NATURALIST.

It being the wish of the Editors to make the journal the recognised organ for information concerning the natural history of the North of England, they hope to rely on Naturalists keeping them supplied with articles and short notes from time to time.

Communications should be written on *one side* of the paper only, and should be sent as soon after the commencement of the month as possible.

Short Notes of important occurrences will be received up to the 20th of the month, and specially urgent ones even later.

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BOOKS RECEIVED.

- Francis Nicholson.—Notes on the Ornithology of the [Manchester] District. Small 8vo reprint, 7 pages. [Author.]
Bristol Naturalists' Society.—Proceedings, New Series, Vol. v, Part ii (1886-7), 8vo, pp. 112+94+14; and Annual Report, 24 pages, 8vo. [The Society.]
Journ. Comparative Medicine & Surgery, 8vo. Philadelphia, Oct. 1887. [Editors.]
The Young Scientist, October 1887. Vol. i, No. 1. [Publishers.]
Hertfordshire Natural History Society, Vol. iv, Part 6, August 1887. [Society.]
Acad. of Nat. Science of Philadelphia. Procs., Part i, Jan.-April 1887. [Academy.]
Manchester Geological Society. Trans., Vol. xix, Parts viii & ix, 1886-7. [Society.]
Wesley Naturalist, No. 8, October 1887. [The Wesley Scientific Society.]
Naturalists' World, vol. iv, No. 46, October 1887. [Percy Lund, Editor.]
Science Gossip, No. 274, for Oct. 1887. [Messrs. Chatto & Windus, Publishers.]
The Young Naturalist, Part xciv, for Oct. 1887. [Mr. J. E. Robson, Editor.]
The Midland Naturalist, vol. x, No. 118, for Oct. 1887. [The Editors, Birmingham.]
Scottish Naturalist, No. xviii, New Series, Oct. 1887. [Prof. J.W.H. Trail, Editor.]
Revue Bryologique, 14^e Année, 1887, No. 5. [Mons. T. Husnot, Redacteur.]
Journal of Microscopy, vol. vi, part 24, Oct. 1887. [Mr. Alfred Allen, Editor.]
The Essex Naturalist, No. 9, for September 1887. [The Essex Field Club.]
Nat. Hist. Journal, vol. xi, No. 97, for Oct. 1887. [Editors, York.]

'NATURALIST' REPRINTS—No. 1.

LIST OF LAND AND FRESHWATER MOLLUSCA OF LANCASHIRE.

BY ROBERT STANDEN.

This paper contains not only Mr. Standen's own observations, but those of Messrs. R. D. Darbshire, T. Rogers, W. H. Heathcote, J. A. Hargreaves, F. C. Long, H. Stephenson, and other conchologists, and the observations published in Dyson's list of 1850, and in Hardy's lists of 1864 and 1865, are reproduced for comparison.

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MAY (continued).

trochilus, *Ruticilla phænicurus*, females; *Pratincola rubetra*, many; *Saxicola ænanthe*, females, few; *Motacilla flava*, many, half females; *Anthus trivialis*, *A. pratensis*, many; *Cuculus canorus*, several; *Caprimulgus europæus*, some; *Hirundo rustica*, *Chelidon urbica*, *Cotile riparia*, and *Cypselus apus*, many; *Columba palumbus*, *Turtur communis*, pretty many; *Ægialitis cantiana*, one; *Æ. hiaticula*, many; *Machetes pugnax*, *Hæmatopus ostralegus*, *Totanus calidris*, and *T. glareola*; *Anthus campestris*, one.

20th. —S., still, clear, hot.

Very strong migration. Everything as day before. *Totanus ochropus*, *Vanellus vulgaris*.

21st. —N. by E., slight, clear, warm.

Again strong migration, all the above species, and in addition, *Eudromias morinellus* and *Vanellus vulgaris*, old birds, as day before, most likely those whose nesting was disturbed.

22nd. —N. E., early, thick, overcast, cold, clouds from N. W.

But trifling migration. Some *Phylloscopus trochilus*, *Motacilla flava*, and *Anthus pratensis*; *Linota flavirostris*, a small flight.

23rd. —E., slight, clear, hot.

Strong migration. *Falco subbuteo*, one; *F. æsalon* (female), *Tinnunculus alaudarius*, and *Accipiter nisus*, several; *Lanius collurio*, some; *Muscicapa grisola*, pretty many; *M. atricapilla* (female), *Phylloscopus trochilus*, *Ruticilla phænicurus* (female), *Sylvia cinerea*, *S. hortensis*, *S. atricapilla*, *Cyanecula suecica*, *Acrocephalus phragmitis*, and *Pratincola rubetra*, many; *Saxicola ænanthe*, fewer, females; *Motacilla flava*, many; *M. melanocephala*, some; *Anthus trivialis*, many; *A. pratensis*, fewer; *Emberiza hortulana*, many; *Hirundo rustica*, *Chelidon urbica*, *Cotile riparia*, *Cypselus apus*, *Caprimulgus europæus*, *Crex pratensis*, *Eudromias morinellus*, *Squatarola helvetica*, *Numenius phæopus*, *Totanus glottis*, *T. ochropus*, *T. glareola*, *T. hypoleucus*, *Turtur communis*.

24th. —S., quite still, warm, clear; afternoon, W.; 5 p.m., very violent, overcast, and cold; evening, clear, still.

During night and early morning, strong migration; *Tinnunculus alaudarius*, *Falco æsalon*, and *Accipiter nisus*, scattered; *Lanius collurio*, *Muscicapa grisola*, many; *M.*

MAY (continued).

atricapilla, few; *Oriolus galbula*, one; *Cyanecula suecica*, a couple; *Ruticilla phœnicurus*, female; *Sylvia cinerea*; *S. nisoria*, one; *S. atricapilla*, some, males; *Phylloscopus trochilus* and *Acrocephalus phragmitis*, tolerable; *A. palustris*, several; *Motacilla flava*, many; *M. melanocephala*, a couple; *Anthus trivialis*, many; *A. pratensis*, few; *Yunx torquilla* and *Caprimulgus europæus*, tolerable; *Hirundo* and *Cypselus apus*, many; *Turtur communis*, ten or fifteen; *Crex pratensis*, pretty many; *Totanus calidris*, several. Afternoon, almost all gone.

25th. —S., fresh, low clouds S.W., aloft S., rain.

Very little migration. Some small Falcons; one *Lanius excubitor*; few *Ruticilla phœnicurus*; *Phylloscopus trochilus*, *Sylvia cinerea*, *Acrocephalus phragmitis*, *Muscicapa grisola*, *M. atricapilla*, *Motacilla flava*, *Anthus trivialis*, *A. pratensis*, *Saxicola œnanthe*, *Pratincola rubetra*, *Hirundo*; *Coturnix communis*, two; *Turtur communis*, a couple; *Totanus* and *Numenius*.

26th. —S.W., slight.

Almost no migration. Scattered birds as day before.

27th. —E., slight, vaporous; afternoon, S. to S.W., rain-shower.

Very slight migration. *Lanius collurio*, some; otherwise, the same as day before, scattered.

28th. —S.W., fresh, clear.

No migration. Some *Turtur communis*, *Saxicola œnanthe*, and *Motacilla flava*.

29th. —S.S.W., slight, fine.

No migration. *Turtur communis*, still very many; *Linota linaria*, one; *Hirundo*, *Totanus*, and *Ægialitis hiaticula*.

30th. —N., still, clear, cirri from S.W.

No migration. *Turtur communis*, again pretty many; also *Hirundo*, species. *Fringilla montana* [? *Passer montanus*], accumulated to about one hundred, have gone.

31st. —N.E., still, clear, warm; evening, N., cold.

Little migration. *Muscicapa grisola*, and few *M. atricapilla*; *Saxicola œnanthe*, scattered; *Linota linaria*, still there; *Vanellus vulgaris*, a few old birds; *Totanus calidris*; *Hæmatopus ostralegus*, four.

June.

- 1st. —E.S.E., fresh, cirri W.
No migration ; very few scattered small birds.
- 2nd.—N., still, cold.
No migration ; few stragglers, small birds. *Melanocorypha sibirica*, fine female, the second occurrence.
- 3rd.—N.N.W. and N., slight ; early, rain.
Nothing. Pretty many *Turtur communis*.
- 4th.—N., slight, cloudy, cold.
Nothing. *Turtur communis*, several.
- 5th.—N.N.W. to N., strong, cold.
Nothing. *Turtur communis*, some.
- 6th.—N. to N.E., slight, clear, very cool.
Hirundo rustica, some ; *Caprimulgus europæus*, one ;
Loxia curvirostra, three gray birds.
- 7th.—N., fresh, misty clouds, very cold.
Nothing at all.
- 8th.—N., fresh, overcast, very cold.
Nothing. Some *Turtur communis*, *Saxicola ænanthe*,
and one *Otocorys alpestris*.
- 9th.—E., still, clear, warm.
Nothing. Few *Saxicola ænanthe* and *Emberiza hortulana* ; one *Otocorys alpestris* ; *Loxia curvirostra*, some.
- 10th.—E.S.E., still, fine.
Very little. *Motacilla flava*, *Anthus trivialis*, and
Cypselus apus.
- 11th.—S., still ; night, fog ; evening, rain.
Nothing. The above scattered. *Numenius* and *Totanus calidris*.
- 12th.—S.W., feeble, fine.
Buteo vulgaris, a couple. Nothing else.
- 13th.—W., slight rain ; later, clear.
Buteo vulgaris and *Hirundo*, several.
- 14th.—N.W., fresh, clouds S.W., cold, stormy.
Nothing.
- 15th.—W., stormy, rain.
Sturnus vulgaris, the first appearance of young, some
flights of twenty or fifty.
- 16th.—N.W., stormy, rain squalls, cold.
Nothing.
- 17th.—N.N.W., windy, rain showers, cold.
Nothing.

JUNE (*continued*).

18th. —E., clear, warm.

Charadrius pluvialis (young) and *Vanellus vulgaris* (young), some; *Numenius phaeopus*, some.

19th. —Early, N.E., violent, overcast; later, E. and S.E., clear, warm.

Monticola saxatilis (female), one in garden; *Muscicapa grisola*, a couple; *Hirundo rustica*, singly; *Charadrius pluvialis* (young), *Vanellus vulgaris* (young), *Numenius* (young); *Machetes pugnax*, four, one white shot.

20th. —E., windy to feeble, clear, warm.

Hirundo rustica and *Chelidon urbica*, twenty or thirty; *Vanellus vulgaris* (young), pretty many; *Charadrius pluvialis*, a couple; *Numenius*, migrating.

21st. —W.N.W., windy, violent; evening, cold.

Nothing. *Totanus calidris*, some young.

22nd to 24th. —N.N.W., stormy, cold.

Nothing.

25th and 26th. —S.W. to W., somewhat better.

Tinnunculus alaudarius, young; *Turdus musicus*, some young in garden.

27th and 28th. —N.E. and E., still, clear, warm.

Migration returning. *Tinnunculus alaudarius*, young; *Sturnus vulgaris* (young), hundreds; *Hirundo rustica*, *Chelidon urbica*, *Ægialitis hiaticula*, *Totanus calidris*, *T. glottis*, *T. hypoleucus*, *Tringa subarquata*, *Hæmatopus ostralegus*, and *Numenius phaeopus*, all young.

29th. —N.W., still, clear, fine.

Sturnus vulgaris (young), very many; *Hirundo*, tolerable; *Columba palumbus*, *Totanus calidris*, *Ægialitis hiaticula*, *Numenius phaeopus*, *Hæmatopus ostralegus*.

30th. —N., slight, clear.

Sturnus vulgaris (young), many; *Vanellus vulgaris* (young), many.

July.

1st. —N.E., early; later, N.N.W., moderate, clear, warm.

Sturnus vulgaris (young), flights of hundreds; *Hirundo rustica*, some old; *Cypselus apus* (young), *Ægialitis hiaticula*, *Totanus calidris* (young).

2nd. —N.W., moderate, clear, warm.

Sturnus vulgaris (young), great flights; *Ægialitis hiaticula*, *Totanus calidris*, *Numenius phaeopus*.

JULY (*continued*).

3rd. —Night and early, fog, W., fresh.

Sturnus vulgaris (young), fewer.

4th. —N.W., clear, warm.

Sturnus vulgaris (young), very many.

5th. —N.N.W., slight, clear, warm.

Sturnus vulgaris (young), many flights.

6th. —W., slight, clear, very warm.

Turdus musicus, some; *T. pilaris*, some; *Ægialitis hiaticula*, *Vanellus vulgaris*, *Gallinago caelestis*, *Totanus calidris*, and *Numenius phæopus* (all young), pretty many.

7th. —S.W., slight, clear, hot.

Sturnus vulgaris (young), pretty many; *Turdus musicus*, eight or ten; *Ægialitis hiaticula*, *Vanellus vulgaris*, *Totanus calidris*, *Numenius arquata*, *N. phæopus*.

8th. —N.W., fresh, clear, cool; later, E.N.E., violent, thick clouds from S.W.

Sturnus vulgaris, young, early, a couple of hundred; *Turdus musicus*, some; *Ægialitis hiaticula*, *Gallinago caelestis*, *Numenius phæopus*, *Ardea cinerea*, one. About evening, *Sturnus vulgaris*, in flights of three to four hundred; also a few '*Sylvia ficedula*' and *Ruticilla phœnicurus*.

9th. —N.W. and N.N.W., very fresh, cirri from S.W., cold; evening, icy cold.

Sturnus vulgaris, young, not many; *Ægialitis hiaticula*.

10th. —N.N.W., fresh; early, icy cold.

Sturnus vulgaris (young), a few hundreds; *Turdus musicus*, ten or fifteen; *Ægialitis hiaticula*, *Totanus calidris*, and *Numenius phæopus*, scattered.

11th. —N.W., moderate, clear, warmer, cirri from W.S.

Sturnus vulgaris, pretty many; *Turdus musicus*, several; *Ægialitis hiaticula*, scattered; *Æ. cantiana*, one; *Vanellus vulgaris* (young), *Totanus calidris*, *T. ochropus*, and *Numenius phæopus*.

12th. —S.W., windy; early, rain, warm; 6 p.m., fog.

Sturnus vulgaris (young), pretty many; *Turdus musicus*, probably the same birds as yesterday; *Ægialitis hiaticula* and *Totanus calidris*, (all young) many.

13th. —W., still, warm; evening, S.; night, violent.

Sturnus vulgaris (young), flights of hundreds; *Turdus musicus*, twenty or thirty; *Ægialitis hiaticula*, *Æ. cantiana*, *Vanellus vulgaris* (young), and *Totanus calidris*.

JULY (*continued*).

14th. —S., violent, clear; later on, overcast, S.S.W., violent; p.m., rain.

Sturnus vulgaris (young), few; *Turdus musicus* of day before; *Hirundo rustica*, young, some; *Columba palumbus*, a couple; *Cuculus canorus* (young), a couple; *Vanellus vulgaris* and *Numenius arquata*, some.

15th. —N.W. to W., fresh; evening, icy cold.

Few young *Sturnus vulgaris*; nothing besides.

16th. —W., slight; p.m., E., still, clear, warm.

Cuculus canorus, one; *Saxicola œnanthe*, some (young); *Ægialitis hiaticula*, *Vanellus vulgaris* (young), *Numenius phæopus*, and *Totanus ochropus*.

17th. —N.W., violent, cloudy; early, cold.

Ægialitis hiaticula; *Totanus glottis*, and *T. hypoleucus*.

18th. —S., still warm.

Cuculus canorus (young); *Alcedo ispida*, one; *Ægialitis hiaticula*, *Numenius phæopus*, and *Totanus calidris*.

19th. —S.S.E., fresh, clear, hot, still.

Cuculus canorus (young), several; *Cypselus apus*, many; *Ægialitis hiaticula*, *Vanellus vulgaris*, *Charadrius pluvialis*, all young; *Gallinago cælestis*, young; *Numenius arquata*, *N. phæopus*, *Totanus calidris*, *T. ochropus*, and *T. hypoleucus*.

20th. —S.W., fresh, sunny and cloudy, squally atmosphere.

Hirundo rustica, *Cypselus apus*, pretty many; *Ardea cinerea*, young; *Numenius phæopus* and *Totanus ochropus*.

21st. —S.E., slight, clear, hot; evening, wind fresher.

Fringilla serinus (young), one; *Hirundo rustica* and *Cypselus apus*, pretty many; *Numenius phæopus* and *Totanus calidris*.

22nd. —S.E., fresh, thunder-clouds.

Cuculus canorus, several young; *Gallinago cælestis* (young), some; *Vanellus vulgaris*, *Numenius phæopus*, and *Totanus calidris*.

23rd. —S., still, overcast, warm; p.m., sunny; evening, still.

Loxia curvirostra, some gray birds; *Cuculus canorus* (young), some; *Cypselus apus*, flights still, young; *Numenius phæopus*, *Totanus calidris* (young), *T. hypoleucus*, and *Ægialitis hiaticula*; *Gallinago cælestis*, young.

24th. —Early, S.E., still, warm, overcast; forenoon, S., still, rain; p.m., S.W., fresh, clear; evening, N.W., stormy.

Tinnunculus alaudarius (young), *Cuculus canorus* (young), *Hirundo rustica*, *Chelidon urbica*, *Cotile riparia*,

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JULY (*continued*).

Vanellus vulgaris, *Numenius phaeopus*, *Totanus calidris* (young), *Gallinago caelestis* (young).

25th. —Early, W., fresh, clear; evening, S.E., still, clouds from W.

Tinnunculus alaudarius (young); *Hirundo rustica* (young), very many; *Cuculus canorus* (young), *Numenius phaeopus*.

26th. —S.S.W., still, warm.

Ægialitis hiaticula and *Vanellus vulgaris* (young); *Numenius phaeopus*, *Totanus glottis*, *T. ochropus*, *T. hypoleucus*, and *T. calidris*.

