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THE

NATURALIST:

A

MONTHLY JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND

EDITED BY

THOMAS SHEPPARD, F.G.S., F.S.A. Scot.

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Past President of the Hull Scientific and Field Naturalists' Club, of the Hull Geological Society; Hon. Secretary of the Yorkshire Naturalists' Union; Hon. Life Member of the Spalding Gentlemen's Society; of the Doncaster Scientific Society; etc.

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Prof. PERCY F. KENDALL, M.Sc., F.G.S. — JOHN W. TAYLOR.

T. H. NELSON, M.B.O.U. — WILLIAM WEST, F.L.S.

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AND
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THE NATURALIST

FOR 1910.

NOTES AND COMMENTS.

THE MANCHESTER MUSEUM.

From the Report of the Manchester Museum recently issued, it would seem that serious changes have taken place there: changes of such a nature that it is feared must result in this institution losing its reputation as one of the best organised and best equipped of our provincial museums. Under the excellent administration of Dr. Hoyle the museum flourished, and was generally considered to be a model natural history museum, arranged most conveniently for the student, and most attractively for the ordinary visitor. A year ago, however, Dr. Hoyle was selected as the Director of the new National Museum of Wales, and he severed his connection with an institution that for twenty years had received the benefit of his knowledge and experience in museum matters. After waiting nearly a year, during which the museum was nominally under the charge of University Professors already overburdened with work, but was, to all intents and purposes, without a head, an advertisement appeared.

AND A 'KEEPER.'

In this, applications are invited for the post of—not Director, as Dr. Hoyle was; not even Curator, but 'Keeper'—the sort of individual one is familiar with in menageries! It also seems that '*preference will be given* to candidates of not more than thirty years of age, who are University Graduates in Natural History subjects.' The successful candidate will also work under the supervision of three professors at the University. In view of the paltry salary that is offered, however, the age limit might have been omitted from the conditions, as surely no one above the age of thirty, who has had any scientific training whatever, would take the post for the sake of the stipend. The people of Wales gave their Director, as a start, nearly four times the salary that his successor at Manchester will 'enjoy.' No experience whatever in museum work is apparently required from the new 'keeper'; the age limit and other 'qualifications' necessarily preclude anyone with even a fair

museum experience ; and certainly the salary offered will have the effect of preventing applications being made from the curators of any of the first-rate, or even second or third-rate museums of the country, though it is common knowledge that these gentlemen are by no means too handsomely paid.

IMPORTANCE OF THE MANCHESTER MUSEUM.

No ; it is painfully apparent that the Manchester University does not want a properly qualified Museum Curator. What seems to be required is a good young man, who will do just as the professors tell him, who will allow them to take the credit for any improvements in the museum that he may effect ; but who, from his exalted position as ' keeper,' may be at the beck and call of all and sundry ; and must be responsible and take the blame for anything that goes wrong. If the new keeper gains any museum experience at all, it will obviously be at the expense of the museum. The chief cause of regret in the whole business is that the members of the Museum Committee should show such palpable evidence of the little regard they have for the magnificent—almost unrivalled—collections under their charge ; and that they should fail to appreciate the importance of the position the Manchester Museum has held in the past. As things now are, can its Committee expect the support of its subscribers and contributors to its collections that it has enjoyed in the past ? We fear not.

' MOORLOG.'

' Moorlog ' is the name given to a tough peaty material, which is frequently brought up from the Dogger Bank in the nets of the trawlers. The pieces sometimes attain a length of five or six feet, and are never more than eighteen inches in thickness. A recent issue of the ' Essex Naturalist ' contains a description of the material by Mr. Clement Reid, F.R.S., and Mrs. Reid. Amongst the plants identified in the peat are *Ranunculus lingua, Menyanthes trifoliata, Betula alba, B. nana, Sparganium simplex, Alisma plantago, Scirpus fluitans, Carex, Lychnis flos-cuculi, Spiræa ulmaria, Galium, Valeriana officinalis, Lycopus europaeus, Sparganium ramosum, Epilobium, Potamogeton,* as well as mosses and ferns. In addition are the remains of the following species of beetles :—*Cyclonotum orbiculare, Chlaenius holosericeus, Notophilus* sp., *Baris pilistriata, Donacia vulgaris, D. claviceps, Apion* sp., *Calathus* sp., and *Chlaenius schranki* ?

AGE OF THE NORTH SEA.

The organic remains from the moorlog 'shew clearly that the deposit was laid down on a land surface, and under conditions almost similar to those now existing in the fen districts.' Mr. Reid, after carefully reviewing the evidence, considers that the masses of moorlog occur in situ on the Dogger. This seems to support Mr. Jukes Browne's theory that 'when this Ice Age was passing away, the whole of the North Sea was dry land, a broad, rolling plain,' through which 'ran the Rhine, of which all the rivers of eastern England became the tributaries . . . The Dogger Bank is a relic of this old land surface, which has never been buried by modern deposits.' Mr. Reid adds that the existing fens of East Anglia may be regarded as a relic of a much greater fenland which once joined England to the Continent.

THE BOOTHAM SCHOOL NATURAL HISTORY CLUB.

Recently two hundred and fifty guests assembled at Bootham School (York) to celebrate the 500th meeting of the Natural History Club, which has developed out of the Society formed in 1834, by the first headmaster of the School, Mr. John Ford. The evening's programme commenced by an inspection of work now being done in the Club in Botany, Ornithology, Conchology, Archæology, Entomology and Microscopy. Past work was represented by the School exhibit, which was awarded a Diploma of Honour at the recent Franco-British Exhibition. The proceedings included short lectures upon subjects of varying interest.

LEISURE TIME.

The success of the evening was due in no small measure to the tradition, which has been continuous for more than seventy years, that leisure time must be well filled. Original observations, systematically recorded with illustrations, are encouraged, and in this way, as a member of the staff said, 'We get a mind alert to see all that is going on around it—bird, flower and beast and changing sky—a mind of omnivorous interest, reflecting, like a mirror, all it sees. From older boys, thinking as well as seeing is expected, and in their work evidence is often discovered of a persistent attempt to prove the unknown, and to summon to their aid every method and every instrument which gives promise of assistance.' We congratulate our young friends at York on the zeal with which they follow their natural history studies.

YORKSHIRE TYPE AMMONITES.

We are pleased to see that Mr. S. S. Buckman, F.G.S., is issuing a work on Yorkshire Type Ammonites, with upwards of two hundred plates. This will include for the first time, illustrations of the specimens described in Martin Simpson's 'Monograph of Lias Ammonites, etc.', the original specimens being in the Whitby Museum. Work of the character undertaken by Mr. Buckman is, unfortunately, rarely remunerative, and we trust all who are able, will assist him by subscribing for copies. A prospectus will be gladly sent on application to the author at Thame.

'OUR GEOLOGICAL RECORD.'

Under the above heading a natural history journal recently issued gives the following gem, under the signature of A. A. Swinton (not 'Hugh Miller'!) Under ordinary circumstances we should refer to the publication from which we have made the quotation; but in the present case we think it a kindness to omit it:—'According to Page, not Lyell, the east of England is a pucker, marked by the Channel which, expanding and contracting to heat and cold, has successively risen and sunk, leaving superimposed, rock-hardened layers of sand, mud and clay, to relate like the leaves of a book, the struggle for existence and evolution.' [pause here to take a breath.—ED.]. '*Silurian trilobites*, predecessors of spiders and insects, swam off the granite coast of Cornwall until lepidendrons [sic.], or tree club-mosses, sprang up at Bristol; fish lizards then plunged over Lyme Regis until bird-like lizards, appeared and cycads, no longer European, flourished in Dorsetshire; in Sussex monstrous lizards luxuriated; then huge ammonites, predecessors of nautili, swam in a chalky sea, and lamp shells and stone lilies dwindled away; elephants came across from the continent: arctic shells such as the *Cyprina islandica*, entombed in the mud of the Greenock docks, cropped up; and when Britannia rose from out the main savage man paddled his canoe and hunted beavers.' [Another breath.] 'A nebulous, molten earth may have receded from its parent sun or changed its orbit; hot water currents may have altered; but has not the sun itself periodically become hot and cold?' If the preceding *is* 'our geological record,' all we can say is that it is a bad one.

COLLECTIONS OF BIRDS.

We are glad to find that the Hull Museum, which recently seems to have been largely devoting its attention to local antiquities, is shewing evidence of a desire to illustrate natural history. It has recently secured two fine collections of birds, viz., the Fortune and Sir Henry Boynton collections. The first was formed by Mr. Riley Fortune, F.Z.S., and consists of a very fine series of Yorkshire specimens, including many rarities. The second is the well-known collection formed by the late Sir Henry Boynton. This consists of an unrivalled series, and has for many years been exhibited in the large room at Burton Agnes Hall. Through the kindness of Mr. and Mrs. Wickham Boynton, this set, numbering over two hundred large cases, has been placed in the Hull Museum, where it will be much more covenient for reference. Practically all the specimens were shot by Sir Henry himself, and they are excellently mounted. As these two collections alone represent something like 2000 square feet of exhibition space, and the museum was already over-crowded, we presume it is the intention of the authorities at Hull to shortly increase the size of their museum.

PROFESSOR A. C. SEWARD, M.A., F.R.S.

At the unanimous invitation of the Executive Committee of the Yorkshire Naturalists' Union, Professor A. C. Seward, M.A., F.R.S., etc., has accepted the position of President of the Union for 1910. Professor Seward is lecturer in Botany at the University of Cambridge, and is the author of numerous important works of Palæobotany, including 'Fossil Plants a Test of Climate'; 'The Wealden Flora,' 2 vols.; 'The Jurassic Flora,' 2 vols.; 'Fossil Plants for Students,' etc, and he is also the joint author with Mr. Francis Darwin of 'More Letters of Charles Darwin.' In connection with the recent celebrations at Cambridge, he edited a magnificent Darwin Memorial Volume, which we have already referred to in these columns. Professor Seward's work amongst the fossil plants in the Jurassic rocks of North-East Yorkshire is well known, and doubtless his address to the Union, which will be delivered at the close of his year of office, will contain much of interest to Yorkshire botanists and geologists.

Dr. R. Bowdler Sharpe, the eminent ornithologist, of the Natural History Department of the British Museum, died on Christmas Day.

NEMERTINE WITHIN TEST OF SEA-URCHIN.

JOHN IRVING, M.D.,
Scarborough.

In connection with the marine exhibits shown at the annual meeting of the Yorkshire Naturalists' Union, held at Scarborough, it may be interesting to note that one of the Sea-Urchins, subsequently cut open, contained a worm of considerable length. The Urchin, *Echinus sphæra*, five inches in diameter, healthy and well-developed, showed no structural malformation internally, notwithstanding the fact that its cœlomic fluid provided a swimming bath for an interloper, measuring, when uncoiled, between four and five yards long. The worm, unsegmented, smooth, cylindrical, was but one-twelfth of an inch in diameter. Through the transparent walls of its cuticle the milk-white contents were well seen. Colour was entirely absent. Both extremities tapered to a blunt point. Under low-power microscopy, a central integumentary depression at the anterior tip indicated the mouth, while a similar depression, eccentric, at the posterior end, represented the anus. No armature of any kind was observed. It was clearly a simple marine nemertine. When, and how it found its way into the Urchin's cœlom is a matter for conjecture. As an egg, or tiny embryo, it may have succeeded in passing through the intestinal wall, or through the porous structure of the test, into this cavity, and, thus imprisoned, had no alternative but to make the best of the situation. Doubtless the cœlomic fluid was nutritive enough to support life, and permit growth. Albinism was manifestly due to lack of light, as well as lack of coloured pabulum. Evidence hardly warrants the idea of parasitism or commensalism. During the past three years I have examined many Sea-Urchins, but this is the first in which I have discovered a permanent unattached lodger.

An excellent method of protecting the eggs of a colony of Terns and Gulls has been adopted at Ravenglass. The eggs are marked with an indelible pencil, and are thus spoiled for the cabinet.—*British Birds.*

The *Mining Magazine*, edited by T. A. Rickard, is to appear monthly, at one shilling, and the specimen before us is admirable. Anyone interested in mining will find the publication most useful; there is an astonishing amount of matter, and the articles are well illustrated.

Mr. F. W. Knocker deals with 'The Practical Improvement of Ethnographical Collections in Provincial Museums' in the *Museums Journal* for November. This paper should be widely read, as it rarely happens that the ethnographical objects in a museum are scientifically classified.

ESTUARINE SHELLS IN THE ALLUVIAL HOLLOW OF SAND-LE-MERE NEAR WITHERNSEA IN HOLDERNESS.

G. W. LAMPLUGH, F.R.S., F.G.S.

Among the many small alluvial basins, formerly lakelets, now intersected by the Holderness coast, is that of Sand-le-Mere, two miles north of Withernsea. The peaty deposits of this hollow have been frequently noticed in geological descriptions of Holderness. Prof. J. Phillips recorded the occurrence in them of 'the bones of oxen and deer, with antlers of the stag, etc.'* Mr. C. Reid has given a short list of their plant-remains and fresh-water shells,† and Mr. T. Sheppard has mentioned the presence of artifically-cut stakes, the supposed indication of an ancient 'lake-dwelling.'‡

During a day spent recently [October 1909] in re-examining the coast-sections of the neighbourhood, I found good exposures of the peat-bed and its associated deposits on the shore opposite the hollow, and noticed what does not appear to have been hitherto seen, that the sequence included beds containing estuarine shells. The point is of interest since it is, I believe, the only case in which evidence has been detected of other than fresh-water or land-swamp conditions in the hollows of this type on the outer coast-line of Holderness.

The bordering cliff-sections show that the hollow at Sand-le-Mere, like most of its class, is due primarily to an undulation in the uppermost band of boulder-clay, though it has been worn deeper by erosion. At the close of the great glaciation the whole surface of the low country east of the Wolds was evidently studded with water-filled depressions or shallow 'kettle-holes,' through which a sluggish drainage system was established. This drainage flowed generally inland or westward from the rim of higher moundy ground now partly removed by the sea, and found its way more or less circuitously to the Humber. In the case of Sand-le-Mere, the connection with the Humber is comparatively direct, as there is a tract of low-lying alluvium,

* 'Illustrations of the Geology of Yorkshire: Pt. I. The Yorkshire Coast,' 3rd ed., 1875, London. p. 74.

† 'The Geology of Holderness,' etc. Mem. Geol. Survey, 1885. p. 84.

‡ 'Traces of an Ancient Lake-dwelling at Sand-le-Mere, near Withernsea.' 'The Naturalist,' October 1898. p. 301.

variable in breadth and outline, extending continuously south-westward for seven miles, from the coast-section to the Humber flat near Keyingham. This tract is trenched and rendered cultivable by Keyingham Drain and its branches, and is protected by a bank at Sand-le-Mere from the outer sea which otherwise might invade the hollow during a high stormy tide. It is my impression, however, for reasons hereafter stated, that the estuarine conditions in the hollow were not due to an incursion of the open sea, but were developed when the Keyingham channel formed a long creek of the Humber.

The exposure that I saw stretched along the foreshore at Sand-le-Mere right across the hollow, revealing the rising slopes of the underlying boulder-clay on both sides. The main strip, containing the estuarine muds, occurred at an average distance of 50 yards from the foot of the raised bank which defends the interior hollow, the length of the bared strip being about 250 yards, its width from 5 to 20 yards, and its level approximately that of half-tide, or say 8 feet below high-water. There was also another large patch laid bare on the lower part of the shore, just above low-water (average tide), the intervening space being hidden by sand; but this lower exposure consisted, so far as I could see, entirely of peat with much wood. Judging from the numerous pholas-borings in it, some containing living occupants, this peat is frequently bare or, at most, thinly sand-covered; and it is perhaps the only part of the basin which has been previously subject to critical examination.

In the upper exposure the deposits included some peat, but consisted mainly of soft black, grey and greenish muds and silts in bands, with streaks and thin seams of black muddy sand, these beds dipping gently and thickening from both sides towards the middle of the basin. From the flatness of the exposure combined with the overlapping of the higher beds towards both margins, the sequence and thickness of the deposits were not easy to determine. For me, moreover, their examination was rendered the more difficult by tempestuous rain while I was on the spot, so that only rough notes could be made, and my stay was brief. Hence the information I could gather was incomplete on several points, particularly with respect to the relation of the estuarine muds to the thick peat-bed of the lower exposure.

Near the northern margin of the alluvial basin, the sequence in the shore-exposure was as follows, in descending order:—

SECTION ON THE SHORE NEAR THE NORTHERN EDGE OF SAND-LE-MERE.

	Ft.	Ins.
Muddy silt with peaty roots and stems of coarse grass and rushes; *Hydrobia* abundant .. ..about	0	4
Fine black silt, with laminæ of grey silt, containing *Hydrobia* in great abundance, and with a 2-inch seam of black sand containing *Tellina balthica* and clusters of *Mytilus edulis* .. ,,	0	6
Banded bluish, greenish and dark grey tenacious silty clay, with cakes and rolled lumps of peat, and a few black sticks — some resembling branched roots: *Cardium edule* (small) *Mytilus edulis* (in patches), and *Hydrobia* (abundant) .. .. ,,	0	3
Browner mud or clay, often black in lower part, with *Cardium edule*, *Mytilus edulis* and *Scrobicularia* .. .. ,,	0	6
The underlying beds were hidden by sand, except at the extreme margin of basin where the whole estuarine series was reduced to a few inches of sandy mud, with *Hydrobia*, resting on—		
Silty mud, full of stones derived from the underlying boulder-clay, and bits of peat and black sticks .. .. ..about	0	10
Sloping floor of stony red boulder-clay, weathered to an earthy texture at the top	—	

Farther southward in the same exposure, in the middle and towards the southern side of the basin, the material seen consisted almost entirely of black peat, containing much wood and some matted roots and stumps of small trees. Associated with the peat there was in one place a large patch of grey tenacious mud, containing *fresh-water* shells only, among which were a large *Planorbis*, *Limnæa* and *Cyclas*.* It is noteworthy that this purely fresh-water mud occurred at precisely the same

* Owing to the execrable weather, I did not stay to make collections of the shells, and am therefore unable to give specific determinations.

level on the shore as the estuarine muds. Still farther southward, as the southern margin of the basin was approached, the estuarine deposits re-appeared, presenting nearly the same succession in reverse order as that seen on the northern margin.

The dip of the estuarine beds on both sides toward the middle of the hollow suggested at first sight that they passed beneath the peat and fresh-water mud which lay between them, and therefore probably also beneath the larger mass of peat exposed at low tide. But I was unable to convince myself that this was actually the case. The presence of detached cakes and rolled lumps of peat in the estuarine deposits at both margins proved, at any rate, that there was peat in the basin before the estuarine muds were deposited; therefore if the peat-bed which I saw exposed were of later age, it would be necessary to suppose that the detached pieces were derived from some older mass buried out of sight. On the whole, I think it most likely that the estuarine beds enwrapped and covered the peat, since this is the usual order of the sequence in the Humber basin,* and I found nothing actually to disprove it in this case.

The mollusca had evidently lived where their shells occurred. Most of the bivalves had their valves united, and many were in the position of life. The cockles, which were the most abundant, were unworn and well-preserved though all comparatively small and thin-shelled. The mussels, also rather small and thin, lay in sparse clusters, and were mostly crushed. *Tellina* and *Scrobicularia* were much rarer, but were well-grown. The little univalve *Hydrobia* occurred in myriads, giving a speckled or streaky aspect to some of the layers; at the northern end of the exposure it was also present, in association with the peaty roots and stems of a grassy plant, in a higher band than the other shells.

The deposit and its fauna clearly indicate a quiet estuarine creek regularly invaded by the salt-water tide with sea-level approximately the same as at present. The peat and the fresh-water mud are evidence of a stage, probably earlier, when the hollow was beyond reach of the tide, either because of a higher level of the land or the existence of a protective barrier.

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* Cf. C. Reid 'The Geology of Holderness,' Chapter viii., pp. 77-93, W. H. Crofts 'Notes on the Post-Glacial Deposits of Hull and District,' *Trans. Hull Geol. Soc.*, Vol. IV., 1899, p. 36; also 'Notes on the Alexandra Dock Extension, Hull,' *ibid.* Vol. V., 1901, pp. 57-62.

From the present position of the shore-line in relation to the hollow, it might seem at first sight certain that the salt-water of the estuarine stage flowed in at its eastward end from the open sea. Yet it is more probable that the inflow was from the opposite direction from the Humber, by way of the low gap at Keyingham. The fauna is essentially that of the Humber muds, and the sediments are such as we should expect to find in a creek of the Humber; nor do I think that the requisite conditions could have been produced by a direct inroad of the open sea, which would necessarily have led to a sharp tidal scour, and the formation of shifting sand-bars, as at the mouths of Barmston Drain and Earl's Dike, farther north in Holderness. I surmise, therefore, that the estuarine beds of Sand-le-Mere were accumulated when the hollow was a blind inlet of the Humber, which has now been decapitated by the recession of the coast-line.

However, my chief aim in writing is not to elaborate the present insufficient data, but to call attention to the need for a closer investigation of the locality.

We have previously had occasion to refer to the excellent achievements of **Mr. Frank M. Chapman,** of the American Museum of Natural History; his work amongst the flamingoes particularly calling for favourable comment. In **Camps and Cruises of an Ornithologist** (Hodder and Stoughton, 432 pp. 12/- net), Mr. Chapman gives us a volume of altogether unusual merit, one that is far, far above the average of 'bird' books, which are teeming like water—very much like water, from the various publishing houses now-a-days. It is difficult to decide which to admire most, the charming and original accounts of his ornithological researches, or the 250 remarkable photographs of bird life, most of which might almost have been 'sat' for in a studio. During the past seven years the author has been preparing 'cases' or 'Habitat groups' illustrating bird life, each 'containing from 60 to 160 square feet!' Partly in connection with these he has visited Florida, Bahama, California, Western Canada and various other places—each a veritable ornithologist's paradise. In his rambles he visited the breeding places of the Pelican, Flamingo, Golden Eagle, Blue Heron, Egret, Water Turkey, as well as the Booby, Man-o'-War Bird and others, not perhaps quite so well known to English ornithologists. In turning over the leaves, and after glancing at views of cañons, morasses and cliffs, one suddenly comes upon a photograph of a homely village, with its church nestling among the trees; as great a contrast between the previous views as well can be. It is entitled 'Selborne from the Hanger,' and is at the commencement of a very interesting series of 'Impressions of English Bird-life,' in which we find the author states:—'I confess that my desire to see and hear the Nightingale, Skylark, Blackbird, Redbreast and other characteristic English species, in their haunts, has been more intense than that which has led me to the distant homes of tropical birds.' He visited the chief haunts of wild bird life in this country in a characteristically thorough manner, and during his brief stay saw much more of British ornithology than has many an English ornithologist. Amongst his many illustrations we notice one entitled 'Bird-egging on Bempton Cliffs; about 130,000 Murres' eggs are gathered here yearly.'

SEA ANEMONES IN CAPTIVITY.

W. H. ST. QUINTIN, J.P., F.Z.S.,
Scampston, E. Yorks.

I SHOULD like to place on record that I have, still in good health and colour, a specimen of *Sagartia troglodytes* (Gosse), and another of *S. viduata*, which are the survivors of rather an extensive collection of 'Sea Anemones,' which I made in 1894 and 1895 on the coast of Devon.

The *S. troglodytes* appears to be of the typical form: the *viduata* to be the variety named by Gosse '*melanops*.'

That these animals are long-lived in captivity is already known; for Gosse,* speaks of a specimen of *A. mesembryanthemum*, the common red 'Beadlet' of our shores, which was known to be between thirty and forty years old when he heard of it as still living in 1860, and which, during its captivity, had produced 334 young!

My anemones used to have a fresh supply of sea-water once or twice a year. But for the last eight years, I have only filled up their vases with fresh water to replace that which has evaporated.

That this is sufficient to maintain life is shewn by the quantity of conferva which spreads through the vases if too much light is admitted; and by the entomostraca (water-fleas) which are generally to be attracted to the flame of a candle held near the surface of the water. Probably these last, and possibly the spores of the conferva, assist in furnishing food to the anemones, in addition to the small earthworms, with which I supply them.

That tried and trusty friend, **Hazell's Annual,** (London, 608 pp. 3/6 net), is more acceptable than ever. In addition to the customary mass of information upon the men and movements of the day the 1910 edition contains a number of signed articles by writers of indisputable authority upon the subjects with which they deal. Sir Arundel Arundel, K.C.S.I., Sir Oliver Lodge, Lady Frances Balfour, Sir Hiram Maxim, Sir Harry Johnston, G.C.M.G., K.C.B., are among the contributors whose names will command attention. For the rest, whether the reader is interested in Foreign Affairs, in Home Politics, in Finance, in Religious Movements, in Social Questions, in Sport, Science, Art, Music or the Drama, he will find in 'Hazell' a fund of facts and figures presented in a form that is equally attractive and convenient.

* 'British Sea Anemones and Corals.'

SOME ACULEATE HYMENOPTERA OF HALIFAX.

O. C. SILVERLOCK.

The species mentioned below were all taken during the summer of 1908.

HETEROGYNA :—

Formica fusca (typical) abundant everywhere. One nest, under a large stone, had no less than eighteen apterous females.

F. fusca (*rufibarbis*) abundant in the Hebden Bridge district.

F. rufa occurs at Hebden Bridge and Hardcastle Crags.

These three closely allied forms are peculiarly interesting. The ordinary observer would detect no difference between the workers of *F. rufa* and *F. fusca* (var. *rufibarbis*), but at the same time, he would not for a moment imagine that there was any close similarity of structure between the two races of the latter. The only difference noticeable with a lens between *F. rufa* and *F. fusca* (*rufibarbis*) lies in the comparative dullness or brightness of the frontal area.

Structurally, the races of *F. fusca* are almost indistinguishable, yet their colour varies from a dark bronzy black to the reddish tint of *F. rufa*. In between these extremes there is almost every possible shade of colour.

In habits the typical *fusca* almost invariably chooses to form its nest under large flat stones. Its race, however, prefers to tunnel underground, and *rufa* always forms the well-known mounds of pine-needles, etc.

Lasius niger—the common garden ant of southern counties—I only found once in North Dean Woods ; *L. flavus*, almost equally common in meadows in the south, I never found at all.

Myrmica rubra—two races only were found ; *laevinodis* and *ruginodis*, these were both commonly seen, yet *scabrinodis*, the commonest race of the south, I never found. Several nests of *laevinodis* were infested with parasitic *acari*, which had attached themselves to the bodies of the ants, often in most peculiar positions.

Leptothorax acervorum—a single specimen from Hebden Bridge.

FOSSORES :—

Fam. *Pompilidae*—the only insect of this most fascinating

family was *Pompilus gibbus*, captured on a hard sandy bank near Copley.

Fam. *Sphegidae*—four species, *Crabro dimidiatus*, *C. anxius*, *C. elongatulus* and *C. palmipes*. This is a very small number, but I left Halifax at the end of July, and August is certainly their best month.

Diploptera :—

Fam. *Vespidae*—these are the true wasps as distinguished from the sand-wasps (*Fossores*).

V. vulgaris and *Germanica*, both equally common; *V. norvegica*, only once seen near Copley.

Anthophila :—

Fam. *Andrenidae* :

Genus *Sphecodes*: two comparatively rare species—*S. reticulatus* and *similis*—were taken. More species are no doubt to be found, as their hosts belonging to the genus *Andrena* are well represented.

Genus *Halictus*—*leucozonius*, *cylindricus*, *rubicundus* and *Freygessneri melanea* has the sculpturation of the abdomen markedly different from that of the southern type.

Genus *Andrena*—well represented by *A. albicaus*, *Clarkella*, *cineraria*, *lapponica*, *fucata*, *rosae* (var. *trimmerana*), *angustior*, *fulva*, *albicrus* and *minutula*. These are nearly all spring bees; *Clarkella* being out early in April. Strangely enough, *A. lapponica*, although only added to the British list fourteen years ago, was taken plentifully on whortleberry.

Genus *Nomada*—all species of this genus are parasitic on members of the last-mentioned genus. *N. Lathburiana*, *Fabriciana*, *ruficornis* and *bifida* were taken; *Lathburiana* at Hebden Bridge, the others at Copley. The specific name '*bifida*' has reference to the mandibles which at once distinguish this species from *ruficornis*, which has the mandibles simple and pointed.

Fam. Apidae :—

Genus *Bombus*—*agrorum*, *hortorum*, *pratorum*, *venustus*, *lapidarius*, *Derhamellus*.

The species *pratorum* is partial to the flowers of the bramble, and may always be found near clumps of the latter.

In conclusion I must thank Mr. Edward Saunders for his kindness in determining doubtful species, and in answering my numerous questions on habits and structure.

OOLITIC PLANT REMAINS IN YORKSHIRE.

Rev. GEORGE F. LANE, F.G.S.
AND
T. SAUNDERS, M.E.

FURTHER to our notes in "The Naturalist' for March 1909: during the past summer, persistent search has been made in the quarries at Marske, with very successful results. During the month of August 1909, we were honoured by a visit from Prof. Nathorst, of Stockholm, and he kindly determined the fossil flora in Mr. Lane's collection. He also examined the Marske Quarry, giving us valuable and suggestive hints, and encouraged us in the work. Some of the duplicates of these rarer plants have been presented by us to the Dorman Museum, Middlesborough, and to the Hull Museum, and altogether a considerable quantity of material is being accumulated. Among the rarer plants found in the Marske Quarry are the following. With the exception of *Taxites zamioides* and *Cycadites* sp., the whole were examined and determined by Prof. Nathorst.

ZAMITES BUCHIANUS.

This plant does not appear to occur in the published list of the Jurassic Flora of Yorkshire. We indicated in our previous article that two species of Zamites had been found. One was submitted to Prof. Seward, and he determined it as *Zamites*, probably new. The specimen of *Z. buchianus* consists of four large pinnae, with the venation clearly preserved. *Zamites buchianus* occurs in the Wealden flora, and it is exceedingly interesting to find it at Marske.

NILSSONIA SCHAUMBERGENSIS.

This is a fine specimen. We already have *N. compta, N. tenuinervis* and *N. mediana. N. schaumbergensis* is new to the Yorkshire Jurassic Flora. 'In the Wealden Flora, the genus *Nilssonia* is represented by the smaller leaved form *N. schaumbergensis.*'*

CYCADITES sp ?

After a careful examination of this fossil plant, its striking resemblance to *Cycadites* led us to this determination. We will submit this specimen later on for expert diagnosis.

CLADOPHLEBIS HAIBURNENSIS.

This beautiful specimen was reported in our article for

* Seward, 'Jurassic Flora of Yorkshire,' page 311.

March 1909, with a query appended. As the type-specimen is deposited in the Newcastle-on-Tyne Museum, Mr. Elgee, of Middlesborough, very kindly took the plant for comparison with the Newcastle specimen. On the opinion of the curators, 'there is absolutely no doubt about the plant being *C. haiburnensis*.'

CLADOPHLEBIS LOBIFOLIA.

The narrow bases of the pinnules, and the spreading habit of the frond are plainly seen. The plant is unfortunately embedded in sandstone, and the venation is poor. We hope some day to obtain a better specimen.

TODITES WILLIAMSONIA.

A good specimen. The bipinnate frond, stout rachis, slightly falcate pinnae, and the venation are well preserved. This is an addition to the Marske collection.

CONIOPTERIS HYMENOPHYLLIOIDES.

A splendid specimen, the tripinnate, linear, acuminate pinnae, and other characters are clearly seen.

TAXITES ZAMIOIDES.

We obtained two good specimens of this plant. The slender axis, the narrow linear leaves, with the single median vein are so well preserved as to make it easy of identification.

Up to the date of writing, thirty-eight species have been found, and their identification may be regarded with a degree of certainty. The discovery of Wealden plants in the Inferior Oolite of Marske, considering the vast intervals of time which must have elapsed between these periods, opens up a suggestive field of research, and adds to our knowledge of Jurassic flora. The commoner species which are found in abundance, are *Williamsonia pecten, W. gigas, Teniopteris vittata, T. major, Baiera gracilis, B. lindleyana* and *Nilssonia mediana.*

The seventeen species found by the late Rev. J. Hawell in this quarry, has now been increased to thirty-eight.

Again we express our indebtedness to Mr. Elgee, curator of Middlesborough Museum, for kindly assistance in determinating many specimens, and especially to Professors Nathorst and Seward, for their valuable help.

The type specimen of *Pseudomelania vittata* Phillips, from the Cornbrash of Scarborough (figured in 'Geology of Yorkshire,' 1829, pl. VII., fig. 15), has been found in a reserve cabinet in the Manchester Museum.—*Geological Magazine* for December.

THE VEGETATION OF 'SWIDDENS' IN NORTH-EAST YORKSHIRE.

FRANK ELGEE,
Middlesbrough.

As contrasted with other plant associations in Britain, the ericetal flora has probably been less interfered with by man. On moors, and especially those of the wettest types (*Sphagneta* and *Eriophoreta*), the interference has been slight, and it is the comparative absence of this interference which renders moorland associations of such great importance and interest to the student of plant ecology. Nevertheless, man does effect changes upon moors, and the following notes refer to the most conspicuous of these changes, and its influence upon the vegetation. But for these alterations, the heath vegetation would present a much more uniform aspect.

The greater part of the uplands of North Eastern Yorkshire is moorland, usually of the pure Heather type. Everywhere the dependence of the vegetation on the nature of the underlying rocks is manifest. Differences due to altitude, to slope, to geographical position have to be added to those produced by the strata and their soils, all of which are still further complicated by the burning off of the Heather.

The Heather is fired in the months of March and April in order to obtain a new growth of the plant for the Grouse. To the areas so burnt, the name Swidden is applied in the local dialect. On the newly-burnt Swidden, a suite of plants springs up, often totally distinct from the surrounding moorland; or more correctly, the dominant vegetation clothing a Swidden may be quite different from the dominant plant-association of the vicinity. As a rule, 12-14 years elapse before a Swidden becomes re-clothed with tall Heather, thus enabling other species of quicker growth to obtain a temporary occupation of the ground. What this temporary vegetation will be depends upon a number of factors, viz., the character of the environing plant-association, the nature of the soil and the effect of the burning upon it—also the position of the Swidden in regard to drainage, slope, and other conditions.

In examining a Swidden, it is important to bear in mind that its age undoubtedly influences the nature of its plant associations, and, although in time a succession is traceable, yet this varies considerably. As a rule, where *Calluna* is weakly

developed, it may be taken that the area is comparatively recent, for its slow growth renders possible the usurpation of the Swidden by other plants. This dominance they retain for a long time, and possibly in some instances, always retain. But, generally speaking, *Calluna* ultimately ousts all competitors.

Swiddens may occasionally be met with where *Calluna* occupies the surface soon after the burning, in which instances it seems likely that the firing has not very largely affected the subterranean portions of the plant.

Passing from the Swidden where *Calluna* is dominant, we must first notice a type where the black peaty soil is frequently almost covered with Lichens of the genus *Cladonia*. On one example, the species next in point of abundance to the Lichens was *Calluna*, with a few scattered bushes of the Purple Bell Heath (*Erica cinerea*), and in the wetter hollows the Heath Rush (*Juncus squarrosus*) occurred. On other parts a thin film of moss covered the soil. The surrounding vegetation was pure Heather moor, and it is significant to note that Graebner, in his account of the origin of moors on bare sand, mentions a stage in which *Cladonia* forms the chief element of the vegetation.* The Swidden differs from the moors, which begin to form on bare sand in already possessing the indispensable peaty soil. Still the correspondence just mentioned is sufficiently close to be worthy of remark.

To be classed with the preceding, both with regard to its own and the surrounding vegetation, is a Swidden on Great Ayton Moor. Young *Calluna* was the dominant plant with *Juncus squarrosus* in wet places. Over the barer parts a thin film of Lichen was spreading, whilst here and there were large tufts of *Polytrichum*.

In the cases just named, the vegetation of the Swiddens is like that of the encompassing moor, but instances occur where it is quite different and occasionally striking. On Readman Plain, a moor due north of Lastingham, *Calluna* is the dominant plant, and on the old Swiddens there are extensive spreads of *Erica cinerea*, forming what may almost be termed a "Cinerea Moor." In places the Heath yields to a strong mixture of *Calluna* and the Pink Bell Heath (*Erica Tetralix*), whilst on more recently burnt areas, Heather dominated towards the

* *Heide Norddeutschlands*, pp. 82-91.

edges with young *Erica cinerea* and *Tetralix* prevailing in the centre.

On peaty moors, *Calluna* and the Bilberry (*Vaccinium Myrtillus*) are the chief features of the vegetation. Consequently, whenever the moor is burnt, Bilberry quickly occupies the Swiddens owing to its more rapid growth. This was particularly noticeable on Glaisdale Ridge, where there are several Swiddens covered exclusively with Bilberry. Another had a little *Calluna* mixed with it, and in one place supported Bracken though this plant does not grow in the immediate vicinity.

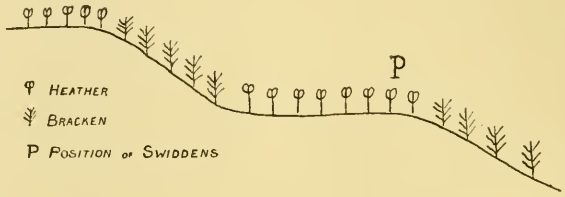
On southern slopes the burning of the vegetation gives Bilberry a strong hold. Thus on the south side of Baysdale, Bilberry Swiddens are frequent, whilst in Stockdale a similar slope is clothed with Bracken in the lower parts, immediately succeeded by great spreads of Bilberry on the burnt areas of the higher parts. This plant is very partial to slopes, particularly those facing the north. I have not yet been able to ascertain whether it is ousted in time by either Heather or Bracken.

The Bracken also is essentially a plant of the moorland slopes of North East Yorkshire, and often enters into strong competition with *Calluna*. Where the slopes are burnt, it at once spreads on to the Swiddens, and the Heather rarely or never returns. This is well shewn in many localities. The moors at the end of the ridges dividing the northern dales present a mixed vegetation, and in the case of Danby Ridge, this consists essentially of *Calluna* and Mat Grass (*Nardus stricta*), interspersed with the Crowberry (*Empetrum nigrum*), the Bilberry, and bushes of Gorse. Here the Swiddens of the slopes are frequently covered with Bracken. In Baysdale, incautious firing has converted good moorland into almost nothing else but Bracken.

On Danby Ridge, but at a greater altitude than in the cases just noticed, pure Heather moor comes in, and a remarkable Swidden of a somewhat rare type was observed here, the vegetation being in such marked contrast to that of the surrounding moor. The Swidden shewed innumerable clumps of *Empetrum nigrum* interspersed with large spreads of the Sheep's Sorrel (*Rumex Acetosella*). Bilberry occurred sporadically amongst the Crowberry, as well as *Calluna* and *Juncus squarrosus* between the clumps of Crowberry. This Swidden, which stood on flat ground, terminated on one side in a very strong Bilberry and Bracken slope, and there was a noteworthy absence of Bracken

from the Swidden, due probably to the dislike which that plant has for growing on a flat.

In other instances, the plant life of Swiddens surrounded by *Calluna* are more complicated, and the following may be taken as examples. They occurred on the edge of a flat terminating in a Bracken slope, and their exact situation can be seen from the diagram.



On the side near the Bracken slope, this plant bounded the Swidden, the remaining sides being bounded by *Calluna*. The principal plants of the edges corresponded to the surrounding vegetation, viz., *Calluna* on the flat side, and Bracken on the edge of the slope. Bilberry was frequent on the northern half, along the western edge, and in the south-east corner. Towards the centre of the Swidden, the following species occurred:— *Erica cinerea* (two or three bushes); *Empetrum nigrum* (two or three bushes); *Calluna*, in patches; the Brown Bent (*Agrostis canina*), a small patch; and short turfy moss.

Another Swidden in a similar position, shewed *Calluna* very dominant on the western half, but not on the eastern edge, where the ground was still without a vestige of plant life. Other species were dwarf Bilberry and Crowberry, whilst patches of the Early Hair Grass (*Aira praecox*) were not infrequent, occurring with *Agrostis canina*, and *Juncus squarrosus* occurred sporadically.

A further Swidden entirely surrounded by *Calluna* on the same flat shewed *Juncus squarrosus* mixed with dwarf *Calluna* dominating at one end with *Erica cinerea*, *Vaccinium Myrtillus*, and *Agrostis canina* occurring sporadically. The Bilberry became very abundant towards the south, and in places the plants were much mixed, forming a short turf of *Calluna*, *V. myrtillus*, *E. nigrum*, *Potentilla Tormentilla*, *J. squarrosus*, *Agrostis* and *Polytrichum*. Where the Bilberry had a tendency to dominate it was interspersed with a quantity of *Calluna* and *J. squarrosus*.

(To be continued).

NOTES ON *ARACHNIDA* ON THE N.E. COAST OF YORKSHIRE.

WM. FALCONER,
Slaithwaite, Huddersfield.

OF the three great divisions of Yorkshire, the North Riding has had the least attention paid to its spider population, so that a few notes of captures made on its north-east coast in August last may not be without interest. Altogether, eighty species of true spiders were met with, of which (*A*) four have not before been found in any part of the county; (*B*) seven others also new to the North Riding; and (*C*) six more, for which there is but one North Riding record, though they have, with one exception, been observed more abundantly in the other divisions.

A.—NEW TO YORKSHIRE.

Micronета innotabilis Camb., one male, on the trunk of a larch in the wood leading out of Riftswood to Skelton.

Cnephalocotes interjectus Camb., many examples of both sexes, on the coast a little east of Redcar.

Troxochrus cirrifrons Camb., two males, eleven females, on the coast west of Marske.

Cornicularia vigilax Bl. One female in Coatham Marshes.

All are local or rare British spiders, but the most interesting is *T. cirrifrons* Camb. It is usually found in the company of *T. scabriculus* Westr., and there is considerable diversity of opinion as to whether the two should be looked upon as one species with dimorphous males, or as distinct species. There are striking differences between the males, but up to the present it has been thought that none existed between the females, the latter being apparently indistinguishable from each other. The Rev. O. Pickard-Cambridge states, however, in a letter to the writer, that he has lately discovered a discriminatory character, which is fairly constant in the specimens he has examined, and certainly on comparing the above females with others, obtained along with *T. scabriculus*, there is a considerable amount of difference between them.

B.—NEW TO NORTH RIDING.

Clubiona pallidula Clerck. One female near Saltburn.

Agroeca proxima Camb., Both sexes, amongst herbage on the cliff adjacent to Marske Cemetery.

Enoplognatha thoracica Hahn. One female in Coatham Marshes. There is one other Yorkshire record only—a female, North Cave, East Riding.

Bathyphantes parvulus Westr. Two females, on coast a little east of Redcar. On record also for West Riding.

Erigone longipalpis Sund. Four males, four females, Coatham Marshes. Elsewhere in Yorkshire it is plentiful on the Humber shore, both east and west of Hull. A maritime species.

Tapinocyba subitanea Camb. One male, four females, on the coast east of Redcar. Usually found in the refuse of stables, and occasionally in cellars.

Araeoncus humilis Bl. At the same place as the last-named, in extraordinary abundance, both sexes, beneath flat, spreading tufts of *Atriplex*.

C.—Additional Records for North Riding.

Clubiona holosericea De Geer. One adult male and several immature examples. Coatham Marshes.

Leptyphantes pallidus Camb. Riftswood (Saltburn) and Upleatham. A female at each place.

Tmeticus reprobus Camb. One adult male and several immature examples amongst heaps of stones on the foreshore at Skinningrove. It has also been found on the Humber shore, near Hull. A rare spider.

Erigone arctica White, var. *maritima*. Five males and several females, on the coast a little east of Redcar; many females in Coatham Marshes, and a few females between Marske and Saltburn. Previously, only one male was on record for Yorkshire at Marton, North Riding. Evidently it will be found to be commoner in this part of Yorkshire than it has been supposed.

Tapinocyba pallens Camb. One female near Coatham Marshes.

Ceratinella brevipes Westr. Two females east of Marske.

Two other interesting species may also be mentioned, *Tmeticus scopiger* Grube, several adult and immature examples of both sexes, on the cliff near Marske Cemetery, which has not, so far, been found in either of the other great divisions; and a female, which is supposed to be a new species of *Metopobactrus* Sim., at Boosbeck, but previously discovered nearer Middlesborough by Mr. J. W. H. Harrison, of that town.

Seven species of Harvestmen were noted, but all were of the commoner kinds, while the common pseudoscorpion, *Obisium muscorum* Leach, occurred at Riftswood and Boosbeck.

NOTES ON YORKSHIRE COLEOPTERA.

W. J. FORDHAM,
Bubwith.

***Cychrus rostratus* L.**—Under a stone near Knottingley, W. Yorks., May 14th, 1898.

***Carabus granulatus* L.**—Running among grass on bank of River Derwent, near Bubwith, E. Yorks., September 20th, 1909.

***Harpalus ruficornis* F.**—Infested with *Gamasus coleoptratorum* near Knottingley, April 16th, 1908. This parasite I have found on *Necrophorus humator*, as well as on various species of *Geotrupes* and *Aphodius*.

***Agabus chalconotus* Panz.**—In ponds on Breighton Common, East Yorks., March 8th, 1909.

***Leistotrophus nebulosus* F.**—Crawling on pathway at Kiveton Park, Notts., May 4th, 1901. and in a similar situation at Heeley, Sheffield, in 1906.

***Prototia annovittata*.**—I obtained a live example of this insect—a native of the Phillipines—in Manila Hemp, in a rope yard at Knottingley, West Yorks., in 1899. The specimen was named at the South Kensington Natural History Museum.

***Saperda scalaris* L.**—On a rhododendron flower at Chatsworth Park, Derbyshire, June 19th, 1904.

***Chrysomela goettingensis* L.**—I obtained one example of this species in a sand hole at Kellingley, near Knottingley, Yorks., May 28th, 1898. This is interesting in conjunction with Mr. Bayford's record for Edlington, as extending the range of this species as given by Canon Fowler. (See 'Nat.', Feb. 1902, p. 64, and Sept., p. 287).

***Calathus micropterus* Duft.**—Mr. G. B. Walsh and I took this insect freely under pine logs at Wilton Wood, Cleveland, January 18th, 1908, and also in decayed pine stumps numerous larvæ and imagines of *Rhagium bifasciatum* F. I also took this latter insect from alder stumps at Lonsdale, Great Ayton, on January 25th, 1908 (both larvæ and perfect insects).

***Endomychus coccineus* L.**—Taken freely in an old birch stump on Skipwith Common, October 6th, 1909. The beetle occurred under the bark, in decaying *Polyporus betulinus* and in moss at the roots.

***Aromia moschata* L.**—One specimen at rest on an oak sapling among sallows near Skipwith, East Yorks., September 11th, 1909. The last two are probably new records for East Yorkshire.

THE SUSPENSION HABIT IN YOUNG CATERPILLARS.

LLEWELLYN LLOYD.

SPEAKING of Ichneumon-flies in the Cambridge Natural History, Dr. Sharp says:—'It is very difficult to observe the act of oviposition; the Ichneumon-flies usually decline to notice caterpillars with which they are placed in confinement. Occasionally, we may, by a happy chance, observe the act in insects at large, and from the records of observers, it may be deduced with tolerable certainty that the sense of sight takes no part in the operation.'

During last August I was watching an Ichneumon-fly hunting caterpillars in a Leeds garden. It found a small caterpillar suspended from the edge of a leaf. Without seeming to hesitate it flew to the leaf and bit through the thread causing the caterpillar to fall on to a leaf below. It flew straight down, seized it, and drove in its ovipositor three times. It would have been absolutely impossible for the fly to do this while the caterpillar, which was the smaller of the two, was in suspension.

I failed to secure the Ichneumon, and so do not care to hazard a guess as to what species it was. In the first place, it seems certain that sight was a most important factor in the series of actions. It may have found the larva by a sense of smell, but how could it have found and cut the thread without the sense of sight coming into play?

Secondly, we can hardly imagine that all Ichneumons would be intelligent enough to cut loose suspended larvae. Granted this, the habit of suspension must be of great use as a protection for larvae against these parasites. Ratzeburg considers that Ichneumons only attack caterpillars in a deficient * state of health, but I have reason to believe that they also attack young forms. The suspension habit is especially developed in young caterpillars.

We are pleased to see from the 'Annual Report of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne,' that the Society has received a legacy of £6000. This will materially assist it in its work.

* We should think it more likely that they avoid unhealthy larvæ.—G.T.P.

YORKSHIRE NATURALISTS AT SCARBOROUGH.

The forty-eighth annual meeting of the Yorkshire Naturalists' Union was held at Scarborough, on Saturday, December 11th. There was a representative gathering of members from all parts of the country, and the meeting was particularly successful as a result of the untiring efforts of the secretary and members of the Scarborough Field Naturalists' Society. Two excursions were arranged in the morning, one for Carnelian Bay, and the other for Peacock's Quarry, Falsgrave.

Under the leadership of Mr. Hargreaves, between twenty and thirty members of the Union walked along the shore towards White Nab.

Mr. Hargreaves writes:—'Immediately after leaving the Museum, attention was drawn to the shell-bearing sand on the shore, and Mr. Woods and others remarked on its productiveness. On passing Holbeck Gardens, a halt was made to point out the parts of the reef most productive in marine life, special mention being made of the various sponges and anemones, the cave and white anemones being found there. Immediately afterwards a halt was made to look for the rare local mineral 'Scarbroite,' which is found only on this coast. It was pointed out how it occurred in veins, and several small pockets were seen, and specimens obtained; but as there had been rough seas, and the mineral is soft, good specimens were not as common as is frequently the case.

'The geological features of the coast as far as visible from this point were next indicated, attention being drawn to changes by denudation, and to the large quantity of Estuarine beds. The party next proceeded to the "plant bed" in the South Bay, which is about two feet thick, and crowded with plant remains, with occasional scales and teeth of fishes.

'Specimens of *Czekanowskia* and *Baiera* were obtained in numbers, notwithstanding the extremely wet state of the cliff, and the unusual state of preservation of the plants, particularly of *Beania gracilis* was commented on. It was possible for small pieces to be lifted bodily from the shale and transferred to paper, like a recent plant. They were also burnt experimentally—a somewhat unusual experience with fossils.'

The Scarborough museum was thrown open for the benefit of the members, and in the evening there was an exhibition of natural history specimens in the large room at the Grand Hotel. This had been specially arranged in honour of the

Union's visit, and reflected the greatest credit upon all concerned. There were so many interesting specimens, mostly of local interest, that it is difficult to particularise. Perhaps those which received the most attention were the various living anemonies, molluscs, crustaceans, etc., which had been obtained from the adjacent shores. There was an excellent series of Chalk and Cornbrash fossils; pre-historic implements, local marine and non-marine mollusca; lepidoptera, fungi, ornithological specimens, etc.; as well as a fine show of drawings and photographs of natural history interest. It is a long time since our members were so well provided for in this way, and unquestionably the success of the conversazione kindly arranged by our Scarborough friends, was largely due to this exhibition.

In the afternoon the General Committee met at the museum, when the reports on the year's work were presented by the respective secretaries of committees and sections, and the various offices for 1910 were elected (see page 33).

At this meeting it was pointed out by the Hon. Treasurer that as practically one half of the members' subscriptions had to be ear-marked for 'The Naturalist,' it left the whole of the work of the Union, and the publication of its programmes, reports and transactions, to be carried out for the small sum of 5/6 per member. He therefore appealed to those who were able, to increase their subscription in order that the many papers and memoirs now awaiting publication might be printed. There was an encouraging response to this appeal, and it is sincerely to be hoped that others may follow the example. The desirability of considerably increasing the membership of the Union was also pointed out, and an effort will doubtless shortly be made in this direction. A good start was made at Scarborough, where several members of the local society joined the Union.

The visitors had tea together at the Grand Hotel, after which Mr. W. H. St. Quintin, J.P. delivered his presidential address, entitled, 'Some Notes on Aviculture,' in which he gave the scientific results of his observations at Scampston, where many rare and interesting birds are reared in his aviaries. These notes will shortly appear in these pages.

During the delivery of the address, the chair was occupied by His Worship the Mayor of Scarborough (Councillor W. Ascough, J.P.), who extended a hearty welcome to the visitors, and gave practical evidence of his interest in natural science.

Cordial votes of thanks were accorded to the President for his address and services during the year; to the Mayor, and to the Scarborough Field Naturalists' Society; the last being ably acknowledged by the Society's President, Mr. E. B. Lotherington.

For particulars of the Union's excursions for 1910, and for the names of the various officers, etc., reference should be made to the report printed at the end of this number of 'The Naturalist.'—T. S.

The Annual Report of Proceedings under Acts relating to Sea Fisheries for the year 1907 (120 pp., 1/11, published 1909) has recently reached us. The volume contains an enormous quantity of valuable records, and whilst it is largely of value economically, there is very much of interest to the naturalist and scientific investigator. There are innumerable tables, giving particulars of the various quantities and kinds of fish caught, when, where, and by what means.

From Messrs. A. and C. Black we have received their indespensable handbooks, **'Who's Who,'** 1910 (over 2200 pp., 10/- net); **'Who's Who Year Book'** (162 pp., 1/-); **'The Writers' and Artists' Year Book'** (127 pp., 1/-), and the **'Englishwoman's Year Book'** (382 pp., 2/6).

With regard to the first of these, the information it contains is simply astonishing. Each year it grows wider and wider, but notwithstanding its 2200 pages, it is still in a convenient form for reference. The 'Year Book' contains lists of Government Officials, Hospitals, Peers, Universities, Professors, Race Meetings, Lecture Agencies, etc., and the House of Commons. Possibly the last will need revision before the next edition is issued. 'The Writers' and Artists' Year Book' is prepared for the use of authors and artists, and contains lists of periodicals, publishers, etc. A useful note appears dealing with the proper way to correct proofs. In the list of Natural History Magazines we notice the 'Zoophilist,' probably a misprint for the 'Zoologist.' A lady friend, to whom we sent 'The Englishwoman's Year Book,' says it's simply perfect, and why didn't we tell her about it before!

Fungi and How to Know Them: An Introduction to Field Mycology, by **E. W. Swanton.** Methuen & Co. 210 pp. 6/- net.

This is a book on Fungi for which there was no very special need. A beginner in field mycology desirous of learning something of the structure and habits of fungi, may certainly pick up some useful information, but very little in comparison to what he may gather from Dr. M. C. Cooke's 'Introduction to the Study of Fungi.' The book only essays to deal with the 'larger fungi,' and, 'of these, for the most part, only very common ones.' The idea of mastering the commoner ones first, as a basis, is a very good one. The classification does not profess to go beyond the genera of British Basidiomycetes, and one or more typical species in each genus, so that its usefulness to a field mycologist is very limited. The book contains sixteen coloured plates 'illustrating' a fair number of species, some of which are recognisable at sight, without referring to the name behind the plate to ascertain the species each figure is supposed to represent. There are also thirty-two plates of roughly-drawn figures in black-and-white, and some photographic reproductions, the latter from photos by C. G. Lloyd. There is a useful Glossary. *Cordyceps militaris* (p. 186) is in its wrong 'sub-order' under Discomycetes; of course, this can only be the result of an oversight. With the statement in the Preface that 'it is therefore no more difficult to identify a fungus than it is to diagnose a flower,' we cannot agree.—C.C.

FIELD NOTES.

BIRDS.

Stormy Petrel near Barnsley.—On November 15th a Stormy Petrel was found dead at Staincross, near Barnsley, having flown against the telegraph wires. The bird was in fair condition, and is now in the Barnsley Naturalists' Society's Museum.—W. BARRACLOUGH, Barnsley, December 7th, 1909.

Unseasonable Nesting Dates.—On November 27th, Mr. R. Fisher, Junr., of Leconfield, reported that a Rook was feeding young on his father's farm ; and that two witnesses besides himself had seen it. On November 29th, Mr. Sidney S. Waterhouse found a pair of Starlings feeding young at Sutton. On looking into the nest he found four half-grown young dead, and one alive, crying out for food.—E. W. WADE, Hull.

Glossy Ibis in Holderness.—In the shop of a bird-stuffer at Hull are two Glossy Ibises, shot on the Lambwath in Holderness, one on the 19th of October, unsexed, as the intestines were so much injured by shot as to make it impossible to distinguish the sex; and another on November 10th—a male. Both are in the immature plumage shown in Dresser's plate, and exactly alike so far as one can see in their present stuffed condition, but the bill of the first is half an inch longer than that of the second. Another was seen, but escaped by running into the reeds when its companion was shot, and may have been the one seen at Hornsea Mere and on the River Hull.—E. W. WADE, Hull.

Migration of Terns.—With reference to the note in last month's 'Naturalist' *re* the ringing of birds. I have obtained fourteen rings, all taken from young Common Terns, which I find had been reared at Ravenglass this year ; the particulars are as follows:—One specimen was ringed on July 22nd, eight on July 30th, three on August 10th, and two on August 13th. They were all caught in the fishermen's bird nets at Flookburgh, on the north side of Morecambe Bay, between Grange and Ulverston, between September 12th and 18th. From these records, the migration of the birds had apparently continued for about eight days in the neighbourhood. Some terns were caught during August and at the beginning of September, but none was found with rings on. Nor were any ringed specimens amongst those caught after September 18th.—H. B. TURNEY, Lightburn Avenue, Ulverston.

MAMMALS.

Otters in Nidderdale.—Otters are not at all uncommon in Nidderdale, and traces of them are frequently seen, generally these are the partially devoured body of a chub or other coarse fish. It is, however, seldom that seven are seen together. This event occurred just above the bridge at Birstwith, on December 11th, when seven Otters, two old and five young ones, were seen endeavouring to breast the rush of waters below the weir, but as the weir was in heavy flood, the task proved too great for the younger members of the party. They eventually turned round and went down the river.—R. FORTUNE.

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ENTOMOLOGY.

Cumberland Trichoptera.—Some time ago the Rev. E. N. Bloomfield, M.A., sent me a number of Trichoptera for determination, which had been taken in Cumberland. As they may not have been previously recorded for that county, I append list :—From St. Bees—*Hydropsyche instabilis*, *H. angustipennis*, *Leptocerus bilineatus*, *Limnophilus extricatus*, *Plectrocnemia conspersa*, and *Gœra pilosa*. From Eskdale—*Limnophilus marmoratus*, *L. luridus*, and *Odontocerum albicorne*. From Eel Tarn :—*Phryganea varia* and *Limnophilus centralis*.—GEO. T. PORRITT, Huddersfield, December 13th, 1909.

MUSEUM NEWS.

The **Louth** Antiquarian and Naturalists' Society has received a gift of £250 towards the erection of a museum for its treasures, and an appeal has been made for a similar amount in order that a suitable building may be erected.

A list of books published before the year 1815, relating to British Birds, from the library of Mr. W. H. Mullens, has been published by the **Hastings** Museum. It is a valuable bibliography, and contains fac-simile title-pages of many of the volumes enumerated.

The Report of the **Warrington** Museum contains details of the many additions made to the collections during the year just closed. There was a 'record attendance, largely due to the interest excited by the capture of the Grey Seal at Paddington Lock in 1908, which was placed in the museum in August 1908.' This report contains a history of 'The Foundation of the Warrington Museum,' by Mr. C. Madeley, the Director.

The seventeenth report of the **Leicester** Museum contains a record of the work accomplished during the past year. Amongst the more interesting features we notice that Dr. F. W. Bennett has presented an extensive collection of Charnwood Forest rocks ; and a collection has been arranged to shew the evolution of the present-day rail 'track.' It is pointed out that it 'is not generally known that the gauge of our modern railway lines is the direct outcome of the distance between the two parallel lines of stones (called 'stone roads') laid down on the highways by the Romans to ease traction over rough or soft ground.'

PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

The Transactions of the Norfolk and Norwich Naturalists' Society for 1908-9 (Vol. VIII., pt. V.) recently to hand, completes the eighth volume, and contains a valuable index of the Society's publications from 1869-1908 by Mr. C. Davies Sherborn. The papers are mostly of local interest: the Rev. M. C. H. Bird gives his presidential address, and deals with East Rushton Common; Mr. A. Bennet writes on 'East Anglian Plants and on *Deschampsia setacea*, a little known Norfolk grass'; Mr. Eldred has notes on 'The Great Bustard,' and there are papers on Meteorology, Bird Life, Herring Fishing, Algæ of Suffolk, and a special series of the monographs on the fauna and flora of Norfolk, dealing respectively with the non-marine mollusca, Marine Algæ, Sawflies, Hymenoptera, Coleoptera, Hemiptera, Fishes and Birds.

Barrow Naturalists' Field Club. Annual Reports, Proceedings, etc., for 27th and 28th years, ended 25th March, 1904. Vol. XVII., 1909. 288 pp.

The Barrow naturalists and their enthusiastic editor—Mr. Harper Gaythorpe—are to be congratulated upon the success which has attended their efforts to keep a record of their work. The present substantial volume (which, by the way, is well indexed), is by far the largest publication the Society has issued, and it is also the most valuable. Though a little belated (No. XVIII. for 1905-6 having been published over two years ago), it is, nevertheless, welcome. About two-thirds of the publication consist of local papers and reports, the remainder being devoted to subjects of more general interest. Many branches of geology, archæology and natural history are represented, and the notes are illustrated by plans, sketches and photographs. Amongst the latter are several excellent representations of birds' nests. A portrait of Mr. Gaythorpe appears as frontispiece. It is impossible here to enumerate even the more important items in the volume, but it can safely be said that future historians and writers upon the natural history and geology of the Furness district will be grateful to the Barrow Society for the pains they are taking in printing particulars of its investigations.

Proceedings of the Liverpool Geological Society, Part V., Vol. X, 1909, pp. 289-339.

This is the first part of the Proceedings of this society that has appeared for many years without the names of either Joseph Lomas or Mellard Reade in the list of contributors. And the publication suffers. Still it contains a record of useful work, and some papers of permanent value. Dr. Dwerryhouse's presidential address, dealing with Carbonic Acid, and the part it plays in the Universe, appears first. Judging from the 'Contents,' Dr. Given records some glacial striæ near Mossley Hill, though, by an apparent oversight, the title of his paper is omitted. Mr. Travis describes some Ordovician Rhyolites and Tuffs in Carnarvonshire, and gives illustrations from micro-photographs. Mr. Brodrick sings once again his old, old song about the footprint casts in the Oolites near Whitby, which he 'had the good fortune to find.' At the time he did not know where they had come from, but on the first occasion upon which the place was visited by another geologist, their exact horizon was identified, and was described in this journal so long ago as October 1908. In view of this, it is perhaps surprising to find the author writing, 'it is unfortunately impossible to say with any degree of certainty the exact horizon from which they had fallen.' The publication concludes with a 'List of Scientific Papers by Joseph Lomas.' There is nothing to indicate who has compiled this list, but it is much to be regretted that it is so incomplete, and we hope a supplementary list will be printed in the next part of the Proceedings. His earlier work, published in the Proceedings of the Liverpool Biological Society, is not referred to in any way; his papers in 'The Naturalist' are omitted; as is also a paper in the 'Proceedings of the Royal Society,' and no reference is made to his contribution to Cassell's 'Nature Book,' which are certainly by far the finest papers he ever wrote.

NORTHERN NEWS.

The new President of the Bradford Scientific Association is Miss Mary A. Johnstone, B.Sc., F.L.S.

Mr. W. A. E. Ussher, F.G.S., has retired from the Geological Survey, after forty-one year's service.

Mr. H. J. Wheldon has 'A Contribution to the Manx Fungus Flora' in *The Lancashire Naturalist* (No. 19).

Some big prices have recently been paid for insects, but that referred to on the headline in 'The Globe'—'Fly for £1000,' is surely a record!

An account of Prof. W. Boyd Dawkins (with portrait), in the 'Eminent Living Geologists' series, appears in the December *Geological Magazine*.

Mr. Ernest Kempsey saw a Glossy Ibis at Hornsea Mere on October 15th, and 'saw a similar bird at the same place in 1902.'—*British Birds* for December.

An excellent account of the life and work of the late J. G. Goodchild, by Prof. J. W. Gregory, appears in 'The Transactions of the Edinburgh Geological Society, (Vol. IX., Part 4) recently issued.

At a recent meeting of the Lancashire and Cheshire Entomological Society, Mr. W. Mansbridge exhibited a series of *Eupethecia valerianata* from Delamere Forest; this being the first record for Cheshire.

We were flattered to find that the gist of Mr. Riley Fortune's note on 'the Ringed Pratincole in Yorkshire,' which appeared in our journal for November, was subsequently inserted in 'The Field,' though above another signature!

Part XVI. of Taylor's 'Monograph of the Land and Fresh-water Mollusca of the British Isles' has appeared, and, as usual, is well illustrated. Besides various distribution maps, there are portraits and autographs of famous conchologists, etc., and an excellent coloured plate of *Vitrina* and *Hyalinia*.

Mr. W. Greaves, of 1 Chapel Avenue, Hebden Bridge, is preparing an account of the fauna of his district, and is anxious to ascertain the whereabouts of the collection of birds formed by Samuel Gibson, over half a century ago. It is said that a list of his birds appeared in the *Manchester Guardian* in May or June 1849, in which year Gibson died. If any of our readers are able to assist Mr. Greaves, perhaps they will communicate with him.

The Rev. W. Hunt Painter has presented the whole of his botanical, geological and conchological collections to the University College of Wales, Aberystwyth. Mr. Painter's herbarium includes a practically complete collection of British flowering plants and ferns, together with many European and other specimens. There is also a fine collection of Cardiganshire, etc., mosses, accompanied by a considerable number of microscope slides of leaves, capsules, etc. The geological collection contains many fossils which cannot now be obtained, as the quarries in which they were found are now closed.

ERRATA.—'Recently Discovered Fungi in Yorkshire,' 'Naturalist,' May and June, 1909. *For* '*C. Stevensoni*,' p. 182, line 9, *read* '*Collybia Stevensoni*'; *for* 'No. 1399,' p. 222, line 5, *read* 'No. 1349.'—C. CROSSLAND.

Through a careless slip on the part of our printers, the matter on pages 436-437 of the December 'Naturalist' has been re-arranged. The whole of page 437 should follow on after the fifth line of page 436, and that portion of page 436 commencing '*Hygromia rufescens*' should follow on after the word 'limestone,' at the bottom of page 437. Perhaps our readers will kindly make this correction.

The Christmas festivities affect different people in different ways. The following is the result of one mild attack :—

'THE NATURALIST.'

Her Crew and Her Cruise.

['The Naturalist' is the oldest scientific periodical in the British Isles, dating back to 1833].

'Twas in the year of 'thirty-three
Our good ship faced the gale,
Upon the Journalistic Sea,
And she still keeps up her *sail*,
My boys,
She still keeps up her sail!

Her *sheets well set* for fourscore years,
Well *articled* and *bound*,
To fight her way through Northern spheres,
With all her men well found,
Brave boys.
With every man well found!

A fearless *Sheppard* leads, along
With a *Woodhead* of *degree*;
The latter name commences wrong,
So spell it with a 'G,'
Now boys,
Just spell it with a 'G'!

A *Baker* and a *Taylor* each
Give service good and true;
While *Fortune* comes within our reach,
With a *Nelson* in the crew,
Ho! boys,
There's a Nelson in the crew!

Though in the north we like the *West*
To show its welcome light,
And *Porr-itt's* rays upon our quest,
For then we're in the right,
Good boys,
We know we're in the right!

Thus everywhere we *Kendall* high
Our spirit of renown;
And for our colours we would dye,
Supported by *A. Brown*,
Eh! boys,
A strong, reliant Brown!

Then here's a toast for old time's sake—
'*The Naturalist and her men*,'
May each a prosperous voyage make
Through nineteen hundred and ten,
Drink boys,
Good luck to nineteen-ten!

George E. Tindal.

Naturalist

YORKSHIRE NATURALISTS' UNION.

FORTY-EIGHTH ANNUAL REPORT, FOR 1909.

Presented at Scarborough, Dec. 11th, 1909.

OWING to a widely expressed desire of the General Committee at the Scarborough Meeting, the Annual Report of the Yorkshire Naturalists' Union is included in this issue of '*The Naturalist*.'—T. S.

The Executive Committee has pleasure in presenting the following report of the work of the Union during 1909.

The Forty-seventh Annual Meeting was held at Doncaster, on Thursday, Dec. 10th, 1909. The Corporation kindly placed the Mansion House at the disposal of the Union, and the Doncaster Scientific Society looked well after the interests of our members, and made the local arrangements. Partly on account of the bad weather the attendance was by no means so representative as that of preceding annual meetings.

Excursions were made to Cusworth, where many botanical and other specimens were secured, and these were exhibited at the excellent conversazione held in the evening. An invitation from the Scarborough Field Naturalists' Society for the Union to spend its next annual meeting at Scarborough was unanimously accepted.

Dr. Wheelton Hind, F.G.S., as his presidential address, gave an admirable and valuable summary of "The Present Position of the Geology of the Carboniferous Rocks of Great Britain," which has since enriched the pages of our journal, "The Naturalist."

The President also made feeling reference to the death of Dr. Clifton Sorby.

Six Field Excursions have been held during the year, upon which many useful observations were made, and several additions to the county fauna and flora placed on record.

The excursions were as follows :—

For York, S.E. —Market Weighton (Saturday, May 8th).
,, Mid. W.—Bowland (Whit Week-end, May 29th to 31st).
,, N.E. —Runswick (Saturday, July 10th).
,, N.W. —Sedbergh (Bank Holiday Week-end, July 31st to August 2nd).
,, S.W. —Cawthorne (August 28th).
,, N.E. —Fungus Foray at Castle Howard (September 18th to 21st).

Market Weighton.—The first excursion during the year was held in this charming Wold district, and was well attended. The numbers were augmented by several teachers, members of the East Riding Nature Study Association. Geologists, Botanists and

Conchologists were particularly in evidence, and the excursion was profitable from the number of records made in the neglected branches of natural history, such as the Arachnida. In fact, a feature of our 1909 excursions has been the attention paid to those orders which are generally considered to be "unattractive." An illustrated report appears in "The Naturalist" for June.

Bowland was chosen for Whit week-end, and despite its great distance from the railway, was well attended by a representative body of members. Owing to the limited accommodation, the attendance was almost too good! But the district was a natura list's paradise, and all parties profited by the excursion. The geologists took advantage of the excellent opportunity afforded of studying the reef-knolls, and also secured many rare specimens. A detailed report appeared in our magazine for August.

The **Runswick** excursion, on July 10th, gave the members an opportunity of visiting that delightful old-world hamlet on the cliffs; and geologists, botanists, entomologists and marine zoologists gave good reports of their doings there in "The Naturalist" for September.

Sedbergh was chosen for August Bank-holiday week-end, but Fate seemed against the party which gathered together under the hospitable roof of the White Hart Hotel. Rain fell almost incessantly during the three days, and the illness of the genial local secretary prevented him from taking an active part in the rambles. Nevertheless, from the report in "The Naturalist" for October, it is apparent that some of the members returned with very pleasant recollections of Sedbergh. The evenings were profitably occupied by papers and discussions.

Cawthorne, near Barnsley, was visited on August 28th, and was fairly well attended. The colliery waste-heaps proved unusually attractive to the geologists, and the surrounding picturesque woods were well worked by the botanists and zoologists. A visit was also paid to the interesting little museum at Cawthorne. For detailed report see "The Naturalist" for November.

Castle Howard.—As will be seen from the report of the Mycological Committee, as well as from the report in "The Naturalist" for December, the Annual Fungus Foray this year was successful; this section of the Union's work being carried out in a particularly thorough and business-like manner.

Sectional Meetings.—As will be seen from the following reports, some of the Sections of the Union have held meetings during the summer, with excellent results. It is to be hoped that this practice will be continued.

As a direct result of the work of the Union at its field meetings, etc., the following papers and notes, have appeared in "The Naturalist"—

JANUARY.—"Yorkshire Naturalists at Doncaster," T. S.; "On the Status of the Stone Curlew in York-

shire," E. W. Wade; "Notes on the Lepidoptera of South Yorkshire in 1908," B. Morley; "The Fungus Flora of Mulgrave Woods," C. Crossland; "Economic Mycology," G. Massee; "Yorkshire Zoologists."

FEBRUARY.—"The Changing Distribution of the Long-tailed Titmouse in the West Riding," H. B. Booth; "Mollusca at Clapham," W. Denison Roebuck.

MARCH.—"Yorkshire Naturalists' Union Meetings."

APRIL.—"Yorkshire Mosses," C. A. Cheetham; "The Present State of our Knowledge of Carboniferous Geology" (and continued in May, June and July issues), Wheelton Hind.

MAY.—"Recently Discovered Fungi in Yorkshire," C. Crossland, (continued in June).

JUNE.—"Yorkshire Naturalists at Market Weighton," T. S.; "Polymorphism in Fungi," G. Massee; "The Flamborough Peregrines,"; "The Solitary Ant."

AUGUST.—"Yorkshire Naturalists at Bowland," T. S.

SEPTEMBER.—"Oystercatcher Nesting at Spurn," Oxley Grabham; "Natural History of Runswick," T. S.

OCTOBER.—"Yorkshire Naturalists at Sedbergh," T. S.

NOVEMBER.—"Yorkshire Naturalists at Cawthorne," T. S.

DECEMBER.—"Fungus Foray at Castle Howard," C. Crossland.

The usual **Excursion Programmes** have been issued to the members and associates; and an extra number has been printed for binding in the Transactions.

Permission to Visit Estates has almost always been readily granted, and in some cases the landowners have been exceptionally kind in arranging for our comfort.

Railway Facilities to attend our excursions have been kindly granted by all the Railway Companies connected with our county.

Excursions for 1910 were arranged as under:—

Yorks., N.W.—Middleton in Teesdale, Whit week-end, May 15th to 17th.

,, Mid. W.—Malham, Saturday, June 4th.

,, S.E.—Easington for Spurn, Saturday, July 9th.

,, N.E.—Kirby Moorside, Bank Holiday week-end, July 30th to August 2nd.

Lincs. N.—Scunthorpe (with Lincolnshire Naturalists' Union), Thursday, August 25th.

Fungus Foray, Mulgrave Woods and Arncliffe, September 17th to 22nd.

The Annual Meeting for 1910—A cordial invitation having been received from the Cleveland Naturalists' Field Club, for the next Annual Meeting to be held at Middlesborough, this was accepted, and the Annual Meeting for 1910 will be held there on December 17th.

Objects of the Union.—The Secretary will supply circulars setting forth the objects and aims of the Union on application.

Winter Lecture Scheme.—A revised list of Lectures was printed, as set forth in the Annual Report for 1908. In this the names of several prominent Yorkshire Naturalists appear, and every advantage of this scheme has been taken by the affiliated societies. In fact, some of them have gone so far as to give donations to the funds of the Union in return for this privilege.

The Affiliated Societies still show a satisfactory increase in number. During the year two new societies have joined, but the Milnsbridge Society is not in a position to remain connected with the Union. The total number of Societies now affiliated is 45.

The Statistics supplied by the Secretaries of Societies shew that the total membership of the affiliated Societies now is 3592 or an average of 80. Added to this, the membership of the Union gives our total numerical strength as 4026.

The Membership now stands at 434. This number does not include the 45 affiliated Societies, each of which is practically a member.

New Members.—The following is the list of new members elected during the year* :—

Miss Mary Nina Peel, Knowlesmere Manor, Clitheroe.
Mr. Edwin Rushton, Oswald Kirk, York.
Mr. Anthony Wallis, M.A., Oakleigh, South End Avenue, Darlington.
Mr. C. Fox Strangways, F.G.S., Kylemore, 24 Hollycroft Avenue, Hampstead. N.W.
Mr. W. Spencer, 5 Finkle Street, Selby.
Mr. G. A. Booth, M.B.O.U., 6 North Parade, Preston.
Mr. L. E. Priestley, Park Road, Halifax.
Mr. Charles Taylor Trechmann, B.Sc., Hudworth Tower, Castle Eden.
Mr Wm. Falconer, Wilberlee, Slaithwaite, Huddersfield.
Dr. J. H. Fryer, Eastgate, Barnsley.
Mr. Rosse Butterfield, Wilsden, Bradford.
Mr. John F. Musham, 53 Brook Street, Selby.
Mr. Thos. Waddington, Moorallerton, Leeds.
Mr. E. A. Parsons, 45 Lansdowne Street, Hull.
Mr. C. J. Hardy, 31 Hampton Road, Sheffield.
Mr. H. Wade, 10 Pitt Street, Barnsley.
Mr. A. J. Moore, 9 Brook Street, Hull.
Mr. Bernard Hobson, M.Sc., F.G.S., Tapton Elms, Sheffield.
His Worship the Mayor (W. Ascough, Esq., J.P.), Grange Avenue, Scarborough.
Mr. E. B. Lotherington, 39 Grange Avenue, Scarborough.
Col. Bland, 35 Avenue Victoria, Scarborough.

* This list includes those elected at the Annual Meeting at Scarborough.

Mr. A. Burnley, York House, Gladstone Road, Scarborough.
Mr. H. Witty, 35 Nansen Street, Scarborough.
Barnoldswick and Earby Scientific Society, Barnoldswick.
Sheffield Junior Naturalists' Club, Sheffield.

We regret to record the death of—
Rev. G. A. W. Huddart, Bedale.
W. H. Hudleston, London.
Herbert Prodham, Pickering.
Rev. W. C. Hey, West Ayton.
The Marquis of Ripon, K.G., Studley Royal, Ripon.
Rev. Dr. Dallinger, London.

Your Committee particularly regrets that in the list are two past-presidents of the Union, viz., W. H. Hudleston, F.R.S., and Dr. Dallinger. As pointed out in our journal "The Naturalist," both these gentlemen had reached a high position in the scientific world; the former as a geologist, and the latter as a microscopist.

In the loss of the late Rev. W. C. Hey, also, the Union has received a serious blow, and our publications will no longer be enriched by the contributions from his pen. As evidence of his thoughtfulness for the Union and its work, Mr. Hey left a legacy of £20, which has recently been received, and is a great relief to us at the present time.