27th. —S., still, warm; noon, thunderstorm and rain; p.m., W.N. to N.W., violent, cold.

Loxia curvirostra, eight or ten grey birds; *Cuculus canorus* (young), some; *Totanus calidris*, *T. glareola*, *T. hypoleucus*; *T. ochropus*.

28th. —N.W., violent, cold, overcast.

Loxia curvirostra, some.

29th. —N.W., fresh, cloudy, cold.

Hirundo rustica and *Chelidon urbica*, some; *Ægialitis hiaticula*, some.

30th. —S., S.E., and S.W., slight, overcast, warm.

Tinnunculus alaudarius (young); *Saxicola oenanthe* (young), pretty many; *Loxia*, several; *Cuculus canorus*, *Hirundo rustica*, *Chelidon urbica*, *Cotile riparia*, *Numenius arquata*, *N. phaeopus*, *Totanus calidris*, *Gallinago caelestis*, and *Larus argentatus* (quite young).

31st. —S.E. to S.W., fresh; early, thunder, overcast.

Tinnunculus alaudarius (young), *Ruticilla phœnicurus* (young); *Loxia*, a small party; *Hirundo*, some; *Cuculus canorus*, some young; *Ægialitis hiaticula* and *Vanellus vulgaris* (young), *Totanus calidris*, and *T. ochropus*.

August.

1st. —S., still, warm, fine.

Chelidon urbica, very many; *Hirundo rustica*, fewer; *Cotile riparia*, tolerable; *Cuculus canorus* (young), some; *Numenius phaeopus* and *Totanus glottis*.

2nd. —S.E. to N.E., slight, clear, warm; p.m., clouded, fresh.

Chelidon urbica, many; *Cuculus canorus*, one old bird; *Totanus calidris*.

AUGUST (continued).

- 3rd. —N.W., violent, cold; early, very cold.
Chelidon urbica, *Cuculus canorus*, *Numenius arquata*,
N. phæopus, *Totanus hypoleucus*, and *Gallinago cælestis*,
single birds.
- 4th. —N.W., windy, cold, thick, cloudy, fine rain.
Saxicola ænanthe (young), pretty many; *Numenius*
phæopus, *Totanus calidris*, *T. ochropus*, and *T. glottis*.
- 5th. —W.N.W., windy, very cold.
Saxicola ænanthe (young), tolerable; *Chelidon urbica*,
Cuculus canorus (young), *Charadrius pluvialis*, *Vanellus*
vulgaris (young), *Gallinago cælestis*, and *Totanus calidris*.
- 6th. —S.W., feeble, high clouds from W.; evening, windy.
Saxicola ænanthe (young), tolerable; *Chelidon urbica*,
fewer; *Totanus ochropus*. During night, migrating,
Numenius arquata and *Gallinago cælestis*.
- 7th. —N.W., moderate, fine dust-rain; evening, S.S.W.
Phylloscopus trochilus, several young, yellow; *Saxicola*
ænanthe and *Pratincola rubetra*, tolerable, young; *Cuculus*
canorus and *Charadrius pluvialis*, young; *Gallinago*
cælestis, *Numenius arquata*, and *N. phæopus*.
- 8th. —N.W., very fresh, cool; p.m., W., stiller and warmer.
Tinnunculus alaudarius (young), a couple; *Phyllos-*
copus sibilatrix, some; *P. trochilus*, several, all young;
Saxicola ænanthe (young), pretty many; *Hirundo rustica*,
some; *Chelidon urbica*, several.
- 9th. —W.N., still, clear, warm.
Phylloscopus trochilus (young), tolerable; *Hirundo*, few;
Saxicola, fewer; *Charadrius pluvialis*, some; *Numenius*
phæopus, *Totanus ochropus*, and *T. glottis*.
- 10th. —S., fresh, overcast; p.m. and evening, E., still, little rain, thunder.
Turdus musicus, some; *Phylloscopus trochilus*, few;
Saxicola ænanthe, tolerable; *Pratincola rubetra*, few;
Loxia, a little party; *Hirundo rustica* and *Chelidon urbica*,
not many; *Cotile riparia*, tolerable; *Cuculus canorus*, a
couple; *Ardea cinerea*, a couple of young ones.
- 11th. —N.W., violent, thick-clouded, cold; evening, clear.
No migration.
- 12th. —W.N.W., fresh, heavy thunderstorm, with rain; misweather.
Nothing.
- 13th. —S.E., better, overcast.
Phylloscopus trochilus, tolerable; *Cypselus apus*, pretty
many; *Tadorna cornuta*, one young bird.

AUGUST (*continued*).

14th. —Quite still, warm, overcast, rain.

Lanius excubitor, one; *Phylloscopus trochilus*, scattered; *Saxicola œnanthe*, pretty many; *Pratincola rubetra*, fewer; *Ægialitis hiaticula*, *Totanus calidris*, and *Gallinago cœlestis* (all young), pretty many.

15th. —N.N.W., fresh, clouded, cold; p.m., clear, stiller, warmer.

Lanius excubitor, two; *Phylloscopus trochilus*, scattered; *Ruticilla phœnicurus* and *Saxicola œnanthe*, tolerable; *Ægialitis hiaticula*, *Charadrius pluvialis* (young), *Totanus calidris*, *T. ochropus*, *Hæmatopus ostralegus* (young), *Numenius arquata*, and *Gallinago cœlestis*, but few of each.

16th. —S., fresh, sunny, fine; p.m., S.E.; evening, S.S.W.

Lanius excubitor ? *major*, one; *Phylloscopus trochilus*, *Ruticilla phœnicurus*, and *Saxicola œnanthe*, many; *Pratincola rubetra*, few; *Chelidon urbica*, pretty many; *Numenius arquata*, *Hæmatopus ostralegus*, *Totanus ochropus*, *T. glottis*, *Gallinago cœlestis*, and *G. gallinula*.

17th. —S.W., feeble, thick, with rain; p.m., still, clear, fine; evening, quite still.

Phylloscopus trochilus, pretty many; *Ruticilla phœnicurus*, fewer; *Saxicola œnanthe*, many, young; *Charadrius pluvialis*, *Ægialitis hiaticula*, *Totanus hypoleucus*, and *Numenius arquata*. During night, Waders, and many *Ægialitis hiaticula*.

18th. —Still, clouds from N.E., clear, warm; night, heavy dew.

Phylloscopus trochilus, *Ruticilla phœnicurus*, *Motacilla alba*, and *Saxicola œnanthe*, moderate; *Emberiza hortulana*, pretty young; *Numenius arquata*, *Hæmatopus ostralegus*, *Totanus ochropus*, *Charadrius pluvialis*, *Ægialitis hiaticula*, *Tringa alpina*, *Gallinago cœlestis*, and *G. gallinula*.

19th. —E.N.E. to N.E., fresh, overcast; later, clear, fine; evening, overcast.

Tinnunculus alaudarius, several; *Circus cyaneus*, one; *Phylloscopus trochilus*, *Acrocephalus palustris*, *Ruticilla phœnicurus*, *Saxicola œnanthe*, *Pratincola rubetra*, *Motacilla flava*, *Chelidon urbica*, *Hirundo rustica*, *Cotile riparia*, *Cypselus apus*, *Emberiza hortulana* (young), many; *Yunx torquilla*, *Upupa epops*, *Cuculus canorus*, *Charadrius pluvialis*, *Ægialitis hiaticula*, *Vanellus vulgaris*, *Numenius arquata*, *Totanus glottis*, *T. glareola*, *Gallinago cœlestis*, and *G. gallinula*, all very many. First strong migration.

AUGUST (*continued*).

20th. —N.E., still, clear, warm.

Circus pallidus (young), *Phylloscopus trochilus*, *Muscicapa atricapilla* (young), *Motacilla flava*, *Saxicola œnanthe*, *Pratincola rubetra*, and *Emberiza hortulana*; *Cuculus canorus*, all young; *Numenius arquata*, *Hæmatopus ostralegus*, *Totanus glottis*, *T. hypoleucis*, *Gallinago cælestis*, and *G. gallinula*. All pretty many.

21st. —Early, S., still; later, slight, E., clear, hot.

Turdus musicus (young), six or eight in garden; *Phylloscopus trochilus*, *Muscicapa grisola*, *M. atricapilla*, *Saxicola œnanthe*, *Pratincola rubetra*, *Motacilla flava*, *Anthus trivialis*, *Alauda arborea*, *Emberiza hortulana*, *Gallinago cælestis*, *Charadrius pluvialis* (a couple), *Totanus ochropus*, and *T. calidris*. Considering the weather, remarkably little migration.

22nd.—E.S.E., fresh, clear, warm; later, stiller; evening, overcast.

Accipiter nisus (young), *Phylloscopus trochilus* and *Ruticilla phœnicurus*, not many; *Turdus musicus*, some; *Motacilla flava*, *Anthus trivialis* and *A. pratensis* (young), *Emberiza hortulana*, *Cuculus canorus* (young), *Eudromias morinellus* (young), *Numenius arquata*, *Totanus glareola*, *Gallinago cælestis*, and *G. gallinula*. Migration pretty smart. Evening migration of *Numenius*, *Charadrius*, *Totanus*, *Tringa*, *Hæmatopus*, etc.

23rd. —E., slight, clear, warm.

Accipiter nisus (young), several; *Tinnunculus alaudarius* (young), several; *Turdus musicus*, twenty; *Phylloscopus trochilus*, *Ruticilla phœnicurus*, *Sylvia cinerea*, *Muscicapa grisola*, *M. atricapilla* (young), *Anthus trivialis*, *A. pratensis*, *Emberiza hortulana*, *Saxicola œnanthe*, *Pratincola rubetra*, *Numenius arquata*, *N. phæopus*, *Totanus calidris*, *Gallinago cælestis*, and *G. gallinula*, all pretty many. Night, much migration of Waders.

24th. —E.S.E., slight, clear, warm.

Pandion haliaetus, *Accipiter nisus* (young), *Tinnunculus alaudarius* (young), and *Turdus musicus*, some; *Phylloscopus trochilus*, *Ruticilla phœnicurus*, *Sylvia cinerea*, *Saxicola œnanthe*, *Pratincola rubetra*, *Muscicapa grisola*, *M. atricapilla*, *Anthus trivialis*, *A. pratensis*, *Motacilla flava*, *Emberiza hortulana* (young), *Charadrius pluvialis*, *Numenius arquata*, *Gallinago cælestis*, and *G. gallinula*. Night, much migration of Waders overhead.

AUGUST (*continued*).

25th. —E.S.E., still, clear, hot ; early, heavy dew.

Accipiter nisus (young), pretty many ; *Phylloscopus trochilus* and *Sylvia cinerea*, tolerable ; *Ruticilla phœnicurus*, few ; *Saxicola œnanthe*, *Pratincola rubetra*, *Anthus trivialis*, *Emberiza hortulana* (young still), *Motacilla flava*, *Numenius arquata*, and *Gallinago*.

26th. —N., feeble, misty, overcast ; later, W., moderate, warm.

Accipiter nisus and *Tinnunculus alaudarius*, some ; *Phylloscopus trochilus*, *Sylvia cinerea*, and *Cyanecula suecica*, scattered ; *Motacilla flava*, *Saxicola œnanthe* and *Pratincola rubetra*, moderate ; *Muscicapa grisola* and *M. atricapilla*, scattered ; *Emberiza hortulana*, *Hirundo rustica*, *Cypselus apus*, *Yunx torquilla*, *Totanus calidris*, and *T. ochropus*.

27th. —W. by N., fresh, light, clouded ; evening, still, clear.

Lanius collurio (young), a couple ; *Phylloscopus trochilus* and *Sylvia cinerea*, tolerable ; *Cyanecula suecica*, a couple ; *Saxicola œnanthe* and *Fringilla montana*, one flight ; *Cypselus apus*, some flights ; *Totanus calidris*. Not much migration.

28th. —S., still, clear, hot.

Accipiter nisus, *Tinnunculus alaudarius* (young), *Phylloscopus trochilus*, *Ruticilla phœnicurus* (young), *Sylvia cinerea*, *S. hortensis*, *Muscicapa grisola*, and *M. atricapilla*, many in garden ; *Saxicola œnanthe*, *Pratincola rubetra*, *Anthus trivialis*, *Emberiza hortulana*, *Yunx torquilla*, *Hirundo rustica*, *Cypselus apus*, *Charadrius pluvialis*, *Totanus calidris*, *T. ochropus*, and *Gallinago*. Good migration ; also in night many Waders overhead.

29th. —S.S.E., early, fresh, clear, hot.

Falco peregrinus, one, young ; *F. æsalon* (young), a couple ; *Accipiter nisus* and *Tinnunculus alaudarius*, several ; *Phylloscopus trochilus*, *Ruticilla phœnicurus*, *Cyanecula suecica*, *Sylvia cinerea*, *S. hortensis*, *Muscicapa grisola*, *M. atricapilla*, *Motacilla flava*, *Anthus trivialis*, *Saxicola œnanthe*, *Pratincola rubetra*, *Emberiza hortulana*, *Yunx torquilla*, *Cuculus canorus*, *Cypselus apus*, *Hirundo rustica*, *Chelidon urbica*, *Eudromias morinellus* and *Charadrius pluvialis* (young), *Totanus calidris*, *Tringa alpina*, and *Streptopelia interpres*, all very many. Very extensive migration, also during night.

AUGUST (*continued*).

30th. —N.E., slight; early until noon, fog; p.m., clear, still, hot.

Accipiter nisus and *Tinnunculus alaudarius*, but a couple; *Phylloscopus trochilus*, *Ruticilla phœnicurus*, *Cyanecula suecica*, *Sylvia cinerea*, *S. hortensis*, *Muscicapa grisola*, *M. atricapilla*, *Motacilla flava*, and *M. alba*; *Saxicola œnanthe*, none; *Pratincola rubetra*, very many; *Anthus trivialis*, few; *A. pratensis*, many; *Fringilla montana*, flights; *Totanus hypoleucus*, one flight beneath cliffs. Pretty much, but mostly arrived since noon.

31st. —S.E., still, clear, hot; night, fog.

Phylloscopus trochilus and *Ruticilla phœnicurus*; *Sylvia cinerea*, some; *Muscicapa grisola*, *M. atricapilla*, *Saxicola œnanthe*, *Pratincola rubetra*, *Motacilla flava*, *Anthus campestris*, *A. trivialis*, *A. pratensis*, *Emberiza hortulana*, *Totanus ochropus*, and *Gallinago cœlestis*. No particular migration; hindered by fog.

September.

1st. —S., slight, clear, very hot; evening, thunder-clouds in S., thunder.

Accipiter nisus, scattered; *Phylloscopus trochilus*, *Sylvia cinerea*, *S. hortensis*, *Ruticilla phœnicurus*, *Muscicapa grisola*, *M. atricapilla*, *Saxicola œnanthe*, and *Pratincola rubetra*, many; *Motacilla flava*, *Anthus trivialis*, and *A. pratensis*; *A. campestris*, one; *Emberiza hortulana*, young and single old birds; *Hirundo rustica* and *Cotile riparia*; *Chelidon urbica*, few; *Charadrius pluvialis*, scattered; *Totanus ochropus*, a couple. Afternoon, almost all gone.

2nd.—E., slight, clear, hot, light thunder-clouds in S.W.; early, thunder; evening till midnight, violent squalls, with rain.

Phylloscopus trochilus, *Ruticilla phœnicurus*, and some *Sylvia hortensis*; *Muscicapa atricapilla*, *Saxicola œnanthe*, *Pratincola rubetra*, *Anthus trivialis*, *A. pratensis*, *Motacilla flava*, *Emberiza hortulana*, *Numenius arquata*, *Hæmatopus ostralegus*, *Charadrius pluvialis*, and *Gallinago cœlestis*. All scattered on account of thunder-stormy atmosphere.

3rd.—E.N.E., slight, clear, hot; later, fresh; evening, cool.

Falco æsalon and *Accipiter nisus*, some young; *Lanius collurio* (young), a couple; *Turdus musicus* and *Sylvia* few, scattered; *Emberiza hortulana*, *Saxicola œnanthe*, *Motacilla flava*, *Anthus trivialis*, *A. pratensis*, *Hirundo rustica*, *Yunx torquilla*, *Charadrius pluvialis*, *Vanellus vulgaris*, and *Numenius arquata*. Not proper migration, most likely thunderstorm somewhere.

SEPTEMBER (*continued*).

4th. —E.N.E., moderate, clearer, warm.

Falco aesalon (young), *Tinnunculus alaudarius*, and *Accipiter nisus*, pretty many; *Phylloscopus trochilus*, few; *Sylvia curruca*, more; *S. hortensis*, scattered; *Ruticilla phœnicurus*, tolerable; *Muscicapa atricapilla*, pretty many; *Saxicola œnanthe* and *Pratincola rubetra*, few; *Motacilla flava*, *M. alba* (young), *Anthus trivialis*, and *A. pratensis*, tolerable; *Columba palumbus*, several; *Charadrius pluvialis* and *Eudromias morinellus* (young), some; *Numenius arquata* and *Totanus ochropus*. Not strong migration, thunderstorm?

5th. —E., fresh, clear, warm; evening and night, thunderstorm.

All the above; also *Hirundo rustica*. Migration interrupted by continual thunder-stormy atmosphere.

6th. —S.S.E., warm, fine, still; p.m., S.S.W.; evening, W.

Falco aesalon, *Tinnunculus alaudarius*, and *Accipiter nisus*, young; *Sturnus vulgaris*, a few flights; *Phylloscopus trochilus*, *Ruticilla phœnicurus*, *Sylvia curruca*, *S. hortensis*, *Cuculus canorus* (one young), *Motacilla flava*, *Anthus trivialis*, *A. pratensis*, *A. richardi* (two), *Upupa epops* (one), *Charadrius pluvialis*, *Eudromias morinellus* (young), and *Numenius arquata* (rustbrown specimen); *Hæmatopus ostralegus* and *Streptopelia interpres*.

7th. —S.S.W., slight, clear, warm.

Tinnunculus alaudarius, several; *Ruticilla phœnicurus*, *Phylloscopus trochilus*, *Anthus trivialis*, *A. pratensis*, *Motacilla flava*, *Muscicapa atricapilla*, *Saxicola œnanthe*, *Pratincola rubetra*, *Emberiza hortulana*, and *Charadrius pluvialis*, all scattered.

8th. —W., slight, thick, with rain; noon, clear.

Tinnunculus alaudarius, some; *Turdus musicus*, few; *Saxicola œnanthe*, *Phylloscopus trochilus*, *Anthus pratensis*, and *Charadrius pluvialis*. Few birds; no migration.

9th. —S.W., windy, thick.

Tinnunculus alaudarius and *Anthus pratensis*. Nothing else.

10th. —N.N.W., slight, rain-shower.

Saxicola œnanthe and *Phylloscopus trochilus*, scattered. No migration.

11th. —W., moderate, clear, warm; evening, still.

Tinnunculus alaudarius and *Accipiter nisus* (young), several; *Turdus musicus*, pretty many; *Phylloscopus*

SEPTEMBER (*continued*).

trochilus, *Saxicola œnanthe*, *Pratincola rubetra*, *Motacilla flava*, *Anthus trivialis*, *A. pratensis*, *Emberiza hortulana*, *Charadrius pluvialis*, *Gallinago cœlestis*, and *Muscicapa grisola*, in gardens, all pretty numerous.

12th. —S.W., fresh; evening, still, clear, warm.

Accipiter nisus (young) and *Turdus musicus*, tolerable; *Motacilla flava*, *M. alba*, and *Anthus trivialis*, few; *A. pratensis*, many; *Fringilla cœlebs*, some, in garden; *Charadrius pluvialis*, a couple; *Ægialitis hiaticula*, several; *Gallinago cœlestis*, scattered. Migration altogether insignificant.

13th. —S.W., slight, sunny; evening, E., quite still.

Accipiter nisus, some; *Turdus musicus*, not many; *Phylloscopus trochilus*, few; *Muscicapa grisola*, some; *M. atricapilla*, few; *Motacilla flava*, a few parties; *Anthus pratensis*, pretty many; *Saxicola œnanthe*, and *Pratincola rubetra*, tolerable; *Emberiza hortulana*, some old birds; *Charadrius pluvialis*, scattered.

14th. —S.E., fine, still, clear, warm, heavy dew.

Turdus musicus, pretty many; *Accipiter nisus* and *Tinnunculus alaudarius*, still there; *Sturnus vulgaris*, many flights; *Phylloscopus trochilus*; *Sylvia rufa* (young), some; *S. cinerea*, *S. hortensis*, *Ruticilla phœnicurus*, old birds; *Muscicapa atricapilla*, pretty many; *Motacilla flava*, many; *Anthus campestris*, a couple; *A. trivialis* and *A. pratensis*, tolerably many; *Emberiza hortulana*, not many, half old; *Fringilla cœlebs*, some; *Charadrius pluvialis* and *Gallinago cœlestis*. Altogether, lively migration.

15th. —N. and N.E., fresh, clear, cool.

Accipiter nisus, pretty many, one old bird; *Sturnus vulgaris*, a few small flights; *Turdus musicus*, pretty many; *Ruticilla phœnicurus*, many old birds; *Phylloscopus trochilus*, *Sylvia rufa* (young), and *Muscicapa atricapilla*; *Saxicola œnanthe*, very many; *Pratincola rubetra*, *Motacilla flava*, *Anthus trivialis*, *A. pratensis*, *Emberiza hortulana*, and *Plectrophanes nivalis*, latter but few; *Fringilla cœlebs*, many; *Charadrius pluvialis* and *Eudromias morinellus* (young), the latter very often this autumn, more than ever. Very lively migration; likely continuous fine weather.

SEPTEMBER (*continued*).

16th. —S.E., slight, fine; forenoon, cloudy.

Falco peregrinus, a couple; *Tinnunculus alaudarius* and *Accipiter nisus*, pretty many; *Turdus torquatus* and *T. musicus*, very many; *Erithacus rubecula*, pretty many; *Phylloscopus trochilus*, *Sylvia rufa*, *S. cinerea*, and *S. hortensis*; *Ruticilla phœnicurus*, many old; *Muscicapa atricapilla*, many; *Motacilla flava* and *M. alba*, many; *Anthus trivialis*, *A. pratensis*, *Saxicola œnanthe*, *Alauda arvensis*, and *Emberiza hortulana* (old); *Plectrophanes nivalis*, many; *Fringilla cœlebs*; *Columba palumbus*, tolerable; *Charadrius pluvialis*, *Limosa rufa* (young), and *Totanus ochropus*. Very strong migration, all small birds being especially many.

17th. —S.E., fine, still, clear, warm.

Falco peregrinus, *F. œsalon*, *Tinnunculus alaudarius* and *Accipiter nisus*. Everything as day before, migration almost as strong; also *Anthus campestris* and *Pratincola rubetra* again.

18th. —N.E., slight, cloudy.

Falco œsalon (young), pretty many; *Tinnunculus alaudarius* and *Accipiter nisus*, fewer; *Turdus torquatus* and *T. musicus*, many; *Ruticilla phœnicurus* and *Cyanecula suecica*, pretty many; *Erithacus rubecula*, *Phylloscopus trochilus*, *Sylvia rufa*, *S. cinerea*, *S. hortensis*, and *Regulus cristatus*, many; *Muscicapa atricapilla*, *Motacilla flava*, *M. alba*, *Saxicola œnanthe*, *Pratincola rubetra*, *Anthus trivialis*, *A. pratensis*, *Emberiza hortulana*, *Plectrophanes nivalis*, and *Fringilla cœlebs*; *Cypselus apus*, great flights; *Columba palumbus*, several; *Crex pratensis*, scattered; *Picus major*, some young; *Scolopax rusticula*, one; *Gallinago cœlestis* and *G. gallinula*; *Emberiza pusilla* seen. All strong migration.

19th. —S.E., fresh, clear, fine.

Falco peregrinus, *F. œsalon*, *Tinnunculus alaudarius*, *Accipiter nisus*, *Turdus musicus*, *Sturnus vulgaris*, *Muscicapa atricapilla*, *Ruticilla phœnicurus*, *Cyanecula suecica*, *Phylloscopus trochilus*, *Sylvia rufa*, *Erithacus rubecula*, *Sylvia cinerea*, *S. hortensis*, *Regulus cristatus*, *Accentor modularis*, *Saxicola œnanthe*, *Pratincola rubetra*, *Motacilla flava*, and *M. alba*; *Anthus richardi*, several; *Anthus trivialis*, *A. pratensis*, *Plectrophanes nivalis*, and *Frin-*

SEPTEMBER (*continued*).

gilla cælebs; *Columba ænas*, one; *C. palumbus*, several; *Charadrius pluvialis*, *Vanellus vulgaris*, and *Gallinago gallinula*. Very strong migration of all the small birds.

20th. —S.E., sunny, fine.

All above again very numerous. *Picus major*, some young; *Accentor modularis*; *Anthus richardi*, several.

21st. —N.N.E., fresh, clear.

Accipiter nisus, singly; *Sturnus vulgaris*, flights; *Turdus musicus*, not so many; *Ruticilla phœnicurus*, *Erithacus rubecula*, and *Sylvia cinerea*, tolerable; *Phylloscopus trochilus* and *Sylvia rufa*, few; one *Phylloscopus sibilatrix*; *Muscicapa atricapilla*, not many; *Motacilla flava*; *Anthus trivialis*, few; *A. pratensis*, more; *Plectrophanes nivalis*, small flights; *Fringilla cælebs*, pretty many; *Parus major*, one; *Charadrius pluvialis* and *Gallinago cælestis*. No particular migration.

22nd.—N.E., fine weather.

Pandion haliaetus, one; *Accipiter nisus* and *Tinnunculus alaudarius*, scattered; *Asio accipitrinus*, tolerable; *Corvus cornix*, many flights; *Sturnus vulgaris*, very many flights; *Turdus torquatus* and *T. musicus*, pretty many; *Ruticilla phœnicurus* and *Erithacus rubecula*, many; *Phylloscopus trochilus*, *Sylvia rufa*, and *S. cinerea*, scattered; *Accentor modularis* and *Regulus cristatus*, pretty many; *Saxicola ænanthe* and *Anthus pratensis*, many; *Motacilla flava*, *M. alba*, *Anthus trivialis*; *Plectrophanes nivalis*, pretty many; *Calcarius lapponica*, some; *Fringilla cælebs*, many; *F. montifringilla*, scattered; *Hirundo rustica*, tolerably many; *Parus major* (young), a couple; *Columba palumbus*, ten or fifteen; *Charadrius pluvialis*, very many, twenty shot; *Gallinago cælestis*. Pretty strong migration of all small birds.

23rd. —N.E. to W.S.W., little wind, fine.

Falco peregrinus, *F. æsalon*, and *Accipiter nisus*; *Corvus cornix*, considerable migration; *Turdus musicus*, tolerable; *T. torquatus*, fewer; *Sturnus vulgaris*, several great flights; *Ruticilla phœnicurus*, *Erithacus rubecula*, *Phylloscopus trochilus*, *Sylvia rufa*, *Acrocephalus phragmitis*, *Accentor modularis*, *Regulus cristatus*, *Troglodytes parvulus*, *Saxicola ænanthe*, *Motacilla flava*, *M. alba*, *Anthus trivialis*, *A. pratensis*, *A. obscurus*, *Alauda arvensis*,

SEPTEMBER (continued).

Plectrophanes nivalis, and some *Calcarius lapponica*; *Fringilla cælebs*, *F. montifringilla*, *Hirundo rustica*, *Cotile riparia*, *Picus major*, some young; *Columba palumbus*, *Charadrius pluvialis*, *Vanellus vulgaris*, *Gallinago cælestis*, and *G. gallinula*. Tolerably strong migration, particularly of small birds.

24th. —E.N.E., slight, light-clouded; evening, N.W., cool.

Accipiter nisus and *Tinnunculus alaudarius*, some; *Sturnus vulgaris*, some flights; *Turdus musicus*, few; *Erithacus rubecula*, *Acrocephalus phragmitis*, *Regulus cristatus*, *Accentor modularis*, *Alauda arvensis*, *Anthus trivialis*, *A. pratensis*, *A. obscurus*, *Motacilla flava*, *M. alba*, *Fringilla cælebs*; *Picus major*, a couple; *Columba palumbus*, some; *Charadrius pluvialis* and *Gallinago cælestis*. Little migration. *Emberiza pusilla*, not shot.

25th. —N.N.W., fresh, rain.

Everything as day before. *Otocorys alpestris*, some small flights; *Troglodytes parvulus*, some; *Regulus cristatus*, very many; *Emberiza pusilla*, one, not obtained.

26th. —S.W., still, overcast, damp.

As day before, but very trifling. *Regulus cristatus*, many.

27th. —S.W., violent; p.m., storm, No. 7; night, No. 9, thick, rain.

Nothing.

28th. —N.W., No. 6; later, No. 7.

Nothing.

29th. —S.W., slight, fine rain.

Nothing. Scattered *Anthus obscurus*, *A. pratensis*, *Fringilla cælebs*, and one *Sylvia mesoleuca*.

30th. —W. by N., fresh, thick.

Nothing.

October.

1st. —S., overcast, slight; evening, E., fresh, clear.

Tinnunculus alaudarius; *Sturnus vulgaris*, pretty many; *Turdus torquatus*, *T. musicus*, *Ruticilla phœnicurus*, *Erithacus rubecula*, *Phylloscopus trochilus*, *Accentor modularis*, *Motacilla alba*, *M. flava*, *Anthus campestris*, *A. trivialis*, *A. pratensis*, *A. obscurus*, *Regulus cristatus*, *Fringilla cælebs*, *Crex pratensis*, *Charadrius pluvialis*, and *Columba palumbus*. Pretty many of all small birds.

OCTOBER (continued).

2nd.—S. E., slight, vaporous; p.m., S.S.W.; later to W.N.W.

Early, little migration; later, very much. *Falco æsalon*; *Sturnus vulgaris*, many; *Turdus musicus*, *T. merula*, *Ruticilla phœnicurus*, *Erithacus rubecula*, *Phylloscopus trochilus*, *Muscicapa atricapilla*, *Regulus cristatus*, *Saxicola œnanthe*, *Motacilla alba*, *M. flava*, *Anthus campestris*, *A. trivialis*, *A. pratensis*, *A. obscurus*, *Alauda arvensis*, *Emberiza schœniclus*, *Plectrophanes nivalis*, and *Fringilla cœlebs*; *Coccothraustes chloris*, many; *Hirundo rustica*, *Columba palumbus*, *Charadrius pluvialis*, *Squatarola helvetica*, *Vanellus vulgaris*. Very much migration.

3rd.—S.E., fresh, clear.

Falco æsalon, *Asio accipitrinus*; *Corvus cornix*, some flights; *C. frugilegus*, fewer; *Sturnus vulgaris*, many; *Turdus musicus*; *T. torquatus*, not many; *Ruticilla phœnicurus*, *Erithacus rubecula*, *Phylloscopus trochilus*, *Accentor modularis*, *Saxicola œnanthe*, *Troglodytes parvulus*, *Motacilla alba*, *M. flava*, *Anthus pratensis*, *A. obscurus*, *Alauda arvensis*, *Emberiza schœniclus*, *Plectrophanes nivalis*, *Fringilla cœlebs*, *F. montifringilla*, *Linota cannabina*, *Charadrius pluvialis*, and *Columba palumbus*. Small birds all pretty many. In night, Larks at lighthouse.

4th.—E.S.E., fresh, fine.

Falco æsalon, *Tinnunculus alaudarius*; *Lanius excubitor*, some; *Corvus cornix*, many; also *C. frugilegus*; *Sturnus vulgaris*, many; *Turdus torquatus*; *T. musicus*, pretty many; *T. iliacus*, some; *Ruticilla phœnicurus*, *Erithacus rubecula*, *Phylloscopus trochilus*, *Regulus cristatus*, *Accentor modularis*, *Saxicola œnanthe*, *Anthus trivialis*, *A. pratensis*, *A. obscurus*; *A. cervinus*, one; *Motacilla alba*, *M. flava*, *Alauda arvensis*, *Otocorys alpestris*, *Emberiza schœniclus*, *Plectrophanes nivalis*, *Fringilla cœlebs*, *F. montifringilla*, *Columba palumbus*, and *Gallinago cœlestis*. Very much migration.

5th.—E.S.E., fresh, clear.

Falco æsalon, *Tinnunculus alaudarius*, *Accipiter nisus*, *Circus cineraceus* (young), *Asio accipitrinus*; *Corvus cornix*, *C. frugilegus*, and *Sturnus vulgaris*, many flights; *Turdus musicus*, *T. iliacus*, *T. torquatus*; all above small birds very many. *Calcarius lapponica*, a couple; *Columba*

OCTOBER (continued).

œnas, a couple; *Cotile riparia*, *Hirundo rustica*, and *Chelidon urbica*, many. One *Scolopax rusticula* shot; two caught in net.

6th.—E. and E.S.E., fresh, clear.

Falco œsalon, *Tinnunculus alaudarius*, *Accipiter nisus*, *Circus cineraceus* (young); *Pandion haliaetus*, one; *Asio otus*, *A. accipitrinus*, *Lanius excubitor*; *Sturnus vulgaris*, *C. cornix*, and *C. frugilegus*, many; *Turdus merula*, *T. musicus*, *T. iliacus*, *Ruticilla phœnicurus*, *Erithacus rubecula*, *Phylloscopus trochilus*, *Regulus cristatus*, *Troglodytes parvulus*, *Accentor modularis*, *Motacilla flava*, few; *Anthus trivialis*, *A. pratensis*, *A. obscurus*, *Alauda*, few; *Emberiza schœniclus*, *Plectrophanes nivalis*, and *Columba palumbus*, some; *Scolopax rusticula*, two or three caught; *Fringilla cœlebs*, *Linota cannabina*, and *L. linaria*. Altogether little migration, but very many *Corvus cornix*, *Fringilla cœlebs*, *Anthus pratensis*, and *Regulus cristatus*.

7th.—E. and S.E., slight, light, overcast.

Falco œsalon, *Tinnunculus alaudarius*, *Accipiter nisus*, *Asio otus*, *A. accipitrinus*, *Lanius excubitor*, *Corvus cornix*, *C. frugilegus*, and *Sturnus vulgaris*, all very many; *Turdus torquatus*, *T. musicus*, *T. iliacus*, *Ruticilla phœnicurus*, *Erithacus rubecula*, *Phylloscopus trochilus*, *P. superciliosus*, *Regulus cristatus*, *Accentor modularis*, *Troglodytes parvulus*, *Anthus pratensis*, *A. obscurus*, *Alauda arvensis*, *A. arborea*, *Otocorys alpestris*, *Plectrophanes nivalis*, *Fringilla cœlebs*, *F. montifringilla*, *Columba palumbus*; *Scolopax rusticula*, five or six caught; *Gallinago gallinula*, some.

8th.—S.E., fresh, overcast.

Falco œsalon, *Tinnunculus alaudarius*, *Accipiter nisus*, *Asio otus*, *A. accipitrinus*; *Corvus cornix*, *C. frugilegus*, and *C. monedula*, flights; *Sturnus vulgaris*, *Turdus torquatus*, *T. musicus*, *T. iliacus*, *Erithacus rubecula*, *Phylloscopus trochilus*, *Regulus cristatus*, *Accentor modularis*, *Saxicola œnanthe*, *Motacilla alba*, *Anthus pratensis*, *A. obscurus*, *Alauda arvensis*, *A. arborea*, *Otocorys alpestris*, *Emberiza schœniclus*, *Plectrophanes nivalis*, *Fringilla cœlebs*, *Linota cannabina*, *Fringilla montifringilla*, and *Columba palumbus*; *Scolopax rusticula*, a couple caught.