Divisional Secretaries.—As in previous years these gentlemen have been of the greatest assistance in arranging the excursions, etc. The following were elected for 1910:—

York, S.W.—A. Whitaker, Worsborough Bridge, Barnsley.
York, Mid.-W.—Riley Fortune, F.Z.S., 5 Grosvenor Terrace, East Parade, Harrogate.
York, N.W.—W. Robinson, Greenbank, Sedbergh.
York, N.E.—J. J. Burton, Nunthorpe, R.S.O., Yorks.
Yorks, S.E.—J. W. Stather, F.G.S., Brookside, Newland Park, Hull.

Local Treasurers.—These gentlemen have also been of service in collecting subscriptions, and in looking after the Union's interests generally. The following were elected for 1910:—

Bradford—H. E. Wroot, 45 Pollard Lane, Bradford.
Halifax—C. Crossland, 4 Coleridge Street, Halifax.
Huddersfield—W. E. L. Wattam, 54 Towngate, Newsome, Huddersfield.
Leeds—H. Ostheide, 91 Harehills Avenue, Leeds.
Malton—M. B. Slater, Newbiggin, Malton.
Middlesbrough—M. L. Thompson, 40 Gosford Street, Middlesbrough.
Redcar—T. H. Nelson, Redcar.
Scarborough—J. H. Rowntree, Folkton Manor, Ganton, York.
Sheffield—A. T. Watson, 11 Leopold Street, Sheffield.
Skipton—J. J. Wilkinson, Burnside, Skipton.
Whitby—Thomas Newbitt, 17 Royal Crescent, Whitby.

General Committees.—The following gentlemen were added to the Permanent General Committee at the Doncaster meeting :—

F. Jowett, Vincent Street, Bradford.
F. Elgee, 24 Kensington Road, Middlesbrough.
Rev. F. H. Woods, B.D., The Rectory, Bainton, near Driffield.
F. Lawton, Carlton Terrace, Skelmanthorpe.
W. Harrison Hutton, 44 Dial Street, Leeds.
A. R. Dwerryhouse, D.Sc., F.G.S., Deraness, Deramore Park, Belfast.
B. Morley, Wind Mill, Skelmanthorpe, Huddersfield.
A. Gibson Robertshaw, Luddendenfoot, R.S.O.

Transactions.—It is gratifying to report that during the year your executive decided to issue a volume of Transactions, containing the various reports which were in type ; and that a volume of about four hundred pages has since been forwarded to each member. In addition to the valuable and detailed reports of the Union for the years 1905-8, it contains reprints of the twenty-nine excursion programmes published during that period ; lists of fungi collected at the Maltby and Grassington forays, by Mr. C. Crossland ; and the geological bibliographies for the year 1902-8, which in former years appeared in "The Naturalist." The last contribution contains over 1600 references to papers and memoirs, and is the work of the Hon. Secretary.

Towards a subsequent volume we have Mr. Lee's supplement to his Flora of Dewsbury ; Dr. F. A. Lees' supplement to his Flora of West Yorkshire ; a List of Yorkshire Arachnida by Mr. W. Falconer ; Yorkshire Hemiptera, etc., by Mr. W. Denison Roebuck ; Economic Fungi, Part IV., by Mr. J. H. Holland ; the Geological Bibliography for 1909 ; and the Excursion reports for 1909.

SECTIONS AND COMMITTEES.

The President and Secretary of the Union are ex-officio members of all Sections and Committees.

It is recommended that in future each section of the Union shall have supervision over the Committees bearing upon the particular work of that section ; and also that as far as possible the Committees and Sections meet in good time, in order to receive and agree to the various reports on the year's work, before passing them forward to the Hon. Secretary for insertion in the Annual Report.

VERTEBRATE SECTION REPORT, 1909.

General.—At most of the meetings of the Union, the section has been well represented, but at two meetings it has been unrepresented. This is unfortunate, and in future, arrangements must be made so that some of the members are always present.

No matter how unattractive a district may be from a zoological standpoint, there is always something to be learned with regard to the distribution of the birds or other vertebrates.

By the invitation of the President of the Union, a special meeting was held on September 4th, at his home, for the purpose of inspecting his aviaries, etc. Unfortunately, the day was unfavourable, but those who journeyed to Scampston had a most interesting and enjoyable time, and were most hospitably entertained by Mr. and Mrs. St. Quintin.

Indoor Meetings.—During the year two meetings were held at Leeds, for the purpose of reading papers and exhibiting slides and specimens. They were both very successful events, and well attended.

West Riding.—Messrs. W. H. Parkin and H. B. Booth report :—Redwings, which had been scarce during the whole of the winter, appeared in good numbers in March, probably on their journey northwards. Numbers of duck and other wild fowl have been reported during the past two winters on the large new reservoir of the Bradford Corporation at Gouthwaite—where they are fairly safe from molestation. This large expanse of water will probably attract wild fowl in winter to the detriment of smaller sheets of water in the district. Some wild Whooper Swans were captured and pinioned on the lake at Harewood House last winter, and have since remained in a semi-domesticated state.

A feature of the season has been the number of species of shore-birds (Waders) in the West Riding. A Bar-tailed Godwit was shot out of a flock of at least a hundred, which alighted in a field near Holden Ghyll on the evening of May 17th (Crosshills Naturalists' Society). Three Ringed Plovers were noted at Malham Tarn on May 10th, and one was still there on May 23rd, but no trace could be discovered of their nesting. An adult Sanderling was shot on the moors near Long Preston, on August 14th (W. Wilson). Two Curlew-Sandpipers, a Little Stint, a Green Sandpiper and some Ringed Plovers were carefully identified in August by several members of the Hebden Bridge Literary and Scientific Society. Oystercatchers were noted in April and in August (four).

The arrival of the summer migrants was more normal, and not so late as in the two preceding seasons—Nightjars and Swifts were unusually early in arriving.

Corncrakes again immigrated in fewer numbers. If this rate of decrease continues, the species will soon be uncommon in the Riding. On the other hand, Starlings continue to multiply and would appear to have already over-reached their food supply. The same thing applies to the Rooks, but in a lesser degree.

The widespread visitation of Crossbills in July was represented in the West Riding by one that was killed by the telegraph wires

in Ilkley on July 18th, and a few that were seen in the neighbourhood of Harrogate.

Red Grouse and Pheasants have done fairly well in 1909, but Partridges have had a very poor season.

By the Yorkshire Naturalists' Union excursion to Newton, more information was obtained respecting the little-known vertebrate fauna of the Bowland district (see "Naturalist," 1909, pp. 301-2). It is to be hoped that members will not neglect to report anything of interest in the Yorkshire drainage of the Ribble. The distribution of the different species of birds there is peculiar.

Mr. R. Fortune writes:—In the Harrogate district the migrants arrived at the normal time. Swifts were first seen on the 6th May, a date upon which they generally return. Landrails are keeping up their numbers, although, of course, they are much less common than they were twenty years ago. House Martins continue to show a slight increase. One feature of the season has been the exceptionally late nesting of a great number of birds, nests with young of several species being seen well into September. The first winter migrant noted was the Hooded Crow, on October 29th. Redwings were seen in numbers in the district on November 3rd, though they had been heard passing over at night much earlier than this. Fieldfares first appeared on November 5th. A flock of at least fifty Wild Geese passed over Farnham village on October 27th, and on the same day quite a lot of Herring-Gulls were flying over the same district.

Mr. Corbett reports two interesting occurrences from the Doncaster district. The first an adult male Scoter, which had injured itself against the telegraph wires, and was picked up near the racecourse early in September. The second, a specimen of the Glossy Ibis, which had been shot on Misson Marsh, Notts, was purchased at a game dealer's shop in Doncaster at the end of October. A Hoopoe was seen on September 23rd at Elsecar, near Barnsley.

East Riding.—Mr. E. W. Wade writes:—An exceptionally hard winter was followed by a dry, but cold and backward spring, the third in succession; and a wet and cold summer, with the exception of a brief spell of warm weather in August. The effect upon bird life, if not exactly what one had expected, affords interesting results, and food for thought, when contrasted with a normal season.

I will deal first with early breeders and resident or partially migrant species.

In this part of the county a great increase in the numbers of field voles had a corresponding effect upon the fertility of owls, and many large clutches of eggs were observed, *e.g.*—

On 29th March, I found the Long-eared Owl with five eggs, just on the point of hatching. The birds must have commenced

laying at the beginning of the month, when snow was on the ground, accompanied by sharp frosts. Four more clutches of five each have been reported, one of them as late as May 9th. The usual date for this species to commence incubation is the last week in March, or the first in April.

Two clutches of five each of Tawny Owls were observed, one of them fresh, on 27th March; one hard-sat, on 3rd April. In 1905, also a vole year, I saw in one day two clutches of Tawny Owls, each with five eggs.

Short-eared Owls, which have undoubtedly bred sometimes on our Yorkshire Wolds, though I have never actually seen the nest myself, and have only the reports of keepers who, on two occasions, have described the finding of a nest containing white eggs, in the rank grass that grows in the steep Wold valleys; this year successfully reared six nests of young, on Broomfleet Island. This corner of the Humber Saltings, which has been silting up for many years, was enclosed and protected from the tides by the Humber Conservancy last year. A rank covering of reeds, tall grasses and rushes, had been growing up all over the ground for many years, and completely covered it when Messrs. W. H. and H. Stickney took it on lease early in 1909, and the process of burning the vegetation and ploughing up the soil commenced in April. In June, when some of the outlying rushes and long grasses came under the plough, six nests of Short-eared Owls, each containing from four to eight well-fledged young, were discovered. Fortunately the cultivators understood the value of these birds in keeping down vermin, and the fledglings were carefully removed to safety as the plough advanced, without in any way disconcerting the parents, who continued to feed them in their new quarters.

On 24th May, Mr. W. G. Griffiths went down with Mr. C. Saxelbye, and photographed one of the nests, which he described as placed at the foot of some slightly withered reeds, two young birds being in it, whilst two others, older and larger, were found about forty yards away. Both old birds were in attendance, and one of them repeatedly swooped down at him as he took the photographs, almost knocking his cap off, and uttering a parrot-like cry meanwhile. The nest contained two dead voles, which, from the report of the foreman in charge of the farm, formed the exclusive food of the birds. I cannot hear of any authenticated instance of the birds breeding in the same district before, and no doubt the plentiful supply of their natural food had attracted them, as in the case of the Scotch vole plague years 1890-92. Early in September they all disappeared. They used to breed on similar ground in Horkstow Carrs, North Lincs., about ten miles nearly due south, but the occurrence can only be regarded as sporadic, and as the land at Broomfleet has been cleared, it is hardly possible that we shall see it recur.

Barn Owls are scarcer in the district than formerly, but I heard of one clutch of six eggs being seen.

On the Corvidæ the season had curiously diverse effects. Magpies had full clutches, one of eight being observed, but Jackdaws produced few eggs, small and poorly marked, four being the commonest number in a nest.

Carrion Crows seem to have been stimulated by abundance of food, for two clutches of six each were found in the same district, the normal clutch of five also being very common.

Rooks showed a puzzling discrepancy of date; young, well advanced, being observed in Holderness on 4th April, whilst on the same date, in Howdenshire, the eggs were almost invariably fresh, or clutches as yet incomplete, and many birds had not commenced to lay.

Peewits were late, very few nesting till the second week in April, when the majority commenced to sit.

Of the Turdidæ, Missel Thrushes were unusually numerous and prolific, many clutches of five being found, one of these as early as 3rd April.

Blackbirds and Thrushes more prolific than usual, five being the usual number of eggs in the first clutches, in place of four, whilst Mr. H. R. Jackson found Thrush (seven) and Blackbird (six) during the season, both very unusual numbers.

Hedge Sparrows produced many clutches of five in the first nesting, instead of the usual four.

Goldfinches and Lesser Redpolls keep about stationary, being thinly distributed all over East Yorkshire. Were it not for the depredations of the bird-catcher in winter, there seems no reason to doubt that they would increase.

Hawfinches appear to be increasing in Holderness.

Chaffinchs were unusually numerous and prolific.

Corn Buntings, like the ground-breeders generally, were very late, the wet apparently being too much for them. Mr. H. R. Jackson had two nests brought to him, taken in front of the reaper at the end of August.

Starlings prolific, a nest of seven is reported by Mr. C. W. Mason.

Of the migrants, the Warblers were late in coming, and late in nesting, but produced full clutches, and in some cases reared two broods, for on 4th July, I saw two nests of the Common Whitethroat with eggs and young, whilst the Garden Warbler was in full song on the same date. I also saw a Lesser Whitethroat with six eggs on 23rd May—a very unusual number hereabouts.

Swallows and Martins arrived about the usual date, and in many cases produced two broods, in spite of the wet summer.

On 19th September I saw a young Cuckoo feeding on caterpillars.

The Hawks produced full clutches. Mr. W. G. Griffiths found a Sparrow Hawk's nest, containing six eggs, and two broken egg-shells lying beneath the tree; and on 3rd July I saw a nest of six—a second clutch of the same number, just hatching. A Kestrel is reported with six eggs.

Turtle Doves appear to be extending their breeding-range in Holderness, as unfortunately do Red-legged Partridges in East Yorkshire generally, having been observed in fresh localities.

Pheasants generally have done well, except at Burton Constable, where a record hatch of five thousand young birds was followed by an epidemic which carried off hundreds per week. Analysis showed them to have enlarged liver and spleen, the latter organ quite light-coloured, and the disease was diagnosed as enteric fever. The expert advice tendered was to shoot down the whole stock, and not rear for three years. Some even of the old birds were affected. The weather was said to have acted disastrously upon a degenerating stock. On the other hand, fresh blood has been continuously introduced, but the same rearing ground has been used for six years, so that we may perhaps find reason to differ from the expert opinion.

Partridges in most parts have been simply wiped out by a succession of wet summers, and on many estates are not being shot at all. The clutches were full, and hatched well, but the June rains killed off the chicks. To find a parallel to this wet season one must go back to 1895.

Landrails have almost disappeared from this district.

Stone Curlews arrived on 31st March, and were nesting in the first week of May.

Redshanks again bred in Central Holderness on 24th April, a week earlier than in 1908.

The report from Hornsea Mere is satisfactory. The watcher proved efficient, and warned several men off the nesting ground. Three pair of Grebes bred, and one of the clutches hatched off was a good one.

Shovellers bred as usual.

The Pochards do not seem to have recovered from the effects of the shooting of fourteen of their number in the autumn of 1908, and apparently the destruction of the resident birds frightens or deranges the breeding stock for some years, their places not being filled up by new-comers.

A pair of Tufted Duck was at the Mere all the season, but did not breed.

A male Pochard and Tufted Duck were at Burton Constable all the summer, unaccompanied by females. In the case of the Pochard, where the males outnumber the females by two or three to one, as at Hornsea Mere, it is not surprising to find a stray drake alone, but the same does not apply to the TuftedDuck.

The Coots and Waterhens were late at the Mere owing to the cold weather.

On 21st October, flocks of migrant duck—Pochard, Widgeon and Tufted, were already present in large quantities, earlier than usual.

Last winter two Bitterns frequented the Mere.

The watcher considers that he should have 21/- instead of 20/- per week, the former being recognised as a standard wage.

Bempton.—The climbers had an unusually early and prolific season, commencing on 12th May, and running through practically without a break, till the last week in June, when the bad weather commenced, but as few eggs were laid then, this made scarcely any difference to the number lifted. In spite of the cold weather, the birds averaged a week earlier than usual throughout the whole cliff, the first scale or fling being over by the end of May, the second in full swing on 12th June, and quite over by 19th, after which the third was so thin as to be hardly worth gathering. On the later grounds the dates would be about a week later than this. The men who took part regularly in the climbing must have done some thirty per cent. better than in 1908. Unfortunately or fortunately, as we take the climber's or bird's point of view, W. Wilkinson had a serious accident, during the last week in May, which disabled him for further climbing in 1909 and has caused his retirement from "the ring;" and though his place was taken now and again by other men, a good many eggs would escape in consequence.

On 11th Sept., H. Marr, the oldest man then climbing the cliff, died suddenly (see notice in "The Naturalist" for November).

I took a special type of egg for the eleventh year in succession.

The Falcon again hatched out in "Falcon's nest" for the second year in succession, and produced two young and one addled egg, which Mr. Sapsworth saw and photographed on 24th May, but on 31st May, when I went down, only one young bird remained, the other apparently having scrambled or fallen off the ledge. The survivor refused to stay in the nest, where I had replaced it, but preferred sitting out among the grass in sight of all visitors, much to the distress of the parent bird. On 12th June it had flown.

Deduction from the 1909 season—Given plenty of food, cold weather does not seem to reduce the fertility of birds.

Occasional Visitors.—21st June—A Ruddy Sheldrake was shot at Sunk Island, and proved to be a pinioned bird.

18th July—A pair of Hedge Sparrows had reared a white young one at Kirkella for the second successive year.

15th July—Immigration of Crossbills in the East Riding, many old and birds of the year being seen at North Dalton and Beverley nurseries.

Several Greenshanks on the Lamwath early in August.

15th August—A Spoonbill observed on north shore of Humber by Mr. Stanley Duncan, and the same observer reported an excep-

tional number of Black-tailed Godwits on north and south shores of Humber on 3rd and 4th September.

8th September—A Manx Shearwater ♂ shot at Trent Corner by a keeper named Lening. The bird was smothered in fat, the intestines being almost filled with a solid mass of fat, and there was also a thick apron of fat all over the breast.

On 15th October, Mr. S. Waterhouse saw a Swift at Doncaster.

15th October—A glossy Ibis shot at Hunmanby, as reported by the Rev. E. Mitford in "The Field" for 6th November.

North Riding.—Mr. T. H. Nelson writes:—A party of nine Pallas's Sandgrouse was observed on May 17th, on West Coatham farm, by Mr. A. Pratt, who told me his attention was first drawn to the marks of their feet on the muddy road; he then saw the birds in an adjoining field, and walked within a few yards of them, when they flew off in the direction of Kirkleatham. On the 27th, a Turtle Dove was picked up on the breakwater, and at the same time a female Honey Buzzard was brought to me. A pair of Sheldrakes nested on the hills between Redcar and Saltburn.

A Nightingale was heard near Thirsk, on June 2nd, by Mr. R. Lee, and on the 22nd one was reported at Richmond.

About the middle of July considerable numbers of Crossbills were seen at Swainby, in the wood where they were noted in 1894 (see "Birds of Yorkshire").

In August I was informed by Mr. E. B. Emerson that a Pratincole had been shot at Danby Wiske, in mistake for a Golden Plover, by Mr. Charlton, of Northallerton, and presented by him to Mr. C. A. Emerson, of Deighton Manor. This is the same bird as referred to by Mr. R. Fortune ("The Naturalist," p. 372), and proved, on examination by him, to be the Black Winged Pratincole (*P. melanoptera*), and a new species for Yorkshire.

At the Teesmouth, in August and September, Godwits and Grey Plover were fairly numerous, and on the 17th of the latter month, a Ruff, in immature dress, was sent to me for identification, whilst on the 27th I procured another example of the same species on a marsh shooting.

On the 30th September, the first Jack Snipe of the season was shot, and one or two Woodcock were reported.

The Autumn migration has not, as yet, been very pronounced in Cleveland. The first flight of Woodcock arrived on Sunday, 17th October, and two or three were shot next day in a small plantation. On 4th November I saw one fly in from seaward, and found it afterwards sitting on a sandbank where it allowed me to approach within ten yards' distance. On November 2nd, I noticed a great influx of Green Plover, Hooded Crows and Larks, which passed in large flocks during most of the morning and afternoon.

On the 25th October, a Grey Lag Goose, a scarce species in this county, was shot at the Teesmouth.

The reported occurrence of three Glossy Ibises in Yorkshire is of great interest, as hitherto there are only five examples on record for the county. One of the new comers was procured on October 15th, and two others were seen at the same time. Another specimen was obtained at Old Ruswarp Hall Farm on 20th October, an adult in winter plumage. This specimen has been procured for the Whitby Museum. The third specimen was obtained by Mr. Corbett (see West Riding Report). The first and last mentioned were immature birds, and it is extremely probable that they are all members of the party seen at Hunmanby.

The following Officers were elected for 1910 :—

President—Prof. Patten, Sheffield.

Secretaries—H. B. Booth, Ryhill, Ben Rhydding; R. Fortune, Harrogate (West Riding); T. H. Nelson, Redcar (North Riding); E. W. Wade, Hull (East Riding).

Representative on Executive—W. H. Parkin, Shipley.

Representative on Committee of Suggestions—S. H. Smith, York.

The Yorkshire Mammals, Amphibians, Reptiles and Fishes Committee.

Mammalia.—The work of this Committee has so far been confined to observations made by members, both at the Union meetings and elsewhere.

The excursions of the Union were attended by members of the Committee, and the observations made at the Bowland one by Mr. H. B. Booth, were exceptionally valuable.

As to Mammals, Mr. A. Whitaker has again obtained Leisler's Bat at Rockley, near Barnsley, and Mr. John F. Musham sent a brood of young Pipistrelles taken in a bedroom in the Northallerton district. Mr. F. Lawton notes an increase in numbers of Dormice, Water Shrews, and Foxes, at Skelmanthorpe, and Mr. Oxley Grabham published in "Country Life" for October 16th, an account of the nesting of the Dormouse in North Yorkshire, illustrated by some interesting photographs. Mr. Riley Fortune noted the migration of Badgers into the Crimple Valley, and Mr. Leonard Gaunt and Mr. H. B. Booth reported some abnormally light-coloured Mice inhabiting a farmhouse in Upper Washburndale, which they attributed to inter-breeding with white mice which had, at one time, escaped in the house.

Fishes.—Mr. Oliver Marsden reports the re-appearance of River Trout in becks in Leeds city, which are now clear in consequence of the closing-down of tanneries.

The year has been an exceptionally good one for Salmon. Filey Bay had a very large run of fish, the best for many years, though they came in very late. In the Wharfe, Salmon were seen as far up as Pool, a most unusual occurrence.

In the Esk a good season has been experienced, and in the Lune, part of which river flows in Yorkshire, it has been the best

season for many years, both for Salmon and Sea Trout. Unfortunately, many fish have been found suffering from disease, apparently coming in that state direct out of the estuary. A large Mackerel was reported from the North Sea, exact locality not stated. This fish was 24 inches long, and weighed 4½ lbs.—a record for the North. Perhaps the most remarkable occurrence during the year was the capture during April of a Herring, in the tidal waters of the Esk at Whitby, by an angler using a rod and line, and baiting with worm.

Numerous large fresh water fish have been captured during the year, the most notable being a Bream, weighing 5 lbs., which was caught at Roundhay, in June, and one weighing 2½ lbs. at Tadcaster, on August 23rd, the latter being especially worthy of record. Tench, 2 lbs. 6 ozs. at Roundhay, in June; Pike, 16 lbs., 18 lbs., and 20 lbs., at Hornsea, in November 1908, 15 lbs. at Malton, in December 1908, 22 lbs. at Malton, in January 1909, and one of 19 lbs. at Yedingham, in October 1909. Several good-sized Trout are reported; one from the Derwent at Malton, in September, weighed 4 lbs. 12 ozs; one from the Swale at Skipton Bridge, in July, 3 lbs. 6 ozs., and one destroyed by an otter, picked up at Stamford Bridge, on July 18th, weighed 3½ lbs. A remarkable catch was obtained on July 11th, in the Driffield Beck, by Captain W. Payne Gallwey; 8 trout weighing 15½ lbs., being nearly a uniform 2 lbs. each; these waters are noted for their large fish. A fish weighing 3 lbs. 8 ozs. was also obtained in the Costa in July. It is interesting to note that a Rainbow Trout weighing 2¼ lbs. was obtained from the Thrybergh Reservoir, near Doncaster, during August. The introduction of this species in the rivers of the county has been a complete failure, though in some of the lakes they have done remarkly well. A Barbel weighing 7½ lbs. was obtained from the Ouse at York on September 6th, and one of 5 lbs. 12 ozs. from the Wharfe at Tadcaster, in August. Chub weighing 5¼ lbs. from the Swale at Brafferton; 3 lbs. 5 ozs. from the same river at Baldersby; 5 lbs. 1½ ozs. and 4 lbs. 12 ozs. at Ulleskelf, in November, are recorded. Dace of the following sizes are reported —11¾ ozs. at Burley, in August, and 12½ ozs. from the Cod Beck in July. Three King Carp were obtained near Selby, on October 21st, two of which weighed 6 lbs. each, and the other 8 lbs. A Roach weighing 3 lbs. is reported to have been obtained from the Dove and Dearne Canal, in December last; but this is probably a mistake. Specimens of the fish of 1 lb. 13 ozs. at Thirsk, in August, and from the Derwent at Malton of 1¾ lbs. in September, 1 lb. 11¾ ozs. in August, and 1 lb. 12 ozs. in November, and of 1 lb. 8 ozs. at Ulleskelf, in October, may all be regarded as good fish for Yorkshire, as may also Perch of 2 lbs. 2 ozs., from the Nidd at Knaresboro', in August; and 2 lbs. at Thirsk in July. A large Eel, 32 inches in length, and weighing 4 lbs., was caught in the Nidd at Pateley Bridge in August.

Reference should here be made to Prof. Garstang's excellent paper on 'The Scarcity of the Plaice,' in "The Naturalist" for December.

Reptiles, etc.—No particular records are to hand, with the exception of the capture of a Grass Snake, 26 inches long, in a quarry at Southowram, in July. Around Hull they are very numerous.

The following were elected for 1910:—

Chairman—A. Whitaker, Barnsley.
Convener—W. Denison Roebuck, 259 Hyde Park Road, Leeds.
Representative on Executive—A. Whitaker, Barnsley.
Representative on Committee of Suggestions—A Whitaker, Barnsley.
Other Members—H. B. Booth, Ben Rhydding; R. Fortune, Harrogate; Oxley Grabham, York; F. Lawton, Skelmanthorpe.

Wild Birds' and Eggs' Protection Committee's Report.—Mr. R. Fortune writes:—The amount received in subscriptions for 1909 is somewhat less than in 1908. It is disappointing to find that the Committee has met with so small a measure of support from the Natural History Societies in the county.

The amount of subscriptions received is £21 2s. 6d.; this, together with the balance left over from 1908, amounts to £53 13s. 7d. The expenses have been £32 13s., thus leaving a balance of £21 0s. 7d. for the work of 1910. It will be seen that the expenses have been considerably more than the income for 1908.

The season at Spurn was a late one, and at the usual time for our watcher ceasing his work, there were a lot of helpless young Terns about; it was therefore decided to retain his services for a fortnight longer, in order that the birds might get strong on the wing. A very successful nesting season has been experienced at Spurn, and there has been a considerable increase in the number of Terns nesting there. The Oystercatcher nested on the Humber side. Mr. Grabham gave an interesting report of this event in "The Naturalist." The watcher at Hornsea reported a successful season there. He had comparatively little trouble in keeping people away from the nesting grounds.

The Peregrine nested at Buckton in the ground climbed by Hodgson, and successfully brought off her young. The Stone Curlews also nested successfully in connection with which Mr. Grabham gave an interesting report illustrated by photographs at the joint meeting of the Committtee and the Vertebrate Section.

Few complaints have been made to the Committee. One case we took up was that of a waiter at the Ben Rhydding Hydro, shooting a Tawny Owl. He was duly fined. The police afterwards took proceedings against him for using a gun without a license; he was again fined. This so disgusted him that he expressed his determination to leave the country.

The watcher at Spurn reported that he had had more trouble than usual with people interfering with the Terns' eggs. It was therefore decided to make an example of someone. A summons was issued against a person who gave an address in Louth. Unfortunately it was found, when the summons was taken for service, that a wrong name and address had been given to the watcher.

A very bad case of the setting of Pole Traps in the Barnsley District was reported. This matter is now receiving the attention of the Committee.

RECEIPTS FOR 1909.

	£	s.	d.
Mr. W. H. St. Quintin	5	0	0
Mr. Jasper Atkinson	1	1	0
Mr. and Mrs. Haworth-Booth	1	0	0
Mr. H. B. Booth	1	1	0
Mr. C. E. Elmhurst	1	1	0
Mr. R. Fortune	1	1	0
Mr. L. Gaunt	1	1	0
Mr. Oxley Grabham	1	1	0
Mr. Digby Legard	0	10	6
Mr. T. H. Nelson	1	0	0
Mr. W. H. Parkin	0	10	6
Mr. W. Denison Roebuck	1	1	0
Mr. T. Roose	0	10	0
Mr. E. W. Wade	0	10	6
Bradford Natural History and Microscopical Society	0	16	0
Bradford Scientific Society	0	10	6
Crosshills Naturalists' Society	0	5	0
Hebden Bridge Naturalists' Society	0	10	6
York and District Field Naturalists' Society	0	10	6
Royal Society for the Protection of Birds (for 1908)	2	2	0
	£21	2	6
Balance from 1908	32	11	1
	£53	13	7

PAYMENTS FOR 1909.

	£	s.	d.
Watcher at Spurn	13	5	0
Watcher at Hornsea	12	0	0
Donation at Spurn	1	0	0
Donation *re* Stone Curlew	1	0	0
Donation at Bempton	2	0	0
Secretaries' Expenses	0	18	0
Bill Posters	1	0	0
Reports	1	5	0
Rent of Room	0	5	0
	£32	13	0
Balance in hand	21	0	7
	£53	13	7

The Committee for 1910 was elected as follows :—

Chairman—W. H. St. Quintin, D.L., J.P., Rillington, York.

Conveners—R. Fortune, 5 Grosvenor Terrace, Harrogate, and T. H. Nelson, Redcar.

Representative on Executive—H. B. Booth.

Representative on Committee of Suggestions—W. Wilson, Skipton-in-Craven.

Other Members—T. Bunker, Goole ; H. E. Dresser, London ; Claude Leatham, Wakefield ; Geo. T. Porritt, Huddersfield ; A. Haigh-Lumby, Bradford ; A. Whitaker, Barnsley ; Prof. Patten, Sheffield ; W. H. Parkin, Shipley ; L. Gaunt, Leeds ; S. H. Smith, York ; W. Denison Roebuck, Leeds ; Oxley Grabham, York ; T. Roose, Bolton Abbey ; E. W. Wade, Hull ; and Digby Legard, Brompton, R.S.O.

ENTOMOLOGICAL SECTION.

Neuroptera and Trichoptera.—Mr. G. T. Porritt writes :—In Neuroptera, perhaps the most interesting item was the re-discovery by Mr. H. H. Corbett of the dragon-fly, *Libellula fulva* in its old locality, Askern, at the end of May. The specimen was immature, and the date early, and it was unfortunate that no expedition was made a little later to ascertain whether the species was there in numbers. The local *Hemerobius orotypus* was common to Mr. J. W. Carter and myself in the Grass Wood at Grassington in September ; and on the river at the same place, a few days previously, Mr. Carter found *Leuctra geniculata* and *Halesus auricollis* commonly. In June Mr. L. S. Brady and I took the formerly very rare trichopteron *Stenophylax alpestris* in abundance near Sheffield. At Glaisdale, early in June, I found *Ecclisopteryx guttulata* and *Leptocerus nigro-nervosus* in abundance in the River Esk, where also *Lasiocephala basalis* and *Brachycentrus subnubilus* occurred in smaller numbers, but commonly. Mr. T. A. Lofthouse has given me *Leptocerus bilineatus* from near Middlesbrough.

Lepidoptera.—The secretaries report that without doubt the past season has been a disappointing one to lepidopterists. Only seven persons have felt they had anything at all worth reporting, out of fifty-one entomologists in different parts of the county who were written to on the matter.

From our own observations and from the few letters which have been received, we should not feel justified in attributing the bad results of collecting to any scarcity of insect life, but rather to climatic conditions which have " damped " the ardour of even the most enthusiastic, and made some modes of collecting almost impossible, and others unproductive.

Warm sunshine during May caused the Aphides to get a good footing earlier than usual, and as a result, honey-dew has been

unusually plentiful throughout the season, and this almost continuously in spite of heavy rain storms. For this reason, "sugaring" has been an almost entire failure until very late in the season. Mr. B. Morley, on the 18th of July (after repeated failure with sugar during the summer), tried it on railings on the moors, at an altitude of 1800 feet, and found that insects came to it in swarms.

Butterflies appear to have been unusually scarce with the exception of the two Whites. These latter have been so abundant as to have become quite a plague in parts of the county, the larvae resulting from them literally devastating kitchen gardens in many instances. The larger species seem to have been the more abundant.

No very great rarities appear to have been taken. Mr. L. S. Brady records *E. coronata* as having been abundant near Sheffield; Mr. B. Morley has taken *C. fluctuosa* in Haw Park, and *A. alni* has been found again in the same locality. The Rev. T. B. Eddrup writes that two specimens of *Z. aesculi* have been captured at Horbury.

Mr. L. S. Brady records an almost black specimen of *A. menyanthidis*, and Mr. J. Hooper has taken several *C. suffumata* var. *porritti*, near Wakefield. Mr. Morley, in taking notes on the percentages of types to vars. in the case of *H. progemmaria* and its dark form *fuscata*, found that whereas in the woods not more than one specimen in ten will show melanism, in the lanes and hedge-rows the proportions are reversed, and only about one specimen in seven will be of the type form.

Mr. H. Dyson records a specimen of *A. atropos* which was taken at light at Skelmanthorpe, and also the presence of *M. maura* on sugar, so exceptionally late as the beginning of October.

An unusual abundance of many kinds of larvae during the autumn may very possibly produce a corresponding swarm of imagines next summer.

The following is the Committee for 1910:—

President—M. L. Thompson.

Secretaries—(For Lepidoptera), A. Whitaker, Barnsley, and B. Morley, Skelmanthorpe; (Hymenoptera, Hemiptera and Diptera), W. Denison Roebuck, Leeds; (Neuroptera, Orthoptera, and Trichoptera), G. T. Porritt, Huddersfield; (Coleoptera), H. H. Corbett, Doncaster.

Representative on Executive—W. Hewett, York.

Representative on Committee of Suggestions—W. Hewett.

Coleoptera Committee.—Mr. H. H. Corbett writes:—A season remarkable for the absence of sunshine, and prevalence of cold, has had just the effect upon the Coleoptera that one would expect. The general report from members of the Committee and others, has been—"very few insects; and these of the commonest." Of course, there are some additions to

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the Comital and Vice-Comital records to report. A list of the more interesting species taken is appended.

**Notiophilus substriatus* Wat. At Eston on the Coast. M.L.T.
Amara convexiuscula Marsh. Banks of the Tees. M.L.T.
Aëpus marinus Ström. At Eston, under *Zostera*. M.L.T.
†*Microglossa nidicola* Fairm. Rossington. H.H.C.
Phytosus balticus Kraatz. At Eston. M.L.T.
Hygronoma dimidiata Grav. At Kildale. M.L.T.
**Heterothops binotata* Grav. At Eston. M.L.T.
**Quedius umbrinus* Er. At Kildale. M.L.T.
Ocypus fuscatus Grav. At Eston. M.L.T.
Xantholinus longiventris Heer. At Eston. M.L.T.
Homalium striatum Grav. At Kildale. M.L.T.
Rhizophagus cribratus Gyll. At Roundhay. E.W.M.
Subcoccinella 24—punctata L. Ryhill. M.L.T.
**Dermestes vulpinus* F. At Thorne Moor. H.H.C.
Byrrhus fasciatus F. At Eston. M.L.T.
**Hallomenus humeralis* Panz. At Roundhay, E.W.M.
Hypera pollux F. At Kildale. M.L.T.
†*Trypodendron lineatum* Ol. At Roundhay. E.W.M.

Mr. J. W. Carter adds:—

Harpalus rufibarbis L. Near Wakefield, July (J. W. Carter and E. G. Bayford); Seven Arches, near Bingley, July (J. W. C.); Buck Mill, near Apperley Aug. (T. Stringer and F. Rhodes).
Anchomenus versutus Gyll. Ryehill Reservoir, July (J. W. C.), new not only to Yorkshire, but to the whole northern counties of England.
Trechus rubens F. Clayton, near Bradford, one July; Menston, one July (T. Stringer).
Trechus secalis Pk. Buck Mill, Aug. (T. S.).
Bembidium punctulatum Drap. Near Ripon, June (A. H. Lumby).
**Tachyporus obtusus* L. Hawksworth, July (J. W. C. and T. S.).
* ,, *solutus* Er. Baildon Moor, Sept. (J. W. C. and T. S.).
* ,, *humerosus* Er. Ben Rhydding, May (T. S.).
* ,, *pusillus* Gr. Near Bingley, Aug. (J. W. C. and T. S.).
Platystethus arenarius Fourc. Rombalds Moor, Aug. (T. S.).
Anthobium ophthalmicum Pk. Grassington, Sept. (J. W. C.).
Homalota luridipennis Mn. Heaton Wood, near Bradford, Sept. (T. S.).
Quedius nigriceps Kn. Dungeon Wood, near Bradford, Sept. (T. S.).
Lesteva sharpi Rye. Saltaire (T. S.).
Choleva watsoni Spence. Malham, June (F. Booth),
Hister succicola Th. Malham, June (T. S.); Shipley Glen, June (A. Becke); Saltaire, June (F. Booth).

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* =New to the district. † =New to the county.

Epuræa melina Er. Malham, June (J. W. C. and T. S.); Grassington, Sept. (J. W. C.).

* ,, *oblonga* Hbst. Grassington, Sept. (J. W. C.).

* ,, *longula* Er. Grassington, Sept. (J. W. C.).

Cryptophagus acutangulus Gyll. Bradford, Aug. (J. W. C.).

Malthodes mysticus Kies. Hawksworth, Aug. (J. W. C. and T. S.).

* ,, *guttifer* Kies. Hawksworth and near Bingley, Aug. (J. W. C. and T. S.).

,, *dispar* Germ. Saltaire, July, Hawksworth, Aug. (J. W. C. and T. S.).

,, *minimus* L. Blackhills, near Bingley, Aug. (J. W. C. and T. S.).

Toxotus meridianus L. Addingham, Aug. (Mr. Ashworth).

Cryptocephalus labiatus L. Wilsden. (R. Butterfield).

Chrysomela gœttingensis L. Cellingham, Sept. Three specimens collected by Mr. F. Rhodes, none of which are typical, differing in that each possess two large punctures on the thorax, one on each side, about midway between the centre and the lateral margins.

Phytodecta pallida L. Malham, June (J. W. C. and T. S.); Grassington, Sept. (J. W. C.). The type of this species is described as "rufo-testaceus." Fowler says:—"varieties occur on the Continent, more especially in Norway and Sweden and Finland, with the thorax and elytra marked with black spots; I have not seen any of these varieties among the British specimens." At Malham all the specimens were very dark, and I did not get a perfectly typical specimen at Grassington; they were all more or less spotted and marked with black.

Hydrothassa aucta F. Malham, June (J. W. C. and T. S.).

Longitarsus luridus Scop. Hawksworth, Aug. (J. W. C.).

Apteropeda globosa Ill. Saltaire, May (F. Booth).

Psylliodes napi Koch. Malham, June (J. W. C. and T. S.).

Cistela murina L. Malham, June (J. W. C. and T. S.).

Apion scutellare Kirb. Harden, Aug. (W. P. Winter).

,, *marchicum* Hbst. Rombalds Moor, Aug. (J. W. C. and T. S.).

,, *affine* Kirb. Rombalds Moor, Aug. (J. W. C. and T. S.). Very common on *Rumex acetosella*.

Several other records of coleoptera have already appeared in "The Naturalist."

The Constitution of the Committee for 1910 is as follows:—

Chairman—E. G. Bayford, Barnsley.

Convener—H. H. Corbett, Doncaster.

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* =New to the district. † =New to the county.

Representative on Executive and Committee of Suggestions—J. W. Carter, Bradford.

Other Members—M. Lawson Thompson, Middlesborough; H. Ostheide, Leeds: W. Foggitt, J.P., Thirsk; John Gardner, Hartlepool; W. Denison Roebuck, Leeds; E. W. Morse, Leeds; and T. Stainforth, Hull.

Yorkshire Hymenoptera, Diptera and Hemiptera Committee.—Despite the cold season, several insects have been submitted for record, and the Committee have been much indebted to Messrs. Grimshaw, Morice, Morley and Saunders, for acting as Referees. Messrs. E. G. Bayford, W. Hewett, Alfred Hodgson, W. H. Hutton, G. T. Porritt, H. J. Robson, W. Denison Roebuck, and Walter Withell have been the collectors, and Messrs. H. C. Drake and T. Stainforth have sent in some Hull Hemiptera. Mr. Rosse Butterfield's reports on Bradford Hymenoptera and Mr. J. H. Ashworth's on Bradford Diptera have appeared in print, and contain numerous additions to the recorded Yorkshire Fauna. The Rev. W. C. Hey, whose sudden decease this year is a great loss to this Committee, published notes on the Humble Bees and Wasps of West Ayton. Among the numerous additions to the Fauna, the most striking are:—*Bombus smithianus*, an interesting Arctic form, found by Rev. W. C. Hey, at West Ayton; *Ammophila sabulosa*, a most conspicuous fossor, taken on Strensall Common by Mr. W. Hewett; *Tenthredo colon*, in a wood within Leeds city boundary, by Mr. A. Hodgson, who also found it again at Roundhay; the rare bee *Nomada lathburiana*, which he discovered last year.

The Convener has in manuscript a list of the Hemiptera recorded for Yorkshire, to which are appended lists of the Mallophaga and Anoplura, which it is hoped some time to publish.

Your Committee ask for re-appointment as follows:—

Chairman—Geo. T. Porritt, Huddersfield.

Convener—W. Denison Roebuck, Leeds.

Members—E. G. Bayford, Barnsley; Rosse Butterfield, Wilsden; J. W. Carter, Bradford; H. H. Corbett, Doncaster; H. C. Drake, Scarborough; Prof. W. Garstang, D.Sc., Leeds; T. Stainforth, Hull; M. Lawson Thompson, Middlesborough.

Referees—Percy H. Grimshaw, (Diptera); Rev. F. D. Morice, M.A. (Sawflies); Claude Morley, (Ichneumon flies); Edward Saunders (Aculeate Hymenoptera, and Hemiptera)

Yorkshire Arachnida Committee.—On the recommendation of the Executive a special Committee was appointed to investigate the Spiders, Harvestmen and Pseudoscorpions of Yorkshire, with Mr. W. Falconer (who has prepared a list of the county Arachnida), as its first President, and Mr. Stainforth as Convener.

Members of the Committee are requested to send difficult specimens to Mr. Falconer for identification, and labels giving full data should be inserted in the tubes of spiders, etc., sent to him.

Mr. W. P. Winter makes an excellent suggestion with regard to one phase of the work which might be taken up by the new Arachnological Committee, viz., that members should as far as possible work up by Photomicrographs the essential organs and general structure of certain selected genera. Copies of photographs made could be exchanged amongst arachnologists in the county, and would prove of great service in the identification of species. There is also much good work to be done in taking observations of the habits of rarer species. Entomologists working in the remoter parts of the county could render great assfstance if they would collect any spiders they might meet with, and forward them to some member of the Committee.

The Committee for 1910 is as follows:—

Chairman—W. Falconer, Slaithwaite.

Convener—T. Stainforth, Hull.

Representative on Executive—T. Stainforth, Hull.

Representative on Committee of Suggestions—T. Stainforth, Hull.

Other Members—W. H. Winter, B.Sc., Shipley; W. J. Fordham, M.B., Selby; H. C. Drake, Scarborough; W. Denison Roebuck, Leeds; G. B. Walsh, B.Sc., Middlesbrough; and E. A. Parsons, Hull.

CONCHOLOGICAL SECTION.

In so well-worked a subject as the Land and Fresh-water Mollusca of Yorkshire, it can hardly be expected to find novelties, and the work done is chiefly concerned with detailed local distribution. Work of this kind has been done at all the excursions of the Union, Messrs. Hutton, Musham, Roebuck and Taylor being present at Market Weighton, Messrs. Saunders and Woods at Runswick, Mr. Musham at Sedbergh, and Messrs. Crowther and Hutton at Cawthorne, while at Bowland shells were collected by Mr. R. Fowler-Jones. No species calls for special comment, except that *Milax sowerbyi*, so unaccountably rare in Yorkshire, though an unmitigated pest in some localities in the south, has been found at Cawthorne and in Leeds, each case being a new vice-comital record. In respect of marine mollusca, Mr. Saunders and Rev. F. H. Woods collected specimens at the Runswick excursion.

The Section has met monthly throughout the year in friendly co-operation with the Leeds Conchological Club, to mutual advantage.

Of work done, attention may be called to the appearance of a new part of Mr. J. W. Taylor's magnificent Monograph, and also to Mr. J. A. Hargreave's list of Scarborough mollusca, and Mr.

J. W. Jackson's paper on Holocene Mollusca near Great Mytton in Bowland, both printed in the "Journal of Conchology," and it is a pity that these papers should not have appeared in our own journal "The Naturalist."

East Yorks., Mr. J. F. Musham writes:—Although the climatic conditions have been adverse throughout the greater part of the year for genial field days, it appears to have been very favourable to Mollusca, in spite of the more or less swollen state of dykes and streams, which interfered somewhat with search for aquatic species.

The first Field Meeting of the Union was held in this division at Market Weighton, on Saturday, May 8th. Although the weather was cold and dry, the conchologists were in full force, and upwards of forty species of Mollusca were noted.

Acanthinula aculeata Müll. was wanted, to add to the list of East Yorkshire shells, but no one was lucky enough to turn it up. Mr. A. J. Moore reports that *Milax sowerbyi* var. *nigrescens* Roeb. and *Milax gagates* var. *rava* have been taken at Hessle and Hull respectively; also *Helix rufescens* vars. *alba* Mog. and *rubens* have occurred at Hessle, and *Helix cantiana* var. *rubescens* at Kelsey Hill, Holderness.

These, with *Planorbis nautileus* var. *imbricata*, which I dredged up at Bowthorpe, October 2nd, are varieties not recorded in Petch's "List of Land and Fresh Water Shells for the East Riding," and are welcome additions to the divisional list.

The Officers were elected for 1910 as follows:—

President—John F. Musham, Selby.

Secretaries—W. Denison Roebuck, Leeds; Thos. W. Saunders, Brotton; A. J. Moore, Hull.

Representative on Executive—J. E. Crowther, Elland.

Representative on Committee of Suggestions—W. Harrison Hutton, Leeds.

Marine Biology Committee.—The Rev. F. H. Woods writes:—A very important meeting of the Marine Biological Committee took place at Leeds, on Saturday, February 13th, in connection with the Leeds Conchological Society, in which we had the pleasure of welcoming for the first time, our new Chairman, Professor Garstang, who made some valuable suggestions as to the future work of members interested in the subject. He urged upon them to observe very attentively, and record, the habits of marine animals of every sort; facts even that seemed trivial might prove very important. What was especially interesting was the promises he held out for the future, of giving active support to the work of the Committee. In particular he expressed a hope of being able to arrange a meeting on some part of the coast. This hope, unfortunately, has not yet been fulfilled, but it will be, let us trust, in the course of next year.

The only coast excursion in 1909 was that at Runswick Bay.

Not very much was actually found, the most interesting species, perhaps, being *Acmæa testudinalis* and *Tonicella rubra*, both of them rather local on this coast (see report in "The Naturalist" for Sept.). At the same time steady work has continued in the way of recording species. During a stay of some days at Redcar, in the autumn, I found some ninety different species, including *Emarginula fissura*, *Dentalium entale*, *Capulus hungaricus* (of which the late W. C. Hey was wrong in saying that it is confined to Redcar; I found young specimens at Filey and Scarborough this year), besides many fairly common, but little known shells, such as *Diaphana hyalina*, *Bela rufa*, and *Clathurella linearis*. A microscopic examination of tide drift from Scarborough and Filey again proved very successful. Among many shells characteristic of the drift, such as *Philine catena*, I found another specimen of the very rare *Ceratia proxima*, which will be placed in the Hull museum.

The collection there is proceeding apace. It is hoped that by the end of the year specimens of about one hundred different species, duly named and arranged, will be available for the student of marine molluscs.

But, in addition to those observations and recordings on which our Chairman so urgently insisted, there is still a great deal to be done for those who desire to know, as scientists would desire to know, the marine fauna of our coast. This may be seen at once by examining the article by Mr. Borley on marine biology in the "Victoria History" of our county. That article is obviously of very great value:—(1) For the first time it puts together in a connected whole notices found scattered in different works of the last fifty years or so; (2) It aims at definite scientific conclusions as regards distribution of species connected with the temperature of the water, its depth, tides, etc. This raises it at once high above the level of a bare string of statistics. If students should find, after a thorough examination, that a fuller, and, to some extent, a more accurate knowledge of the mollusc fauna and its distribution require some modification of these conclusions, it is only what happens in all scientific works. In this case the results should certainly not be accepted as altogether final.

(1) In addition to a few misprints, such as *fasiata* for *fasciata*, *telinella* for *tellinella*, which need deceive nobody who possesses the Conchological Society's list of Marine Mollusca, there are one or two more serious errors. Thus *Pholas crispata* is given as a distinct shell, with different records, from *Zirphæa crispata*, though they are, of course, only two names of the same species. Again, Mr. Borley has, it appears, misunderstood the objections of Alder and Jeffreys to admitting Bean's record of *Gibbula magus* as found at Scarborough. When they suggested that it had come with ballast, which Jeffreys shews to have been a fruitful source of incorrect records, they did not mean to suggest that it was non-British, but merely not a native of the Eastern or North-

Eastern coasts. In fact, it is an extremely common shell in the South-west of England.

(2) Mr. Borley has made no use of two important sources of evidence: (*a*) Bean's list of Scarborough shells as published in Theakston's "Guide to Scarborough"; (*b*) Ferguson's "Natural History of Redcar." It is difficult to know what to think of the first. The list is so extraordinarily comprehensive that it requires considerable credulity to believe that all the species enumerated (some not to be found either in the Conchological Society's list or in standard works on British conchology), were found at, or indeed anywhere near Scarborough. How far the inclusion of so many species is to be explained by the supposition that Bean, who was a prodigious collector, did not always keep an exact record of where or how he obtained his specimens, and trusted to a faulty memory; how far it may be due to an editor possibly enlarging Bean's original list from other sources (the earliest editions contained no list of shells), it is difficult to say. It is practically certain that the list could not have been accepted as a whole. On the other hand, there is presumptive evidence in favour of the inclusion in the Yorkshire fauna of some shells given in Theakston's list, though not quoted by Jeffreys on Bean's authority, where the wide distribution of the species made the quotation of special localities in Jeffreys' opinion unnecessary, as is the case with, for example, *Barbatia* (*Arca*) *lactea* and *Tellina crassa*.* Such species might well have been included with a query. Ferguson goes to the opposite extreme. His list only numbers seventy-five as compared with two hundred and six of Theakston, and microscopic shells are hardly touched upon He was more or less an amateur, and makes a few obvious mistakes, for example, *Abra prismatica* for *Abra alba*—a shell too common at Redcar to have been overlooked. But the list is valuable where the species are well known and unmistakeable, as *e.g.*, *Lucina borealis*, *Corbula gibba*, *Emarginula fissura*. By finding the last, as already mentioned, this autumn (three shells washed up, but fresh) at Redcar, I have been able to confirm the last record. The only locality given by the Victoria History is the Dogger.

(3) Probably several species enumerated in the "Victoria History" should have been either omitted or marked with a query. *Fissurella græca* is given avowedly on the evidence of Hey as found at Redcar (the only record). Now, Hey, in "The Naturalist," 1884, p. 130, gives Ferguson as his authority. Ferguson, however, does not, in fact, give this shell, but he does give as already said, *Emarginula fissura*. In this case Hey, generally a most trustworthy authority, evidently confused the names *Fisurella* and *Fissura*. The omission of *Gibbula magus* would follow if Alder's

* I have since learned that *T. crassa* has sometimes been brought in by Scarborough trawlers.

and Jeffrey's objection holds. Ferguson, however, makes the interesting statement that two or three specimens had been found at the sands at Redcar. Yet he did not consider it a native of Yorkshire. Nor can much be said for *Bittium reticulatum*, which is quoted in the "Victoria History" for Scarborough, on the sole authority of Gosse. It is a southern species, which generally abounds, when found at all, as at Falmouth. But here again the evidence is apparently confirmed by the remarkable statement of Ferguson that the shell had been frequently found on the beach. Possibly Ferguson mistook worn specimens of *Bela turricula* (rather a common shell at Redcar) for *Bela trevelyana*, and then confused an old name of the latter—*Pleurotoma reticulata* with *Cerithium* (*Bittium*) *reticulatum*.

(4) The "Victoria History" does not give nearly enough records. The result is that shells which practically occur on all parts of the coast look as though they were quite local species. To give as the only record of *Turtonia minuta* "Few in shell sand at Sandsend," is something like saying that *Rosa canina* has occasionally been found at Bainton. A conchological student unacquainted with the Yorkshire coast, might imagine that this common shell is rarer than say *Fissurella græca*, which probably does not occur at all. Some general statements shewing the comparative frequency of all the different species would have added very largely to the value of the article.

What is much to be desired is a list of the marine fauna which will indicate with a query all doubtful species, with a note of admiration those which depend on only one or two records, (especially when these include the Dogger Bank), of which it is desirable to obtain confirmation, and in square brackets species which are not native, and marking in some other way those for which the evidence is deemed altogether unsatisfactory. Under the last category would come several species given in Theakston's Guide. The list proposed should include those species which have been recorded since the list of the "Victoria History" was compiled, due care being taken to ascertain their accuracy. It is hoped that such a list may be prepared by this Committee before long.

It is also of great importance to have, for the purpose of reference, a good collection of Yorkshire marine shells. A good beginning has already been made in the Hull Museum collection already referred to, but there is very much still to be done. Several species are as yet unrepresented, and in other cases the specimens are not fully mature. It is hoped that eventually specimens will be obtained of most of the different species in all stages of growth. It is sometimes suggested that there is a danger of the Marine Biological Branch becoming too exclusively a Conchological Society or a Collecting Society, or a mere record-mongering Society. The true answer to all these objections seems to lie in

the facts that the study of marine life without a satisfactory account of the marine fauna is like trying to study a literature without a dictionary, and that the hunting of species new, at any rate to the hunter, is one of the best ways of stimulating and training those habits of observation, on which so much depends. Meanwhile those engaged in this work will have more than one reason to be grateful to this article in the "Victoria History" even while they frankly recognise that the list of the marine molluscs is only provisional.

The Committee proposes holding a mid-week meeting at Redcar, in 1910, during the September spring-tide.

The following were elected for 1910 :—

Chairman—Prof. Garstang, Leeds.

Convener—Rev. F. H. Woods, B.D., Bainton, Driffield.

Representative on Executive—Prof. Garstang.

Other Members—Geo. Massee, Kew; S. Lister Petty, Ulverston; J. Fraser Robinson, Hull; W. Denison Roebuck, Leeds; Arnold T. Watson, Sheffield; J. D. Butterell, Wansford; E. Howarth, Sheffield; W. Harrison Hutton, Leeds; Dr. A. S. Robinson, Redcar; T. W. Saunders, Brotton; J. Irving, Scarborough; W. H. St. Quintin, J.P., Scampston; Sir Charles Eliot, K.C.M.G., Sheffield; A. J. Moore, Hull; D. W. Bevan, Scarborough; A. J. Burnley, Scarborough; and J. A. Hargreaves, Scarborough.

BOTANICAL SECTION.

General.—Mr. J. F. Robinson reports that although nothing of a very striking character can be reported for the year 1909; yet there can be no doubt that, whatsoever may be the cause, the older or so-called "floristic" mode has been decidedly in the ascendant in Yorkshire, during the past season. Witness, for example, the comparatively many and long references to botanical matters—new authoritative plant lists, new plant discoveries, new localities, etc.—which have recently appeared in the organ of the Union—"The Naturalist."

When weather permitted, as it really did on the occasion of one or two of the excursions, good botanical work was done, without, however, anything that we can note as striking or remarkable being recorded.

In their private capacity, or on the excursions of the affiliated societies, members and associates have made quite a number of additions to the flora of Yorkshire. The broomrape—*Orobanche reticulata* Wallroth, new to Britain, first came under the notice of Mr. H. E. Craven, within ten miles of Leeds. The host plant was *Cnicus eriophorus,* and the time August 1907. The somewhat belated announcement of this species new to our British lists, shows the care which truly scientific men take before rushing to

conclusions. It is rather remarkable that another broomrape—*Orobanche ramosa*, new to Yorkshire, we believe, turned up on tomato plants in greenhouses at Thorngumbald, East Riding of Yorkshire, in August 1909, the discoverer being Mr. Hy. Knight, of the Hull Scientific and Field Naturalists' Club.

Mr. Wm. Ingham, B.A., one of our most ardent and lynx-eyed observers, again adds a new record to the East Riding Flora, viz., *Euphrasia rostkoviana* (Eye-bright), from Warthill.

Like the plant students of our seaport towns, Mr. John Cryer, of Bradford, has been having a good time among "aliens" on waste heaps near Bradford. As might be expected, from an inland "woollen" town, Mr. Cryer's list can, or recently could, be duplicated in all but one or two items by the botanists of Hull, the great raw wool port of the East Coast. (See Robinson's Flora, East Riding Yorkshire).

A plant first discovered near the River Hull by one of your Secretaries many years ago, and closely related to *Cardamine pratensis*, but quite distinct from the common cuckoo flower, both in its smaller snow-white flowers and in its foliage, has again been submitted to the experts—on this occasion to Dr. F. A. Lees, the author of the "Flora of the West Riding." Dr. Lees, likewise, is indisposed to give the plant a name. Probably it is a hybrid with *C. pratensis*, and perhaps *C. amara* or *C. flexuosa*; but the matter is still *sub judice*, and, so far as we can at present see, the form or species or hybrid is quite new to science.

The following were elected for 1910:—

President—T. W. Woodhead, Ph.D.

Secretaries—H. H. Corbett, 9 Priory Place, Doncaster; J. Fraser Robinson, 22 Harley Street, Hull.

Representative on Executive—E. Snelgrove, Sheffield.

Representative on Committee of Suggestions—S. Margerison.

Botanical Survey Committee.—Dr. T. W. Woodhead writes:—Botanical Survey in Yorkshire has been actively continued during the year. The Survey by Dr. W. G. Smith, which has been in progress for several years in the Cleveland area, is now completed, and we hope the publication of the results will not be long delayed.

Considerable progress has been made by Mr. W. M. Rankin, in his surveys of North-west Yorkshire, and also in Lancashire.

The sheets of North Derbyshire and South-west Yorkshire, by Dr. C. E. Moss, are being published through the Ordnance Survey Office, and we trust will be issued shortly. Considerable portions of the Malton and Scarborough Sheets have been surveyed by Dr. T. W. Woodhead.

Mr. Frank Elgee has made some interesting detailed surveys of the Cleveland Moors, and the results of his investigations of the "Swiddens" will shortly appear in "The Naturalist." Mr. S. Margerison has published the result of his studies on the

vegetation of disused quarries, which is an important contribution to the study of "succession." We are glad to note that survey methods have been employed in the study of the distribution of Mollusca. The paper by Messrs. Kendall, Dean and Rankin on "the Geographical Distribution of Mollusca in South Lonsdale," is an interesting contribution to the subject, and might, we think, be applied with advantage in other branches of zoology

The following were elected for 1910 :—

Chairman—J. F. Robinson, Hull.

Convener and Representative on Executive and on Committee of Suggestions—T. W. Woodhead, Ph.D., Huddersfield.

Other Members—S. Margerison, Calverley, Leeds; C. Waterfall, Hull; W. B. Crump, Halifax; H. H. Corbett, Doncaster; J. Hartshorn, Leyburn; J. W. H. Johnson, Thornhill; W. E. L. Wattam, Huddersfield; P. F. Lee, Dewsbury; F. Elgee, Middlesbrough; H. J. Wilkinson, York; W. Jackson, Goole; Wm. G. Smith, Edinburgh; and W. Robinson, Hull.

Yorkshire Bryological Committee.—Mr. C. A. Cheetham reports :—One or more members of this Committee have attended each of the Union's meetings.

Although additional species to the county list are few, the general distribution is still being investigated, and many mosses which have been apparently extremely rare, are being shown to occur more frequently.

Mr. T. C. Thrupp, of Doncaster, found *Tortula cernua* Lindb. near Conisboro'; previously its only known British station being Aberford.

Dicranodontium longirostre var. *alpinum* Schp., with its former solitary Ingleboro' station, is now shown to be more frequent. Mr. A. Wilson found it at Greygarth, West. Lancs., close to our borders. It is also abundant in Buckden Woods, and on the moors above; in the extreme corner of the West Riding it grows on the north slopes of Baugh Fell; just across the boundary on Wild Boar Fell there are sheets of it; again at the head of the Ure it is plentiful, this latter locality adding the moss to the North Riding list.

Mnium orthorrhynchum B. and S., is not so rare as stated in our West Riding Flora. It is generally to be found in the Mountain limestone gills. It grows in Bishopdale, and thus is an addition to the North Riding list.

Another interesting addition to the Yorkshire list is *Barbula gracilis* Schwaeg. This was pointed out by Mr. W. E. Nicholson from specimens misnamed *B. Hornschuchiana* Schlutz. It is fairly common on the Magnesian Limestone at Knaresbro'.

At the Cusworth Park (Doncaster) meeting, *Phascum Flœrkeanum* W. and M., was added to the West Yorks. list. At Market

Weighton Mr. J. J. Marshall pointed out the best mosses. The statement in "The Naturalist," at the top of p. 233 re *D. undulatum* needs alteration: it should read "only known station in Yorkshire": an addition to this district's list was *Fissidens viridulus* var. *Lylei* Wils.

At the Sedbergh meeting, Mr. W. Ingham found *Campylopus atrovirens* var. *gracilis* Dixon, this being new to the county.

The Cawthorne excursion yielded only the usual coal measure species; *Aulacomnium androgynum* Schwæg, being the most interesting.

A welcome note on *Ricciocarpus natans* at Doncaster, from Mr. W. West, appears in "The Naturalist."

Some remarks by Dr. Smith, at Runswick, indicated how a new phase in ecology might be developed by careful observation of the grouping of mosses and their relation to their higher neighbours and surroundings. In some measure this was attempted in Mr. S. Margerison's paper on "The Vegetation of some Disused Quarries" (reviewed in "The Naturalist" for October).

If one or two meetings of our bryologists could be held, and these matters discussed, much useful information might accrue.

The important work of bringing the West Yorks. list up to date has been undertaken by Mr. W. Ingham, and is now well on its way to completion. When published, this will show the present state of our knowledge of these plants, and with the North Yorks. and East Yorks. lists, will form an up-to-date moss flora of Yorkshire.

Mr. J. J. Marshall, of Beverley, has found the following interesting mosses and hepatics in the East Riding:—

**Mnium stellare* in chalk pit at Skidby.
,, *affine* v. *elatum* at Springwells.
Orthotrichum pulchellum at Burton Bushes and **O. stramineum* in Deepdale.
**Trichostomum nitidum* at Thornwick Bay, abundant.
Physcomitrella patens at Bishop Burton.
Pottia bryoides near Pulfin.
Ephemerum serratum between Cottingham and Beverley.
Fissidens exilis at Burton Bushes.
Phascum floerkianum at Bishop Burton.
**Weisia viridula* v. *amblyodon* near Market Weighton.
Tortula ambigua at Hornsea and *T. mutica* at Pulfin.
Hypnum glareosum at Goodmanham and *H. caespitosum* at Pulfin.
Acaulon muticum and **Pleuridium axillare* v. *strictum*, *Campylopus atrovirens* v. *gracilis* on Allerton Common, the same plant that Mr. W. Ingham found on Skipwith Common, these two habitats being the only ones known in Yorkshire for the variety.

The above marked * are new to the East Riding. He has also found the Hepatic **Ricciocarpus natans* var. *terrestris* at Figham.

1910 Jan. 1.

Mr. Snelgrove has found *Kantia sprengelii* in the Rivelin Valley new to V.C. 63, and a curious *Sphagnum* at present sub judice.

The Committee for 1910 was elected as follows :—

Chairman—W. Ingham, York.

Convener—C. A. Cheetham, Armley.

Representative on Executive—C. A. Cheetham, Armley.

Representative on Committee of Suggestions—W. Ingham.

Other Members—R. Barnes, Harrogate; Dr. R. Braithwaite, London; L. J. Cocks, London; W. West, Bradford; J. W. H. Johnson, Dewsbury; M. B. Slater, Malton; A. R. Sanderson, Bradford; E. Snelgrove, Sheffield; F. Haxby, Bradford; and H. Foster, Armley.

Mycological Committee.—Mr. C. Crossland writes :—The interest in mycology has been kept up keenly as ever since the last report Fungi have been sent in from various parts of Yorkshire. The very interesting *Lepiota vittadinii* Fr. found at Battyford, Mirfield, was sent to me by Mr. A. Clarke. It is the first Yorkshire record.

An unofficial foray was held at Selby, May 22nd and 24th (see "The Naturalist," September 1909). Four species were added to the county flora, six to vice-county S.E., and eighteen to Mid. W.

Geaster fornicatus was sent from Wensleydale by W. A. Thwaites, Masham.

The third instalment of newly-discovered Yorkshire fungi, since the publication of the "Yorkshire Fungus Flora," appeared in "The Naturalist" for May and June, and brought up the total of Yorkshire Fungi from 2706 in 1908 to 2763.

The recent Castle Howard foray was among the most successful hitherto held. The locality was well chosen, and bore out all that was expected of it, the results being most gratifying. Of the fungi collected, there was one new species, to be called *Flammula carnosa* Mass; three, and one var. proved new to Britain, and twenty and two varieties new to the county. The total number identified was 490, and 8 varieties.

The report and list of additions and species will be found in "The Naturalist" for December.

The Committee decided to recommend Arncliffe Woods and Mulgrave for next year's foray, September 17th to September 22nd. It was thought Mulgrave would well repay another visit.

The following members form the Committee for 1910 :—

Chairman—George Massee, Kew.

Convener—C. Crossland, 4 Coleridge Street, Halifax.

Representative on Executive—C. Crossland.

Other Members—Rev. Canon W. Fowler, Liversedge; Harold Wager, F.R.S., Leeds; Alfred Clarke, Huddersfield; W. N. Cheeseman, Selby; Thos. Gibbs, Wirksworth,; J. W. H. Johnson, Dewsbury; R. H.

Philip, Hull; C. H. Broadhead, Throngsbridge; Sir H. C. Hawley, Bart., Boston; M. Malone, Bradford; A. R. Sanderson, Bradford; W. Robinson, Hull; A. E. Peck, Scarborough; and Jas. Needham, Hebden Bridge.

GEOLOGICAL SECTION.

The Secretaries report that the excursions have afforded the geologists opportunities of examining almost the whole sequence of the rocks exposed in Yorkshire. The section has been well represented on each occasion, and much useful work has been done. At Market Weighton the interesting junction of the Lias and Red Chalk was examined. In Bowland the week-end was very profitably spent in collecting fossils from the Lower Carboniferous rocks, and furthering the work of zoning these rocks. Runswick Bay, with its fine exposures of Liassic and Lower Oolitic strata, in cliff and scar, attracted many members. The phenomena connected with the drift-filled old valley also received attention, and many erratic boulders were noted. The study of the pre-Carboniferous rocks of the county, and their relationship to the Carboniferous formation, commenced at Ingleton, and continued in successive years at Horton and Clapham, was concluded at Sedbergh. A good number of geologists spent the week-end in the district, examining the Silurians, with their igneous intrusions, so well exposed in the numerous stream sections, and paying particular attention to the basal beds of the Carboniferous formation, besides noting the vividly displayed effects of the great Dent Fault. Some fine specimens of Coal Measure plants were obtained from the Barnsley district, in connection with the Cawthorne excursion.

The members of the section tender their congratulations to its President, Dr. A. R. Dwerryhouse, on his appointment as Lecturer in Geology in the University of Belfast.

The following were elected for 1910 :—

President—H. Culpin, Doncaster.

Secretaries—Cosmo Johns, Burngrove, Pitsmoor Road, Sheffield.
E. Hawkesworth, Sunnyside, Crossgates, Leeds.

Representative on Executive—Godfrey Bingley.

Representative on Committee of Suggestions—Professor Kendall.

The Geological Photographs Committee of the Yorkshire Naturalists' Union regrets that it is unable to report any large increase in the number of photographs added during the year, although those that have been sent well maintain the excellence of the collection, and will prove to be valuable geological records.

The Committee would like to draw the attention of the members of the Union to an interesting field in geological photographs

which has not yet been explored, or at least has not yet sent its records to the Union's collection. We refer to micro-photographs of geological sections. A number of these are constantly turning up in illustrations of papers, and are often thrown on the screen at lantern lectures, so we think there must be some prints to be obtained, and would ask the members of the Union to help us in collecting a series for the Union's Albums, where they would be handy for reference to students who are not the possessors of microscopes.

During the year the albums have been on exhibition at the Crosshills Scientific Society's Annual Conversazione.

The following photographs have been added during the year:

By C. HASTINGS, Esq.—
Scratched Rock at Sedbergh Golf Links, Spen Gill.

By Dr. BURNETT—
Grooved Palæozoic Grit, Sedbergh, looking East.
,, ,, ,, ,, ,, South.
,, ,, ,, ,, ,, West.

By J. W. STATHER, Esq.—
Section in Chalk Quarry, Kirk Ella; Section in Chalk Cutting, Kirk Ella; Cliff Section at Gristhorpe Bay.

By E. E. GREGORY, Esq.—
Worm Tracks on Slab of Middle Grit, Oxenhope; Gaping Ghyll, Ingleborough; Boulder-Clay, South Bay, Bridlington; Stratified Sands, South Bay, Bridlington; Purple Boulder-Clay, South Bay, Bridlington; Stratified Sands (now covered up), South Bay, Bridlington; Sandsend Cliffs and Ness, near Whitby; The Scar (Upper Lias), East Cliff, Whitby; Chalk Cliffs capped by Boulder Clay, Flambro'.

The following were elected for 1910:—

Chairman—Professor Percy F. Kendall, M.Sc., Leeds.
Convener—A. J. Stather, 224a Spring Bank, Hull.
Representative on Executive—J. H. Howarth, J.P., Halifax.
Representative on Committee of Suggestions—Godfrey Bingley, Leeds.
Other Members—J. J. Burton, Nunthorpe; J. H. S. Dickenson, Sheffield; E. E. Gregory, Darlington; H. E. Wroot, Bradford; and C. Bradshaw, Sheffield.

Glacial Committee.—The only items we have received for inclusion in this report are from the members of the Hull Geological Society, and from Mr. H. Culpin, as below:—

Mr. C. Thompson writes:—"In your last report it was mentioned that representative ammonites from all the Liassic zones, except that of *jamesoni*, had been found in the Boulder Clay of Holderness. As a result of the work which has been carried on

through the current year, a representative of that zone was found at Hornsea, in June.

The work, so far, has revealed many new forms, about twenty species having been found either new to Yorkshire records, or only doubtfully inserted therein. They include at least four species new to science.

Mr. S. S. Buckman is responsible for the naming of nineteen of that group of twenty species.

A prolonged search has also been made for certain specimens of well-marked varieties of Danish cretaceous boulders corresponding to our chalk, but without success. Although many varieties of chalk were found, none could be asserted to have come from Denmark."

Mr. H. E. Denham reports the finding in the boulder clay at Aldborough, Holderness, a mass of shelly limestone, *Bucklandi* zone, containing the ammonite *Arietites scipionanus*. The specimen measured 24 inches in diameter, and is certainly the largest recorded for Yorkshire, and possibly for the British Isles.

Mr. J. W. Stather reports that large slips of boulder clay have occurred at Yonn Nab, Gristhorpe Bay. Large numbers of boulders were noted, including a fine conglomerate, probably Basement Carboniferous, $4\frac{1}{2}$ feet by $3\frac{1}{2}$ feet by $2\frac{1}{2}$ feet.

The excavations for the new dock at Marfleet, near Hull, have disclosed some fine sections in Humber Warps, Forest Bed, and underlying glacial clays. From the latter, two Shap Boulders have been obtained, the larger of which, 16 inches by $14\frac{1}{2}$ inches, by the kindess of Mr. F. L. Pawley, has been placed in the Hull Museum.

Mr. Culpin writes:—The excavations made for the engine-house at the new colliery in the valley north of Edlington Wood, $3\frac{1}{2}$ miles south-west of Doncaster, and $1\frac{1}{2}$ miles south-west of the well-known deposit of boulder clay at Balby, have shown that the northern slope of the valley between the 100 to 140 feet contour lines is covered with boulder clay. It varies from a few inches to twelve feet in thickness, and forms a patch about fifty feet wide along the side of the valley, the lower edge being some fifty feet above the bottom of the valley. It contains a mass of ice-scratched Permian Limestones, some of which measure forty cubic feet, and there is a sprinkling of grits, ganisters and Carboniferous Limestones, with an occasional ash and basalt. At the upper edge of the boulder clay is some ten to fifteen feet of grey sand, with occasional beds of gravel, streaks of coal fragments, and here and there boulders of Permian Limestone, grits and Carboniferous Limestones. This sand is probably the washings from the glacial ice.

The boulder clay and the sand rest on a surface of Upper Permian Limestone, which is here overlooked by the Lower Permian Limestone rocks brought up by the Edlington Wood fault.

1910 Jan. 1.

The following were elected for 1910 :—

Chairman—P. F. Kendall, M.Sc., Rosedene, Weetwood, Leeds

Conveners—J. H. Howarth, J.P., Somerley, Halifax, and J. W. Stather, Newland Park, Hull.

Representative on Executive—E. Hawkesworth, Leeds.

Representative on Committee of Suggestions—E. Hawkesworth, Leeds.

Other Members—Rev. W. Lower Carter, M.A., London; Rev. E. M. Cole, M.A., Wetwang; H. H. Corbett, Doncaster; W. Simpson, Settle; F. F. Walton, Hull; H. Brantwood Maufe, Edinburgh; J. E. Wilson, Ilkley; H. Culpin, Doncaster; A. R. Dwerryhouse, D.Sc., Belfast; Godfrey Bingley, Leeds; A. J. Stather, Hull; E. E. Gregory, Darlington; and J. J. Burton, Nunthorpe.

Yorkshire Coast Erosion Committee.—The Convener, Mr. E. R. Matthews, writes: "There is nothing special to report *re* Coast Erosion in 1909. We have had one or two rather severe northerly and north-westerly gales during the early part of the year, accompanied by heavy seas, but no unusually great erosion occurred, as the gales did not occur at Spring Tides.

I do not know of any sea defence work which has been constructed *this year* on the Yorkshire Coast, except that the Bridlington Corporation put down a groyne on the north foreshore to replace an old one which had been there for forty years, and which had become very dilapidated."

The Committee for 1910 was elected as follows :—

Chairman—F. F. Walton, Hull.

Convener—J. W. Stather, Hull.

Representative on Executive—F. F. Walton, Hull.

Representative on Committee of Suggestions—H. Culpin, Doncaster.

Other Members—J. T. Sewell, Whitby; J. W. Stather, Hull; W. Y. Veitch, Middlesbrough; J. J. Burton, Nunthorpe; Rev. E. M. Cole, Wetwang; and J. A. Hargreaves, Scarborough.

Carboniferous Flora and Fauna Committee.—Dr. Kidston regrets that it has not been possible for him to prepare the final report of the Yorkshire Carboniferous Flora this year.

Mr. Culpin writes :—In the Doncaster district, Mr. H. T. Foster has found, in the roof of the Duncil seam at the Bentley Colliery, specimens of an *Anthracomya*, which is believed to be a new species. In other respects there has not been much opportunity for work near Doncaster, the pit sinking during the year having been confined to the rocks overlying the Coal Measures. Collecting grounds have, however, been noticed at Shafton and at Crofton, which it is hoped local workers may, by this reference, be stimulated to investigate. Several plants have been obtained in an excellent

state of preservation from a clay pit at the former place, while at the latter, *Naiadites* and *Spirorbis* have been seen in the shales exposed in the railway cutting. At Cadeby, also, plants are being tipped from the roof of the Barnsley seam.

The following were elected for 1910 :—

Chairman—R. Kidston, LL.D., F.R.S., Stirling, N.B.

Convener—Cosmo Johns, Sheffield.

Representative on Executive Committee—Miss Johnstone, Bradford.

Representative on Committee of Suggestions—Cosmo Johns, Sheffield.

Other Members—W. West, Bradford; C. Bradshaw, Sheffield; P. F. Kendall, Leeds; S. Nettleton, Ossett; E. E. Gregory, Bingley; Wheelton Hind, Stoke-on-Trent; Walcot Gibson, London; E. Hawkesworth, Leeds; H. Culpin, Doncaster; and John Holmes, Crosshills.

OTHER COMMITTEES.

Committee of Suggestions for Research.—No direct call has been made on this Committee during the past year, and there was no occasion to organise a meeting. The suggestion made in 1907 that each Section should arrange a programme for each day at the Union's Excursions has been adopted in most cases. Some progress has been made in arranging for the investigation of peat deposits in various parts of the county; there is, however, still great need of collectors of material from representative localities. Attention may be directed here to the interesting series of papers in recent numbers of "The Naturalist" (September-December, 1909), "On the Geographical Distribution of Mollusca in South Lonsdale." This investigation is on the lines of one of the original suggestions of this Committee—"To promote co-operation of members in dealing with questions involving knowledge of several branches of science." Although this particular investigation was carried out independently and outside of our vice-counties, the fauna and flora are familiar enough, and the papers form a striking example of what the combined forces of conchologist, botanist and geologist can achieve. It is to be hoped that the suggestion thus conveyed may not be lost on the naturalists of Yorkshire. One other suggestion, a personal one, that the interests of this Committee would be better looked after by a resident Convener.

The Committee for 1910 is as follows :—

Chairman—P. F. Kendall. M.Sc., Rosedene, Weetwood, Leeds.

Convener—Wm. G. Smith, B.Sc., Ph.D., Edinburgh.

Representative on Executive—Professor P. F. Kendall.

Representatives of Committees and Sections—J. W. Carter, Bradford; W. Hewett, York; J. W. Taylor, Leeds; Cosmo Johns, Sheffield; W. West, Bradford;

W. Ingham, York; E. Hawkesworth, Leeds; Godfrey Bingley, Leeds; A. Whitaker, Barnsley; T.W.Woodhead, Ph.D., Huddersfield; S. Margerison, Leeds; W. H. Parkin, Bradford; and W. Wilson, Skipton.

Micro-Zoology and Micro-Botany Committee.—Mr. Moore regrets that partly in consequence of illness, he has not been able to devote much attention to pond life this year.

Among the new work done by this section, the first place must be given to Messrs. Wm. West and G. S. West's researches on the Phytoplankton of the Lake District, of which extensive accounts have appeared in "The Naturalist." In the March number also there appears a very interesting paper by Mr. J. M. Brown on the Freshwater Rhizopods of the Sheffield District. Of the excursions of the year, three at least (Market Weighton, Sedbergh and Castle Howard) have been attended by members of the section, but unfortunately, the work to be done has suffered from the paucity of workers. At Sedbergh, Mr. R. H. Philip read a paper on "the Diatoms of the Sedbergh district and their relation to some new theories of the Evolution of the Diatomaceæ," which will appear in "The Naturalist." In local work there has been an addition of a few new species to the "Diatoms of the Hull District," full particulars of which appear in "The Transactions of the Hull Field Naturalists' Club," 1909, (p. 70), just issued.

The Committee for 1910 is as follows:—

Chairman—M. H. Stiles, 2 Frenchgate, Doncaster.
Convener—R. H. Philip, Hull.
Representative on Executive—H. Moore, Rotherham.
Representative on Committee of Suggestions—W. West, Bradford.
Other Members—J. N. Coombe, Sheffield, Prof. A. Denny, Sheffield, F. W. Mills, Huddersfield; G. Howard, Rotherham; and T. Howard, Bradford.

Soppitt Memorial Library.—Dr. T. W. Woodhead writes:—During the year Mr. C. Crossland, F.L.S., has presented to this library a collection of twenty-eight valuable papers, bearing on the Fungus Flora of Yorkshire. These include accounts of the Fungus Forays at Selby (1896), Barnsley (1897), Harewood (1898), Mulgrave (1900 and 1908), Cadeby (1901), Arncliffe (1902), Masham (1902), Helmsley (1903), Rokeby (1904), Maltby (1905), Farnley Tyas (1906) and Grassington (1907), also accounts of new Yorkshire and British Fungi from 1892 to 1908, by Messrs. Crossland, Massee and Soppitt.

British Association.—In consequence of the general meetings of the British Association being held in Canada this year, the Conference of Delegates from the corresponding Societies was held in London on October 25th and 26th.

"The Naturalist."—Our journal has been regularly issued on the first of each month, and besides containing records of

the Union's work in its various branches, as already pointed out; has had useful papers on various branches of natural history by numerous writers. An effort has also been made to keep our members acquainted with current literature by the inclusion of new features, such as News from the Magazines, Proceedings of Provincial Scientific Societies, etc.; and criticisms on current topics have appeared in the Notes and Comments and Northern News columns. A further effort has also been made to increase the usefulness of the mazagine by giving conscientious reviews of current natural history books.

The botanists alone have contributed over 150 pages, amongst the authors being such well-known writers as Messrs. J. G. Baker, C. Crossland, G. Massee, M. C. Cooke, Druce, Lee, Lees, Woodhead, Smith, Ross, Gibbs, Keegan, Alexander, Winter, Cheetham, Creyer, McDonald, Ingham, Faber, Musham and Snelgrove.

The geologists take a second place (70 pages), and in this section we are fortunate in securing the help of Messrs. Wheelton Hind, Burton, Culpin, Dwerryhouse, Drake, Lane, Saunders and Thompson.

The ornithologists are responsible for 50 pages, written by Messrs. Fortune, Wade, St. Quintin, Grabham, Booth, Potter, Parkin, Wilson and Hope.

Conchological notes are usually brief, and amongst our contributors are Messrs. Taylor, Roebuck, Carter, Wallins, Booth, Blackburn, Peacock, Petty, Musham, Rankin, Dean and Kendall.

Messrs. Whitaker and Forrest are responsible for notes on the Mammals; Messrs. George, Stainforth, Falconer, and Hull, for the Arachnida; Messrs. Porritt, Carter, Bayford, Corbett, Armitt, Morley and the late W. C. Hey for Entomology; Messrs. Philip, Brown, W. West and G. S. West for Micro-botany and Micro-zoology; whilst other branches are represented by Messrs. Friend, Armstrong, Garstang and Sheppard.

The Presidency for 1910 has been offered to and accepted by Prof. A. C. Seward, M.A., F.R.S., etc., Cambridge.

The Union wishes to record its indebtedness to its retiring President, Mr. W. H. St. Quintin, J.P., of Scampston, Yorks., for his services during the year.

Other Officers.—In addition to the President, Divisional Secretaries, Local Treasurers, etc., already referred to, the following officers of the Union were elected for 1910:—

Delegate to the British Association—Mr. T. Sheppard.
Auditors—Messrs. J. W. Stather and J. F. Robinson.
Hon. Treasurer—Mr. H. Culpin, Doncaster.
Hon. Secretary—Mr. T. Sheppard, Hull.

The Financial Position of the Union.—The following are the Treasurer's statements of Income and Expenditure during the twelve months ending November 30th, 1909:—

1910 Jan. 1.

INCOME AND EXPENDITURE STATEMENT, 12 months to November 30, 1909.

INCOME.

	£	s.	d.
Members' Annual Subscriptions ..	119	19	0
Levies from Associated Societies ..	15	11	3
Life Members' Subscriptions (two) ..	14	14	0
Legacy—Rev. W. C. Hey, M.A. ..	20	0	0
Sales of Publications—			
Baker's "North Yorkshire" £0 18 9			
West's "Alga Flora" 0 15 0			
Transactions 0 11 3			
	2	5	0
Sundries	0	19	5
"Naturalist"—			
Subscriptions . 93 16 0			
Sales 1 4 6			
Recognition fee .. 5 0 0			
	100	0	6
Balance, being expenditure of year in excess of income	49	1	10
	£322	14	0

EXPENDITURE.

	£	s.	d.
Expenses of Meetings	11	4	0
Printing and Stationery (General A/c)	24	18	2
Postages, Telegrams, etc. (Hon. Secretary's Account)	26	4	7
Postages of Transactions, Part 34 ..	8	6	4
Clerkage (Hon. Secretary's Account)	20	0	0
Rent, etc., of Room, Hull	5	5	0
Printing and Stationery (Hon. Treasurer's Account)	4	1	10
Postages (Hon. Treasurer's Account)	2	15	10
Cost of Publications:—			
Annual Reports, 1905-8, £49/8/3, less provision of £33/9/- in previous statements £15 19 3			
Fungus Foray Lists .. 4 0 3			
Geological Bibliography 30 1 11			
Binding "North Yorkshire" 0 1 9			
Reprints for Vertebrate Section.. .. .. .. 0 2 2			
Annual Report, 1909 (estimate).. .. .. .. 12 0 0			
	62	5	4
Life Members' Account (contra) ..	14	14	0
"Hey" Legacy Account (contra) ..	20	0	0
"Naturalist"			
Subscribers £98 10 0			
Life Members' Copies 7 5 0			
Exchanges.. .. .. 5 0 0			
Extra cost and postage of special numbers 8 7 0			
Odd numbers and sundries 3 16 11			
	122	18	11
	£322	14	0

BALANCE SHEET, November 30, 1909.

LIABILITIES.

	£	s.	d.	£	s	d.
Accounts due from Union—						
"Naturalist" ..	125	12	1			
Transactions, Pt. 34	83	10	5			
Sundries	9	15	0			
				218	17	6
Annual Report, 1909 (estimate) ..				12	0	0
Life Members' Account				22	1	0
"Hey" Legacy Account				20	0	0
Subscriptions received in advance				2	12	6
				£275	11	0

Audited and found correct,
J. F. ROBINSON,
J. W. STATHER.

ASSETS.

	£	s.	d.	£	s.	d.
Cash at Bank	88	12	4			
Cash with Hon. Secretary	2	12	1½			
				91	4	5½
Subscriptions in Arrears:—						
Prior to 1909 ..	5	9	5			
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Naturalist,

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THE NATURALIST.

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THE MUSEUMS, HULL;

AND

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TECHNICAL COLLEGE, HUDDERSFIELD.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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FEB 1910

A NEW MASONIC WORK—

A History of the Humber Lodge No. 57.

By GEORGE A. SHAW, P.M., P.Z.

(Lecture Master 1907-8-9).

192 pages, Demy 8vo, with 7 full-page Plates (Portraits, etc). Cloth Boards, Gilt Top, **5/-** *net, postage 4d. extra.*

Contains the history of one of the oldest Lodges in England, dating back to 1756, and the contents appeal strongly to all members of the craft who desire to know more of the way in which Masonry has been built up. The Humber Lodge is in a flourishing condition, has given off two younger Lodges, and the author claims that it is a model of what a Masonic organisation ought to be.

A NEW GENEALOGICAL WORK—

The Parish Registers of South Cave (East Yorkshire).

With Notes thereon by WILLIAM RICHARDSON.

160 pages, Demy 8vo, with 7 full-page Plates, and other Illustrations in the text.

Bevelled Cloth Boards, Gilt Top, **5/-** *net, postage 4d. extra.*

This book has a fascination for all historical readers. The extracts from the Registers are accompanied by notes from other sources, much interesting information thus being brought together. The author has adhered well to George Herbert's quotation on the title-page, and "copied faire what Time hath blurr'd."

A NEW MUSICAL WORK—

A History of Hull Organs and Organists.

By DR. G. H. SMITH

(Hull College of Music and Hull Vocal Society).

180 pages Crown 8vo, with 12 full-page Plates (Portraits, etc.). Cloth Boards, **3/6** *net, postage 3d. extra.*

This volume traces the history of music in Hull, and to the musical public all over the country it is of great interest, showing how music came gradually to take a more and more important part in the services of the Churches, and how the art diffused seed from which grew many musical societies. The biographical notes, the specifications of the organs, etc., are all of much value and interest.

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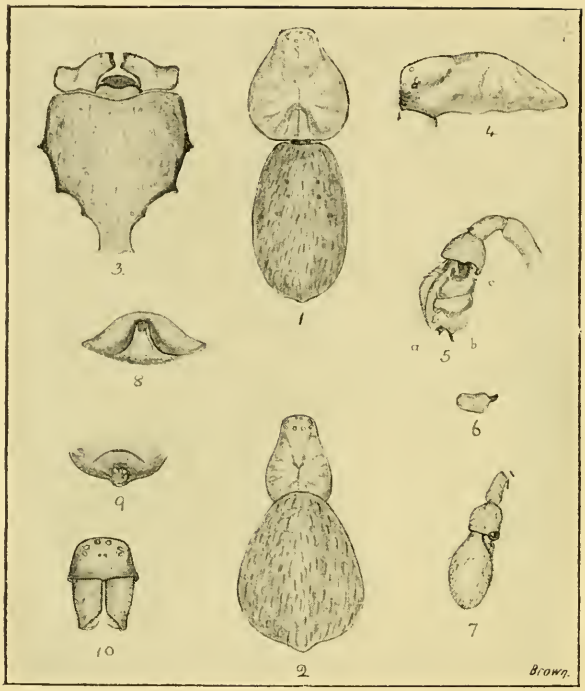


FIG. 1.—Male from above, all appendages removed.

FIG. 2.—Female, from above, all appendages removed.

FIG. 3.—Sternum, maxillae and labium.

FIG. 4.—Cephalothorax of male in profile.

FIG. 5.—Left palp of male, outside view: (*a*) emarginate keel-like termination of lobe; (*b*) pointed projection of apical process; (*c*) C-shaped process at base.

FIG. 6.—Enlarged view of process 5B.

FIG. 7.—Left palp of male, from above, and a little to the outside.

FIG. 8.—Vulva of female.

FIG. 9.—Spinners and fold of lower abdomen, with opening leading to spiracular organs.

FIG. 10.—Face and falces, front view.

NOTES AND COMMENTS.

THE BATTLE OF LAND AND SEA.*

In a remarkably cheap volume, with the above title, Mr. W. Ashton gives a very complete history of the recent geological changes on the Lancashire, Cheshire and North Wales Coasts, together with an account of the origin of the Lancashire sandhills. By the aid of geological and historical evidence, the author graphically describes the erosion and growth of land; and his narrative is illustrated by photographs of submerged forests, etc. Of particular value is the reproduction of various plans and maps of different dates, which shew at a glance the alteration in the form of the coastline.

THE PALÆONTOGRAPHICAL SOCIETY.

With its customary regularity the volume of the Palæontographical Society made its appearance at the close of the old year. To collectors, curators, geologists and zoologists in general, the work is invaluable. The wonder is that so much can be issued for the small subscription of one guinea. The various authors give their services, and some of the plates are paid for by the Carnegie Trust for the University of Scotland; consequently subscribers receive a maximum amount of material for their money. We trust that as many of our readers as possible will encourage this society in its work by sending in their names and subscriptions to Dr. Smith Woodward, of the British Museum (Natural History), South Kensington.

WOLVES, FISHES AND MOLLUSCS.

Amongst the items in the present volume are memoirs 'On the Pleistocene Canidæ,' by Prof. Reynolds, with plates illustrating the osteology of fossil wolves and foxes; 'Carboniferous Ganoid Fishes' (7 plates), by Dr. Traquair; 'Fishes of the Chalk' (6 plates), by Dr. A. Smith Woodward; and 'Cretaceous Lamellibranchs' (10 plates), by Mr. H. Woods. In these monographs several species from Speeton, Hebden Bridge and other northern localities are figured.

STEREOSCOPIC PHOTOGRAPHY.

THERE can be no doubt that stereoscopic photography, for natural history purposes, has great advantages over the ordinary method; and it has long been known that a member of the editorial staff of this journal (Mr. Riley Fortune, F.Z.S.), has

* Southport, W. Ashton & Son, 217 pp., 1/6 net.

been exceptionally successful in stereoscopic work. With regard to birds and their nests, stereoscopic photography is particularly valuable, as in this way the objects photographed, often almost invisible in an ordinary print, stand out in a delightful manner. We are glad to see that the well-known publishers, Messrs. Gowan and Gray, of Glasgow, have reproduced no fewer than sixty photographs of birds, etc., by Mr. Fortune, and these are issued in book form for the small sum of sixpence.*

LINCOLNSHIRE NATURALISTS.

At the recent annual meeting of the Lincolnshire Naturalists' Union, the officers were all re-elected, including the President, Mr. W. Denison Roebuck. Mr. Roebuck, in his address, began by stating that he was an original member of the Lincolnshire Naturalists' Union, which owed its origin to a suggestion made by him to Mr. W. F. Baker, the actual founder, in 1893.

LINCOLNSHIRE MOLLUSCA.

The President then dealt with the history of the investigation of the mollusca of Lincolnshire. This began with Martin Lister, one of the remarkable trio of English naturalists (Ray and Willughby were the others) who put natural science on its modern basis a full century before Linne. Lister noted more or less certainly a score of Lincolnshire mollusca, and stated definite localities for *Cyclostoma elegans*, *Pupa cylindracea* and *Hyalinia fulva*, all of which have been verified of recent years in those spots by Mr. H. Wallis Kew and Mr. Roebuck.

The history was otherwise of a personal nature, dealing with the work of observers now living—only Thos. Ball and Alfred Reynolds figure among the deceased,—and half-a-dozen of the observers whose work was summarised, were present to listen! The venerable John Hawkins, now living at Grantham, who attained his 90th birthday on 3rd January, 1910, was the first investigator after the blank of a century and a half following Martin Lister (1678 to 1850).

COMMON CRINOID NAMES.

In a recent issue of the 'Annals and Magazine of Natural History,' Dr. F. A. Bather gives a detailed study of type specimens and other fossils. He then discusses crinoid nomenclature, and from his remarks it is evident that, as in

* Gowan's Stereoscopic Series, No. 1, 'Birds and their Nests,' 6d.

the case of other branches of zoology, much time is occupied with this question that might be devoted to original work. Still, the discussion of such subjects is, unfortunately, necessary; and it cannot be better carried on than by specialists in the respective departments, whose knowledge of the subject is naturally better than that of the ordinary student.

THE FIXATION OF NOMENCLATURE.

To settle, once and for all, the question of which particular name is to be given to a particular species, Dr. Bather makes some suggestions which are worthy of serious consideration. He opines that 'zoologists should agree to accept as final the decision of some authority by them appointed. The vehicle for such authority already exists in the Nomenclature Committee of the International Zoological Congress, the only body that has any claim to represent either all branches of zoology or all nationalities.'

METHOD OF PROCEDURE.

Dr. Bather suggests that 'those zoologists who wish to protect certain names should lay the complete facts of the case before the Committee, and should accompany their request for the retention of certain definite names in defiance of the rules by the signatures of as many workers as the group affected as they can obtain. Due announcement of the proposed step should be made in certain widely circulated journals, and a reasonable time should be allowed for the reception of protests. The Committee should ultimately give its decision, and this decision should be published in the aforesaid journals. A summary of the labours of the Committee in this direction would, of course, be given from time to time in the publications of the International Zoological Congress.' In case the particular Committee referred to did not meet with the general approval of zoologists, and this is quite possible !—some other Committee might be formed. Anyway, the precise style or mode of appointment of the desired authority does not greatly matter, if only zoologists will agree to accept it.

EOCIDARIS.

The necessity for such a course as that referred to being adopted, is well illustrated in a paper by the same author, in another part of the 'Annals'; a paper which refers, *inter alia*, to some Permian fossils in the Hancock Museum, Newcastle. In this instance the case is further complicated by the fact that

some of King's original types are missing. Perhaps the following extracts from Dr. Bather's 'Summary and Conclusions,' will give an idea of the intricacies of the nomenclature problem, and illustrate the necessity of something being done to assist ordinary mortals to attach a correct name to a specimen when they find one :—

'CONCLUSIONS'

'*Cidaris keyserlingi* Geinitz, which has frequently been referred to *Eocidaris*, is discussed, and fresh details of its structure are given. Numerous topotypes of *Cidaris verneuiliana* King are described and figured, and that species is proved a synonym of *C. keyserlingi*. The evidence thus adduced shows that these fossils belong to *Miocidaris* Doederlein (1887). *Miocidaris* is re-diagnosed, and *M. cassiani* nom. nov. (=*Cidaris klipsteini* Desor, non. Marcou) taken as a genotype. The genus is distinguished from the recent *Cidaris*. Other species examined and referred to *Miocidaris* are *Cidaris subcoronata* Munst., *C. grandæva* Goldf. on the evidence of Quenstedt's specimens (1875), and *C. coæva* Quenst. Others are alluded to. It follows that there is no necessity for *Eotiaris* Lambert founded to receive *Miocidaris keyserlingi*. It also follows that *Cidaris verneuiliana* King and *C. coæva* Quenst. cannot belong to *Permocidaris* Lambert, a genus that rests on the inadequately described *Cidaris forbesiana* De Kon.' With such facts as these we can pity the poor museum curator who is asked the simple question—'What is the name of this fossil ?'

SKELETON OF A SOWERBY'S WHALE.

Sir William Turner favours us with a reprint of his paper on 'The Skeleton of a Sowerby's Whale, *Mesoplodon bidens*, stranded at St. Andrews, and the Morphology of the Manus in Mesoplodon, Hyperoodon and the Delphinidæ.'* In this valuable memoir Sir William gives detailed descriptions of the anatomical characteristics of an adult female Sowerby's Whale stranded in St. Andrew's Bay in May 1908, and compares it with other specimens stranded on Scottish shores during the past century, most of which he has described. In view of the comparatively rare occasions upon which it is possible to obtain proper scientific descriptions of these interesting mammals, Sir William Turner's pioneer work in this direction is all the more valuable.

* Proc. Roy. Soc. Edinb., Vol. 29, Pt. 7, No. 41, pp. 687-720.

THE VEGETATION OF 'SWIDDENS' IN NORTH-EAST YORKSHIRE.

FRANK ELGEE,
Middlesbrough.

(*Continued from page 20*).

This last-named Swidden passed into another, which was practically grassed over with a turf of *Agrostis canina, Aira praecox*, and the Sheep's Fescue Grass (*Festuca ovina*), all dwarfed and closely nibbled by sheep. Clumps of *J. squarrosus* were conspicuous in one part, and clumps of *Calluna* in another. *Polytrichum* was also a constituent of this characteristic bit of moorland sward.

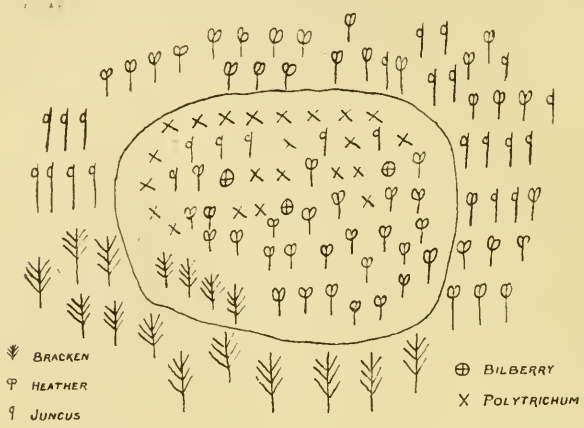
Sometimes large Swiddens which have been "graved" for "turves," merely shew plants growing isolated here and there, the rest of the ground being bare. One was noted near the preceding examples, and the plants upon it were *Polytrichum, Agrostis, Aira, Juncus squarrosus, V. Myrtillus, Potentilla* and *Calluna*.

The following details of the plant life of a Swidden on a slope facing the south are interesting. Towards the summit of the slope the principal plants were *Calluna, Aira praecox* and *Juncus squarrosus*. The latter species together with patches of *Agrostis*, were very conspicuous on the slope itself, whilst amongst the burnt stems of Heather at the foot of the Swidden, Bilberry prevailed with a few tufts of *Polytrichum*.

On Swiddens of the mixed character, just described, *Festuca ovina* is occasionally plentiful, and often occurs in rounded tussocks closely bitten off by sheep. A Swidden shewing this feature was observed on Fryup Ridge, where the ground was practically covered with *Festuca* and *Agrostis*, both grasses having a tendency to grow in old cart tracks; young Heather was also numerous with occasional plants of *Juncus squarrosus* and *Potentilla*. This and the last described Swiddens were surrounded by pure *Calluna* moors. *Calluna* frequently appears first on tracks crossing Swiddens which may otherwise be destitute of plants.

We must next consider those Swiddens occurring on wet ground, and one which was observed in Stockdale on a slope

facing the south, was surrounded by vegetation disposed as in the following diagram :—



Near the northern boundary there was much *Polytrichum* and *Juncus communis*, with *Calluna* and Bilberry appearing sporadically. Towards the Bracken both *J. communis* and the moss yielded to more *Calluna*. No Bracken occurred on the Swidden, except at the S.W. corner.

Another, in a similar situation, and with a somewhat similar disposition of plants around it, shewed the following aspects :—*Polytrichum* dominated in the centre with a few clumps of *Juncus communis* towards the western edge ; *Calluna* and *Erica Tetralix*, although very subordinate, were dispersed amongst the moss, and at the extreme eastern edge there occurred the Cotton Sedge (*Eriophorum vaginatum*) and *Sphagnum*. Wherever the soil became drier, *Polytrichum* gave place to *Calluna* with *Juncus squarrosus*.

On wet *Callunetа* with *Nardus stricta* as an abundant element in their flora, Swiddens present similar features to the surrounding moors, except that *Nardus* becomes the chief plant. This is probably owing to the fact that the stout tufts and rootstocks of the grass withstand the firing better than *Calluna*, and consequently spring up again almost immediately. Other species noted on such Swiddens are *E. Tetralix*, *J. communis* and *squarrosus*, *Potentilla*, and *Agrostis*.

Another example from the same type of moor shewed an advance towards the *Tetralix* Moor. *Nardus* prevailed in one part, and *Erica Tetralix* in another. *Calluna* and *Potentilla*

were of not infrequent occurrence, whilst a species of *Carex* was sporadic.

Sometimes Swiddens on wet moors are clothed with nothing else but *E. Tetralix*. On Harland Moor, near Gillamoor, this species prevailed on an old Swidden. *Calluna* was generally absent, but interspersed amongst the Heath were patches of *Nardus* and *J. squarrosus*. In a wetter part, *E. Tetralix*, though still the dominant plant, was much mixed with *Calluna* and the Flying Bent (*Molinia varia*). The surrounding moor was mostly Heather. Such *Tetralix* Moors are of rare occurrence on other than burnt areas. The most extensive natural *Tetralix* Moor in North East Yorkshire is that of May Moss, near Goathland.

A yet more remarkable example of the influence of burning has to be named. Many of the moorland slopes have at one period been wooded, and these woods have been removed by either natural or artificial means. Bracken and Heather have covered their sites so that nearly all trace of the original woodland has been lost. These slopes, as previously mentioned, are then burnt, and on a wet Swidden with a southerly slope the following plant association radically distinct from that of the surrounding moor was observed.

The dominant plants were *Molinia varia* in wet places and *Calluna* in the drier. Numerous species were *Scirpus caespitosa* and *J. communis*; the principal species of sporadic occurrence were *J. squarrosus*, *Potentilla*, *E. Tetralix*, *Luzula campestris*, *V. Myrtillus*, *Aira flexuosa*, *Holcus mollis*, and *Polytrichum*. A small quantity of *Sphagnum* occurred associated with *Drosera rotundifolia*. *Vaccinium Vitis-idaca* was also seen in one place. Part of the original wood remains, consisting of a few shrubs of Salix and Alder, with an undergrowth of *Molinia* and *Rubus*. It seems probable that in this case, *Molinia* was a constituent of the woodland undergrowth which must have contained various other ericetal plants. I have frequently seen *Molinia* flourishing on damp ground under Birch in the vicinity of the moors.

Finally it may be remarked that if Cotton Grass moors are burnt, the sedge is the first plant to reclothe the Swiddens with ts characteristic tussocks. This is due to the resistance which its stout growth offers to the burning.

It is significant to note that in the vast majority of cases ericetal plants alone spring up on the Swiddens. So far as my

observations go, I have not yet seen a Swidden with plants typical of other associations upon it. Ruderal species may be observed upon moors, but only under one condition, viz.,—the ground must have been radically disturbed, and the soil thereby considerably changed in character. Thus Nettles, may be found growing upon artificial ground consisting of cinders, sand, etc., by the side of the Rosedale Branch Railway at Farndale Head. Again by moorland roadsides, where road scrapings and gutter refuse have been banked up, ruderal plants may be met with, Nettles, Thistles, Docks, etc. The burning of the Heather, though it must undoubtedly exert some influence upon the raw humus, does not change the character of the soil to any extent, and consequently ruderal and other species not being adapted to grow upon peat never appear on the Swiddens.

From the foregoing facts it will be obvious that the uniformity of Heather Moorlands is much disturbed by burning. There can be little doubt that if left undisturbed, *Calluna* would reign supreme over a much larger area ; whilst on the slopes, especially towards the moor edges, Bracken and Bilberry would not be so dominant. Again many important constituents of the ericetal flora, *Erica Tetralix*, *E. cinerea* and *Empetrum nigrum*, occurring sporadically as a rule amongst the Heather, become much more abundant, and so help to break the monotony of the moorland vegetation.

What the order of succession of plants upon Swiddens may be, and whether they spring from seeds or from the underground parts of the burnt plants, are problems which must be left for future consideration.

MUSEUM NEWS.

The late Felix Cobbold, M.P., has bequeathed £20,000 to the Ipswich Museum for the purchase of specimens.

Mr. James Britten has retired from the Botanical Department of the British Museum (Natural History), after serving thirty-eight years.

By the generosity of one of the members of the York Philosophical Society, a new lecture theatre is to be built in connection with the museum, and the present theatre will be converted into an entrance hall.

From the Manchester Museum we have received three publications. The first is its Annual Report for 1908-9, in which are recorded many serious changes in the administration of the museum. Publication No. 64 is Prof. F. E. Weiss' 'Chapters from the Evolution of Plants'; and No. 65 is a reprint of Mr. R. Standen's paper in the Museums Journal, on 'How to Make and Use Glue and Turpentine Cement for Alcholic Mounts.'

YORKSHIRE HAWKWEEDS.

JOHN CRYER.

THE following list of Hawkweeds contains a few new records for Yorkshire and several additional localities for already recorded Hawkweeds :—

Hieracium anglicum Fr., × *H. hypochœroides* Gibs., var. *lancifolium*, W. R. Linton. Gordale, Kettlewell, and Linton near Skipton. Found growing in each district with both parents.

The Rev. Augustin Ley, M.A., in a note *re* this plant, says :— ' It has just the appearance of the hybrid I suggest, and Hanbury and other authorities believe that *anglicum* hybridises in Yorkshire.'

H. anglicum Fr., var. *Brigantum* F. J. Hanb., Grassington. Very rare.

H. decolor sp. nov.—*H. caesium* Fr., var. *decolor*, W. R. Linton. Skirethorns, Grassington, Kettlewell, Ribblehead.

H. lasiophyllum Koch, forma. Malham. Very rare.

H. rubicundum F. J. Hanb., var. *Boswelli* W. R. Linton. Near Shipley. New to the West Riding.

H. Somerfeltii Lindeb, var., *splendens* F. J. Hanb. Skirithorns. Very rare.

H. britannicum F. J. Hanb. Type. Linton near Skipton. ' New to West Riding,' says the Rev. A. Ley, in letter to the writer.

H. britannicum F. J. Hanb., var. *ovale* Ley. Ribblehead, Kettlewell, Malham.

H. silvaticum Gouan. Linton.

H. silvaticum Gouan, var. *tricolor*, W. R. Linton. Linton, Grassington, Ribblehead.

H. silvaticum Gouan, var. *subcyaneum* W. R. Linton. Skirethorns.

H. silvaticum Gouan, var. *asymmetricum* Ley. Skirethorns.

H. variicolor Dahlst. Gordale, Kettlewell.

H. crebridens Dahlst. Skirethorns.

H. rubiginosum F. J. Hanb. Malham, Linton, Skirethorns, Grassington, Ribblehead.

H. holophyllum W. R. Linton. Linton.

H. petrocharis W. R. Linton. Skirethorns, Kettlewell. New to the West Riding.

H. cymbifolium Purchas. Gordale.

1910 Feb. 1.

H. sarcophyllum Stenstr., var. *expallidiforme* Dahlst. Linton, Grassington, Gordale.

H. vulgatum Fr., var. *subfasciculare* W. R. Linton. River-side, Shipley.

H. vulgatum Fr. var. *subravusculum* W. R. Linton. Grassington, Skirethorns, Appletree-wick, Bingley, Shipley.

H. acroleucum Stenstr. Near Shipley. Only recorded previously in Yorkshire for Ribblehead.

H. scanicum Dahlst. West of Newby, near Scarborough. Not recorded in Mr. Baker's 'North Yorkshire,' Second Edition. Skirethorns, Grassington.

H. conspersum Dahlst. New record for Yorkshire. Ribblehead and Clapham. Mr. Ley says in a letter to the writer: 'I hear from Rev. E. F. Linton *is not* the Scandinavian plant so named, but your plant is certainly what W. R. Linton so called.'

H. sciaphilum Uechtr. Clapham, Ribblehead, Skirethorns, Janet's Cave, Malham, Bradford, Baildon, Newlay. Only previous record for Yorkshire, Dent Dale.

H. sciaphilum, Uechtr var. *transiens* nov. var. Gordale, Malham, Skirethorns, Grassington, Appletree-wick, Milcar Hill, and Low Moor, near Bradford, Shipley, West of Newby, near Scarborough.

H. sciaphilum Uechtr, var. *strumosum* Ley. Appletree-wick, Arthington.

H. cacuminatum Dahlst. Grassington, West of Newby, near Scarborough, Not recorded in Mr. Baker's 'North Yorkshire,' Second Edition.

H. diaphanoides Lindeb. West of Newby, near Scarborough. New to the North Riding. Calverley Woods, near Leeds.

H. sparsifolium Lindeb. var. *grandescens* Dahlst. Grassington.

H. rigidum Hartm. var. *Friesii* Dahlst. On Wharfe banks between Burnsall and Barden. The only other locality recorded is Ingleborough, 1889.

H. rigidum Hartm. var. *trichocaulon* Dahlst. West of Newby, near Scarborough. Not hitherto recorded for the North Riding, as far as I can ascertain.

Specimens of all the above have been gathered by the writer during the past season in the districts enumerated, and nearly all of the specimens have been carefully examined by the Rev. Augustin Ley, M.A., to whom I am deeply indebted for his generous help.

Naturalist,

A NEW GENUS AND SPECIES OF SPIDER (*EBORIA CALIGINOSA*).

WM. FALCONER.
Slaithwaite, Huddersfield.

(PLATE I.).

Amongst a number of spiders collected in May 1909, on a high moor in the neighbourhood of Marsden, in the Colne Valley, S.W. Yorks., were a male and female which were unknown to me. Subsequent examinations and careful comparison with other species led me to the conclusion that they were not only new to science, but also possessed characters, which would prevent their inclusion in any of the known genera of the *Erigoneae*, the group of the sub-family *Linyphiinae* to which they belong. They were submitted to the Rev. O. Pickard-Cambridge, and Dr. A. Randell Jackson, and these authorities concurred in the view taken of them. I have, therefore, in the following pages, described and figured them as the two sexes of a new species in a new genus.

Fam. Argiopidæ.

Sub-Fam. Linyphiinæ.

Group Erigoneae.

Gen. Nov. EBORIA.

Cephalothorax very little longer than wide, and oval in shape, very broadly so in the male, but narrower in proportion in the female; well rounded at the sides behind and squarely truncate at the posterior margin; a little attenuated forward, and very obtusely truncate in front; thoracic sutures distinct. *Male* without cephalic lobe, postocular impressions or central longitudinal strie. In both sexes there is a slight dip above, and a slight constriction at the sides, between the caput and thorax; and a shallow depression (indistinct in ♀, distinct in ♂) separates the posterior centrals from the rest of the eyes.

Caput and Thorax both somewhat convex; the latter in the male considerably more elevated than the former; much more nearly equal, however, in the female.

Clypeus equal in height to the ocular area, impressed below the eyes, and the lower margin slightly advanced.

Ocular area occupying the whole of the wide front.

1910 Feb. 1.

Eyes rather small, and eight in number, arranged in two rows. Those of the *posterior row* equal in size, and, when viewed from above, forming a line distinctly curved backwards, the centrals clearly closer to each other than to the laterals, the intervals being wider than the diameter of an eye. In the female, the laterals are brought nearer to the centrals, so that they become equidistant or nearly so. The *anterior eyes* viewed from the front, in a straight line; the centrals decidedly the smallest of the eight, and very close together, a much greater interval separating them from the laterals, which are equal in size to the eyes of the posterior row.

Central eye space much longer than wide, and much narrower in front than behind.

Lateral eyes on each side in contact, and situated on fairly strong oblique prominences, the anterior portions of which are more raised than the posterior.

Falces moderately stout, about equal in length to the facial space; obliquely truncate on the inner side, somewhat attenuated and slightly divergent towards the extremity, a little angular in the ♀. *Upper margin of fang groove* furnished with three short, equal, equidistant teeth. *Lower margin* without teeth. *Fang* long and very slender.

Maxillae very short and wide at the base at the point where the palpi are inserted, their length and basal width being about equal. At first parallel, then in the apical half a little inclined to each other in front of the labium; truncate at the extremity, the upper angle of which is shortly and obtusely produced.

Labium small, at least twice as wide as long, thickened and reflexed at the apex in somewhat triangular form; deeply and transversely impressed at the base.

Sternum broadly heartshaped, very little longer than wide, slightly convex, terminating between the coxae of the posterior pair of legs in a moderately wide, parallel sided prolongation which is truncate at its extremity and inflexed.

Palpus slender; palpal organs and tarsus small. *Femur* long, incurved, and enlarged upwards. *Patella* slenderer than the femur, short and enlarged at its distal end. *Tibia* short and wide, produced all round (most so above and beneath), forming an irregular margin but without apophyses, very little shorter than the patella. *Palpal organs* fairly complex, and devoid of a long circular or rolled exserted spine at the extremity.

Legs. Order of length 4, 1, 2, 3, all tarsi a little shorter than the metatarsi, which in turn are shorter than the tibiae; moderately long and stout, well covered with long stiff hairs, many of which spring from small black raised bases; some of these hairs, especially beneath the femora and tibiae, are of a more bristly nature, and form conspicuous rows of almost spine-like character. *Posterior coxae* separated by a distance rather less than the diameter of one of them; in the male they are narrowly and bluntly produced on the inner side at the extremity. *Femora* stout, swollen beneath, having below their extremity two long, slender, conspicuous bristles. *Genuae* provided with an apical bristle, strongest in III. and IV., weak in I. and II. *Tibiae*, spine on III. and IV. slender, and much longer than the diameter of the joint, and situated in the basal third; on I. and III. two shorter and weaker spines, the additional one being in the apical third. They are furnished with one or two (in IV. there are three) sensory setae, one situated just before the middle, and the others where present, in the distal half of the joint. *Metatarsi* also provided with one sensory seta, near the middle of the joint.

Tarsal claws weak and slender.

Abdomen slender and oblong oval in the male, stouter and more broadly oval in the female, clothed with long strong hairs; on the under surface, in both sexes, just in front of the spinners, in a curved fold of the integument is a narrow transverse slit opening into the breathing apparatus (fig. 9).

Spinners short, stout, converging from base, four in number, upper and lower pair equal in length, set in a shallow circular depression and concealed from above by an outward anal prolongation of the abdomen.

Eboria possesses characteristics which make it difficult to assign it to its true position. It has been considered to have some correspondence with *Cnephalocotes* Sim, but the much wider posterior termination of the sternum, the shorter and less hairy legs, the spine on tibia IV. shorter than the diameter of the joint, and placed beyond the basal third, and the large palpal organs with a long exserted spine of the latter genus will easily differentiate them. It seems more correctly to belong to that sub-section of the Erigoneae, in which an abdominal scutum is absent, the anterior eyes in a straight line, and the posterior row curved backwards; and to that part of it in which the eyes, instead of being very minute and

very widely separated as in *Thyreosthenius* Sim, are relatively larger and more closely grouped. Its nearest allies are *Lophomma* Menge and *Pocadicnemis* Sim. In *Lophomma*, however, the eyes are larger and the posterior row in a straight line, the legs longer, the sternal termination wider, the falces much stronger, more divergent and more attenuated, the tibial spines on IV. never longer than the diameter of the joint, while the male has strong postocular impressions. *Pocadicnemis* Sim. which has the same long strong pubescence on abdomen and limbs, and the tibial spine on IV. also longer than the diameter of the joint, may be distinguished by the more equidistant eyes in both rows, the longer, stouter legs, with the tarsi III. and IV. much shorter in proportion to the metatarsi III. and IV., and the long rolled exserted spine of the male's palpal organs.

EBORIA CALIGINOSA sp. nov.

Length of male and female each 1.75 mm.

MALE, Plate I., figs. 1, 3, 4, 5, 6, 7.

CEPHALOTHORAX (fig. 1 and 4) smooth, dusky brown in colour, suffused with a deeper tinge towards the margins, and along lines converging to the thoracic junction. Towards the middle is a dark triangular marking, the apex of which is directed backwards, and prolonged in a slender line to the posterior margins; on the hinder slope this line is joined by two others, one on each side, and the three together form a distinct, symmetrical, trident-shaped mark. A similar line passes from the centre of the base of the triangle to the ocular area, just in front of which there are on it two slender erect hairs, longitudinally placed.

THE CAPUT is attenuated backwards, and limited by indistinct suffused lines behind the lateral eyes. Viewed from above, the pedicle which unites the cephalothorax to the abdomen is partly visible (fig. 1).

THE CLYPEUS is furnished with a number of long, black, unequal, slightly curved bristly hairs, which are very characteristic.

FALCES AND MAXILLAE dull yellow brown, and labium dark brown (fig. 3).

THE FALCES AND MAXILLAE are very sparingly clothed with short hairs; the latter being also provided on the inferior surface near the external margin at the extremity with a long strong bristle (fig. 3).

Sternum dark brown, with a few long unequal scattered hairs and a number of widely spaced small, shallow, punctate impressions (fig. 3).

Eyes all situated on black spots. *Posterior centrals* slightly but clearly nearer to each other than to the laterals of the same row, being less than 1½ times their diameter apart. The *anterior* centrals less than once their diameter apart, and 1½ times that distance from the laterals.

Palpus dull yellow brown, and, with the exception of the tarsus, very scantily supplied with hairs. *Patella* with a weak apical bristle; *tibia*, produced edge squarely truncate above with a stiff bristle at the outer angle, more pointed beneath, inferior surface of joint provided with one short, strong, curved bristle, and the external margin with two long, slender sinuous bristles, one nearly twice the length of the other (figs. 5 and 7).

Palpal Organs composed of various lobes and processes, the chief of which are—

1. A dark brown C-shaped process at the base on the outer side (fig. 5c).
2. A small process at the apex ending in a short dark blunt projection, the whole forming a rough representation of a lepidopterous scale (fig. 5b, projection visible only; fig. 6, an enlarged view of process).
3. Also at apex in close proximity to (2) a lobe with an emarginate keel-like termination (fig. 5a). Careful focussing is required to separate the two last.

Legs. Yellow brown, becoming a duller dusky brown towards the extremities.

Abdomen black, and much narrower than the cephalothorax, rounded behind and squarely truncate in front; in spirit, two rows of round depressions, the posterior pair the largest and most widely separated, are visible on the anterior half of the abdomen (fig. 1). The epigastric fold on the under surface is thickened and distinct.

Spinners black (dusky brown in the female), with pubescence similar to that on the abdomen.

The Female agrees with the male in colour and other general characters. The eyes are, however, more closely grouped, and the intervals not quite so great; the posterior eyes are equidistant or nearly so. The cephalothorax (fig. 2) is less wide in proportion and the markings not quite so distinct;

the clypeus with only one or two short inconspicuous hairs. The *abdomen* (figure 2) is wider than the cephalothorax, broad behind with pointed termination, and in front projecting over the cephalothorax in bluntly rounded form. In spirit, the whole surface appears covered with dusky yellowish spots.

EPIGYNAL AREA black, much wider than long, with scattered pubescence. Vulva very characteristic ; orifice truncate cone-shaped, filled with a pale process of much the same shape (fig. 8).

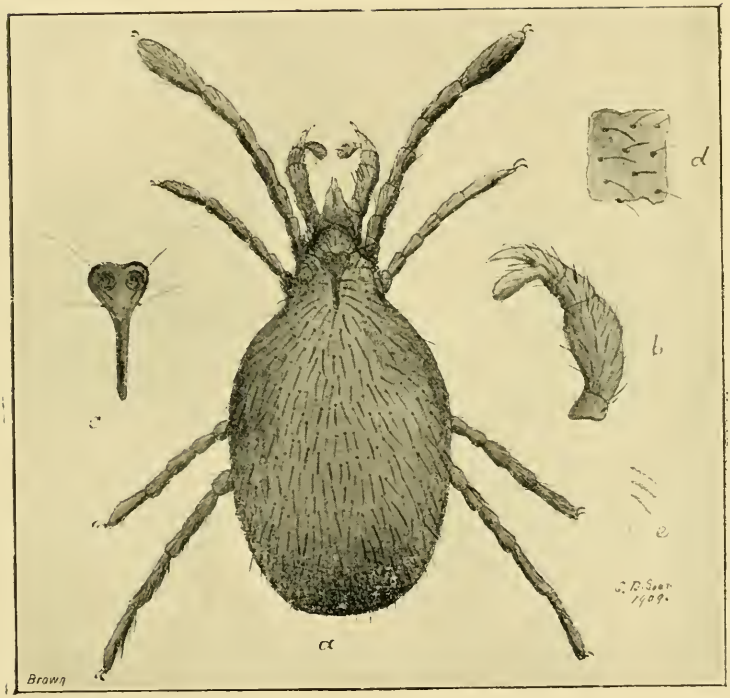
E. CALIGINOSA is a very distinct species in coloration and structure. The absence in the male of any cephalic lobe or eminence, postocular impressions or ocular processes, and in its palp, of any tibial apophysis or of a long circular or exserted terminal spine in its palpal organs will at once separate it from the same sex of every British member of the Erigoneae. The female may be similarly identified by the disposition and curve of the eyes, the strong pubescence on its abdomen and limbs, the long tibial spine on legs IV., and the formation of its vulva.

Solitary examples of the male and female were found at the roots of rushes growing up through *Sphagnum* in boggy ground, beside the Old Pack Horse Road on Clowes Moor, Marsden, May 15th, 1909.

The Annual Report and Transactions of the **Manchester Microscopical Society** for 1908 have recently been issued (90 pp., 1/6). They bear evidence of an excellent year's work. Besides the business reports, there is the Presidential Address of Prof. S. J. Hickson, on 'The Suctoria'; Mr. T. Smith writes on 'Edible and Poisonous Fungi'; Mr. C. Turner on 'Desmids'; Mr. G. Hickling on 'The Microscopic Study of Rocks'; Mr. R. Welch on 'Narin Foraminiferous Strand'; and Mr. W. A. Rogerson on 'Mummy Cloth.' There are also several shorter notes. The report is cheap.

The foremost place amongst the publications of our provincial scientific societies must again be given to the **Proceedings and Transactions of the Liverpool Biological Society,** Vol. XXIII., of which has been recently received. Liverpool (653 pp., one guinea).

The papers and reports it contains are of altogether exceptional value. Besides accounts of the meetings, etc., the publication contains the Presidential Address of Prof. B. Moore, on 'Reactions of Marine Organisms in Relation to Light and Phosphorescence'; 'The Twenty-second Report of the Liverpool Marine Biological Committee and their Biological Station at Port Erin,' by Prof. W. A. Herdman; 'Report on the Investigations carried on during 1898 in connection with the Lancashire Sea-Fisheries' Laboratory, at the University of Liverpool, and the Sea-Fish Hatchery at Piel, near Barrow,' by Prof. W. A. Herdman, A. Scott and J. Johnstone. The volume also contains no fewer than three of the important and profusely illustrated 'Memoirs,' viz., 'Pecten,' by W. J. Dakin; 'Eledone,' by Annie Isgrove, and 'Polychaet Larvae of Port Erin,' by F. H. Gravely.



a.—***Ottonia bicolor.***
b.—Palp.
c.—Crista.
d.—Dorsal hairs enlarged.
e.—Hairs on legs.

Length of body	1·28 mm.
Length of crista	0·14 ,,
Palpus	0·24 ,,
Length of hairs on body	0·05 ,, about.

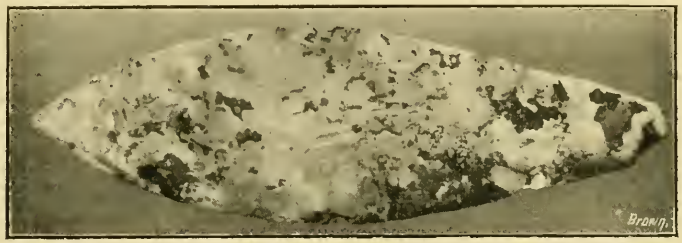
Hairs on legs feathered.

A RARE TYPE OF FLINT DAGGER FROM COTTINGHAM, EAST YORKS.

T. SHEPPARD, F.G.S., F.S.A.Scot.

At the recent meeting of the Yorkshire Naturalists' Union held at Scarborough, there was on exhibition a number of pre-historic implements, amongst which was an unusually fine flint dagger, labelled 'Cottingham.' This has since been acquired for the Hull Museum by means of an exchange, and forms a welcome addition to the local pre-historic collection there exhibited.

The dagger is of dark flint, though the surface is now of a light colour, due to oxidisation. It is $7\frac{1}{2}$ inches in length, $2\frac{1}{2}$ inches in greatest width, but is so remarkably well made that it is nowhere as much as $\frac{1}{2}$ inch in thickness. A very sharp cutting



edge has been made by very careful chipping, and about half-way between the point and the butt end is a notch on each side of the blade, which has apparently been made in order that the dagger may be better bound to its handle.

Flint daggers of this kind are exceedingly rare in this country and the probability is that the Cottingham example had been buried with an interment. The last specimen of its kind found was obtained at Middleton-on-the-Wolds in 1905, and was associated with an earthenware vessel known as a drinking cup. This was figured and described in 'The Naturalist' a short time ago.*

* 1908, p. 231.

In Mr. Mortimer's well-known book on 'Forty Years' Researches in British and Saxon Burial Mounds of East Yorkshire,' two similar specimens are figured, one $5\frac{3}{4}$ inches long was found in a barrow at Garton Slack; another a little larger was found in an adjoining grave. This last-named specimen, as in the case of the Cottingham dagger, is notched towards the blunt end, in order to give better security to the handle. Unfortunately, in the Cottingham example, the extremity of the point has been broken away, apparently recently; but this has been carefully restored.

NOTE ON *OTTONIA BICOLOR*.

C. F. GEORGE, M.R.C.S.,
Kirton-in-Lindsey.

(PLATE II.).

In 'The Naturalist' for 1908, page 452, I gave a brief description of *Trombidium bicolor* (Hermann). At that time I had not a specimen in proper condition for drawing, but in February 1909, Mr. Evans sent to me, with other mites, a specimen taken by him in December 1905, in moss, from Aberfoyle in Perthshire; it had become almost decolorized from long maceration in the preservative solution; and from this specimen Mr. Soar made the drawing to illustrate this paper. The eyes prominent, the hairs distinct and simple, and the crista are seen to be well marked; an enlarged figure of this organ is seen at *c*. There are two stigmata, each provided with a curved tactile hair; the backward projecting portion is rather short but well defined; some of the hairs on the legs are seen to be pectinate (Plate II., fig. *e*).

[∓ **The Kea: A New Zealand Problem,** by **G. R. Marriner.** London: Williams and Norgate. 151 pp., 7/6 net.

Much has been written about this extraordinary parrot, and its remarkable acquired habit of attacking sheep and feeding upon their flesh. There is no doubt that in some cases reports have been exaggerated. Mr. Marriner has made an exhaustive enquiry on the subject, having visited various parts of New Zealand for the purpose, and gives the result of his work in this volume. From this it is clear that the Kea is guilty, and has done great harm to the flocks of sheep. Its method seems to be to alight on the back of a sheep, and simply tear away the flesh, quite regardless of the animal's frantic attempts to get rid of its enemy. The book is illustrated by a large number of convincing photographs, and besides containing a good account of the birds, also describes their country well.

RHIZOPODS FROM THE SHEFFIELD DISTRICT.*

JAMES M. BROWN, B.Sc.,
Sheffield.

In a previous number of 'The Naturalist' (March 1909), I gave a list of the Freshwater Rhizopods which I had collected in this district up to that date. Since then continued work has made known the occurrence of nearly thirty further species. While some of these are fairly well-known forms, others appear to be little known, or at any rate have been seldom noticed, while a few are, I believe, new to this country.

I give in each case a reference to the authority, so that other naturalists may easily refer to the original descriptions of the species.

1.—*Amoeba fluida* Grüber ('Zeitschr. f. wiss. Zool.' Bd. 41, 1885; Penard: 'Faune rhizopodique du Bassin du Leman,' 1902, p. 42). A fairly large form of the 'limax' type, which shows peculiar internal currents in the protoplasm. Occurs in sediment from Burbage. Size 100μ. Rare.

2.—*Amoeba vespertilio* Penard. ('Faune rhizop,' p. 92). An occasional form met with in sediment and characterised specially by the triangular and pointed shape of the pseudopodia. Found also in Esthwaite Lake. Size 50 μ.

3.—*Amoeba terricola* Greeff. ('Arch. f. mikr. Anat.' Bd. II., 1866, p. 299). In my previous paper I mentioned that *A. verrucosa* Ehr. was probably a composite species, now broken up into distinct species. *A. terricola* is one of these and the most commonly occurring form. It is widely distributed amongst mosses, both submerged and growing in woods, on walls, etc.

4.—*Amoeba papyracea* Penard. ('Arch. f. Protistenk,' 1905, p. 201). A pellicled form like the last, and occurring in similar situations but not so common. Found in numbers amongst Lichen, Wyming Brook.

5.—*Ouramoeba vorax* Leidy ('Freshwater Rhizopods of North America,' 1879). Occasionally *Amoebae* occur which are attacked by parasitic fungi which produce tufts of hyphal filaments protruding from the surface of the animal. To such, Leidy gave the name '*Ouramoeba*.' Various species are attacked in this way. In sediment at Burbage, numerous *A. villosa* occurred, most being attacked by the fungus.

6.—*Hyalodiscus rubicundus* H. and L. ('Arch. f. mikr. Anat,' Vol. X., suppl.; Penard, Faune rhizop., p. 159; Cash.

* For previous paper see 'Naturalist,' March, 1909, pp. 105-108.

Brit. Freshwater Rhizop. 1905). A small form occurring amongst moss. Rare.

7.—*Corycia flava* (Greeff). ('Arch. f. mikr. Anat.' Bd. II., 1866). Several very small (young) forms amongst moss. Size 25*μ*.

8.—*Difflugia lanceolata* Penard ('Mém. Soc., phys. et hist. nat. Genève,' 1890; 'Faune rhizop.,' p. 250). In numbers in sediment of a pool, Whiteley Woods.

9.—*Difflugia rubescens* Penard ('American Nat,' 1891; 'Faune rhizop.' p. 227). A small form, almost pyriform in shape, with endoplasm containing many brick-red granules. Not common. Sediment Burbage. Size 60*μ*.

10.—*Difflugia fallax* Penard ('Mém. Soc. etc.,' 1890; 'Faune rhizop.' p. 245). Another small form met with amongst submerged moss. Size 59 *μ*.

11.—*Pontigulasia spectabilis* Penard. ('Faune rhizop.' p. 318). Occurs in sediment Burbage. Appears to be the same as *Difflugia pyriformis* var. *vas* of Leidy, but is distinguished from *Difflugia* by the presence of an internal shelf across the 'neck' of the test.

12.—*Hyalosphenia papilio* Leidy ('Freshwater Rhizopods N. America'). Occurs in sphagnum, and as far as I have observed is very rare in this district. It has only been reported once or twice in this country. I have also found it as a rare form in the Lake District.

13.—*Nebela lageniformis* Penard ('Mém. Soc.', etc., 1890, p. 158; 'Faune rhizop.', p. 355). An elegant flask-shaped species with long neck. The examples I have found are much smaller than those of Penard, being 66 *μ*, and probably represent a distinct variety. Fairly common in sphagnum at Stanage, etc.

14.—*Nebela militaris* Penard ('Mém. Soc.', etc., 1890; 'Faune rhizop.' p. 368). A fairly common and widely distributed species. In sphagnum, Stanage, etc. Size 70 *μ*.

15.—*Nebela crenulata* Penard (=*N. dentistoma*, Penard, in 'Mém. Soc.', etc., 1890, p. 162; 'Faune rhizop.' p. 370; 'Cash. Trans. Manch. Micro. Soc.', 1891, p. 50). Differs from other Nebelas in having a crenulated 'mouth' to the test. Fairly common in sphagnum, Stanage, also in a stream entering the Quaker Fish Pond, Monsal Dale.

16.—*Nebela bohemica* Taranek ('Monogr. der Nebeliden Böhmens,' 1882, p. 34). Related to *N. collaris*, but differs in

the form of 'mouth' and 'lips.' Occasional in sphagnum. Size 118 μ.

17.—*Heleopera petricola* Leidy ('Freshw. Rhiz. N. Amer.', p. 165). Many in a stream entering the Quaker Fish Pond, Monsal Dale.

18.—*Arcella arenaria* Greeff ('Arch. f. mikr. Anat.' Bd. II., 1866, p. 299; =*A. microstoma* Penard, in 'Faune rhizop.,' p. 406). Common in mosses of woods and walls.

19.—*Phryganella hemisphaerica* Penard ('Mém. Soc.', etc., 1890; 'Faune rhizop.', p. 421). Very common in mosses of woods, walls, etc. Most tests are found empty. It is often confused with *Difflugia globulosa*.

20.—*Euglypha cristata* Leidy. ('Freshw. Rhiz. N. Amer.', p. 218; Penard 'Faune rhizop.', p. 511). A small form and only occasionally met with. Amongst sphagnum, Stanage, and in a stream entering the Quaker Fish Pond. Monsal Dale. Found also in Easedale Tarn. Size 40-45 μ. Rare.

21.—*Euglypha brachiata* Leidy ('Freshw. Rhizop. N. Amer.', p. 200; Penard, 'Faune rhizop.', p. 504). A very rare species. Found once only in a stream entering the Derwent near Froggatt Size 64 μ.

22.—*Sphenoderia dentata* Penard ('Mém. Soc.', etc., 1890; 'Faune rhizop.', p. 523). Differs from all other Sphenoderia in the dentate form of the mouth. Not a common species. In mossy growth on watertrough, Ecclesall; in a stream entering the Quaker Fish Pond, Monsal Dale. Size 45 μ.

23.—*Sphenoderia fissirostris* Penard ('Mém. Soc.', etc., 1890, p. 184; 'Faune rhizop.', p. 523). A rare species. Found once only in sphagnum, Stanage. Size 40 μ.

24.—*Assulina muscorum* Greeff ('Sitz-Ber. d. Ges. z. Beford, d. ges. Natur. Marburg, 1888; Penard 'Faune rhizop.' p. 519). Occurred in large numbers amongst moss from a field, Ecclesall. Size 36 μ.

25.—*Trinema lineare* Penard ('Mém. Soc.', etc., 1890; 'Faune rhizop.', p. 529). A small and widely distributed species, amongst moss and sphagnum.

26.—*Corythion dubium* Taranek ('Monogr. der Nebeliden, Böhmens,' p. 43). Another widely distributed form, though not often recorded in this country. Amongst sphagnum, Stanage, etc.; in moss, Ecclesall, etc.; amongst lichens, Wyming Brook. Size 36 μ.

27.—*Pamphagus hyalinus* Leidy ('Freshw. Rhizop. N. Amer.', p. 194). Many individuals in sediment of pool, Ringinglow, also in mossy growth on water trough, Ecclesall.

FIELD NOTES.

MAMMALS.

Rhinoceros Tooth at Dimlington, East Yorks.—Whilst walking along the cliffs south of Withernsea recently, I found a fine molar of a Rhinoceros, $2\frac{3}{4}$ inches in length, and $5\frac{3}{4}$ inches in circumference. Mr. E. T. Newton, F.R.S., kindly informs me that this is a premolar of *Rhinoceros antiquatis* Blum., = *Rhinoceros tichorhinus* Fischer. Remains of Rhinoceros have been reported from Sewerby, Kelsey Hill, Bielbecks and Hessle, in East Yorkshire, but are only very rarely met with on the coast.—T. SHEPPARD.

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ECHINODERM.

Worm Parasitic in Sea-Urchin.—With reference to a 'Nemertine' found within the test of a Sea-Urchin at Scarborough, by Dr. John Irvine, and described by him in the January number of 'The Naturalist' (p. 6), may I suggest the possibility that this is an example of the Nematode, *Ichthyonema grayi*, first described by Drs. Gemmill and von Linstow in 'Archiv für Naturgeschichte,' vol. LXVIII., 1902, pp. 113-118, a summary of that account appearing in 'Trans. Nat. Hist. Soc.', Glasgow, vol. VI., p. 229. The original specimens were found in examples of *Echinus esculentus*, and the mature females reached a length of five feet, although specimens supposed to be males, at least one of which generally occurred in the same test as a female, were much smaller, only from two to six inches in length. The specimens described in those papers were found at various localities in the Firth of Clyde, and Mr. D. C. M'Intosh of Edinburgh, informs me that he has observed several specimens in tests of the Common Sea-Urchin, *Echinus esculentus*, dredged by him in the neighbourhood of the Shetland Isles. Except for this species, *Ichthyonema* is an internal parasite of fishes.—JAMES RITCHIE, The Royal Scottish Museum, Edinburgh, 20th January, 1910.

BIRDS.

Black-headed Gulls nesting in trees.—At the Twigmoor Gullery in Lincolnshire I observed several pairs of Gulls nesting in the Fir trees. This is a most unusual occurrence and worthy of note. The nests were of considerable size, and in each case the bird was incubating the eggs. Why they should choose such unlikely places when others more suitable were at hand is difficult to understand. It would be interesting to know

R. Fortune, F.Z.S.]. [*Photo.*

if the parents got the young ones down safely. The photograph shews one of the Gulls on its nest in the top of a tree. It is not, however, as good as it might be, as the day was dull and windy.—R. FORTUNE, Harrogate.

Eagle and Green Woodpecker near Scarborough.—On January 15th when at Cloughton Wyke, an Eagle of some species passed about half a mile out to sea, mobbed by Gulls. With my glasses I could see that the basal part of the tail was light coloured, and the rest of the bird mottled brown, but could form no accurate idea as to the species.

On the same day I saw distinctly at close quarters with the glasses, a Green Woodpecker, flying north over the sea in the midst of a flock of immature Herring Gulls. The bird was within fifty yards of me, and I could not mistake it.—W. J. CLARKE, Scarborough.

In Memoriam.

SIR CHARLES STRICKLAND, Bart.

(PLATE III).

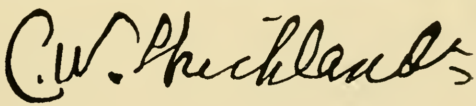
WE regret to record the death of Sir Charles William Strickland, Bart., which occurred during the closing hours of the old year. Sir Charles, who was over ninety years of age, had been ill for about a fortnight, but previously had enjoyed wonderful health. He took a keen interest in the natural sciences, particularly geology, and was especially well informed with regard to the structure of the district around Malton. He also took a keen interest in the county Geological Society. Many years ago, at York, when the present writer read his first paper, Sir Charles was in the chair, and his encouraging remarks then made to a lad in his 'teens will not soon be forgotten. Sir Charles also took a great interest in horticulture, and was one of the first to introduce exotic orchids into Yorkshire. The antiquities of his county likewise occupied his attention. Sir Charles was the original of 'Martin the Madman' in 'Tom Brown's School Days.' Wordsworth there introduces him with—

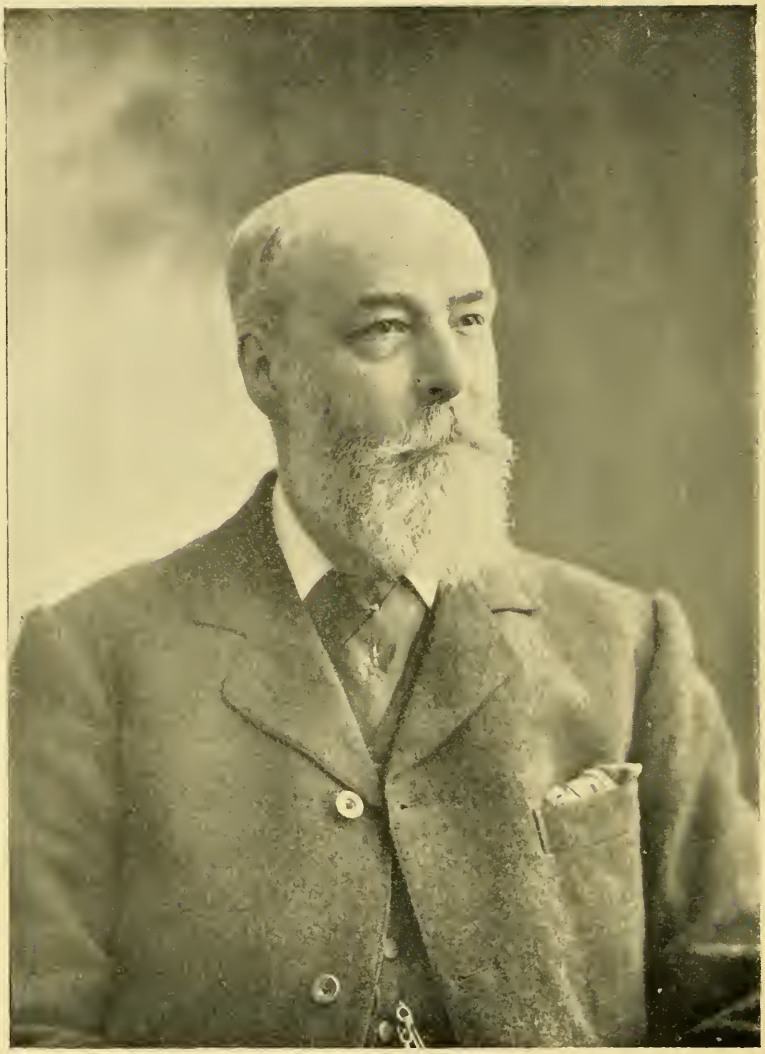
'Let Nature be your teacher.
* * * *
Sweet is the lore which Nature brings;
Our meddling intellect
Misshapes the beauteous forms of things.'

T.S.

A Descriptive Catalogue of the Dobree Collection of European Noctuæ, by Horace B. Browne, M.A. Published for the Hull Museums Committee. A. Brown & Sons, Hull. 156 pp., 1/-

This is a splendid piece of work, and we most heartily congratulate Mr. Horace Browne on its completion and production. Though modestly called a catalogue, it is largely a history of the well-known fine collection of European Noctuæ got together by the late N. F. Dobree of Beverley, and presented by him to the Hull Museum. As the Preface states, it is an attempt to give 'an exact record of the collection as it now is, showing when, where, and by whom the specimens in it were obtained, describing briefly the varietal and aberrational forms of each species,' etc. As the collection 'consists of a fine series of magnificent specimens from almost every district in the entire Palæarctic Region,' and the history of nearly every specimen is given, denoted by a number in the catalogue corresponding with the number in the collection, some idea may be formed of the value of the catalogue, and of the amount of labour which Mr. Browne has bestowed upon it. We recommend all Yorkshire lepidopterists who want to profitably spend a spare day during the winter—usually the only time of the year when they have such days—to go over to the Hull Museum, and study the collection with this catalogue in hand, and they will not regret the excursion. The paper, get-up, and printing are far ahead of the average of such books; and all the late Mr. Dobree's friends will be pleased to see so good and characteristic a portrait as forms the frontispiece.—G.T.P.





Yours faithfully,
Harper Sagthorpe

In Memoriam.

HARPER GAYTHORPE, F.S.A.(Scot.).

1850-1909.

(PLATE IV.).

As we were going to press with our January issue, the death occurred of Mr. Harper Gaythorpe, of Barrow-in-Furness. He was born at Tarporley, in Cheshire, in March 1850, and he will long be remembered for his exertions in connection with the Barrow Field Naturalists' Society—a Society which owes its present position very largely to Mr. Gaythorpe's energy during the quarter of a century he was connected with it, and of which he was President in 1903-4. He made numerous contributions to the archæology and natural history of the Furness district, and also accomplished much good work in preparing and editing the records of the Barrow Field Club, a volume of nearly 300 pages having been published by him only a little while before he died. This was noticed in our January number, and we are kindly permitted to reproduce the portrait which there appeared as frontispiece (plate IV). The Furness district and the Barrow Club particularly, have lost a careful investigator, and a true friend. Largely as a result of his exertions, a local museum has recently been formed in Barrow-in-Furness.

In Memoriam.

GEORGE STABLER.

1839-1910.

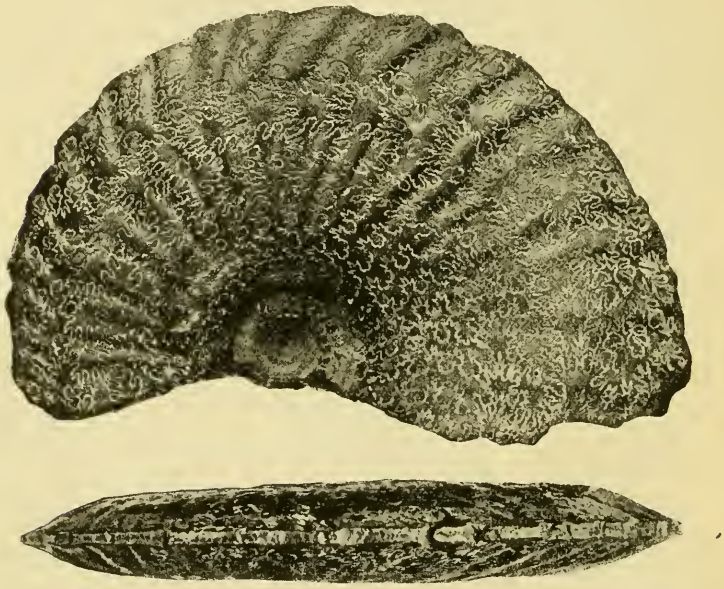
On January 4th Mr. George Stabler, of Levens, Westmorland, quietly passed away at the age of three score years and ten. He had been totally blind for the past two years, but was nevertheless quite interested in his favourite hobby—botany; and though deprived of his sight, his country walks were full of interest to him, and he was able to identify the various birds, etc., by their calls. Mr. Stabler was born at Welburn, near Malton, and went to Levens on his appointment as schoolmaster there, forty years ago.

He was a life-long friend of Dr. Spruce, and is referred to in Spruce's account of his travels in South America, recently edited by Dr. Russell Wallace, and reviewed in these columns a little while ago.

YORKSHIRE TYPE AMMONITES.

Yorkshire Type Ammonites, edited by **S. S. Buckman,** part I., pp. 1-xii, i.-ii., 12 plates, and Descriptions Nos. 1-8. London: Wesley & Sons. 3/6.

One of the greatest difficulties a geologist has to encounter is the identification and proper naming of his specimens. In the case of Liassic Ammonites, which have long been keenly sought by collectors, this difficulty is a very serious matter, and, as was shewn by Mr. C. Thompson in these pages recently, even the generally accepted names to the common forms are often wrong. This state of things is partly due to the fact that the first descriptions of the species given by Simpson, were published without illustrations; partly owing to a confusion of somewhat similar forms, and partly because one writer has copied the errors of another. Mr. Buckman, however, has gone to the fountain head. Simpson's types are still preserved in the Whitby Museum. These have been examined, and compared



***Ammonites polyophyllus,* Simpson, 1843.**
Lias, Whitby.

with the original descriptions, and photographs have been taken by Mr. J. W. Tutcher. In each case the original description is reprinted, and additional details and remarks are supplied by the editor. There, together with the very fine reproductions from photographs (with sketches of the suture lines, etc.), give all that anyone can desire. On the completion of Mr. Buckman's monograph, the identification of Liassic ammonites will be, for the first time, a comparatively easy matter. The species figured in part I. are *Ammonites reticularis*, *ripleyi*, *aureus*, *mulgravius*, *exaratus*, *resupinatus*, *dennyi*, *polophyllus*, *alternatus*, *subconcavus* and *boulbiensis*. One of the smaller illustrations we are permitted to reproduce herewith. In view of the number and excellence of the plates, the price is very reasonable.

NEW NATURAL HISTORY BOOKS.

The number of new books dealing with natural history, from a popular point of view, now being published, is appalling. It is wonderful how well they are produced, and at such low prices. The next generation should be a good one for our natural history societies !

From Mr. Andrew Melrose we have received **The New Book of Birds,** by **Horace G. Groser** (309 pp. 6/- net). It is a magnificent volume, with large type, large pages, and plenty of illustrations, including a dozen coloured plates by George Rankin, each of which is a gem. The more remarkable of the birds are dealt with, *e.g.*, the ostrich, pelican, albatross, eagle, bustard, stork, vulture, raven, etc. ; whilst the kingfisher, lark, robin, etc., are also described. The descriptive matter is pleasantly written, and appears to be free from the glaring inaccuracies of some books.

A Book of the Zoo, by **Eric Parker,** is published by Messrs. Methuen, London. (307 pp. 6/-).

This is unusually well written, and besides being a handy guide to the collections in the possession of the Zoological Society, also contains much valuable information likely to appeal to many who are not able to visit the gardens. Most of the important species are well described, and in a thoroughly reliable manner. The volume is improved by several excellent illustrations from photographs by Mr. Henry Irving, who seems almost as successful with his photographs of animal life as he is with his views of trees.

The Animals and their Story, by **W. P. Westell.** London : Robert Culley. 322 pp., 5/- net.

The first impression one gets on opening this book is that it is very similar to the previous volume, but better. So far as the illustrations are concerned, that impression remains after a close inspection. In the advertisement we learn that in this ' worthy addition ' to the ' Nature Story ' series, the author ' has struck *out in* an entirely new line.' We fail to see it. He has certainly described animals only usually found in the Zoo, whereas formerly he kept to the British fauna and flora ; but the style, the ' originality,' shall we say, is the same. At the rate Mr. Westell is turning books out this is hardly to be wondered at. His reputation would be much better if he paid a little more attention to his style. Though the book is entitled ' Animals ' and their story, it is obvious that the author has fallen into a general error, and means ' mammals.' He also, as usual, promises ' following up the story by further volumes.' Apparently this is the first book that has appeared since Mr. Westell got his bronze ' Medaille de 2d Classe, 4th section,' and pretty certificate (which beats the B.E.N.A. badge), from the Société Nationale D'Acclimatation de France ; and so a photograph of the obverse and reverse of the medal, and of the certificate, appear at the beginning of the book ; though, as these were granted for a work on popular entomology, it is difficult to understand why they appear here. The book is dedicated to the French Society by the author, ' as a token of his high regard for the splendid work which the society has accomplished.' But so long as Mr. Westell is successful in securing excellent illustrations, his books will sell. In the present case there are eight coloured plates by Mr. W. S. Berridge, and a hundred photographs taken in the Zoo by the same gentleman. These, particularly the former, are perfect, and alone are worth the money. Without them we fear the book would have a ' struggle for existence ' amongst the writings of Lydekker, Ingersoll and Selous, in which the author has delved deeply.

Nature Walks and Talks, by **T. Carreras.** London : Partridge & Co. 286 pp. 2/6.

The author of this book differs from many recent writers on ' Nature Study,' inasmuch as he is thoroughly acquainted with the moths, butter-

flies, snails, wasps, beetles, galls, etc., about which he writes. His information is given in a pleasant style, and is reliable. His final chapter, dealing with nature photography, is particularly good. We can strongly recommend it to our young readers.

The Story of the Pine-Marten, Mustela, by **A. B. Hutton.** London: David Nutt. 73 pp.

This is a series of chapters dealing with the adventures of a Pine-Marten, one of the rarer of our British mammals. It is told in a form suitable for young readers, and is illustrated by excellent photographs. The story is founded on facts, and told by one obviously familiar with the habits of the animal he describes. It is apparently Mr. Hutton's first book, or we should not have found on the title-page a statement to the effect that he is a member of a certain society, which is open to anybody and everybody who will pay a penny a year for the privilege!

The Pond and other Stories, by **Carl Ewald.** London: Everett and Co. 320 pp. 6/- net.

This volume contains a charming series of Nature 'Fairy Tales,' translated from the Danish by Alexander Teixeira de Mattos. The stories are written in a very entertaining style, and are sure to please young folks, and at the same time give them an accurate idea of the ways of birds, fishes, reptiles, shells and plants. The stories, as such, are excellent, and are doubly valuable for the care that has been exercised in regard to the details of the lives of the animals so well described.

Tommy's Adventures in Natureland, by **Sir Digby Pigott.** London: Witherby and Co. 180 pp. 2/6 net.

This is a companion volume to 'The Changling,' by the same author, who thinks it is possible that his new book 'may fall into the hands of boys or girls whose education has been so sadly neglected that they have never read or heard of 'The Changling.' The new book is somewhat on the same lines: a little boy takes the form of a pheasant, a seagull, etc., and describes his experiences. His stories are pleasant to read, and are likely to create a desire on the part of juvenile readers for more nature study.

The Hills and the Vale, by **Richard Jefferies,** with an introduction by Edward Thomas. London: Duckworth & Co. 312 pp., 6/-.

Though Richard Jefferies is no longer with us, we have in Mr. Edward Thomas a devout disciple, whose work we have previously had the pleasure of referring to in these columns. To him is due the credit of the appearance of the present book, which contains three unpublished essays of Jefferies, together with fifteen others reprinted from various magazines, where they have probably been little noticed since the time of their appearance. Amongst the subjects dealt with are Marlborough Forest; Choosing a Gun; Birds of Spring; Village Organisation; On the Downs; The Sun and the Brook, etc. It is unnecessary, we feel glad to think, to commend any of Richard Jefferies' work to the readers of 'The Naturalist.'

Vol. V. of the Caxton Publishing Company's **Book of Nature Study,** edited by **Prof. Farmer,** is to hand (224 pp. 7/6).

It is largely botanical, and also contains many papers of economical importance. A good proportion deals with school gardens and their management. The papers are also remarkably well illustrated, and in every way are admirable, and will be found particularly useful to teachers. Miss C. L. Laurie has a series of chapters dealing with 'Seashore Vegetation, Aquatic Vegetation, the Vegetation of Meadows and Pastures, and the Weeds of Cultivation'; Mr. J. E. Hennesey writes on 'School Gardens from Various Aspects,'; and Mr. A. D. Hall, F.R.S., writes on 'The Origin of Soils.'

One and All Gardening, 1910, edited by **Edward Owen Greening,** London: Agricultural and Horticultural Association. Price Twopence.

This interesting Annual has now reached a fifteenth issue. The 128 pages are full of valued matter by writers of eminence in the horticultural world. The editor gives an illustrated article on garden homes in connection with profit sharing co-partnerships of industry at home and abroad. Other articles are on American School Gardens; Walking-stick Insects; Gardening without Soil; the Outdoor School; Legends of Plants, and the much-discussed subject of Nitro-Culture.

An Introduction to the Study of the Comparative Anatomy of Animals, by **Dr. G. C. Bourne.** London: George Bell & Sons. Vol. I., 300 pp., 6/- net.