OCTOBER (*continued*).

9th. —S. by W.N.W., light, misty; p.m., clear.

Tinnunculus alaudarius, *Accipiter nisus*, and *Corvus cornix*; *Sturnus vulgaris*, not many; *Turdus musicus* and *T. iliacus*, slight; *Erithacus rubecula*, *Phylloscopus trochilus*, *Regulus cristatus*, *Accentor modularis*, and *Saxicola œnanthe*; *Anthus*, few; *Alauda arvensis*, *A. arborea*, *Otocorys alpestris*, *Fringilla cœlebs*, *F. montifringilla*, *Emberiza schœniclus*, and *Plectrophanes nivalis*; *Scolopax rusticula*, a couple; *Gallinago cœlestis* and *G. gallinula*, some. But slight migration.

10th. —S.W. to W.N.W., fresh, clouded, rain.

Very little migration of above. All singly.

11th. —S.W. to N.W., violent, much rain.

Almost nothing at all. *Falco æsalon*, *Corvus frugilegus*, *Turdus musicus*, *Fringilla cœlebs*, and *F. montifringilla*.

12th. —W.S.W., fresh, clouded.

Very little migration. *Falco peregrinus*, one; *F. æsalon*, a couple; *Regulus cristatus*, *Turdus iliacus*, *Otocorys alpestris*, and *Motacilla alba*, all singly.

13th. —S.W., very violent, slight rain.

No migration whatever. Some *Regulus cristatus*.

14th. —S.W., light rain; p.m., still.

No migration; p.m., Crows, some *Chrysomitris spinus*, *Plectrophanes nivalis*, *Charadrius pluvialis*, *Anthus obscurus*.

15th. —S.W., fresh, vaporous; 3 p.m., S.E., storm.

Early, no migration; forenoon, many *Corvus cornix*; many *Turdus musicus* and *T. iliacus*; *Saxicola œnanthe*; *Anthus pratensis* and *A. obscurus*; many *Fringilla cœlebs* and *F. montifringilla*; few *Alauda arvensis*, *A. arborea*, and *Otocorys alpestris*; noon, extraordinarily many *Anthus pratensis*; many *Turdus torquatus*, *T. merula*, *T. musicus*, and *T. iliacus*. At the outbreak of the S.E. storm, 3 p.m., everything gone.

16th. —S.E., fresh.

Falco æsalon, *Tinnunculus alaudarius*, and *Accipiter nisus*, some; *Corvus cornix* and *C. frugilegus*, very many; *C. monedula*, few; *Sturnus vulgaris*, *Turdus musicus*, and *T. iliacus*, pretty many; *Erithacus rubecula*, many; *Saxicola œnanthe* and *Pratincola rubetra*, pretty many; *Accentor modularis*, *Regulus cristatus*, and *Alauda arvensis*, many; *A. arborea* and *Otocorys alpestris*, some; *Anthus pratensis* and *A. obscurus*, tolerable; *Emberiza schœniclus*

OCTOBER (continued).

and *Plectrophanes nivalis*, not many; *Fringilla cœlebs* and *F. montifringilla*, very many; *Troglodytes parvulus*, pretty many; *Anthus richardi*, *Charadrius plumvialis*, and *Vanellus vulgaris*, some; evening, from 7 to 8.30, *Alauda arvensis* at lighthouse.

17th. —E.S.E., very violent, rain.

Early, nothing; later, all the above singly. One *Falco peregrinus*; *Chrysomitris spinus*, a small flight; *Regulus cristatus*, scattered.

18th. —S., fresh, clouded.

Falco æsalon, *Accipiter nisus*, *Asio accipitrinus*, *Corvus cornix*, and *C. monedula*, but slight; *Sturnus vulgaris*, pretty many; *Turdus torquatus* and *T. pilaris*, some; *T. musicus* and *T. iliacus*, pretty many; *Erithacus rubecula*, *Ruticilla phœnicurus*, *Regulus cristatus*, and *Saxicola œnanthe*, some; *Accentor modularis* and *Troglodytes parvulus*, many; *Anthus pratensis* and *A. obscurus*, many; *Motacilla alba*, some; *Alauda arvensis*, pretty many; *A. arborea* and *Otocorys alpestris*, some; *Emberiza schœniclus*, many; *Plectrophanes nivalis*, fewer; *Fringilla cœlebs* and *F. montifringilla*, many; *Chrysomitris spinus*, some; *Scolopax rusticula*, five or six shot.

19th. —E.S.E., light, clear, fine.

Aquila albicilla, one; *Falco peregrinus*, *F. æsalon*, *Accipiter nisus*, and *Corvus frugilegus*; *C. monedula*, many; *C. cornix*, fewer; *Sturnus vulgaris*, many flights; *Turdus musicus* and *T. iliacus*, tolerable; *T. viscivorus*, *T. pilaris*, and *T. torquatus*, some; *Erithacus rubecula*, pretty many; *Sylvia hortensis*, few; *Regulus cristatus*, pretty many; *Accentor modularis*, many; *Plectrophanes nivalis*, small party; *Fringilla cœlebs*, many; *F. montifringilla*, fewer; *Chrysomitris spinus* and *Linota cannabina*, pretty many; *Alauda arvensis* and *Otocorys alpestris*, many; *Alauda arborea* and *A. cristata*, a couple; *Scolopax rusticula*, seven or eight shot.

20th. —E.S.E., fresh, overcast; p.m., E.

All above; but slight migration. Pretty many *Fringillinae* and *Troglodytes parvulus*; thirty-four *Scolopax rusticula* captured.

21st. —S.S.W., slight, overcast.

Very few singly of above. No *Scolopax rusticula*; *Gallinago cœlestis*, a couple.

OCTOBER (*continued*).

22nd.—N.W., still, light, overcast.

Almost no migration whatever. Singly: *Falco peregrinus*, *Tinnunculus alaudarius*, *Turdus merula*, *T. musicus*, *T. iliacus*, *Alauda arvensis*, *A. arborea*, *Otocorys alpestris*, *Anthinæ*, *Fringillinæ*, etc.; three or four *Scolopax rusticula* captured.

23rd.—N.W., early; later, E., slight, overcast.

Slight migration of above. *Emberiza citrinella* and *Parus major*, some; eighteen or twenty *Scolopax rusticula*. In evening, dark sky, much migration at lighthouse, especially *Turdus torquatus*; *Alauda*, fewer; *Sturnus*, *Limosa*, and *Tringa*.

24th.—E., fresh.

Not much migration. *Falco æsalon*, *Tinnunculus alaudarius*, *Accipiter nisus*, *Sturnus vulgaris*, *Turdus merula*, *T. musicus*, *T. iliacus*, *T. pilaris*, *Erithacus rubecula*, *Accentor modularis*, *Troglodytes parvulus*, *Regulus cristatus*, *Parus major*, and two or three *Scolopax rusticula*, all scattered.

25th.—E.S.E., violent, clear.

Falco peregrinus, *F. æsalon*, *Tinnunculus alaudarius*, *Accipiter nisus*, *Asio accipitrinus*, and *Asio otus*; *Corvus cornix*, immense flights of thousands continually overhead; *Sturnus vulgaris*, *Turdus merula*, *T. musicus*, *T. iliacus*, and *T. pilaris*, all but few; *Erithacus rubecula*, *Accentor modularis*, *Regulus cristatus*, *Troglodytes parvulus*, *Emberiza citrinella*, *E. schoeniclus*, *Plectrophanes nivalis*, *Parus major*, *Fringilla cœlebs*, *F. montifringilla*, *Linota flavirostris*, *Alauda arvensis*, *Otocorys alpestris*, and *Hirundo rustica*; *Scolopax rusticula*, a couple; *Gallinago cœlestis*, some. P.m., very many *Accipiter nisus*; otherwise migration trifling.

26th.—S.E., fresh, clouded.

Slight migration of above; *Cotile riparia*; only one *Scolopax rusticula* shot.

27th.—S.E., stormy, clouded.

Nothing. *Aquila albicilla*, one shot, fell into the sea; *Falco peregrinus* and *Accipiter nisus*. Afternoon, pretty many *Accipiter nisus* and *Fringilla cœlebs*.

28th.—S.E., violent, scattered clouds.

Little migration. *Falco peregrinus*, *Tinnunculus alaudarius*, *Accipiter nisus*, *Buteo vulgaris*, *Pernis apivorus*,

OCTOBER (*continued*).

and *Asio accipitrinus*; *Corvus cornix*, pretty many; *Sturnus vulgaris*, not many; *Turdus musicus*, few; *Alauda*, *Anthus*, *Emberiza*, *Fringilla*, *Parus*, *Accentor*, *Regulus*, and *Trochilus*, all very scattered; *Linota flavirostris*, a small flight.

29th.—S., fresh, clear; night, frost, horizon misty.

Very little migration of above. *Archibuteo lagopus*, one.

No *Scolopax rusticula*.

30th.—W., feeble, dew, frost, fog.

Almost nothing at all. *Asio accipitrinus*, *Corvus cornix*, *Turdus pilaris*, *T. merula*, *T. musicus*, *Erithacus rubecula*, *Regulus cristatus*, *Accentor modularis*, *Anthus pratensis*, *A. obscurus*, *Alauda arvensis*, *Otocorys alpestris*, *Fringilla cælebs*, *F. montifringilla*, *Columba palumbus*; eight or ten *Scolopax rusticula*; *Emberiza cia*, one.

31st.—S.E., slight; night and early, fog, rain.

No migration. Above singly. *Anthus richardi*, one.

November.

1st.—S.E.; early, cloudy.

Almost nothing. *Corvus cornix*, *C. monedula*, *Sturnus vulgaris*, *Turdus merula*, *T. musicus*, and *T. pilaris*, few; *Alauda arvensis*, *Anthus pratensis*, *A. obscurus*, *Emberiza citrinella*, *Fringilla cælebs*, *Erithacus rubecula*, and *Troglodytes parvulus*. All very singly.

2nd.—S.S.W.; night, fog; early, S.S.E., fog.

No migration. *Asio otus*, a couple; *Sturnus vulgaris*, few; singly *Turdus*, *Anthus*, *Emberiza citrinella*, *Erithacus rubecula*, *Sylvia hortensis*, *Regulus cristatus*, and *Parus major*; *Rallus aquaticus*, one.

3rd.—S.S.W., light dust-rain.

No migration. Afternoon, storm-warning. Storm-centre, Hebrides. *Pandion haliaetus* and *Falco peregrinus*; singly *Turdus*, *Anthus*, *Alauda*, *Fringilla*, *Erithacus rubecula*, *Troglodytes parvulus*, and *Parus major*; *Gallinago cælestis*, a couple.

4th.—W.S.W., violent, rain.

Nothing. Singly *Turdus*, *Alauda*, *Anthus*, *Erithacus rubecula*, *Regulus cristatus*, *Parus major*, and *Scolopax rusticula*.

5th.—S.S.W., fresh, clouded.

No migration at all. Single stragglers as above.

NOVEMBER (*continued*).

6th. —S. W., violent, chasing clouds.

No migration.

7th. —S. W. to W., very violent, thick, storm and rain-clouds.

Nothing.

8th. —W., light, overcast, rain.

Little migration. *Asio accipitrinus*, *Corvus cornix*, *C. monedula*, *Sturnus vulgaris*, *Turdus pilaris*, *T. merula*, *T. iliacus*, *Alauda arvensis*, *Otocorys alpestris*, *Plectrophanes nivalis*; thirty or forty *Scolopax rusticula* shot.

9th. —E. S. E., violent, rain; p. m., E. N. E.

Little migration. The above in few numbers. *Numenius arquata*; *Phylloscopus superciliosus*, one; *Scolopax rusticula*, four or five.

10th. —S. W. to E. S. E., slight, overcast.

Slight migration. *Asio accipitrinus*, *A. otus*; *Corvus cornix*, small flights; *Turdus pilaris*, pretty many; *T. merula*, *T. musicus*, and *T. iliacus*, few; *Erithacus rubecula*, *Regulus ignicapillus*, *Troglodytes parvulus*, *Parus major*, some; *Anthus*, few; *Alauda arvensis*, pretty many; *A. arborea* and *Otocorys alpestris*, fewer; *Emberiza citrinella* and *E. miliaria*, some; *Plectrophanes nivalis*, a flight; *Numenius arquata*, migrating; *Scolopax rusticula*, one.

11th. —S. E. to W. S. W., fresh, dull.

Little migration. *Falco peregrinus*, *Asio accipitrinus*, *Corvus cornix*, *Turdus pilaris*, *T. iliacus*, *Alauda arvensis*, *A. arborea*, *Otocorys alpestris*, *Erithacus rubecula*, *Emberiza citrinella*, *Plectrophanes nivalis*, *Linota flavirostris*, and *Parus major*, all but scattered; *Scolopax rusticula*, a couple.

12th. —S. S. E. and S., moderate, clouded.

Little migration. *Asio accipitrinus*, some; *Corvus cornix*, several small flights; *Turdus pilaris*, *T. iliacus*, and *Alauda arvensis*; *Otocorys alpestris*, pretty many; *Alauda arborea*, some; *Erithacus rubecula*, still some; *Emberiza citrinella*, *Plectrophanes nivalis*, and *Parus major*; five or six *Scolopax rusticula* shot.

13th. —S. S. W., violent, thick, rain.

No migration.

14th. —W. S. W., moderate; p. m., N. W., rain.

Little migration. *Corvus frugilegus*, a small flight; the above scattered; still some *Accentor modularis*;

NOVEMBER (*continued*).

Columba palumbus, a couple; five or six *Scolopax rusticula* shot.

15th. —N.E. to S.E., slight.

Little migration. *Corvus cornix*; *C. frugilegus*, a few small flights; *Turdus pilaris*, *T. merula*, *T. iliacus*, *Alauda arvensis*, *Anthus pratensis*, *Erithacus rubecula*, *Accentor modularis*, *Pratincola rubicola*, *Emberiza citrinella*, *E. schoeniclus*, *Plectrophanes nivalis*, and *Troglodytes parvulus*.

16th. —W.S.W., moderate, rain, thick.

Nothing. *Asio otus*, a couple; the above singly.

17th. —S.W., violent, overcast, rain.

Nothing.

18th. —W. and W.N.W., windy, rain squalls.

Turdus merula, scattered; *Alauda arvensis*, some; some *Scolopax rusticula*.

19th. —N.N.E., stiller, clear.

Little migration. *Corvus cornix* and *C. frugilegus*, still tolerable flights; *Turdus pilaris*, *T. merula*, and *T. musicus*, some; *Motacilla lugubris*, in winter plumage, one; *Alauda arvensis* and *Otocorys alpestris*, pretty many; *Linota flavirostris*, a flight of thirty to forty; three or four *Scolopax rusticula* shot.

20th. —S., slight, fine weather.

Somewhat more migration. *Corvus cornix* and *C. frugilegus*, yet pretty many; *Turdus merula*, *T. musicus*, *Erithacus rubecula*, *Accentor modularis*, and *Anthus pratensis*, pretty many; *A. richardi*, a couple; *Alauda arvensis* and *Otocorys alpestris*, few; *Emberiza citrinella* and *Plectrophanes nivalis*, some; *Fringilla cœlebs*, *F. montifringilla*, and *Linota cannabina*, tolerable; *Parus major*, some; *Scolopax rusticula*, five or six shot.

21st. —W. to N.E., fresh, cold.

Migration becomes very slight. *Turdus merula*, some.

22nd. —N.E., moderate, clear, cold.

Corvus cornix, a small flight.

23rd. —E. and E.N.E., slight, clear.

Turdus merula, few; *Alauda arvensis* and *Emberiza nivalis*, pretty many; *Linota flavirostris*, a small flight; three or four *Scolopax rusticula* shot; *Corvus cornix*, some.

NOVEMBER (continued).

24th. —N.W., moderate, clouded.

Falco peregrinus, one; *Turdus merula*, *Alauda arvensis*, and *Emberiza nivalis*, some; *Scolopax rusticula*, one shot.

25th. —N.N.W., fresh.

Falco aesalon, one old bird; *Alauda arborea* and *Emberiza schæniclus*.

26th. —N.N.W., strong, up to end of month N.N.W. and N.; 30th, W.S.W.

Very singly *Turdus merula* and *Alauda arvensis*.

December.

1st and 2nd.—N.W., violent hail-squalls.

Lomvia troile, thousands in the cliffs at the hatch-ridges.

3rd. —N. by W., slight, with hail-squalls, fresh.

Accipiter nisus, one; *Turdus pilaris* and *T. merula*, some; *Scolopax rusticula*, two or three; *Charadrius pluvialis*, early, several flights.

4th. —S.W., very violent, overcast.

Nothing. Some *Turdus pilaris*.

5th. —W., fresh to violent; night, storm, No. 9.

6th. —W.N. to N.W., violent.

Nothing. *Parus major*, some; *Plectrophanes nivalis*, a flight.

7th. —Still, rain, depression West of Scandinavia; night, lightning, thunder, hail, W., stormy.

Otocorys alpestris, some; *Plectrophanes nivalis*, few; *Scolopax rusticula*, one.

8th. —S.W., very stormy, thick, low minimum N.W. Island, 705!!!

9th. —S.W. to S.S.W., very stormy to No. 11, minimum over North Sea, 710!!!

10th. —S.W., stormy, somewhat better. Barometer commences to rise.

11th and 12th.—S.W., violent, rain.

13th. —W.N.W., violent, clouded.

14th. —N.W., more moderate, clear; evening, still, easterly.

Otocorys alpestris, very many overhead; *Turdus merula*, *Erithacus rubecula*, *Fringilla cælebs*, and *Parus major*, some; *Plectrophanes nivalis* and *Charadrius pluvialis*, flights.

15th. —S. to S.S.W., stormy, No. 9.

Larus minutus, very many between the two islands.

16th. —Early, S.W., still; evening, N.W., stormy, rain. Barometer rising.

17th. —N.W., fresh, few clouds.

Turdus merula and *T. pilaris*, tolerable; *Plectrophanes nivalis*, a great flight; *Scolopax rusticula* and *Gallinago cælestis*, several.

DECEMBER (*continued*).

18th. —W. and N.W., fresh, snow and hail-squalls.

Turdus merula and *Alauda arvensis*, tolerable; *Scolopax rusticula*, some; *Charadrius plumbealis* and *Tringa alpina*, flight overhead.

19th. —S.E., moderate, clear, some frost.

Corvus cornix, small flights; *Turdus merula* and *T. musicus*, tolerable; *Alauda arvensis* and *Plectrophanes nivalis*, flights; *Fringilla montifringilla*, *Coccothraustes chloris*, and *Linota flavirostris*, pretty many; *Scolopax rusticula*, five or six shot.

20th. —E., slight, clear, some frost.

Accipiter nisus; *Tinnunculus alaudarius*, several; *Corvus cornix*, a few small flights; *Sturnus vulgaris*, several; *Turdus merula* and *T. iliacus*, small party; *Alauda arvensis*, pretty many; *Otocorys alpestris*, fewer; *Plectrophanes nivalis*, *Coccothraustes chloris*, *Linota cannabina*, *Fringilla montifringilla*, and *Linota flavirostris*, pretty many; *Carduelis elegans*, some; *Charadrius plumbealis* and *Numenius arquata*, many overhead; *Scolopax rusticula*, three or four shot; *Anas*, very many over the sea, migrating.

21st. —E., slight, clear.

Turdus merula and *T. iliacus*, several; *Scolopax rusticula*, a couple.

22nd. —E. and S.E., slight, overcast.

Turdus merula and *T. iliacus*, some; *Otocorys alpestris*, tolerable; *Alauda arvensis*, fewer; *Scolopax rusticula*, one.

23rd. —S.E., slight; evening, N.

Turdus merula, some; *Plectrophanes nivalis*, scattered; *Linota flavirostris*, a small flight.

24th. —W.S.W., fresh, rain.

Nothing.

25th. —N.W., fresh, rain squalls.

Nothing.

26th. —W.S.W., fresh, clouded.

Nothing.

27th. —E., fresh, thick, with snow, 1½°.

Nothing.

28th. —W., thick, with rain.

Motacilla citreola (young), very fine specimen shot and preserved; *Asio otus*, one shot; *Sturnus vulgaris*, some; *Turdus pilaris*, one flight; *Motacilla alba*, a couple; *Alauda arvensis*, small flights; *Otocorys alpestris*, several.

DECEMBER (*continued*).

29th. —W., moderate, thick, clouded.

Asio otus, a couple; *Turdus pilaris*, very many;
Alauda arvensis, tolerable party.

30th. —N.E., fresh, thick, clouded, some frost.

Turdus pilaris, a great flight; *Alauda arvensis*, small flights; *Turdus merula*, many during night, also *Charadrius pluvialis* and *Numenius arquata* overhead.

31st. —N.E., slight, misty.

Aquila albicilla, one; *Turdus merula*, pretty many;
T. pilaris, very many; *Otocorys alpestris*, thousands;
Alauda arvensis, many.

CORRECTION.

Under date August 29th and 30th, and September 1st, omit *Sylvia hortensis*, inserted by mistake for *Emberiza hortulana*. Mr. Gätke writes that the former does not occur so early in the year, and commences to appear about the time that *Emberiza hortulana* begins to disappear.—EDS.

NOTES—ORNITHOLOGY.

Late stay of Swift near Rotherham.—I have to report a late appearance of the Swift (*Cypselus apus*), which I think beats the record. Last night (September 16th) one of the members of the Rotherham Naturalists' Society reported that he had just seen a Swift flying around our parish church. I felt very dubious of the fact, and thought it a case of mistaken identity. On reaching the place, however, I saw the bird many times. It appeared weary, and frequently alighted clinging underneath a projecting ledge of the church only a few yards overhead, leaving no doubt as to the fact that it was a Swift. Have you heard of a later occurrence?—F. W. DICKINSON, Rotherham, September 17th, 1887.

Grey Plover and Greenshank in Northumberland.—I have just obtained a very fine specimen of the Grey Plover (*Squatarola helvetica*), immature, shot on the Northumberland coast on the 7th September. This bird is sufficiently rare on the Northumbrian coast to be of interest to naturalists.

An immature specimen of the Greenshank (*Totanus glottis*) was also shot on this coast on the 16th August.—H. T. ARCHER, Newcastle-on-Tyne, 15th September, 1887.

Kingfisher and Sparrowhawk.—Early this year I was standing by the Fell Beck, I heard a scream of a Sparrowhawk (*Accipiter nisus*), which was in pursuit of a Kingfisher (*Alcedo ispida*), which on the Hawk nearing 'ducked' into the stream, to be re-pursued on appearing. This occurred several times and no doubt would have ended badly for the Kingfisher had I not interfered to save it.—JOE KIRKBY, Brimham, August 1887.

Extraordinary behaviour of a Kestrel.—On the 10th of April a Kestrel (*Tinnunculus alaudarius*) was observed in hot pursuit of a Pipit, which alighted close to a feeding horse for protection, whereupon the Kestrel perched upon the horse's back for a few moments on look-out for its quarry.—W. STOREY, Pateley Bridge, August 1887.

LINCOLNSHIRE BOG AND MOORLAND PLANTS.

REV. WILLIAM FOWLER, M.A.,

Vicar of Liversedge, Yorkshire; Vice-President of the Yorkshire Naturalists' Union.

IN the *Naturalist* for April 1878, I gave a list of Lincolnshire Coast Plants. Those, however, which are found in the bogs and moorland are of greater interest, for two reasons—firstly, because they are less common; and secondly, because they are far more likely than the sea-coast ones to become extinct. Drainage and cultivation have already exterminated several interesting species once known to occur, and there is no reason to doubt that, as the conversion of peat-bogs and warrens into arable land goes on, many others will be sought for in vain. In *South* Lincolnshire there is hardly a place remaining where bog-plants can thrive; and some years ago I used to wonder how it was I never came across plants recorded for that division. But since then I have seen old maps representing the East Fen district (which is now one of fertile corn-fields) as abounding in pools, and have read of the thousands of wild ducks taken in decoys and sent to the London market, as well as of the peat-moss in the neighbourhood of Friskney, from which, in favourable seasons, as many as 4,000 pecks of cranberries were gathered. Most of the Southern division was at one time doubtless an immense swamp, on the sides of and through which any botanist might well love to wander. *Malaxis paludosa* is recorded for Lincolnshire, and may perhaps still be found, but *Senecio paludosus* and *S. palustris* are almost certainly extinct. The best stations for bog and moorland plants are in the *Northern* division, the peat mosses and ‘commons’ that lie at the foot of the Oolitic and Liassic ranges of hills being most productive. In the following list, stations are only given for those plants which, in Lincolnshire, are not common; the plants for which no stations are given may, therefore, be considered as generally occurring in all places suitable to their growth.

Viola palustris. (In a paper on ‘The Botany of Lincolnshire,’ in White’s Directory for 1872, *V. lactea* and *V. stagnina* are said to occur.)

Drosera rotundifolia, D. intermedia, and D. anglica all grow together on Scotton and Manton Commons, and the two former in many other peaty places.

Hypericum elodes. Very fine about Laughton.

Rhamnus Frangula. Tower Moor, Horncastle; Laughton Low Warren.

Genista anglica. Field near Broughton Wood. Manton Common.

Comarum palustre.

Epilobium palustre.

Parnassia palustris.

Hydrocotyle vulgaris. Hamp-dykes, Crosby. Bog near Little Coates. Ferry Flash.

Peucedanum palustre. Laughton Low Warren. Sandtoft, in the Isle of Axholme.

Valeriana dioica.

Carduus pratensis. Laughton Low Warren. Tower Moor, near Horncastle. Manton Common.

Calluna vulgaris.

Erica Tetralix and **E. cinerea.**

Vaccinium oxycoccus.

Gentiana Pneumonanthe. Frodingham and Scotton Commons.

Menyanthes trifoliata.

Myosotis repens.

Pedicularis palustris and **P. sylvatica.**

Veronica scutellata.

Scutellaria minor. Santon Warren.

Pinguicula vulgaris. Manton and Scotton Commons.

Anagallis tenella.

Littorella lacustris. Scotton Common.

Empetrum nigrum. Frodingham Common.

Myrica Gale.

Habenaria bifolia. Skier's Flash, near Haxey. Epworth Turfery.

Epipactis palustris. Ferry Flash, near Owston. Reported also by Mr. Cordeaux as occurring in a bog near Little Coates, Grimsby.

Alisma ranunculoides.

Narthecium ossifragum. Coningsby Pits. Manton Common. Laughton.

Juncus supinus (Moench.), **J. squarrosus**, and **J. bufonius.**

Luzula multiflora.

Potamogeton polygonifolius (Pourr.).

Schœnus nigricans. Coningsby Pits. Manton and Scotton Commons.

Cladium Mariscus. Manton Warren. Peat bogs in the Isle of Axholme.

Rhynchospora alba. Laughton High Warren. Kirkby Moor, near Horncastle.

Blysmus compressus. By the side of a pond in Broughton Wood.

Eriophorum vaginatum and **E. polystachion.**

Carex pulicaris, **C. stellulata**, **C. fulva**, **C. Œderi**, **C. binervis**, **C. ampullacea**, and **C. vesicaria**, are all frequent.

Carex paniculata. Coningsby Pits, and boggy wood in a glen near Nettleton, Caistor.

- Carex elongata** and **C. canescens**. Laughton Low Warren.
Carex filiformis. Pond near Laughton Warren.
Nardus stricta.
Calamagrostis lanceolata. Coningsby Pits.
Molinia cærulea.
Equisetum palustre, with varieties '*polystachium*' and '*nudum*.'
Lastræa Thelypteris. Boggy wood in Nettleton Glen. Manton Common.
Lastræa Oreopteris. About Laughton. Howsham. Scotton Common.
Lastræa spinulosa. Coningsby Pits, Santon Warren, etc. Boothby Wood.
Blechnum boreale.
Osmunda regalis. Santon Warren in 1876, but now, I fear, extinct, having been dug up and taken away to stock gardens!
Lycopodium clavatum. Scotton Common.
Lycopodium alpinum. Crosby Warren in 1857. Now almost certainly extinct, a fir-plantation occupying its former habitat.
Lycopodium inundatum. Damp places on Crosby Warren and Scotton Common.
Selaginella selaginoides. Manton Common.

There seems little reason to doubt that *Vaccinium myrtillus* and *Andromeda polifolia* may yet be found in Lincolnshire, but as yet they are unrecorded.

NOTES—ENTOMOLOGY.

Sphinx convolvuli in Lincolnshire.—On the 22nd September last, and again on the 29th of the same month, a specimen of *S. convolvuli* was brought me. Both were alive. One had been found in a field, and the other on the line of railway in Alford, both by persons quite ignorant of entomology.—R. GARFIT, Alford, 22nd October, 1887.

Sphinx convolvuli in Nottinghamshire.—An example of this moth, in tolerable condition, was captured on the 23rd of August last. It was discovered on the ground, close to the base of a post supporting the gate leading into my yard. It is now in my possession. After setting, it measured exactly four inches across the forewings.—W. A. GAIN, Tuxford, October 23rd, 1887.

NOTE—BOTANY.

Twiggy Mullein (*Verbascum virgatum*) at Wetherby.—There is now (Sept. 21st, 1887) growing in a large gravel-pit, a single specimen of the above rare plant, with very handsome racemes of flowers and fruits, with its characteristic short fascicled flower-stalks, and purple-haired filaments, and flowering in a curiously intermittent way, i.e., fruit, flowers, flower-buds, then fruit, flowers, flower-buds. I have never seen this plant in the gardens here. The pit is dug in a bed of river-gravel (mountain limestone and grit), and the question forces itself to one's mind, Have the seeds of the plant brought centuries ago from the higher reaches of the river been deposited and preserved in the dry gravel, ready to germinate when exposed?—JOHN JACKSON, Wetherby.

OCCURRENCE OF PAGELLUS ACARNE AT WHITBY.

THOMAS STEPHENSON AND FRANCIS DAY, C.I.E., F.L.S., &c.,
Whitby. Cheltenham.

[Mr. Stephenson writes:]

I have great pleasure in communicating the capture off Whitby of a specimen of the Axillary Bream (*Pagellus acarne*), the fact being the more interesting as I cannot find any recorded instance of the capture of this fish on the Yorkshire coast, and therefore conclude that this is another addition to our fauna.

On the 23rd of January last, this Bream was taken off Whitby in the trawl-net of the steam-trawler 'Challenger,' and given to Mr. J. H. Wilson, who, after preserving it, kindly gave it to me to be placed in the Whitby Museum. Not having seen the fish in the flesh, and the colours of this preserved specimen having somewhat faded, I had (though certain it was of the family *Sparidae*) some doubt as to its identification. I therefore, at your suggestion, sent it to Dr. Day for determination; he returned it saying that it was *Pagellus acarne* (Cuv.). This specimen, which was of a fine silvery colour, measures in length from the nose to the extreme point of the caudal fin $10\frac{3}{4}$ in., in girth $8\frac{3}{4}$ in., has fourteen spinal rays in the dorsal fin, one at the anterior portion of each ventral fin, and two at the anterior portion of the anal fin, has no dark spot at the origin of the lateral line like *P. centrodontus* (several fine specimens of which have been landed here lately), and much smaller scales.

[Dr. Day writes as follows:—]

The stuffed specimen of *Pagellus acarne* sent to me from Whitby was about $11\frac{1}{2}$ inches in length, and in fair condition. This species was first recognised by Rondeletius, and although Risso in his 'Ichthyology of Nice,' 1810, re-named it *Sparus berda*, he subsequently, in his work, 'Histoire Naturelle de l'Europe Méridionale,' 1826, reverted to Rondeletius's synonymy, and called it *Pagrus acarne*. Cuvier and Valenciennes drew attention to its teething, etc., and removed it to its present genus, from which period it has been known as *Pagellus acarne*. Present in the Mediterranean, and so far south in the North Atlantic Ocean as the Canary Isles, it has been observed to visit the south coast of Great Britain; and one from Leach's collection is still in the British Museum. It was obtained from Headstow, in Cornwall, and was the example from which Dr. Günther first recognised the species as British. This species was not known as British to Couch or Yarrell, and though probably an occasional visitor, must still be considered as rare. This is the first example recorded from so far north.

Naturalist,

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On a Little-known State of Plumage of the Arctic Tern.—HOWARD SAUNDERS, F.L.S., M.B.O.U.

Botany of the Cumberland part of the Pennine Range.—J. GILBERT BAKER, F.R.S., F.L.S., etc.

List of the Flora of Wensleydale.—JOHN PERCIVAL, B.A.

Leafing of the Oak and Ash.—J. HAGGER.

List of Land and Freshwater Mollusca of Airedale.—H. T. SOPPITT and J. W. CARTER.

Interesting Geological Discovery at Wortley, Leeds.—C. BROWNIDGE, F.G.S.

Coal-Dust and Explosions in Coal-Mines.—REV. ARTHUR WATTS, F.G.S.

Yorkshire Naturalists at Welton Vale, and on Hatfield Chace.

North of England Specimens in the British Museum.—T. D. A. COCKERELL.

The Editors are open to receive suitable papers for insertion, particularly on Botany, Entomology, Ornithology, Geology, etc.

Bibliography for 1885 (continuation) and 1886.

Natural History of Lincolnshire.—The next instalment of this is to be upon the Mammalia, by JOHN CORDEAUX. Schedules have been prepared for obtaining information: one will be sent to anyone willing to furnish notes.

Short Notes.—It is the wish of the Editors to give in each number about a page of short notes in each of the various subjects of which the *Naturalist* takes cognisance. To this end they rely upon their friends keeping them well supplied. At present short notes on Botany, Entomology, Palæontology, Microscopy, Conchology, &c., are particularly desired.

ORNITHOLOGICAL PAPERS

Which have appeared in the 'Naturalist.'

RED-BREASTED FLYCATCHER IN NORTHUMBERLAND.—GEO. BOLAM.

WINTER VISIT TO THE FARNE ISLANDS.—REV. H. H. SLATER, M.A., F.Z.S.

ORNITHOLOGICAL NOTES FROM UPPER COQUETDALE.—J. CORDEAUX, M.B.O.U.

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BOOKS RECEIVED.

- Notarisia, Commentarium Phycologicum, Anno II, No. 8, Ottobre 1887. [G. B. de Toni e David Levi, Redattori.]
- A. Vertebrate Fauna of Caithness, Sutherland, and West Cromarty, by J. A. Harvie-Brown and T. E. Buckley. 8vo., cloth, gilt top, 344 pages, maps, panoramic views, woodcuts, and other illustrations. Edinburgh, 1887. [Authors.]
- The Young Collector's Handbook of Ants, Bees, Dragon-flies, Earwigs, Crickets, and Flies (Hymenoptera, Neuroptera, Orthoptera, Hemiptera, Diptera), by W. Harcourt Bath. Small 8vo., cloth, numerous woodcuts, 108 pages. London, 1887. [Swan Sonnenschein & Co., Publishers.]
- Journal of Conchology, vol. v, No. 8, Oct. 1887. [J. W. Taylor, Editor.]
- Nat. Hist. Journal, vol. xi, No. 98, for Nov. 1887. [Editors, York.]
- The Essex Naturalist, No. 10, for October 1887. [The Essex Field Club.]
- Naturalists' World, vol. iv, No. 47, November 1887. [Percy Lund, Editor.]
- Journal of New York Micro. Soc., vol. iii, No. 4, October 1887. [The Society.]
- The Young Naturalist, Part xcv, for Nov. 1887. [Mr. J. E. Robson, Editor.]
- The Midland Naturalist, vol. x, No. 119, for Nov. 1887. [The Editors, Birmingham.]
- Science Gossip, No. 275, for Nov. 1887. [Messrs. Chatto & Windus, Publishers.]
- Wesley Naturalist, No. 9, November 1887. [The Wesley Scientific Society.]
- Liverpool Geological Association.—Annual Report, 1887, 8vo., 16 pages. [Society.]