Since this volume was first published, ten years ago, it has been very largely used, and we can personally speak as to its value. A second edition has now been called for, and much new matter is included. The portion relating to Mitosis, the Maturation of the Ovum, Spermatogenesis and Fertilisation, and the chapter on Monocystis, have been re-written. A useful chapter on Malaria has been added, which will be of particular service to medical students. The illustrations are clear and well drawn.

Beasts and Men, by **Carl Hagenbech.** London: Longmans, Green & Co. 358 pp., price 12/6 net.

Hagenbeck and his wonderful achievements with regard to training and rearing wild animals, are doubtless well-known to all our readers. His Zoological Park at Stellingen, where various beasts are kept in apparently natural surroundings, is known the world over, though some objections to the methods there adopted are pointed out by Dr. Chalmers Mitchell, F.R.S., who contributes an introduction to the volume. The very title of the book conveys an idea of the relative regard paid to beasts, and to the other animals—men, by the author! The volume is full of Hagenbeck's reminiscences—interesting anecdotes relating to his collecting expeditions, and also chatty descriptions of the various races of mankind met with in his travels. There are many excellent stories; a particularly good one referring to an Englishman who wanted to shoot an elephant. This Mr. W., hearing that Hagenbeck had a specimen that was dying, went over to Germany with a fine array of rifles, etc. But he 'funked' it at the last moment, and the beast had to be strangled. It does not state whether he still brought his 'trophy' home. There are a hundred illustrations, the first being Hagenbeck himself, and the last some niggers and a monkey. A valuable part of the work is that relating to his 'zoo,' of which there are several fine photographs. It is interesting to read that in the author's opinion, greater success in training animals is attained by kindness than by the whip.

Nature Through the Microscope, by **W. Spiers.** London: Robert Culley. 355 pp., 7/6 net.

The author of this volume is evidently an enthusiast, and has also a practical acquaintance with the various and numerous branches of microscopic work with which he deals. The book is intended for the beginner, though it also contains many useful hints, likely to be of value to advanced students of the microscope. He also covers a very wide field, dealing with almost every branch of natural history, vegetable and animal. The objects he describes too, are such as can readily be obtained by most beginners, and hence his book is the more likely to be of service. There is an absence of technical words, without in any way deteriorating the value of his descriptions. There are ten excellent coloured plates by Miss E. M. Spiers, and about three hundred drawings and micro-photographs by the author. In addition are reproductions of the well-known micro-photographs made by Mr. C. D. Holmes, of Hull, at which place we believe the author until recently resided. There is a useful chapter on 'How to choose a Microscope,' and a photograph of the author on the cover.

Parts II.-VII. of **The Story of the Heavens,** by **Sir Robert Ball** (Cassell & Co., 6d. each net) are to hand.

Each is well illustrated by diagrams and plates, and the text is written in a popular style. As this work is so well known, our main object in calling attention to it is that those of our readers who do not already possess a copy may be aware that it can be obtained in this convenient form at sixpence a fortnight.

NORTHERN NEWS.

Mr. W. M. Tattersall has been appointed keeper of the Manchester Museum.

According to the daily papers, a pure white Squirrel, with pink eyes, has recently been shot at Thornby, Northamptonshire.

We regret to learn that Mr. John Eggleston, Assistant at the Sunderland Museum, was found drowned in the Wear near Southwick, early in January.

We notice in a recent weekly natural history column that reference is made to the *Eruption* of Crossbills.

The Report of the Committee on Erratic Blocks of the British Isles, presented at Winnipeg, consists principally of records from Lincolnshire, Northumberland, Durham and Leicester.

Mr. J. W. Jackson favours us with a copy of his paper on 'Fossil Pearl-Growths,' which appeared in Vol. VII. of 'The Proceedings of the Malacological Society.' The specimens, some of which are illustrated, are in the Manchester Museum.

Lord Walsingham's collection of Microlepidoptera is being transferred to the British Museum, having been presented to that Institution. The collection consists of about 260,000 specimens, and will include about 45,000 species not previously represented in the National collection.

According to the 'Grand Magazine,' 'in after days he looked upon that evening as the date on which he burst from the chrysalis and became a caterpillar.' To this 'Punch' naturally adds, 'and the date lower down in his calendar, with the *two* red lines round it, marks the occasion when he finally burst into an egg.' Speaking of eggs reminds us that the Parliamentary elections have recently taken place, in connection with which there have been frequent references to history, both natural and unnatural. In the *Barrhead News* a correspondent writes, 'the insidious snake of Free Trade should not wag the cloven hoof of Protection in the air.'

It is gratifying to learn that at the recent meeting of the Council of the London Geological Society it was decided to confer the Murchison Award upon Mr. J. W. Stather, F.G.S., of Hull. Mr. Stather was one of the founders of the Hull Geological Society, and has passed through its presidential chair. He has acted in the capacity of Honorary Secretary to the Society almost without a break since its formation. He has also carried out much geological work in the district, under the auspices of the British Association, and has also done some excellent work in East Yorkshire and North Lincolnshire, particularly amongst the Cretaceous and Glacial series. He has served on the council of the Yorkshire Geological Society, the Yorkshire Naturalists' Union, and other important scientific bodies. This is the second occasion upon which the London Geological Society has conferred honours upon Hull naturalists in recent years, another Hull geologist having received the Lyell Award only a short time ago.

PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

The Forty-Eighth Annual Report of the Yorkshire Naturalists' Union for 1909 (reprinted from 'The Naturalist' for January), can be obtained from the Hon. Secretary of the Union at one shilling. It contains a useful summary of the natural history observations in Yorkshire during 1909.

The Transactions and Journal of Proceedings of the Dumfries and Galloway Natural History and Antiquarian Society, Vol. XX. (220 pp.), has been issued, and contains a record of the work accomplished during the Session 1907-8. The papers and abstracts deal with a variety of subjects, from Paul Jones to Local Fungi, and a good proportion of the articles are of local interest. Amongst the natural history items we notice birds occupy a prominent place, whilst fishes, fungi and butterflies are also dealt with.

The Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne is to be congratulated upon its **Transactions** (Vol. III., Part 2, pp. 223-540, 6/6) recently issued.

The thick tome is packed with most valuable papers, mostly dealing with the arachnida and other usually neglected orders. The articles are well-illustrated, and have the further merit of bearing upon the Society's sphere of work. Besides the reports on the field meetings, the museum, etc., there are papers on Exotic *Thysanoptera*; British *Collembola* and *Pauropoda*, by Mr. R. S. Bagnall; Mr. E. L. Gill describes a new arachnid from the Coal Measures; the Rev. J. E. Hull and Mr. A. R. Jackson respectively have papers on rare spiders; Miss M. V. Lebour publishes her further work amongst the Trematodes of the Coast; Canon Norman and Prof. G. S. Brady describe the coast crustacea, and geological items are contributed by Dr. Woolacott and the Rev. A. Watts.

The Transactions of the East Riding Antiquarian Society for 1909 have recently been published (A. Brown & Sons, Hull).

The volume is principally occupied by two lengthy papers. The first is by the President, Col. P. Saltmarshe, and refers to 'Some Howdenshire Villages,' and includes an elaborate pedigree of the Metham family. The second is by Mr. T. Sheppard, and deals with 'Some Anglo-Saxon Vases in the Hull Museum.' He describes an unusually fine series of cinerary urns, and their contents, principally from Sancton in East Yorkshire, though there are three from Newark. This paper is illustrated by ninety-four photographs and sketches.

Vol. I. of the **Year Book of the Viking Club** is a further publication issued by this enthusiastic society.

It contains the reports of the district secretaries; a paper on 'The Rampshire Sword,' by the late Harper Gaythorpe; an excellent series of 'Viking Notes,' Reviews, Bibliography, etc. From the same society we have received No. 17 of **Old Lore Miscellany**; **Orkney and Shetland Records** (No. 18), and **Caithness and Sutherland Records** (No. 19). The editors of these publications are again to be congratulated upon the general excellence and value of the work.

We have received Vol. I. No. 4 of the **Hastings and East Sussex Naturalist** edited by Mr. W. Ruskin Butterfield. (Hastings, pp. 131-196, price 2/-).

It is particularly valuable from the local character of its contents. The Rev. E. N. Bloomfield gives a list of Sussex Fungi; Mr. W. H. Mullens writes on 'Gilbert White and Sussex'; the editor gives notes on Hastings Harvestmen (*Phalangidea*); Mr. T. Parkin refers to Nesting Boxes at Westfield Place, Sussex; Mr. M. J. Nicoll describes the Pipits in the Hastings area; the Rev. Bloomfield gives 'Annual Notes on the Local Flora, Fauna, etc.', and there are several shorter notes. We must congratulate our Hastings friends on the attention they pay to local notes.

NEWS FROM THE MAGAZINES.

A Wryneck was heard at Studley Royal near Ripon, on June 8th, 1909. —*Zoologist*, December.

Rhopalomesites tardyi Curt, is recorded for Lancashire, a female being caught near Ulverston in August last.—*Entomologist's Monthly Magazine.*

Dr. J. E. Marr and Mr. W. J. Fearnsides have a lengthy and well-illustrated paper on 'The Howgill Fells and their Topography,' in the *Quarterly Journal of the Geological Society.*

Mr. F. F. Blackman has an interesting paper on 'Vegetation and Frost' in *The New Phytologist* for December. In the same journal is an illustration of *Botrychium lunaria* with two fertile fronds.

Mr. W. Eagle Clarke writes on 'The recent remarkable visitation of Crossbills' in *The Annals of Scottish Natural History*, No. 72. In the same journal Mr. F. N. Williams writes on 'The High Alpine Flora of Britain.'

In *Man* for January, Mr. C. T. Trechmann records a miniature implement of transparent quartz, from the site of the lake dwelling in the Greifensee, Switzerland. The implement measures 11 millimetres long, by 6½ millimetres broad.

Mr. G. H. Caton Haigh shot a Yellow-Crowned Warbler at North Cotes, Lincs., on October 12th, and a Red-Breasted Flycatcher at the same place, on September 16th, the latter being said to be the first record of the species for Lincolnshire.—*British Birds*, December.

In *British Birds* for January, Mr. H. F. Witherby figures and describes the specimen of Nordmann's Pratincole, shot at Danby Wiske, and described in these pages for November 1st last. Mr. Fortune's photograph is also reproduced, without any reference to the photographer. In the same journal is a photograph of a nest of a Raven, with young, taken in Northumberland.

The Bradford Scientific Journal for January contains a paper on the Migration of the Swift, by Mr. E. Harper; 'the Lees' Herbarium,' by Mr. F. A. Lees; 'The Roman Road between Cockhill and Ilkley,' by Dr. F. Villy, and some valuable local natural history observations made by the recorders of the Bradford Naturalists' and Microscopical Society.

Besides the paper on 'Moorlog' referred to on page 1, the *Essex Naturalist* (Vol. XVI., pts. I. and II.) contains interesting papers on 'The Re-afforestation of Hainhault'; 'A New Forest of Weltham,'; 'Notes on Palæolithic and Neolithic Implements in East Essex,' and a report of two Conferences on the use of museums in promoting 'Nature Study' in schools.

Our contributor, the Rev. O. Pickard-Cambridge, F.R.S., favours us with a reprint of his paper 'On British Arachnida noted and observed in 1908,' which appears in the Proceedings of the Dorset Natural History and Field Club. It is pleasant to find that a very large proportion of the new species recorded is due to the efforts of Yorkshire workers.

In the *Bradford Scientific Journal* for January, is a short note recording a bed of peat between two clays in the Wrose Brow Brick Works. 'It rests horizontally and apparently undisturbed between two blue clays, . . . the lower clay is about 25 feet thick, and the upper one 8 feet thick.' It is stated that 'both these deposits are probably boulder-clays.' If this is so, the section is of the utmost importance, and we trust our Bradford friends will make a very careful examination of the beds.

MARCH 1910. No. 638
(No. 416 of current series).

THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY
T. SHEPPARD, F.G.S., F.S.A.Scot.,
THE MUSEUMS, HULL;
AND
T. W. WOODHEAD, Ph.D., F.L.S.,
TECHNICAL COLLEGE, HUDDERSFIELD.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
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All communications should be addressed to the Hon. Secretary,

T. SHEPPARD, F.G.S., The Museums, Hull

NOTES AND COMMENTS.

GEOLOGICAL SURVEY MAPS.

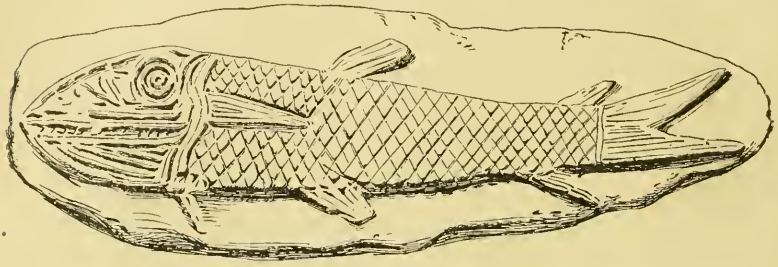
In the 'Geological Magazine' for January, Mr. Bernard Hobson draws attention to the penny-wise policy recently adopted by the Treasury of increasing the cost of the hand-coloured geological survey maps. For instance, quarter sheet 92 N.-E., Pateley Bridge, has been raised in price from 3/- to 14/3; and quarter sheet 81 S.-E., Buxton, from 3/- to 8/3. 'This means that while thousands of pounds are spent in geological surveying, the results are inaccessible to the public except at an almost prohibitive price. It makes British geologists envy their friends in the United States, where the antediluvian hand-colouring is unknown, and a geological folio containing topographical geological economics, and structural map with explanation, can be bought for twenty-five cents (1/-). In Canada geological maps are supplied gratis to Canadians.'

CAVE REMAINS FROM WARTON CRAG.

At a recent meeting of the Geological Society of London, Mr. J. Wilfrid Jackson described his excavations at Dog Holes, Warton Crag. The cave is situated on the western side of Warton Crag, and opens on a sloping 'pavement' of limestone. It owes its origin to the erosion of a series of master-joints in the Carboniferous Limestone. The present entrance is by a vertical drop from the general level of the 'pavement,' and is undoubtedly of secondary origin, due to the falling-in of the weakened roof of one of the passages. The specimens found were derived from the cave-earth below the surface-soil in one of the chambers of the cave. They comprise a large series of small vertebrates, including Rodents, Insectivores, Amphibians, Birds, etc. Among the Rodents are some interesting forms, the chief of which are the Arctic and Norwegian Lemmings, and the Northern Vole. A large series of non-marine Mollusca was found along with these remains, one species being of particular interest, namely *Pyramidula ruderata*, only known in this country by its fossil remains in Pleistocene deposits. The Pleistocene age of the remains is fully discussed, as well as their possible mode of origin through a former swallow-hole. In many respects the cave and its contents bear a striking resemblance to the famous Ightham Fissures.

A 'FAKED' FOSSIL FISH.

'Flint Jack,' who was well known a generation ago for the successful way in which he made 'pre-historic' implements and other 'antiquities,' did not hesitate to make anything, so long as he could get a market for it. Hugh Miller's 'Old Red Sandstone' was then, as now, a popular work; but in those days few who had read the book had seen the actual fossils



"Fossil-Fish" made by "Flint Jack."

referred to therein. 'Flint Jack,' by the aid of a file, chisel, and pieces of West Riding Coal-Measure Sandstone, made fairly passable 'ganoids.' One of these is figured herewith, and whilst it would not pass many geologists to-day, it still has an interest.

LIASSIC PLESIOSAURS.

We are glad to find that the hitherto neglected study of the Saurian remains from our Liassic rocks is at last being taken up in earnest, and with promising results. In the well-known memoirs issued by the Manchester Literary and Philosophical Society, Mr. D. M. S. Watson has a Preliminary Note on two New Genera of Upper Liassic Plesiosaurs, and from his remarks it is evident that a careful examination of the Saurian remains in our museums and collections will shew that there is much material awaiting proper description. In Tate and Blake's 'Yorksire Lias' (1876) are recorded two crocodiles, eight Plesiosaurs and three Ichthyosaurs. 'No other Plesiosaurs have been described since.' Seven of these species are founded on more or less complete skeletons, two of which Mr. Watson has been unable to find.

'SNAKESTONES.'

Visitors to Whitby will be familiar with the story of St. Hilda and the way in which she caused all the snakes in our island to 'curl up and die,' literally to lose their heads, roll

into the sea, and become stone. That is why snakestones are hardly ever found with their heads on! And the story is perpetuated in the arms of the borough, which consists of three snakestones. Hearing that a Whitby dealer had been fortunate enough to find one with a 'head,' complete, we wrote for it, and duly received it with an intimation that such perfect specimens were exceedingly scarce, and rarely met with. The

A "Snakestone."

'head' is fairly well made, with eyes and mouth complete, though it still retains the marks of the file. An application for other two specimens (accompanied by a postal order!) was successful, and doubtless our friend will be fortunate enough to 'find' others, if he gets orders for them!

YORKSHIRE ORNITHOLOGY.

It is pleasing to find that through the efforts of the officials of the Vertebrate Section of the Yorkshire Naturalists' Union, a keen interest in ornithology is being created in the county. The meeting at Leeds a few days ago, reported in another column, was most encouraging, and would have been creditable to any of the London societies. The attendance was almost too good, having regard to the size of the room! The meeting lasted from 3 o'clock in the afternoon until a late hour in the evening, with only a short break for tea; and the interest was sustained throughout. The work of this section might well be copied by other sections of the Union.

A FAMOUS WHALE.

The accompanying illustration is from an old and scarce aquatint of a sperm whale, which will be of interest to our readers. This engraving measures 25 inches by 15 inches, and was drawn by R. Iveson in 1825, and was engraved by R. Fenner, London. Beneath is the following description :— A Sperm Whale, cast on shore at Tunstall, in Holderness, on the 28th April, 1825. Whole length, 58 ft. 6 ins. ; girth, half-way between eye and nose, 31 ft. ; girth of the neck, 33 ft. ;

A Sperm Whale.

girth behind shoulder fin, 34 ft. ; girth before the tail, 7 ft. 2 ins .; length of lower jaw in view, 10 ft. 6 ins. ; blow-hole opening at (*a*) ; width of opening, 2 ft. ; depth, 1 ft. 2 ins. ; length as far as traced, 20 ft. 3 ins. ; number of teeth, 51.' This particular whale was the cause of a law-suit at the time, and finally was taken over by a member of the Constable family, of Burton Constable, who was lord of the manor. The skeleton of the whale, though in a somewhat dilapidated condition, is still at Burton Constable.

NEW LINCOLNSHIRE BELEMNITES.

In ' The Proceedings of the Geologists' Association ' recently published, Mr. G. C. Crick describes a new genus and species of Belemnite from the Lower Chalk of Lincolnshire. There are two specimens recorded, found by the Rev. C. R. Bower, and both were obtained from the Totternhoe Stone, at Welton Vale, near Louth. Judging from the illustrations, the specimens are very unusual in appearance, and totally different from anything of the kind previously recorded from the chalk. They almost resemble large Saurian teeth, are deeply grooved, and somewhat triangular in section. Mr. Crick gives the name *Belemnocamax boweri* to the specimens.

SOME AVICULTURAL NOTES.*

W. H. ST. QUINTIN, J.P., F.Z.S., ETC.,
Scampston, E. Yorks.

I FEEL that I have no business to select such a subject as I have chosen for my address, unless I can show that I have also some contribution to offer, however humble, to the science which is the bond which unites us together. Now, what can an aviculturist do in this direction? How far is the keeping of birds in captivity of any scientific value? I put aside altogether the keeping of birds for exhibition purposes. It cannot be claimed that science learns much from bird shows as such, although of course, the demand for rare and beautiful 'exhibits' does stimulate the importation of uncommon species, and brings into the country birds which would otherwise not come into the possession of those who wish to keep them for purposes of study.

I think an aviculturist's hobby is only likely to produce scientific results if his birds are kept, first of all in good health and condition; and secondly, as far as possible under fairly natural conditions, and especially if they can be induced to breed.

If an aviculturist is fortunate and successful, he can, to a considerable extent, supplement the work of the scientist in the laboratory and museum, by filling up gaps in the history of a bird, and by elucidating points which it may not be possible to observe in the case of a bird when at liberty. As examples, I will presently refer to certain habits of the Sandgrouse and Brush Turkey.

In referring to my birds, I mean to treat of some facts, which besides being curious and interesting, have not been recorded in the standard ornithological works which we generally consult; though sometimes they have been noticed in some of the journals. At the same time I will, as far as I can, only deal with such actions and habits as might be expected of birds in a state of freedom, if one had opportunities of seeing them; and to steer clear altogether from noting the eccentric behaviour of individuals, which, though often amusing enough, are of no scientific value.

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* Being the Presidential Address to the Yorkshire Naturalists' Union, delivered at Scarborough on Dec. 11th, 1909.

1910 Mar. 1.

I will deal with the Bustards first, for it is a family in which I have long taken great interest. I have kept Great Bustards for some twenty-three years, and during that time I have never been without specimens.

My first GREAT BUSTARD came to me from a respectable London dealer, who was as ignorant as I was then of the extreme care required in packing these birds. There were no signs that the hamper had met with ill usage on the way, but the poor thing reached me with one wing, and both thighs broken, and I learnt then how fragile are the bones of these heavy and excitable birds. This was a very bad start, but the late Lord Lilford most kindly set me up with several others; and what was of still more value, he taught me how to keep them. They must have shelter from wind and wet, and above all things, they must be kept out of danger of sudden frights. The Great Bustard, however thoroughly tamed, if suddenly scared, is as likely to injure himself as one of the larger antelopes or deer, in captivity, and one can not say more than that! I can myself speak to several disastrous instances of damage and even death resulting from sudden frights. A friend of mine lost a female bird which was peacefully feeding on the lawn, but which dashed itself against the house when startled by the sudden apparition of a gipsy coming round the corner. A male, which I had kept for thirteen years at Scampston, was frightened by a gardener, whom he did not know, coming up with a broom on his shoulder, and in his alarm fractured a wing bone close up to the body, opening an artery at the same time, and bleeding to death in a few minutes. A specimen of the great Australian Bustard, which had just been let into his paddock for the summer, after being confined in an aviary all the winter, leaped into the air in play, as these birds do, and coming down heavily, broke both his thigh bones, and had to be destroyed. This was in the London Zoological Gardens.

In 1897 with a friend, I imported several Great Bustards from the South of Spain, one of which, a female, still survives. Another of this batch distinguished herself by hatching the first young Bustard ever hatched by a tame bird in this country, so far as records go.

And here I may say that the male Great Bustards are not fully adult, with, in the breeding season, their chesnut pectoral bands; and their pouches are not fully inflatable, till they are

about five years old. The females probably breed when a season younger. The female mentioned above as having hatched a young bird in 1901, was just four years old; while a young male of the same age was not that year in fully complete nuptial dress at the time she was incubating.

There have been sometimes wild suggestions that the Great Bustard if domesticated would be of great economical value. The argument being—the Turkey is an undoubtedly useful bird, and why not also the Great Bustard, which is very nearly as big? I need hardly say that these enthusiasts ignore some essential facts connected with the Bustard's nature:—First, it is in no way related to the Order which contains the fowls and gamebirds; secondly, it is not adult till it is four or five years old; thirdly, it lays only two, or at most three eggs; fourthly, though several persons in this country have for years been trying to breed them in captivity, no one has yet been successful!

The hatching of a young Great Bustard in captivity, being such an exceptional event, perhaps I may refer to it. At that time I had a fine old male in full display. In addition to the four-year-old male above mentioned, there were two young hens of the same age running with him; and besides the one which hatched, the other also laid eggs, but they were unfertile. The male never seemed to notice but the one female, and so far as it goes, this case points to the birds having paired: though some persons who have watched Great Bustards in the wild state consider them polygamous.

In the enclosure there was a group of coarse grass tussocks, and the hen bird made a deep scratch, with no lining amongst them; and when she was sitting she was well concealed. I was amused to see that both the males were quite aware that the hen was hidden in the grass, and used to strut round the place, peering forward with outstretched necks. When they came too near, the hen still hidden, would sometimes utter several gruff barks, as if warning them to clear out. The Great Bustard, by the way, has no note except this bark, which is not loud, and a curious whining whistle, which carries a long way, and is particularly difficult to locate. This is, I believe, the cry of the young, but it is occasionally used by the adults, when separated from their companions, and in distress.

Though peaceable enough at most times, the old male would not allow the young male to 'display' in his sight, when the

female was sitting. He spent most of his time in a distant corner of the paddock, occasionally dropping his wings, and inflating his pouch, till he began to moult. In the wild state, the hen birds in the early summer leave the males, and go off to the standing crops to lay, and the sexes live apart till the autumn. When two male Bustards fight, they spar awhile, and then grasp each other's beaks, and push and pull until one gives way, and runs. I have never known Bustards do each other any serious harm.

Although we had no data to go upon, I expected that a month might be the period of incubation, as with the Cranes; and on the twenty-eighth day the female rushed out at my man from the long grass, but from a place a little away from the nest; and on searching where she came from, he found a young bird, standing but with closed eyes and very weak. It was unluckily most extremely cold and wet, and the conditions could not have been more unfavourable. The little bird never was seen to feed, and was found dead the same evening. I lost the mother bird that autumn through a chill, and have never been so near success since that date. Still I have a hen that lays regularly, and sometimes incubates; and I have by no means given up all hope of bringing off what would be rather an avicultural triumph.

I have seen nothing which supports the statement copied by one author from another, that the bird sheds its primaries altogether, like the Waterfowl, and some other birds; and that it is flightless until these feathers grow again.

The story ran that at that time the adults used to be taken by greyhounds. I believe this is an entire fable. At any rate, with my birds the moult of the quills is a prolonged business, and goes on simultaneously with the change of the other plumage during the late summer and autumn months.

Neither can the bird run exceptionally fast. Its usual pace is a stately walk, often a strut. No doubt a winged Great Bustard would flap along, like a wounded wild goose, for a few hundred yards; but any dog or an active man would, I should expect, run it down if he could keep it in sight.

I am sorry that my name should be in any way associated with the extermination of our old Yorkshire race of Great Bustards, but I fear I can't gainsay the story told in Mr. Nelson's 'Birds of Yorkshire,' published by the Yorkshire Naturalists' Union, that a gamekeeper in the employ of my family in 1806

actually managed to destroy eleven Great Bustards at one shot in the East Riding.

When we recollect that at most twenty years converted a splendid species, fairly plentiful in England where conditions suited it, into a mere memory, it is to be hoped that we shall never again make such a deplorable mistake; and that all true naturalists will discourage those two mischievous arguments—'Why! what does it matter? There are plenty more!" or "If I don't take it someone else will; I'll have it!'

I will next refer to the LITTLE BUSTARD, of which I have two males and three females, which came to me in the plumage of the first year, when the sexes much resemble each other.

After the first moult in the second autumn, the vermiculations on the feathers of the male's upper parts, especially of the shoulders, are finer than in the case of the female; and henceforth the sexes are easily distinguished at all seasons. The striking breeding dress is assumed by the males at the end of their second year, but my hen birds did not lay till they were a year older.

In the past summer, for the first time, one made a nest, merely a 'scratch' in a bunch of coarse grass, laid three eggs, and sat steadily. But in the end, though the eggs contained chicks, none were hatched. No doubt some specially severe storm of that miserable season drove her off the nest, and the eggs got chilled. The other females dropped eggs in the enclosure, which were put under hens. Young were hatched, but we could do nothing with them. They would not pick up food of any kind, nor take it when offered them. One was kept alive a week, by being crammed, and then died. In a favourable summer I think these birds might be bred, but the young, if hatched, must be left to the parents, who, no doubt, like the Rails and Cranes, pick up food, and hold it for the young to take. These birds undoubtedly pair, whatever the Great Bustards do.

CRANES are very interesting birds to keep. Most of them soon become very tame, and show much intelligence; and except the African species, they bear our climate, if they have some shelter in the worst of weather, very well.

Though I have representatives of seven species, I have only successfully reared the Demoiselle. This is curious, for several other species have bred in this country (five species at Woburn this year), while the only other Demoiselles reared, except at Scampston, were at Lord Jersey's place, Osterley, in 1797.

My Demoiselles were early breeders. About the middle of April they always made their nest on a flat piece of ground within a few yards of a stream. The nest merely consisted of a small handful of birch twigs, and the eggs rested on the ground. This used to be the case with some Common Cranes that I had; in their case the first egg used to be laid, and then a few bits of stick and sedge arranged round it. But some of the Cranes make large structures.

Once there was a thunderstorm, and the water in the beck rose and threatened to swamp the nest. The next morning we found the egg, a single one that year, quite nine feet further inland, and some fifteen inches higher up the slope.

When there were two eggs, the female began to sit when the first egg was laid, and, of course, there was an interval between the appearances of the chicks.

The nestling, after a few hours can stand, and during the first day totters about within a yard or two of the nest, the parent which is not incubating the other egg, tending it closely, brooding it when necessary; and when it is hungry, going off to forage for insects.

At first the fly or beetle is brought right up to the chick, but the latter soon gets stronger on its legs, and goes forward to meet its parent.

When the second chick is strong enough, the parents lead both away, and they never return to the nest, but the old birds are very careful and clever in choosing a dry and sheltered place to brood the young at night, or if rain comes on. If anyone approaches, the parents get very excited, and try to draw one off, crouching with spread wings, and feigning lameness.

When the young birds are quite strong, it is a very pretty sight to see the birds four abreast, the parents outside with the young between them, parading up and down through the long grass, each old bird reaching out to catch an insect, and offering it to its particular young one.

Once, in spite of their extreme devotion, it was curious to see how both old birds passed over one young one which did not thrive, and favoured the better bird, with the result that the fittest survived.

It is, so far as I know, very unusual that there should be any irregularity in the shedding of their flight feathers by birds. The rule is that they are cast once a year, and at the same season.

Probably if the matter were looked into, it would be found that in all cases there is a regular order in which the principal feathers are cast. In falconry the moult is a very important matter, and is closely studied. The Falconer knows that the first feathers to be thrown by his Peregrine will be the first secondaries, and the last important feathers the outside tail-feather but one, on each side. What the rule may be in the case of the Cranes I am not yet prepared to say, but I am satisfied that the larger species, such as the Sarus, Whitenaped and Wattled Crane, and perhaps others, do not cast their primaries every season. This has been also noticed in the very fine collection of Cranes at Lilford.

The Cranes, like the Waterfowl and Rails, are flightless during the moult.

Most of the Waders accommodate themselves readily to confinement, and the smaller species show themselves much better if they can be left full-winged. Like the Gulls, in an aviary, they are very clever in avoiding the perches and sides of their prison, and take a great deal of exercise without damaging themselves at all.

Amongst the small Waders, there are none more deservedly popular than the RUFF, and it thrives in confinement, if given plenty of clean water and good turf.

The REEVE has reared her young with me, or rather the young have reared themselves; for though for a few days the Reeve caught insects for them, they soon foraged for themselves, scrambling over and amongst the long grass, and finding plenty of natural food. One had to be very quiet, if one wished to see the young, for, till she got used to one's presence, the Reeve kept piping her alarm note, and the chicks remained invisible till she stopped.

REDNECKED PHALEROPE. A kind friend who was fishing in Iceland last summer found himself near a breeding colony of these birds, and brought back three adults for me, two males and a female. The birds are extremely tame at their breeding place, and he had no great difficulty in catching them. But it was only by the exercise of very great care and skill that he brought them down country on ponyback, and through the risks of a tedious voyage. However, they reached me in splendid order, the female, as usual, much the larger, and with a more conspicuous chesnut patch on the neck.

They soon made themselves quite at home on a small pond

with a stream flowing through it; and though they readily ate ants' eggs and finely chopped meat, they caught a great amount of natural food off the water and from the grass overhanging the margin. This largely consisted of gnats and other winged insects. Sometimes one would be seen to swim to the shallow end of the pond and to spin round for several minutes together, joined perhaps by one or both of the others, paddling furiously with his lobed feet and pecking at the particles, some evidently edible, which rose from the bottom in the currents thus produced. It was evidently a deliberate action, and is probably regularly practised in the wild state, but I have never seen it recorded.

Flamingoes can be seen to shuffle their feet rapidly, stepping backwards all the time, and searching with their reversed bills for food uncovered, probably molluscs and the fine roots of water plants. Plover, Gulls and Thrushes adopt other means of setting worms in motion, so as to expose their whereabouts.*

Brush Turkeys. I don't think any of my birds created more surprise and interest than some Brush Turkeys, which I once kept. They were of the common species, *Catheturus lathami*. I found them fairly tolerant of our climate, but I used to keep them in a dry shed till mid-April. As soon as they were let out, the male would begin to make his mound, raking together all the loose soil, leaves and grass, for a radius of some twenty yards from the selected spot, which was always out of the sun, under the protection of an overhanging tree. The bird turns his back to the place where the heap is to be, and grasps with his particularly large foot as much of the material as he can manage, and flings it backwards. Once I happened to be about when the cock bird was laying his 'foundation stone,' so to speak. He had excavated a short trench about two and a half feet by one foot. Presently the mound was raised above this trench. I never satisfied myself as to the object of this trench, nor do I know if there is always one underneath a mound. Certainly it was not for the reception of the eggs, for they were never laid less than two feet above the ground level, though as the mound consolidated, they sank with it.

(*To be continued*).

* If anybody doubts that Earthworms can be heard, let him put a few healthy worms in a flower-pot of loose earth, and hold it to his ear, when they can be distinctly heard moving about.

THE YORKSHIRE SPECIES OF *LEUCTRA*.

GEO. T. PORRITT, F.L.S., F.E.S..
Dalton, Huddersfield.

Leuctra is a small and somewhat obscure genus belonging to the family Perlidæ, in the order Neuroptera. For many years only two species were recognised as British, named respectively *geniculata* and *fusciventris*. Of these *geniculata* was distinct enough, being considerably larger than any of the so-called *fusciventris*, and having roughened antennæ. But *fusciventris* remained in a very unsatisfactory state, and probably most of us who took much interest in its group, were satisfied that there were more than one species contained in it. It was therefore no surprise when Klapalek separated a species from it which he called *nigra*; but we were scarcely prepared to find Kempny several years ago creating no fewer than four additional species out of it. These he named *Klapaleki*, *albida*, *hippopus*, and *handlirschi* with its varety *inermis*. Of the six species now contained in our list I have taken all except *albida* in Yorkshire. *Geniculata* is plentiful on the Wharfe at Grassington, on Scalby Beck near Scarborough, and probably on most of our larger rivers; whilst *Klapaleki*, *hippopus* and the variety *inermis* of *handlirschi* seem to be abundant on all the clough streams in South West Yorkshire, and probably equally so in the other parts of the county. The claim of *nigra* rests on a specimen I took at 'Bills o' Jack's,' near Huddersfield, in 1888, which Mr. K. J. Morton determined as a male, certainly referable to this species. It is to be hoped that someone will now soon add the remaining species, *albida*, (which is on the wing in early June) to our county list.

In the January *Geological Magazine*, Mr. J. W. Jackson records a specimen of *Archæosigillaria vanuxemi* (Göppert) from the Carboniferous Limestone of Meathop Fell, Westmorland. This is the third record of the species in Britain.

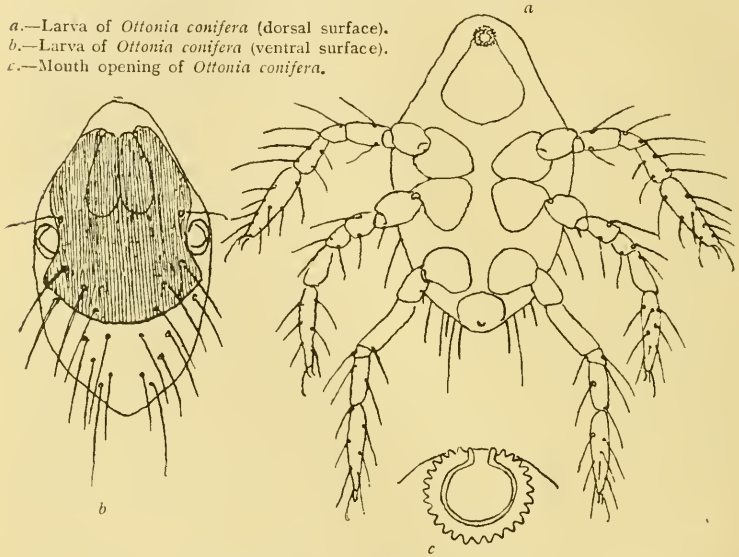
Occasionally our good friend *Punch* has provided useful information to the readers of *The Naturalist*. We are glad to find, from the following note in *Punch* for February 9th, that we have been able to reciprocate. 'The Contortionist.—'The Naturalist' of this month calls attention to a gentleman who was "one of the founders of the Hull Geological Society, and has passed through its presidential chair." Moreover, he has "acted in the capacity of honorary secretary to the society almost without a break." We can picture to ourselves a jolly evening with the H. G. S.' Those who know our friend Mr. Stather, will be glad to recognise him in his new role.

NOTE ON THE LARVA OF *OTTONIA CONIFERA.*

C. F. GEORGE, M.R.C.S.,
Kirton-in-Lindsey.

Mr. Evans, of Edinburgh, has succeeded in rearing the larvæ of *Ottonia conifera* from eggs laid by that mite. They are very small and delicate, as well as active, and therefore rather difficult to deal with. Mr. Soar has, however, succeeded in making a fair drawing of the little creature. It will be seen to differ very considerably from the other larvæ figured in 'The Naturalist' for 1908, page 452. The most striking part is the

a.—Larva of *Ottonia conifera* (dorsal surface).
b.—Larva of *Ottonia conifera* (ventral surface).
c.—Mouth opening of *Ottonia conifera.*



Length 0·32 mm. Multiplied 170 times.

formation of the mouth opening, which is circular in form, and surrounded by a chitinous rim not unlike the toothed rim of a watch cog wheel (see enlarged figure of this part). I find a similar feature figured in a posthumous paper by the late Professor A. C. Ondemans, of Arnhem (kindly sent to me by Professor Van den Schruver) on 'Thrombidium larven.', plate V., fig. 14, which he calls *Allothrombidium tectocervix.*

The next difference is that the shield of the cephalothorax is striated longitudinally. Ondemans also finds this striation in the larva of another creature as well as *tectocervix,* which he calls '*Allothrombidium striaticeps*' (plate V., fig. 17), but in both these creatures he figures the plate as divided into two portions, whilst in *conifera* it appears to be single, as shewn in the figure.

THE PEAT MOORS OF LONSDALE.

AN INTRODUCTION.

W. MUNN RANKIN, M.Sc.(Leeds), B.Sc.(Lond.).

Lonsdale is a well defined drainage area lying between three ancient uplifts and Morecambe Bay. To the north is the Cumbrian axis, to the east the main Pennine ridge, and to the south the Bowland anticlinal. Passing round the basin the heights of the mountains slowly decline from some 3000 feet in the north, to 2400 feet in the east, and 1400 and less in the south. The first ridge is built up of the various rocks of the silurian and ordovician systems, the second chiefly of mountain limestone, and the third of the Upper Carboniferous grits and shales. The low-lying country is no less diversified in its rock structure and, in addition, shows the variety incident upon a pretty extensive glaciation. The geographical feature which has the most bearing upon the distribution of peat moors in the lowlands is the long, flat valleys which run inland for many miles at various quarters of the Bay. These great valleys reach down from the Lake District: in their upper extensions dominated by slate hills or fells; in their lower, frequently closed in by great scars of Mountain Limestone. The bottoms of these valleys are made of estuarine silt—a sandy clay—undoubtedly brought up in times past by the rush in of the tides, which undercut the bases of cliffs into small caves and alcoves, now in many places miles from the sea. From the shape of the valleys the incoming tide must have been characterised by a bore, such as even to-day continues in the estuary of the Kent. Above the alluvial deposits rest peat moors, remnants of a formerly much wider extension (Fig. 1).

According to the locality of their development, peat moors may be separated into two groups: the lowland moors about the river valleys and low watersheds, and the upland on the ridges and slopes of the hills or fells. It would be confusing to apply the terms 'Low-moor' and 'High-moor' to such deposits, for these may also be taken as renderings of the continental designations, 'Nieder-moor' and 'Hoch-moor,' which correspond to characteristics having nothing to do with altitude. Indeed, as will be seen later, the greater part of our lowland moors are 'Hoch-moors' in the commoner sense of the term, while 'Nieder-moors,' though not extensive, are frequently developed at high altitudes.

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The accumulation of peat has proceeded for many centuries, and even continues to-day where the life conditions are at all favourable, despite the interference of man, directly or indirectly exerted. The low-lying peat moors have by the chance neighbourhood of the peasantry, suffered most; having in the past supplied them with the major part of their fuel, and even to-day contributing much. Plains now extensively cultivated with grain and root crops were within historic times wholly quaking mosses. The large and great moors still remaining, especially about the township limits, are plainly the residues

Fig. 1.
Sea Caves in Limestone at Gilpin Bank.
5½ miles inland.

of wide wastes. The hill moors have suffered much less from the activities of man, and even then, only on the edges against the "intakes" or upland pastures. The decay of these moors, which can be seen here and there, as on broad summit ridges or passes between the valleys, where stacks of peat in all stages of disintegration, from the scarcely grooved masses, through the detached "outliers" capped by a still growing vegetation, to the crumbling heap of peat fibre and dust, the plaything of every storm, and the final patch of dark mud, this takes greater toll of the moors than man's needs. But, regarding the great mass of peat-moors on the fells of the district, the loss from either cause is proportionately not considerable. Sheets of peat, many feet in thickness, mantle square miles of moorland

with but little decay; bare, unprotected peat in such areas being the exception. Not only does the peat here maintain its own, but also continues to increase in thickness, by the growth of *Eriophorum vaginatum*, in the common type of moor, and of *Molinia* and rushes in the rarer.

In the low-lying districts, peat continues to accumulate about the margins of tarns and lakes, as well as on the broad peat moors when the drainage is only slow. On the hills, as well as on the plains, the climatic conditions of rainfall and temperature, conjoined with the factors of the soil, favour the continuance of the growth of the moor associations, and as a consequence, the accumulation of peat. However true it may be of other parts of England, it is not the case with Lonsdale, that the climatic conditions of the present time are unfavourable to the growth of peat.

LOWLAND PEAT MOORS.

The moors of the low-lying district may be divided according to the occasion of their development into two groups: that including the deposits in and about tarns and other quiet sheets of water, generally held up by glacial mounds—these are small and scattered—and a second comprising the mosses developed on the silt deposited in the long fiord extensions out of the Bay—these are extensive. Before the clearance of the country, there must have been many shallow-water tarns lying in the inequalities of the ground moraine. Only a few remain, as preserves for water fowl, and of the peat which filled up many, but little persists. The latter group of still extensive moors, were undoubtedly of wide extent and frequency in earlier times, so much so that "Lake Lancashire," the name given to much of the low-lying Triassic plain extending from Furness into Cheshire, was aptly applied to a country of meres and swamps, of which the peat moors of to-day are the representatives and descendants.

Lake Peat Moors.

Examples of this first group are to be met in different parts of our area, some plainly in the making as about the margins of sheets of water, others in the late stages of development as yet undisturbed by man, and a few, no longer growing, but being dug for fuel.

Swamps by the sides of streams, in the deserted stream courses or filling-up shallow hollows more or less saturated with

ground water, form by their growth some small quantity of peat, though scarcely ever attaining any extent or depth. As a matter of fact, the wet grassland associations accompanying rivers, are but feebly developed in this district, and there are lacking entirely the valley moors, which in this country, are typically developed in the New Forest.

Where the margins of the tarns are shallow and gently shelving downwards, and especially about the inflow of streams, the growth of marshes or swamps is often noteworthy. Examples of such lake swamps, may be seen in the few tarns about Silverdale and Kendal on the limestone (Haweswater and Cunswick Tarn) and on the slate rocks about Kirkby Lonsdale (Terrybank Tarn). Beyond the limits of the district

Fig. 2.

Open-Water and Reed-belt associations of Lacustrine Swamp Moor.

lake swamps are well developed about Malham Tarn in Airedale and Newton Regny, near Penrith, in Edendale (Fig. 2).

In such places may be seen various zones of vegetation; the societies of the open water, water lilies above and stone-wort below, of the reed-belt, outermost of the reed-grass and bulrush, innermost, at times, of *Cladium*, more generally of the greater sedges, and behind on firmer soil, a richly floral association of dicotyledons, backed in turn by a zone of luxuriant *Molinia*. In addition to this zonation, narrow or broad according to conditions, there is within each belt a more or less evident layering of complementary associations.*

(*To be continued*).

* T. W. Woodhead, 'Ecology of Woodland Plants in the neighbourhood of Huddersfield.' Journ. Linn. Socy., Vol. XXXVII., p. 344, 1906.

WIND-FORMED SNOWBALLS AT HARROGATE.

A. LESLIE ARMSTRONG, P.A.S.I.

THE heavy fall of snow on Friday, January 28th, left a depth of ten or twelve inches overspreading the two large fields in East Parade, Harrogate, opposite 'Grosvenor Terrace.' During Friday night a strong north-east wind got up, and upon Saturday morning the fields referred to presented a most unusual spectacle, for the south-west portion of each was overspread by innumerable snow balls, ranging in size from tiny balls the diameter of a walnut, up to huge ones of quite twenty-four inches; by far the greater number were over twelve inches in diameter. Apparently they had been rolled up by the wind in much the same manner that the 'small boy" delights to roll up snowballs, but these were much more spherical in form than his usual productions. Possibly the nucleus of each had been derived from particles blown off the trees which stud the fields, or off the fences which bound them. Many of these balls were still in process of formation, but later in the day the cessation of the wind and a lowering of temperature caused them to settle in the snow a good deal, although they remained until the break up of the frost, prominent objects for observant eyes.

Strange to say, I could find practically no trace of similar action elsewhere in the vicinity, with the sole exception of three instances, but in no case did the balls number more than half a dozen, whereas there were hundreds in the fields referred to. An old dalesman tells me he once saw the same sort of thing many years ago, but it was said 'the Fairies had done it.' I can quite understand that idea because the wind had almost obliterated all the tracks of the balls, and to superstitious minds they presented a very weird appearance.

We notice in a Birmingham bookseller's catalogue that there is for sale 'A remarkably fine bronze of Buffalo, with fine pair of horns, *in full flight*.' On the same page are offered 'Ten pieces of Mycenæan pottery, dating from the age of the earliest European civilization,' which 'are probably *fully three hundred* years old.'

In our February issue we referred to the note on Nordmann's Pratincole in the January *British Birds*, and stated that 'Mr. Fortune's photograph is also reproduced, without any reference to the photographer.' Whilst the second part of the sentence still holds, we are pleased to learn that it was not Mr. Fortune's photograph that was reproduced, though oddly enough it was supplied by the same person that had received two prints of the bird from Mr. Fortune; and the photograph was taken from a precisely similar point of view. We regret the error.

NOTES ON THE EFFECTS OF HEATH FIRES ON VEGETATION.

H. F. PARSONS, M.D., F.G.S.,
Croydon.

Apropos of Mr. Elgee's paper on the vegetation of 'Swiddens,' *i.e.*, burnt moors, in North-East Yorkshire, the following notes on the effect of heath fires on vegetation in another part of the country may have some interest.

In the neighbourhood of Croydon, in Surrey and Kent, are several hilly commons on the Tertiary pebble beds, mostly at altitudes between 300 feet and 500 feet + O.D. The ground is mostly dry, except in the low parts, owing to the absence of any impervious beds to throw out springs. The top soil is thin and peaty, more or less mixed with sand. The dominant plants are gorse (*Ulex europæus* and *nanus*) ling (*Calluna*), purple heath, bracken and grasses, especially *Aira flexuosa*, *Molinia*, *Agrostis canina* and *Festuca ovina*. There are also scattered trees and bushes, especially birch and hawthorn with brambles.

The commons are not intentionally fired, unless in mischief; but in dry summers they are often set on fire by picnickers, by lighted matches thrown down by careless smokers, and even, it is said, by the sun's rays through the bottoms of broken glass bottles which act as burning glasses. Areas several acres in extent are thus frequently converted into a blackened waste.

The fire feeds chiefly on the dry vegetation and débris above ground, and owing to the thinness of the soil, does not char the ground to any great depth. A footpath across the common is usually sufficient to limit its progress, though sometimes when the vegetation is long and dry, the flames, especially if aided by a wind, will scorch the foliage of trees across a road of 30 feet or more in width. Trees are not usually killed, though their foliage suffers. Of bushes such as gorse, the twigs are consumed, but the larger branches remain blackened and charred, and the roots are not killed. Tufts of *Molinia* may also escape with a top charring.

This superficial action of the fire is different from what I have observed in fires on deep peat moors, *e.g.*, Goole Moor, where the fire may consume the dry superficial layers of the peat before the vegetation on the surface. I have seen behind the advancing edge of the fire, indicated by the smoke rising from the

ground, a belt in which the green heather lay loose, as if mown off by a scythe, upon the smouldering surface for some little time before being sufficiently dried to catch fire and burn.

The plants which appear during the following season on the burnt ground are of two classes :—1st, deep rooting and thick-rooted plants, whose rootstocks and rhizomes have escaped being killed by the fire, such as the gorse, heather and bracken, and other herbaceous plants with deep-spreading rhizomes, as *Epilobium angustifolium*; 2nd, wind-borne plants which can grow on a soil destitute of organic matter. Of these, the first to take possession of the ground are the mosses, *Ceratodon purpureus* and *Funaria hygrometrica*, the latter of which has an especial affection for materials that have been burnt, as bricks, lime, rubbish, cinders and charcoal heaps. These mosses form a wide-spreading brightly coloured carpet over the blackened soil, and by their decay furnish the humus necessary for the growth of the higher plants. In our comparatively dry climate lichens are of slow growth, and large forms like *Cladonia* have not time to establish themselves in such places before the ground is again occupied by phanerogamic vegetation, but *Lecidea decolorans* spreads like the mosses over the bare barren surface. Of flowering plants, the first to take possession of the ground are the hair grass (*Aira flexuosa*), *Senecio sylvaticus*, and the sheep's sorrel (*Rumex acetosella*). All of these appear able to grow in soil containing a minimum of nutritive matter; the *Senecio* seeds are transported by a feathery pappus, and the sorrel has a creeping rhizome which may have escaped the fire. Seedling plants of heather, gorse and birch, and of grasses and other herbaceous plants later spring up, and eventually the ground is covered with a vegetation resembling that which existed before the fire. But it is probable that some species which grew on the area before the fire may not re-appear; and the frequency of these fires owing to the increased resort of holiday-makers to the commons, may be one of the reasons why many plants mentioned in old records are no longer found growing there.

Still they come, and go! For some months Mr. E. K. Robinson in the pages of *Country Side*, and its hopeful offspring, has been correcting Darwin! Amongst the subjects discussed was 'the survival of the fittest.' Both *Country Side* and *Science Gossip* have now ceased to be. R.I.P.

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BOTANICAL NOTES ON A BRADFORD WASTE HEAP.

JOHN CRYER.

THROUGH the kindness of Mr. A. B. Jackson, of Kew Gardens, and Mr. W. B. Turrill, I am able to add the following to the list of aliens which appeared in 'The Naturalist' for April 1909.

Sisymbrium orientale L. (abundant).

Trigonella corniculata L.

Medicago truncatulata, Gaertn.

Medicago lappacea (Desr.).

Senecio lautus Forster.

This plant was first recorded for Great Britain by Miss Hayward, in the 'Report of the Botanical Exchange Club' for 1908. She found it on the banks of the Tweed, near Galashiels.

The writer found a specimen at Bradford in the same year.

Cousinia tenella Fisch et Mey.

Mr. A. B. Jackson writes:—'The *Cousinia* does not appear to have been recorded for these Islands before as an alien.'

Datura stramonium L.

Cannabis sativa L.

Panicum miliacium L.

Panicum cf. *jumentorum*.

This plant is not recorded in Dunn's 'Alien Flora of Britain,' nor in Druce's 'List of British Plants.'

Eleusine indica Gaertn.

Lolium multiflorum Lam. forma *cristata* Timm., in 'Deutsch, IV.', p. clxix. (1887).

So named by E. Hackel.* This I believe is new to Great Britain. It was growing in abundance. I also found it on a waste heap at Rodley, near Leeds.

In *Aquila*, Tome XVI. (Budapest) recently received, Dr. Otto Herman, the Editor, gives in English an appreciative memoir on the late Prof. Newton, together with copies of several letters which passed between them, principally in reference to bird protection. This particular publication has a number of excellent coloured plates of birds, etc., and lengthy reports in reference to bird migration.

* See Report of the Botanical Exchange Club for 1908, page 405.

RARE FISHES ON THE YORKSHIRE COAST.

W. J. CLARKE, F.Z.S.,
Scarborough.

On October 6th, 1907, while examining rock pools on Filey Brig, I came across one occupied by a shoal of Sprats, amongst which were one or two other little fishes which I did not at first recognise. Borrowing a landing net, one of them was soon captured, and proved to be an Atherine, or Sand Smelt (*Atherina presbyter*) a delicate little semi-transparent silvery fish, about five inches in length, easily recognisable from the common Smelt by the broad band of dead silvery white, which runs down each side, from head to tail.

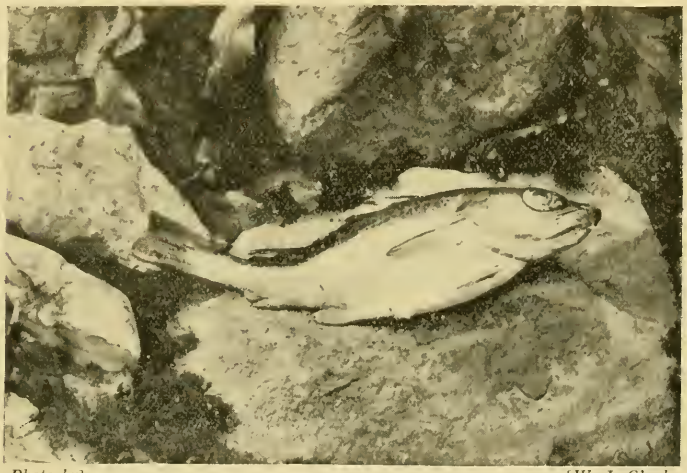

Photo by] [*W. J. Clarke.*

Power Cod. (⅓ size).

Fishing for Whitings from the East Pier at Scarborough after dark on the evening of October 1st, 1908, I caught a little fish which, in the bad light, I took to be a Whiting Pout. Dropping my capture into the basket amongst the others, I was delighted to find on further examination at home, that I had got a full-grown specimen of the Power Cod (*Gadus minutus*) the smallest member of the Cod family. The fish took a piece of fresh Herring as bait.

On January 4th, 1910, my friend, Mr. F. Grant, was fishing with rod and line for Codling on the North Sands, in front of the Clarence Gardens, and hooked a nice fish. Upon gutting the Cod, Mr. Grant found within it a small fish, perfectly fresh, and apparently just swallowed, which he sent to me. It proved to

be an Atherine, and was quite perfect in every respect, being about five inches in length.

I write subject to correction, but I believe that these are the only records for Yorkshire of these two species of fish, as I can find no previous ones published, nor does anyone whom I have asked know of others which have occurred. All three specimens are now in my possession.

HELLEBORINE ATRO-RUBENS DRUCE, var. *CROWTHERI*, nov. var.

G. CLARIDGE DRUCE, M.A., F.L.S.,
Yardsley Lodge, Oxford.

In 1909 Mr. J. Crowther of Grassington, accompanied Mr. Arnold Lees and myself (at different times) to Grass wood, to inspect the varied growth of Helleborines which occur there under the shade of trees, in rich soil about the old lead mine trench. We were too early to see them in flower, however. Later on, Mr. Crowther sent me a very interesting series, as well as some excellent photographs of the plants *in situ*. There were many forms of *H. media* (Fries) Druce, including the broad-leaved form, which is often miscalled *latifolia*, and to which I have recently* given the name *platyphylla*. There were also some curious forms of *H. atro-rubens* Druce. One of these was especially interesting as it was somewhat intermediate between *H. media* and *H. atro-rubens* and, indeed, may eventually prove to be that hybrid, *i.e.*, = × H. Crowtheri. For the present, however, I venture to describe it as *H. atro-rubens* Druce, var. *Crowtheri* nova var. Plant, robust 2-3 feet, stem stout, solitary leaves (with internodes about 1½ inches), very broad, oval, abruptly narrowed into a short cusp, with about fifteen strong primary veins, and about thirty-six intermediate fainter ones. rather suddenly diminishing half way up the stem into ovate and more gradually pointed leaves and leafy bracts. Flowers dark rich red purple. Labellum roundly cordate, with slightly crenated margin, and two strongly plicate-rugose bosses, with rarely an intermediate one.

In habit and size it resembles *H. media*, and the shape of the labellum approaches that species, while the leaves are like those of var. *platyphylla*. The colour of the flowers is that of *atro-rubens*. I may say that Mr. Cryer has sent me perfectly typical *H. media* from the same wood.

* Hayward's Botanist's Pocket Book, 13th edit., 1909.

NOTE ON *HELLEBORINE ATRO-RUBENS* var. *CROWTHERI.*

F. ARNOLD LEES, M.R.C.S.,
Leeds.

Mr. Druce asks me to say something of my local knowledge as I have quarried in the Grassington woods through several years. Three, if not four of the segregate *formes*, or (as gardeners say) 'strains,' which 'come true' under cultivation, of the latifolian *Helleborine*, occur under differing circumstances as to exposure and aspect, in 'Grass,' with 'Bastow' Wood; and it is my conviction that these long-acting local differences, aided by chance impartial insect visitation, explain the modifications in ex-specific features of growth we dub cross-varieties. Moreover, we find other species so far apart in type as *Arenaria verna*, *Potentilla verna* and *Valeriana officinalis* varying (among themselves) in lines parallel to those of the Epipactis group. On the spoil slope below the old Roman lead-getting trench (now overgrown with trees), the vernal leadwort straggles laxly amid the grass, and has acquired a facies totally different from the trim cushions of the same species a mile away on Sweet Side. On exposed ridges of Bastow there grows what some botanists consider to be *Potentilla eu-verna*, while in Dibscar 'Cove,' and on the limestone faces of the same scrub-clothed slack an old forest area—with *Helleborine atro-rubens* (type) grows trailing, hairy long-petioled *Potentilla alpestris* or *maculata* with blood-orange pigmentation at the base of the petal, due to concentration of xanthine. The Valerian varies from *sambucifolia* (by the riverside) to typic *Mikanii* of dry-soil woodland.

The particular form of *Helleborine* which Mr. Druce has named *Crowtheri* rests as yet upon a single specimen of huge stature, 33 inches or thereabouts from crown of root to tip of stem, the 'No. 5" of a series of selected specimens gathered August 16th, 1909, by Mr. John Crowther, of Grassington, and submitted to Mr. Druce, who styled it 'extraordinary.' The *Helleborine* grows in clumps of two or three, four, or even five assurging stems, over some hundred or more square yards of broken ground, the spoil heap slopes of ancient lead workings, and as we see it now, is tree-shaded and sheltered snugly from winds. The items of the colony exhibit consider-

able dissimilarity, but the locale is uniform as to cover and aspect, and very unlike the bare exposed lime-rock fanged and platy-ledged ground of a furlong or two away, where *H. atro-rubens* type (*ovalis* Bab.) still flourishes hardily, and preserves its stiff stunt character with a brown-red almost buttony perianth, just as on the Great Orme or the Stackhouse 'borrins' of the Settle pale. Surely one may predicate as a botanic axiom that gradual alterations in environage will bring about differences in vegetative growth relationships of one part to another? That, I take it, is the natural evolution of a plant's 'generation'—a period, in this case of a rhizomatous orchid, of at least five years. In the influences of bringing-up plant life distinctly parallels animal. How-so-be-it the square mile of Grass wood, upper and lower, furnishes collectors with the *formes* which follow?

1. *H. latifolia* Druce. Growing singly, perianths livid-greenish, bosses of corolla-lip *smooth* and distinct, without an intermediate tongue or coil. The leaves vary from the blunt oval of type to narrower, and slightly acute in the var. *augustifolia* Druce. The state (?) with purplish-livid perianths has been called *purpurea* Celak; but I state these distinctions 'without prejudice,' expressing no opinion as to how worthily they merit special designation.

2. *H. media* (Fries) Druce. (*Epip. violacea* of 'Flora W. Yorks,' p. 434). Growing in tufts, perianths more or less clear greenish-violet or pink, but bosses of lip *rugose-plicate* tending to confluence; in the var. *atro-viridis* (Linton) Druce, developed by fission so as to produce a central intermediary coil, rather longer than the lateral hunches. The leaves vary from latifolian to orbicular cuspidate in var. *phatyphylla* Druce, but in both they do not abruptly change into foliaceous bracts as with *latifolia* or *atro-rubens*, so far as I can judge from the few specimens I have examined. Only Gibb's wood, Newton-in-Bowland (Hodder area) has furnished, to Miss Peel's investigation, a distinctive *atro-viridis*, in which the bracts are large and leafy, lessening in size truly, but all tapering ovate-lanceolate, except the lower two; in conjunction with which was the elongated central tongue between the lip bosses. The soil there was 'impure Yoredale, very little lime in it,' yet what Mr. Druce certified as true *H. media* (Fr.) grew there *with it*—another hint at a conclusion that all these names are designative of *formes* not stable ver-species.

3. *H. atro-rubens* (Roehl) Druce. (*H. atro-purpurea*, (Raf?) *H. ovalis* Bab.). Growing singly or in pairs on exposed limestone surfaces; perianth segments short, blunt approximating at tip except in bright weather and while sexually ripe; of a dark brownish red-purple. Bracts small suddenly in relation to the neat blunt oval leaves. Bosses very distinct, seeming wide apart, rugose or plicately coiled like minute yellow balls of twine—no intermediate coil or loop hung down betwixt. I have not seen the extreme type from the pale of Grass Wood, though it does grow on the bare scar-ledges of the district, but I have the assurance of Mr. Cryer that he has done so. Nevertheless, I am certain that cultivation in shade alters its physiognomy greatly. Mr. Druce's var. *Crowtheri*, clearly comes in here, although, as he has said, seeing that in colour of perianth and leaf-detail, *atro-rubens* is 'a variable plant,' we might regard the var. *Crowtheri* indifferently as a hybrid between two vars., or, as the analogue among the 'atro-rubens' strain, of '*platyphylla*' among the '*media*' group. I cannot think it matters much which view we take so long as we can differentiate clearly between the actual flower-faces which this wonderfully rich and diversified tract of upland wood and brae presents perennially to our inquisitiveness. I know no square mile (not even Widdy Bank) which furnishes so many—on towards four hundred—Phanerogams!

FIELD NOTES.

ZOOPHYTES.

Humber Zoophytes.—Referring to my notes in 'The Naturalist' for December 1908 (p. 454), it now transpires that the species recorded there as *Obelia dichotoma* should be *Gonothyræa hyalina*.—J. Thompson, Hull.

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BIRDS.

Birds with partial Albinism in N. Lincs.—Mr. Douglas Witty informs me that he observed a Fieldfare with a white patch on its back on Christmas Day, and a Sparrow ♂ with a white tail on January 5th—both at Barton-on-Humber.—H. E. Forrest, Shrewsbury, 7th February, 1910.

Great-crested Grebe near York—A specimen of the Great Crested Grebe, a male in winter plumage, was shot in the Derwent at East Cottingwith, by Mr. T. S. Wright, on February

5th. Unfortunately it was too badly shot about the head and neck to be worth preserving.—SYDNEY H. SMITH, York, February 14th, 1910.

Crossbills near York.—A party of Crossbills was seen near York by Mr. George Machin. The birds were observed about the middle of November in the woodland district lying between Skelton and Wigginton, four miles north of York. Three birds were shot, two males and one female. They were dissected by Mr. Helstrip, taxidermist, who stated they had been feeding upon seeds of the plaintain. On December 15th last ten were seen in the same locality, and, I believe, are still frequenting the district.—SYDNEY H. SMITH, York.

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ARACHNIDA.

***Agroeca celans* Bl.—A Spider new to Yorkshire.**—On January 5th, I took an adult female of this species on the Storthes Hall side of Woodsome, Huddersfield. This is the first time it has been observed in Yorkshire. It is also elsewhere a scarce spider, being on record for one Irish locality, Dorset, Surrey, Sussex, Northumberland, Cumberland, and Grange-over-Sands in Lancashire, where I obtained an adult male in a wood, August 1903. The only other representative of the genus in the county is the much commoner *Agroeca proxima* Camb., which has now been met with in all the Ridings. —WM. FALCONER, Slaithwaite, January 27th, 1910.

***Pachygnatha listeri* Sund. in Yorkshire.**—On the same day, on both the Almondbury and Storthes Hall sides of the above estate, I bottled one male and five females, all adult, of another rare British spider, *P. listeri* Sund. I knew, however, of its occurrence here, as I had previously, in March 1908, obtained a female. Its first record as a Yorkshire species occurs in the ' Spiders of Great Britain and Ireland ' (Blackwall), having been discovered near Bradford in the 'fifties. It does not seem to have been secured since by anyone except myself, my first acquaintance with it being made in a wood at Dalton Lane, near Leeds, where I met with both sexes in September 1906. It is a very distinct spider, and is by its vivid colouring distinguishable at sight from its more soberly marked and generally distributed congeners, *P. degeerii* Sund and *P. clerckii* Sund.—WW. FALCONER, Slaithwaite, January 27th, 1910.

YORKSHIRE NATURALISTS' UNION.

Two well-attended meetings of the Vertebrate Section of the Union were held at the Leeds Institute on the afternoon and evening of February 19th, when more than sixty members and associates assembled from different parts of the county, and a few from over the Lancashire border. Mr. W. H. St. Quintin, J.P., M.B.O.U., Chairman of the Wild Birds' and Eggs' Protection Acts' Committee, presided at the afternoon meeting.

Mr. Riley Fortune, F.Z.S., the Secretary of the latter Committee, reported that funds were coming in satisfactorily, and that several new subscribers had been obtained by the Chairman. It was decided to re-appoint bird watchers at Spurn and Hornsea during the nesting season, and to take means to protect the Bempton Peregrine Falcons, and both the breeding places of the Stone Curlew in Yorkshire. A resolution giving the power jointly to the Chairman and Secretary of the Committee, of using further funds in giving protection, or in taking proceedings against offenders, was passed unanimously.

Mr. W. Denison Roebuck, F.L.S., the Convener of the Mammals', Reptiles', Amphibians' and Fishes' Committee, reported progress of that Committee's work, and sketched out directions for future workers.

Prof. C. J. Patten, M.A., M.D., exhibited, among other interesting specimens, a young Wren, showing partial albinism; a clutch of House Sparrow's eggs, showing dimorphism in a marked degree, and the skin of a Guillemot that was picked up on the shore near Dublin, in September, which differed slightly in the beak, colouration, and mottling of the axillary feathers, from the common type, and approached in resemblance one distinct form of Brunnich's Guillemot, which the Professor had noticed in North America.

In the discussion which ensued, Mr. St. Quintin remarked upon the very great extent to which the axillary feathers of Common Snipe vary. Formerly he had saved many for an angling friend. He could not reconcile this variation with sex, but had believed those with the darker ones were young birds. Later he reared a nest of young Snipe in his aviaries, and found that their axillaries were, on the contrary, very light coloured. Mr. St. Quintin exhibited one-day-old chicks of the Little Bustard (the first one hatched in an aviary in England), and of the Brush Turkey (*Telegallas lathami*), the largest of the Megapodes or Mound birds. Their eggs are laid in these mounds, and are hatched by the heat developed by the decaying vegetable matter. The young when hatched have well developed wings, capable of flight, and look after themselves from the first. A young Demoiselle Crane (a week old) was shewn, and the very noticeable shortness of the tibia and metatarsus at this age commented upon, which is in great contrast to the leg development later in life.

Mr. W. Hewett exhibited a pair of Vipers taken on Strensall Common in 1881, and stated that though not so common as formerly, yet they still occur there, in spite of the military occupation and manœuvres.

Mr. A. Haigh Lumby exhibited the skin of a monster tabby cat, recently killed in a feral state near Ripon, where its poaching exploits had been notorious for several years. It was pointed out that with the exception of the shape of its tail and a few minor details, it might easily have been mistaken for a genuine British *Felis catus*, and that in cases like this it was not surprising that country people, and even gamekeepers, were mistaken and reported what they believed to be Wild Cats.

Mr. H. B. Booth exhibited and commented upon a very fine melanic Water Vole, sent to him by Mr. T. Roose from near Bolton Abbey, and from a colony that had been known to exist for over seventy years. It was believed locally to be a colony of old British Black Rats.

Mr. W. H. Parkin then read a paper dealing with the 'Reported Wonderful Records of Young Cuckoos when but a few days old.' Mr. Parkin doubts the ability of the tiny infant of a day or two in age to throw out its

foster brothers and sisters, in spite of the reports of several reliable field naturalists who have witnessed it, and photographed or sketched it whilst in the act. Mr. Parkin would class it with such exploded fallacies as the Goatsucker sucking the udders of Goats, and the stated inability of the Swift to rise from the level ground, etc. He gave many instances where young birds had died because of their stronger and larger fellow nestlings being able to secure the whole of the food, and for other reasons. When dead these young had been cleared out by the parents, and Mr. Parkin suggested that this was generally the most likely explanation of the tragedies which befel the foster brothers of the young Cuckoo. Instances were described where older nestlings were inserted into nests amongst younger ones, to the great detriment of the latter. He commented upon the well-known case containing series of Cuckoos' eggs in the South Kensington Natural History Museum. not being in accordance with field observations, as each set contained the full clutch of eggs of the fosterers.

A lively and lengthy discussion ensued in which Mr. Parkin's views were greatly combated, and even the ability of the Swift to rise from perfectly level ground was disputed by some speakers. It was evident that we have not heard the last of this argument, and that further field notes and experiments on the matter will be made, which is what Mr. Parkin wished should be done, and was the chief object of his paper.

Professor Patten (the President of the Section), presided at the evening meeting. The Chairman shewed slides distinctly illustrating the scraping by the Lapwing during nest-making, and a curious nest of the Chaffinch showing variation from the type. This nest had been built round the top of a Holly stump, and the building materials were confined to the outer circle of the nest, the centre containing no other foundation than the lining of feathers.

Mr. W. H. St. Quintin exhibited beautiful slides illustrating the attitudes and plumage of the Great Bustards, Cranes, etc., in his aviaries at Scampston Hall. Mr. Riley Fortune, F.Z.S., threw upon the screen a charming series of slides, all taken from life, illustrating the whole of the smaller mammals, reptiles and amphibians inhabiting the county of York, and pointed out the technical differences in species difficult to determine, such as the bats, shrews, voles and newts.

Mr. Oxley Grabham, M.A., M.B.O.U., showed and described a delightful series of pictures illustrating 'Yorkshire Wild Sports,' both past and present. His audience was taken graphically through the intricacies of shooting, flighting, punting and falconry. The two old Yorkshire duck decoys were illustrated, and also old Yorkshire decoy-men and wild fowlers; and the ancient Yorkshire 'sport' of cock-fighting was illustrated by several birds in full armour, which were celebrated in their day.

Mr. E. W. Wade, M.B.O.U., brought a most successful meeting to a close by showing a large series of lantern slides illustrating the 'Birds of Bempton Cliffs,' which he minutely described, and upon which no one can speak with greater authority. Incidentally he mentioned that at all seasons of the year there is a Wren upon the face of these cliffs, which, upon critical examination, may possibly prove to have developed sub-specific characters after the manner of the St. Kilda Wren.

H. B. B.

——:o:——

Part 22 of Hulme's **Familiar Wild Flowers** (Cassell & Co., 6d.) contains coloured illustrations of the Tansy, Wood-vetch, Sowthistle, Leopard's Bane, Herb-Robert, Woody Nightshade, Corn Cockle and Hearts-ease. Each is described in four pages of letterpress. Part 8 of Sir Robert Ball's **Story of the Heavens** (6d.), also issued by Cassells, is devoted to descriptions of Neptune and Uranus.

REVIEWS AND BOOK NOTICES.

Aids in Practical Geology, by **Grenville A. J. Cole.** 6th Edition. London : C. Griffin & Co. 143 pp. 10/6 net.

Those who have heard Prof. Cole in the lecture-room will be familiar with his lucid and convincing style, and will not be surprised to find that in the present volume there is the same thoroughness and clearness of expression, two qualities which particularly appeal to geological students. The present work also differs from many other text books, as it is specially written for those engaged in practical work. The fact that it has recently reached its sixth edition, speaks well for the way it has been appreciated. In the present edition very many alterations have been made, though without increasing the size of the volume. The illustrations are fairly numerous, and there is a coloured plate shewing microscopic sections of Olivine Gabbro and Torridon Sandstone, as frontispiece.

Memorials of Old Yorkshire, edited by **T. M. Fallow.** London : George Allen & Sons. 315 pp., 15/- net.

Seeing that the Memorials of Lancashire in this series occupied two volumes, it is a little surprising at first to find ' Yorkshire ' in one volume. And, as the Editor points out, there is less variety in this volume than there is in others of the series. The surprise does not end here, but is sustained as we read through the list of contributors and note the names of the authors, and also the omissions from the list. The monastic history of the county, for example, does not find a place, though we notice the Editor refers to a ' companion volume,' in which, with other subjects, this will be dealt with. The ' Memorials of Yorkshire,' however, does not profess to be a history of the county, but a series of papers dealing with particular phases thereof. And such papers as are included are unusually well done, particularly that on ' Norman Doorways,' by Mr. C. E. Keyser. This alone, with its wealth of plates (kindly provided by the author) is worth the cost of the book. Mr. G. Clinch writes on ' Prehistoric Yorkshire,' and having regard to the limited space at his disposal, has given a useful summary of the subject. As he enumerates the various discoveries of Chariot Burials, it seems a little odd that the Hunmanby Chariot Burial,* the most recent of these finds, should not be referred to. Mr. J. N. Dickons writes on ' Roman Yorkshire,' and deals at considerable length with the Roman roads, etc. In this paper some of the recent discoveries, such as the villa at Harpham, find no place. Dr. C. J. Cox writes on 'The Forest of Ouse and Derwent, and other Royal Forests of Yorkshire,' and his essay is an exceedingly scholarly piece of work. ' York and its Minster ' find a capable guide in the hands of the Rev. J. Solloway, and Mr. A. Hamilton Thompson does full justice to ' The Village Churches and the Castles of Yorkshire ' ; his notes being well illustrated by photographs and plans. Mr. J. E. Poppleton writes on ' The County's Bells and Bell-founders ' ; Canon Nolloth describes ' Beverley and its Minster ', and consequently a favourable comment upon the modern figures in the old niches is assured ; probably any other writer would have condemned them ! It is appalling to learn that ' there are 108 statues on the exterior of the building, *three* of which are ancient ; and 74 in the interior, of which 30 are ancient. Let us hope that some day a future historian may be able to write ' there are three statues on the exterior, and thirty in the interior, all of which are good.' Except for this little hobby of the Canon's, by which all the available niches in the 'loveliest of English Minsters' are being filled with sausage-shaped stone caricatures of the late Queen, the Prince of Wales (in his Masonic robes !), and other more or less suitable personages, we admire his work at Beverley. Possibly one of his successors (though we hope the Canon will live a long time yet), will present all these modern works of art (!) to the new Beverley Museum and Art Gallery, where they will certainly cause amusement, if not instruction . Miss M. W. E. Fowler has a charming paper on ' Yorkshire Folk-Lore,' in which we learn that cinder tea is good for colic, that people are hump-backed because worms have devoured their back-bones ; that a clean shirt causes weakness, and other useful pieces of information. There is a good index.

* Described in detail in the ' Yorkshire Archæological Society's Journal for 1907,' and also by Canon Greenwell in ' Archæologia ' for the same year.

NORTHERN NEWS.

An excellent portrait of the late Dr. Bowdler Sharpe appears in *British Birds* for February.

Dr. Henry Woodward favours us with a reprint of an obituary notice of the late W. H Hudleston, with portrait.

There is a good paper on the 'Breeding Habits of the Mole,' by L. E. Adams, in the *Memoirs and Proceedings of the Manchester Literary and Philosophical Society*, recently issued.

The Liverpool Geological Society has recently celebrated the jubilee of its first meeting. Prof. J. W. Judd gave an address on 'The Triumph of Evolution: a Retrospect of Fifty Years.'

A lengthy paper on 'The Zones of the Lower Chalk of Lincolnshire,' with a list of new records from the Red Chalk of the County, by the Rev. C. R. Bower and J. R. Farmery, appears in the *Proceedings of the Geologists' Association*, Vol. XXI., Part 6, just published.

The Annals of Scottish Natural History for January contains an excellent coloured plate of the Eastern Pied Chat (*Saxicola pleschanka*), a new British bird, from the Isle of May. In the same journal Mr. J. R. Malloch gives tables of all the British species of *Phoridæ*.

The following is one of a number of questions recently placed before junior librarians, and possibly accounts for the fact that in some towns the chief librarian is also the curator of the Museum, Art Gallery, etc.:—'Describe the arrangement of any museum known to you, and *state where the arrangement might be improved.*'

Mr. R. Standen favours us with a copy of his notes on the blind Woodlouse (*Platyarthrus hoffmanseggii*) in West Lancashire. The species has hitherto, with one exception, been reported from England in the extreme south only. The species only occurs in ants' nests, and doubtless, as the author points out, further search will reveal it in many other areas.

Mr. J. W. Jackson kindly sends us copies of two valuable papers, by himself, which appeared in the *Lancashire Naturalist* for December. The first records the remains of Lemmings in Dog Holes, Warton Crag; and the second is a report on the Mollusca from this same cave. Amongst the records are *Pyramidula ruderata*, hitherto only recorded from the Pleistocene deposits of the South of England, and the Continent.

At a recent meeting of the Hebden Bridge Scientific Society Messrs. J. Greenwood and S. C. Moore reported that sections in the 'Mytholmroyd Moraine' (see Simpson & Low in 'P. Yorks. Geol. Soc.', Vol. XIV., part II.) were exposed in connection with the excavations for the laying of a main drain. Many hundreds of boulders have been thrown out. The sections are of considerable interest, and it is hoped that they will throw some light on the manner in which the deposits were laid.

Few writers have contributed so much to ornithological literature as the late Dr. R. Bowdler Sharpe. A list of his papers and books has been published in a special number of the Bulletin of the British Ornithologists' Club. From this it appears that Dr. Sharpe's first paper was contributed to our journal, 'The Naturalist,' so long ago as 1866. This was entitled, 'Notes on Birds collected by E. M. Young, Esq., in the Vicinity of the Nile and in Palestine.'

We are glad to see that at the recent annual meeting of the Halifax Scientific Society, the members shewed their appreciation of Mr. Fred Barker's twenty-one years' services as Secretary, by presenting him with an "Empire' typewriter. Speaking generally, we consider that it is in the interests of a society to retain the services of one Secretary as long as possible, so long as he answers the purpose. With regard to Presidents, however, we agree with Mr. W. B. Crump, who has just been elected to the chair at the Halifax Society for the tenth year, that it is in the interests of natural history, etc., societies for the President to be changed periodically. Mr. Crump's excellent work at Halifax doubtless accounts for the length of time he has held office.

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A MONTHLY ILLUSTRATED JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

T. SHEPPARD, F.G.S., F.S.A.Scot.,

THE MUSEUMS, HULL;

AND

T. W. WOODHEAD, Ph.D., F.L.S.,

TECHNICAL COLLEGE, HUDDERSFIELD.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

J. GILBERT BAKER, F.R.S. F.L.S., GEO. T. PORRITT, F.L.S., F.E.S.,
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Mr. T. Sheppard, F.G.S., contributes a list of the papers relating to the Geology of the Northern Counties, during the past seven years. This contains over 1600 references.

There are also reprints of the last twenty-nine excursion programmes of the Yorkshire Naturalists' Union, which contain full reports on the natural history of the various districts visited.

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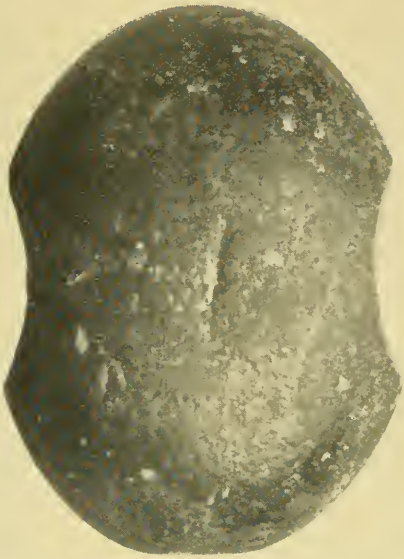

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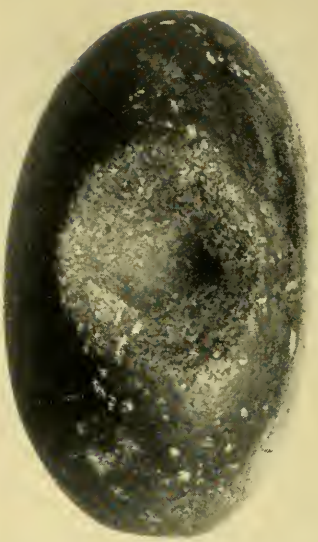

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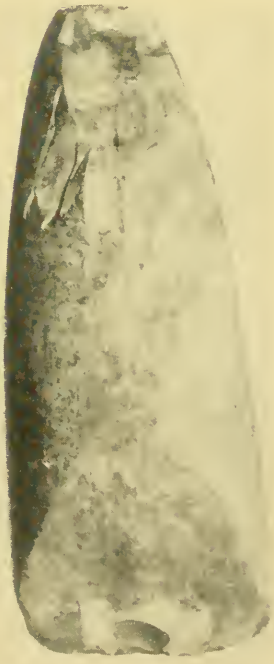

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Rare Neolithic Implements from East Yorkshire.

NOTES AND COMMENTS.

BRITISH OAKS.—QUERCUS SESSILIFLORA,

To the numerous botanists who have experienced the difficulty of distinguishing our British Oaks, the article by Dr. C. E. Moss in the January and February issues of the 'Journal of Botany' will be welcome. Of the two native species, *Quercus sessiliflora* and *Q. Robur* (=*Q. pedunculata*), the former is best distinguished by the presence of stellate (*i.e.* branched) hairs on the under surface of the leaf. These hairs may easily be seen by means of a lens magnifying 10 or 12 diameters, and they are very conspicuous on some forms of the tree. They may be distinguished at any time of the year and even on fallen dead leaves and in old herbarium specimens. On the rocks of the Millstone Grit and Coal-Measure series of the Pennines *Q. sessiliflora* is the dominant tree in the woods below 1000 feet. Above this altitude the tree occurs rarely up to 1200 feet.

QUERCUS ROBUR,

This tree, often quoted under the name *Q. pedunculata* Elish., may always be identified by the presence of two completely reflexed auricles at the base of the blade and by the absence of branched hairs. It is characteristic of deep soils, while *Q. sessiliflora* generally occurs on shallow soils; but both species occur side by side in some woods on deep sandy or gravelly soils. Generally, however, they characterise distinct regions. In East Cheshire the *Q. Robur* region ceases at about 600 feet, in West Yorkshire this region does not reach even such a moderately low altitude. The tree is planted on the Pennines up to 1100 feet.

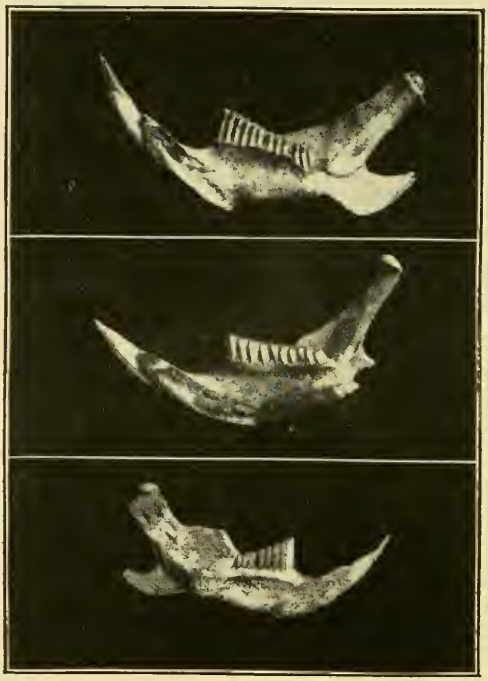
QUERCUS ROBUR × SESSILIFLORA.

The two preceding species form a natural and fertile hybrid whose occurrence in Britain is widespread. The first British record seems to be that in the 'Naturalist' for March 1909 (p. 113). The hybrid oak has recently been observed in several vice-counties including Chester, South and West Lancaster, North-East, South-West, and Mid-West Yorkshire, and Westmorland; and herbarium specimens indicate its occurrence in Derbyshire and elsewhere. The hybrid is easily distinguished by the presence of both branched hairs and reflexed auricles. This Oak is not *Q. intermedia* of D. Don.,

which, according to Dr. Moss, is not worthy of recognition as a species or variety. The paper also deals with several alien oaks such as *Q. lanuginosa*, *Q. cerris* and *Q. Ilex*; it includes a useful key, and is illustrated by a plate of the hybrid oak.

FOSSIL LEMMINGS.

In an interesting note on the Vertebrate Fauna found in the cave earth at Dog Holes, Warton Crag, which appeared



Arctic Lemming (top), Norwegian Lemming and Northern Vole (bottom).

in the 'Lancashire Naturalist' for February, Mr. J. W. Jackson gives an interesting list of species found, which includes the Frog, Toad, Slow-Worm, Common Lizard, House Martin, Whinchat, Blue Tit, Mole, Common Shrew, Pigmy Shrew, Daubenton's Bat, Lesser Horseshoe Bat (as well as another species of Bat), Northern Long-tailed Field Mouse, Northern Lemming, Norwegian Lemming, Bank-Vole, Water-Vole, Field-Vole, Northern Vole (together with the bones of other smaller Rodents), and Weasel. This constitutes an extraordinarily

Naturalist,

complete fauna, and reflects the greatest credit on the careful way in which Mr. Jackson has conducted his investigations. Accompanying his paper is the illustration which we are kindly permitted to reproduce herewith, shewing the jaws and dentition of the Arctic Lemming, Northern Vole, and Norwegian Lemming.

A MUSEUM FOR DONCASTER.

On March 23rd the Mayor of Doncaster (Councillor Halmshaw) formally opened a Municipal Museum at Doncaster, for which purpose some of the rooms in a fine mansion known as Beechfield, purchased by the Doncaster Corporation some little time ago, have been set apart. There was a representative gathering present, and the Curator, (Mr. H. H. Corbett), and his committee are to be congratulated upon the excellent start that has been made. The cases are all of first-rate quality, and so far the rooms are devoted to local archæology, natural history, and geology respectively. The number of specimens that has been obtained in these respective branches is most satisfactory. Mr. T. Sheppard, of Hull, who some little time ago was asked by the Corporation to make a report as to the lines the museum should take, and whose suggestions have been carried out, was called upon by the Mayor to give an address. In this he dwelt more particularly upon the educational advantages of museums, and the necessity of provincial museums being of local interest. Subsequently the visitors were conducted round the various rooms. Undoubtedly, Doncaster has now an important educational institution in its midst, and the local scientific knowledge and zeal of the Curator will go a long way towards ensuring its success.

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A Government Research Grant has been awarded to Dr. T. W. Woodhead, by the Committee of the Royal Society, for the investigation of the Geographical distribution of Vegetation in Yorkshire.

We understand the Treasurer has sanctioned the appointment of six additional Assistants to the Natural History Museum, South Kensington. Four of these will be assigned to the department of Zoology, one to that of Geology, and one to that of Botany.

The Yorkshire Geological Society had a profitable excursion on the Yorkshire Coast at Easter. The headquarters were at Filey, and the coast between Scarborough and Bridlington was minutely examined. Messrs. J. W. Stather and T. Sheppard were the leaders, and the party had the advantage of the presence of Messrs. G. W. Lamplugh, F.R.S., and P. F. Kendall, F.G.S. Many important finds were made.

NOTE ON A MEADOW-PIPIT'S NEST CONTAINING TWO EGGS OF THE CUCKOO.

C. T. TRECHMANN,
Castle Eden.

On June 10th, 1909, while walking over a large rough pasture on the edge of a small stream near Castle Eden, I put up a Meadow Pipit from her nest under a tuft of coarse grass. The nest contained five eggs, two of which had something peculiar about them. I took the whole nest and its contents home, and found two eggs to be undoubtedly of the Cuckoo. I compared them with the coloured figures in Seebohm's ' Eggs of British Birds,' plate 49, and found one to correspond pretty closely with the figure in the left-hand bottom corner, while the other

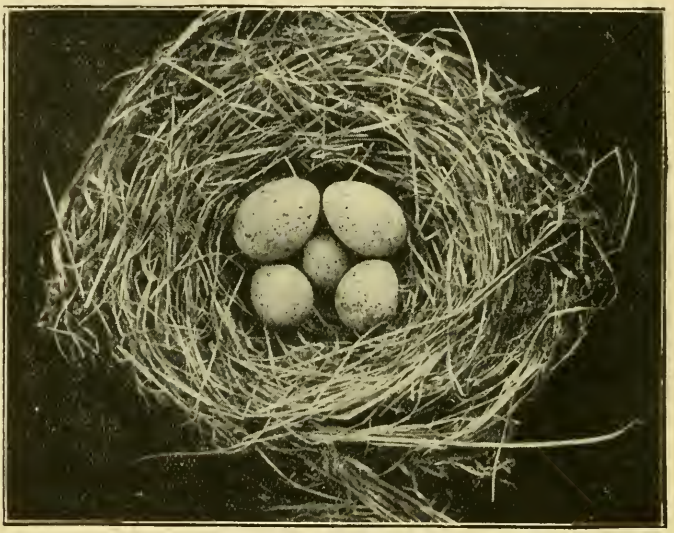


Photo by] [*R. Fortune.*

Meadow-Pipit's Nest with two Eggs of Cuckoo.

(a smaller egg) was very like the figure above it on the right-hand side. They seem certainly to belong to two different birds, and the larger measures $\frac{15}{16}''$ by $\frac{11}{16}''$, and has a greyish white ground colour, mottled with light mauve with darker blotches. The smaller egg measures roughly $\frac{7}{8}''$ by $\frac{5}{8}''$, and is more slender and has a greenish ground with light brown and mauve mottling. Two of the meadow pipit's eggs are very

minutely mottled with brown and mauve, while the third has larger blotches of mauve and darker brown. The larger cuckoo's egg resembles this latter Pipit's egg, while the smaller one is more like the two former eggs. On blowing the set no further doubt remained as to their identity, as the shells of the cuckoo's eggs were thicker and more solid, and the contents were slightly set, having some streaks of blood in the yolk, the Pipit's eggs being quite fresh. This seems to indicate that the eggs of the Cuckoo come to maturity sooner than those of its foster parent, or that the Cuckoo partially incubates the eggs before placing them in the nest of the Pipit or other bird. It would have been interesting to have left the nest alone, but it was so near the main road that I thought I might lose this interesting find altogether.

ASTERACANTHUS IN THE YORKSHIRE CORNBRASH.

HENRY CHARLES DRAKE, F.G.S.,

DURING the last few months geological work in the field has been rather at a disadvantage ; but one advantage of the wet weather is that the rock and shale have been well washed, and the frost has helped to break it up.

In November I found a tooth shining out in the well-washed

Asteracanthus in Yorkshire Cornbrash.

shale, and in January of this year I found another, which I certainly should not have seen but for the rain. I submitted these teeth to Dr. A. Smith Woodward, who pronounced them what I thought them to be, namely (*Steophodus*) *Asteracanthus*.

The first remains of this Jurassic shark in Yorkshire was described by Platnauer in Yorkshire Phil. Society Transaction 1886, and afterwards by Prof. Blake in his Memoir on the Cornbrash (Pal. Soc., 1905).

A tooth is there described and figured from the north side of the Castle Hill, Scarborough. This tooth is very small, only 7 mm. in length, totally unlike the teeth I possess.

The first of the two teeth recently found is almost square, and measures 15 mm. by 12 mm., and very reticulated, especially at the edges. It resembles the flat Asteracanthus teeth from Pottonsands, Bedfordshire, only smaller.

The second tooth is more oval in form, rounded at one end and truncated at the other, measuring 9 mm. by 5 mm. This tooth is very smooth, as if water worn, but remains of the reticulations can be seen on the edges.

The tooth described by Platnauer and Blake was said to be the only Asteracanthus tooth found in Yorkshire.

NORTHERN NEWS.

In the 'Museums Journal' for February Mr. E. Howarth of Sheffield gives notes on 'Some German Museums,' with illustrations.

We are glad to see that the 'Yorkshire Observer' is publishing a weekly 'Out of Doors' column, which contains much information of interest to nature students.

Mr. Rosse Butterfield, of Wilsden, Bradford, has been appointed Curator of the Keighley Museum in succession to Mr. S. L. Mosley, at a salary of £130 per annum.

At a recent meeting of the Leeds Geological Association the members presented a valuable surveying aneroid to Dr. A. R. Dwerryhouse in recognition of his services to the Society during the years he spent in Leeds.

At the recent annual meeting of the Stamford Institution, a resolution was passed recommending the sale of the specimens in the Stamford Museum, in order that the room might be converted into a smoking lounge and reading room.

In the 'Country Home' for March are many excellently illustrated articles of interest to the naturalist. Amongst them are 'Nests in the Brent Valley Birds' Sanctuary,' by Mr. W. M. Webb, and a description of the Hall-ith-wood Museum at Bolton. There is also an interesting note on 'Old Wind Mills.'

The Transactions and Proceedings of the Perthshire Society of Natural Science, Vol. V., Part 1, have been received, and contains many papers of interest to Perthshire naturalists. Amongst them are 'Insects of Methven Moss,' 'Perthshire Mosses,' 'The Fresh-water Pearl Mussel,' 'The Dyke Rocks of the Schiehallion District,' 'The Cuckoo,' 'Meteorology' etc. There are several good plates.

We have received from Messrs. Longmans, Green & Co. a charming series of ten coloured charts, representing the flowers, etc., for different months of the year. These are drawn by a well-known artist, Archibald Thorburn, and are the most effective we have seen for a considerable time. We don't know that anything could be more suitable for wall decoration in schools, etc. For the modest sum of sixpence the same publishers have issued a descriptive handbook to these pictures, which contains suitable notes on the plants, butterflies, etc., shown on the charts.

RARE NEOLITHIC IMPLEMENTS FROM EAST YORKSHIRE.

T. SHEPPARD, F.G.S., F.S.A.Scot.

(PLATE V.).

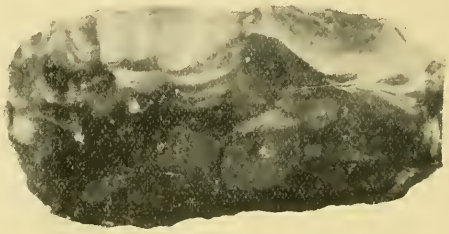
THE specimen figured on the attached plate (Plate V.) are of unusual type and should be placed on record.

The first is a hammer-stone of somewhat rare form (figs. 1 and 1*a*) from Nafferton in East Yorkshire. It measures $2\frac{3}{4}$ inches in length, 2 inches in width, and $1\frac{1}{2}$ inches in thickness. It is oval in shape and bears evidence of considerable use, particularly at one end; and at the sides are two depressions which have been carefully worked, evidently for the reception of the thumb and finger. Each depression measures 1 inch by $\frac{7}{8}$ inch, and is about a quarter of an inch deep in the centre. This hammer-stone has evidently been made from one of the oval quartzite pebbles such as are found in fissures and hollows on the Yorkshire wolds; and have obviously been derived from some earlier geological deposit. It is exceedingly tough, and is of metamorphosed sandstone. Hammer-stones after this type are figured in Evans' 'Ancient Stone Implements,' (see figures 160, 161, 163, 164 and 165), some of which are East Yorkshire specimens. Mr. Mortimer of Driffield, in his museum, also possesses one or two, but in all these cases the depressions for the thumb and finger are made on the front and back of the pebbles, or hammer-stones, and not on the sides. The Nafferton example is the first I have noticed of this particular type.

The other specimen (see figs. 2 and 2*a*) is a very unusual form of adze from Bridlington. At any time these adzes are not very common in East Yorkshire, and adzes of flint, the material of which the Bridlington example is made, are exceedingly scarce.

The specimen figured is also remarkable from its small size and delicacy of finish. Its entire surface has been ground down and polished. The sides have been left slightly square, and the cutting edge has been formed by rubbing down a triangular portion of one side of the implement. The adze measures $3\frac{3}{8}$ inches in length, $\frac{1}{2}$ inch in thickness, $1\frac{1}{8}$ inch at the cutting edge, and half an inch at the butt. From a comparatively recent chip in the centre of the cutting edge it is evident

that the weapon is made from black flint, which occurs in the drifts of East Yorkshire. This material has probably been derived from an outcrop in the bed of the North Sea. The flint occurring in the Yorkshire chalk is light coloured and too brittle for making these fine weapons.



Flint axe-head, in the rough, from Bridlington.
Actual size.

The flint axe-head figured herewith is remarkable for its unusually small size, and for the fact that it is unfinished. I picked it up on the beach just south-west of 'Danes' Dyke,' near Bridlington, recently. There had been a fall of cliff at the point which is a favourite collecting ground for flint implements. The axe-head is still 'in the rough,' and has not been polished and sharpened. It is not often that implements are found in this state in East Yorkshire, though they are common in Denmark. At the small end the 'bulb of percussion' is shown, and all round the axe there are flakings, carefully struck off. It is of dark flint, is $2\frac{1}{4}$ inches in length, $1\frac{1}{8}$ inches in width, and $\frac{1}{2}$ in. in thickness.

It is worthy of note that at this particular point on the cliff top, as well as at another place south of Bridlington, it is fairly clear that there was a neolithic implement factory, as 'flakes,' and implements in various degrees of finish, are found in enormous numbers.

BIRDS.

Hen Harrier near Whitby.—Early in February a female Hen Harrier (*Circus cyaneus*) was shot on the Mulgrave estate, four miles from Whitby.—T. Stephenson, Whitby.

Early arrival of Pied Wagtail.—In Spring this bird usually arrives in the Whitby district about the middle of March. This year three males were observed near Whitby on Sunday, February 27th.—Thos. Stephenson, Whitby.

SNAKESTONES.

G. C. CRICK, F.G.S., ETC.,
(*British Museum, Natural History*).

WITH reference to the editorial note in 'The Naturalist' for last month about 'Snakestones,' it may be interesting to recall the fact that so far back as 1815 James Sowerby figured in the 'Mineral Conchology' (Vol. II., part 19, p. 10, pl. 107, f. 2), an example of the common Whitby Ammonite (*Ammonites communis*=*Dactylioceras commune*) that had been furnished with a 'head.' In the remarks appended to his description of this species he states :—'The Ammonites are called in common Snake-stones, and superstition has accounted for their having been found constantly without heads, saying, the curse of St.

FIG. 1.

FIG. 2.

Fig. 1.—The Whitby Ammonite (*Dactylioceras commune*), with carved head, figured by James Sowerby in 1815 (Min. Conch., Vol. II., part 19, pl. 107, fig. 2). British Museum collection, No. 43895*a*. Natural size.

Fig. 2.—A Whitby Ammonite (*Dactylioceras commune*), with carved head, in the British Museum collection, No. 37927. Natural size.

Cuthbert was the cause of it; but as some of the dealers felt it a possible inconvenience, they were determined to be less barbarous, and compassionately supplied some with heads. I was so curious as to desire to see what sort of heads might be substituted, and Lady Wilson kindly procured me a specimen when at Whitby. I have figured that specimen for the information of others; see fig. 2.'

This fossil (Fig. 1) is now in the British Museum collection

(No. 43895*a*). It is not so large as the example figured in 'The Naturalist,' being only about 51 mm. (*i.e.*, about 2 inches) in diameter, and compared with that specimen the end of the nose is relatively thicker and slightly upturned.

The practice of supplying heads to the Whitby Ammonites was also mentioned in 'The Geologist' for 1858 (p. 111) in a note, by S. J. Mackie, on an exceedingly well-preserved example of *Ammonites communis* (=*Dactylioceras commune*), from the Lias of Whitby, that belonged to Dr. J. S. Bowerbank's collection. The writer states:—'Of all the numerous fossils which occur so abundantly in the Lias, none are more common, and few more beautiful, than the abundant form we have figured, the *Ammonites communis*, so long and so well-known as the "Snake Stones," into which St. Hilda, by her devotional fervour, is reputed to have changed those obnoxious reptiles in this district. . . .

'The snakes, however, appearing to have lost their heads, and to have been decapitated before or in the process of petrification, these fossils became a source of great tribulation to those who thus attempted to account for their origin. The "curiosity" dealers knew better how to treat the subject, and carved heads out of the matrix, demanding high prices for these so-styled "perfect" specimens.'

Again in 1885, in his work entitled 'Our Common Fossils and where to find them,' J. E. Taylor in referring to the common Whitby Ammonites, states (p. 313) that 'They are found in blue nodules, which, when broken open, reveal the coiled-up ringed shell, wonderfully resembling a snake in such species as *Ammonites communis*, and still more wonderfully resembling one when they put a 'head' on, with eyes in—as they sometimes do.'

The British Museum collection contains another example (No. 37927) of *Dactylioceras commune* (Fig. 2), also from the Upper Lias of Whitby, having a diameter of about 30 mm. (*i.e.*, rather more than $1\frac{1}{8}$ inches), that has been provided with a head, the nose being much more pointed than in the specimen figured by Sowerby, and much more closely resembling that of the example figured in 'The Naturalist.' This fossil was added to the National Collection in 1859.

It would therefore seem that the practice of carving heads upon the more common of the Whitby Ammonites has certainly been in vogue for nearly one hundred years.

MYCETOZOA OF THE SCARBOROUGH DISTRICT.

A. HIBBERT-WARE,
Scarborough.

SINCE 1907, we have gathered forty-six species of this group of border-land organisms. Our hunting grounds have been chiefly Oliver's Mount and Forge Valley. Five of the species appear to be new records for Yorkshire, since they are not mentioned in the 'Fungus Flora of Yorkshire' (Massee and Crossland).

Lamproderma arcyrionema, found in Forge Valley in November 1907, we believe to be the second record of the species for Britain. The other four are *Badhamia foliicola*, *Physarum diderma*, *Physarum contextum* and *Stemonitis splendens*.

The beautiful species *Arcyria ferruginea*, is prominent among the autumn forms of life of Oliver's Mount. It has not, however, been so abundant in 1909 as in previous years. Its striking feature, in this district, is the prevalence of yellow sporangia amongst its normal rust-coloured growths on old tree stumps. *Diachæa elegans* and *Chondrioderma radiatum* occurred in unusual abundance last autumn.

Three of the above—*Physarum diderma, P. contextum* and *Stemonitis splendens*—are new to the Yorkshire Fungus Flora, but two have been previously met with. Mr. Massee recorded *Lamproderma suboenum* many years ago for Bulmer, North-East Yorkshire ('Yorks. Fungus Flora,' p. 353.) This is placed in Lister's 'Mon. Myc.', p. 127, under *Lamproderma arcyrionema* Rost as a synonym.

Mr. T. Petch found *Badhamia foliicola* in abundance on dead hawthorn twigs in a dry ditch at Tansterne, August 1903 ('Jour. Bot,' XLII., p. 129; 'Trans. Hull Scientific and Field Naturalists' Club,' 1905, p. 198). The record in 'Journ. Bot.' was accidentally overlooked when the 'Yorkshire Fungus Flora' was compiled.—C. CROSSLAND.

We have received Part 8 of The Mineral Kingdom (2/-), by Dr. R. Brauns; translated, with additions, by Mr. L. J. Spencer of the British Museum. It is largely devoted to Iron Ores, and has some excellent plates. Messrs. Williams and Norgate are the publishers.

THE DIATOMS OF THE SEDBERGH DISTRICT.

A STUDY IN EVOLUTION.*

R. H. PHILIP.

(PLATE VI.).

SEVEN years ago, at a previous meeting of the Yorkshire Naturalists' Union at Sedbergh, the writer made a collection of the Diatoms of the district—a collection which bears a certain special interest in its relation to a new theory of the evolution of the Diatomaceæ recently propounded by the French Diatomist, M. Peragallo. By all authorities great importance has been attached to a rift or slit which passes down the centre of the valve from one extremity to the other, in certain genera, and known as the raphe. It is universally agreed that this rift is inseparably connected with the mysterious power of apparently voluntary motion, and though the authorities are by no means agreed as to the method by which this motion is effected, there can be no doubt that without a raphe no motion is possible. Hence the Diatomaceæ have been classified in three subfamilies: the Raphidieæ, having a true raphe on at least one of the two valves; the Pseudo-Raphidieæ, having a blank space simulating a raphe on at least one valve; and the Crypto-Raphidieæ—or, as M. Peragallo more accurately prefers to call them, the Ana-Raphidieæ, which possess neither a true raphe, nor the appearance of one on either valve. The first division (with some exceptions to be referred to later) are self-motile. The other two divisions are incapable of self-movement.

M. Peragallo holds that the origin from which the evolution of Diatoms started was from the marine Radiolaria, an amaeboid organism having a siliceous skeleton, and consisting for the rest only of a protoplasmic jelly with the usual nucleus and nucleolus, and generally considered to be a member of the animal kingdom. Now, as the same authority unhesitatingly accepts the Diatoms as true vegetables, it may cause us some surprise to be asked to believe that they can have been evolved from an animal ancestor. Perhaps a more correct way of putting it would be to regard Radiolaria and Diatoms alike as descended from a common ancestor in which the differentiation of animal and vegetable had not been attained. However this may be, it will be sufficient for us to note that those forms

* Abstract of a Paper read at the meeting of the Yorkshire Naturalists' Union at Sedbergh, August 1909.

of the Diatomaceæ nearest in apparent structure to the Radiolaria are the earliest to appear in fossil deposits. These all belong to the sub-family, Ana-Raphidieæ, and are circular, sub-circular, triangular or polygonal in outline, and frequently furnished with processes, spines, or awns. There is a fossil deposit found at Oamaru in New Zealand, in which a considerable number of very beautiful species well known in the "show" slides, issued by those who mount for sale, are found. These are without exception, all belonging to the Ana-Raphidieæ. It is clearly a marine deposit from a warm sea rich in silicon, and besides the diatoms, contains an abundance of radiolaria and sponges, which also require this element to build up their skeletons. A somewhat later deposit of a similar character is that which underlies the city of Richmond, Virginia, but in this, while the great majority of species are those of Ana-Raphidieæ, there is also a small but significant number of Raphidieæ. The collections made by Cleve and others from the Plankton of various seas to-day, consist also in the main of Ana-Raphidieæ. Hence we may picture the earliest diatoms as belonging to this sub-family, such forms as the first three figures in our plate, floating on the surface of the sea, moved only by the winds and waves, having no power nor need of self-motion.

Next we must conceive that quantities of these forms would be carried by currents to the margin of the sea, and from being purely oceanic, would be compelled to adjust themselves to a neritic existence covering the surface of rocks and mud on the shore. Here the continual deposition of silt washed by the waves from clay cliffs, or brought down by rivers would be the greatest danger against which the organism would have to struggle, and forms unable to lift themselves to the surface of the mud, would be buried and stifled. Hence we have the development of the Raphidieæ, with their bilateral instead of centric shape, their raphe, and its associated power of self motion. Most persons, when they first see through the microscope living naviculas passing hither and thither across the field of view, are apt to think this motion is at least as free and voluntary as that of the Infusoria. Further investigation, however, reveals that it is strictly limited to an alternating movement, a certain distance in one direction, a pause and a return. How effective this motion is, nevertheless, for the purpose for which it was evolved may be seen any day by collecting a gathering of Pleurosigmas from the mud of our tidal

estuaries, shaking them up with the mud, and then placing them on a dish in the sunlight. In a short space of time they will have worked their way up through the mud, and covered its surface with a brown film. It is not with them a question of journeying anywhere, of pursuing prey, or of escaping from enemies, it is simply just sufficient to enable them to preserve their freedom. This limited power of motion has evidently been an important advantage in the struggle for existence, since we find that the Raphidieæ are much the largest of the sub-families to-day. Taking for instance the list of 600 species and varieties in the "Diatoms of the Hull District," we find that about two-thirds are Raphidieæ and less than a sixth Ana-Raphidieæ. Figs. 4, 5, and 6 on Plate VII. are typical examples of motile Raphidieæ.

Established on the coast, the Raphidieæ increased in numbers, and began to find their way up the estuaries and rivers into the internal waters of the land, and in marshes, lakes, ponds, streams and springs evolved into different forms suited to their respective environment.

And now we come to the Diatoms of the Sedbergh district. The waters of this neighbourhood are ghylls, little streams cutting their way through deep gorges on the hill sides, at all times rapid in flow, and in rainy seasons liable to become violent torrents. In such waters, how are our tiny organisms to be able to maintain themselves? The Ana-Raphidieæ, with their circular or polygonal forms and helpless immobility, would be swept into crevices and stifled in mud, if they had ever got up here—which they never did, for not a single member of the sub-family is to be found here. The Raphidieæ, with their limited power of motion, sufficient only to rescue them from premature burial, would scarcely fare better, being liable to be continually carried down to the sea by the rapid waters. Hence new methods must be found if they are to continue to inhabit these streams, and the problem of existence has been solved by several distinct methods. Some of the Raphidieæ, of which the Gomphonemas are an example, acquired a stipe, or stalk which anchored them to a rock or water plant, enabling the diatom to float securely in the most turbulent streams; others like Cocconeis attached themselves by one surface to mosses or plant stems, while others, like Achnanthes, improved on this by piling themselves on one another. But now comes the Nemesis of over security, they lose their freedom. No doubt

a Gomphonema or Cocconeis swept by accident from its hold, may, by the use of its raphe, regain a position in which it may safely fix itself again, but such cases must be comparatively rare. The majority live on in undisturbed security, and, as a consequence, lose first the use of the raphe, and then the raphe itself. We find in many cases that it has disappeared from that one of the valves by which the diatom has been anchored. Eventually it will no doubt disappear from the other as it has already done in many cases, and then we arrive at our third sub-family, the Pseudo-Raphidieæ,in which a blank space interrupting the striation of the valve marks the line which was formerly occupied by a raphe. Such forms as these are specially adapted to inhabit the streams of Alpine districts, and we find that they, along with the non-motile Raphidieæ, constitute the bulk of the forms comprised in my Sedbergh gatherings. Like the Raphidieæ, they have adopted various methods of securing themselves. Some, as the Synedras, rely on a long needle-like form, or, as Ceratoneis, on a hooked shape, for entangling themselves in the meshes of algæ; others, like Fragilaria and Meridion, attach themselves together in ribbon-like bands, or, as Diatoma and Tabellaria, in chains and rope-like filaments. The following list of species found in the Sedbergh district, shows a predominance of this sub-family when we bear in mind, not only that as compared with the list of the Hull district in which the Pseudo-Raphidieæ constitute only about a fourth, but also that the mere number of species does not indicate the proportion of individuals. Many of the motile Raphidieæ are represented only by scarce and casual forms, while the Pseudo-Raphidieæ are the most numerous part of each gathering. These gatherings were made from Hebblethwaite Ghyll, Uldale Ghyll, Settlebeck Ghyll, and also from some tanks on the slopes of the hill of Winder. A single species (*Fragilaria crotonensis*) was found in the drinking-fountain in the Market Place.

LIST OF DIATOMS OF SEDBERGH.

RAPHIDIEAE (MOTILE).

Amphipleura pellucida Kutz.
Amphora ovalis Kutz.
Cymbella aequalis W. Sm.
,, *affinis* Kutz.
† ,, *delicatula* Kutz.
,, *laevis* Naeg.
†*Cymbella leptoceras* Kutz.
,, *microcephala* Grun.
,, *obtusa* Greg.
**Encyonema caespitosum* Kutz.
,, *ventricosum* Kutz.
Navicula elliptica Kutz.
,, var. *ovalis*.

* Abundant. † Rare.

Navicula elliptica var. *oblongella*
,, ,, *minima*.
†*Navicula atomus* Naeg.
† ,, *fontinalis* Grun.
† ,, *lepidula* Grun.
,, *limosa* Kutz.
,, *radiosa* Kutz.
,, *viridula* Kutz.
†*Pinnularia borealis* Ehr.
,, *mesolepta* Ehr.
,, *subcapitata* Greg.
,, *sublinearis* Grun.
,, *viridis* Kutz.
Stauroneis anceps Ehr.
,, *gracilis* Ehr.
,, *Phenicenteron* Ehr.
Vanheurckia vulgaris V.H.

RAPHIDIEAE (NON-MOTILE).

†*Achnanthes coarctata* Breb.
,, *exilis* Kutz.
* ,, *linearis* W. Sm.
* ,, *lanceolata* Breb.
* ,, *microcephala* Kutz.
† ,, *trinodis* (Arnott) Grun.
Achnanthidium flexellum Breb.
Cocconeis placentula Ehr.
,, *pediculus* Ehr.
Cymbella (old genus *Cocconema*)
* ,, *cistula* Hempr.
,, *cymbiformis* Ehr.
,, *gastroides* Kutz.
,, *Helvetica* Kutz.
,, *lanceolata* Ehr.
Gomphonema acuminatum Ehr.
,, *constrictum* Ehr.
,, *geminatum* (Lyng) Ag.
,, *gracile* Ehr.
,, *intricatum* Kutz.
,, *montanum* Schum.
,, *parvulum* Kutz.
Rhoicosphenia curvata (Kutz.) Grun.

PSEUDO-RAPHIDIEAE.

Ceratoneis arcus Kutz.
Denticula tenuis Kutz.
Diatoma elongatum Ag.
,, *tenue*
* ,, *hiemale* (Lyng) Heib.
,, ,, var. *mesodon*.
Epithemia gibba Kutz.
,, *Argus* Kutz.
,, *sorex* Kutz.
,, *turgida* (Ehr.) Kutz.
Eunotia arcus Ehr.
,, *lunaris* (Ehr.) Grun.
,, *major* W.Sm.
,, *pectinalis* (Kutz.) Rab.
,, *prærupta* Ehr.
Fragilaria capucina Desm.
,, *brevistriata* Grun.
,, *Crotonensis* (Edwards) Kitton.
,, *virescens* Ralfs.
Meridion circulare Ag.
Nitzschia Denticula var. *Delognei*.
,, *linearis* (Ag.) W.Sm.
,, *Palea* var. *fonticola*.
,, *sinuata* (W.Sm.) Grun.
Surirella ovalis Kutz.
,, ,, var. *minuta*.
,, ,, ,, *ovata*.
,, ,, ,, *pinnata*.
,, *robusta* var. *tenera* Greg.
† ,, *spiralis* Kutz.
Synedra Acus (Kutz) Grun.
,, *amphicephala* Kutz.
,, *capitata* Ehr.
,, *pulchella* Kutz.
* ,, *radians* (Kutz) Grun.
* ,, *ulna* (Nitz) Ehr.
,, ,, var. *splendens*.
,, ,, var. *subaequalis*
,, *vaucheriae* Kutz.
Tabellaria flocculosa (Roth) Kutz.

DESCRIPTION OF PLATE VI.

ANA-RAPHIDIEÆ (MARINE).

1. *Actinoptychus undulatus*.
2. *Amphitetras antediluviana*.
3. *Biddulphia aurita*.

MOTILE RAPHIDIEÆ (SEDBERGH).

4. *Navicula elliptica*.
5. *Pinnularia viridis*.
6. *Stauroneis gracilis*.

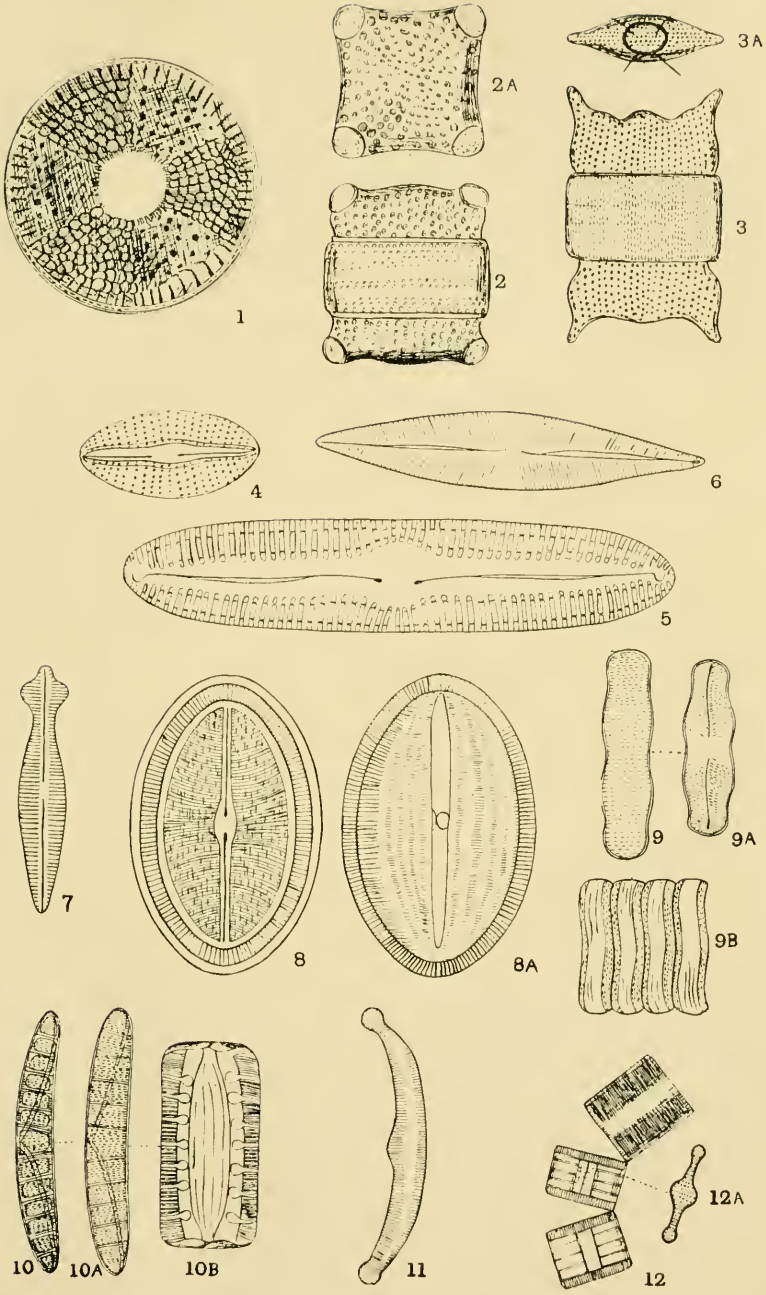
NON-MOTILE RAPHIDIEÆ (SEDBERGH).

7. *Gomphonema acuminatum*.
8. *Cocconeis placentula*.
9. *Achnanthes coarctata*.

PSEUDO-RAPHIDIEÆ (SEDBERGH).

10. *Epithemia Argus*.
11. *Ceratoneis arcus*.
12. *Tabellaria flocculosa*.

* Abundant. † Rare.



Diatoms of the Sedbergh District, etc.

THE PEAT MOORS OF LONSDALE.

AN INTRODUCTION.

W. MUNN RANKIN, M.Sc.(Leeds), B.Sc.(Lond.).

(*Continued from page 122*).

These many floral associations ranging between the open water associations and the often broad bordering meadows of *Molinia*, may be regarded as expressions of certain well-defined physical factors operating beneath the vegetation, which in no small measure is dependent upon them. In addition to the group of physical factors considered as resident within the station, and operative upon living forms, selecting and modifying perhaps, and thus made visible, there are those factors, also having effect upon the constitution of a floral association, which arise out of the presence of individuals of the same and different species, namely those of biological competition. Considering the association kinetically, it is seen to be a congeries of very many factors, which it would be difficult, if not impossible, to evaluate. Yet, as judged by the results, the group of factors of the station are of the first importance; as they vary, so the plant association through which they work, undergoes change also. The physical characteristics of the soil, its moisture, temperature, inorganic and organic composition, regarded at a particular spot, are continually changing. As a consequence, the complexion of the floral covering is steadily varying. Thus taking our example of the lake side associations in passing from the open water to the closed grass meadows on the opposite limit of the swamp, there is a more or less steady decrease in the percentage of water within the soil, accompanied by a change in the composition of the dissolved compounds as well as by variations in the factors of the soil consequent upon these.

This zonation of physical factors is expressive of the succession of the same factors above a particular spot. The region of open water near the reed-belt will, under favourable conditions, in time itself pass under the condition of the reed-belt, and later of the other zones. This change in the physical conditions of a spot due in the main to the accumulation of plant debris or peat, is expressed in the vegetation as a succession of plant associations. This succession is, under favourable conditions, recorded in the different strata of the peat. And in general, this vertical succession will correspond closely to the lateral zonation, though it must be noted that on the outer limits,

within the influence of the hard rising land, the agreement is not maintained.

Underlying all the diversity within the series of zones between the open water and the Molinia swamp, there is at least the common feature that the root-system of the vegetation searches soil supplied with water, which either immediately or but little remotely has been in contact with the mineral rocks, and is therefore to some extent, supplied with inorganic salts. Such a series of plant societies is grouped under the comprehensive term of 'Swamp Moor.' Moors of this type, when viewed from without, have a flat upper surface, which gives occasion for the continental name of 'Flach-moor.' Owing to the extensive clearings by man, restrictive or wholly destructive, the swamp moor or flat-moor, as found in this district on the lowlands, shows rarely the full succession displayed in a typical development, but more generally only the associations representing a few out of many phases. About tarns the earlier zones are the most evident, and above filled-up hollows, the latter associations, often in transition to the associations of the heath-moors.

The moor associations which have been long removed from the state of open water, as the Molinia meadows well behind the waters of lakes or over the drying-up tarn hollows, have had opportunity by the increase in thickness of peat, steadily to become raised above the water table within the soil, and thus to become drier. This increasing dessication often favours the growth of shrubs, as the alder, birch, and willow, but even more so the growth of heath plants, which are less dependent than swamp plants upon soil water with dissolved salts, and so quite at home in a soil which is dependent for its moisture upon the chance precipitation of rain. Such heath plants thrive upon or between the tussocks of *Molinia*, and in the course of time engulph them, forming a high layer independent of the water level searched by the swamp associates. Bog-moss, *Sphagnum*, Cotton sedge, *Eriophorum vaginatum*, and ericaceous plants, as *Calluna* and *Erica* species, are among the first intruders, and finally the conquerors.

The moor resulting upon the growth of these heath plants shows a much more restricted floral list than that of the preceding swamp moor. Very few species are held in common, and even of these, as in the case of Molinia, there is the separation into two distinct forms, expressive of the distinct groups of

physical factors underlying and conditioning the two formations, the swamp and heath-moors. Moors of this latter type have received many designations from the variety of aspects in which they have been regarded. According to the frequent abundance of bog-moss, they may be termed Sphagnum Moors. Yet few of the present day moors, whatever were their immediate predecessors, may be so labelled. *Eriophorum vaginatum* is more commonly the dominant species, suggested in the restricted title of Eriophorum Moor, as the dominance of *Calluna* suggests the term Calluna Moor. The common continental term, 'Hoch-moor,' or high moor, is derived from the raised surface, especially noticed after heavy rain when the moor swells like a sponge. This humping-up of the moss is at times well seen on Cockerham Moss. The term that will be used here—Heath Moor—has the advantage that within it may be understood moors of various facies, whether dominated by *Sphagnum*, *Eriophorum*, *Calluna* or Birch, in all of which prevails a dominance of the physical factors of the heath—insufficiency of inorganic ions and dissolved oxygen in a soil water which further shows a decided humic acidity, producing a physiological drought.

The heath moors are the last phases in Nature of the process of land formation by vegetation from open water. And so they are to be seen best in the long closed-up lake hollows among the mounds of glacial drift. Many such peat moors have been cleared away, but here and there, representatives of the last stages still remain. The peat deposits laid down about the shores of the hard-water lake of Hawes Water near Silverdale, when the surface was some seven or eight feet higher than to-day, have been almost entirely removed. Close at hand, however, in the neighbouring basin of Burton Moss, once filled by an extensive shallow-water lake, receiving drainage from the 'hard' land about, sufficient deposits remain to give a good idea of the succession of heath moor upon swamp moor. The layers of the lower peat show not only the lowest amorphous peat of fragmentary debris carried in from the reed belts, but also the deposits of the reed belts of *Phragmites* and *Cladium*, as they encroached upon the narrowing waters of the tarn. As the open water was taken in, the peat would seem to have got drier, and the swamp to have been succeeded by a thicket of Birch, possibly a variety of the Alder wood type.

After this came in the heath associations, which continuing

for some time, gave an accumulation many feet in thickness of Sphagnum and Eriophorum peat. The marl at the deepest hollow of this lake is to a large extent composed of *Limnaea pereger*,* lacking the variety of the Hawes Water deposits. Traces of similar peat moors lying above lake-marl may be seen below Norber Fell, in Clapdale and Crummockdale. In the same quarter, Austwick Moss shows a fairly extensive development of heath moor, though there are not infrequent traces of the former swamp moor associations. A short way across the limits of Lonsdale, other moors as Cocket Moss, near Giggleswick, and Helwith Moss, below Moughton Fells in Ribblesdale, show good development of both types of moors.

Littoral Peat Moors.

Passing from these comparatively small and generally scattered peat moors, we come to the consideration of the great and continuous peat moors, about the coast plains of Furness and the neighbouring part of Westmorland. (Fig. 3).

Following upon the Ice Age, there has been an extensive silting up of inlets out of Morecambe Bay, as well as of the Bay itself. The alluvial flats slowly rising by accretion, first above the average high water mark, and then above the limits of ordinary spring tides, must, as may be seen to-day being enacted between Carnforth and Silverdale, have passed under the vegetation first of salt, and later of fresh-water marshes. The land drainage by small streams would be irregular, easily deviated, and often checked, so that the state of the alluvial flats would become eminently suited for the growth of all manner of swamps. Extensive marshy meadows of tall reed-grasses and sedges, diversified by occasional open meres, swarming with every variety of animal life, molluscan, insect and avian, such must have been the aspect of much of low-lying Furness, as it was without doubt, of southern Lancashire into comparatively recent times. And the records of the peat are sufficient sanction for the extension of this known landscape to our Lonsdale sea-valleys. Altogether, during the early stages of the covering of the estuarine silt with vegetable remains, there must have been the closest resemblance with the Fens about the Wash opening.

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* 'Geographical Distribution of Mollusca in S. Lonsdale,' Kendal, Dean and Rankin, *Naturalist* 1909.

As was noticed in the case of the swamp moors of lacustrine origin, namely the tendency for the succession of the associations to continue towards the associations of an entirely different complexion, so here over the ancient fens or swamp moors, crept the heath moors, with their abundant bog-moss and cotton sedge, finally covering all the broad marshland, except within the reach of the river floods and of the drainage from the rising land against which the moors rose, on their outer limits. (Fig. 4).

Within the regimen of the heath moors, the succession of associations continued, now a dominance of *Sphagnum*, at other times of *Eriophorum*, and at others still of *Calluna*, according as the conditions of the stations varied. The sections of the peat, as well as the traditions of the district, show that immediately previous to the present, rather dry association above the moors, of *Calluna* and *Eriophorum*, there was a strong dominance of *Sphagnum* species, resulting in a very wet surface. The drying moor of Foulshaw is gradually being spread over by self-sewn birches, and occasional Scots firs, forming a second, if not a third, wood or thicket association that has developed there; the earliest at the base of the peat, the other between the swamp moor and the heath moor, also of birch and fir. (Fig. 5).

For many centuries the mosses must have rendered the valleys even more impassable than the sea or sands, too miry for safe foot-travelling, and not sufficiently so for keels. Near Gilpin Bridge there still remain short lengths of a corduroy road, sunken in the peat, across which at some time or other traffic passed. How early the peat moors were dug we cannot say, but it is probably correct to assert that the greater part of the clearance has been effected in the last century or so. To-day in place of water is cultivation of an intensive character, which makes the still remaining moors, inliers of an ancient landscape, the more striking. The largest moors yet persisting, as Foulshaw, near Grange, and Ellerside Moss near Cartmel, probably the most extensive lowland moors in England south of Solway, still continue to grow, and thus permit of an alliance with the much wider moors of North Germany, which have been so ably monographed by Graebner, Weber and others. (Fig. 6).

UPLAND PEAT MOORS.

While the peatlands of the plains and valleys were at one

time pretty extensive, and now are much reduced, those of the hills of the 'moorlands,' are still extensive. And yet the upland peat moors of Lonsdale, wide as they are on some of the fell slopes, are of a comparatively small extent when considered against the broad mantlings from horizon to horizon, which cover many of the fells of the Pennines between Penyghent and Crossfell. For an appreciation of the dominance over square miles of landscape by a single plant formation, no part of England is more suited than a summit on the Pennine escarpment. Still within our limits, as for example, on the grit fells of the southern edges of Lonsdale, the heath moor attains that dominance characteristic of the Pennines from the Peak to the Cheviots.

The development of a peat moor on an upland region depends upon many factors, those of the climate and those of the soil. The first group naturally show wide differences from those obtaining on the seaward plains or lowland watersheds. About the Bay the rainfall varies inland between 40 inches and 50 inches, on the hills it attains in the north of the district, 90 inches, and in the south possibly 70 inches. On the coast the mean January temperature is somewhat below 40°, and the mean July temperature about 60°F. The hills above 1200 feet on which the peat-moors are best developed, will show according to the usual rule, corresponding temperatures below 36° F. and 56° F. respectively. The higher mountains will show a mean annual temperature between 38° and 42°. As seen by the growth of both swamp and heath moors, at all levels from sea levels to at least 2500 feet, the climatic factors throughout the district are favourable to their existence.

The more important factors which decide within the district the origin and the continuance of moors, are those of the soil, bound up with its chemical as well as its physical features.

The volcanic breccias, silurian greywackes, sandstones and slates show much less development of peat moors than the shales and sandstones of the Yoredale and Millstone Grit series, though quite typical moors occur, often broadly on these rocks. Possibly the general steepness of the older rocks, rather than their frequent sub-basic mineral composition, is to be held accountable for the contrast between their cleanly fell sides and the gloomy flanks of the Carboniferous hills. While, with the higher ridges to the north, at most the narrow summits and occasional 'slacks,' or broadly concave

areas are peat-covered, and the broad hill sides are pasture grown, on the southern watersheds ridges and flanks alike are submerged beneath sodden moors, which reach down almost to the farmsteads. The heavy glaciation of the whole district, which at its maximum engulphed all except the topmost peaks in ice, has left many signs on the highlands. Drumlins have ponded back drainage as shallow tarns, which filling, first with sedges, rushes and grasses belonging to the swamp, finally passed into heath-moors. Swathes of more or less impervious ground moraine plastered over easily pervious limestones, as on Ingleborough, have brought up the associations of the wet grasslands in the midst of those of the drier type.

The two groups of associations constituting the wet Grasslands, those of the swamp moor formation and those of the heath moor, so evident in the lowlands, are scarcely less distinguishable on the uplands.

The swamp moors, it may be recalled, are characteristic of the infilling pools, or other badly drained spots fed by water more or less immediately telluric in origin. The heath moors, on the contrary, have the atmospheric precipitation as the chief water supply.

On the uplands, swamp moors of rushes and *Molinia*, with a small florula of dicotyledons are seen about shallow tarns fed by small streams draining some limited watershed, but more particularly about the issues of springs, and the early courses of streams. In places, such miry spots are regularly cut for litter, the moor-grass, *Molinia*, and the rushes, no less than the bracken, *Pteris*, of drier spots, yielding useful bedding harvest.

Molinia meadows are in a few places seen to encroach upon, and in the late phases of succession to engulph, birch scrub growing upon damp, clayey soil.

As with the Molinia marshes of the lake margins of the lowlands, so on the uplands, they show the intrusion of the heath in the plants of ling, *Calluna*, heaths, *Erica* sp. cotton-sedge, *Eriophorum vaginatum* and bog-moss *Sphagnum* sp., being in the course of time, as seen by the present zonation beyond, fated to pass wholly into the heath-moor.

All totalled, these swamp moors and transition moors of Lonsdale make but a poor show in comparison with the great Eriophorum moors. Moors of *Sphagnum*, of *Scirpus cæspitosus* and of *Racomitrium*, occur but rarely, and then are of

small dimensions. A study of the peat sections on the fells further brings out the fact that in times past the complexion of the heath moors was much as to-day. Underneath the deep deposits of the cotton sedge association, there is in general but a narrow basal thickness of peat other than heath-peat. It is within this layer at the base that birch timber occurs even at good heights. So far, on our moorlands, no peat layer of arctic plants, as that recorded for Crossfell by Mr. Lewis, has been found, and, indeed, it is quite probable that as Dr. Moss has shewn for the southern Pennines, the deposit of peat is comparatively recent in origin, the greater part post-Danish, and the whole possibly post-Roman.*

Where uncut by deep stream courses, the water-level high, the Eriophorum moors are generally pure, but in parts more or less wasting or on better drained slopes on the edges of the moorland, *Calluna* is a constant co-dominant. On the topmost ridges bilberry, *Vaccinium Myrtillus*, forms a frequent derivative of the normal type. The variety of the Calluna—Eriophorum moor is also seen on the lowland moors, where, owing to the peat-cutting at the edges, as well as to deep transverse ditches, there is some effectual drainage.

Though there is a close resemblance between the heath-moors of the uplands and of the lowlands, which corresponds without doubt to a close community of soil factors, yet the florulæ of subordinate species show some differences. How far these are due to climatic factors, to edaphic factors, or to those issuing from the mode of development of the succession of the associations cannot at present be determined.

SUMMARY.

FORMATIONS OF WET GRASSLANDS.

SWAMP MOOR FORMATION.

I.—Lowland Moors.

(*a*) *Lacustrine.*

Existing. Hawes Water, Terrybank Tarn (Cunswick Tarn and Newton Regny Moss).

In part. (Helwith, Cocket Mosses) Austwick Moss.

Sub-fossil. Burton (Helwith Moss).

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* Peat Moors of the Pennines. C. E. Moss. The Geogr. Journ., Vol. XXIII. [1904], pp. 660-671.

Fig. 3.
Lowland Eriophorum Moor with invading Birch wood.

Fig.4.
Within Swamp Moor Zone on the edge of Heath Moor (Fowlshaw).

Fig. 5.

Section of Lowland Peat Moor.

1.—Present Eriophorum-Calluna Moor.
2.—"Grey Peat" of Sphagnum-Moor.
3.—"Black Peat" of Eriophorum-Moor.
4.—"Short-metal" of Swamp-moor with timber of Scots Fir, etc.

Fig. 6.

Peat Digging in the Gilpin Valley.

(*b*) *Estuarine and Littoral.*

Existing. Edges of Ellerside and Foulshaw Mosses. (Traces within Cockerham Moss).

Sub-fossil. Ellerside, Foulshaw, Levens Mosses (Cockerham Moss).

II.—Upland Moors.

Generally Distributed.

HEATH MOOR FORMATION.

I.—Lowland Moors.

(*a*) *Lacustrine.*

Existing. Terrybank Tarn, in part. Austwick Moss.

Sub-fossil. Burton (Helwith Moss).

(*b*) *Estuarine and Littoral.*

Existing. Ellerside, Foulshaw, Levens Mosses (Cockerham Moss).

II.—Upland Moors.

Generally Distributed.

Proceedings, etc., of the Hull Junior Field Naturalists' Society, Vol. I., Part 1, Edited by Albert J. Moore (Hon. Secretary). Price 1/- net, 8vo. [No date on title; introduction dated January 1910].

The Junior Naturalists of Hull are to be congratulated on this first number of their proceedings, and still more on their firm grasp of the essential principle of including nothing but what is local. The only exception is Mr. A. Werner's paper on 'Photo-micrography,' but this is a class of paper which, when properly done, is printable in any journal. The Society's actual proceedings show evidence of energy and well-directed activity. The papers deal with varieties of Mollusca new to the East Riding, note on *Melampus myosotis* near Saltend Common, Botanical Notes, a paper in which the British nativity of *Selaginopsis mirabilis* found off Flamborough is accepted, a record of *Eryon antiquus* from the Yorkshire Lias, some recent geological and archæological notes, a list of some Withernsea fungi, a list of East Yorkshire spiders, harvestmen and pseudoscorpions, a list of spiders and harvestmen collected in 1909 in North Lincolnshire, a few ornithological notes, a record of *Silpha thoracica* for Market Weighton, note on a Romano-British urn found in East Yorkshire, and of a stone adze found at Withernsea. The respective authors are Albert J. Moore, C. Waterfall, John C. Craven, H. Knight, James Ritchie, M.A., B.Sc., A. Werner, T. Sheppard, F.G.S., A. M. Murley, Arthur R. Warner, E. A. Parsons, M. Ling, F.Z.S., and E. Sawyer. Typographically the part is a handsome one, and it is pleasing to note that the species in lists, and the salient points in other papers, are indicated by the use of thick-faced type, but the use of wire-stitching is entirely unsuitable to a publication like this, which is of permanent value. There are several illustrations, and a frontispiece. In the latter case we would suggest that it is perfectly useless to figure a 'Pseudoscorpion' without stating both its name and its locality. However, this only brings out into prominent relief—as does also the note on *Paramæcium aurelia*—the unscientific ways of microscopists, who have (as a class) still to learn that their slides and objects should be labelled fully and precisely, and that a slide of 'leg of fly' or 'hairs of plants' are of not the slightest use unless it is stated what is the name and the locality of either the 'fly' or the 'plant.'—R.

SOME AVICULTURAL NOTES.

W. H. ST. QUINTIN, J.P., F.Z.S., ETC.,
Scampston, E. Yorks.

(*Continued from page 116*).

Of course, the male only, worked. If sometimes, especially at feeding times, when any titbits were going, his treatment of his wife appeared old-fashioned, to do him justice, he never, like the primitive human races, left the hard work to the weaker sex, for he was always busy at something, sometimes at useful work connected with the mound, at other times trying to dig a way under the fence of his enclosure, so as to get at some rival on the other side.

The incubation of the eggs within the mound depended entirely upon the proper fermentation of the materials of the composing mass. Von Rosenberg found that the temperature in the interior of the mound of another species, *Talegallus fuscirostus*, was 93° Fahr., when that of the external air was 85° in the shade. Workers of incubators will remember that a temperature of 104 degrees is required to hatch the eggs of the domestic fowl.

It sometimes seemed that the hen bird miscalculated the period when the heap would be ready for the eggs, and that the fermentation was past before the eggs had time to hatch. Probably, if there had been several hens, some eggs would have been forthcoming when the fermentation process was at the right point. But I only had one hen, and at the end of the summer, I more than once on opening the mound, found eggs unhatched with chicks in various stages of development. Though they had a good big run, the birds were partly dependent for materials on what we gave them, which, of course, had to be in such a condition that it would ferment. Entirely dry stuff, such as straw or dead leaves were of no use. Lawn mowings were eagerly appropriated, but if too much was given the heap heated too fiercely, and did not last warm for the whole incubation period.

The whole process has been watched, and described both in our Zoological Gardens, and at the Gardens at Melbourne. I will not repeat what has been already recorded, beyond saying that my birds were so tame that I could stand within a yard of the male when he was doing sentry on his heap, and could watch him digging down to the close neighbourhood of

the eggs without disturbing him. He always opened the heap almost to the level of the eggs towards the end of the summer afternoon, filling up the opening, and smoothing all over before sunset. This was probably to cool the eggs.

There is one observation I was able to make, which I think has not been noticed. I several times, in the morning, found that the cock bird had cut away the side of the mound, leaving a perpendicular wall. I believe this was to make the exit of the chick more easy; and it may have been that the bird heard the cry of the chick, and did his best to help. We found several chicks at different times which had failed to get out owing to the heap getting too much consolidated. The male was, during the breeding season, always upon or close to the mound, and constantly altering its appearance, and I was never actually able to connect the cutting away of the side with the emergence of a chick, but I was convinced that this was the bird's purpose.

The young can fly at least four or five feet up to a perch the day they are hatched, and, of course, are perfectly independent of the parents.

The first young bird hatched at Scampston was found in the next enclosure but one to that in which the mound was; having somehow managed to get under, over, or through, two wire fences eight feet high; and it was discovered by the noise it made in vigorously scratching amongst the dead leaves under some bushes.

I found the male bird very dangerous to other species. Besides hunting his mate whenever he saw her, he was the bully of my collection, and being very active, it was difficult to keep him in his own domain. I once saved an old Capercaillie cock from at least very severe punishment. The Caper was on the run, with the Brush Turkey after him, hitting him with his foot whenever he got within striking distance. My Brush Turkeys are now in Sir Edmund Loder's beautiful park at Leonardslea in Sussex, and, interesting as they were, I have never regretted their departure!

Sandgrouse. These are peaceable, rather sluggish birds, not difficult to keep in confinement if kept absolutely dry. They are not as often kept as they deserve. I have had five species, the fine *Arenarius*, *Alchatus* (both the Spanish and the Asiatic form), *Exustus*, and *Bicinctus*, both of which last I have found delicate; and *Senegallus*, which in plumage is

near *Arenarius*, and which with me is quite hardy in a dry aviary. Sandgrouse should be kept on a dry, sandy floor, with plenty of sharp grit, lime in the shape of old mortar, and some rocksalt. Several species are great eaters of grass, lettuce, and such common weeds as Shepherd's Purse; but *Bicinctus* and *Exustus* with me will look at nothing but small seeds.

And perhaps here I may suggest to the aviculturist the more free use of maw seed, which, of course, is the seed of the various poppies. The drug opium is, I believe, obtained by crushing the seed-capsule, and the seed itself appears to have no injurious qualities. All Sandgrouse, and Quails, are extremely fond of it, and my Bearded Tits mainly live upon it.

The Sandgrouse are usually placed near the pigeons, but they frequently lay three eggs, and the young feed themselves, and wander from the nest-scratch almost immediately. The young can be reared upon maw seed, grass and clover seed, and the ripening seeds of chickweed, and shepherd's purse.

There is a very peculiar habit of at least some of the Sandgrouse, viz., the manner in which the young while unfledged receive water from the male parent. My friend, Mr. Meade Waldo, was the first to record this interesting habit, having bred *Pterocles alchatus* in his aviaries in Hampshire, and sent an account to the 'Avicultural Magazine.'

Mr. Waldo described how the cock bird (only) when it is aware that the young are thirsty, becomes very restless, and runs up and down the aviary, till presently it steps into the water pan, crouches down with breast plumage distended, and might be thought to be going to have a good wash. But it is not so, for when the soft feathers are well soaked, it leaves the water, and runs towards the young, uttering a cry which is quite unlike any of its usual notes. The nestlings understand, and hurry up, and bury their heads in the soaked plumage, and can be seen taking the wet feathers between their bills and evidently accepting this rather scanty supply with the same quivering of the wings that one sees in a young pigeon when being fed by the parent.

It is, of course, true that the Sandgrouse breed in very arid districts, with no opportunities of finding water, except in the form of dew, which must soon disperse when the sun is up. At the same time, the food of the chick, if we may argue from what we see in our aviaries, is not any form of insect life, or of succulent vegetation, but dry seeds mainly: and therefore

it seems that this habit has been evolved of the male parent going off to seek water, often probably at such distances that it seems strange that any fluid worth having remains after a flight through the desert air. What Mr. Waldo recorded of *Pterocles alchatus* I repeatedly witnessed, for we also got it to breed at Scampston. I had told my man what to expect, but nevertheless so remarkable is the performance, that the first morning when I went down to the aviary, knowing that the eggs were due to hatch, I found him standing in speechless astonishment, the old bird having just run out to the newly-filled water pan to soak itself at his feet.

After this I bred *Exustus*, which has exactly the same habit. *Bicinctus* has not laid with me, while a pair of *Senegallus*, though laying frequently, are confirmed egg-eaters.

Both Mr. Waldo and I have had eggs from *Arenarius*, but no further success, but he has told me that he has seen males enter the villages in Morocco to soak in the puddles left round the wells, and then fly off.

All four species that have nested with me have the same way of dividing the duties of incubation, the females, with their plumage harmonizing so wonderfully with sand and gravel, sitting by day; the male, which is often more bright-coloured, going on to the eggs for the night.

In speaking of the TRAGOPANS, three species of which I have kept and bred, the Satyr, Temmincks and Cabots, I can give another example of a habit noted by the aviculturist which could hardly have been observed in a wild state, especially when the subject inhabits such wild difficult ground, and has such skulking ways, as the Tragopans. At any rate, it was not known until I recorded it from experience with my birds, that the Tragopans habitually nest in trees. Although, like all gamebirds, they will occasionally drop eggs on the ground in confinement, my birds have never attempted to incubate unless the latter were placed on a nest or platform off the ground.

Sometimes they have made use of rough platforms of twigs which we have put up for them in yew or spruce trees, sometimes they have appropriated old pigeon's nests. Once a Temminck Tragopan hen laid her eggs in a Stockdove's nest in some ivy, seventeen feet from the ground. How she found the nest I could not imagine. She could only reach it by climbing up a yew tree, and passing along a horizontal branch, from which she could spring into the ivy.

In all these cases the bird made some addition to the platform or nest, as a finishing touch generally placing a few green twigs of yew or spruce by way of lining.

Perhaps from finding plenty of sites ready to hand, it was not till this season that a Tragopan ever built a nest entirely of itself. In this case a rather untidy pigeon-like nest was made in a spruce tree some five feet from the ground, constructed of live, and dead, small branches and twigs of the spruce; and though it looked a shaky structure, it bore the weight of sitting bird and eggs. I must have had at least 30 clutches of eggs, since I have kept Tragopans laid in all cases off the ground; and so I think I may safely draw the conclusion that this is the natural habit.

In this unusual nesting propensity the Tragopan shows itself very distinct from its nearest allies, the Grouse and Pheasants. Moreover the nestling is clothed with a peculiar hairy down, and can fly several feet, and even from branch to branch, when newly hatched. In fact the bird is strikingly arboreal in its ways.

The Roller. Though very handsome, I don't recommend the European Roller as an aviary bird to anyone who is not prepared to take a great deal of trouble. The bird is extremely nervous and shy, and unless great care is used, will certainly spoil its plumage against the wires of the aviary. It is quite impossible to keep either an Oriole or a Roller in a cage, for the same reason. Both are shy, and both are short-legged, and when clinging to the side of a cage will not keep their bodies off the wires like a Crow or a Thrush, but seems to find a perverse delight in thrusting tail and flights through, till nothing but stumps remain.

Rollers are so nervous that I have known one suffer real hunger and decline to come down to the foodpan, because a brush had been accidentally left inside the door.

With regard to food, a Roller lives much like a Shrike, and therefore must have a Shrike's food: mice, beetles, meal-worms, and when meat is given, it must have at the same time what a falconer calls 'casting,' namely feathers or fur, which it will presently eject as a pellet.

Therefore, to get Rollers to breed, which was at one time my ambition, I had first to get hold of two sound birds, which was not easy; then get them well moulted, and thoroughly used to the aviary; and finally only one person ever went into

the covered part of the aviary, in which we fixed up a large hollow log. Without going into details now, which I have elsewhere recorded, I will only say that in due course the birds paired and took to the log, eggs were laid, and finally, to my great satisfaction, young birds were heard clamouring for food. And here a failure nearly occurred with the young, and a tragedy between the parents could not be prevented. Whether we showed too much interest in the event or not, suddenly the hen bird was seized with a blind fit of jealousy against her mate, who was peaceable enough, poor fellow, and only too anxious to do his duty by his family. But the excited virago forgot her nestlings, and thought of nothing but of buffeting and fighting with her mate, who never offered any resistance. The young were in danger, so I removed the cock, and the mother instantly went back to her duties. But it was the end of the beautiful male. In another aviary he passed the greater part of two days ceaselessly flying from perch to perch with food in his beak, calling to the young which were not there, and then taking no food himself, pined and died.

Pine-grosbeak. Of all the smaller hardy birds that one can keep in a garden aviary, I think there is none more desirable than the Pine-grosbeak. It is utterly impervious to the worst weather as one would expect, and is from the first extremely tame. Although, of course, it is always best, if one can, to keep one breeding pair apart from others of the same species. I have never known the Pine-grosbeak interfere with any other kind of bird, even of the smallest. Another merit is that the cocks, so far as my experience goes, retain their bright colour, while, as is well known, males of Crossbills, Linnets and Redpoles are apt to lose it at the first moult, and do not regain it. Mr. Hugh Wormald, however, says that since he has fed his Redpolls on the seeds of the Reed, they have kept their colour. It probably is a question of health produced by correct food, with fresh air and space for exercise. I have more than once bred the Pine-grosbeak, though it had not been previously done in this country. They made a substantial and neat nest of dry spruce twigs, and lined it mostly with dead grass, and a little moss.

The tameness of the brooding hen was very remarkable. Of course we have all noticed how bold the sitting Bullfinch, a very near ally of the Pine-grosbeak, often is. When the nestlings were hatched, the female parent very sensibly availed

herself to the full extent of any assistance that we could offer by way of food for the young. I have stood within a yard of the nest, and seen my bird-keeper offer fresh ants' eggs in a teaspoon to the old bird as she sat, which she took, and after holding them in her mouth for a minute or two, probably to moisten them, pass them on to the nestlings.

Sooner or later every aviculturist is likely to have it brought home to him how very highly strung and nervous birds often are by nature; and it leads to many grievous disappointments. In 1903 I was the first to get the WAXWING to lay its eggs in confinement. Much interest has always attached to the breeding habits of this charming bird, and much mystery. Until the discovery of its nesting grounds in the forests of Lapland, the egg was unknown to ornithologists.

Mr. Wolley's exhibition of the first nest and eggs, the fruits of several arduous expeditions in the far north, caused great excitement in scientific circles. Attempts had been made by keeping a flock in an aviary to get an egg or two dropped, but with no success.

Last winter I brought an egg, the first ever laid except in the wild state, and showed it at one of the Yorkshire Naturalists' Union meetings at Leeds.

In 1903, though eggs were hatched at Scampston, the young were not reared, and the only point gained was that the period of incubation, fourteen days, was ascertained.

I had every hope of doing better the following season, as I had the same pair of birds, and apparently in splendid health. The Waxwing is rather sluggish, and one would think not very sensitive or emotional. However, the hen died unaccountably, perhaps from egg-binding, for there was no examination; and the first sign that anything was wrong was that her body was found on the floor of the aviary and the cock-bird sitting huddled up close by it, and he died in a few hours. If this was not death from a broken heart it was at least very near it!

(*To be continued*).

Mr. Harvie-Brown has a note on the 'Increase of Jays in Ireland,' in the *Irish Naturalist* for January. In the same journal Dr. R. F. Scharff records the File-fish in Irish waters.

In *The Museums Journal* for January, Dr. F. A. Bather has a useful and practical paper on 'Business Devices for the Museum Curator.' As he points out, museum curators are not necessarily business men; hence his notes.

FAULT REVELATION THROUGH THE AGENCY OF UNDERGROUND WATER, NEAR HAWES, WENSLEYDALE.

G. T. McKAY, B.Sc.

(PLATE IX.).

On the road from Hawes through the Buttertubs Pass to Muker in Swaledale, an interesting section is exposed. It occurs about three miles from the former place, and, as at first seen, seems to be the face of a long disused lime-quarry; in fact it was almost passed over as such. But the 'second look' involved in passing along the top of it (following the road) revealed several peculiar features. Most of these can happily be well seen in the accompanying photograph, and they will be further understood from reference to the diagram. There is a perpendicular face of much-weathered limestone, about fifteen feet deep at its centre. This forms the upper side of a narrow cleft, pointed at each end where it comes out to the surface, and widest and deepest in the centre, where the side of this cleft opposite the limestone is broken through by another valley at right angles to and as deep as the original one, and running into the major valley (Foss Dale) on the sloping side of which all this is situate. (Plate IX., fig. 2).

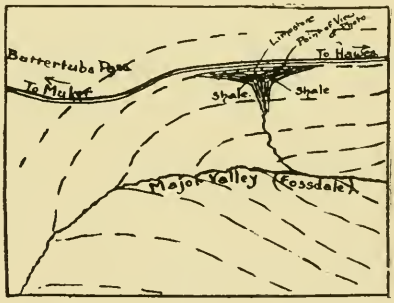

Diagram showing position of Exposure.

The configuration thus consists of three small valleys. Two of these are in a straight line, opposed to each other, and deepest where they meet; at which point the third takes off from both, at right angles to them, carrying away the water which runs down them into the major valley below.

The important feature is that one side (the upper) of the two opposed valleys consists of a vertical wall of limestone, while the other side is more sloping, is for the most part grass grown, and can be seen at one point to consist of black shale. It is through this shale that the third valley has been cut.

The explanation of these phenomena seems to be that there is a fault running along the side of the main valley, which has

thrown down *impervious* shale, against *pervious* limestone. Along the planes and joints of the latter, underground water has been and is making its unseen way. Coming against the shale, it can no longer pursue its underground course, and is forced to come to the surface. In doing so it clears out the easily-moved shale until the face of the fault stands revealed. The straight cleft thus formed is deepest at the centre, either because the underground stream has its greatest volume there, or because that is where the greatest 'throw' of the fault lies. The water which collects in this long, narrow excavation, in finding its way by overflow into the major valley, eats out the third valley at right angles to both. This automatically maintains the same depth as the cleft it drains, at the point where it opens out of it, and thence thins down to the ordinary depth of a hill-side stream.

ADDITIONAL NOTE ON THE 'BUTTERTUBS.'

Half an hour's walk over the divide from this section, alongside the road, is a group of pot-holes which give their name to the pass. They do not compare with Alum Pot and Gaping Ghyll in depth (being at most only twenty-five feet deep), but they are in another way even more interesting. They hardly deserve the name of 'Pot-Holes,' for the one in the photograph (which is quite the best) is so full of pillars and walls of limestone, that it is quite possible to walk across the 'pot,' from one side to the other as on stepping stones. The sides of these pillars and walls are uniformly vertical, and they present a beautifully columnar or fluted surface, like many Cathedral pillars. (See Plate IX:, fig. 1). Into one of the pots a small stream plunges and is lost. The bottom and sides of all of them are covered with many kinds of ferns.

The explanation of the peculiar features of these pots could only be arrived at through a detailed comprehension of the geological structure of the district. The fluting and the pillars are probably due, in the beginning, to certain unusual stresses to which the limestone has been subjected; which stresses in some way not easily understood, have produced the columnar jointing along the planes of which the pots have been eaten out by the ordinary agents of subaerial denudation.

Fig. 1.—**One of the 'Buttertubs' Potholes.**
The fluted limestone can be seen best at the far side of the photo on the extreme left.

Fig. 2.—**The Section.**
The point of view of the photo is shewn in the diagram.

THE ANNELID FAUNA OF WORCESTERSHIRE.

Rev. HILDERIC FRIEND,
Great Malvern.

In order that we may supply a satisfactory list of the species of Earthworms at present known for this county, outside the two genera *Lumbricus* and *Allurus* already described,* it will be necessary to devote a little further attention to the question of classification.

In 1874 Eisen split up the old genus *Lumbricus*, and gave to those species which differed in the shape of the head the generic name *Allolobophora*. He also divided this genus into two, and gave the name *Dendrobaena* to a group which was fond of haunting decaying timber. His distinctions were based entirely on external characters, and these were not at all of the first importance, but they served to draw attention to the fact that real differences existed. His diagnoses are as follows :—

1. LUMBRICUS.—*Tubercula ventralia in segmento* 14. *Setae ubique binae approximatae. Lobus cephalicus postice segmentum buccale in duas partes dividens.*

2. ALLOLOBOPHORA—*Tubercula ventralia in segmento* 14. *Setae ubique binae approximatae. Lobus cephalicus postice segmentum buccale non dividens.*

3. DENDROBAENA—*Tubercula ventralia in segmento* 14. *Setae ubique aequo intervallo distantes exceptis duabus summis quarum intervallum aliquanto majus est. Lobus cephalicus tres partes segmenti buccalia occupans.*

4. ALLURUS—*Tubercula ventralia in segmento* 12.

It should be observed that most modern authorities now reckon the peristomium as the first segment, and so regard the male pore as occupying the 15th segment in *Lumbricus*, *Allolobophora* and *Dendrobaena*, and the 13th in *Allurus*.