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ON A LITTLE-KNOWN STATE OF PLUMAGE
OF THE ARCTIC TERN (*STERNA MACRURA* Naum.).

HOWARD SAUNDERS, F.L.S., F.Z.S.

MR. W. EAGLE CLARKE has kindly presented me with a specimen of the Arctic Tern (*Sterna macrura* Naum.) in a state of plumage not often obtained. It was shot at Spurn Head, Yorkshire, in July 1884, and is evidently a bird hatched in the summer of 1883. In their dried condition the bill, legs, and feet are nearly black (the webs of the latter livid); the forehead white, the crown streaked with black, and the nape almost entirely black. The upper parts are grey as in the adult, except for a dark mottled line indicative of immaturity along the lesser wing-coverts, and the darker tints of the tail feathers, especially on the outer webs; the entire under-parts are pure white. In this plumage a similar specimen, which I examined when in America, was described as a new species under the name of *Sterna portlandica*, by Mr. Ridgway, of Washington, ('American Naturalist,' viii, p. 433, 1874), but the author has long since relegated this name to the list of synonyms of the Arctic Tern. Incidentally it may be mentioned that American ornithologists have decided upon adopting the 10th edition of Linnæus's 'Systema Naturæ' (1758), as their starting point, instead of the 12th (1766); the result being that they call the Arctic Tern *S. paradisæa* Brünnich (1764); and as Keyserling and Blasius have applied the same name to the Roseate Tern, an element of confusion is thereby introduced in this case, as in a great many others. To return to the question of plumage: the mottled garb of the first autumn is well known, but after the young birds have left the immediate vicinity of our shores, very little is seen of them until they return in the second spring in breeding plumage. This intermediate stage is, therefore, seldom observed, and I have only seen five or six. Another American synonym for this species is *S. pikei*. The winter range of the Arctic Tern is very extensive, reaching to Table Bay, and even to the south-east of Madagascar on the one side; and to Arica, in south-western America on the other. The former brings it within a measurable distance of the Islands of St. Paul and Amsterdam, in about 38° S. lat. in the Southern Ocean, the home of the very closely allied *S. vittata*. This species reaches westward to Tristan d'Acunha, and southward to Kerguelen, in about 50° S. lat., where it meets with a much darker species, *S. virgata*, confined, so far as we know at present, to that island. If any reader of the above will enable me to learn which of these two species is found on the more western Crozettes, Marion, and Prince Edward Islands, he will lay me under a great obligation.

FISH-NOTES FROM WHITBY.

THOMAS STEPHENSON.

DURING the past few months the following instances of the capture of uncommon fishes have occurred here to my knowledge :—

Trachinus draco. Greater Weever. Five instances; two of these were caught in the roads off Whitby (August 26th), and are now in the Museum.

Galeus canis. Common Tope. Two instances.

Mugil chelo. Thick-lipped Gray Mullet. One instance, caught in salmon nets, August 24th. Length, $20\frac{1}{2}$ in.; circumference, $11\frac{3}{4}$ in. Now in the Museum. Mr. Martin Simpson, the senior curator of the Whitby Museum, and I concur in thinking this to be *M. chelo*; it has the longitudinal streaks, and very large scales.

Læmargus borealis. Greenland Shark. One, 7 ft. 6 in. long, was caught in August, about twenty-five miles off Whitby, by the crew of the steam fishing-boat 'Albatross,' and brought into this port.

Orthogoriscus mola. Short Sun-fish. One specimen, caught outside the Bell Buoy, floating on the surface of the sea, September 22nd, measuring from tip of dorsal to tip of anal fin, $27\frac{1}{2}$ in.; length from nose to outer edge of caudal fin, 19 in.; length of pectorals, $2\frac{1}{2}$ in.; length of dorsal fin, 9 in.; length of anal fin, $8\frac{1}{2}$ in.; caudal fin, from body to outer edge, $3\frac{1}{4}$ in.; gape, $1\frac{1}{8}$ in. The stomach contained nothing but a brown slimy substance, resembling digested sea-weed. From the sides of this fish I took two parasites, which Dr. Day has pronounced to be *Tristoma coccineum*.

NOTE—ORNITHOLOGY.

The Sooty Shearwater.—Since writing my note for your October issue upon the occurrence of a pair of Sooty Shearwaters (*Puffinus griseus*) on our Yorkshire coast, I have examined two more out of a collection of four examples of this uncommon bird, which were shot on the 26th of August at Filey. I have also had a newspaper sent to me containing an account of a Sooty Shearwater captured at Newbiggin-by-Sea (Northumberland), also during the month of August. This I omitted to mention before, as I had not actually seen the specimen in question myself, nor was it shot in my own county; now, however, the capture of four more Sooty Shearwaters in Yorkshire makes the occurrence of the Newbiggin bird all the more likely to be correct, and I have therefore thought well to mention it, though by whom the account was written I know not. There have, therefore, now been recorded about half as many Sooty Shearwaters shot during a single month as have ever been met with so far as is known in Great Britain. The advent of such a number of a species so comparatively little known anywhere in the world is certainly remarkable and somewhat difficult to account for. It will be interesting to hear reports from Heligoland and other migration observatories, for it seems hardly probable that our English shores should be the only ones chosen for a visit from this rara avis of the antipodes. The Filey specimens may be seen at Mr. C. Helstrip's, of St. Saviour's Place, York.—J. BACKHOUSE, Jun.

[Mr. Backhouse is hardly correct in his estimate of the scarcity of this species; I know that the Sooty Shearwater occurs almost annually on the Yorkshire coast, especially at Flamborough, and is very much more frequent in its occurrence than the Great Shearwater.—W.E.C.]

Naturalist,

NOTES ON BRITISH LICHENS:
LECANORA MURORUM AND ITS MORE IMMEDIATE
ALLIES.

JOSEPH A. MARTINDALE,
Staveley, near Kendal, Westmorland.

MUCH fresh light has recently been cast on the species allied to *Lecanora murorum* (Hoffm.) Nyl. (*Placodium* Leight. Lich. Flora), as well as on the limits of the species itself, by continental botanists, and more especially by Dr. Nylander in the pages of 'Flora,' and it may, perhaps, be of some service to point out the characters of the British members of the group by the aid of information derived from those sources.

Formerly too much reliance was placed on external appearance, as on colour, in determining the species, while the definite and trustworthy characters to be derived from a careful examination of the apothecia and spermogonia were but little regarded. With respect to colour, Dr. Nylander has pointed out that all the yellow *Placodia* readily assume a more or less miniate hue when growing in dry and open situations. Nothing, certainly, can well present a greater contrast to the eye than a deep red '*obliterata*' set by the side of a pale yellow or vitelline *lobulata*, or than a '*miniata*' beside a pale greenish-yellow form of *tegularis*; but the fallaciousness of resting specific distinctions on such contrasts is readily seen when the identity of the apothecia and spores in these cases is proved by examination, more especially as plants of intermediate shades connect the two extremes.

But if placing undue importance on colour has led to the making of bad species, the trusting too much to another external matter, the pulverulence which more or less covers certain species, has also led to false division, as where plants really belonging to *sympagea* are confounded with *murorum*. Certainly the evidence afforded by the spores and spermatia as to specific relationship is much stronger than that of a variable suffusion of the thallus. If species are to be correctly recognised, the characters afforded by the apothecia and their contents, and by the spermatia, must be held to be of fundamental importance. Guided by these it will, I believe, be possible to refer, with a great deal of precision, to their proper species forms which would otherwise be most perplexing, or at best uncertain.

The following descriptions are limited to the more immediate allies of *L. murorum*, that is, those with a distinctly flavescent thallus

and placodine, or polari-bilocular spores. *L. fulgens*, on account of its simple spores, and *L. teicholyta* and *L. Lallavei*, from their different aspect, are in no danger of being confounded with any of them. The *Placodium citrinum* of Leighton's Lichen Flora belongs to another group, that of *Lecanora cerina*.

* Spermata very minute, Spores ellipsoid or oblongo-ellipsoid, not swollen in the middle.

Lecanora elegans (Link. in Ann. Bot., i, 37, A.D. 1794); Ach., Syn., p. 182; Nyl., Flora, 1883, p. 105. *Placodium miniatum*, pro parte, Leight., Lich. Flora, 3rd ed., p. 162.

Exs.—Moug. et Nestl., 354; Schär., 338, 545; Hepp., 195; Mass., 104; Anz., It. S., 133a.

Thallus appressed, laciniate; laciniaë radiating, discrete or subdiscrete, linear, 5-1.5 mm. broad, flexuose, convex, multifid, naked, generally dark orange red, but varying to rich orange yellow above, nearly white below.

Apothecia concolorous; at first concave, afterwards nearly plane, surrounded by a generally perfectly entire border, though apothecia with crenulated borders are not unknown (Nyl., Scand., p. 137). *Paraphyses* stoutish, articulated, free, slightly branched near the apex, two or three of the uppermost cells frequently much swollen. *Spores* ellipsoid, 0.011-0.016 mm. long and 0.006-0.009 mm. broad.

Spermogonia very minute, dark red externally. *Spermata* borne on arthrosterigmata, straight, 0.002-0.0025 mm. long and 0.0005-0.0008 mm. broad.

β tenuis (Whlbn., Lapp., p. 417, A.D. 1812); Ach., Syn., p. 183. *Placodium elegans* var. *discreta* Mudd, Man., p. 101. *Placodium elegans* Leight., Lich. Flora, p. 163.

Exs.—Schär., 481; Hepp., 906; Anz., It. S., 133c.

Differing from the type, which it graduates into, only in its smaller size and in its narrower subfiliform laciniaë, which are about 0.25 mm. broad.

On alpine and sub-alpine rocks. More particularly a plant of northern regions and high elevations, but descending to lower latitudes and levels.

Grampian Mountains in Scotland, somewhat rare. Var. *tenuis* on Whimbold Rocks, New Radnor, Wales (Joshua), and Craig Guie in Scotland (Crombie).

Leighton joins the miniate forms of *regularis* to *elegans* to form his *Placodium miniatum*. At all events such seems to be the case from the exsiccati he cites under that species.

2. *Lecanora dissidens* Nyl. in Flora, 1875, p. 298; Leight., Lich. Flora, 3rd ed., p. 161 (as a form of *L. murorum*); *Lichen flavicans* Withering, Arr., 7th ed., vol. iv, p. 21 (fide Crombie in Grevillea, vol. xii, p. 61).

Thallus appressed, lacinate; laciniae radiating, discrete or sub-discrete, linear, .25-1.0 mm. broad, flat or slightly convex, torulose, multifid, slightly rough on the upper surface, vitelline or sub-miniate.

Apothecia having the disc deeper coloured than the thallus, plane almost from the first, surrounded by a paler border, which, at first entire, becomes crenulated or jagged when old. *Paraphyses* stoutish, articulate, often much branched from the middle upwards, upper cells swollen. *Spores* ellipsoid, .009-.016 mm. long and .005-.007 mm. broad.

Spermogonia very minute and difficult to detect. *Spermatia* borne on arthrosterigmata, straight, rod-like, .002-.003 mm. long and .0005-.0006 mm. broad.

On rocks, walls, and tiled roofs.

Distribution not made out, but probably widely diffused. Nylander founded the species on plants gathered near Cirencester by Mr. Joshua. Distributed through Westmorland from Arnside in the south to Eamont Bridge in the north. In some places abundant on roofs of farm-buildings.

3. *Lecanora scopularis* Nyl. in Flora, 1883, p. 105.

Exs.—Norrlin, H. L. F., 280; Fries and Stenh., 391a.

Thallus small, closely adnate, lobato-lacinate; segments radiating, hardly discrete, linear, .25 mm. broad, somewhat rigid, convex, naked, vitelline or subminiate.

Apothecia concolorous with the thallus, border entire. *Paraphyses* slender, branched, the upper cells gradually increasing in width, but not to such a degree as in the two preceding species or in *murorum*, apical cells oblong or subspherical, .003-.005 mm. broad. *Spores* ellipsoid, .009-.017 mm. long and .005-.007 mm. broad.

Spermogonia minute. *Spermatia* '.0025 mm. long and .0005-.0006 mm. broad,' Nyl., l.c.

On maritime rocks, Portlethen, Kincardineshire (Cromb.). I have only seen continental specimens gathered near Viborg by Wainio, and kindly sent me by Prof. Norrlin, of Helsingfors. These specimens, unfortunately, are without spermogonia.

4. **Lecanora lobulata** Smrft., Lapp., p. 87, A.D. 1826; Nyl., Flora, 1883, p. 105. *Placodium murorum* v. *lobulatum* Leight., Lich. Flora, p. 161, and *P. miniatum* v. *obliteratum* Ibid., p. 162.

Exs.—Hepp., 71; Anz., Langob., 275a; Leight., 207; Mudd., 95; Larb., Lich. Herb., 295.

Thallus areolate or subsquamuloso-lobulate, not radiating, areolæ scattered or contiguous, effuse, imposed upon a pale hypothallus, which often forms a thin subfibrous margin round the plant, vitelline or intensely miniate.

Apothecia with disc generally deeper in colour than the thallus, and having a paler entire border, sometimes becoming obsolete. *Paraphyses* stout, articulate, slightly branched, upper cells much swollen, apical cells subspherical, up to 007 mm. diam. *Spores* ellipsoid, 010-014 mm. long and 005-006 mm. broad.

Spermogonia comparatively large, easily found in the vitelline forms. *Spermatia* oblong or subellipsoid, 002-003 mm. long and 0005-0007 mm. broad.

On maritime rocks. Very abundant in one or other of its forms all round the British Isles. In great profusion on the short piece of Westmorland coast (vitelline form), both forms occurring in the Isle of Man.

Sometimes difficult, or almost impossible, to distinguish from degraded forms of *Lecanora murorum*, unless found accompanied by plants showing the gradual degradation from the type.

5. **Lecanora murorum** (Hoffm., En., p. 62, tab. ix, fig. 2); Nyl. in Flora, 1883, p. 106. *Placodium murorum* Mudd, Man., p. 132, pro parte; Leight., Lich. Flora, 3rd ed., p. 160, pro parte.

Exs.—Schär, 479; Hepp., 196, pro parte; Mass., 97, 98.

Thallus closely adnate, rimoso-areolate at the centre, shortly plicato-lobate at the circumference; lobes crowded, short, sometimes linear, but more frequently broadening anteriorly, so as to assume a triangular outline, flat or slightly convex, thin or somewhat tumid, inciso-crenate at the apices which are often thickened and incurved, rarely quite naked, most frequently albo-suffused, pale yellow to reddish yellow; true colour often concealed beneath a thick white pulverulence.

Apothecia small, deeply coloured, surrounded by an entire paler margin of the same colour and consistence as the

thallus. *Paraphyses* stout, articulated, branched just below the apex, upper cells remarkably swollen, the apical cell $\cdot 006\text{-}\cdot 010$ in diameter. *Spores* ellipsoid, $\cdot 009\text{-}\cdot 015$ mm. long and $\cdot 004\text{-}\cdot 007$ mm. broad. In some plants the spores do not exceed $\cdot 013$ mm. in length, but have the usual breadth.

Spermogonia minute, reddish. *Spermatia* borne on arthrosterigmata, straight, $\cdot 0025\text{-}\cdot 003$ mm. long and $\cdot 0005\text{-}\cdot 0007$ mm. broad.

On limestone walls and on mortar.

Distribution unknown, owing to the confusion between it, *sympagea*, and other species. I have recently gathered a thin naked form of it at Heversham, Kendal, and Shap, but only sparingly at each place. From *sympagea*, which has often been called *murorum*, it may be known at once by its ellipsoid spores and shorter spermatia. All the exsiccati quoted in Leighton's 3rd edition, with the exception of Hepp., 196, are *sympagea*. In the 1st edition of the work he quoted Schär., 479, and Mass., 97, 98, which belong to the true *murorum*, but these he has omitted in his last edition.

6. **Lecanora decipiens* (Arn. in Flora, 1866, p. 529); Nyl. in Flora, 1883, p. 106; Leight., Lich. Flora, p. 161.

Exs.—Hepp., 196, pro parte; Rabh., 904; Arn., 222b, 445; Rabh., 850 (state).

Thallus closely adnate, verrucose at the centre, shortly plicatolobate at the circumference: central warts, turgid, rounded, crowded, often breaking up into pulverulent soredia; peripheral lobes radiating, sub-imbricate, convex, thick, varying from $\cdot 3$ to 1 mm. broad, widening towards the front before branching, apices incurved, crenato-incised, surface very rough, yellow.

Apothecia sunk among the centre verrucæ, with a fulvous or reddish or sometimes white pruinose disc, surrounded by a rough entire border which is eventually somewhat granulato-crenate or sometimes obsolete. *Paraphyses* stout, articulated, shortly and sometimes crowdedly branched just below the apex, two or three upper cells enlarged, apical cell subspherical, $\cdot 005\text{-}\cdot 006$ mm. diam. *Spores* oblong or oblongo-ellipsoid with blunt ends, $\cdot 010$ to $\cdot 017$ mm. long and $\cdot 004\text{-}\cdot 007$ mm. broad.

Spermogonia minute. *Spermatia* borne on arthrosterigmata, oblongo-bacilliform, $\cdot 003\text{-}\cdot 0035$ mm. long, $\cdot 0007\text{-}\cdot 0009$ mm. broad, Nyl., l.c.