It was thought that the differences between *Allolobophora* and *Dendrobaena* were insufficient for generic purposes, and for some years the latter term was discarded. Kulagin and myself, however, revived the term owing to the fuller discoveries which followed upon the study of the internal anatomy.

Next to Eisen, we owe more to Dr. Rosa of Turin, than to any other, for the pioneer work in this direction which the last century witnessed. He published in 1893 a memorable volume,

* 'Nat.,' December 1st, 1909, pp. 425-9.

entitled '*Revisione dei Lumbricidi*,' to which every later student owes an immense debt of gratitude. He pointed out that while the different species of Earthworms may be readily identified by external characters alone, it is absolutely necessary to study the internal organs to obtain a satisfactory classification. Availing himself of the work of Eisen, Oerley, and others, he split up the old genus *Allolobophora* (Eisen) into four groups. After having rejected *Dendrobaena* for a time, he re-adopted it, together with Oerley's term *Octolasion*, and added a new term *Notogama*. It was found that, not only did the *spermathecae* vary in number, but that they were located in different segments, and opened in different directions; while the vesicles also varied in number, and in their relation to other essential organs.

Here, again, some of the points of difference were trifling, if considered by themselves, but as time went by, it was found that their cumulative character rendered the division of the old genus imperative. Rosa's division was an advance upon Eisen's, and may be summarised thus:—

1. Allolobophora—Vesiculae seminalis four pairs, testes and funnels free, spermathecae opening in a line with the dorsal setae. Setae geminate (or strictly paired). Colour variable.

2. Dendrobaena—Vesiculae seminalis three pairs, testes and funnels free, spermathecae opening in the direction of setae 3 or 4. Setae more or less distant; purple coloured dorsally.

3. Octolasion—Vesiculae seminalis four pairs, with four capsules enclosing testes and funnels. Spermathecae opening in the direction of the third seta. Setae distant, *i.e.*, in eight rows.

4. Notogama—Vesiculae seminalis four pairs, testes and funnels free, spermathecae opening near the median dorsal line, setae either paired or in separate rows more or less distant; with or without pigmented zones on the dorsal surface.

It is not necessary to deal with Oerley's classification. Some of his terms, such as *Aporrectodea*, have never been accepted, though he was perhaps the first to suggest that the worms whose tubercula pubertatis fall on alternate segments (as *A. chlorotica* Savigny) should be separated from those in which they form a continuous band. *Octolasion* (which Dr. de Ribaucourt persistently spells Octalosion), has proved a useful term, and is at the present time in vogue for certain species whose setae are in eight rows.

So long ago as 1845 Hoffmeister, who did splendid work

in this department, gave the name *Helodrilus* to a worm found in wet, marshy ground. It was for a long time placed among the uncertain species; but during recent years it has been re-discovered, and proves to be a native of this country. We therefore have to add this genus to the four already named. Then we find Rosa pressing forward his researches, and adopting the term *Eophila*, while *Notogama* gives place to *Eisenia*, and the term *Bimastus* (Moore) is introduced to cover some anomalous species which are destitute of spermathecae and tubercula pubertatis.

At the present time, therefore, the old genus *Allolobophora* of Eisen is divided into no fewer than seven sub-genera, viz., *Allolobophora*, *Dendrobaena*, *Octolasion*, *Helodrilus*, *Eisenia* (=*Notogama*), *Eophila* and *Bimastus*. Their main characteristics will be gathered from the remarks already made, and as there is reason to believe that every one of these different genera is represented by one or more species in Worcestershire, I will now proceed with the classification which I think is most in harmony with our present knowledge. I shall deal first with the species which I think should still be retained as typical of the old genus *Allolobophora*, as understood by Eisen, and modified by Rosa and other investigators. This will enable us first to study the best-known species, and so gradually come to those which are less familiar, and those which have recently been discovered.

Genus Allolobophora Eisen. Sub-genus *Allolobophora*, as defined by Rosa. Characters—Worms of varying size and colour. Prostomium inserted in the peristomium more or less deeply, but not completely bisecting it. Setae in pairs; form of body usually cylindrical. Male pores on fifteenth segment, on conspicuous papillae in the case of indigenous species. Tubercula pubertatis on certain girdle segments, either forming a band (*A. longa* and *A. trapezoides*), or placed on alternate segments (*A. chlorotica* and *A. turgida*), and classified by Oerley as *Aporrectodea*. Four pairs of vesiculae seminalis; testes and funnels free. Spermathecae two or three pairs, opening on the line of the dorsal setae. Spermatophores present. According to de Ribaucourt, all belong to the class which has a peduncle embedded in the integuments, and not merely attached to the cuticle.*

* My researches, however, do not confirm this statement; but this does not affect our present study.—H. F.

1. Allolobophora longa Ude. Everywhere mistaken for the true earthworm, which it closely resembles in size and general appearance. Often taken by lecturers as the class-room type in biology, to the endless confusion of students and text-books. It can be distinguished from its rival *Lumbricus terrestris* L. by many infallible signs. The head bears a strongly marked letter H, but the prostomium does not completely bisect the first segment. The colour is usually a dirty brown or burnt sienna, not so ruddy as *Lumbricus*, and the tail is more cylindrical. The male pores are conspicuous on the fifteenth segment, the girdle varies somewhat in the number of segments which it includes, but the tubercula pubertatis are constant. They extend over three segments only (not four as in *Lumbricus*), and the usual formula for girdle and tubercula is $\frac{28\text{-}35}{32\text{-}34}$ while that of *Lumbricus terrestris* is $\frac{32\text{-}37}{33\text{-}36}$, a difference which is unmistakeable.

On account of its size, and the clear arrangement of the internal organs, it is the best worm by far for the student to use for purposes of dissection. The spermathecae will be found attached to the body wall in two pairs, on either side of the ventral nerve-chain, and looking like the heads of pins. The ovaries and testes are attached to the septa, and the vesiculae seminalis are the large white bodies which cause the worm to be so much larger in segments 9 to 12 than elsewhere. It exudes a kind of mucus or slime like the true earthworm, but not a coloured fluid, such as *A. chlorotica* or the Brandling give off when irritated. It frequently reaches a length of seven or eight inches, but averages five, and is half an inch in diameter at the widest part in large specimens. Although Savigny described this worm long before Ude did, there is such confusion in the terminology till Ude's day that, to save all further trouble, I adhere constantly to the characteristic name *longa*. The synonyms may be found in all the principal authorities.

This is the most widely distributed of all our species, alike in Worcestershire and elsewhere. Found in gardens, by the roadside, and in fields everywhere. I have taken it in Malvern from the burrows made beside the curb stones in the streets. It is hardier than *Lumbricus terrestris*, which prefers a fatter living, if it can be obtained.

2. Allolobophora trapezoides Dugés.—This and the next are frequently taken to be sub-species, and are put under *Caliginosa*. There is much to be said for this, but

I have examined hundreds of specimens from every part of Great Britain, and from many foreign parts, and I find that it is possible to obtain examples of every shade of divergence from those which can, with difficulty, be differentiated, to those which could not be confused with each other.

The worm is a good deal smaller than the last, and lighter in colour. The setae are paired, the head less distinctly marked, the male pores on very prominent papillae, which usually affect the adjoining segments. The girdle extends from about the twenty-eighth to the thirty-fourth segment, and the tubercula pubertatis form a band along the thirty-first, thirty-second, and thirty-third, resulting in the formula $\frac{28\text{-}34}{31\text{-}33}$

3. Allolobophora turgida Eisen.—This differs from the latter chiefly in the matter of the tubercula. They belong to the class designated *Aporrectodea* by Oerley, being found alternately on 31 and 33. This is the form most prevalent in Worcestershire, so far as my observations have gone hitherto. Next to *longa* it is perhaps the commonest worm we have. It may be found by scores in spring, caught by the frost after it has been lured forth by the dew and warmth of the early night. Formula $\frac{28\text{-}34}{31:33}$.

These three worms have an unpleasant, earthy smell. They all emit mucus, but differ from the next in giving off no turbid, coloured secretion.

4. Allolobophora chlorotica Savigny.—This is a worm which can never be confused with any other British species. It will eventually have to be separated from this genus to which it is not at all closely related. It differs from the foregoing in having three pairs of spermathecae, three pairs of pores for tubercula pubertatis, much smaller dimensions and different habits, and in the emission of a turbid green or yellow fluid from the dorsal pores, to mention no other points of difference. It is perhaps the most sluggish worm we have, and yet is usually extremely well favoured. It coils itself up almost like a grub or slug, and lies under stones by ponds and fords, or in the turf by the side of water. It is frequently found also in gardens, and seems to be eschewed by birds and fishes on account of its yellow fluid. It is about two or three inches long when uncoiled, usually of a dirty green colour, with girdle on segments twenty-nine to thirty-seven, and papillae on alternate segments thirty-one, thirty-three, thirty-five. It is the type of Oerley's *Aporrectodea*. The formula is $\frac{29\text{-}37}{31:33:35}$.

Found everywhere around Malvern and Worcester, varying a good deal in colour and size, according to habitat.

This concludes the list of species in this section, and the remaining forms will occupy our attention in the next paper, after which the water worms and enchytraeids may be conveniently taken up. It will be noted that I have not given the positions of the dorsal pores. The reason is that my researches hitherto have not convinced me that they are reliable. I am at present, however, giving this point my special attention.

Erratum.—The formula for *Lumbricus castaneus* ('Nat.', Dec. 1909, p. 428 should read $\frac{28-33}{29-32}$.

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FIELD NOTES.

COLEOPTERA.

***Homalota nigricornis* Thoms in Yorkshire.**—Amongst some small beetles taken under the carcase of a bird on the shore at Eston-in-Cleveland last September, was a *Homalota* strange to me. Mr. E. A. Newbery has kindly examined this insect, which proves to be *H. nigricornis* Thoms. The species is rare in the northern counties of England, and does not appear to have been previously recorded for Yorkshire.—M. Lawson Thompson, Middlesbrough, March 10th, 1910.

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CRUSTACEA.

Occurrence of *Platyarthrus hoffmannseggii* in Yorkshire.—Referring to the note on *Platyarthrus hoffmannseggii* on page 136 of the March 'Naturalist,' I should like to point out that although this Isopod may not appear in any printed records for the North of England, it has frequently been met with in several portions of the county. I have found it in ants' nests at Kelsey Hill, near Keyingham, in Holderness, and at Spurn. Mr. H. C. Drake, F.G.S., informs me that he has obtained it at Hessle, near Hull, and at Scarborough; and Mr. J. W. Boult, says it occurs frequently on the suburbs of Hull in ants' nests under paving stones, or 'flags.' If proper investigations were made it is probable that it would be found to be generally distributed in Yorkshire.—T. Stainforth, Hull.

THE CHEMISTRY OF SOME COMMON PLANTS.

P. Q. KEEGAN, LL.D.,
Patterdale, Westmorland.

Ox-eye Daisy (*Chrysanthemum Leucanthemum*)—This plant is characteristic of pastures and meadows in poor condition, and is allied to the wormwood and not to the asters, which latter are near the common daisy. It springs up quickly some one to two feet high, with a rapidly lignifying, erect stem bearing leaves very variable in shape, and with no latex. On 15th June the overground parts contained a very little volatile oil, some carotin, wax and fat, and a resinous bitter principle soluble in sulphuric acid with brown to violet colour. There was some glucose and levulose, and abundant tannin, yielding the reactions of caffeetannin, also a catechin-like substance, and considerable mucilage and proteid. There was no stored-up starch or inulin, and only a little oxalate of calcium. The ash of the air-dried plant amounted to 6.6 per cent., and contained 43.1 per cent. soluble salts, 5.8 silica, 18 lime, 6.4 P^2O^5, 4.3 SO^3, and 5.8 chlorine, with a good deal of iron and manganese. The chemical analysis as compared with that of the common daisy, clearly reveals that this is a much more highly developed plant in a chemical sense. In fact, with the exception of the sub-order Cynarocephaleæ and the Yarrow and Sow-thistle, it would seem that none of our native composite plants exhibit a process of deassimilation carried so far, or perhaps produce less of those products of chemical degradation vaguely designated 'bitter principles.' To the scientific and non-poetical eye this plant is much more worthy of regard than the frail and delicate familiar organism whose patronymic it has borrowed.

Devils-Bit Scabious (*Scabiosa succisa*)—Open meadow grounds and breezy uplands are the favourite denizens of this deeply-tinted flower. The root is a remarkable organ. The germ-roots and the epicotyl produce side roots which contract and draw the stemlet below the soil, and then later on several storage roots are thrown out which are long and 2 or 3 mm. thick, the rind and pith thereof being filled with small granules of starch. On 29th July the benzene extract of the dried overground parts amounted to 1.4 per cent., and had considerable corotin, much wax, some fat-oil, and a resinous substance; the alcoholic extract was very bitter, and had caffeetannin and cane-sugar, resin, and a bitter principle dissolving in sulphuric acid with

a brown-red colour. There was also some mucilage, reserve starch, and a considerable quantity of oxalate of calcium. The ash amounted to 6 per cent., and had 25.7 per cent. soluble salts, 20.3 lime, 5.3 P^2O^5, 3.8 SO^3, and 4 chlorine. There was no soluble carbonate, but considerable manganese and iron. It will be observed that the above analysis recalls that of the more developed compositæ. It has been averred with regard to the flowers of this species that 'we have few other blossoms of that strength of tint.' A chemical examination thereof, however, reveals that the peculiarly deep colour arises neither from the amount, nor from a special development of the pigment. In fact, the chromogen is very far from being fully converted into the appropriate visible colour which it is fitted to produce, and the latter as regards brilliancy, purity and development is far inferior to that of the petals of the Knapweed, so frequently a co-tenant of the autumn waste.

Cow-Parsnip (*Heracleum Sphondylium*)—This plant is conspicuous in shady places, under walls in fields, etc. The roots are very tough and fibrous, and contain much starch, some glucose, and a yellow acrid resin yielding a deep brown colouration when treated with sulphuric acid; there is no tannin. The leaves in mid August contained 1.7 per cent. of a mixture of a little carotin, wax with much chlorophyll, and a resin dissolving in sulphuric with a deep brown colour. The alcoholic extract was highly chlorophyllous, and had a tannoid yielding vivid yellows with alkalis, etc., also there was some cane-sugar, and a resin which was coloured green by alcoholic HCl. There was also considerable mucilage, and much oxalate of calcium, but no reserve starch. The ash amounted to 10.5 per cent., and contained 26 per cent. soluble salts, 2 silica, 27.4 lime, 11.3 magnesia, 5 P^2O^5, and 2.5 chlorine. With the exception of the large affluence of chlorophyll, there is nothing specially interesting in this analysis. The process of deassimilation has advanced to the tannoid stage merely, but there is decided evidence of a great migration of albumenoids. The fruit yields a volatile oil which is mainly acetate of octyl $C^2H^3O^2$, there is also a resin and an acrid principle similar to that in the roots.

Willow Herb (*Epilobium montanum*)—This plant, however pestiferous in cultivated ground, is in many ways one of the most scientifically interesting of our common plants. The wonderful vitality of its root parts, the prolific production of

seed, and the extremely easy culture, may be ignored in view of the supreme importance of the chemical analysis. There is no mycorhiza attached to the roots, and there is a great production of nitrates, and a copious excretion of water through the large water-slits on the teeth of the leaves. On 15th August the overground parts contained a very little carotin, some wax, and fat-oil; the alcoholic extract was acid and bitterish, and contained a tannin which gave all the reactions of gallotannin, there was no free phloroglucin or glucose, but some cane-sugar and a little resin; there was very much pectosic mucilage nearly all extracted by warm water, also considerable starch and oxalate of calcium (occurring only as raphides in the leaves). The ash contained 34.2 per cent. soluble salts, 6 silica, 22.7 lime, 3.3 magnesia with a little manganese, 3.5 oxide of iron, 3 P^2O^5, 4.1 SO^3, and 3.2 chlorine. The amount of carbonates was very high, indicating a powerful movement of the albumenoids. The chief interest of this analysis centres in the presence of gallotannin which seems to be rarely found in our flora outside the orders Onagraceæ and Lythraceæ. I have never detected it with certainty in any other of our common wild plants. Its presence in the Willow-herb is a clear indication that this plant is one of the most chemically advanced members of our flora. The tannin itself is a derivative of pyrogallol, which contains three hydroxyl (HO) groups, and thus it would appear that in the course of the process of deassimilation a period of extensive hydration occurs in this plant, which is in strict accordance with the copious water movement already referred to. There is some peculiarity in the needs or otherwise, say of the seed-forming, which allows the proteid, on the occasion of its migration, to drop or leave behind more than usual of its aromatic groups. The pigment of the flowers is very similar to that of the Purple Loosestrife, *i.e.*, it is nearly pure, but not comparable to that of some of our wild geraniums.

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MAMMALS.

Badger at Holmpton, Holderness.—On March 3rd a fine female Badger weighing 23 lbs. was shot on Mr. Swales' farm at Holmpton, near Withernsea. It is a very unusual thing for a Badger to be in this district.—J. Wilkinson, Withernsea.

In Memoriam.

EDWARD SAUNDERS, F.R.S.
(1849—1910).

We much regret to record the death of Mr. Edward Saunders, F.R.S., which took place recently in his sixty-second year. A notice appears in the 'Entomologists' Monthly Magazine,' of which he was an Editor, from which we learn that Edward Saunders "devoted himself first to the Coleoptera, but acquired also considerable familiarity with entomology in general, and with several other of the 'systematic' sciences, such as botany and conchology. At the age of sixteen he published a paper in the first volume of the 'Entomologist's Monthly Magazine' on 'Coleoptera at Lowestoft,' and was afterwards for some years mainly occupied in studying the Buprestidæ of the world. A succession of notes, descriptions, revisions of particular collections, groups, etc., bearing on this subject was communicated by him to the 'Transactions of the Entomological Society' from 1866 to 1869. In 1870 he published a 'Catalogue of the Species contained in the *Genus Buprestis* Linn.,' and in 1871 his '*Catalogus Buprestidarum Synonymicus et Systematicus*,' a work the importance of which was immediately recognised.

His grand work 'Hymenoptera-Aculeata of the British Isles' (1896) is one of the few without which no serious hymenopterist thinks his working library complete. Saunders became a Fellow of the Entomological Society in 1865, served as Treasurer from 1880 to 1890, and was a Vice-President in no fewer than five sessions, viz., in 1874, 1899, 1901, 1906 and 1907.

Though he never actually held the Presidency, it is scarcely a secret that he would more than once have been elected to it unanimously if he could have been pursuaded to accept a post, the duties of which he felt unequal (physically) to discharge so completely as he would have wished.

He entered the Linnean Society in 1869, and about that time contributed at least three papers to its journal. Long after, in 1890, he published in the same journal an exceedingly careful and interesting paper on the tongues, etc., of bees, with beautiful illustrations, drawn by his brother, Mr G. S. Saunders, from microscopic preparations made by Mr. Enock.

His election in 1902 to the honour of Fellowship in the Royal Society was not only highly gratifying to himself and his personal friends, but to all who saw in it a recognition of systematic entomology, treated as Saunders treated it, as no mere idle dilettantism, but a genuine branch of science."

FIELD NOTES.

FISHES.

Record Nidd Trout.—A large Trout was found dead in the grates of the Mill Race at the New York Mills near Pateley Bridge, on March 11th. It weighed $5\frac{3}{4}$ lbs., and measured 2 feet 4 inches in length, and 12 inches in girth, and constitutes a record for the river Nidd. Several anglers have at various times had their tackle broken by a large Trout in the Nidd dam, and no doubt this is the fish responsible for the damage. An extra heavy rush of water probably carried the fish out of the dam, and dashing it against the wall of the race or the grate, brought about its death.—R. FORTUNE.

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GEOLOGY.

Boring at Hull.—We are indebted to Mr. Somerscales for the following 'particulars of Strata passed through bore at Earles' Shipyard, Hull, 1890.' The position is on the west side of the yard, and 550 feet from the river boundary:—Made Ground, 14 feet; Warp, 6 feet; Clay, 12 feet; Peat, 8 feet: Yellow Clay, 5 feet; Hard Clay, 11 feet; Blue Clay, 3 feet; Marl, 3 feet; Quicksand, 10 feet; Boulder Clay, 14 feet; Gravel, 16 feet; Chalk, +63 feet; total, 165 feet. Doubtless all between the Peat and the Chalk is of glacial age.—T. S.

Boulder Clay in Flamborough Caves.—Last summer whilst visiting the caves in North Sea Landing, Flamborough, I noticed a small cave or fissure on the south side of the Bay, in which Boulder Clay occurred, apparently in its original position. This cave is on the beach level.

A larger cave, on the north side of North Landing, which has for its roof a flint band crowded with *Holaster planus*, had in its upper portion, not only Boulder Clay, but bedded sand and gravel. The glacial deposits seem to pass laterally into 'grut' or land-wash, such as occurs over the old pre-glacial beach at Sewerby. This I believe to be in its original position, and is not redistributed. If this be glacial deposit *in situ*, it follows that this cave, be it of land or marine origin, is pre-glacial. The evidence seems to point to the fact that it is a sea-cave, and therefore North Sea Landing is a bay dating back to pre-glacial times. From this it would appear that post-glacial erosion at this part of Flamborough has been practically nil.—P. F. KENDALL, Leeds.

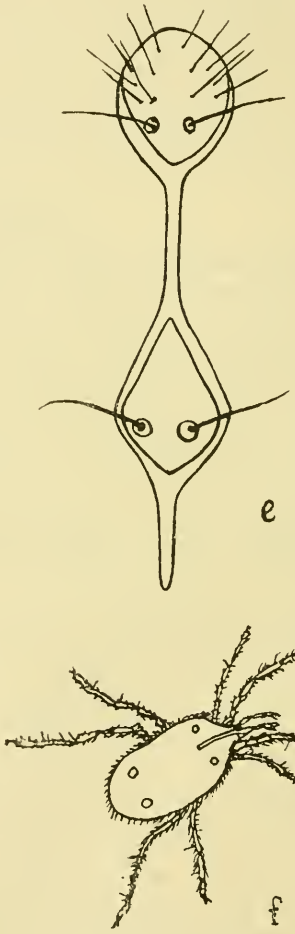
SOME BRITISH EARTHMITES.

Rhyncholophidæ.

C. F. GEORGE, M.R.C.S.,
Kirton-in-Lindsey.

(PLATE X.).

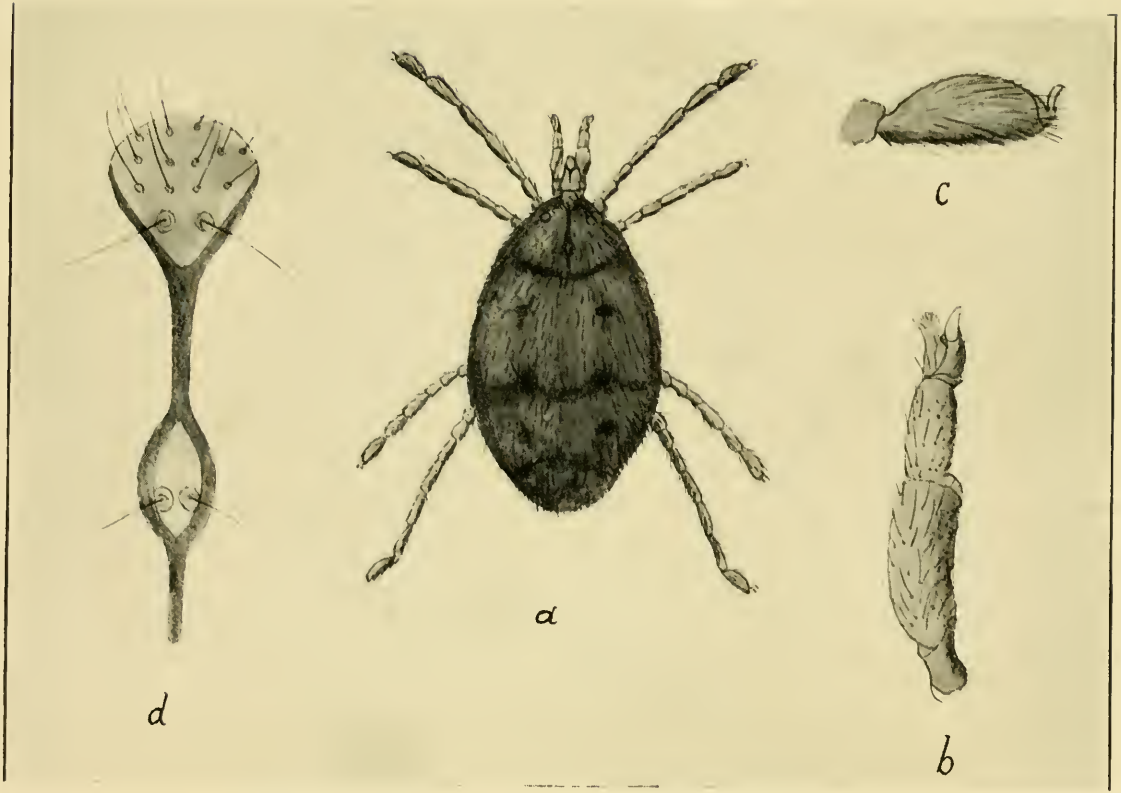
RITTERIA HIRSUTUS, n.sp.—This mite is the most striking species of this sub-genus I have yet met with. Its body is almost black, with a peculiar sheen in some lights, best seen in a living specimen. No doubt the dark colour depends in some degree upon the internal contents of the abdomen, which are decidedly black, and not easily decolorized by maceration in preservative solutions. If a portion of the skin of a moderately fresh specimen be washed in water on its inner side, with a camel's hair pencil, so as not to remove the coloured part of the skin, and then dried on a microscopic slide, it will be found to be finely striated; the lines are very wavy, and of a beautiful blue colour for the most part, but here and there they are more or less transparent. Under a highish power it forms a very pretty slide.



e.—Crista of *Ritteria hirsuta.*
f.—*Rhyncolophus episcopalis* Koch

Besides the striæ are the hairs, which are curved and bent backwards, and where these have been broken off are little round marks.

The next thing most striking is the beautiful blood-red colour of the proboscis, palpi and legs. These, also, have a pitted appearance, especially the large joints of the palpi,



a.— ***Ritteria hirsuta.***
b.—Palpus.
c.—End joint of fore leg.
d.—Crista.

which much enhances the effect of the colour. This cannot be seen in a decolorized or mounted specimen. The fifth joint of the palpus is rather peculiar, and seems to form a sort of forceps with the claw at the end of the fourth joint (fig B). In every species of *Ritteria* I have yet examined, this part of the creature seems to have some peculiarity. The legs are rather short, scarcely as long as the body, the hind ones being slightly the longest, and the fore legs the stoutest. The penultimate internode of the last legs is not materially longer than the others. The end joints of all the legs are a little enlarged and flattened from side to side, those of the front pair being rather the largest; all are very hairy underneath. The crista is very peculiar, quite unlike any of those already figured. It has a hairy capitulum, and is furnished with two stigmatic openings. Each stigma has a long tactile hair, a little below the middle. The rod of chitin divides into two; these separate and form a more or less diamond-shaped opening. The two rods re-unite and pass down as one, terminating in a blunt end, this portion being about as long as the diamond shaped opening (see figure) which has two stigmata with tactile hairs, similar to those of the capitulum. The eyes are placed on the back of the cephalothorax, rather wide apart. Each consists of a single ocellus. The hairs of the body are mostly long, curved, and simple, but some are spindle-shaped and plumose.

The mite was found in some numbers by Mr. Evans of Edinburgh, under stones below high water mark on the coast east of Dunbar. Koch figures and describes a mite which he calls *Rhyncolophus episcopalis*. The description and figure agree pretty well with this mite, excepting that I do not find the round spots of a scarlet red colour, so conspicuous in his figure. He also found his mite in a pine wood, probably not near the sea, so that no doubt the mites are not the same species.

'Fruit,' by W. Iggulden, F.R.H.S. London Agricultural and Horticultural Association. Price 1d.

In this little handbook the author has specially aimed at explaining in simple terms all that is most important to be known in regard to fruit culture for small gardens. The booklet is No. 23 of the One and All Garden Books, edited by Edward Owen Greening, and published at the popular price of one penny each. It is fully illustrated.

REVIEWS AND BOOK NOTICES.

The Proceedings of the Bristol Naturalists' Society, Vol. II., Part 2. 60 pp., 2/6, contain a number of papers bearing on the Bristol area. Profs. Lloyd Morgan and S. H. Reynolds give a sketch of the Geological History of the Bristol District; Mr. F. E. Fritsch and Miss F. Rich write on 'Biology and Ecology of the Algae Flora of Abbot's Pool, near Bristol'; Messrs. C. K. Rudge and H. J. Charbonnier describe the local mammals; Mr. J. W. White gives 'Notes on Bristol Plants,' and there is an abstract of a paper on 'Physical Disturbances in the Somerset and Gloucestershire Coalfield.'

Indian Insect Life: A Manual of the Insects of the Plains (Tropical India), by **H. Maxwell-Lefroy,** assisted by **F. M. Howlett.** London: W. Thacker & Co. 786 pp. 30/- net.

We do not remember ever previously being so much impressed by the beauty and extraordinary variety of tropical insect life, as we are by a perusal of this massive tome. Its authors, the first and second entomologists respectively of the Department of Agriculture for India, are exceptionally well qualified for the task, and the work is published by Government authority, from the Agricultural Research Institute at Pusa. The wealth of illustration and letterpress call to mind the publications issued by the various Institutes in the United States; and it is pleasant to find that India is similiarly able to suitably present the work of its naturalists for the benefit of the scientific world. There is a very interesting Introduction to insect life; classification, nomenclature, the zoo-geographical divisions, 'insects and man,' etc., are dealt with; and the remainder of the volume deals with the various natural orders. No expense appears to have been spared with regard to the illustrations, there being considerably over five hundred, and in addition there are no fewer than eighty-four 4to plates, most of which are reproductions by the three-colour process. As a means of identifying exotic insects, alone, the book is well worth the money, and should appeal to collectors, museum curators, etc. The only part of the volume we don't like is the cream-coloured cloth cover, which makes the volume all too conspicuous on the book-shelf. It also seems to convey the impression that the book is of the 'cheap and nasty' kind, whereas it is quite the reverse.

Erosion of the Coast and its Prevention. By **F. W. S. Stanton.** London: St. Bride's Press. 68 pp.

In this little book is reprinted a series of articles which recently appeared in 'Public Works.' The book is divided into three, viz., (1) 'General Observations,' in which the author discusses the question as to how the cost of protecting the coast should be borne; (2) 'Agents of Destruction and Construction,' and (3) 'Land Reclamation and Coast Defence.' There is also an appendix dealing with the Thames estuary. We notice the author accepts the statement that much of the material derived from the Holderness coast is washed into the Humber (p. 15). As is unfortunately not infrequently the case with engineers, his geology is a little faulty. 'From Berwick to Tynemouth' we learn 'the formation is of Carboniferous Limestone, *Yorkshire* rocks,' etc. Between Saltburn and Whitby 'the new red sandstone and lias predominate,' and 'bands of chalk and upper green sand cut the coast line at Flamborough Head'; and a map (p. 23) shews the greater portion of Flamborough as made up of 'Up-greensand.' Between Bridlington and Spurn Point the land 'is entirely of glacial drift, overlying boulder clay,' etc. A valuable part of the work is the discussion of the best methods of protecting the coast. In this we observe that the system of box groynes loaded with rubble, at Bridlington, 'is not only of large initial cost, but also incurs constant work of maintenance and costly repair.' There are several plans and sections, and altogether the work is one which should be consulted by anyone interested in the erosion of our coast, and its prevention.

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A MONTHLY ILLUSTRATED JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY

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AND

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Mr. T. Sheppard, F.G.S., contributes a list of the papers relating to the Geology of the Northern Counties, during the past seven years. This contains over 1600 references.

There are also reprints of the last twenty-nine excursion programmes of the Yorkshire Naturalists' Union, which contain full reports on the natural history of the various districts visited.

OSWESTRY.—GEOLOGISTS, BOTANISTS, etc., desiring fresh ground for Holidays should communicate with **Proprietor, Wynnstay Hotel, Oswestry,** for particulars.

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NOTES AND COMMENTS.

THE RAVENSCLIFF CAVE.

In the admirable journal of the Derbyshire Archæological and Natural History Society, referred to elsewhere, there are two papers dealing with the Ravenscliff Cave, which are written by Mr. A. Storrs Fox and Dr. C. H. Read respectively. The cave overlooks Cressbrook Dale, Derbyshire, and has been systematically excavated, with important results. Mr. Storrs Fox gives an account of the geological discoveries, and Dr. Read describes the relics of the Stone Age and Bronze Age which were found, amongst the latter being a fine pair of curiously corrugated gold bands, which Dr. Read considers are not unlikely contemporary with the stone axes and flint flakes found at Ravenscliff. The following is a satisfactory list of the Mammalian, etc., remains found, the figure referring to the number of objects (bones, teeth, etc.), obtained:—Man, 400; Cat, 32; Dog (or Wolf), 87; Fox, 152; Badger, 13; Bear, 178; Ox, 131; Sheep and Goat, uncounted; Deer, 48; Boar, 45; Horse, 9; Rhinoceros, 15; Hare, 57; Rabbit and Vole, uncounted; Bird (including 1 of Eagle), 101; Frog and Toad, uncounted.

Plebeius argus var. *Masseyi* TUTT.

In Volume X. of Tutt's 'British Lepidoptera' just issued, northern lepidopterists will be specially interested in the author's account of the well-known variety of *Lycaena aegon* (the *Plebeius argus* of the book), which occurs so freely on the 'mosses' of Westmorland, and of the Lancashire border. This striking 'race' of the species was first recorded from Witherslack, from captures made by the late Mr. J. B. Hodgkinson in 1856; and it was found in profusion by the same collector at Whitbarrow Scarr in July 1861. Little was then heard of it until 1892, when, as well as in the several following years, Mr. Massey of Manchester, again found it on the Witherslack mosses, and it has continued to be found in the district ever since by those who have gone to look for it.

Mr. Massey and Mr. Tutt came to the conclusion that it was the same form as a Corsican race which Bellier had named var. *Corsica*, and as such Mr. Massey recorded it, and by this name it has until recently been known in Britain. Whilst working out the material for his Vol. X., however, Mr. Tutt saw that the Westmorland race clearly differed from the Corsican form of the butterfly, and consequently it was neces-

sary to bestow on it another name, so in future it is to be known as var. *Masseyi*. Full description of the variety will be found on pages 202-3 of the volume in question, followed by particulars as to its distribution, etc., in Westmorland.

A NEW BRITISH MINERAL.

In the 'Mineralogical Magazine' recently issued, Mr. L. J. Spencer describes two rare minerals, Alstonite and Ullmannite, found in a Barytes-Witherite vein, at the new Brancepeth Colliery, near Durham. Alstonite has only previously been recorded twice, at Nent Head in Cumberland and near Hexham in Northumberland. The first records for each were made in 1834. Ullmannite has not previously been recorded for the British Isles, and the presence of this mineral and also of Alstonite was somewhat unexpected in a coal mine. Alstonite is a Barium and Calcium Carbonate, whilst Ullmannite is a nickel sulp-antimonide.

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NORTHERN NEWS.

We are glad to notice that Mrs. and Mr. William Horne, F.G.S., of Leyburn, have recently celebrated their golden wedding.

In a recent issue of the *Feuille des Jeunes Naturalistes* Mr. W. Denison Roebuck has notes on 'Quelques Limaciens du departement de l'Orne' and 'Helix aspersa en France.'

The new President of the Geological Society is Prof. W. W. Watts. Dr. A. Smith Woodward has been elected one of the Secretaries, and Dr. Aubrey Strachan is the Treasurer.

The Bradford Public Libraries have issued a description of the Lees' Herbarium and Library, reprinted from the Bradford Scientific Journal, and sold at 3d. We note that in Bradford 'La vertad es siempre verde (from the Spanish).'

Just after the recent visit of the Yorkshire Geological Society there was an enormous fall of rock at Cayton Nab, the mass of rock falling from the top of the cliffs to the shore. There seems to be every probability of further falls in the district.

Mr. Edward Lovett sends us a paper on 'The Garden Museum: a Dream of the Future.' Mr. W. B. Crump, of 4 Marlborough Avenue, Halifax, forwards a 'select list of permanent photographs and lantern slides, which he has for sale, illustrating the principal plant associations of England and Wales.' These chiefly refer to Yorkshire and the northern counties.

The members of the Bridlington Corporation have recently been discussing the question of the town's water supply, and have spent some time in deciding whether the services of a water diviner should be requisitioned, or whether a professional geologist should be asked to report. The difficulty seemed to be that the professional geologist required a larger fee than that of the water diviner. The discussion, however, was brought to a close when the Town Clerk pointed out that payments to water diviners were not legal, and that the cost thereof might be charged to the Committee!

MAN AS AN INSTRUMENT OF RESEARCH.*

By G. W. LAMPLUGH F.R.S., F.G.S.

. . . "'T is Man's to explore
Up and down, inch by inch, with the taper his reason;
No torch, it suffices—held deftly and straight."
(*Apollo and the Fates*).

INSTEAD of taking some concrete geological theme as the subject for my address, I am about to adventure, with your permission, upon a sequence of ideas concerning the qualifications of the Human Mind as an Instrument of Research. The ideas are such as will have occurred at times to every worker in science; but it is useful occasionally to bring them together for rehearsal and comparison. And as the scope of our Society covers practically the whole field of Natural Science, it seems not unfitting that we should find opportunity sometimes to examine the groundwork of our studies.

The attitude in which I propose that we approach our subject is that, in imagination, we detach human consciousness from the organism in which it is entangled, and consider first the qualifications of the organism itself as a scientific instrument. This attitude, you will grant, is easily acquired in one's outlook upon the work of his neighbour, though not so easily in respect to one's own activities.

THE RANGE OF THE SENSES.

Let us, then, examine the instrument. We immediately perceive that the organs of sensation—the traditional 'five senses'—though so perfectly adapted for the physical conditions of human life, have limitations which are reached at every turn when their use is extended beyond the requirements from which they have arisen. For the purposes of our newest function—the conscious acquisition and correlation of knowledge, the human senses have been proved inadequate, and are suspected to be even more inadequate than we have yet ascertained. We may, and do, increase their range by careful education, but only to reach a stronger conviction of their insufficiency. Until we learnt to enlarge their scope by supplementary instruments, our accurate information progressed hardly at all beyond the bounds of common experience.

**Presidential Address to the Hertfordshire Natural History Society, April 12th, 1910.*

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There was a time when it was deemed impious to question the completeness of our faculties; but that stage of human vanity is past, and we can now more justly appreciate their purposes and their restrictions. By the invention of artificial instruments to eke out the senses, we have brought within reach of consciousness much that had been hitherto unattainable, and have mastered methods that will further extend our grasp. But with every aid that ingenuity has yet been able to devise, we have still often to chafe at the limitation of our bodily faculties, dimly conscious how much of the universe there is that evades us.

By means of its powerful auxiliaries—the telescope, the microscope and the spectroscope, the range of sight has been enormously enhanced; yet these adjuncts have also helped us to realize that there are vibrations to which we are utterly blind—a world of littleness unseen with microscopes, and a world of bigness beyond our reach with telescopes.

Taste, touch and smell, so wonderfully acute in detecting minute differences among organic substances, are blunt and undiscriminative for most things that do not directly affect our physical well-being. In order to render them serviceable for our new purpose, we have had to devise delicate methods, instruments of precision, chemical reagents, and all the paraphernalia of the modern laboratory.

Our sense of hearing we have similarly to supplement, recognizing that our unaided ears are deaf to all sound-waves above or below an ascertained magnitude.

Not only is it so with the senses we have, but we have further discovered that there are whole groups of physical manifestations, such as those of electricity, radiant energy, etc., for which we are practically devoid of natural perception. In many cases, it is by indirect or artificial means alone that we have become conscious of these phenomena. In order to probe them, we use apparatus endowed, as it were, with senses we do not ourselves possess. Yet the new knowledge thus artificially brought within our ken is proving of profound significance in shaping our comprehension of the universe, and is clearly essential to our grasp of its problems.

It is unnecessary that I should follow this argument further, since the conclusion is self-evident. Regarded as instruments of research, our senses, like their artificial accessories, are adapted for purposes that are confined within limits, and the

restrictions are too narrow to satisfy our demand for accurate knowledge of our environment. It is, indeed, an old conclusion — as old as the earliest thinkers whose thoughts have come down to us—that our senses, at the best, can yield us only an imperfect and unsatisfactory record of the universe.

While thus conscious of our perceptive limitations, we can as yet but dimly surmise what proportion the sum of our present knowledge may bear to the knowable ; or how much of the unattained is absolutely unattainable. But we do know that, hitherto, every careful and properly equipped advance into the unknown has opened up the way for further advance ; so that it is mere idleness as yet to stand still at the vague apprehension of impassable obstacles ahead.

In considering the application of the human senses as instruments of research, we shall find that an important factor is their varying acuteness in different persons. Sharp senses alone do not, of course, qualify a person for research, and are often endowed upon those who make no intellectual use of them. But I suppose that every worker in science must, like myself, have felt at times how much more he might have learnt if under the given circumstances he had been able to use severally the supranormal senses of different acquaintances as his observing instruments. As it is, to a certain extent we do actually borrow each other's perceptive faculties, gaining by intercommunication many impressions that we could not have gained individually. Is it not, indeed, one of the chief purposes of our scientific societies to facilitate this kind of mutual aid and intercourse ? And may we not anticipate that in a perfectly organized community, such as we imagine for the distant future, every supranormal idiosyncrasy likely to be instrumental in advancing knowledge will be sought out and used ?

Undoubtedly the possession of acute senses, when accompanied by other qualifications, is of high consequence in scientific work. If through any flaw or feebleness the senses fail to respond normally to their duty—if they transmit stimuli partially or in a distorted form—they cannot supply a sure foundation for further work. Like all other delicate instruments, they must be capable of perfect adjustment if they are to be used for the purpose of conveying accurate impressions.

Even so, the impressions they transmit are fugitive unless

registered and interpreted by the intellect. Let us next consider this matter of their registration and interpretation.

The Interpreting Faculty.

For, after all, in scientific research it is upon the conversion of the sense-impression into its equivalent thought that everything depends. However sensitive our faculties may be as receiving instruments, they are of no avail to science unless we are able severally to transmute their records into approximately equivalent ideas, and to transmit these ideas accurately to other minds. Herein lies the factor which differentiates man from any other organism known to us ; herein also lie the chief differences between man and man in effectiveness as instruments of research.

We can all grasp the meaning of the metaphysicians when they affirm that of the whole universe, only such part as becomes imaged by thought is real to us. It is, in fact, our conscious and persistent aim in science ever to extend the boundaries of reality in this sense. And man himself is the sole instrument by which our aim can be achieved ; our ingenuity can devise no extraneous aid in this process.

Wide as the variations of personal faculty are in respect to the senses, they are slight if compared with the variations in the purely mental faculties with which we are now concerned. Being the latest acquisition of humanity, the power of abstract thought has apparently not yet become standardized but is in full evolution, throwing our experimental shoots in every direction. I think it is largely by virtue of this unstable condition that the rapid progress of modern science has been possible. In the new world that has opened before us, there has been, and still is, room for every type of mental endowment, and for each its appropriate task ; while our greatest advances have been made by the harmonious blending of results attained through diverse means. In this need for diversity of faculty there is encouragement for everyone interested in science, and especially for those who desire to share actively in its advancement, since it brings the certainty of usefulness in some degree to every participant.

It must not be forgotten, however, that a heavy responsibility rests upon him who undertakes to add his gleanings of new knowledge to the common stock. After having brought the full power of his senses to bear upon the object of his

investigation, he must strive so to fashion the mind-picture representing his impressions that it shall be faithful to the thing observed, and shall be transferrable to other minds in a form still true to its original. This is the step that costs. So far as the sphere of expanding consciousness is concerned, this is the creative act. If through carelessness or inability in the observer a false idea be fashioned and transmitted, it is worse than useless; for, like a bad stone in the building, it will crumble and imperil the superstructure.

Therefore, first, to learn rightly to understand the evidence of the senses; and next, to learn to convey what has been gathered from them in unmistakable terms, are the indispensable qualities in the equipment of man as an instrument of research. Possessing these qualities, the investigator may rest assured of the permanent value of his work, whether the field of his observation be great or small.

From temperamental diversity, however, it often happens that the person who is most capable as an observer has no equivalent capacity for conveying his results to other minds. His powers of perception are keen; he finds it easy, nay, pleasurable, to face outward on the borders of the known, and to advance therefrom into the region where new impressions grow thickly. But to formulate his knowledge for transmission is a task that is uncongenial to him; it may even demand faculties that he does not possess, and cannot or will not take the trouble to acquire. He is daunted by the ever-increasing complexity of technical expression, and has no liking for the literature in which it is used. Rather than struggle with the irksome task, he will remain mute, and allow his discoveries to die with him.

Persons of this type—and they are many—are to be counted among the most valuable instruments of research if we can use them rightly, and can distil from them the knowledge they are so peculiarly fitted to gather. Here again, our societies serve an important function, in bringing about that personal intercourse whereby the passage of information from mind to mind is rendered simple and direct; and it is their particular duty to reach and encourage the observer who sincerely devotes himself to investigation, but is careless or diffident about placing his results on record. Let them assure him that he will do good service even by recording the simple facts alone, without attempting to demonstrate their intricate

relationships or to trouble himself with the technicalities by which these relationships are conventionally expressed.

In this connection we may profitably consider for a moment the methods by which we transmit knowledge, and the difficulties that, in varying degree, we all encounter in the process.

The Transmission of Knowledge.

The difficulty of accurate expression is one of man's fundamental imperfections as an instrument of research. Our customary modes of intercommunication, slowly evolved from their beginnings in the expression of simple physical wants, have been gradually forced into use for conveying abstruse ideas by conventional symbolisms and subterfuges; but they are radically defective for the purposes of scientific demonstration.

Everyone who has tried to translate his observations into accurate description must have felt the inadequacy of language to convey even such simple qualities as the colours and forms of objects when these are at all exceptional; while to express the more complex relations of a subject in words is often found well-nigh impossible.

Yet unless the difficulty be overcome—unless, in fact, we qualify not only as observing, but also as recording, instruments the new knowledge we may have acquired remains merely personal, and may fade out, making no addition to the heritable knowledge called Science.

To eke out the insufficiency of language we are constantly inventing new methods of expression, and trying experiments therewith; so that generally the most arduous and often the most lengthy task in research-work is to devise or select the proper means of registering the results. Hence arise the symbolisms and technicalities that make modern scientific literature so unintelligible and even repellent to those who lack opportunity or inclination to master its hieroglyphics. With more or less success we minimize our difficulties by the use of symbols, formulæ, figures, diagrams, tables, photographs and pictures of many kinds; and with each advance of knowledge we advance also in the art of transmitting ideas with definiteness, struggling patiently towards the ideal standard of certitude.

But in spite of our care, it is still often found that the dis-

cussions among scientific workers over apparently contradictory results owe their origin to some obscure yet radical misunderstanding arising from a faulty medium of expression.

I suppose that one of the chief difficulties experienced by everyone using language for the description of phenomena is that the observed facts form, as it were, an entangled mass, with innumerable threads, interlacing, converging, diverging around their common centre in all directions; whereas their expression in language necessitates that the corresponding ideas shall be spun off in linear sequence on a single plane. Hence it is well-nigh impossible to reproduce the original massed effect picturing all the facts in their complicated relations. We can only strive to select and arrange the material in such order as is most likely to enable another mind to reconstruct the dimensional relations from our consecutive statement. But we know that our intention is often very imperfectly attained, and that the process of transferrence entails the loss of many factors of consequence and the severance of many interlacing links.

There is, of course, great variation of individual faculty in this particular; but even the clearest exponent is able to convey only a part of his impressions. Though he may arrange this part so skilfully that the rest of the picture is implied, through suggestion and association; yet he can never be assured of the precise effect of his exposition, since the minds which are the receiving instruments conform to no fixed standard and are of varied range.

To realise the measure of this obstacle to our fitness as instruments of research, let anyone recall for a moment any instance wherein he brought his own senses to bear for the first time upon some object (a geological section supplies me personally with a good example) of which he had previously formed a mental image from description. How rare is it in such cases that the previous idea coincides with the actual impression and remains unchanged by it! In main outlines, the two may conform; but the details have generally to undergo kaleidoscopic rearrangement.

If this be so in the domain of science where every effort is made to ensure faithfulness in the record, it is no wonder that the discrepancy between the fact and its description should often be so wide in other fields where there is no such striving after accuracy. Do not our newspapers provide us daily with evident examples?

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Nevertheless, as I have already said, we have made and are still making rapid progress in the art of accurate expression. And it is possible, nay, likely, that incidentally, among the many boons that Science will confer upon mankind, will be this of bringing the idea and its expression into closer approximation. Radically modifying our methods of thought, it is simultaneously increasing and clarifying our power of conveying thought, and is breaking down the barriers that separate mind from mind and nation from nation. Quietly and gradually, it is building up new modes of expression that become universal among its followers, despite all incompatibilities of mother-tongue. On this ground alone, and independently of all other benefits, the scientific movement of modern times has been richly justified.

The Uses of Temperamental Diversity.

The great advantages that accrue to us collectively through the services of differing individual faculties in any branch of research are so obvious that it may seem superfluous to discuss them further than has been already done. There are, however, still some aspects in which these services may be profitably reviewed.

From the infinite diversity of our personal faculties it ensues that each of us constitutes, as it were, an instrument of somewhat different design from any other ; therefore in each there is the possibility of peculiar fitness in some particular. Hence it comes to pass that often enough the very object that has been repeatedly and capably examined will yield new results of high consequence when examined afresh by a later investigator. Let no one conclude that the potentialities of a subject have been already exhausted until he shall have proved it so, in his own case, by personally testing his powers upon it ; and even then, let him remember, without prejudice or disappointment, that the next explorer, with slightly different equipment, may yet discover some new phase that has eluded him.

It may be granted that the normal healthy senses of persons living in community appear to register nearly identical impressions. But we know that these impressions group themselves differently in different minds ; and only by the comparison and correlation of many separate experiences can we eliminate individual aberrations, distortions, and idiosyncracies, and so attain the common ground of agreement that we

call Truth. Herein rests the need for the rooted scepticism of Science, democratic in essence and standing in sharp contradistinction to the aristocratic attitude of pre-scientific times, when solitary visions and imaginings demanded and received unquestioning credence. Hence, also, even repetitional observation in science has its value, in confirming or, it may be, amending previous impressions; so that every application of the intelligence has some measure of collective usefulness, whether it yield new matter or simply confirm what is known.

The scale of temperamental variation being widest in the interpreting and communicating faculties, it is in them that the individuality of the investigator becomes most apparent. At one extreme of the scale is the type, already discussed, in which the capacity for direct observation is great, while the capacity for co-ordination and expression is deficient. At the other extreme is the type in which there is little or no aptitude for original observation, but high capacity for the assimilation of ideas and for their classification. The majority of scientific workers rank, of course, between these extremes, though usually with a very perceptible leaning toward the one side or the other.

We may figuratively compare the functions of the first type to those of the plant that seizes upon surrounding particles of unorganized matter, and builds up from them an organised substance which thereafter passes as vital currency through the whole chain of life. So, the simple impressions captured and held fast by the observer are converted into conscious knowledge. The hitherto Unthought becomes Thought, and is available for merging into Collective Thought.

We may pursue the simile further. The activities of the other extreme type may be likened to the animal function, that remains almost inert to inorganic matter, but readily assimilates the products of the plant and constructs from them substances of still higher complexity. When provided with pabulum of the right quality, this type will extract from it the hidden essence; but when such material is lacking, its action is ineffective.

The interdependence of these types is manifest. Their functions are complementary; and it is only through combination of service that either can achieve its full power as an instrument of research.

But we are all naturally inclined to over-rate those qualities

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which we personally possess; therefore it happens not infrequently that representatives of the extreme types tend to under-rate the value of the faculty in which they are deficient. Thus, the investigator in whom the observational faculty is dominant becomes readily mistrustful of the dexterity of his fellow-worker endowed with facile powers of co-ordination and expression. Perhaps rightly, perhaps wrongly, he may regard the results as a mere display of imaginative ingenuity. His own work, in turn, is looked upon with impatience by a mind of the opposite type, as being nothing more than the collection of detached and meaningless scraps.

Let us acknowledge that both views have a certain measure of justification. It may be granted that detached observations are of small consequence until their relations are understood. But without them the co-ordinative mind can only raise castles in the air that have no foundation, and can have no permanence. Also it is often curiously evident that an intelligence fertile in construction may be very deficient in discrimination, and will weave bad material into the fabric along with the good. All the more needful, therefore, is the co-operation of the critical observer, not only to furnish new material, but likewise to prevent the gathering in of any which is not of the proper standard. When thus aided and safe-guarded, it is certain that the constructive imagination is a most potent instrument of research, and attains results that are unattainable by any other means.

In the estimation of these temperamental qualities and their relative value in scientific work, I think that we are somewhat too ready, both individually and collectively, to discourage the task of prolonged observation by our impatience at the tardiness and dryness of its results. Individually, we reach for conclusions before they are ripe, lest they be gathered by others. Almost instinctively we cherish our ideas more than our facts, being impelled thereto both by our constitution and by our education.

We feel that in all work of observation there is an impersonal element; that our own impressions would be approximately repeated in the senses of others under the same circumstances; that the instrumentality of the discoverer is more or less accidental.

Otherwise is it where the more abstract faculties of the mind are concerned. Here the personality becomes all-important;

the ideas as they are coined are stamped, as it were, with the mint-mark of their originator ; his right in them is admitted ; he is held responsible for their validity and is expected to defend them against all challengers.

We may learn from history that ever since man became a thinker, it has been for the possession and dominance of his personal ideas that he has most bitterly quarrelled and fought ; and even in the rarefied atmosphere of scientific thought the old leaven is not yet entirely eliminated. So we are pardonably apt to appreciate brilliancy of invention above brilliancy of observation. But let us never forget that the one faculty is incomplete without the other ; and that the effectiveness of research depends upon their proper combination. Moreover, if comparison be indulged in, it must be allowed that painstaking observation alone, such as is open to any of us, will always be helpful to the growth of knowledge ; while the exercise of the imagination alone, though productive in art, is rarely of value in science, and may be absolutely detrimental to it.

The service that can be rendered by temperamental aptitude for expression, as an adjunct in research, is manifest. But we must admit that, though potent, this quality is not in itself a sufficient equipment. When predominant, it finds its chief sphere of usefulness in the simplification and transmission of knowledge already acquired. Our ordinary methods of education, which consist entirely in the recapitulation of the known, create a constant demand for such service ; and the persons who are to become instruments of education are trained systematically to this end. Of qualified teachers of science there is no lack or likelihood of lack ; and they, like the instruments of the college laboratory, are good auxiliaries of science, but are not necessarily, or in all cases, instruments of research.

It is outside the schools and the atmosphere of teaching that the most vigorous growth of fresh knowledge is stimulated ; and our voluntary societies have a value beyond that of the schools in fostering research.

But my theme must be kept within limits ; so let me conclude by summing up its main intention. It is to reiterate and emphasize the fact that human consciousness is still in every way incomplete, but can be immeasurably increased by deliberate and sustained effort. The degree to which we have

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already extended its bounds is marked for us by the difference between civilized and uncivilized man; and we may reasonably anticipate that the advantage of fuller knowledge to our race in the future will be not less great than in the past. Consequently it should be our earnest endeavour, individually and collectively, to push investigation in every direction further and further into the unknown. In this work, the co-operation of many varied capacities is essential; and each of us by his individual quality has the possibility of service as an instrument of research that can be rendered by none other. In penetrating the darkness, every taper has its value—"no *torch*, it suffices—held deftly and straight. Eyes, purblind at first, feel their way in due season." The poet of modern thought has spoken truly and well for us in this. And he shall voice our intent, for—

> " . . . Man's the prerogative—knowledge once gained—
> To ignore,—find new knowledge to press for, to swerve
> In pursuit of, no, not for a moment: attained—
> Why, onward through ignorance! Dare and deserve!
> As still to its asymptote speedeth the curve,"

The principal paper in the 'Essex Naturalist,' which has recently appeared, and covers the period October 1908 to January 1909, is on 'A History of the Mineral Waters and Medicinal Springs of the County of Essex,' by Mr. Miller Christy, F.L.S. and Miss Thresh.

From the Birmingham and Midland Institute Scientific Society we have received the Records of Meteorological Observations taken at the Observatory at Edgbaston, 1909 (2/-). The records have been prepared under the editorship of the Curator, Mr. Alfred Cresswell.

Amongst the publications recently received we notice parts XX. to XXII. of the valuable 'Old Lore Series,' issued by the Viking Club (29 Ashburnham Mansions, Chelsea), under the editorship of Mr. and Mrs. Johnston. Number XX., which deals with the Orkney, etc., district, has an illustrated paper entitled, 'The Past in the Present,' referring to the methods of marking sheep, etc. The volume also contains many items of interest to antiquaries and philologists.

In commemoration of their recent Jubilee, the Liverpool Geological Society has issued a well-illustrated and well-written volume containing 'A Retrospect of Fifty Years' Existence and Work,' by Mr. W. Hewitt. In addition to reviewing the work that the Society has accomplished, there are notices and photographs of former prominent members, namely:—Joseph Lomas, George H. Morton, T. Mellard Reade and Charles Ricketts. Several other well-known geologists are also referred to.

The Corresponding Societies' Committee of the British Association has issued its report on the Conference of Delegates held in London (45 pp., 1/-). This contains reports of an address by Dr. A. C. Haddon on 'Regional Surveys'; 'National Anthropometry,' by Mr. John Gray; and 'The Financial Position of our Local Societies,' by Mr. John Hopkinson. There is a list of the Associated Societies, and a Bibliography containing particulars of the papers published in the Transactions of Local Societies during the year ending May 31st, 1909. This list seems somewhat incomplete, though doubtless through no fault of the compiler.

Naturalist,

ABNORMALITY IN SPIDERS.

WM. FALCONER,
Slaithwaite, Huddersfield.

Mr. Parson's note (page 214), bears upon a subject, to which arachnologists have hitherto given scant attention, and which may therefore be considered not unworthy of more than passing notice. It is now a matter of common knowledge that in both the animal and vegetable worlds, types are not fixed, but admit of a certain range of variability, which is of interest to, and recognisable only by, systematists. Outside the permissible limits, abnormality results. Amongst spiders cases of real abnormality, the more pronounced deformities in, and deficiencies of, structure, coloration and shape, are most exceptional, and though in the course of a long experience as a student of the arachnida, I have naturally met with several such examples of one kind or another, they have nevertheless been exceedingly few in number compared with the thousands of quite normal form and aspect which have passed through my hands.

The number, size, and arrangement of the eyes form very important discriminatory characters in the diagnose of genera and species of spiders, so that any peculiarity in them is readily observed. Especially is this the case if some form of blindness is present. This, when it occurs, may be either partial or total, according to the number of eyes affected, and is usually associated with a more or less abnormally shaped caput. One would imagine that the more complete the degree of blindness, the more severely would the unfortunate creature be penalised in the struggle for existence and the less likely to escape a violent death from the ferocious jaws and deadly beaks of its numerous enemies. The range of vision in spiders, however, is supposed not to be very great, and if they depend, as has been surmised, upon other senses far surpassing our own in perceptibility, even more than upon that of sight, for preservation from danger and for the capture of prey, then the deprivation will be less serious in its consequences. However this may be, I can only remember to have seen during the last eleven years, two individuals in which all trace of eyes had been completely obliterated, the one described by Mr. Parsons in his note, and the other, a female, *Walckenaera acuminata* Bl., collected by myself in Roundhay Park, Leeds, on November 11th, 1908. The latter had its copulatory organs fully developed, and the

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eye eminence irregularly shaped and angularly produced in striking contrast to the rounded and symmetrical contour which is characteristic of a properly equipped specimen.

I have unfortunately not made notes of all the cases of partial blindness I have seen, but have noticed that the male of *Tiso vagans* Bl., in which the eyes are naturally minute, seems to be more liable to this kind of deformity than any other species, of which I have had experience, as I have at various times taken several examples of it thus afflicted.

In a short paper, 'East Coast Spiders,' 'Naturalist,' January 1906, p. 29, I recorded a very curious specimen of a female, *Hilaira excisa* Camb., from Hayburn Wyke, North Riding, which had only half its eyes in a serviceable condition, two laterals on the same side being altogether obsolete, the two centrals next to them greatly reduced in size and imperfectly formed, and the caput in some particulars abnormal also.

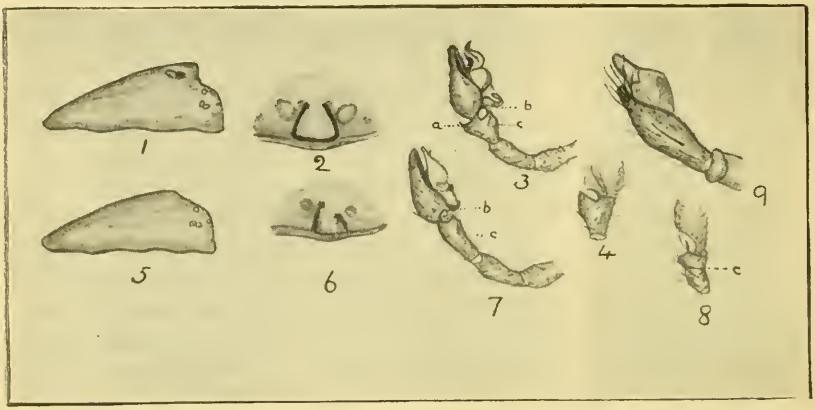
The effects of this form of blindness are, of course, restricted to the individual, and do not in the least affect the race. It is, therefore, quite different in character from that which prevails amongst certain exotic cave-dwelling spiders, in which it is commonly supposed to be the cumulative effect, through countless generations, of darkness so intense as to render the faculty of sight futile and the possession of eyes useless, with the result that these organs have gradually degenerated to mere pigment cells, and, in course of time, all traces of them have entirely disappeared. The blindness is here a characteristic of the species and not merely of the individual. This is, however, an extreme case. All cave-dwellers are not blind, though some have their eyes reduced in number or diminished in size. Neither are all those species with eyes lessened in number or in size troglodytes. Several British spiders, for example, *Tiso vagans* Bl., *Thyreosthenius biovatus* Camb., and the members of the genus *Porrhomma* Sim., are particularly noticeable for the small size and often imperfect structure of their eyes. Some of the *Porrhommata* were originally discovered in caves and coalmines, having been conveyed to the latter in fodder, and the condition of darkness under which they there existed, was held to be sufficient to account for the peculiar state of their eyes. We now know that they are not confined to such places, but may be found in the open at the roots of grass, amongst fallen leaves and beneath stones, and that these characteristics are not altered thereby. We may con-

jecture, therefore, as explicit knowledge is denied us, that some other influence in addition to darkness is at work to produce atrophy of the organs of vision.

Combinations of male and female characters in the same individual are exceedingly rare amongst spiders, the four noted below being, so far as I can discover from the literature at my disposal, the only ones which have occurred, or at least been considered worthy of specific mention. The same phenomenon is much commoner amongst insects, but in neither class is there a genuine case of hermaphroditism, such as exists amongst the mollusca, worms, and others of the lower animals, in which either mutual or self-impregnation obtains, with subsequent production of young, but all instances, at least amongst spiders, are marked by some structural imperfection in one or both sets of copulatory organs, as that having regard to the mode of reproduction amongst them, it may be taken for granted that these organs are functionally inoperative. The first reference to the condition is that of the Rev. O. Pickard-Cambridge in his paper 'On New and Rare British Arachnida' in the 'Proc. Dorset Field Club,' Vol. XXII., 1902, p. 17. The example there referred to, *Hilaira excisa* Camb., was taken in Glamorgan, by Dr. A. Randell Jackson, in 1901, and had one palpus of the male and the other of the female form ; the caput bore the peculiar structure which belongs to the male alone, and the abdomen was also of the normal male form. Mr. Cambridge, also states that he once found a similar specimen in a collection of exotic spiders, but it was lost or destroyed by some mishap before he could make either a drawing or description of it ; further that these were the only ones he had noticed among the many thousands of spiders which he had had occasion to examine. The third example is recorded by Dr. Jackson in his 'Spiders of the Tyne Valley,' p. 384, 'Trans. Nat. Hist. Soc. of Northumberland, Durham and Newcastle-upon-Tyne,' New Series, Vol. I., part III., a *Porrhomma oblongum* Camb., found at Hexham, which had one male palpus, a female palpus, and a distorted epigyne. It was an examination of this specimen, kindly lent to me some years ago by its finder, that first evoked in me an interest in the subject of this paper—an interest which was further stimulated and increased, when a short time afterwards I myself obtained a most curious form of *Œdothorax retusus* Westr., which was included in a large gathering of the same species which I made on the sandhills, south of Southport,

on May 22nd, 1904. It is still in my possession, but has not yet been described or recorded.

The cephalothorax (fig. 5) is raised behind the eyes as in a normal male (fig. 1), but the elevation is much less lofty, not so massive and totally devoid of the lateral impressions which are not so conspicuous in the latter, while the descent to the ocular area is also less abrupt. Both palpi are of the male form, but some of their parts, including the palpal organs, are abnormal in shape, size and structure. In a normal example the tibial joint (fig. 3*c*) is shorter than the patella, and provided at the extremity with an angular prominence directed outwards, and ending in a small pointed apophysis, (fig. 3*a*),



REFERENCES

Œdothorax retusus **Westr.**

NORMAL SPECIMEN.

Fig. 1.—Cephalothorax of Male. Fig. 2.—Epigyne of Female.

Fig. 3.—Right palpus from outside: (*a*) angular prominence and (*b*) curved spine of tibial joint (*c*).

Fig. 4.—Tibial joint of left palpus from above.

ABNORMAL SPECIMEN.

Figs. 5 to 8 correspond with those above, (*c*) in 8 being false articulation of tibial joint of left palpus.

Fig. 9.—*Meta segmentata* Clerck, male, abnormal tibial joint and palpal organs of right palpus.

a little distance from which is a small, black, sharp-pointed, slightly curved spine, directed downwards (fig. 3*b*). In the abnormal specimen (figs. 7 and 8), both palpi are without the angular prominence, possessing only the curved spine (marked *b*); the right palpus is equal in length to the patella (fig. 7); the left palpus is in normal proportion, but towards the extremity

has an irregular false articulation (fig. 8). The palpal organs are also somewhat abnormal in structure, but the differences may best be seen by a comparison of the figures given (3 and 7). The epigyne (fig. 6) is imperfectly formed, but all the details may be distinctly traced (compare with that of normal specimen fig. 2). (*To be continued*).

CRUSTACEA.

***Platyarthrus hoffmannseggii*, in Yorkshire.**—On the visit of the Leeds Conchological Club to South Milford on April 9th, several ants' nests were examined in a disused quarry near Monk Friston, and in three of them, which belonged to the Yellow Ant, (*Formica flava*) was found the crustacean *Platyarthrus hoffmannseggii* fairly numerous. I also turned over a stone in the same quarry, where I found no indication of ants at the time ; the nearest nest being over two yards away. Under this stone I found eight specimens of *P. hoffmannseggii*. I have also found specimens in the nest of the same species of ant on Adel Moor, near Leeds.—W. Harrison Hutton, Leeds.

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COLEOPTERA.

***Quedius obliteratus* Er., and *Homalium septentrionis* Thoms. in Yorkshire.**—When on a visit to Knaresborough last month I took a single specimen of *Quedius obliteratus* Er. among dead leaves. This is the *suturalis* Kies of the older British collections, and as such is recorded by Bold as rare in Northumberland and Durham. Beare and Donisthorpe in their catalogue of British Coleoptera include the two species thus separated, but *obliteratus* Er. is the insect of our collections.

I have been much interested in detecting amongst some old specimens of *Homalia*, one which is referable to *H. septentrionis* Thoms. I found this rare North British insect in decaying fish used to attract beetles at Saltburn Wood in July 1894.

Another beetle which appears to be new to Yorkshire is *Homalota æneicollis* Sharp, which I find was taken under bark at Saltburn in 1896. It is closely allied to the common *H. xanthoptera* Steph, and will probably be met with in other parts of the county when this difficult genus comes to be more closely studied.

It is to Mr. W. E. Sharp of London, I am indebted for assistance in establishing the identity of these insects.—M. Lawson Thompson, Middlesbrough, April 19th, 1910.

SOME AVICULTURAL NOTES.

W. H. ST. QUINTIN, J.P., F.Z.S.,
Scampston, E. Yorks.

(*Continued from page 168*).

This summer I had a still greater disappointment. A pair of Waxwings nested, and began to sit on the 22nd of June, and a fortnight later the eggs were chipping. The interesting event greatly excited the hen bird, and in the end she positively died in a sort of fit; while a few hours afterwards the male also succumbed to an effusion of blood upon the brain. I think we had perhaps got the birds in too high condition. They are, as I have said, sluggish birds with great appetites. Being largely eaters of flying insects in a wild state, they get plenty of exercise chasing their food. In an aviary, life is made too easy for them, and they become apoplectic. I hope to guard against this another year. But we had to deal with the eggs which were chipping and nearly cold. There was luckily in another aviary a Snow-bunting just due to hatch, so the Waxwing's eggs were put under her. Only one hatched, the others having got hopelessly chilled. The Snow-buntings reared their foster-child for a week; when perhaps because another pair of Snow-buntings were nesting too near, and owing to the resulting quarrels, the nestling Waxwing seemed to be getting neglected, and to be growing weaker. My man conceived the idea of taking it and putting it into a foster-mother, in a Blackbird's nest, lined, and covered with a flap of cotton-wool. Here it was fed at very frequent intervals on flies, fresh ants' eggs, gentles, and small silk-worms, for three days. There seemed a good chance of rearing it, but one morning it was found dead for no obvious reason; but being a solitary bird, it may not have been kept warm enough; on the other hand I do not feel certain that it was not stifled by the wool. This was its eleventh day, and so far this is the greatest age to which a young Waxwing hatched in captivity has attained, though Mr. Reginald Phillipps, who has been wonderfully successful in keeping and breeding delicate and difficult birds, had a brood in his garden aviary in West Kensington this summer, which lived a week, and only succumbed apparently to a spell of very wet weather.

I should think it likely that the young Waxwing develop-

ment is slow, for my nestling's eyes were only partly opened on the eleventh day.

The gape was of a brilliant crimson-violet, which vanished speedily after death, and had almost disappeared when the bird had reached the Natural History Museum (in spirit). It was curious to note that though the primaries were only just beginning to shoot, the scarlet wax tips of the secondaries could be distinctly seen through their transparent sheaths.

Snowy Owls. I have a splendid pair of these birds, brought from Norway by a friend in July 1901. That was a Lemming year, when the hordes of the little rodents were over-running the district, attended as usual, by numbers of beasts and birds of prey, the beasts including wolves, and the birds including goshawks, rough-legged and common buzzards, and snowy owls.*

A Lapp had brought the young birds many miles, in a rough basket, and they were in a sorry plight. He had a bag hanging on his back, and as he turned away, my friend saw it move, and asked what was inside. It was the poor male bird, which had been daring enough to dash at the Lapp's chest when he was taking the young, and got its claws entangled in the latter's clothing, and was grabbed before he could clear himself. There was also the body of the female owl, which had been bored through with a spherical bullet, from an elk rifle, fired at very close quarters, as she sat snapping her beak while her nest was being robbed. They were being taken further down the valley, to an official, so that the head-money offered for beasts and birds of prey might be claimed. My friend secured both for a price slightly above the official reward, and cleverly brought the old bird, who was half-stifled, but not otherwise seriously hurt, back to complete health, and he came over to England with the nestlings.

My birds have gone to nest many times. They are late breeders, and if July is a warm month, the young are seldom

* Two years later I was fishing in the same valley. A few wolves remained. They had practically destroyed the small flock of a farmer near where I stayed, a few days before I got there. But the Snowy Owls had retired to the higher mountains, and there was no more than the usual number of the other Raptores breeding in the neighbourhood that season. But I was shewn places where quantities of Lemming skeletons and skins remained, notably a cutting on the Stockholm and Trondhjem Railway, where the little animals tumbled over a rock some forty feet high on to the line, and had smothered each other in a water gully.

reared. This season the owlets were suited well enough by the cool moist weather, and there were two a fortnight old, which seemed doing well. Suddenly the old female turned on them, and not only killed, but ate them both. They are always kept as quiet as possible when breeding, and I cannot account for it.

As regards the plumage, these birds differ greatly. Some individuals are much more spotted than others. As a rule the males, which in the plumage of the first year are heavily spotted, though the markings are always smaller and paler than in the case of the females of the same age, become more and more white each moult until about four years old, and then remain without further change.

My old male bird has this autumn in the moult altered his appearance a good deal. Since his fourth year, he had been pure white, except for a few black spots on the tertiaries on both sides. This time he has put down many spotted feathers on the wing coverts, so that the character of his plumage is changed from what it had been for fourteen or fifteen years.

My RAVENS are regular breeders, and, of course, very early in their nesting operations. They would sometimes build, if they had the materials, before January was out, but I think it early enough to supply them with their sticks about the middle of February. A large basket is then fixed up in a corner of the aviary, and a barrow load of larch and birch branches is thrown in, also pieces of turf and wool. Moss used to be given, but it was never used. The birds work so energetically that in a week's time the nest is ready for eggs. The period of incubation is 21 days, and the young do not leave the nest till five weeks old.

Last year five fine young were successfully reared, and duly distributed amongst my friends. This was rather a severe tax upon not only the parents, but also upon those who had to procure and prepare the food for such a family; and no one was sorry when this spring's brood was found to consist of but two, probably owing to the first-laid eggs having been frozen.

As an old falconer, I ought to have known better than to feed as I did the first brood, some five years ago, with too light food. The keepers were killing down rabbits at the time, and small ones were brought in and freely given to the ravens. They were, of course, quite fresh, and there was an ample supply, but the young Ravens developed 'ricketts.' When the time came for them to leave the nest, not only were their beaks

crooked, but their wings and legs were bent, and bowed. It was nothing but want of sufficiently nourishing diet.* Since that lesson, I have always seen that the ravens had a regular supply of rough butcher's meat, as well as other lighter food, and with the best results. Ravens are, of course, absolutely omnivorous, and nothing edible comes amiss. Even hempseed is readily picked up.

The bark is easily heard on a still day, quite two miles away. It is strange to hear the male, who is possessed of greater vocal accomplishments than his mate, after a series of coarse reverberating notes, drop his voice and exactly imitate the crooning of the Jackdaws in the hollow elm tree over his head.

The last bird I shall refer to is the SECRETARY-BIRD, of which I have two very fine examples, which I am hoping will turn out to be a pair.

The Secretary-bird, besides a kind of 'roar,' has some rather eagle-like notes, and his beak is that of a bird of prey, but otherwise he seldom betrays his relation to the Raptores, and many of his ways are peculiar to himself.

My birds came from Potchefstroom, in the Transvaal, and were brought as nestlings to my friend Major Horsbrugh, in a pillow-case on the back of a burgher, who had ridden on his bicycle forty odd miles with this burden. They have enormous appetites, and I fear gave much trouble, before they were old enough to send off to England. They take an immense amount of exercise, and delight in racing about in a good big enclosure, which they share with some Cranes, and the Great Bustards. Their movements often remind one of the aeroplane. The neck is outstretched, the wings wide spread, and held without flapping at such an angle that after the bird has run across the field (his paddling feet representing the motor), he is sometimes lifted off the ground. I ought to say this used to be the case, for to my regret I found it necessary to pinion the birds, and now they are not evenly balanced as before.

They are fed twice a day, and stuff down an extraordinary amount of food with fur, feather and bone. Luckily they are not particular, and all rats, moles, and even stoats and weasels are reserved for them. But a hen's egg is their special dainty

* A peregrine or goshawk, if fed on rabbit, or even on blue-hare, is quite unfit for hard work; and though as a change of food for a hawk not in training, rabbit flesh is allowable, it must not be given except as a change occasionally, once or twice a week at most.

and in eating them they have shown a good deal of intelligence. They have no intention of breaking the shell, and losing any of the contents. On the contrary, the egg is to be swallowed whole, and reliance is placed on the gastric juices to dissolve the shell. They used to find it difficult to pick up the egg when in a standing position, without cracking it, but now they flex their long legs, lay the lower mandible flat on the ground, and shovel up the egg. That the egg is swallowed whole is certain, for I have known one of them dispose of three eggs one after the other, and when pursued by the other bird, deliver them up on the grass still unbroken.

I have never offered my birds a snake, but an eel is treated with much caution as if it might be dangerous, and receives many unnecessary blows long after all motion has ceased, before it is swallowed. The blows with the foot are given with great rapidity, and a rat released from a trap has no chance, and is rolled over very neatly, getting a disabling blow, generally on the head, in spite of his activity. Though their inclination is to swallow their prey whole, if given too large a piece, of rabbit for instance, they will hold it under their feet, and tear off pieces, cleverly enough, like an ordinary bird of prey.

The birds are quick-tempered, and are best kept in separate compartments when in a shed. Sometimes if they have a difference, one will give the other a resounding thump with its foot; and I have known an inquisitive Stanley Crane thrown back a yard or more by an unexpected blow on the chest.

In summer it is pretty to watch them striding about their paddock examining the grass, and stooping down to pick up a sleepy fly or beetle, or standing watchfully over a tuft as if they had heard a mouse stir.