The preceding description is that of the form considered by Dr. Arnold to be the type of the species. It is distinguished from *murorum* by the larger and more turgid thallus, often forming rounded verrucose swellings and breaking out into soredia, by the more oblong and larger spores, and by the somewhat larger spermatia. Dr. Nylander has expressed the belief that perhaps this is the true *Lichen murorum* of Hoffman. States occur more or less different externally. In one the thallus becomes effuse, or nearly so, the peripheral lobes being very irregularly produced. In this state the plant has a softer look, and a smoother surface, covered slightly with a fine mealiness. In another state represented by Rabh., Exs. 850, the thallus is not so turgid, hardly verrucose, but breaking up into soredia here and there as in the typical form. The spores are quite similar in all the forms, and are peculiarly liable to deformations, being often curved and sometimes narrower in the middle than at the ends. The polar cells take on very irregular shapes, each being often nearly divided in two, and in extreme cases the spore resembles that of *Lecanora tetrastricha* Nyl. They are also sometimes simply uniseptate.

I do not know whether the type occurs in Britain or not. Leighton quotes Arnold, Exs., 382a, 382b as identical with the plant he refers to *decipiens*, but neither of these numbers is typical. He seems, furthermore, to have been guided entirely by external appearance, not mentioning, in his account of the species, the size of the spores nor describing their shape correctly. The plant, referred to by Leighton (l.c.), as gathered at Weston, in Oxfordshire, and presumably the same as published by Lorbalestier, Lich. Herb., No. 51, is not *decipiens* at all, but *tegularis*. I have gathered at Shap, on limestone walls, a form which agrees fairly well with Rabh., Exs., 850, or is intermediate between that and the effuse state above mentioned.

7. *Lecanora tegularis* (Ehrh., Exs. 304; Hoffm., Flora Germ., p. 158); Nyl., Flora, 1883, p. 106. *Placodium miniatum* pro parte, Leight. Lich. Flora, p. 162. *Lecanora pusilla* Auctorum pro parte.

Thallus closely adnate, orbicular or broken and somewhat dispersed, rimoso- or diffracto-areolate at the centre, plicatolobate at the circumference; lobes very short, convex, incised or crenate, naked or albo-suffused, pale yellow, vitellinous subminiata or miniata.

Apothecia often very numerous and crowded at the centre, which they then completely hide, concave at first, afterwards plane; disc deeper coloured than the thallus or concolorous, surrounded by an entire margin. *Paraphyses* of irregular thickness, articulate, upper cells gradually widening, apical cell oblong or spherical, '005-'008 mm. in diameter. *Spores* ellipsoid or oblongo-ellipsoid, '009-'011 mm. long and '0035-'0045 ('005) mm. broad (Nyl.).

Spermogonia minute, slightly prominent, reddish. *Spermatia* borne on arthrosterigmata, straight, '0025-'003 mm. long and '0005-'0007 mm. broad.

On stones of all sorts, limestone, sandstone, slate.

Distribution unknown, probably very common. I have gathered it in all parts of Westmorland.

This species is little understood, and is often confounded with *murorum*, and sometimes called *miniata*, at others *pusilla*. Both *pusilla* and *miniata* of authors embrace a large number of heterogeneous things. The plants growing on hard rocks and in open and dry situations are often intensely miniate and naked; those, on the other hand, growing on limestone and in moist situations are most frequently vitelline and albo-suffused. The margins of the apothecia vary according to the varying thallus, being thick and mealy in the suffused states, and thin and shining in the naked.

8. **Lecanora obiiterascens* Nyl. in Flora, 1883, p. 99.

Thallus closely adnate, minutely areolate, here and there minutely lobato-squamulose, resembling that of *Lecanora lobulata*, orange yellow or subminiate.

Apothecia with a deeper coloured disc and thin margin, plane, eventually somewhat convex. *Paraphyses* stoutish, articulate, sparingly branched, uppermost cell (or two upper) swollen, subspherical, '004-'007 mm. diam. *Spores* ellipsoid, '008-'011 mm. long, '004-'005 mm. broad.

Spermatia ?

On rocks of all kinds, limestone, granite, serpentine, sandstone. Rocks, Craig Tulloch, Blair Athole (Crombie).

I have only seen one small specimen, which is without spermogones, gathered in the Haute Vienne by Mons. Lamy de la Chapelle. The thallus in this specimen is almost covered with the apothecia.

9. ***Lecanora miniatula** Nyl. in Flora, 1883, p. 98.

Thallus closely adnate, very minutely areolate, here and there minutely squamuloso-lobate, subminiata, much resembling *L. obliterascens* and states of *L. lobulata*.

Apothecia very minute, '2 to '4 mm. diameter, concolorous, at first plane with a thin entire border, afterwards slightly convex, the border becoming obsolete. *Paraphyses* stoutish, articulate, sparingly branched, uppermost cells (or two upper) swollen, subspherical, '004-'007 mm. diam. *Spores* ellipsoid, '007-'009 mm. long, '004-'005 mm. broad.

Spermatia ?

On quartzose rocks, Morrone, Braemar (Crombie).

I have only seen one specimen, gathered by Mr. Crombie, which unfortunately is without spermogones. This differs from *L. obliterascens* only in the smaller size of the spores.

10. **Lecanora cirrochroa** Ach., Syn., p. 181, A.D. 1814. Nyl., Lapp., p. 126; Leight., Lich. Flora, p. 161.

Thallus closely adnate, rimoso-areolate in the centre, lacinate at the circumference; laciniae radiating, discrete, or sub-discrete, linear, '125 to '3 mm. broad, convex, naked or sometimes slightly suffused at the apices, which are incurved and entire or sub-incised, vitelline or orange-coloured; both the central areolations and the peripheral laciniae breaking out into round citrine-coloured soredia, which sometimes become confluent.

Apothecia 'minuta, plana, aurantiaca,' Fries, Lich. Scand., p. 171. *Spores* oblong, '012-'016 mm. long, '006-'007 mm. broad, according to Dr. Nylander.

Spermogonia ?

On limestone rocks, Arnbarrow, Milnthorpe, and Levens Park, Westmorland; Brancombe Cliff, Leaton, Devonshire; Alston, Cumberland, fide Rev. W. Johnson. It occurs also in Wales, I believe.

This beautiful species is unfortunately almost barren, and no fruiting specimens have yet been found in Britain. The spermogonia have, I believe, never been observed.

* * *Spermatia* small (longer than in the preceding species); spores swollen in the middle—'lemon-shaped' (Leight.); 'subquadrangular' (Malbranche).

11. **Lecanora callopisma** Ach., Lich. Univ., p. 437, A.D. 1810; Leight., Lich. Flora, 3rd ed., p. 162 (excluding varieties).

Exs.—Schär., 337; Hepp., 907; Mass., 103; Nyl., 36; Arn., 488.

Thallus very closely adnate, rimoso-areolate or continuous at the centre, lobate at the circumference; lobes radiating, soft-looking, 5-1.5 mm. broad, very thin, flattened, contiguous, margins overlapping, becoming obsolete, leaving only very narrow rimæ or shallow channels between the contiguous lobes, apices rounded, pale yellow, bright orange, and sometimes almost red, more or less suffused, and frequently with a white zone just within the circumference.

Apothecia often crowded at the centre; disc plane, darker than the thallus, with a pale entire or slightly crenulated border, which sometimes becomes obsolete. *Paraphyses* lying in most abundant gelatinous matter, slender or stoutish, articulated, upper cells hardly dilated, apical cell 0.002-0.004 mm. broad. *Spores* swelling in the middle, spherical, subspherical, or subquadangular, 0.008-0.012 mm. long, 0.007-0.010 mm. broad.

Spermogonia scattered, more or less prominent, orange or dark brown. *Spermatia* on arthrosterigmata, straight, 0.004-0.005 mm. long, 0.006-0.008 mm. broad.

12. **Lecanora sympagea* (Ach., Prod., p. 105, A.D. 1798); Nyl., Flora, 1883, p. 197. *Physcia aurantia* (Pers.), Arnold, Lich. Fr. Jura, p. 80. *Placodium murorum* Leight., Lich. Flora, 3rd ed., p. 160, pro parte. *P. callopismum* v. *plicatum* and v. *sympageum* Leight., op. cit., p. 162.

Exs.—Hepp., 197; Zw., 58; Leight., 113; Nyl., 119; Mass., 58, 93, 94, 95; Mudd, 94, 96; Anz., 134, 444a; Arn., 381.

Thallus closely adnate, rimoso-areolate or imbricato-squamulose in the centre, plicato-lobate or lobato-laciniate at the circumference; lobes radiating, contiguous subimbricate or subdiscrete, varying in breadth, more or less convex, smooth and naked or suffused, becoming broader anteriorly and sometimes flattened, multifid, apices incurved and subcrenate, bright yellow or dark orange coloured, sometimes white at the centre.

Apothecia crowded or scattered, disc concolorous or rather darker than the thallus; at first plane with an entire border, afterwards convex with the border obsolete. *Paraphyses* conglutinated, stout, articulate, apical cells slightly swollen. *Spores* swollen in the middle, 0.010-0.015 mm. long and 0.007-0.011 mm. broad.

Spermogonia minute, prominent, reddish. *Spermatia* borne on arthrosterigmata, straight, '004-'005 mm. long and '0006-'0008 mm. broad.

On limestone rocks, common and generally distributed; especially abundant on seaside rocks.

A comparison of the exsiccati quoted above with those cited by Leighton under *P. murorum*, will show that he considered certain states of *sympagea* to belong to *murorum*. The spores of the two species ought, however, always to prevent confusion. The affinity of the present species with *callopsima* is very close, and states of the two approximate very much, though in general the stouter, firmer thallus of *sympagea* is very distinct from that of the other.

Acharius, in all his works, marks the plant he describes under the name of *sympagea* as one that he had not seen; but he cites as synonymous Persoon's *Lichen aurantius*. Why, under the circumstances, he changed the name, I do not know.

* * * Plant imperfectly developed.

13. **Lecanora xantholyta** Nyl., Flora, 1879, p. 361, and 1883, p. 107.

Thallus spreading irregularly, quasi-effigurate at the circumference, nearly continuous at the centre, soft, thin, minutely granuloso-leprose, citrine yellow.

Apothecia and *spermogonia* unknown.

On limestone rocks. Probably common in limestone districts, but disregarded.

It has been found in the South of England, near Bangor in Wales, at several places in Westmorland, and in Yorkshire.

Dr. Nylander considers it to have some affinity with *Lecanora cirrochroa*; but on account of its leprose thallus, and, so far as known, imperfect development, he provisionally places it in a sub-genus, *Leproplaca*.

NOTE—BOTANY.

Carex pendula in Cumberland.—During a few days' sojourn in the northern division of Cumberland, in July of the present year, I explored a part of the parishes of Scaleby, Kirkclinton, Stapleton, Abbey Lanercost, and Arthuret. I found the Great Sedge growing luxuriantly in a wood near Shanks Castle, on the north bank of the river Lyne, below Racks Bridge, and above the junction of Solport Burn with the main river. A little lower down I remarked several fine examples of *Carduus heterophyllus* and *Equisetum maximum*. This latter plant grows abundantly by the little river Cambeck, between Kirkcambeck hamlet and Solemain.—W. HODGSON, A.L.S., Flimby, near Maryport, Nov. 17th, 1887.

THE LEAFING OF THE OAK AND ASH.

J. HAGGER,

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FOR the last seven years I have, in my botanical and other rambles, paid considerable attention to the leafing of the oak and ash, chiefly with the view of ascertaining if any reliance could be placed on the tradition respecting these trees. I endeavoured also to ascertain from farmers, and others most likely to know, what reasons there were for supposing a wet summer might be expected if the ash was in leaf before the oak, or the opposite if the oak had the advantage.

I was rather surprised at the many unsatisfactory answers I received; but the gist of them may be thus expressed: the oak strikes its roots much deeper in the soil than the ash, consequently if it be raining, the moisture sooner reaches the ash and forces it more quickly forward; whilst on the other hand, if the weather be dry the ash is retarded, and the oak, obtaining its support from deeper and moister ground, will take precedence.

Assuming this to be a correct statement, it seems but an equivalent to saying, a wet spring means a wet summer, and vice versâ. Is this found to be the case? My observations do not lead to such a conclusion. I will only mention two instances, well remembered by me, that were quite the opposite. In the year 1860 the spring was very dry, and farmers were looking forward to very light hay crops, yet the summer—if it deserved the name—was the wettest and coldest of which I have any recollection. The year 1881 was very cold and wet during the chief part of July, the whole of August, and early part of September; yet in the spring the rainfall was considerably below the average. I may further mention that in the last-named year if either tree was in advance it was the oak, consequently the summer should have been dry and warm.

The result of my observations leads me to believe that under equally favourable circumstances the oak in leafing never precedes the ash to an appreciable extent. I have come to this conclusion by carefully inspecting all the trees I met with in numerous walks, often covering several miles of country, and also from observations in neighbouring counties. I perfectly well remember the first ramble I took in which I paid special attention to this matter, and was at once convinced that observations to be of any value must embrace as large an area as possible, for in that round of about ten miles I found near home the oaks were a little in advance of their neighbouring ash trees, whilst around the furthest limit of my walk the ash was before the oak.

Subsequent observations showed that atmospheric influence could not be the sole agent, but that situation, and soil, too, had each a share in the general result. With respect to soil, both trees flourish best on good, rich land; but the ash seems more delicate than the oak, and does not thrive so well on poor land. Of the effect of situation I will give an instance. There are two ash trees, equally vigorous, growing in a hedge so near together that a portion of their branches interlace. Their position is such, they equally receive the sun's rays from mid-morning to mid-afternoon, but one tree on its eastern aspect enjoys the sun for some time before he has southed sufficiently to touch the other tree. In consequence of this the tree which first catches the sun has always been in advance of the other for the three years I have had them under observation. I have noted that saplings, whether oak or ash, unless unfavourably placed, commence leafing first, young trees come next, and old ones last of all. In woods trees are not so forward as in open ground, unless it be a few favourably placed on the outskirts.

In the process of leafing, the ash shows to considerable disadvantage. An oak with leaves no further out than those of a neighbouring ash will be perceived at a far greater distance, owing to their much lighter colour, so that a close examination is requisite. If the leafing is to be considered an evidence of vigour, and a waking up from the dormant state of winter, it can scarcely be considered a fair test, for the ash flowers before leafing, which is not the case with the oak, whose flowers do not precede the leaf.

It seems strange that two trees, differing so much in their manner of leafing, should have been chosen as indicators of the kind of weather to follow. In the country remarks on the subject may be heard every spring, and often, from very slight observation, sage predictions made; but I consider them worthless, because they are far oftener contradicted than verified by the subsequent weather.

I may mention that this year, 1887, on the 16th of May, neither oak nor ash were in leaf; but on the 30th of April and also 2nd of May I noticed several ash trees in full flower, whilst the buds on the oak trees had scarcely any appearance of swelling. On May 14th the oak here and there showed plainly in the sun that the buds were swelling, and the flowers of the ash dying away and the samara beginning to form.

NOTES AND NEWS.

It is gratifying to observe that four members of the Executive of the Yorkshire Naturalists' Union were chosen upon various sectional committees of the British Association at the Manchester Meeting, viz., Messrs. J. W. Davis, Halifax (Geology and Anthropology); C. P. Hobkirk, Dewsbury (Biology); Wm. Cash, Halifax (Geology), and S. A. Adamson, Leeds (Geology).

Naturalist,

LEPIDOPTEROUS FAUNA OF LANCASHIRE
AND CHESHIRE.

JOHN W. ELLIS, L.R.C.P., L.R.C.S.E., F.E.S.,

*Liverpool; Honorary Secretary to the Lancashire and Cheshire Entomological Society;
and to the Liverpool Naturalists' Field Club.*

PART VII.—PYRALIDINA.

Fam. *PYRALIDIDÆ*.

AGLOSSA, Latr.

- Aglossa pinguinalis**, L. Common in the neighbourhood of stables.
Aglossa cuprealis, Hübn. Recorded from one (Lancashire) locality only, Barton, by Mr. Chappell.

ASOPIA, Tr. (PYRALIS, L.)

- Asopia glaucinalis**, L. Scarce.
Lanc.—Barton (J.C.); Hale-bank, one specimen (C.S.G.)
Ches.—Carrington (J.C.); Cheadle Hulme (H.H.C.); New Brighton, on one occasion only (J.C.M.).
Asopia farinalis, L. Abundant about stables and granaries.

SCOPARIA, Haw. (EUDOREA, Curt.)

- Scoparia ambigualis**, Tr. Apparently generally distributed throughout both counties.
Scoparia cembræ, Haw. Local, and not common.
Lanc.—Pendleton and Cheetham Hill, near Manchester (J.C.); Windermere, not common (J.B.H.).
Ches.—Birkenhead, one specimen, and Denhall (A.O.W.); Neston and Woodchurch (C.S.G.).
Scoparia dubitalis, Hübn. Recorded from one Lancashire locality, Silverdale, by Mr. Hodgkinson; and from Ledsham, Puddington, and East Cheshire by Mr. Walker.
Scoparia conspicialis, Hodg. Not rare on the Lancashire side of Windermere (J.B.H.).
Scoparia murana, Curt. Local.
Lanc.—Longridge, abundant at light (J.B.H.); Manchester district (Stainton's Manual).
Ches.—Prenton Hill, near Birkenhead (C.S.G.); the wall of Tatton Park (J.C.); Wirral and East Cheshire (A.O.W.).