Major Horsbrugh tells me that he has seen a wild Secretary-bird extend a wing and gently touch a bush, and like a flash strike at a lizard or locust which might be disturbed and try to escape. Any low-flying butterfly, such as a meadow-brown, is soon knocked down, and eaten by my birds, and I have seen one pursue even a common blue across the enclosure, striking at it whenever he got a chance, but, as far as I have seen, without success. But evidently insects form a large portion of their natural food, and I should think they must destroy a great amount of locusts.

Their way of resting is unusual, and very unlike that of other members of their Order. They lie down with wings

pressed close to the side, and when walked into their sheds for the night, lie down almost at once.

In the summer when left out altogether, they creep under the spreading branches of some young spruce fir, and so roost. My specimens are of the South African species, with brilliant orange yellow cere. The form found in the equatorial regions have the same parts rose pink in colour. I notice that when my birds are greatly excited, a suffusion of pink creeps over the yellow cere, in fact the bird blushes!

I should like here to acknowledge my indebtedness to my Bird-keeper, Arthur Moody, to whose skill and care much of such success as I have achieved is due: as well as many important observations, and notes taken when I have been from home.

In conclusion, it is pleasant to think that ornithology has now become something more than a science, it is a popular study. Not only is there a desire on the part of the public, no less eager than before, for information on structure and classification, which can only be properly worked out in the museum and laboratory; but in addition there is a thirst for knowledge, as full as may be, of how birds live, and what their ways are, how they feed, and display their plumage, make their nests, and tend their young.

The wonderful supply of beautiful photographs which exhibit the life-history of birds is a proof of this demand. I have for a large portion of my life found much interest in studying this aspect of the delightful science of ornithology; and it is a great addition to one's pleasure if one can impart some of that interest to others.

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The President of the Board of Education has appointed a Departmental Committee to consider and report upon various questions in regard to the present condition and the future development of the valuable collections comprised in the Board's Science Museum at South Kensington and the Geological Museum in Jermyn Street. In particular the Committee are asked to advise him (*a*) as to the precise educational and other purposes which the collections can best serve in the national interests; (*b*) as to the lines on which the collections should be arranged and developed, and possibly modified so as more effectively to fulfil these purposes; and (*c*) as to the special characteristics which should be possessed by the new buildings which, it is hoped, will shortly be erected on the South Kensington site to house these collections so as to enable the latter to be classified and exhibited in the manner most fitted to accomplish the purposes they are intended to fulfil.

1910 May 1.

In Memoriam.

CHARLES FOX-STRANGWAYS, F.G.S., 1844-1910.

During the past two or three years it has been our painful duty to record the decease of quite a number of workers in Yorkshire geology. To this list must now be added the name

of C. Fox-Strangways. Mr. Fox-Strangways was a painstaking, consciencious and careful worker ; most courteous and friendly on all occasions, occupying a place in the hearts of all who knew him well. He has left behind several important memoirs, which will ever remain a monument to his memory.

He was born near Exeter in 1844, and after being educated at Eton and Göttingen, he entered the service of the Geological Survey in 1867. He mapped parts of the Yorkshire coalfield,

and also worked in other parts of Yorkshire, particularly in the Harrogate and Scarborough districts. His mapping of our Eastern Moorlands is a splendid example of detailed geological field-work.

In later years he was engaged in mapping the Leicestershire coalfield, and the surrounding areas. He retired from the Survey six years ago, but since that time he has been by no means idle; in fact he was constantly at work, either for the Survey, or in some other way furthering the interests of geology. At the time of his unexpected death from heart failure on March 4th, he was engaged in preparing a complete bibliography of Yorkshire geology. This enormous work was, we believe, practically completed, and it is to be hoped will be printed for the benefit of future workers. Such, we know, was Mr. Fox-Strangway's wish in undertaking the bibliography, as at his age he could not expect that it would be of much service to him personally. Only those who have had experience in this kind of work can properly appreciate the amount of labour Mr. Fox-Strangways voluntarily undertook for the benefit of his fellow-workers.

Of his published memoirs the first place must be given to 'The Jurassic Rocks of Britain, Vols. I. and II., Yorkshire', published by the Geological Survey in 1892. The first volume contains a general account of the Yorkshire Jurassic strata, with map, sections, and illustrations of typical fossils; whilst the second contains a catalogue of the fossils, a bibliography, etc. It is needless to add that this work has been of the greatest service to geologists and others.

Only so recently as 1907 Mr. Fox-Strangways published a memoir on the Leicester and South Derbyshire Coalfield, which occupied nearly 400 pages, with numerous plans, sections, etc. He also was author of a number of smaller Survey memoirs; those for Harrogate and Scarborough requiring second editions—a rare occurrence with Survey publications.

Amongst his other writings the following is a list of those we happen to have before us:—'The Valleys of North-East Yorkshire and their Mode of Formation' (1894); 'Glacial Phenomena near York' (1895); 'Notes on the Coast between Redcar and Scarborough' (1896); 'Filey Bay and Brigg' (1897); 'Geology of the London Extension of the M. S. & L. Rly. from Annesley to Quainton Road, near Aylesbury' (1897); 'Sections along the Lancashire, Derbyshire and East Coast

Railway between Lincoln and Chesterfield' (1898); 'Notes on Spitsbergen and Iceland' (1900); 'Excursion to Scarborough' (1903); 'Excursion to Whitby' (1904); 'Geology of North-East Yorkshire in relation to the Water Supply of the District.'*

Mr. Fox-Strangways was of a retiring disposition, and shrank from taking a very prominent part in connection with the work of the various scientific societies with which he was connected. An exception was made with the Leicester Literary and Philosophical Society, however, where he took a keen interest in the meetings and excursions—the Society even extending its excursions to the Yorkshire coast under his guidance.

Mr. Fox-Strangways was not one to court friendship, but those who knew him best appreciated him most. The loss of his quiet presence from amongst us will be peculiarly felt by Yorkshire geologists, on whom his example and his instruction have had far greater influence than they themselves are sometimes aware.

T. S.

Messrs. G. E. W. Young and W. Wright have issued a useful 'Classified Index to the Contents of the Proceedings of the Geologists' Association,' Vols. I. to XX.

In the 'Quarterly Journal of the Geological Society' for February Mr. S. S. Buckman has an interesting paper on 'The Jurassic Strata of South Dorset,' in which he compares the beds of that country with those of North-East Yorkshire.

We regret to note the deaths of Mr. G. W. Kirkaldy, a well-known entomologist; the Rev. Henry Charles Lang, who published 'The Butterflies of Europe' in parts, in the early 'eighties; Basil G. Nevinson, who published a Revised Synonomic list of the genus *Phanæus* in 1892; and George C. Bignell, who wrote a number of papers on the Ichneumons, etc., of Devon.

In the April 'Journal of Conchology' is Lieut.-Col. Godwin-Austen's Presidential Address entitled, 'The Importance of the Animal in the Land Mollusca, shown by certain Evolutionary Stages in some Genera of the Zonitidæ,' which is well illustrated. There is also an important paper by Mr. J. Davy Dean, on 'Periodic Variation in Limnæa pereger,' and Mr. C. Oldham writes on 'The Range of *Pisidium supinum*.'

We have received from the West Australian Museum and Art Gallery, Vol. I., Part I., of their *Records*, which contains a valuable paper by Mr. L. Glauert, formerly of Sheffield. This deals with 'The Mammoth Cave,' and contains a detailed description of the remains of the *Phascolomys hacketti*, a new species of Wombat. Mr. B. H. Woodward contributes an 'Introduction to Fossil Marsupials of Western Australia,' and there are some interesting museum notes. Mr. Glauert's paper is illustrated by a number of excellent plates.

* References to these papers will be found in the Bibliographies prepared by the present writer, and published in *The Naturalist* or in the Transactions of the Yorkshire Naturalists' Union.

FIELD NOTES.

MAMMALS.

Mammals at Osmotherley.—At the excursion of the Yorkshire Naturalists' Union to Osmotherley (*vide* 'The Naturalist,' 1908, pp. 403-411), Mr. Wm. Nowell collected several rejected 'pellets' of an owl in a wood near to Mount Grace Priory. Mr. W. Greaves now writes that these 'rejecta' have since been kept perfectly intact, and that he has recently submitted them to Mr. T. A. Coward, who reports that they contain the remains of three Field Voles (*Microtus agrestis*); three Bank Voles (*Evotomys glareolus*); two Long-tailed Field Mice; one Common Shrew; and one Rabbit of fair size. The first three species were not observed during our visit. At that season of the year the owl would not be likely to have travelled very far.—H. B. Booth.

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BIRDS.

Old Record of Red-backed Shrike near Silsden.—I have lately been reading some newspaper cuttings from which I see that a Mr. Mitchell communicated to Mr. S. L. Mosley, late Curator of Keighley Museum, the nesting of the Red-backed Shrike on Howden Clough, near Silsden, on the authority of the late Jesse Miller, of Keighley, a good authority on birds. When Mr. Nelson was writing his work on the 'Birds of Yorkshire,' I informed him that a friend of mine in the 'sixties had a pair of this species in his possession, which he alleged has been taken on Silsden Clough, and which he gave me to understand at the time had bred there, but Mr. Nelson omitted this record. Mr. Miller's record, however, which we have no reason to dispute, corroborates that communicated by me to Mr. Nelson.—E. P. Butterfield, Wilsden.

—: o :—

FISHES.

A Record Yorkshire River Trout.—A fine specimen of the Brown Trout (*S. fario*) was found dead on the banks of the Wharfe at Ilkley, on April 9th. It weighed 10 lbs. 9 ozs., and measured 31 inches in length and 15½ inches in girth. Apparently it had died from accident or disease. The dorsal fin was a bad colour, nearly white, and partly eaten away, and the top of the head was much bruised, otherwise the fish was in fair condition. It was secured by Dr. Bates of Addingham, who is having it preserved. I should say that no river fish has ever been obtained in Yorkshire, approaching this size.—R. Fortune.

ARACHNIDA.

A Malformed Eyeless Spider.—On September 4th of last year I collected a curious spider in the beech woods east of South Cave. The caput was malformed, and no trace of eyes could be observed. As it was not quite adult the species could not be determined. Such examples with one or more, or as in this case with all eyes obsolete or imperfect, are very occasionally met with. The deformity would seem to be due to some inherent defect in the embryo, or to some accident either at birth, or in moulting. It is remarkable that a creature so greatly handicapped should be able to preserve its life amidst so many enemies, and obtain the necessary food supply.—Ernest A. Parsons, Hull.

—: o :—

FLOWERING PLANTS.

***Hymenophyllum peltatum* Desv. (=*H. Wilsoni*, Hooker) at Ingleton.**—I found the Deflexed Filmy Fern near the Greta Gorge, Ingleton, on the 28th March last. I forwarded one of the specimens to Mr. F. Arnold Lees, who kindly replied as follows:—'Thanks for your welcome new (particular) locality for the Deflexed Filmy Fern (*Hymenophyllum peltatum* Desv.= *H. Wilsoni* Hooker). In the course of years it may have been a 'wash-down' from the long-known head-quarter situate on Foalfoot Rocks, west fall of Ingleboro'; but nobody before yourself seems to have detected it in the Greta Gorge. It turned up, however, to John Handley, in Dentdale, two miles from Dent village, towards Ingleton, but the water of the cascade there flows west into the Lune. Yours is in the Lune Basin, too, but the southern sub-division.'—W. E. L. Wattam, Newsome.

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In the March 'Geological Magazine,' Dr. C. W. Andrews has an interesting paper on 'A Mounted Skeleton of a small Pliosaur (*Peloneustes*) from the Oxford Clay at Peterborough,' illustrated by an excellent plate. There is also an article by Dr. F. A. Bather on 'Some Fossil Annelid Burrows.'

From our contributor Mr. T. Petch, we have received a further batch of publications which bear evidence of the excellent work he is doing in Ceylon. There is 'A List of the Mycetozoa of Ceylon'; 'Revisions of Ceylon Fungi,' Part II.; and 'New Ceylon Fungi.' These are reprinted from the 'Annals of the Royal Botanic Gardens, Peradeniya.' There are also three 'circulars', one, which consists of over a hundred pages, deals with 'The Stem-bleeding Disease of the Coconut,' which is illustrated by a number of plates; the others are entitled 'A Bark Disease of *Hevea*, *Tea*, etc,' and 'Die-Back of *Hevea Brasilensis*.'

PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

The Transactions of the Yorkshire Dialect Society, Part XI., contains an admirable paper by the Rev. C. F. Morris, on 'The Treasures of Dialect, with Illustrations from the Folk Speech of the Woldsman.'

The Proceedings of the Liverpool Naturalists' Field Club for the year 1909 (55 pp.), contain a 'Report on the Year's Field Work,' by Mr. J. W. Ellis; the Presidential Address of Dr. C. W. Hayward, entitled, 'Odd Facts for Naturalists,' in which the question of Evolution is discussed; and particulars of the club's various prize schemes.

The Fifty-seventh Annual Report and Transactions of the Nottingham Naturalists' Society for 1908-9 contains the Presidential Address of Mr. J. Goulding on 'The Mysteries of the Milk Pail'; a brief 'Report of the Work of the Microscopical Section'; and a note on 'The British Pansies.' There are records of the Common Seal and the Glossy Ibis in Nottinghamshire, the former being shot in the Trent, whilst the record of the latter has already appeared in these pages.

The Thirty-third Annual Report and Proceedings of the Lancashire and Cheshire Entomological Society is just to hand. Besides the usual list of members, balance sheet, etc., we notice papers by Mr. H. H. Corbett on 'The Phylogeny of the Insecta'; Mr. W. Mansbridge on 'Micro-Lepidoptera in the Liverpool District'; Mr. H. R. Sweeting on 'The Valuation of Variation to a Species': and Mr. F. N. Pierce on 'The Luperinas.' There is an excellent portrait of our old contributor, Mr. Robert Newstead, as frontispiece.

The **Norwich Museum Association** has issued its Second Annual Report of Proceedings, and contains reports of lectures on the 'Food of Birds,' by Mr. C. Gorden Hewitt; 'House Flies as Carriers of Disease,' by J. T. C. Nash; 'Fungoid Diseases of Plants.' by Mr. E. S. Salmon; 'Wheat and Bread-Making,' by Prof. R. H. Biffen; 'The Soils of Norfolk,' by Mr. W. L. Sutton; 'The Insect Pests of Fruit' by Mr. F. V. Theobald; and 'Roses,' by Mr. T. B. Field. The Norwich Museum Association was formed to further the interests of that Museum, and is doing excellent work.

Vol. I., No. 2, of the **Journal of the Spen Valley Literary and Scientific Society,** which contains 64 pages, and is sold at the absurdly low price of 3d., is to hand. The journal contains a portrait of the late H. T. Broughton; 'A Record of the Society's Work'; a paper on 'The Society: its Past, Present, and Future,' by Mr. A. Moore; 'Sectional Reports'; 'Pond Life in the Spen Valley,' by W. Bagshaw; 'Report on a first investigation of Local Diatoms in 1909,' by J. A. Long; 'Records of Mollusca,' by T. Castle; a small 'List of Mosses and Hepatics in Spen Valley, 1909'; and a poem entitled 'The Spen Society,' in which the author tells us that he is 'not a poet born.' We should almost have guessed it!

We have received Vol. V., Part I., of the **Transactions of the Carodoc and Severn Valley Field Club for** 1909. It contains a record of the club's work, and of the various lectures that have been given, some of which refer to the fauna and archæology of the Ilkley and Craven district, where the club held its long excursion in June. Amongst the contributors we notice the names of Mr. Rosse Butterfield, Mr. J. E. Wilson, Mr. H. B. Booth, Mr. Frank Hall, Dr. W. E. Hoyle, Mr. H. E. Forrest, Rev. H. Friend and others. There is nothing to indicate under whose editorship the volume has been produced, but presumably the Hon. Secretary, Mr. H. E. Forrest is the editor. We do not know whether the Carodoc Club proposes to start a new fashion with regard to the shape of its Transactions, but the part before us has been so badly guillotined, that it is dangerously approaching a lozenge shape.

We have received from the **Hebden Bridge Literary and Scientific Society** its 'Recorders' Reports for 1908-1909, Natural History Section (19 pp.). The pamphlet contains a useful record of the Society's work during the year. Mr. W. Nowell writes on 'Flowering Plants'; Mr. J. Needham has a note on 'Mosses, Hepatics and Fungi,' in which he says the year has been the worst he has known for twenty years. Mr. W. Graves has a lengthy report on 'Vertebrate Zoology' in its various branches, and includes some new records for the district. Mr. E. B. Gibson gives a list of the Lepidoptera, and there is a list of Coleoptera taken from 'The Naturalist.' Mr. J. E. Crowther has a list of the local Mollusca, and Mr. J. H. Greenwood and Mr. E. Wager have a chapter on geology.

The Journal of the Derbyshire Archæological Society for 1910 (Vol XXXII.) is as usual, full of interesting matter, the editor being careful to restrict the scope of the papers to the area of the Society's operations. There are a number of valuable archæological papers, which, however, hardly come under the scope of our journal. Amongst the items of more general interest are notes on 'Excavation Discoveries in the Derwent Valley,' when a specimen of an unusually well-preserved fossil fish, *Acrolepis hopkinsi* was obtained in the Lower Yoredales. Mr. H. Vassall describes an interesting Neolithic axe made of Borrowdale volcanic ash; Mr. W. Storrs Fox and Dr. C. H. Read have admirable papers on 'The Ravencliff Cave, and its remarkable contents of pre-historic and Roman relics,' and Mr. W. Smithard writes on 'The Roman Road between Little Chester and Minning Low.' The Rev. F. C. R. Jourdain gives his usual welcome 'Zoological Record for Derbyshire,' 1909, which includes notes on Mammals, Birds, and Insects, and there is a figure of a bronze relic from Longstone, which much resembles the handle to a cooking vessel, although it is suggested that it may possibly have held the Danish 'Raven.' A 'History of Lead Mining in the Wapentake of Wirksworth' by Mrs. Meade Waldo is also included. The volume has a profusion of excellent illustrations, and will take a prominent place amongst the annals of provincial scientific societies.

REVIEWS AND BOOK NOTICES.

From Messrs. Cassell we have received further numbers of their interesting publications 'Familiar Wild Flowers' and 'The Story of the Heavens,' each of which is being issued in serial form at 6d. each.

Under the title of **Gardening Difficulties Solved,** Expert Answers to Amateurs' Questions, edited by **H. H. Thomas**; Messrs. Cassell & Co. have issued a useful handbook of 160 pages for the modest price of 1/-. The volume is well illustrated, and will undoubtedly go a long way towards clearing away many of the trials and troubles of amateur gardeners.

Yorkshire Type Ammonites, (edited by S. S. Buckman, Part 2, pp. XIII.-XVI., 12 plates and descriptions Nos. 9-22). We are pleased to see that the second part of this handsome work has appeared so promptly. It is, in all respects, equal to the first, which we have recently noted in these columns. The following is a list of the species which are figured in the present instalment:—*Hildoceras levisoni*, *Pseudolioceras lythense*, *Denckmannia rudis*, *Haugia beanii*, *Rhacoceras ambiguum*, *Caloceras belcheri*, *C. convolutum*, *Echioceras exortum*, *Amaltheus lenticularis*, *Uptonia ignota*, *Paltopleuroceras elaboratum*, *Frechiella subcarinata*. With this number is a useful table giving 'Table Zones and Yorkshire Lias Strata.' Of course, the new names given are doubtless correct, and the most suitable, but there will be others besides beginners who will yearn for the old-fashioned names, and doubtless prefer, for example, the former *Ammonites elaboratus* to the present *Paltopleuroceras* [very] *elaboratum*.

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AND

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WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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Mr. T. Sheppard, F.G.S., contributes a list of the papers relating to the Geology of the Northern Counties, during the past seven years. This contains over 1600 references.

There are also reprints of the last twenty-nine excursion programmes of the Yorkshire Naturalists' Union, which contain full reports on the natural history of the various districts visited.

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OSWESTRY.—GEOLOGISTS, BOTANISTS, etc., desiring fresh ground for Holidays should communicate with **Proprietor, Wynnstay Hotel, Oswestry,** for particulars.

NOTES AND COMMENTS.

YORKSHIRE SPECIES OF THE *Hydræcia nictitans* GROUP.

As all lepidopterists are now aware, the species of *Hydræcia*, which until recent years always stood in our collections as *nictitans* only, has, owing to the study of the genitalia, been split up into the four species—*nictitans*, *paludis*, *lucens* and *crinanensis*. Of these, only *nictitans* is as yet known to occur in our own county, but as all four are already recorded for Lancashire—three of them not uncommonly—there is little doubt that we have others; indeed, probably all of them. I am therefore anxious that during the present season, our Yorkshire lepidopterists shall settle the matter by collecting a few specimens from as many localities as possible. *Paludis* is partial to sand-hills and salt-marshes, and will probably be found at Spurn and similar districts. *Lucens* occurs on 'mosses,' and other marshy places, and should be found on Thorne Waste, Riccall Common, etc., and possibly on the boggy parts of our moorlands, whilst *crinanensis* has as yet always been associated with running water, though that very likely is more a coincidence than anything else. *Nictitans* seems to occur everywhere on more or less dry agricultural land. The species comes freely to ragwort flowers in August, and so are easily collected.—G. T. P.

THE AGE OF SHREWS.

In 'A Hypothesis as to the cause of the Autumnal Epidemic of the Common and the Lesser Shrew, with some Notes on their Habits,' by Mr. Lionel E. Adams ('Memoirs and Proc. Manchester Lit. and Phil. Soc.', Vol. LIV., pt. 2, x., pp. 1-13), the author arrives at the somewhat startling conclusion that 'the autumnal "epidemic" is due to nothing more than old age; old age in the case of the Common and the Lesser Shrew being reached in, roughly, thirteen or fourteen months.'

NEW METHOD OF MOUNTING COLEOPTERA, ETC.

Coleopterists have long had to resort to the inconvenient method of mounting their smaller specimens on cards, which results in the ventral surfaces being hidden; pinning the specimens, of course, being out of the question, excepting in the case of the larger species. In 'The Entomologist' for May, Mr. F. H. Moore describes some thin gelatine mounts, which certainly seem to have advantage over the old method, as the under surfaces of the objects can readily be examined. The

new method is as follows :—' Set the specimen in the ordinary way by gumming on card. When set remove from the card, cleanse, dry, and place on a gelatine mount. Then proceed to touch down the tarsi and antennæ with the point of a camel's hair brush dipped in warm water, and allow to dry for a minute or two, when the insect will be found firmly and cleanly attached.'

THE STUDY OF SPIDERS.

We have frequently urged our readers to devote attention to the neglected branches of natural history, and particular appeals have been made in favour of the study of the Arachnida. In recent years it has been pleasing to observe that the study of spiders, etc., has received more deserved attention. In the pages of ' The Naturalist,' as well as in the publications of the various scientific societies which have been sent to us, there has been evidence of increasing interest being taken in the subject. The great difficulty, however, has been with the question of classification. To assist students in their work we are publishing a series of Keys to the Families and Genera of British Spiders, etc., the first instalment of which will be found on page 233.

DISTRIBUTION OF SPIDERS.

Mr. W. P. Winter, who is studying the distribution of spiders in the Bradford area, writes asking for information as to the best methods of defining suitable areas for records. Purely geometrical divisions are obviously too artificial, and the numbered enclosures of the 25-inch ordnance map are too small. Mr. Winter adds :—' We might use the Watersheds, or even the streams with the consequent difficulty of mapping out the boundaries on the higher ground, but both of these involve a source of error in bringing together the two banks of the same stream with their different aspects and consequent difference in the small fauna (in the Watershed division), and two banks of different streams with a similar difficulty (in the division by the stream). Of course this might be dealt with by further sub-division, but a broader, bolder first division would be preferable because there will be necessarily some splitting up by reason of the surface features, wood, marsh, etc., and to a less extent, by reason of the geology. Œcology alone would hardly serve as a main division because the sections obtained would be very unequal, and, moreover, species found near the boundaries, say of a wood, either within it or outside, would be

difficult to assign to their proper place.' If any of our readers can help in the direction desired we shall be glad to have their views.

NOTTINGHAM FOSSILS.

At a recent meeting of the London Geological Society, Mr. Lewis Moysey read a paper 'On *Palæoxyris* and other Allied Fossils from the Derbyshire and Nottinghamshire Coal-field.' After reviewing the bibliography of *Palæoxyris*, the author records the finding of 22 specimens from Shipley Clay-pit (Derbyshire), and over 130 from Digby Clay-pit (Nottinghamshire), also several isolated examples from other localities in the district. He describes *Palæoxyris helicteroides* noting especially the presence of a 'beak,' which had not, hitherto, been adequately described. He then describes *Palæoxyris prendeli* from Shipley Clay-pit, again noticing the formation of the 'beak.' The discovery of *Palæoxyris johnsoni* from Digby is noted, and it is proposed that this fossil be removed into the genus *Vetacapsula*. He also describes a specimen of *Vetacapsula cooperi* from Newthorpe Clay-pit (Nottinghamshire), and discusses the differences between this and other specimens, and Mackie's type-specimen, but considers it unadvisable to multiply species. A review of the bibliography of *Fayolia* is followed by the description of a new species from Shipley Clay-pit; also a small compressed example is described as near to *Fayolia dentata*. The author then discusses the distribution of these organisms in time, and their possible affinities with the egg-capsules of the Cestracionts and the Chimæroids.

THE LARGE LARCH SAWFLY

Referring to the note in our issue of March 1909 (p. 65), the Board of Agriculture and Fisheries has now issued a memorandum on the large Larch Sawfly (*Nematus erichsoni* Hart.). In this it is pointed out that in recent years the larch plantations of Great Britain have been visited by a pest which has already caused great losses in certain places and threatens to inflict serious injury on British Forestry. The Large Larch Sawfly is known to have done much damage in Denmark about sixty years ago, and in more recent times has devastated the larch forests of North America. How long it has been present in Great Britain is not known, but its presence was not officially confirmed till 1906, when it was reported from Cumberland. It has since been found over a large area in Wales, a wide district in the north of England, and a very considerable area of

the south of Scotland. It probably exists in other parts of the Kingdom. There is reason to believe that up to the present the general attack is but slight, but in the spots where the prevalence of the pest is greatest many thousands of trees have been killed. Nor is it likely that the plague will go no further.

AND ITS RAVAGES.

There are evident signs that it has spread in recent years, and it is recorded that in the United States and in Canada it did not stop till 50 to 100 per cent. of the matured larch over vast areas was destroyed, with the loss of many billions of feet of timber. The Board hopes that all who are connected with the care of larch plantations will search for the pest during the summer and autumn of 1910, and immediately communicate the discovery of the presence of any of indications of Sawfly attack. In order, however, to make any report of value, the following information should be sent :—

(1) The name of the wood or plantation with some indication of the place where it is to be found.
(2) The approximate size of the wood.
(3) A description of the intensity of the attack according to a scale which is given.

A First Book of Wild Flowers, by **M. M. Rankin,** with 109 illustrations in colour, by Nora Headley. London : A. Melrose. pp. X. and 180. 6/- net.

This well-got-up book is written for children, and often in quite delightful language ; the little folks are asked to make friends with the flowers, to be content to know a few, and go on learning. The authoress says, ' I have gathered some for you, and the artist has painted them.' These number 180, and on the whole are well done and characteristic, while the text is clear and well printed. The book further claims to tell not only something about the names of flowers, but also something of their ways. In the latter, children soon learn to take a keen interest, but on turning over the pages of this book we must confess to a certain disappointment. We find a good deal about the medicinal properties of the plants, and the bitter drinks made from some of them, but we are not convinced that this phase is an attractive one to children. On the other hand we are told very little about ' their ways,' and this is often inaccurate. To give a few examples, we are informed that the leaves and flowers of the Anemone grow together ; that the barren strawberry bears ' no fruit,' ; that the dandelion and goatsbeard bear ' downy seeds ' ; that the leaves of the wood sorrel ' fold neatly up,' as the ' clover leaves do ' ; the globe ranunculus ' grows only in the woods.' Some plants like the meadow vetchling are ' very common everywhere,' but ' poppies do not grow everywhere . . . . but they grow in almost every field in England.' The dwarf red rattle is labelled ' *Pedicularis Sylvatica* ' on the plate, and *P. palustris* in the text. This form of printing scientific names is adopted throughout ; on the plates all specific names begin with a capital, in the text this is not so, but at times capitals are used without obvious reason, and against recognised custom. But for errors such as we have mentioned, the book is quite an attractive one.

Naturalist,

GEOLOGICAL NOTES ON THE DISTRICT NORTH OF MALHAM.

COSMO JOHNS, M.I.Mech.E., F.G.S.

In a few pages it is impossible to discuss, with any approach to adequacy, the complex structural features of the great zone of fracture and displacement that runs almost due east from Clapham past Malham to the valley of the Wharfe near Grassington. Its description as being characterised by two step faults with the downthrow towards the south and with a total vertical displacement of many hundreds of feet will sufficiently prepare the visitor for an example of normal faulting on a gigantic scale, and any attempt at an elaborate discussion of the physical history of the area would be out of place. It will suffice to say that many of the differences that exist among those who have attempted to explain the structure of the faults that divide the Craven Lowlands from the Uplands are due to the failure to recognise more than one system of faulting. Fortunately, for the purpose of this present paper, we are chiefly concerned with the east and west system to which the Inner and Outer Faults of the Malham area belong, and thus it will not be necessary to refer except very briefly to the N.W. and S.E. system of faults, which are characteristic of the Ingleton district. Mention, however, must be made of the E. and W. system of anticlines, for it is this anticlinal system that forms the boundary between the Upland and Lowland type of the Lower Carboniferous rocks. The E. and W. Faults are closely related to the anticlinal system referred to, and in the district under discussion we might define the structure as a faulted anticline. Any such definition must, however, be tentative, for differential movements were in progress during late Visean time, and continued until the Ingleborough grit was laid down.

So far we have simply discussed the area of which the Outer Craven Fault is the southern boundary. As originally mapped, with its marked outward bend near Scalebar, this fault involved a reading of the structure which gave the mass of limestone between the two faults a thickness very much greater than that found north of the Inner Fault. Evidence has now been brought forward* which renders the old view

* Proc. Yorks. Geol. Socy., 1908, p. 393.

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untenable, and it is demonstrated that the Outer or Southern Fault runs along the foot of a well-marked line of scars near the rifle-butts, and about half a mile north of the line adopted on the Surrey map at the point where it crosses Scalebar Beck. Attention has been directed to a number of faults belonging to the N.W. and S.E. system, which cross the great limestone plateau between the Inner and Outer Faults. It is not suggested that all the faults have been described, but sufficient has been done to make it clear that the great Scar Limestone between the faults is little, if any, thicker than it is to the north.

South of this Outer Fault, as now defined, comes the typical Craven Lowland sections. It is with the utmost difficulty that any correlation can be established between the Upland and Lowland areas. Folded, faulted, crushed—obscured by a thick mantle of drift—we have a country that might be described by imagining the great fault scarp of the outer fault to be a mighty sea cliff, at the foot of which lies the foundered fragments that had fallen from its face. If the strain on the imagination be not too great, then the mantle of drift would be the sea washing up to the foot of the cliffs. No attempt will be made here to discuss that Lowland area ; careful mapping and the recognition of faunal divisions more precise than have yet been determined* will be necessary before the complex structure of the Craven Lowlands can be unravelled.

The Great Scar Limestone between the faults is typical, and can be directly correlated with its representative further north. There is a considerable thickness of comparitively unfossiliferous limestone of Lower Visean age, with beds containing a rich Upper Visean fauna at the top, where denudation, which has been very active, has not removed them. It was by carefully noting the occurrence of these Upper Visean beds and mapping the position of the faunal base, that the trend and throw of the new faults were determined. It will be possible to review some of the evidence during the visit of the Yorkshire Naturalists' Union to Malham.

Interesting though the evidence of the faulting might be, it is the rarely mentioned eminence of Black Hill that deserves most attention. Unfortunately the sections are rather obscure,

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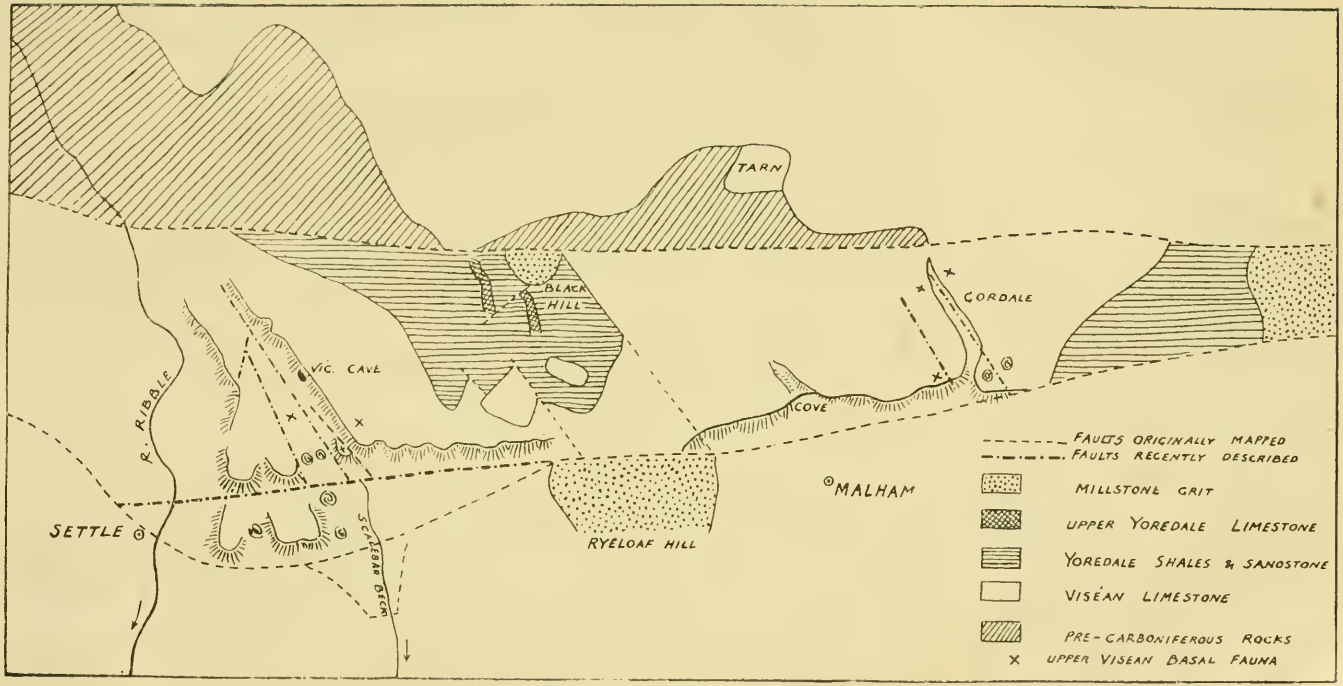
* Since the above was written the writer has had an opportunity of visiting many of the more striking sections under the guidance of Dr. Albert Wilmore, F.G.S., who is describing the area. Several important divisions have been established, and their local value is very evident.—C.J.



Geological Sketch-Map of the District around Malham.

and not easy to locate, but enough can be seen to make it clear that beneath the capping of Millstone Grit, and above the tawney weathering limestones that form the top of the great scar, we have a degenerate representative of the Main or Upper Scar Limestone of the Yoredale Series. This outpost of Yoredales faulted in and preserved on the great dip slope of the Limestone massif, between the faults, is of the utmost importance, and supplies an important link in the chain of evidence which will ultimately demonstrate the relation between the Yoredale and the Pendleside or Culm faunas.

NEWS FROM THE MAGAZINES.

Mr. P. G. Ralfe has some lengthy 'Ornithological notes from Denmark' in the *Zoologist* for March.

The *Journal of the Board of Agriculture* for April contains illustrated articles on 'Sclerotia Disease of the Gooseberry,' 'The Corn Cockle,' and 'Edible Fungi;' the latter being illustrated by coloured plates of the Sheathed Agaric, the Scaly Agaric, and the Chocolate Agaric.

In *British Birds* for April, Mr. G. H. Caton Haigh records the Lanceolated Warbler in Lincolnshire—a 'new British bird.' He shot it at North Cotes on November last. In the same journal Mr. C. B. Ticehurst records that he shot a Lesser Kestrel on the Holderness Coast in October last.

In *The Entomologist* for April, Mr. A. M. Stewart has an interesting note concerning the fertilization of *Orchis maculata*. In this he shows that the flowers of *Orchis maculata* are visited by moths of the genus *Plusia*. A photograph of the head of *Plusia festucæ* with a pollinium attached is given.

The April *Bradford Scientific Journal* contains notes on Chellow Dean, by Mr. E. Naylor; 'The Origin of Chellow Dean,' by Mr. H. B. Maufe; 'Introduction to the Study of Grasses,' by Dr. W. G. Smith; 'Is our Local Dialect Worth Preserving,' by Mr. W. R. Holloway, and notes on Mind, Brain and Colour, by Dr. J. H. Rowe.

In *The Entomologist* for May, Mr. W. J. Lucas figures and describes a specimen of *Odontopsalis lewisi* Burr (an earwig), which was found in the market at Liverpool amongst 'sweepings,' in January 1904. Examples of the same species from Japan were described in the 'Transactions of the Entomological Society of London' for 1904.

In the *Zoologist* for May, Mr. B. F. Cummings has some interesting notes on 'The Formation of Useless Habits in Two British Newts (*Molge cristata* and *M. palmata*)'; and in the same journal Messrs. D. L. Thorpe and L. E. Hope give some useful ornithological notes under the heading 'Natural History Record Bureau (1909), the Museum, Carlisle.'

In the excellent May issue of *British Birds*, there are records of the recovery of three marked birds. A Lapwing marked at North Ferriby on July 15th, 1909, was shot near Broomfleet Island (close by) on December 27th; a Blackheaded Gull marked at Rossitten, Germany, on July 5th, 1906, was found dead near Cowes, Isle of Wight, in March, 1910; and a Hedge Sparrow marked at Evanton, Ross-shire, on November 4th, 1909, was caught in a mouse trap at the same place on March 30th, 1910.

RESULTS OF EXPERIMENTS ON THE FLORAL COLOURS.

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THE experiments on the floral colours recorded in 'Nature,' vol. LXI., pp. 105-6 have been continued and extended. It was found that by mixing the aqueous solution of the pigment with a small quantity of a solution of succinate of manganese, and allowing the liquid to dry in a shallow basin, decisive results were obtained. Thus it was observed that those pigments, whose behaviour under the various processes hitherto employed indicated a more or less complete deassimilation (*i.e.*, tannic chromogen more or less fully converted to pigment), now yielded reactions with precisely similar and comparable indications. For instance, Cranesbill, Tufted Vetch, and Sweet Pea dried up a deep pure blue, while Poppy, Burnet, Cineraria and Pæony dried up red, but Foxglove and Carnation showed blue on the edges only, and Clover remained greenish. It was natural that in course of time certain conjectures of a scientific hypothesis should arise in the way of explaining the phenomena, and the analyses of plants performed by myself (see 'The Naturalist,' 1902-10) were extremely helpful in this respect; for thereby it was clearly shown that while the flowers of certain plants were vividly and purely tinted, the quantity of tannic chromogen in the same whole plant was remarkably small; in fact, in many cases the particular chromogen found in any appreciable quantity was merely a tannoid capable of yielding yellow pigments only. The conclusion irresistibly pressed forward was, that the formation and development of the blue and red pigments were strictly local and absolutely confined to the floral envelopes, *i.e.*, they were not necessarily in any way dependent on the particular amount of tannin produced by the plant organism in its entirety.

This disclosure immediately threw upon the subject a vivid light wherewith no one apparently had hitherto been irradiated. True, it was previously known that the corolla was the seat of active oxidation, that its colouration was the necessary consequence of the development, and that its rapid growth was effected in spite of a very reduced supply of nutriment, which must inevitably bring about a notable impoverishment of the

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cytoplasm (Curtel, *Annales des Sci. Nat.* bot. ser. 8, t. 6). But all the while it was held that 'every cause which slackens nutrition will diminish the proportions of tannin, and consequently those of the coloured juices which they engender.' In point of fact, it was strongly suggested by my experiments that the pigment was the direct result of the withdrawal of the proteid substance from the corolla, *i.e.*, the impoverishment of its cytoplasm took place subsequently, and not previously.

This movement and withdrawal induced a process of deassimilation more or less complete, a disruption of the proteid molecule of the corolla cells, a separation of its nitrogenous groups, and the abandonment of its aromatic groups which were left behind as chromogens of pigments more or less vivid and pure. This physiological action would be strictly local and its principal cause would be the powerful and insistent demands which the formation and development of the pistil and ovules would make upon the quantum of proteid lodged in the cells of the adjacent organs, more especially the corolla. When this happens to be imperative and exacting, the deassimilation would be complete and a blue pigment would result; when fairly moderate, there would be a red; when slight, it would be a straw yellow or even white. The demand and usufruct moreover, would be in direct proportion to the number or to the size of fertile ovules produced by the pistil, and therefore it would follow that, other conditions being alike, those floral organs which habitually produce most ovules ought to exhibit the most vividly tinctured corollas, like what occurs in the Gentians, Auriculas, Gladiolus, etc. The force necessary to enlarge the ovary itself, in certain instances, so as to make room for the great number of ovules produced, is also a factor in the case. In cases, also, where the corolla is developed before the stamens and pistils are differentiated, the drain on the corolla proteid must be excessively severe, as in Mallows and Hollyhocks.

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The leaflet containing particulars of 'Recent Additions, April 1910,' issued by the **Warrington Museum,** shews a fairly extensive list of desirable additions to that go-ahead institution.

The Transactions of the Manchester Geological and Mining Society, Vol. XXXI., pts. 9 and 10, contain a note on the Chew Reservoir of the Ashton-under-Lyne, Staleybridge, and Dukinfield District Waterworks, by Mr. A. L. Mellor. It is accompanied by a valuable plate of sections.

Naturalist,

PLANTS OF THE STEEP HOLME.

G. CLARIDGE DRUCE, M.A., F.L.S.,
Oxford.

A visit to the above interesting islet of Sabrina in the Bristol Channel, to see its special flowers in good blossom, was made on May 26th, 1909. In the 1½ hours' stay, in company with Mr. W. Harford, the following ninety-five species were observed :— *Ranunculus bulbosus* L., often much dwarfed, *Pæonia*, still existing and in good flower, *Cardamine hirsuta* L., *Brassica Rapa* L., form, *Cheiranthus Cheiri* L., *Cochlearia danica* L., *Erophila verna* DC., *Diplotaxis tenuifolia* DC., *Viola Riviniana* Reichb., *Cerastium vulgatum* L., *C. pumilum* Curt., *Hypericum montanum* L., *Lavatera arborea*, L., *Geranium molle* L., *G. Robertianum* L., *Erodium maritimum* L'Hérit., common, *E. cicutarium* L'Hérit., *Acer Pseudo-platanus* L., near house, *Lotus corniculatus* L., *Vicia sepium* L., *V. angustifolia* L., *V. sativa* L. form, *V. hirsuta* S. F. Gray, *Rubus rusticanus* Merc, *Saxifraga tridactylites* L., *Sedum acre* L., *Cotyledon Umbilicus Veneris* L., *Conium maculatum* L., *Smyrnium Olusatrum* L., *Crithmum maritimum* L., *Hedera Helix* L., *Sambucus nigra* L., *Symphoricarpus racemosus* Mich, the relic of a garden, *Rubia peregrina* L., *Galium mollugo* L., *Sherardia arvensis* L., *Kentranthus ruber* Druce, *Dipsacus fullonum* L., *Bellis perennis* L., *Inula squarrosa* Bernh., *I. crithmoides* L., *Chrysanthemum Leucanthemum* L., *Senecio Jacobæa* L., *Carlina vulgaris* L., *Arctium minus* Bernh, *Carduus crispus* L., *C. nutans* L., *Cirsium lanceolatum* Scop., *C. arvense* L., *Taraxacum vulgare* Schrank, *T. erythrospermum* Andrz., *Sonchus oleraceus* L., *Limonium binervosum* C. E. Salm, *Statice linearifolia* Laterr, *Primula veris* L., *Anagallis arvensis* L., *Syringa vulgaris* L. planted, *Ligustrum vulgare* L., common, *Blackstonia perfoliata* Huds., *Centaurium umbellatum* Gilib., *Cynoglossum officinale* L., *Lycopsis arvensis* L., *Myosotis scorpioides* L. (*M. arvensis*), *M. versicolor* Sm., *Echium vulgare* L., *Hyoscyamus niger* L., *Verbascum Thapsus* L., *Scrophularia nodosa* L., *Nepeta hederacea* Trev., *Marrubium vulgare* L., *Teucrium Scorodonia* L., *Plantago Coronopus* L., var. *ceratophyllon* Rapin., which Mr. Williams thinks is a distinct species, *P. maritima* L., *P. lanceolata* L., *Beta maritima* L., *Rumex crispus* L., *R. Acetosa* L., *Mercurialis perennis* L., *Urtica dioica* L., *Parietaria ramiflora* Moench, *Iris foetidissima* L., *Allium Ampeloprasum* L., *Scilla*

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non-scripta L. and H., *Arum maculatum* L., *Carex flacca* Schreb., *Dactylis glomerata* L., *Poa pratensis* L., *Festuca rigida* Kunth, *F. rubra* L., *Bromus erectus* Huds., *B. hordeaceus* L., *Brachypodium sylvaticum* R. and S., *Asplenium Adiantum-nigrum* L., *A. Ruta-muraria* L., *Polypodium vulgare* L.

The two commonest species observed were *Sedum acre*, which was in immense quantity, forming masses which give just previously to flowering, a peculiar greenish yellow colour to the rock-slopes; and *Smyrnium*. No agrestal cultivation exists on the Island, so that no *Veronica, Papaver, Lamium, Stachys, Capsella* nor *Lychnis alba* was observed. But some plants, usually put among the Colonists were noticed, *i.e.*, *Anagallis arvensis*, which was common on the barer slopes, *Sherardia arvensis*, which rarely grew in turf, and *Lycopsis* (several plants) were seen. No tree (except an evidently introduced *Acer Pseudo-platanus*) other than *Sambucus nigra* was noticed. Yet *Scilla non-scripta*, *Vicia sepium*, *Conium maculatum*—plants requiring some shelter were noticed. It may be remarked that *Scilla* also grows on Flat Holme, where there is no tree and no grass, the verdure in that island being chiefly *Spergularia*, which I did not observe on Steep Holme. *Hypericum montanum*, *Mercurialis perennis*, *Arum maculatum*, might probably be included in the last group of shade lovers.

Cerastium pumilum was rather plentiful as it is on Brean Down with which doubtless at one time the Steep Holmes was united; but neither *Helianthemum polifolium*, nor what I expected, *Koeleria vallesiana* nor *Apinella glauca* could be found; but owing to the shortness of time and the somewhat backward state of vegetation, my search was not exhaustive. Among the more doubtful natives, *Marrubium*, looking quite native, *Hyoscyamus* and *Diplotaxis tenuifolia* may be mentioned.

On the side of the rock where the chief treasure grows are *Allium Ampeloprasum* in great quantity, and there also is the *Brassica Rapa* form, while on the rocks in the vicinity are *Cheiranthus Cheiri* and *Kentranthus ruber*. As to whether *Paeonia* is native or not, I do not venture to pronounce.

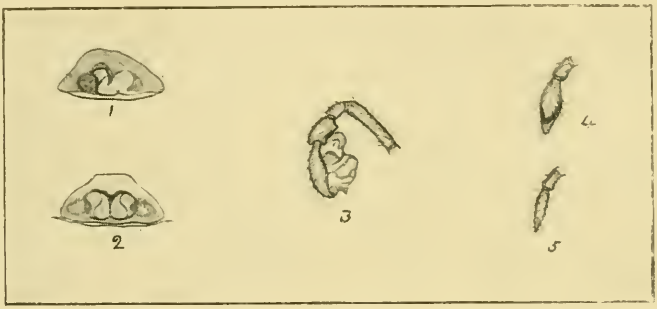
It may be remarked that I noticed no *Hypochæris radicata*, *Crepis*, *Rosa canina*, *Ranunculus acris* or *repens*. However, we await further investigation before the reasons for these absences, if such they really are, can be suggested. The *Dondia* [*Sueda*] *fruticosa*, which Lobel thought he saw on the rocks, may have been *Inula crithmoides*.

ABNORMALITY IN SPIDERS.

Wm. FALCONER,
Slaithwaite, Huddersfield.

(*Continued from page 203*).

Since the first part of this paper appeared in print, Dr. Jackson has kindly drawn my attention to the record of a gynandrous spider which I had overlooked, and has also lent me another example which has not hitherto been noted or described, the number of the pseudo-hermaphrodites being thereby increased to six. In the one, a *Leptyphantes pallidus* Camb., from Cudham in Dorset, which is described by him in a paper entitled 'On some Rare Arachnids obtained in 1908,' p. 20 ('Trans. of the Nat. Hist. Soc. of Northumberland, Durham and Newcastle-upon-Tyne,' New Series, Vol. III.,



Maso sundevallii Westr.
Fig. 1. Abnormal specimen. Epigyne of female.
,, 2. Normal specimen. Epigyne of female.
,, 3. Left palpus of male from outside.
,, 4. Right palpus of abnormal specimen.
,, 5. ,, ,, ,, normal female.

pt. 2), the left palpus was of the female form, while the right was of the male type, with well-developed palpal organs. The central portion of the large and asymmetrical epigyne was of the normal female form; so also was the left part of the scape. The right side of the latter process however, was quite short. The specimen was thus male on the right side and female on the left.

In the other, a *Maso sundevallii* Westr., place and date of capture now unknown, the left palpus is of the male form, the palpal organs being again well developed (fig. 3); the right

palpus is somewhat tumid with the appearance of being loosely covered at the apex (fig. 4), and is thus not quite of the normal female shape (fig. 5). The epigyne (fig. 1), is very imperfect, the parts on the left side being obsolete, and those on the right being very much distorted. Compare with the drawing of the normal epigyne (fig. 2). The specimen is thus male on the left side, but not quite female on the right.

It is interesting to note that the spiders in which this condition has so far been found to exist are all members of the subfamily *Linyphiinæ* of the family *Argiopidæ*, Maso belonging to the group *Erigoneæ*, and the rest to the group *Linypheæ*.

It may be advisable here to point out that the females of a certain section of the Micronetae have the tarsal joint of the palpus naturally and characteristically tumid, and might easily be mistaken by anyone ignorant of the fact, for hermaphrodites in an incipient stage of development.

Occasionally male spiders may be found wanting the terminal joint and its accompanying palpal organs in one or both of the palpi. Quite recently I examined a male *Lophomma herbigradum* Bl., without a vestige of either of these appurtenances, but perfect in other respects, both 'stumps' being neatly rounded and covered with smooth, unbroken skin. These parts may sometimes be broken off by rough handling during capture, but in this event the tissues at the point of fracture show unmistakeable evidences of violent separation. At other times they may be so defectively developed and distorted as to be a mere travesty in shape, size and construction of what they should really be, and are then totally unrecognisable, though the species may be known in other ways. While penning these lines, a good illustration of this defect has come to hand from Mr. W. P. Winter, of Shipley—a *Meta segmentata* Clerck, of which in fig. 9, page 202, I give a drawing of part of the right palpus.

Both sexes at times occur with deep wide longitudinal channels, either on the dorsal or ventral surface of the abdomen. The consideration of this defect opens out an interesting problem. Have spiders which do not undergo metamorphoses but advance to maturity by successive moults, the same ability to repair an injury to their bodies as insects which do undergo metamorphoses, and moult in the intermediate stages? In the latter, regenerative power of the kind is absent in the imago, but exists in the larva and pupa, being coincident with the moulting

period. In the first a wound never heals, but in the two others persists only until the next moult, when the injury is not only repaired, but all indications of the occurrence are obliterated. In the intermediate stages the incident of moulting necessitates the possession by the organism of a living formative dermis capable of secreting a successive number of dead protective epidermic investments, but in the perfect form the latter once formed are permanent and cannot be replaced. This would lead us to infer that the marks on the abdomen of spiders are not the indelible records of accidents which have maimed the body, but not destroyed the life, and that they should rather be ascribed to faulty development. A spider can, however, replace a lost limb. Individuals may sometimes be seen with one leg of a pair shorter than the other. The short one is a limb in process of renewal. This is in accordance with a beneficent provision of Nature, not unparalleled in other forms of animal life, but by different methods, whereby the creature when seized by the leg is able to throw it off, and escape from its assailant, preserving its life at the cost of a temporary inconvenience. In one or two instances amongst the 'wolf' spiders, which have come under my notice, the reproduced limb (at least I have taken it to be this one) has grown considerably beyond the original length, as if the regenerative force expended had been more than sufficient to effect the needful restoration.

With the exception of the last-named, the abnormalities we have so far discussed are permanent. Others are merely temporary and mainly associated with the period of moulting. They may nevertheless, puzzle anyone unacquainted with them. Such are the possession of a double set of eyes, the old in process of peeling off the new; the reticulated abdomen of *Hilaira uncata* Camb., and *H. excisa* Camb., and the very thickly dotted one of *Pholcomma gibbum* Westr. Newly moulted specimens are pale in colour, but gradually assume the deeper tints proper to them, and as a rule deviate very little from them, the colour of the body and limbs being often a good discriminatory character between species closely allied. In one strange-looking example of *Gonyglidium rufipes* Sund., a female, which was sent to me from the north of Yorkshire, the whole of the dark pigment of the various parts seemed to have become concentrated on the caput, leaving the rest of the body pale and unicolorous, and imparting to the creature a striking

and perplexing appearance. Equally bewildering is the aspect of male *Enidia bituberculata* Wid., in the stage immediately preceding the final moult, when though the palpal organs and tibial apophysis are faintly and imperfectly traceable beneath the enveloping membrane, it nevertheless shows little signs, beyond a slight convexity, of the great bifid lobe which will soon surmount the caput of the adult. Other species which are similarly ornamented at the same period of development, present unmistakeable tokens of the near advent of these peculiar adult sexual structures.

Abnormality in the sense in which it has been treated in this paper is of no benefit either to the individual or the race. It partakes more of the nature of a sport, inexplicable, a mere curiosity, and, though instances frequently occur both in the animal and vegetable kingdoms, it has not, it is thought by evolutionists, taken any part in the origin of species. Nevertheless it constitutes an interesting study. To the student it is one of the mysteries of nature, revealing eccentricities in the vital processes of the germs, and to the nature lover would probably, if he could by any means attain to a more explicit knowledge, tell of vicissitudes endured and perils past in the lives of the humbler creation.

The Seventy-Sixth Annual Report of Bootham School (York), Natural History, Literary and Polytechnic Society (35 pp.), has been recently issued, and contains particulars of the work accomplished in the various sections. There are notes on almost every important branch of natural science but geology.

The Report of the Castle Museum Committee to the Town Council [of Norwich] includes a good record of work during 1909. Suitable reference is also made to the late Thomas Southwell, who took a great interest in the institution. One illustration is entitled 'Monkey Eating Eagle,' though it seems to represent an eagle that has eaten a monkey. Anyway, we have failed to find the monkey !

The four parts forming Volume XXV. of **The Journal of the Northants Natural History Society and Field Club** for 1909 contain numerous valuable papers on various archæological and natural history subjects. Amongst those of more particular interest to our readers we notice 'The Birds of the Neighbourhood,' ; 'Report for 1908' ; '*Vertigo antervertigo* [? *antivertigo*] in Northants' ; 'The Lepidoptera of Northamptonshire' ; 'An Addition to the Northants Woodlice' ; 'Botanical Report' ; 'Anglo-Saxon Cemetery at Haldenby' ; 'The Botany of the Northants Fenland' ; 'A New British Species [of plant, *Zannichellia gibberosa*]' ; 'A History of the Water Supply of Northampton' ; and 'Northamptonshire Botanologia, Eighteenth Century.' There are some useful Meteorological Notes, and an obituary notice of the late V. D. H. Cary-Elwes (with portrait). There are several illustrations. Amongst the authors are Messrs. W. A. Shaw, C. E. Wright, E. F. Wallis, C. A. Markham, Rev. R. M. Serjeantson, E. T. Leeds, G. C. Druce, H. N. Dixon, and Beeby Thompson.

KEYS TO THE FAMILIES AND GENERA OF BRITISH SPIDERS, AND TO THE FAMILIES, GENERA AND SPECIES OF BRITISH HARVESTMEN AND PSEUDO-SCORPIONS.

WM. FALCONER,
Slaithwaite, near Huddersfield.

Amongst the neglected branches of Natural History in this country there is not one more worthy of the best attention of naturalists, or more replete with interest, nor one which would more fully repay research than that dealing with spiders and allied forms. The would-be student, however, is beset with difficulties from the first, not the least of which is the lack of an accessible and comprehensive literature on the subject, for since the publication of the last great English work, the Rev. O. Pickard Cambridge's 'Spiders of Dorset' (1879-82), the progress made in nomenclature and in our knowledge of the British species has been recorded only in various publications, such as the Annals and Magazines of Natural History, and the transactions of the Dorset Field Club, the Northumberland, Durham and Newcastle-apon-Tyne Natural History Society, and the Chester Society. Even then in many cases recourse must be had for figures and descriptions to foreign authors.—Kulczynski's 'Araneæ Hungariae,' and Simon's 'Les Arachnides de France' and 'Histoire Naturelle de Araignées,' etc. So wonderful are the instincts, habits and structure of these creatures that there is no doubt that if this difficulty were removed, many more than at present would devote some time to their study.

The following keys have therefore been compiled—those for spiders mainly with the assistance of the above-named works; those for harvestmen and pseudoscorpions with that of the Rev. O. Pickard Cambridge's monographs ('Proc. Dorset Field Club,' 1890 and 1892), in the hope that they will prove of service in the identification of the British Arachnida in so far as they treat of them. In the case of the spiders, I have followed chiefly the sequence and arrangement, but not always the nomenclature of Mr. Cambridge's 'List of British and Irish Spiders,' 1900. The abbreviation B.I.S. in the footnotes refers to this work.

It must be remembered that when the example under consideration has been located by the successive use of the tables—

first the family in table A., then the genus under the chosen family in table B., and lastly the species under the selected genus in table C.—the determination should be invariably confirmed by careful comparison with a detailed description, and, if possible, with sectional figures.

FAMILIES AND GENERA OF BRITISH SPIDERS.

TABLE A.—FAMILIES.

A. Eyes 6, in *Diblemma* 2 .. .. First Section.
B. Eyes 8.
  I. Eyes in 3 transverse groups of 3-2-3* .. Second Section.
  II. Eyes in 2, 3, or 4 rows.
    1. Eyes in 2 rows, not greatly unequal in size, forming a transverse group wider than long .. .. Third Section.
    2. Eyes in 3 or 4 rows, very unequal in size, and homogeneous, forming a group as long or longer than wide .. Fourth Section.

First Section.

A. Eyes in 3 widely separated pairs—the odd pair in front .. .. Scytodidæ (4).
B. Eyes in a compact group.
  I. Falces strong. Eyes of moderate size .. Dysderidæ (2).
  II. Falces weak. Eyes large .. .. .. Oonopidæ (3).

Second Section.

A. Falces very weak. Legs very long and slender .. .. Pholcidæ (12).
B. Falces exceedingly strong. Legs much shorter and stouter .. .. Atypidæ (1).

Third Section.

A. Tarsal claws 3.
  I. Females at least with a cribellum (supernumerary spinner).
    1. Cephalothorax without a longitudinal impression, caput narrow. Eyes in 2 transverse rows widely separated .. Uloboridæ (16).
    2. Cephalothorax with a longitudinal (9) or small round (8) impression, caput more or less broad and massive ..
      (*a*) Eyes in 2 rows more or less parallel and fairly closely grouped .. .. Dictynidæ (9).
      (*b*) The four central eyes forming a close group well separated from the lateral eyes of both rows, which are themselves widely separated .. Eresidæ (8).
  II. Both sexes without cribellum.
    1. Superior spinners long, two jointed (exc. *Argyroneta*).
      (*a*) Spinners in a group .. .. .. Agelenidæ (10).

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* See also *Pholcomma* on p. 240.

(*b*) Spinners in a transverse row, the longest ones on the outside .. .. HAHNIIDÆ (11).

2. Spinners short, in a compact group, one jointed.

(*a*) Legs I. and II. with a row of long, strong spines beneath their tibiæ, metatarsi and tarsi .. .. .. MIMETIDÆ (15).

(*b*) Legs I. and II. without such spines

(i.) Legs IV. with a double row of short, curved spines beneath tarsi. Rest of leg joints usually without spines. Falces almost transversely truncate at extremity. Maxillæ more or less converging over labium. Tibial joint of ♂ palpus without an apophysis .. .. THERIDIIDÆ (13).

(ii.) Tarsi without spines. Legs usually spined: if spines are small and confined to tibia IV., the tibial joint of ♂ palpus generally has an apophysis. Falces very obliquely truncate at extremity. Maxillæ straight and parallel, not converging except in *Erigone*.

(*α*) Clypeus wider than the ocular area (except *Tapinopa* and *Tapinocyba*). Falces without a convex smooth space at base. Greatest width of maxillæ at base. .. .. LINYPHIDÆ (14).

(*β*) Clypeus not wider than the ocular area. Falces often with a convex smooth space at base. Greatest width of maxillæ at extremity .. .. ARGIOPIDÆ (17).

B. Tarsal claws 2.

I. Inferior spinners well separated at their bases. Maxillæ widely and obliquely impressed in the middle.. .. .. .. DRASSIDÆ (5).

II. Inferior spinners close together at their bases. Maxillæ not impressed in the middle .. ..

1. Eyes all dark (diurnal). Posterior row curved forward. Legs II. longer than I., and often than IV. Clypeus moderately high.

(*a*) Legs I. and II. much longer than III. and IV. Tarsi without scopulæ .. .. THOMISIDÆ (18).

(*b*) Legs not greatly unequal. Tarsi with scopulæ .. .. PHILODROMIDÆ (19).

2. Eyes mixed light (nocturnal) and dark (exc. *Sparassidæ*). Posterior row curved backwards. Legs I. and IV. longer than II. Clypeus low.

(*a*) A distinct transverse fold in the integument of the under abdomen. Legs I. longest.. .. .. ANYPHÆNIDÆ (7).

(*b*) Under abdomen without this transverse fold. Legs IV. longest (exc. *Chiracanthium*).
(i.) Labium rather long. Central eye space generally wider than long.. CLUBIONIDÆ (6).
(ii.) Labium very short, almost semicircular. Eyes dark. Central eye space much longer than wide SPARASSIDÆ (20).

FOURTH SECTION.

A. Eyes in 4 unequal rows. Legs with numerous long spines .. .. OXYOPIDÆ (21).
B. Eyes in 3 rows of 4, 2, 2.
I. Eyes of first row very large. Tarsal claws 2 SALTICIDÆ (24).
II. Eyes of first row small. Tarsal claws 3..
1. Second row of eyes much shorter than the third. Clypeus high. Tibial joint of ♂ palpus with an apophysis .. PISAURIDÆ (22).
2. Second row of eyes not much shorter than the third. Clypeus moderate. Tibial joint of ♂ palpus without an apophysis .. .. LYCOSIDÆ (23).

TABLE B.—GENERA.

1. FAM. ATYPIDÆ.
A. Falces very highly developed, inserted horizontally, permitting movement in a vertical plane. Upper spinners 4 jointed *Atypus* Latr.
2. FAM. DYSDERIDÆ.
A. Abdomen without a pattern, grey, middle and lower spinners almost equal in length. Coxæ of legs somewhat globular.
1. Eyes in the form of a horseshoe, convexity backwards. Tarsal claws 2. Cephalothorax red or liver-coloured *Dysdera* Latr.
II. Eyes forming nearly a complete circle. Tarsal claws 3. Cephalothorax brownish or blackish .. .. *Harpactes* Templ.
B. Abdomen with a pattern. Middle spinners slender, and much shorter than the lower ones. Coxæ cylindrical. Tarsal claws 3 .. .. *Segestria* Latr.
3. FAM. OONOPIDÆ.
A. Abdomen without scuta .. .. .. *Oonops* Templ.
B. Abdomen with dorsal and ventral scuta
I. Eyes 6. Ventral scutum short.
1. Anterior eyes contiguous and ocular area forming a complete circle .. *Ischnothyreus* Sim.*
2. Anterior eyes separated, and ocular area open in front .. .. *Triæris* Sim.*
II. Eyes 2. Ventral scutum long .. .. *Diblemma* Camb.*
4. FAM. SCYTODIDÆ.
A. Number and position of eyes characteristic. Cephalothorax subglobose .. .. *Scytodes* Latr.

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* In Britain, hothouse exotics.

5. Fam. Drassidæ.
   - A. Fang groove with a raised toothed keel on inner edge. Posterior row of eyes curved strongly forward and the anterior row a little backwards .. .. *Gnaphosa* Latr.
   - B. Fang groove without this keel, but with isolated teeth. Posterior row of eyes curved slightly backwards or straight.
     - I. Palpus inserted much below the middle of the maxillae, which are almost straight externally, and very little inclined to the labium. Fang groove very oblique, with three unequal teeth on outer edge, and two on inner edge *Drassus* Walck.
     - II. Palpus inserted at or above the middle of the maxillae, which are convex externally, and inclined to the labium. Fang groove almost transverse (exc. *Scotophæus*), without teeth, or only small ones.
       1. Posterior row of eyes not or hardly longer than the anterior row.. .. *Prosthesima* L. Koch.
       2. Posterior row considerably longer than the anterior row.
          - (*a*) Central anterior eyes much larger than the other eyes.. .. .. *Scotophæus* Sim.*
          - (*b*) Central anterior eyes not larger than the other eyes.. .. .. *Phæocedus* Sim.

6. Fam. Clubionidæ.
   - A. Tibiæ and metatarsi of legs I. and II. with two rows of long spines beneath. Cephalothorax with a longitudinal impression. Labium as long or a little longer than wide.
     - I. Falces with a very strong spine, in front. Clypeus wider than an anterior eye.. *Micariosoma* Sim.
     - II. Falces without such spine. Clypeus not wider than an anterior eye.
       1. Posterior row of eyes curved forward, and much wider than the anterior row.
          - (*a*) This curve very great .. .. .. *Zora* C. L. Koch.
          - (*b*) This curve slight .. .. *Liocranum* L. Koch.
       2. Posterior eyes curved strongly backwards, and slightly wider than the anterior row .. .. *Agroeca* Westr.
   - B. Tibiae and metatarsi I. and II. without rows of spines beneath. Labium much longer than wide.
     - I. Eyes in two almost concentric rows, convexity backwards, Cephalothorax without longitudinal impression. Body with brilliant metallic scales .. .. *Micaria* C. L. Koch.
     - II. Posterior eyes straight or nearly so. Body without metallic scales.
       1. Cephalothorax with a longitudinal impression. Legs short and spinose. Legs IV. longest .. .. *Clubiona* Latr.
       2. Cephalothorax without longitudinal impression. Legs much longer and much less spinose. Legs I. longest *Chiracanthium* C.L. Koch

* *Drassus blackwallii* Thor.—B.I.S.

7. Fam. Anyphænidae.
   A. Legs I. longest. Cephalothorax with a longitudinal impression. Labium much longer than wide .. .. *Anyphæna* Sund.
8. Fam. Eresidae.
   A. Position of eyes characteristic. Caput very convex, and distinctly marked off from the thorax .. .. *Eresus* Walck.
9. Fam. Dictynidae.
   A. Legs without spines.
      I. Clypeus much wider than an anterior eye. Caput strongly convex. Maxillae fairly long, and inclined to labium .. *Dictyna* Sund.
      II. Clypeus not or not much wider than an anterior eye. Caput lower. Maxillae short, and nearly straight.
         1. Posterior eyes small, widely separated, straight or very slightly curved forward. Central eye space somewhat wider than long .. .. *Protadia* Sim.
         2. Posterior eyes large, closer, curved slightly backwards. Central eye space not wider than long .. .. *Lathys* Sim.*
   B. Legs with spines.
      I. Sternum not produced, and posterior coxæ touching. Supernumerary spinner bipartite.. .. .. *Amaurobius* C. Moch.
      II. Sternum produced between the separated posterior coxae. Tibia III. beneath, with a long curved spur-like spine, stout in ♂, slender in ♀ .. .. *Altella* Sim.†
10. Fam. Agelenidae.
   A. Spinners in a group, one jointed. The four openings of the tube and laminal tracheæ on the anterior part of the under abdomen *Argyroneta* Latr.
   B. Superior spinners two jointed. The single opening of the tube tracheae close to the spinners.
      I. Labium longer than wide. Posterior coxae contiguous. Apical joint of the upper spinners at least as long as the basal. Anterior tibiae with few spines.
         1. Falces very gibbous at the base, projecting beyond the clypeus, inferior margin with three teeth. Legs short *Coelotes* Bl.
         2. Falces not gibbous, or only slightly convex, not projecting beyond the clypeus.
            (*a*) Posterior eyes strongly curved forward .. .. *Textrix* Sund.
            (*b*) Posterior eyes straight or strongly curved backwards. Legs long.
               (i.) Both rows of eyes curved backwards .. .. *Agelena* Walck.
               (ii.) Both rows of eyes nearly straight *Tegenaria* Latr.
      II. Labium not longer than wide. Posterior coxæ not contiguous. Apical joint of

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* *Lethia* Menge, preoccupied.—B.I.S.

† *Amphissa* Cb., preoccupied.—B.I.S.

upper spinners much shorter than the basal. Anterior tibiæ with two rows of spines beneath.

1. Labium about as long as wide. Anterior tibiæ and metatarsi cylindrical, spines beneath few (2-2 rarely 3-3) and slender .. .. .. *Cicurina* Menge.
2. Labium wider than long. Anterior tibiæ and metatarsi not cylindrical, spines beneath long and strong (4-4 or 6-6).
   (*a*) Anterior eyes straight. Posterior eyes small, widely separated.. *Tetrilus* Sim.
   (*b*) Anterior eyes very strongly curved backwards. Posterior eyes large, closer .. .. *Cryphoeca* Thor.

11. Fam. Hahniidae.

A. Central anterior eyes larger than the laterals, and at least double the posterior centrals .. .. *Antistea* Sim.

B. Central anterior eyes smaller than the laterals .. .. *Hahnia* C. L. Koch.

12. Fam. Pholcidae.

A. Eyes of lateral groups large, of central group small. Legs in both sexes without spines .. .. *Pholcus* Walck.

13. Fam. Theridiidae.

A. Tarsal claws with teeth.

I. Abdomen (at least in the ♂) with a stridulating organ.

1. Posterior central eyes closer to each other than to laterals. Lateral eyes on oblique tubercles.
   (*a*) Lateral eyes not touching. Inferior margin of fang groove without teeth. Eye tubercles strong.
      (i.) Eyes smaller. Central eye space longer than wide. Clypeus nearly as long as falces .. .. *Asagena* Sund.
      (ii.) Eyes large. Central eye space at least as wide as long. Clypeus scarcely half the length of the falces .. .. *Lithyphantes* Thor.
   (*b*) Lateral eyes touching. Inferior margin of fang groove with teeth.
      (i.) Labium scarcely half the length of the maxillae Eye tubercles strong. Sternum narrowly produced between the posterior coxæ .. .. *Enoplognatha* Pav.
      (ii.) Labium more than half the maxillae. Eye tubercles low. Sternum *not* produced between the posterior coxae.. .. .. *Robertus* Cb.
2. Posterior eyes nearly equidistant. Lateral eyes not on tubercles and touching.
   (*a*) Posterior eyes in straight line or curved slightly backwards. Anterior row nearly straight .. .. *Teutana* Sim.

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(*b*) Posterior row curved forward, and anterior row curved backwards..
(i.) Anterior eyes equal or centrals smaller, curve slight .. .. *Crustulina* Menge.
(ii.) Central anteriors much larger than the laterals, curve strong *Steatoda* Sund.

II. Abdomen without a stridulating organ.
1. Upper tarsal claws, with numerous teeth to the apex.
(*a*) Body with strong, erect, unequal hairs, Posterior central eyes much closer to each other than to laterals .. .. *Dipoena* Thor.
(*b*) Body with very short equal hairs. Posterior eyes equidistant or the centrals a little closer.. .. .. *Laseola* Sim.
2. Upper tarsal claws with few long divergent teeth at the base only.
(*a*) Posterior legs shorter than the anterior. Posterior coxæ not longer, often shorter, than the anterior coxae.
(i.) Falces ♂ parallel, not projecting, and without an apophysis .. *Theridion* Walck.
(ii.) Falces ♂ divergent, projecting a little, and with a very strong, pointed, oblique apophysis .. *Phyllonethis* Thor.
(*b*) Posterior legs not shorter than the anterior. Posterior coxae long and divergent.
(i.) Legs very unequal (III. much shorter than the rest). Abdomen steep and truncated behind *Episinus* Walck.
(ii.) Legs scarcely unequal.
(*α*) Legs long, IV. longest. Sternum not convex, terminating in a narrow point. Posterior eyes curved strongly forward *Euryopis* Menge.
(*β*) Legs short, I. longest. Sternum very convex. Posterior extremity unusually broad. Posterior eyes straight .. *Melos* Cb.

B. Tarsal claws without teeth or nearly so.
I. Abdomen globular.
1. Abdomen without a scutum. Sternum very convex .. .. *Onesinda* Cb.
2. Abdomen with a strong scutum. Sternum slightly convex. Eyes in three groups of 3, 2, 3 .. .. *Pholcomma* Thor.

14. Fam. Linyphidæ.
A. Tibia IV. (often also of I., II., III.), with two spines or erect bristles, one near the base, and the other in the terminal third. Tibial joint of ♂ palpus without an apophysis (exc. *Hilaira*). The palpus of ♀ with a terminal claw .. .. Sub. Fam. Linyphieae.
B. Tibia IV. with one spine or erect bristle only, towards the centre, or near the base. Tibial joint of ♂ palpus with an apophysis. The palpus of ♀ without a terminal claw.. Sub. Fam. Erigoneae.

Sub. Fam. Linyphieae.

A. Maxillae not longer than their basal width, externally oblique, and dilated at base. Metatarsi I. not longer than tibia I. Legs either with few spines or none, tibiae generally without lateral spines.

I. Legs short and stout. Metatarsi I. shorter than tibia I. Male palpus with a tibial apophysis .. .. *Hilaira* Sim.

II. Legs longer and slender. Metatarsi I. and tibia I. about equal. Male palpus usually without a tibial apophysis ..

1. Sternum drawn out into a long, slender, pointed projection between the coxæ of the posterior legs.. .. *Opistoxys* Sim.

2. Sternum broadly and obtusely produced.

(*a*) Eyes small and widely separated *Porrhomma* Sim.

(*b*) Eyes larger and much closer.

(i.) Legs short and stout. Posterior eyes rarely less than one diameter apart, usually more. Lateral eyes not prominent. Clypeus vertical and flat .. *Tmeticus* Menge.

(ii.) Legs longer and slenderer. Posterior eyes seldom more than one diameter apart, usually less. Lateral eyes on a distinct prominence. Clypeus more or less depressed below the eyes .. ..

(*α*) Posterior row of eyes straight, or nearly so. Falces of ♂ much attenuated, and very divergent .. .. *Microneta* Menge.

(*β*) Posterior eyes curved backwards. Falces of both sexes neither attenuated nor divergent.

* Posterior eyes subequal. Ocular area not prominent.

† Cephalothorax strongly hollowed out behind. Sternum considerably longer than wide .. .. *Eupolis* Cb.

†† Cephalothorax not hollowed out. Strenum at least as wide as long .. .. .. *Sintula* Sim.

** Posterior central eyes much larger than all the others. Ocular area prominent .. *Syedra* Sim.

B. Maxillae longer than their basal width, straight or obliquely truncate at apex, forming an acute angle. Metatarsi I. not shorter than tibia I. Legs spinose (exc. *Tapinopa*), tibiæ nearly always with lateral and dorsal spines.

I. Central posterior eyes much nearer to each other than to the laterals. Anterior row curved strongly forward.

1. Clypeus very low. Anterior central eyes larger than the laterals. Legs short and without spines .. .. .. *Tapinopa* Westr.
2. Clypeus very high. Anterior central eyes smaller than the laterals. Legs long and very spinose .. .. .. *Floronia* Sim.

II. Posterior eyes nearly equidistant. Anterior row nearly straight.

1. Falces with two stout spines in front at the base .. .. *Drapetisca* Sim.
2. Falces without such spines at the base.
   - (*a*) Posterior eyes close, intervals less than a diameter. Sternum heart-shaped, not longer than wide.
     - (i.) Central eye space longer than wide. Eyes subequal .. .. *Labulla* Sim.
     - (ii.) Central eyes epace not longer than wide. Central anterior eyes smaller than the others.
       - (*α*) Posterior eyes strongly curved forward. Clypeus wider than the ocular area. All femora with spines, and metatarsi with few spines .. .. .. *Taranucnus* Sim.
       - (*β*) Posterior eyes straight, or nearly so. Clypeus *not* wider than ocular area. Femora I. only with spines.
         - * Metatarsi of at least I. and II. with one spine only on upper side. Anterior eyes straight or curved slightly forward .. .. *Leptyphantes** Menge.
         - ** Metatarsi without spines. Anterior eyes straight or curved slightly backwards *Bathyphantes* Menge.
   - (*b*) Posterior eyes more widely separated, intervals greater than the diameter. Sternum longer than wide.
     - (i.) Central eye space longer than wide .. .. *Bolyphantes* Menge.
     - (ii.) Central eye space at least as wide as long.
       - (*a*) Tarsus I. half as long as metatarsi I. Central eye space much narrower in front. Dorsal tibial spines equally strong in all legs .. *Linyphia* Latr.
       - (*b*) Tarsus I. a little longer than ½ metatarsus I. Central eye space not narrower in front. Dorsal tibial spines very slender on I. and II., stout on III. and IV. .. *Stemonyphantes* Menge.