- Scoparia resinosa**, Haw. Recorded from Croxteth and Allerton Hall (both in Lancashire) by C. S. Gregson; and from the Birkenhead district in Stainton's Manual.
- Scoparia truncicolella**, Staint. Local.
Lanc.—Windermere, not rare (J.B.H.).
Ches.—Dunham Park and Knutsford (J.C.); Prenton Wood (C.S.G.); Wirral, on Scotch fir (A.O.W.).
- Scoparia cratægella**, Hübn. Recorded only from Silverdale and Windermere in Lancashire (J.B.H.); and Bowdon and Bucklow Hill in Cheshire (J.C.).
- Scoparia frequentella**, Sta. (= *mercurella*, L.). Not rare.
Lanc.—Edge Lane and Green Bank, near Liverpool (C.S.G.); Preston district, common (J.B.H.).
Ches.—Bidston Hill (C.S.G., A.O.W.); Ness, Puddington, and East Cheshire (A.O.W.).
- Scoparia angustea**, Steph. Common and generally distributed.
- Scoparia atomalis**, Doubl. Recorded from Longridge, near Preston, by Mr. Hodgkinson.
- Scoparia pallida**, Steph. Local, but common where it does occur.
Lanc.—Chat Moss (J.C.); Simmonswood Moss and Crosby (C.S.G.); Penwortham, near Preston, and Pilling Moss (J.B.H.).
Ches.—Bidston Marsh (C.S.G., J.F.B.); East Cheshire (A.O.W.).

EURRHYPARA, Hübn.

- Eurrhypara (Botys) urticata**, L. Common and generally distributed.

BOTYS, Tr.

- Botys (Ennychia) octomaculata**, Fab. Local, and recorded from Lancashire only, viz., Grange (J.B.H. in E.M.M., vii, 87), and Silverdale and Arnside (S.J.C., J.C.M.).
- Botys (Ennychia) cingulata**, L. Local.
Lanc.—Silverdale, among wild sage (J.B.H.).
Ches.—Wallasey sandhills (J.F.B., C.S.G., G. A. Harker, F.N.P., J.W.E.).
- Botys aurata**, Scop. = **Pyrausta punicealis**, Schiff. Recorded only from Lancashire, viz., Lydiate, scarce (C.S.G.), and Silverdale (J.C.M.).
- Botys (Pyrausta) purpuralis**, L. Local.
Lanc.—Ditton (C.S.G.); Silverdale (S.J.C., J.B.H., J.C.M.).
Ches.—Bollin Valley and Knutsford (J.C.); Parkgate and Sutton (C.S.G.); Ledsham and Wallasey (J.F.B.).

- Botys** (*Pyrausta*) *ostrinalis*, Hübn. Local, but plentiful.
Lanc.—Kenyon (J.C.) and Silverdale (J.C.M.).
Ches.—Knutsford (J.C.); Wallasey sandhills (C.S.G., G. Harker, W.J., F.N.P.).
- Botys** (*Rhodaria*) *sanguinalis*, L. Plentiful among wild thyme on the Wallasey sandhills.
- Botys** (*Herbula*) *cespitalis*, Schiff. Common and generally distributed.
- Botys** *fuscalis*, Schiff. Fairly common.
Lanc.—Manchester district, generally distributed (J.C.); Preston district, common among yellow-rattle (J.B.H.).
Ches.—Bidston marsh, plentiful (C.S.G.); Wirral (J.F.B.).
- Botys** *terrealis*, Tr. Recorded only from Grange, Lancashire, by J. B. Hodgkinson; and from Puddington, Cheshire, a single specimen, by J. F. Brockholes.
- Botys** (*Ebulea*) *crocealis*, Hübn. Local.
Lanc.—Grange (J.B.H. in E.M.M., x, 40); Preston, among flea-bane (Id., in litt.); Kirkby and Lydiate (C.S.G.); Manchester district, common (Stainton's Manual).
Ches.—Bollin Valley (J.C.).
- Botys** (*Ebulea*) *sambucalis*, Schiff. Common and generally distributed.
- Botys** (*Scopula*) *ferrugalis*, Hübn. Local, and not common.
Lanc.—Crosby, a single specimen (G. A. Harker); Lytham, occasionally (J.B.H.).
Ches.—Bidston, Rock Ferry, Ness, Wallasey (J.F.B.); Saughall Massie (C.S.G.).
- Botys** (*Scopula*) *prunalis*, Schiff. Common and generally distributed.
- Botys** (*Scopula*) *olivialis*, Schiff. Common and generally distributed.
- Botys** (*Scopula*) *lutealis*, Haw. Abundant.
- Botys** *pandalis*, Hübn. Recorded only from Castle Mill, Cheshire, by Mr. Chappell, though in Stainton's Manual it is given as occurring in the Manchester district.

EURYCREON, Led. (SPILODES, Guen.)

- Eurycreon** *sticticalis*, L. Rare.
Lanc.—Ashton-under-Lyne (J.C.); Chat Moss (W.J.); Lytham (J.B.H.).
Ches.—Wallasey sandhills, seven specimens recorded by C. S. Gregson, this locality being also referred to by J. F. Brockholes and R. S. Edleston, Zool. 1845, p. 1220.
- Eurycreon** *palealis*, Schiff. Very rare, and only recorded from Lancashire, viz., Barton Moss, a single specimen (J.C.); a

specimen 'at Manchester' (W. P. Weston, Ent., x, 92); a specimen at Seaforth near Bootle, captured August 1876, by William Whitwick, and recorded by T. I. Roxburgh (Ent., ix, 278).

Eurycreon (Botys) verticalis, L. Common, but local.

Lanc.—Liverpool district (probably Wirral is intended) (W.J.).

Ches.—Chester district (A.O.W.); Marple (J.C.); Wallasey (J.C.M.).

NOMOPHILA, Hübn.

Nomophila noctuella, Schiff. = **Stenopteryx hybridalis**, Hübn.
Common and generally distributed.

PSAMOTIS, Hübn. (LEMIODES, Guen.)

Psamotis pulveralis, Hübn. The only record of the occurrence of this species in either of the two counties is 'Stockport, scarce' (R. S. Edleston, Zool., 1845, p. 1220).

PIONEA, Guen.

Pionea forficalis, L. Frequent wherever there are kitchen-gardens.

HYDROCAMPA, Guen.

Hydrocampa stagnata, Don. Fairly common and generally distributed.

Hydrocampa nymphæata, L. Common everywhere.

PARAPONYX, Hübn.

Paraponyx stratiotata, L. Local.

Lanc.—Crosby (G. Harker); Old Trafford (J.C.); Preston Canal, near Salwick (J.B.H.); Silverdale (J.C.M.).

Ches.—Bidston Marsh (C.S.G., J.F.B., F.N.P.); Chester and Ness (A.O.W.); Delamere (J.C.); Dunham Park (J.C.); near Liscard (C.S.G.).

CATACLYSTA, Hübn.

Cataclysta lemnata, L. Abundant everywhere.

Fam. CHILONIDÆ.

SCHENOBIUS, Dup.

Schoenobius forficellus, Thunb. Somewhat local.

Lanc.—Pits near Preston (J.B.H.); Pendleton and Withington.

Ches.—Bidston Marsh and Oxtun, scarce; commoner at Little Neston and Burton; Chester, by the canal, common (A.O.W.); on the canal bank between Macclesfield and Marple, also Cheadle Hulme (H.H.C.); most swampy places, especially at Liscard (C.S.G.).

Schoenobius mucronellus, Schiff. Rare. Liverpool district, probably Bidston marsh (C.S.G.); one specimen among sedges, taken by T. Cooper, on the canal, Preston (J.B.H.).

CHILO, Zinck.

Chilo phragmitellus, Hübn. Recorded from Crosby Marsh (G. A. Harker) and from Bidston Marsh (id., F.N.P., J.F.B.).

Fam. *CRAMBIDÆ*.

CRAMBUS, Fab.

Crambus hamellus, Thunb. Local.

Lanc.—Chat Moss (J.C.).

Ches.—Carrington Moss (J.B.H.); East Cheshire (A.O.W.); rough plantations beyond Eastham (C.S.G.); Lindow Common and Wilmslow (J.C.M.).

Crambus pascuellus, L. Heaths and mosses, plentiful.

Crambus pratellus, L. Abundant.

Crambus dumetellus, Hübn. Local.

Lanc.—Chat Moss (J.C.).

Ches.—Wallasey sandhills (J.F.B., C.S.G.).

Crambus hortuellus, Hübn. Common, but local.

Lanc.—Prestwich (J.C.M.) and the mosses of the Manchester district (J.C.); near Southport (J.B.H.).

Ches.—Lindow Common and Cheadle, abundant but local (H.H.C.); New Brighton (C.S.G.).

Crambus falsellus, Schiff. Very local.

Lanc.—Wall at Hough End Hall, Withington (J.C.).

Ches.—Moss-covered walls near Hooton (C.S.G.); Ness and East Cheshire (A.O.W.).

Crambus pinellus, L. = **pinetellus**, L. Not common.

Lanc.—Barlow Moor and Withington (J.C.); Grange (J.B.H. in E.M.M., vii, p. 87); lanes round Didsbury (Id., in litt.).

Ches.—Near Birkenhead (C.S.G.); Delamere Forest (J.C.M., F.N.P.); East Cheshire (A.O.W.); Lindow Common, on one occasion only (H.H.C.).

Crambus margaritellus, Hübn. Common on the heaths and mosses of Cheshire and South-West Lancashire.

Crambus latistrius, Haw. Local.

Lanc.—Crosby sandhills (C.S.G., W.J.).

Ches.—Wallasey (J.B.H., J.C.M.); Claughton Fir-wood (J.F.B., C.S.G.).

Crambus fureatellus, Zett. A mountain species, recorded from Coniston Old Man by Mr. Hodgkinson.

Crambus culmellus, L. Abundant everywhere.

Crambus inquinatellus, Schiff. Local.

Lanc.—Recorded only from Silverdale (J.B.H.).

Ches.—The Kennel Wood, Hartford (G. Harker, F.N.P.) Hooton (C.S.G.); Wallasey (J.C.).

Crambus geniculellus, Haw. Common on the sandhills of the Lancashire and Cheshire coast.

Crambus contaminellus, Hübn. Local.

Lanc.—Salt marshes near Preston (J.B.H.); near Grange (id. in E.M.M., vii, p. 87).

Ches.—Dee Marsh near Puddington, and Denhall, scarce (A.O.W.).

Crambus tristellus, S.V. Abundant everywhere.

Crambus selasellus, Hübn. Very local.

Lanc.—Banks of the river Alt at Sefton (C.S.G.); Chorlton-cum-Hardy (J.C.); Salt marshes at Preston and Fleetwood (J.B.H. in litt. and Intell., 1858, i, 146).

Ches.—Dee marsh near Puddington (A.O.W.); Heatley (J.C.).

Crambus perlellus, Scop. Local.

Lanc.—Chat Moss (J.C.); Kirkby Moss (C.S.G., G. Harker); Salt marsh near Preston (J.B.H.).

Ches.—Bidston Marsh (F.N.P.); Bidston, Bromborough, Ince, and Puddington, in marshes (A.O.W.).

Crambus Warringtonellus, Staint. On the Lancashire and Cheshire mosses and heaths, often abundant.

EROMENE, Hübn.

Eromene ocellæa, Haw. Recorded only from Eastham Wood (C.S.G., J.B.H.) and Cheshire coast (C.S.G., Ent., iv, pp. 249, 263).

Fam. PHYCIDEÆ.

DIORYCTRIA, Zell.

Dioryctria abietella, Zk. Recorded from one locality only in each county, viz., Silverdale (J.B.H.) and Bidston (W.J.).

NEPHOPTERYX, Zell.

Nephoptyryx spissicella, Fab. = **roborella**, Zinck. Recorded only from Dunham Park, Cheshire (J.C.).

PEMPELIA, Hübn.

Pempelia betulæ, Göze. Recorded only from Lancashire, viz., Chat Moss (J.B.H.); Botany Bay Wood and Woolden Wood, (J.C.).

Pempelia fusca, Haw. = **carbonariella**, Fisch. On heaths and mosses, *plentiful upon the burnt parts*.

Pempelia palumbella, Fab. Heaths and mosses, plentiful.

Pempelia adornatella, Tr. = **dilutella**, Hübn. Recorded from two localities only—Prescot in Lancashire, and Prenton in Cheshire, by Mr. Gregson.

CRYPTOBLABES, Zell.

Cryptoblabes bistriga, Haw. Scarce.

Lanc.—Once in Brockholes Wood, near Preston (J.B.H.); Woolton Wood, near Liverpool, on a single occasion (C.S.G.).

Ches.—Bidston Park Wood (J.F.B.); Dunham Park (J.C.).

ACROBASIS, Zell.

Acrobasis consociella, Hübn. Rare.

Lanc.—Recorded only from Silverdale (J.B.H.).

Ches.—One specimen taken in Clifton Park, Birkenhead (J.F.B.); 'bred from oak-leaves collected at the rough plantation beyond Hooton' (C.S.G.).

Acrobasis tumidella, Zinck. Rare. Mr. Chappell mentions it as rare on Chat Moss, and Mr. Gregson refers to a specimen taken somewhere in Cheshire, in the Liverpool district.

MYELOIS, Zell.

Myelois advenella, Zinck. Recorded only by Mr. Hodgkinson from the banks of the Wyre.

EUZOPHERA, Zell.

(**Euzophera pinguis**, Haw. Recorded from the Birkenhead district in Stainton's Manual, but not mentioned in any of our local lists.)

HOMŒOSOMA, Curt.

Homœosoma nimbella, Zell. Local.

Lanc.—Morecambe (J.B.H.).

Ches.—Wallasey sandhills (J.F.B., C.S.G.); Flaybrick Hill (C.S.G.).

ANERASTIA, Hübn.

Anerastia lotella, Hübn. Abundant, but local, on the Wallasey sandhills. Also recorded from the Lytham sandhills by Mr. Hodgkinson.

EPHESTIA, Guen.

Ephestia elutella, Hübn. Plentiful in the neighbourhood of warehouses in Liverpool, Manchester, Preston, and Knutsford.

Ephestia ficella, Doug. Prestwich (J.C.M.).

Ephestia semirufa, Haw. Plentiful in some Liverpool warehouses (C.S.G.).

Ephestia passulella, Bar. Abundant in a mill at Preston, among oil-cake (J.B.H.).

Ephestia ficulella, Bar. Liverpool warehouses (C.S.G., Ent., v, 385).

Ephestia interpunctella, Hübn. Liverpool warehouses (C.S.G., J.B.H.).

Fam. *GALLERIE*.

APHOMIA, Hübn.

Aphomia sociella, L. Frequent.**Lanc.**—Banks of the Wyre.**Ches.**—Lanes about Wallasey (W.J.); comes to sugar in the plantations at Wallasey (C.S.G.); Burton, Ness, and Puddington (A.O.W.).

ACHRŒA, Hübn.

Achrœa grisella, Fab. = **alvearia**, Fab. Recorded only, as infrequent where bees are kept in the Liverpool district, by Mr. Gregson.

NOTES—ORNITHOLOGY.

Pied Wagtail sitting on Wrens' Eggs.—Whilst walking by a stream in May 1886, I flushed a Pied Wagtail from off her nest. On peeping in I found she had been sitting on five of her own eggs and five of what appeared to be Wrens'. The first named eggs were remarkable for their size, the largest being much above the average size of a Pied Wagtail's egg, whilst the smallest was less than that of a Wren's. The remaining three were intermediate between the largest and smallest. The ground colour of the smallest was a decided grey. The Wrens' eggs were of the usual type.—F. B. WHITLOCK, Nottingham.

Variety of the Grouse.—On the 9th of September a pale variety of the Common Grouse (*Lagopus scoticus*), by dissection a female, was obtained by Mr. S. G. Buxton at Bolsterstone, near Sheffield. The pale tint is chiefly on the upper parts, and as if to make amends the breast is suffused with black. It was exhibited at a meeting of the Norwich Naturalists' Society, and, in the opinion of members present, is a partial melanism and not a hybrid, but all concurred in thinking it a very curious variety.—J. H. GURNEY, junr., Keswick Hall, Norwich, November 3rd, 1887.

NOTE—MOLLUSCA.

Notes on Land and Freshwater Shells near Bridlington.—During a visit to Bridlington I have made a few observations and gathered a little information about the Land and Freshwater Shells of that district, which is, perhaps, partly new. *Anodonta cygnea*, *Planorbis corneus*, and *Limnæa stagnalis* occur in Boynton Fish-pond. Some specimens of the last-named shell have a greatly inflated lip. On the sandhills near Auburn, three miles south of Bridlington Quay, *Helix virgata* occurs very fine, and in great variety, in company with *H. caperata*. *H. caperata* var. *ornata* is very abundant near the North Shore Pavilion. *Pupa marginata* is plentiful near Bampton. *Planorbis vortex* and *Valvata piscinalis* abound in the streams below Driffield. I never saw such quantities of the last-named shell. *Helix arbustorum* occurs on Speeton Cliffs on the slopes below the chalk. At the back of Bridlington Harbour are some freshwater marls. They comprise some inches of earthy marls at the top, and a foot or more of blue marls below. In the upper stratum I found *Limnæa stagnalis*, *L. palustris*, *L. truncatula*, *L. peregra*, *Planorbis spirorbis*, *P. carinatus*, *P. complanatus*, *Succinea putris*, and, most abundant of all, *Bythinia tentaculata*. *Sphærium corneum* and *Pisidium pusillum* occur sparingly. The blue marls contain very few shells. I met with *Pisidium pusillum*, *Sphærium corneum*, and *Valvata piscinalis*, also a single specimen of *Cochlicopa lubrica*. In an excavation now being made at Sewerby, there occurs beneath the purple boulder clay, a quantity of pre-glacial chalk wash, or perhaps rather inter-glacial. Mr. Lamplugh showed me some fragments of shells found in it. The species are *Pupa marginata*, *Helix pulchella*, and *H. hispida*. I found these three species associated under a railway-sleeper at Bampton Station the next day, and reflected that this, at any rate, was a genuine case of eternal friendship!—W. C. HEY, York, Oct. 20, 1887.

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