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* *L. nebulosus*, *L. leprosus*, *L. minutus*, and *L. terricola*, have several lateral spines as well on the metatarsi.

(*To be continued*).

GLACIAL EVIDENCES NEAR HARROGATE.

A. LESLIE ARMSTRONG, F.S.A. (Scot.),
Harrogate.

An enterprising farmer, whose land lies to the north-west of Harrogate, abutting upon the 'Rough Road,' or Pennypot Lane, has recently endeavoured to 'break' a small portion of virgin moorland (where the Butterfly Orchis, *Habenaria bifolia*, grew very plentifully), but his labours have proved far more satisfactory to the geologist than to himself. A capping

The Pennypot Lane field. View looking north-west towards the source of the ancient ice-stream.

of vegetable soil, only a few inches deep, here overlays the glacial drift, which consists of stiff blue clay enclosing an enormous number of boulders immediately below the surface; —many of the larger ones quite visible above it. An infinite amount of trouble has been involved in raising these boulders, and they lie closely scattered over the two acres or so which have been 'broken,' so that the land in all probability now presents almost identically the same appearance that it did after the recession of the great ice sheet. Some idea of the number and size of these boulders will be obtained from the accompanying illustration. They all consist of local gritstones of various kinds, probably from Guys Cliff Moor, and the heights

above Pateley. There is an entire absence of limestones. All are ground and polished, and some are deeply striated and ice scratched. Most of the larger fragments are of the same class of stone, viz.—a hard, fine-grained white grit, almost a quartzite, flat-bedded in nature, and from their appearance these have travelled the farthest. The dimensions of a few of the largest stones are 4′ 6″×3′ 6″×1′ 0″; 4′ 0″×2′ 3″×1′ 6″; 2′ 0″×2′ 0″×1′ 0″; 4′ 0″×1′ 6″×1′ 3″. The field is situated upon the north side of the road, and is No. 34 upon the 25 inch Ordnance Map No. CLIII-15.

Scores of acres of land in the immediate vicinity, now clothed with ling and gorse, were under cultivation forty or fifty years ago, and produced five quarters of wheat to the acre. From indications in many of the fields surrounding No. 34, such as glacial boulders built into the walls, and large heaps of stones of the same origin still existing in the field corners, it is evident that similar conditions prevailed over all this area when the land was first brought under the plough. At the present time several of these long-neglected allotments are in course of re-cultivation, and cart-loads of boulders, many of large size, are still being encountered.

During the last few weeks, six or more large glacier-borne boulders have been turned up in making a tennis-lawn at the north-west corner of Duchy Road, Harrogate. At this point four to six feet of glacial clay overlays the upturned edges of the Kinderscout grit. The six stones I have examined are principally of ovoid form, all of local grit, and three are deeply striated upon the under side. Some of them were also marked by the plough, but the glacial striations are very distinct therefrom. Most of these have been broken up, and also several others which I had not the opportunity of previously examining. The measurements of the largest were 3′ 6″× 2′ 6″×2′ 6″; the remainder averaged about 3′ 0″×2′ 0″×1′ 8″.

——:o:——

In the Floodborough (Lancs.) district it has been recommended that the black-headed gulls be excluded from the Wild Birds' Protection Act, as it has been ascertained that they feed almost exclusively on young cockles, which they pick out of the sand, and are consequently harmful to the cockle-beds. At a meeting of the Wharfedale Chamber of Agriculture held at Otley recently, it was agreed to recommend to the Central Chamber of Agriculture that steps be taken to exclude the green linnet and the bullfinch from the Wild Birds' Protection Order. It was also stated that the skylark was most destructive.

FIELD NOTES.

BIRDS.

Peregrines at Bempton.—When Ned Hodgson's gang commenced climbing the cliffs at Bempton on the 9th of May, they found the Peregrine Falcons with three young ones at the eyrie which has now been used for three seasons.—E. W. WADE, Hull.

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FLOWERING PLANTS.

***Euphrasia Rostkoviana* Hayne in Westmorland.**—I do not know whether *Euphrasia Rostkoviana* Hayne has been recorded for Westmorland, but it may be of interest to know that it grows abundantly at the head of Great Langdale. On July 2nd, 1909, the meadows near Wall End Farm, on the way from the old Dungeon Ghyll Hotel to Blea Tarn, were full of it. The most casual botanist cannot fail to contrast the large corolla of this species with the usual smaller flowered one. I am indebted to Mr. J. A. Wheldon, F.L.S., for the determination of this.—J. BEANLAND, Bradford.

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GEOLOGY.

Lias Fossils in the Drift.—On the occasion of the Easter excursion of the Yorkshire Geological Society to Filey, I obtained some fragments of Ammonites from a large mass of transported Lias shale exposed at the foot of the cliffs south of the Filey promenade. One of these was considered by Mr. C. Thompson, who was present, to be Simpson's *A. aureum*. The specimens have been submitted to Mr. S. S. Buckman, who is at present at work amongst the Yorkshire Lias Ammonites, and he identifies them as belonging to *Platypleuroceras aureum* Simpson, and *P. birchoides* Quenstedt, respectively, thus confirming Mr. Thompson's identification of one of the specimens. These two forms are characteristic of the middle beds of the Middle Lias, and definitely denote the horizon from which the transported mass has been derived. These species have not previously been recorded from the drift of East Yorkshire, and are not included in Mr. Thompson's list of derived Liassic fossils now being published by the Hull Geological Society. They are in the museum at Hull.—T. SHEPPARD.

HAYWARD'S BOTANISTS' POCKET BOOK.

A really useful and reliable 'reminder' *re* the distinctive characters of the vegetations of the green ways, in the handy shape of a thirteenth revised and re-set edition of **Hayward's Botanists' Pocket-Book,** first issued in 1872, and of proved value even then, came in the Fall of 1909 as a distinct result of the fillip given to botanic field work by the appearance of G. C. Druce's Oxford *List of British Plants*, and the tenth edition of the *London Catalogue*. It more than deserves, it almost compels an analytic notice in any botanic survey of the last lustrum. The revisionary work, resulting in an enlargement to XLIV. and 280 pages, is a marvel of condensation in face of the not inconsiderable and most happy inclusion of the differentiating points between dozens of 'new' found species and some hundreds of 'varieties,' to say nothing of some other score or more of Strangers 'on the make' that, finding the conditions of life in our clime 'grateful' to them, are in the way to become quite permanent integers in the flora of our coasts and fields. To say that this classificatory labour of love—a '*labor limæ*' indeed, it must have been—has been performed by G. C. Druce, M.A., the Fielding Curator in the University of Oxford, is a sufficing guarantee of the well-nigh impeccability of the result. I have tested it in various ways by reference, not merely to 'Hooker' and 'Babington,' but to original definitions in the cases concerned; and I can testify to its accurate grasp of detail and broad conception alike; coming to the conclusion that in no work with which I am acquaint do the specific and varietal names, as well or better indicate the 'equal values' of the growths for which they stand.

The nomenclature is in accordance with the Vienna ordination; and one is as pleased to see that our Bladder Campion is once more the descriptive '*inflata*' rather than the misleading '*latifolia*,' as sorry our fugaceous common Rock-rose is still *Helianthemum chamæcistus* of Miller, too, instead of Gaertner's '*vulgare*,' as in the Index Kewensis. But Mr. Druce admits 'no exceptions to the law of priority,' and so, one may suppose, no concessions to sentiment and long usage. Yet may we be thankful that our dear Daisy is still *Bellis perennis*, no morphologist having yet resolved its generic characteristics by dissection to some limbo of the Archæio.

Of course, all such 'cribs' to flower-names call for care from the consulter, but it is not the weary temper-trying work it possibly looks at a first glance. Keys to the species are omitted—they lead, in my experience, to isolation and identification of a name without understanding—but those to the genera in each order are clearly contrasted; and for the rest a legitimate, orderly *visualising in the mind of the exact meaning of the terms* set down, will enforce the light, whilst disguising the dose of the physic lesson. This appears to me its truest claim to award. Perfunctory consultation is hardly possible, and so delimited are the abbreviated descriptions that for use in the actual field, a good platyscopic lens to eye, it easily out-distances its only rival among British-printed manuals. It goes without saying, of course, that its 'new' matter puts it far in advance of former editions; till we get a compendious Bentham which shall define for us the thousand-and-one aliens now to be found cheek-by-jowl with indigens within the pale of almost every 'raw import' factory of the land from Campbelltown and Dundee to Deptford and Helston, the description of which drawing attention to herbarium sheets 'sided' away as unknowns by the collector, will revive 'interest' in the mummified, and lead the gatherer to re-visit the old localities with a new pair of eyes. In this world of dillusions simpling deserves a meed of more than cool toleration as harmless, and there is in it that quality of making-young-again, which calls more things to bloom and burgeon than just flower and leaf.

Among 'Natives,' old and newly defined, we have accurate diagnoses, herein, for the first time of *Viola montana* L., said to be found in 'Hunts. only' (but I believe it has occurred in Lincoln); *Viola calcarea* Greg.;

Viola nana Sam. ; *Cochlearia micacea* Marsh—pod 'more than twice as long as broad'—a Scottish prostrate form or state of high schistose rocks, placed now as a variety of *C. alpina*, and not as in *Lond. Cat*, a 'species' of equal values with the rest ; *Polygala vincoides* Chod.—like a diminutive periwinkle with stem leaves opposite, crowded and broadly elliptic, which, too, sounds like a *state* induced by local conditions ; *Dianthus gallicus* ; *Lavatera sylvestris* ; *Trifolium resupinatum* and *agrarium*—the latter suggestively enough found chiefly in Scotland and North England, starred as introduced, but since like *Rhinanthus major* of waste reclaiming days, appears mainly in ground taken over for cultivation, possibly a hardy long-overlaid indigen which has in recent days got its chance to assert itself through soil overturned at the hands of man ; *Coronilla varia* ; *Fragaria bercheriensis*—hitherto in Yorkshire mis-referred to *Moschata*, the Hautbois strawberry, which occurs at Grimston (C. Waterfall !) and elsewhere in light soil woodland ; *Rosa uncinata* Lees, kept as a var. of Smith's *tomentosa*, and not erected into an equal value species as is done by Ley in Lond. Cat. Ed. 10. ; *Callitriche truncata* ; *Œnothera Lamarkiana* ; *Carum Petroselinum* (Parsley), now quite a dominant denizen on certain soils in Mid-Lincolnshire ; *Selinum Carvifolia* ; *Coriander*, which, with its buggy 'aroma' and prettily fanning petalic enlargement is common enough by Yorkshire miln-decked rivers, in these later days ; *Asperula arvensis* ; *Crepis nicæensis* ; *Oxycoccus macrocarpus*, *the* Americ-Cranberry ; the hybrid Bil-cow-berry, to the localities for which the Oakbeck pinewood at Harrogate must be added ; *Ledum palustre* ; *Limonium lychnidifolium* ; *Gentiana Pamplinii* Druce—another 'cross' to those whom personal appelations affront ; *Omphalodes verna ; Linaria pulchella* Druce ('spur bent, palate of flower orange-spotted') ; *Euphrasia minima* Jacq., *E. salisburgensis* F., and *E. latifolia* Pursh—three rightly-styled 'micro-species' of the 'Eyebright' plant pixies, of which *E. Rostkoviana* with clownish big flower-face, plays the showiest antic on the turf ; *Orobanche Spitzelii* and *ramosa* recently found near Hull ; *Pinguicula bicolor*, *Thymus glaber*, Mill and *T. præcox* (Opiz.) ; *Salvia Marquandii* ; *Prunella laciniata* ; *Stachys alpina* ; *Teucrium Scorodonia* var. *dentatum* Bab. ined—a form with deeply-cut leaves almost confined to the barrenest potassic rock-soil ; *Plantago ramosa* and *argentea* ; *Salsola tenuifolia* (leaves narrow not spinescent) ; *Rumex alpinus*, so retentive of its monachal sites (as still at Adel near Leeds !) ; *Urtica hispida* D.C., the very venomous Porcupine Nettle ; *Salix daphnoides* Vill. ; *Orchis cruenta* (Mull), with the vars. *præcox* Webst.=*ericetorum* Lint., and *O'Kellyi* of the common 'spotted' gandergoss of our undrained lands ; *Sagittaria heterophylla* Pursh var. *incana* Hiern—introduced to the Exe with wood-pulp for paper-making, it is probable ; *Potamogeton Drucei* Fryer (river Loddon) ; 'the blade of the floating (4 to 6 inch) leaves gradually merging into petiole,' and so elliptic 'beautifully reticulated throughout'—one is sorry not to find our Calder Canal *P. pensylvanicus* or *epihydrus* also defined, for cotton-carried to us as it is, it is now 'at home' through six miles stretch of waterway ; unlike the foregoing the detection by Mr. Druce of a seventh *Zannichellia* (*gibberosa* Rchb.) in Northants dikes near Eye and semi-brack ditches in Berks at Marcham, to be known from all the rest by the briefly stipitate cornua being crested like a newt on *both* dorsal and ventral curve, came just too late to be included ; but, to finish, what an alluring feast for the eye of new shapes and forms, not to be found in the Bentham or Babington of our Victorian days may be identified in this marvellous little but latest mirror 'held up to nature,' or rather, to the special fair face of Flora ! For which every devout worshipper must give Mr. Druce hearty thanks.

The publishers and proprietors, Geo. Bell & Sons, have maintained the format and standard of typographic execution well, so that at 4s. 6d. the rounded corner, 'limp' tome is a *multum in parvo* for the wily and wise 'book-in-breeches' botanist.

F. Arnold Lees.

1910 June 1.

NORTHERN NEWS.

Dentists will be interested to know that a mammoth tooth has been dug from the cliff's face at Filey.

We regret to record the death of Mr. C. Bird, President of the Rochester Naturalists' Club, and author of a small work on the geology of Yorkshire.

Mr. A. Dean, of Marsden, informs us that he has had a fine specimen of *Panchloia exoleta* given to him. It was obtained on May 12th from a bunch of bananas. This pale green cockroach is now quite common in our towns during the banana season.

At the recent annual meeting of the Leeds Philosophical and Literary Society a suggestion was again made that the Society's collection should be better housed. Mr. E. Kitson Clark, however, pointed out that 'as regards the premises, the finest museum in the world, that at Copenhagen, was not better housed'!

The National Trust for places of Historic Interest or Natural Beauty is appealing for £2400 for the purpose of purchasing a property of 310 acres, comprising the greater part of Grange Fell and more than a mile of the River Derwent, including the Bowder Stone and the land on which grow the birches which form so important a feature in the incomparable beauty of Borrowdale.

In the 'Zeitschrift für wissenschäftliche Insektenbiologie' for March (edited by Dr. Chr. Schröder, Schöneberg-Berlin, Vorbergst, 13, Part 2, price 1 mark) is an interesting article on the relative abundance of the varieties of *Adalia bipunctata* L. (Die relative Haufigkeit der Varietäten von *Adalia bipunctata* L.) in 1908-9, by Otto Meissner. This is accompanied by a table giving the percentages of named varieties occurring in six localities in Germany. Attention is drawn to the rarity of forms intermediate between the 'black' and 'red,' and the still greater rarity of unicolorous red or black examples. The possibility that there are two perfectly fertile species ('vollkommen fruchtbaren Arten') under the name of *A. bipunctata* L. is discussed. Reference is made to the extreme rarity of variations in *C. 7-punctata*, and illustrations are given of the eltrya of varieties of other species of Coccinellidæ showing how closely these approach the first-named species in the arrangement of the spots.

The Proceedings of the Yorkshire Geological Society for 1909, Vol. XVII., pt. 1, (issued May 19th, 1910), is not a publication that will be read from cover to cover, and as regards size, illustrations, etc., is in marked contrast with the preceding part published by this society. Of the 96 pages which it contains, 68 are occupied by an elaborate 'Classified List of Organic Remains from the Rocks of the East Riding of Yorkshire,' by Messrs. H. C. Drake and T. Sheppard. This list has been compiled in order to aid future workers amongst the rocks of the East Riding, by placing in a convenient and compact form all the various and scattered records that have been published. In addition, a number of species is now placed on record for the first time. The list includes all the records between the Lower Lias and Post-Glacial beds, and at the head of each section is a Bibliography. Mr. H. Culpin has a valuable paper on 'Marine and other Fossils in the Yorkshire Coal Measures above the Barnsley Seam, as seen at the Bentley Colliery, near Doncaster.' Details of the Bentley bore are given, and the tables of fossils will prove exceedingly useful. Mr. G. V. Wilson records 'Marine Bands in the Millstone Grit of Wharfedale,' a note which is illustrated by a block which would have been better if right side up; Mr. E. Hawkesworth records two borings, at East Harsley and Selby respectively; Prof. J. Goodman describes an apparatus for determining the Inclination of Bore Holes, and Mr. W. Lower Carter contributes an obituary notice of 'The Marquess of Ripon.'

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NOTES AND COMMENTS.

INFLUENCE OF TECTONIC FACTORS ON VEGETATION.

The recently published Part XI. of 'Die Vegetation der Erde,' has been noticed at some length by Dr. Wm. G. Smith in the May number of the 'Scottish Geographical Magazine,' and some of the features dealt with are well worth the attention of all interested in problems of plant distribution. This part deals with the vegetation of the Balkan lands, and is by Dr. Lujo Adamović. A noteworthy feature of this work is the importance ascribed to the influence of tectonic factors in vegetation; that while climate and soil conditions play an important part, yet neither alone nor combined do they entirely determine vegetation. The influence of mountains as barriers to climate has its effect on the vegetation, and the winds prevailing in a valley must bring distinct conditions. Mountains and valleys are routes of migration for plants, because somewhere, high or low on the slopes, any given species can find those conditions best suited for its full development and reproduction. A long simple mountain range, without lateral spurs or broad intersecting valleys, is well adapted to act as a bridge for migration, but the number of species will probably be small because the slopes are everywhere exposed.

INFLUENCES OF THE 'MASSIF.'

The conditions on a mountain 'massif' are different, spurs branch off in many directions, thus affording much variety in exposure and shelter, and favouring a greater number of species. The mass is less liable to extreme climatic conditions, and in Servia the presence of grouped mountains furnishes the lower lands with moisture, an important item in a region of summer drought; a longer winter also results, but this furnishes conditions suitable for the growth of species requiring moisture and a cool climate.

WIND *versus* TEMPERATURE, ETC.

In a great 'massif,' too, all the zonal limits of plants are lifted upwards, and cultivation of crops is carried higher than it is on long open ranges. Dr. Adamović attributes this to wind more than to temperature and soil. The higher and more complex the mountain group, then so much higher lies the most destructive sphere of the wind, hence there is for plants a greater available area with a favourable environment, including suitable insolation, soil-warmth and soil-moisture. The

'massif' also tells in another way. On a narrow range with peaked summits, narrow ridges and steep broken slopes, the atmospheric agents which effect weathering and erosion have full play, hence screes of talus and wind-swept rocky slopes occupy a large proportion of the ground and are unsuitable for a large plant population. On the 'massif' all this is modified, and a greater part of the area consists of rounded summits, with broad intervening cols and gentle slopes completely clad with grassland, moor and forest. Here erosion has less effect, the soil is less disturbed, and the primitive vegetation remains; whereas on recently disturbed soil only a few relict species can retain their place, and a number of new comers find a home.

PATRICK SHIRREFF AND THE IMPROVEMENT OF CEREALS.

In a short paper contributed to the 'Transactions of the Highland and Agricultural Society of Scotland,' 1910, Dr. Wm. G. Smith has performed a double service, first to remind investigators of the important work done by Shirreff (1791-1876), and second to summarise the results obtained since his time. The beginning of the nineteenth century stands out prominently as a period when many new varieties of wheat, barley and oats came into cultivation, and almost entirely replaced the older sorts of the eighteenth century. In this work Patrick Shirreff occupies a pre-eminent position. When quite a young man his attention was directed to promising plants in a crop. The first he selected was a fine specimen in a wheat field at his farm at Mungoswells, East Lothian, and measures were taken to invigorate its growth, and in spite of several stalks being cut down by hares, he eventually gathered sixty-three ears from it. This was the origin of 'Mungoswell's Wheat.' For several years he paid attention to the improvement of cereals 'by fits and starts,' and several useful varieties resulted, *e.g.*, the 'Hopetoun Oat,' 'Hopetoun Wheat,' 'Shirreff Oat,' also the 'Hopetoun Tare.'

SELECTION AND HYBRIDISATION.

After a break of many years he adopted more systematic methods, and collected large numbers of promising ears of wheat which were then propagated on his experimental trial plot, and yielded about a dozen varieties, which were placed on the market. He then began to hybridise varieties of cereals, and succeeded in obtaining genuine hybrids, some of these being produced when he was eighty years of age. In 1873 he pub-

lished privately the results of his experiences in a book now difficult to obtain, entitled, 'Improvement of Cereals.'

As Dr. Smith points out, this book has scarcely received the credit it undoubtedly deserves, for it contains much of great value. Darwin said of him, 'a higher authority cannot be given,' and De Vries says: 'at that time—1859—Shirreff was the highest authority, and the most successful breeder of cereals.' The remainder of the paper contains a short but carefully-written account of recent work on Selection and Hybridisation, and it is interesting to see how close are the results obtained by Shirreff long ago with those of recent investigators, whose work we are too apt to regard as new.

SCHOOL NATURE STUDY.

Judging from the Flower Show Schedule recently issued, the young folks in the Huddersfield schools are doing excellent work in Nature Study. Unlike most schedules, this is a valuable booklet for teacher as well as child. The fifteen competitions for which prizes are given have been carefully thought out, and the detailed instructions under each are well expressed. The collections of wild flowers have to illustrate types of habitat, stress being laid on characteristic common things, and the collection of rarities is rigidly discouraged. The drawing competitions are arranged not merely to develop the artistic faculties, but to train the observing eye. Another competition requires sets of specimens grown by the children, illustrating the life-history of a common annual from seed to fruit. Three other competitions show how real is the attempt to deal practically with local geography. One is a map of the neighbourhood of the school; another a map of a field; and a third a contour model. Prizes are also given for the best plants grown from seedlings, for models in clay or plasticine, and the best kept school garden and garden produce. In 1908 there were 378 exhibits; last year they exceeded 1400, and it is hoped there will be a further increase this year. Although written ostensibly for the guidance of children, we can heartily recommend this scheme to all interested in making the Nature Study method a really valuable and educational instrument in our schools.

DEW-PONDS.

Mr. E. A. Martin, F.G.S., has been investigating the dew-ponds of the south of England, and has recently presented a

report on the subject to the Research Department of the Royal Geographical Society. His conclusions are as follows:—'I commenced my observations on this subject with a leaning towards the theory that many downland ponds were dew-ponds; that is, that they were replenished principally from dew. I confess I should have wished to have been able to prove that dew was an important factor in filling the ponds. But I have been led to believe otherwise, and I retract anything which I have said in this direction as having been founded on insufficient data. Very rarely, indeed, does dew ever form on the surface of ponds, and rarely, I believe, on the puddled margins; and if we continue to use the term dew-pond, we must remember that the word must be used here in the widest sense as including any form of condensation out of the atmosphere. Rain is undoubtedly the all-important replenisher of these, as of all ponds which are not fed by springs. It is almost with a feeling of regret that I abandon the theory of dew-filled ponds. The mystery surrounding the quiet invisible formation of dew has a fascination for me, as for most people, but the results of greater knowledge must prevail, and the dew which waters our downland grass and the corn on our dry flint-bestrewed downland fields cannot longer be held to have any important bearing on the "mystery," which is no longer a mystery, "of the dew-pond."'

Wild Flowers and How to Identify Them, by **Hilderic Friend.** London: Robert Culley. 63 pp., 1/-.

This neatly-bound and well-illustrated volume, by one of our contributors, will prove a Friend indeed to anyone wishing to become familiar with our common wild flowers. By means of a series of coloured plates and many illustrations in the text the reader is made familiar with the more attractive of our wild flowers. There is also a useful table for the purpose of identification, and blank leaves for notes.

Catalogue and Field-Book of British Basidiomycetes up to and inclusive of the year 1908. By **Dr. M. C. Cooke, A.L.S., V.M.H., etc.** John Wheldon & Co., 28 Great Queen St., W.C. Price 2/6.

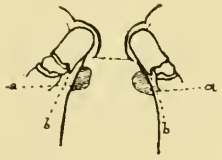
During the last 20 years many additions have been made to the British list of the higher fungi, largely owing to the activity of the Mycological section of the Yorkshire Naturalists' Union. A handy and concise list of species brought up to date was needed. Our thanks are due to Dr. Cooke for meeting this necessity by so useful a work, which has the benefit of his very wide and ripe experience. The work is further useful in counteracting a recently published alteration of the nomenclature attached to each species, and in the restoration of the system adopted by Prof. P. A. Saccardo, in his 'Sylloge Fungorum,' now universally accepted.

The Catalogue is got up in a convenient pocket size—10½×4 in. The 96 printed pages, with blank page opposite each for additions or notes, includes Alphabetical List to Genera. The work was privately printed at Huddersfield, and only a limited number of copies was struck off.—C.C.

NOTES ON *EBORIA CALIGINOSA* FALCONER.

WM. FALCONER,
Slaithwaite, Huddersfield.

PREVIOUSLY unsuccessful on more than one occasion in the autumn of 1909, I again, on March 26th and 31st last, met with both sexes of *Eboria caliginosa* Falconer, in the same place (elevation 1000 feet) whence came the original types described and figured in ' The Naturalist,' February 1910, pp. 83-88, the two visits after a long and close search yielding one male and six females, all adult. The additional material thus obtained enables me to supplement my description *loc. cit.* in one or two particulars. It has been suggested to me that possibly the female might not be the proper mate for the male. The two have, however, again occurred in each other's company; the difference, too, between them is not greater than happens in the case of many others, (indeed it is less than in some), so that there can be, I think, little doubt that they are properly allocated to each other.



Stridulating apparatus of ♂ *Eboria caliginosa* Falcr.

As I suspected from the structure of one of the leg joints, (but, in my anxiety to preserve the solitary type specimens in as unmutilated a condition as possible, could not ascertain to my satisfaction), both sexes have a stridulating apparatus which is in duplicate, one set on each side of the body, and each set consisting of two parts :—

1. A sounding surface on the outer side of the fore extremity of the ventral surface of the abdomen, formed by the spiracular plates which are for this purpose covered with a close series of raised transverse chitinous edges (marked *a* in sketch).
2. A sound producer formed by the corneous blunt projection at the inner side of the fore extremity of the coxal of the fourth pair of legs (marked *b* in sketch).

The latter process is in position to act upon the former, and when scraped across it produces a sound inappreciable by human ears, but perceptible and serving as a love call to the opposite sex during the pairing season. The organ in the male is very strong and distinct, but in the female is much weaker and less discernible.

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The same or a similarly constructed apparatus is present in several other British spiders (sometimes, too, in both sexes), but not always in the position described above, being sometimes on the falces and palpus or cephalothorax.

In the female, the convexity of the epigynal area extending above and on each side of the orifice is finely but distinctly transversely ribbed. As this feature is very unusual amongst British spiders, being most prevalent in the genus Erigone, it will, therefore form a most important discriminatory character in the determination of this sex of Eboria. The genus Erigone, however, is very distinct, and no member of it can possibly be confounded with the present species.

Check List of Lincolnshire Plants, by **E. A. Woodruffe-Peacock, F.L.S., F.G.S.** 66 pp. 'This pamphlet claims no merit, except that it is a practical study, a sign-post on the way to a flora . . . It is an analysis . . . of some 500,000 observations.' By a series of figures and signs, the distribution of the plants of Lincolnshire is clearly indicated in the closely-printed pages forming this pamphlet. In view of the lines upon which the Lincolnshire Union is working, viz., that of filling up blanks in the lists for the various divisions of the county, this pamphlet will prove most useful. There is nothing to show who has printed the list, but whoever it is, he apparently cannot distinguish between the letter 'o' and the figure '0,' as both are used indiscriminately. We also notice that the pamphlet is headed 'Lincolnshire Naturalists' Union Transactions, 1909, part I.' There is nothing to shew that it was published in 1910, and this makes at least the third 'Part I.' of this Society's Transactions, and we can't say whether this is Part I. of a new volume, part I. of the Check List, or part I. of a new series of monographs. In a future publication it would perhaps be as well to give a bibliography of the various publications issued by the Lincolnshire Union; as it is, a reference to "part I.' in years to come, will take some finding.

Field and Woodland Plants, by **W. S. Furneaux.** Longmans, Green & Co. London, 1909. pp. xvi. and 383. 6/- net.

This volume is the fifth by the same author of the 'Outdoor World Series.' Its aim is to give descriptions of common plants in non-technical terms, and we may say that these are fuller and freer from errors than one usually finds in books of this kind; the illustrations, too, are so numerous and usually so characteristic that many of the plants commonly met with may be identified. In addition to the many figures from photographs and drawings, fifty-two species are given in colour on eight plates. Some of the figures, however, are misleading, *e.g.*, on p. 62 is a photograph of an exotic cultivated species of Barberry to illustrate the wild one mentioned in the text. An introductory chapter deals with an account of the parts of a plant, and the general characters of the main orders. In the following chapters the species are described according to the seasons Spring, Summer and Autumn, and in each case further grouped according to habitat. The study of wild flowers from the point of view of habitat is one of the most tempting as well as most promising, and there is plenty of room for a work dealing with this aspect of field botany. Unfortunately the author has missed the point entirely, he has apparently given little attention to the subject himself, and so we frequently find that 'habitat' resolves itself into the heading of a chapter, without further comment, while the species included are often not characteristic of the habitat he gives. Failing this, the book is well got up, and will prove useful to beginners and others requiring a simple account of our wild plants.

THE RECENT CLOUD-BURST ON THE YORKSHIRE WOLDS.

Rev. E. MAULE COLE, F.G.S.

(PLATE XI.).

It is not to be supposed that the Wolds of the East Riding are more liable to terrific thunderstorms and torrential rains than other parts of the country, but the effects are more visible, and often more disastrous. This arises from the peculiar conformation of the ground—there is hardly a level field anywhere, all is on the slope. The land is intersected with deep dales, like the branches of a tree, all making for its own trunk. There is a hard sub-soil of chalk, and very little covering of earth, hence when a cloud-burst occurs, the rain cannot sink but rushes down the sloping fields, gathering in its course hundreds of streams which converge in the lower portion, till it reaches a steep dale side ; then, with leaps and bounds, the torrent dashes down the bare side of the dale, carrying all before it, and excavating deep chasms in its path, strewing the dale bottom with chalk debris and soil removed from the fields above. This has been specially noticeable in the two storms of May 20th and May 21st, 1910.

On May 20th, at about 4 a.m., a rush of water came down from Haverdale to Lutton on its way to Helperthorpe. This in itself was not important, but it was soon joined by a tremendous flood descending from Croom High House, about a mile east of Sledmere. This filled the dale bottom leading from Croom to Helperthorpe, gathering on its way many streams from the hill sides, and finally uniting with the stream from Haverdale, poured itself into the Gypsey Race, and completely flooded the cottages in Weaverthorpe to the depth of four feet, filling them with mud, and destroying the gardens. About half a mile to the east of Weaverthorpe another torrent came down Galloping Slack from the high barn on Weaverthorpe pasture, and augmented the disaster. Here it was that the hedges were levelled, and a straw stack, weighing four tons, carried intact for a full mile. All this occurred on the north side of the High Street, which runs from Sledmere to Bridlington. Curiously enough the High Street itself was hardly touched, and not damaged at all. But on the south side it was different. Here at Cowlam the rain cloud burst in its

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most intense form—many fields, some prepared for turnips, were completely swept of soil; deep ruts were formed in all directions, and the combined force of water dashed down the dale side through a plantation, excavating enormous chasms. The reason for these, independent of the slope of the ground, seemed to be that the roots of the trees bared of soil still formed a temporary barrier to the rush of water, and caused it to leap up and then dash down with renewed force in the form of a cataract, excavating a deep hole at the foot. One of these holes measured 23 feet in depth. This was the flood which, like a wall of water, descended Cowlam Dale, and caused the great damage at Driffield, six miles away.

May 21st—The second storm, on the following morning, passed over Malton and the Pickering Vale on both sides, causing floods at Ellerburn, Thornton, Allerston and elsewhere on the north, and great damage to the slopes of the Wolds on the south. East Heslerton suffered most. Here, on Grange Farm, numerous channels were excavated on the brow of the hill, one being 13 feet deep and 23 feet wide, and chalk debris scattered over the fields below, completely obliterating what little soil was left.

There have been previous storms, but none to equal the above. The nearest approach was the great cloud-burst on Sunday, July 3rd, 1892.* One portion broke over Huggate, and rushed down as a mighty river four miles to Wetwang—the other burst over the hill sides above Langtoft, and completely flooded that unfortunate village. Two years later the hills between Canada and Towthorpe were the scene of a tremendous downpour, the water rushing down York Dale to Fimber Station, a foot in depth. On this occasion three water-spouts were observed advancing from the sea to Towthorpe. This partly explains the origin of the phenomena which we have been considering. The writer has more than once witnessed the meeting of two heavy rain-clouds, one from the sea on the south-east, and the other from the south-west. Each probably contained as much moisture as it could hold. On intermingling the united cloud sailed away to the high ground, and being unable to support the weight of water, emptied itself in a perfect deluge.

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* See illustrated paper by the present writer in Trans. Hull Scien. and Field Nat. Club, Vol. I., pt. 4, for 1901, p. 225.

Photo by] **Effect of Cloud Burst, Cowlam.** [*H. Thelwell.*

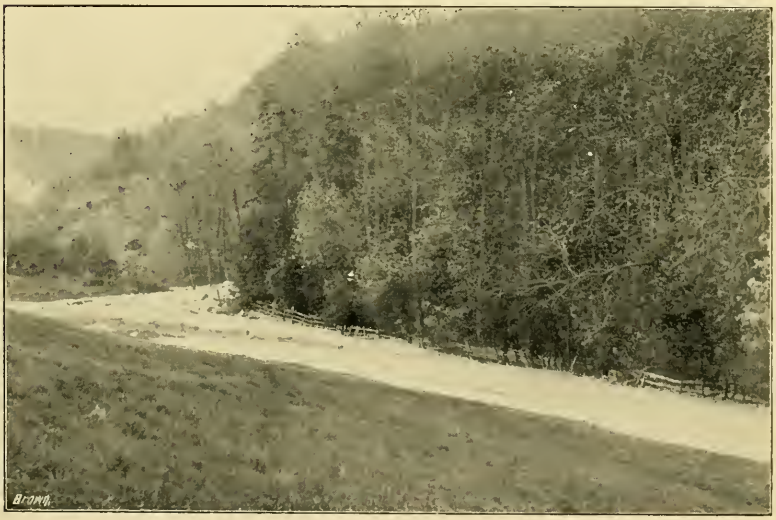

Photo by] **Gravel carried down the Valley at Cowlam.** [*H. Thelwell.*

Fig. 1.

Fig. 2.

Fig. 1. *Asteroceras acceleratum* Hyatt. × $\frac{1}{5}$ (approx.).
,, 2. *Asteroceras stellare* Sow. × $\frac{1}{5}$ (approx.).

NOTES ON TWO LARGE AMMONITES FROM THE HOLDERNESS DRIFT.

C. THOMPSON, B.Sc. (Lond.).

(PLATE XII.).

In following the life history of an individual ammonite, as exemplified in the shell, from the earliest stage to the last, it will be seen that as a rule, in infancy, the whorls are quite smooth. This stage continues through a variable number of whorls, which number seems to be a characteristic of the genus to which the specimen belongs. Then in the youthful stages it acquires its characteristic ornaments, gradually advancing from obscure folds, or swellings, to the more ornate costæ, spines, etc. The acme of ornamentation may be said to be reached in, and to persist through the adult stage. In old age, however, senile decay is manifested by a gradual loss of ornaments, and the whorl becomes either smooth, or traversed by slight ridges, mere indications of the former ornate folds. Again the shape and amount of involution of the whorl changes, especially in old age.

If we now examine a series of species, the successive representatives of the genus, or race; we find that the changes mentioned begin at earlier and still earlier periods in the lives of successive species descended from some given progenitor. Thus in a series *A*, *B*, *C*, *D*, we may find in the adolescent stage of *B* the characters of the adult of *A*, its predecessor; that in *C* and *D*, one or more stages may be crowded out altogether from their individual development, so that even in youth they may resemble the aged representatives of *A*, or, have acquired entirely new characteristics.

This mutation of form and ornamentation is expressed by Hyatt's Law of Acceleration. (*vide* his 'Genesis of the Arietidæ').

Perhaps one of the most striking, or most manifest examples of the law, is the species *acceleratum* of the genus *Asteroceras*. This species has been shewn by Hyatt to have descended from *obtusum*, through *stellare*, and to display in its adult stage the characters of the last stage of the other two. It is a rare ammonite, but a few specimens have been found in the Côte d'Or and also in southern Germany. These are preserved in the museums at Semur and at Stuttgardt respectively.

1910 July 1.

In the Côte d'Or it was found in the *Birchi* bed, while in the South German basin it occurred first in that of *Geometricum*. When found in place in England it should occur in the lower beds of our *Oxynotum* zone. That it has ever been found in situ in England is doubtful, for no record of it can be found. However, Mr. Sheppard has recently acquired for the Hull Museum, from the Drift of Holderness, a very fine ammonite, which the writer has determined to be a specimen of Hyatt's *acceleratum*. This determination has been supported by Mr. S. S. Buckman, Mr. G. C. Crick of the British Museum, and by Dr. H. Joly, of the University, Nancy, to whom photographs have been submitted.

The specimen is the largest one of the species known to the writer, and would have been much larger if it had not lost the entire body chamber. The following are its dimensions :—

Largest diameter	317	mm.
Width of outer whorl	130	,,
Height of outer whorl (keel to keel) ..	101	,,
Greatest thickness of outer whorl ..	95	,,
Width of last whorl but one	67	,,
Width of same overlapped	34(?)	,,
Width of umbilicus	100	,,

An examination of the specimen (fig. 1), shews that it consists of five or six whorls (?), that the inner adolescent ones have the characteristic costæ or ribs of *stellare*, but that they die away gradually in the outer whorl which then becomes quite smooth. The umbilical shoulders are rounded, large and prominent, so that the umbilicus is deep. The section of the outer whorl is ovate, the flanks converging to the periphery with a gentle curve. Its ventral surface, or periphery, is narrow and sharply defined, while it carries a rounded, depressed, but still prominent keel between two broad but very shallow furrows. The keel may be easily distinguished in the figure. It will also be noticed that it is more involute than *stellare* ; that is, the outer whorl covers, or overlaps, about one half of the preceding one, while in the last-named, Hyatt writes that the maximum overlap is one-third. The suture lines resemble those of *obtusum*.

The second specimen (fig. 2), which is also in the Hull Museum, has been kindly determined by Mr. G. C. Crick and by Mr. S. S. Buckman as *Asteroceras stellare* Sow. This is also a very large ammonite. As it wants by far the greater part of

its body whorl, it must have been very big indeed when complete. The following are its dimensions :—

Largest diameter	348 mm.
Width of outer whorl	140 ,,
Height of outer whorl (keel to keel) ..	120 ,,
Greatest thickness of outer whorl ..	112 ,,
Width of last whorl but one	76 ,,
Width of same overlapped	30? ,,
Width of umbilicus	130 ,,

The outer whorl is very different in section from that of *acceleratum*. The flanks converge slightly so that the periphery is much wider and also much flatter than in the last-named, being traversed, however, by two distinct broad furrows and a very low depressed keel, so low that it cannot be seen in the figure. This specimen is also remarkable for the beautiful display of its suture lines.

The writer's thanks are more especially due to Mr. Sheppard for bringing the above specimens to his notice ; to Mr. Crick, for first introducing him to Hyatt's incomparable work ; and to his colleague, Mr. H. A. Denham, for the excellent photographs.

Pleasant Walks Round Halifax, by **C. Crossland.** Edward Mortimer, Halifax. 1910., 52 pp. Price 6d.; cloth 1/-

Probably few know the ways and byways around Halifax so well as does Mr. Crossland ; hence his 'Ten Country Rambles over Hill and through Dean, in the Parish of Halifax, with Scraps of Local and Natural History,' are written with a full knowledge of the subject. No words are wasted in fine writing, and much is told in little space. Personally, we were a bit surprised to find that there were such pleasant walks so near Halifax ! The book is a handy size for the pocket, neatly bound in cloth, and has ten large scale maps illustrating the routes.

The Geology of the Melton Mowbray District and South-East Nottinghamshire, by **Messrs. G. W. Lamplugh, W. Gibson, C. B. Wedd, R. L. Sherlock and B. Smith,** with notes by C. Fox-Strangways, has recently been issued by the Geological Survey 'in explanation of Sheet 142' (118 pp. and plates). The Melton Mowbray area is of particular interest to the geologist, as shewn by the headings to the chapters, viz. :—General Description, Concealed Carboniferous and Older Rocks, Trias, Lower Lias, Middle Lias, Upper Lias, Inferior Oolite, Glacial Deposits, Post-Glacial River Gravel and Alluvium, Economic Geology, Borings and Sinkings, and Bibliography. There is also a good index. Judging from the plates, there are several excellent sections in the district covered by sheet 142. Whilst the memoir is of particular value to those 'interested' in minerals, etc., the 'ordinary' geologist will perhaps find that part dealing with the more recent beds to be the most readable. Each section of the memoir (in some cases each paragraph) is initialled, so that there will be no difficulty in tracing the authority for any statement made. The price is two shillings and threepence ; the odd coppers doubtless being for the paper cover, which is rather better than the flimsy shaving-paper usually used by His Majesty's Stationery Office for 'binding' the results of some of the best geological work that has ever been accomplished.

NATURAL HISTORY OF MIDDLETON-IN-TEESDALE.

In continuation of its usual practice of investigating the fauna and flora of the county by means of field meetings, the Yorkshire Naturalists' Union commenced its year's work at Middleton-in-Teesdale during last Whit-week-end. Here, on the borders of the county, with an occasional trespass into Durham, the party spent a glorious time amidst glorious surroundings. The district was surely ideal for a Naturalists' Society ; and in addition to possessing a wonderfully varied and interesting fauna and flora, the structure of the country was also well accessible ; partly by means of the enormous sections exposed during quarrying operations, and partly as a result of the work of waterfall and stream. The members had the unusual advantage of well-informed leaders. In addition to the divisional secretaries, Messrs. J. J. Burton and W. Robinson, there were Messrs. G. Hodsman, W. Walton, W. Collins and others, all of whom exerted every possible effort to ensure the success of the excursion. To Mr. Hodsman, also, the party was indebted for thoughtful assistance of a very acceptable nature ; his thorough acquaintance with the district enabling him to gauge the requirements of a party of naturalists in a wild county, where roads, "etc.," are few and far between !

To write a proper and adequate account of the Middleton excursion would require much more space than can be spared. The moors, waterfalls and quarries had their charm, quite apart from their interest to geologist and zoologist ; and it was not necessary to be an ardent botanist to appreciate the delightful beauty of the azure stars of *Gentiana verna* as they shone from the grassy slopes upon which they grew.

After the excursion a meeting was held at the headquarters, the Cleveland Arms, at which Mr. Burton presided. At this reports were presented by the representatives of the various sections ; thirteen new members were elected, and hearty votes of thanks were passed to the landowners, and also to the various gentlemen who had so willingly assisted with the excursion.

Mr. Burton's report on the geology of the district will be found on page 268.

The zoologists were not so well represented as usual, and consequently reports were meagre. A fine specimen of the Common Lizard was noted, and accommodatingly left its tail

in the hands of its captor, presumably for purposes of identification! Amongst the birds the peregrine was perhaps the most noteworthy, and the landlord at the Cleveland Arms convinced the party that fine trout occurred in the adjoining river.

COLEOPTERA.—Mr. M. L. Thompson reports that the following beetles were met with on the high moors in Lunedale :—

Notiophilus biguttatus F.
,, *aquaticus* L.
Dyschirius globosus Hbst.
Bradycellus similis Dej.
Pterostichus madidus F.
,, *diligens* Stm.
Amara lunicollis Schiöd.
Calathus melanocephalus L.
,, *micropterus* Duft.
Olisthopus rotundatus Payk.
Patrobus excavatus Payk.
Cercyon hæmorrhoidalis F.
,, *melanocephalus* L.
Cryptopleurum atomarium Ol.
Aleochara lanuginosa Grav.
Homalota atramentaria Gyll.
Hypocyptus læviusculus Man.
Tachyporus chrysomelinus L.
Tachinus marginellus F.
Mycetoporus lepidus Grav.
Philonthus æneus Ross.
Othius myrmecophilus Kies.
Lathrobium fulvipenne Grav.
,, *brunnipes* F.
Stenus impressus Germ.
Platystethus arenarius Fourc.
Oxytelus laqueatus Marsh.
,, *tetracarinatus* Block.
Olophrum piceum Gyll.
Deliphrum tectum Payk.
Aphodius fimetarius L.
Aphodius ater De G.
,, *constans* Duft.
Cryptohypnus riparius F.
Ceuthorhynchus ericæ Gyll.

Mr. W. P. Winter has kindly sent me the following additional species taken by him on the banks of the Tees at Mickleton :—

Trechus minutus F.
Tachinus rufipes D. G.
Creophilus maxillosus L.
Philonthus decorus Grav.
Lathrimæum unicolor Steph.
Silpha nigrita Cr.
Silpha rugosa L.
Cryptohypnus dermestoides Hbst.
Chrysomela staphylea L.
Hydrothassa marginella L.
Apion nigritarse Kirby.
Otiorhynchus picipes F.

ARACHNIDA.—For the Arachnological Section, Mr. Falconer reports that as the district to be investigated was practically an unworked one, the season opportune and the weather indications favourable, he and Mr. Winter anticipated a successful issue to their quest for spiders, Their hopes, however, were not fully realised, for, with one exception, these creatures were not at all plentiful, either as individuals or species. This scarcity was most noticeable along the higher reaches of the river, where the prevailing humidity of the climate in conjunction with the underlying impervious strata produces extensive tracts of water-logged ground apparently as inimicable to spiders as it is favourable to some other forms of both animal and vegetable life. For the first two days the prescribed routes were adhered to. Good use was made of the brief

halt at High Force, several species being obtained there, amongst them being *Harpactes hombergii* Scop., *Cryphœca silvicola* C. L. Koch, *Walckenaera nudipalis* Westr., *Nesticus cellulanus* Clerck, *Ero thoracica* Wid., *Neon reticulatus* Bl., and the rarer or more local *Leptyphantes obscuris* Bl., and *L. flavipes* Bl. Beyond the fall beneath a stone at the foot of the cliffs Mr. Winter found two of the beautiful stalked balloon-shaped egg cocoons, and a young indeterminable example of a species of *Agroeca*. A little farther on, but still on the Durham side of the river, at a great bend covered with thick low-lying tufts of ling, grass and moss, Mr. Falconer shook out one male *Maro falconerii* Camb. and one female *Clubiona diversa* Camb. The former previously found only in Cheshire and West Yorkshire is new to Durham county, its limit of range being thus greatly extended northwards. On crossing Cronkley Bridge into Yorkshire, the distance still to be traversed was so great, and the time so short, that very little collecting was possible, though Mr. Winter managed to secure a fine female *Tarentula andrenivora* Walck, with her egg-sac, between White Force and Maize Beck. On the second day the neighbourhood of Winch Bridge yielded one male *Troxochrus hiemalis* Bl., and a number of common species. On the third day the south bank of the Tees as far as its junction with the Lune was investigated, the return journey being made along the left bank of the tributary. Here *Leptyphantes tenebricola* Wid., a spider for which there are few other Yorkshire or north of England records, occurred, and dozens of *Lycosids* sped swiftly over the grass in the bright sunshine, attempts to catch them affording excellent sport. Later examination showed that no less than five species were represented. For *Lycosa agricola* Thor. there is but one other Yorkshire record, (Lower Teesdale). On the fourth day an hour was spent in the woods at Barnard Castle, *Leptyphantes tenebricola* Wid. being again met with. Altogether seventy species of true spiders, five of harvestmen and one pseudoscorpion were noted.

In the following complete list, the initial ' W ' denotes that the species was found by Mr. Winter only ; ' F ' by Mr. Falconer only ; and those uninitialled, by both ; the species not recorded for Durham in Rev. J. E. Hull's ' Catalogue of the Spiders of Northumberland and Durham, are distinguished by an asterisk, though it is probable that, as other naturalists have been more recently at work, who have not yet, however, published their

results, some or most of them have since been taken in that county.

I.—In both counties.

Amaurobius fenestralis Stroem.
Cryphœca silvicola C. L. Koch.
Cœlotes atropos Walck.
Tegenaria derhamii Scop. F.
Robertus lividus Bl. F.
Leptyphantes blackwallii Kulcz.
**L. ericæus* Bl. F.
**L. tenebricola* Wid.
Bathyphantes nigrinus Westr.
B. gracilis Bl.
B. dorsalis Wid. F.
Microneta viaria Bl.
Œdothorax retusus Westr.
**Œ. gibbosus* Bl. F.
**Œ. agrestis* Bl.
Tiso vagans Bl.
**Lophomma herbigradum* Bl. F.
Neriene rubella Bl.
Dismodicus bifrons Bl.

Diplocephalus cristatus Bl. F.
**D. fuscipes* Bl. F.
**D. latifrons* Camb.
Peponocranium ludicrum Camb.
Meta segmentata Clerck.
M. merianæ Scop.
Zilla X-notata Clerck. F.
Pirata piraticus Clerck. F.
Lycosa amentata Clerck.
L. pullata Clerck.

Liobunum rotundum Latr.
Platybunus corniger Herm. *forma triangularis* Herbst.
Metabunus insignis Meade.
Oligolophus morio Fabr.
Nemastoma lugubre O. F. Mull.

Obisium muscorum Leach.

II.—In Yorkshire only.

Bathyphantes variegatus Bl. F.
B. concolor Wid. F.
Erigone dentipalpis Wid.
Dicymbium tibiale Bl. F.
Diplocephalus permixtus Camb. F.
Savignia frontata Bl. W.
Pocadicnemis pumila Bl. W.

Walckenæra acuminata Bl.
Xysticus cristatus Clerck. W.
Trochosa terricola Thor. F.
Tarentula pulverulenta Clerck.
T. andrenivora Walck. W.
Lycosa agricola Thor.
Lycosa palustris Linn.

III.—In Durham only.

Harpactes hombergii Scop. F.
Oonops pulcher Templ. F.
Clubiona reclusa Camb. F.
**C. diversa* Camb. F.
C. comta C. L. Koch.
Agræca sp. W.
Amaurobius similis Bl. F.
Textrix denticulata Oliv. F.
Theridion pallens B. F.
Linyphia peltata Wid. F.
L. clathrata Sund. F.
Cornicularia cuspidata Bl. F.
Nesticus cellulanus Clerck.
Ero thoracica Wid. F.

Epeira diadematа Clerck.
Neon reticulatus Bl.
Labulla thoracica Wid.
Leptyphantes terricola C. L. Koch. F.
**L. obscurus* Bl. F.
L. flavipes Bl.
L. tenuis Bl. F.
Tmeticus bicolor Bl. F.
Gongylidium rufipes Sund. F.
Neriene rubens Bl.
**Maro falconerii* Jacks. F.
**Troxochrus hiemalis* Bl. F.
**Walckenaera nudipalpis* Westr. F.

At the Sectional Meeting, Mr. Winter brought forward the question of defining suitable areas for records, but no satisfactory conclusion was arrived at (See "Naturalist,' June, p. 218). Another point raised was one dealing with the method of making records, which should include at least the exact place, especially in the case of very rare or new spiders, for the

information of any future worker who might wish to verify the record ; the date, number and sex of the specimen taken to tell the time of adolency or immaturity and the comparative rarity or abundance of the species, together with any further particulars as to its habits or life-history and the kind of habitat favoured. It was urged, also, that a good look-out should be kept for definite examples of the way in which spiders are disseminated, and that more attention should be paid to abnormal specimens, and means taken to preserve them.

For the CONCHOLOGICAL section Mr. T. W. Saunders writes that in a wooded valley which leads to King's Walk and Jack Scar, he found *Agriolimax agrestis*, with varieties ; *Helix rotundata, Zonites nitidus*, and *Vitrina pellucida*. Close to the stream he came across a colony of *Helix arbustorum*. *Agriolimax agrestis* was very abundant, almost every stone turned over yielded several specimens. A little further on were many *Helix arbustorum, Arion ater, Helix hortensis, H. hispida, H. nemoralis* var. *carnea, Cochlicopa lubrica*, and a little beyond was *Zonites crystallinus, Helix hortensis* var. *lutea* and *Bulimus obscurus*. In an old disused limestone quarry I got *Pupa umbilicata, P. marginata* and *P. ringens* (?) with *Bulimus obscurus, Helix hortensis* and *H. rufescens*.

Amongst some old ruins, I got *Zonites cellarius* and *Z. alliarius*. *Arion ater* was in abundance ; *Helix arbustorum* was very plentiful, feeding on the grasses.

On Monday we drove to Lunedale, and in an old quarry I got *Carychium minimum, Zonites fulvus*, and *Helix hortensis* and its var. *lutea* copulating. Further up I got *Agriolimax laevis*. and *Zonites alliarius*. Near the stream I got *Ancylus fluviatilis* and in a pond close by, *Pisidium pusillum*, which was in abundance. Above the reservoir works in a small pond, were *Limnea peregra* and *L. truncatula*. *Clausilia laminata*, and *C. rugosa* were found by other members. One striking feature was the scarcity of *Helix nemoralis*. I only found this at one place. Quite near to Middleton, below the Railway Station close to the river, *Helix arbustorum* was very plentiful, and at the same place I got *Helix arbustorum* var. *flavescens* and *Helix hortensis*.

On Tuesday, in crossing the country to the River Tees below Widdy Bank Farm, I got *Helix arbustorum, H. granulata* and *Zonites cellarius*. At the top of Cauldron Snout, in the stream, I got quite a number of *Ancylus fluviatilis* and *Limnea peregra*.

Naturalist,

The following is a list of the species found :—

Agriolimax agrestis.
Arion ater.
,, *hortensis.*
Agriolimax lævis.
Ancylus fluviatilis.
Pisidium pusillum.
Limnea peregra.
,, *truncatula.*
Helix rotundata.
,, *arbustorum*
,, ,, var. *flavescens.*
,, *hortensis.*
,, ,, var. *lutea.*
,, *nemoralis*
,, ,, var. *carnea.*
,, *hispida.*
Helix rufescens.
,, *granulata.*
Zonites nitidus.
,, *crystallinus.*
,, *cellarius.*
,, *alliarius.*
,, *fulvus.*
Cochlicopa lubrica.
Bulimus obscurus.
Carychium minimum.
Clausilia laminata.
,, *rugosa.*
Pupa umbilicata.
,, *marginata.*
Vitrina pellucida.
Pupa ringens ?

Botany.—A special report on the Botanical features of the area is being prepared by Drs. Smith and Woodhead, which will probably appear in our next issue.

Mosses and Hepatics.—Mr. W. Ingham writes :—The whole district is very rich in these plants, and there have been many competent workers who have recorded a long list of rarities. The following notes refer to those plants of interest met with at this excursion :—

I. Hudeshope Beck (Skears Beck).—The stones, walls and trees in the valley traversed by this beck are richly covered with mosses and lichens, indicating a copious annual rainfall, and an atmosphere free from smoke. In addition to the very common mosses that were dominant here, the following may be mentioned :—*Camptothecium lutescens* and *Eurhynchium striatum*, both large forms and of a golden colour ; *Orthotrichum stramineum* and *O. anomalum* var. *saxatile.*; *Barbula rigidula* and *B. fallax* var. *brevifolia*, both in fruit, the latter being rare in that state ; *Tortula intermedia* ; *Amblystegium filicinum*, very small and near var. *trichodes* ; and *Hypnum uncinatum* var. *plumulosum.*

II. High Force to Cauldron Snout.—At the High Force, the beautiful glossy *Webera cruda* and a large and interesting state of *Hypnum cuspidatum* var. *pungens* were observed.

Between Cronkley Scars and the River Tees were *Sphagnum subnitens* var. *obscurum* c. fr., *S. acutifolium* var. *versicolor*, *S. rubellum* var. *flavum*, *S. inundatum* and *S. cuspidatum* var. *submersum*. Here also was the Harpidioid Moss, *H. fluitans* var. *Jeanbernati*. *Tetraplodon mnioides* and *Splachnum sphaericum* were on this ground, and both in young fruit.

The Yorkshire side of the Tees, after passing Widdy Bank Farm and before reaching Falcon Clints, is probably excellent ground for rare mosses. During the short time spent there, deep tufts of *Barbula rubella* var. *ruberrima* and *Bryum filiforme* were collected. Both these mosses are buried up to their apices in wet sand, and the Bryum is much finer than the same species high up in the crevices of Falcon Clints on the Durham side.

Mr. Anderson brought down from Cronkley Fell a large state of the Hepatic *Marsupella aquatica*, also *Mylia Taylori* and *Metzgeria conjugata*.

III. Cauldron Snout over Widdy Bank Fell.—There was no time to search for mosses in this route. Two good plants were found, viz., *Barbula rubella* var. *ruberrima* and *Hypnum fluitans* var. *Lindbergii*, a new variety of Harpidium lately described by Renauld in the 'Revue Bryologique.'

IV. Along Lunedale to Grassholme.—In the quarry en route was a large yellow form of *Tortula subulata* with the seta an inch or more in length, and its leaves much larger than the type.

On the limestone cliffs by the side of the Lune were *Dicranum Bonjeani* var. *juniperifolium*; *Orthotrichum cupulatum* var. *nudum*; *Weisia viridula*; *Hedwigia ciliata*; *Eurhynchium myosuroides*, a large form; *Hypnum cupressiforme* var. *resupinatum*; and the rare Hepatic, *Lejeunea cavifolia* var. *planiuscula*. There was much *Encalypta vulgaris* on the walls in the return journey.

V. Shacklesborough Moss.—This extensive Sphagnum Bog would require a long time for its study. There is no doubt that the bog is on the increase in the growth of Sphagna. In one part of the way across was a large tract of ground where the heather had been burnt. Around the dead heather stems was a copious growth of *Sphagnum acutifolium* var. *versicolor* with long stems. This seems to point to a copious annual rainfall, and this means excellent conditions for the growth of Sphagna. Again, the drainage channels were filled with the vivid green *Sphagnum recurvum*, a bog moss that delights in a plentiful supply of water.

Although remains of Birch only were found in the exposed peat of this treeless expanse, it seems highly probable that pure Sphagnum peat would be found under the present Sphagnum growth.

Naturalist,

The usual bog mosses of moorlands were met with, such as *S. rubellum* var. *versicolor* and *S. tenellum*. A very interesting Harpidium was found in the shallow water splashes, viz., *Hypnum fluitans* var. *Jeanbernati*, quite different from the same plant in Cronkley Pastures, in having variegated colours instead of being quite green. *Campylopus pyriformis* in fruit, a typical peat moss, and *Splachnum sphæricum* were obtained.

A remarkable feature of the Hepatics was the great abundance of the beautiful *Blepharozia ciliaris*. This was repeatedly met with in the way across the bog. *Lophozia Floerkii*, another true moorland plant, was also found.

On descending from this great Sphagnum Bog into Balderdale, we had a very unusual sight of the moss *Bryum pallens*, occurring in large brilliant rosy red hassocks all along the side of the River Balder.

T.S.

We have received the **First Interim Report of the Excavation of the Roman Fort at Castleshaw.** (Manchester: Sherratt & Hughes. 37 pp., 1/-). It is an excellent production, and contains maps, plans and various plates of objects found during the excavations. The whole work seems to have been carried out upon thoroughly scientific lines, under the direction of specialists, and every fact likely to be of service has been noted. The information given in reference to the various stamped tiles is particularly interesting. The Report is well 'got up,' and remarkably cheap.

The Evolution of Man: A popular scientific study, by **Ernst Haeckel.** Vol. I.—Embryology or Ontogeny; Vol. II.—The Evolution of the species or Phylogeny. London: Watts & Co. 774 pp., 12/6.

We are proud to think that there is no need to draw the attention of our readers to the nature of this well-known work. What we do wish to do, however, is to point out the fact that the Rationalist Press Association, Ltd., has just issued it, in two well-illustrated and neatly-bound volumes, with all the illustrations, at the exceedingly low figure of 12/6. This edition is translated by Mr. Joseph McCabe, from the fifth and enlarged edition of Haeckel's work. Those who have not the volumes on their shelves should certainly now possess them.

Prehistoric Man, by **Joseph McCabe.** London: Milner & Co. 128 pp. 1/-. This is an addition to the remarkably cheap volumes forming the 'XXth Century Science Series,' which Messrs. Milner & Co. are publishing. The volume is well illustrated, and strongly bound in good cloth. The author has a thorough grasp of the subject with which he deals, and in a pleasant style takes the reader through 'The Founding of the Science'; 'The Earliest Traces of Man'; 'The Beginning of the Old Stone Age'; 'Progress During the Old Stone Age'; 'The Men of the New Stone Age'; 'The Monument Builders'; and 'The Metal Age and the Dawn of History.' There is also a 'Bibliography'; and Index. It came as a surprise to us to find that the works of Greenwell, Mortimer and Pitt Rivers were not included in the Bibliography.

GEOLOGICAL NOTES ON THE MIDDLETON-IN-TEESDALE DISTRICT.

By J. J. BURTON, F.G.S.

The three principal objects of investigation by the Geological section of the Yorkshire Naturalists' Union at its recent meeting at Middleton-in-Teesdale were :—

(*a*) The Limestone sections as compared with those of the Ingleborough district.

(*b*) The Great Whin Sill and its effect upon the strata above and below.

(*c*) Glacial action and the occurrence of erratics.

Time did not permit of going over the area where the sections of limestone could be examined in the order in which they were laid down, but during the three days excursions a large number of exposed sections in different localities were visited, which enabled the members to get a good idea of their sequence and of the important dislocations which have occurred in the area.

Going up Hudeshope Beck, fine sections of the Great or Main Limestone were seen, together with considerable thicknesses of black shales and grits. These were not again observed until visiting the Lune Valley, when they were found in the bed of the stream some distance up, beyond the dam of the Grassholm reservoir, and also on the south bank of the river. At this point they have an extremely sharp dip nearly due south. In this exposure a very fine prolific band of cup corals and Brachiopods was noticed, and specimens were taken for identification.

On the south side of the Tees, and below the Whin Sill, an exposure of the Jew (or Hardraw) limestone was noticed, and its occurrence at this point, with the proper sequence of the Yoredale rocks above (interrupted only by the intrusion of the Basalt), taken together with the previously observed position of the Main Limestone bed, proved conclusively that somewhere near the line of the River Tees and also in the Lune Valley, faults must exist which have thrown down (relatively) the strata to the north of the Tees, and also to the south of Harter Fell between Teesdale and Lunedale.

Collating the various exposures observed along Hudeshope Beck, in Teesdale, and in Lunedale, it becomes strikingly evident that the enormously thick masses of Yoredale limestones seen

in the Ingleborough district have become greatly attenuated as we proceed northward, and have been replaced to a considerable extent by bands of thin limestone, shales and grits. These indicate that considerable earth movements have been in progress in the area, and that the relative position of the Teesdale area of the ancient littoral, and of detritus-bearing streams, had been frequently undergoing change during Yoredale times, and to a much greater extent than was the case at no great distance to the south.

The outstanding geological feature of Upper Teesdale is the Great Whin Sill, an enormous intrusive dolerite mass,

Tarns on the undercliff, Cronkley Scars, Upper Teesdale.

extending into Northumberland, but having its greatest development in Teesdale. It is prominent in precipitous cliffs on the south side of the river from Middleton to High Force. It forms the river bed in many places, and at High Force the river plunges over a lip of the basalt into the gorge, 69 feet below. The outcrop is also well seen in the precipices of Cronkley Scars, Falcon Clints and Cauldron Snout (a cascade of about 200 feet over basalt) where the columnar structure was very evident.

In Park End quarry it was noticed that coarseness of the

granular fracture increased from the bottom upward, and that the shales with which it had come into contact were greatly altered. One of these, locally known as the 'pencil bed,' was erroneously believed to be the same formation as the shales near Cronkley, from which slate pencils were once made. The property of being able to mark slate is common to both, but on examining both shales carefully there is no hesitation in confirming the conclusion of the Survey that the Cronkley shales are probably of Silurian origin, and an upthrow of the Burtreeford Dyke, and that the Park End shale is a deposit of fine clayey matter formed during Yoredale times, which has since been much altered by contact with the Whin Sill. The analyses of the two shales are quite different.

At Park End quarry is a very interesting fault. The outcrop of the Whin abuts on indurated shale and adhering to the Whin is a thin vertical sheet of hard scoriaceous material, full of cavities. The true Whin is seen to interlock into this 'crust' in serrated edges, but the thin wall of crust shews clear lines of stratification, and where it joins the Whin the lines of stratification are very distinctly curved upward.

Is this 'crust' the result of water action in the fault after the intrusion of the Basalt? Or is it an actual crust of intrusive lava cooled against a surface of shale against which it has come up? Is the fault part of the great fault formed after the intrusion of the Basalt? Or is it a pre-existing fault? Has the sheet of Basalt been broken at this point and denuded, or has it here cut across the bedding planes and risen to a higher level through finding its course obstructed and then been denuded?

These questions are left unsettled, and may give an opportunity for some further discussion.

The effect of contact with the Whin Sill which was noted in this quarry, was seen to still greater perfection at High Force where the stratified shales and grits and limestone below the Whin have assumed a prismatic character. But perhaps the most interesting section of altered limestone is at White Force, where some thirty to fifty feet of underlying strata have been completely marmorised, although on weathering the limestone is reduced to fine granular white sand. In this section there still remains evidence of the fossils which it contained prior to its metamorphosis. Still further evidence of altered strata occurs on Widdy Bank in the vicinity of Cauldron Snout, but here it is the overlying limestone which has become granular

and crystalline in structure, in most respects identical with that seen below the Whin at White Force. These two important facts seem inconsistent with any theory of a submarine overflow of the Basalt which is still advocated by some people and on which there has been much dispute ever since Sedgwick's time.

On the occasion of the Lunedale excursion, the members had the privilege of examining the model of the contours of the valley, and the sections cut through by the Tees Valley Water Board in forming the dam for the Grassholm reservoir, and also the admirable records which the engineering staff have preserved, which in future will be of much value to geologists.

The Lunedale quarries owned by Mr. Hodsman, gave fine and interesting sections of the Basalt, which seems to be a dyke, of what age compared with the Whin Sill there was no opportunity of investigating, but it is fairly certain they are both of Tertiary age.

It was surprising that during the three days' excursions very few far-travelled erratics were seen. Between the mouth of the Lune and Cauldron Snout the boulders were of local origin, which is what might be expected as there is no reason for supposing that the great glacier from the west ever overtopped the very elevated region at the head of Teesdale. The valley of the Lune however, is considered to be one of the main routes which the glacier coming over Stainmoor took in its course down to Cleveland, and it was expected that many evidences of this would have been found. On the contrary, although much time was spent amongst the drift which has been cut into or used for forming the Grassholm trench, the great mass of boulders were from local rocks. The explanation probably is that as the size of the ice sheet diminished, the high ground of Stainmoor cut off the supply to Teesdale, and that such erratics of western origin as had already commenced their journey were carried forward on or in the ice towards the North Sea, and that the further supply of ice being entirely of local origin, so the boulders left on the final disappearance of the ice were chiefly local. A few large blocks of Shap Fell granite have in the past been removed from the banks of the Lune.

Messrs. A. Brown & Sons, Hull, have just published the **First Annual Report of the Yorkshire Numismatic Fellowship.** It is edited by Mr. T. Sheppard, and naturally, has a strong 'Hull' flavour about it. It contains several illustrated papers on Yorkshire coins and medals, and is a record of a good year's work having regard to the small membership of the Society. The price is one shilling.

THE LOWER CARBONIFEROUS ROCKS OF MILL GILL (WENSLEYDALE).

COSMO JOHNS, M.I.Mech.E., F.G.S.

Introduction.

When the Yorkshire Geological Society made Bainbridge its headquarters for the June meeting, it was only to be expected that the well-known Mill Gill near Askrigg would be visited. To the writer the visit was specially welcome for it enabled him to further renew his acquaintance with sections that he had investigated some four years ago, the results of which are still unpublished, though the conclusions have been the subject of private communications to other workers in Carboniferous Geology. Phillips knew the ground well, though the typical Yoredale Series as described in his 'Mountain Limestone of Yorkshire,' is based on a generalised section in which local variations are omitted. Owing to the labours of Dr. Wheelton Hind the fuana of the Yoredale rocks became well known, and Mill Gill with Whitfield Gill received special attention. The state of knowledge at that time did not admit of a determination of the corals with the accuracy now available, and thus the task of correlating the Yoredale Series with some portion of the Carboniferous Limestone Series in areas where a zonal classification had been adopted, still awaited accomplishment when the writer visited Askrigg in August 1906. From the point where the stream passes under the road, up to the main limestone above Whitfield Scars, an almost continuous series of sections is available, enabling the upper portion of the great Scar Limestone, and the whole of the Yoredales as here developed, to be examined. This present communication is based on observations made during that early investigation, when several days were spent on the sections; and during the recent visit of the Yorkshire Geological Society. Thanks are due to the President, Prof. Kendall, and the members present, for their valuable and willing services in checking previous records, and making additions. Special attention was paid to those levels where the occurrence of forms known to characterise the Lower Pendleside and Lower Culm rocks had been recorded by Dr. Hind and the writer.

The Succession.

Making a start in the stream bed at the point where it passes under the Askrigg Road, it is found that for some little

distance the section is obscured owing to the number of boulders washed down from higher levels. During the visit of the Yorkshire Geological Society the occurrence of limestone boulders with *Saccammina carteri*, in the drift, had been noticed by Prof. P. F. Kendall. These became more numerous as Mill Gill was ascended, and the parent bed was found at a point about 25 feet below the top of the Great Scar Limestone. The occurrence of this particular fossil is noteworthy for it has been recorded by Mr. Smith from the Acre Limestone of Lowick; a much higher level than that now recorded from Mill Gill. It is known, however, that it occurs at several horizons in the Lower Carboniferous Rock, and as its range is from the Ordovician to the present time, it is an interesting example of a remarkably stable and persistent species. Succeeding the *Saccammina* bed we have well-bedded grey and black limestones with occasional shale partings, and corresponding to similar beds found in the other Yorkshire Dales at the top of the Great Scar Limestone. Corals are not uncommon, *Lithostrotion martini* *Syringopora* sp. and occasional specimens of *Cyathaxonia*, the specific identity of which has not yet been determined.

The top of the Great Scar is a massive limestone with small 'knolls' which stand up in domes or ridges, around and over which the black shales shortly to be described were laid down. The resemblance of these miniature 'knolls' to those described by Mr. Lamplugh from the Isle of Man was most striking, and the occurrence of *Posidonomya becheri* in abundance in the shales which immediately succeed, strongly suggests identity of level. In both areas there is an intimate relation between the *Cyathaxonia* limestones, the knolls, and the *Posidonomya becheri* beds. Several specimens of Trilobites were obtained from the black shales. Among the brachiopods that occur in these shales are:—

Productus setosus
,, *elegans*
,, *granulosus*
,, *undatus*
Rhipidomella michelin
Amboccelin sp. nov.
Spiriter trigonalis
,, *triangularis*
Pugnax cf. pugnus
Orthotetes sp.
Chonetes sp.

It is interesting to compare this list with that recorded by Dr. Wheelton Hind (Brit. Assn. Report, 1903), from a higher level in these same shales in which, in addition to the brachiopod fauna, such forms as *Ctenodonta lævirostris* and *Stroboceras*

sulcatus occur. Their occurrence so near the level of *Posidonomya becheri* is significant.

The Hardraw, Simonstone and Middle Limestones are well exposed, but a discussion of their fauna can hardly be undertaken here. The Underset and Main Limestones which are exposed in the well-known Whitfield Scars, have yielded an important fauna, including *Productus giganteus* and *Prod. latissimus*. These forms are abundant at many levels from the base of the Yoredales to the Main Limestone, and are only mentioned to emphasise their range throughout the Yoredales. It is the coral fauna which is of present importance :—

Lithostrotion irregulare (small var).
Cyclophyllum packyeudothecum (adv. mut.).
Dibunophyllum murheadi.
,, *splendens.*
Lonsdalia cf. *duplicata.*

A larger list could be given if forms obtained from the Main Limestone of the neighbouring dales were included. This fauna has enabled a definite correlation of the Main Limestone of the Yoredale area and the Great Limestone of North Northumberland to be made, and a valuable confirmation of the stratigraphical evidence is thus obtained.

A Digression.

At this point it might serve some useful purpose if certain conclusions as to correlation of the Yoredale Series be briefly stated here, while reserving a fuller discussion of the evidence on which these conclusions are based for another communication. The Main and Upper Scar Limestone of Ingleboro', Penyghent, Buckden Pike and of the ridge that divides Wensleydale from Swaledale, contains the same brachiopod and coral fauna as the Great Limestone of Weardale and North Northumberland. This Main or Upper Scar Limestone is the highest calcareous member of the Yoredale Series in the country between the Craven Faults and Wensleydale, and is succeeded, after an interval of a variable thickness of shales and sandstone, by the Ingleborough Grit. This Main Limestone of Ingleborough can be correlated with confidence with the Crinoidal Limestone of Whittington which occupies the same relative position to the Millstone Grit above, and the Limestone masses below. This was also the opinion of Phillips, and indeed no other conclusion

seems possible. Now in the area south of the Craven Faults, of which Pendle Hill might be regarded the centre, a thick limestone of considerable extent occurs below the Millstone Grit, and separated from the massif by a great mass of shales with occasional limestones. Phillips did not discuss these sections with his usual lucidity, and evidently recognised the difficulties of the area. Dr. Wheelton Hind brought forward convincing evidence that the Pendleside Limestone was the equivalent of the Whittington Limestone.

Now it has already been pointed out that Phillips unhesitatingly correlated the Limestone of Whittington with the Main of Ingleboro'. If both these correlations be accepted as correct, it will be found that all the difficulties of the problem of determining the relation between the Yoredale Series and the Pendleside Series disappear. The fauna which characterises the lower Pendlesides has been obtained from beds unquestionably of Yoredale age. As Dr. Hind has established the identity of the Pendleside and Lower Culm faunas, it is now possible to correlate these with the Yoredales. It has been mentioned that the Main or Upper Scar Limestone is the highest of the Yoredale Series in the area under discussion. This Limestone contains a striking fauna including corals of an advanced type, and indicating a level higher than anything recorded from the Bristol area or South Wales. This coral fauna occurs in beds above those in which the Pendleside fauna has been found. The evidence is therefore consistent and the only conclusion possible is that of the equivalence of the Lower Culm, the Pendleside Series, and the Yoredale Series.

A Tentative Classification.

Phillips, who first described a typical section of what he called the Yoredale Series, was led to draw the upper limit at the top of the Main Limestone, thus throwing all the beds above into the Millstone Grit. When the Survey officers mapped the North of England, they found it necessary to draw the dividing line at the base of the Ingleborough Grit, and thus included the Chert beds and Fell Top Limestones in the Yoredale. This classification, which was based on the examination of a much wider area than Phillips had described, is unquestionably the correct one. The table on next page compares these older classifications with the one now tentatively put forward.

1910 July 1.

Lithological Divisions.	John Phillips, 1831.		Geological Survey, 1881.	As now suggested, 1910.		
Millstone Grit of Ingleborough.	Millstone Grit.		Millstone Grit.	Millstone Grit.		
Fell Top Limestones.			Yoredale Series.			
Shales and Sandstones with thin variable Limestones and thick Chert beds.				Chert Series Y3*b*.	Upper Yoredale Y3.	Yoredale.
Main Limestone.	Upper Scar Series.	Yoredale Series.		Upper Scar Series Y3*a*.		
Sandstone and Shale.						
Underset Limestone.						
Flaggy Sandstone and Shales with the 3 yd. and 5 yd. Limestones.	Hawes Flag Series.			Flagstone Series.	Middle Yoredale Y2.	
Middle Limestone.				Lower Limestone Series.	Lower Yoredale Y1.	
Sandstone and Shale.						
Simonstone Limestone.	Black Limestone Group.					
Sandstone and Shale.						
Hardraw Limestone.						
Sandstone and Shale.						
Great Scar Limestone with Black Limestones at summit.						

Resumé and Conclusions.

The occurrence of a Lower Pendleside fauna in the Yoredale Rocks of North-West Yorkshire is indicated, and the equivalence of the Yoredale and Pendleside Series is suggested. The coral fauna of the Main or Upper Scar Limestone enables its correlation with the Great Limestone of North Northumberland to be established.

The fauna of the Upper Scar Limestone is advanced on that of D2 of the Bristol area, and thus it indicates a higher level than the top of the Viséan of the South-West Province of Dr. Arthur Vaughan.

The identity of the Main Limestone of Ingleborough with the Whittington Limestone near Kirkby Lonsdale, and with the Pendleside Limestone of Longridge Fell and Pendle Hill is asserted.

A tentative classification of the Yoredale Series is put forward.

FIELD NOTES.

MAMMALS.

Pine Marten (?) in Littondale.—A fine specimen of this scarce animal was found in a trap on Out Moor above Litton, towards the end of April. The throat was yellow, which would indicate that it was a Pine Marten, and not a Beech Marten. Dr. Macgillivray in his 'History of British Quadrupeds,' and Linnæus are of opinion that in England there is only one species; and that the throat is white or yellow, according to age. It is more than twenty years since the Marten has been seen in this dale.—W. A. Shuffrey, Arncliffe Vicarage, May 17th, 1910.

In view of the rarity of this species in Yorkshire, I made enquiries with a view of having the specimen exhibited at the Malham meeting of the Yorkshire Naturalists' Union. I was disappointed to learn that it had been destroyed, and that the Rev. Shuffrey had not personally seen the specimen. I understand it had been in the trap a day or two before being found, and when taken to the taxidermist was too far 'gone' to make a 'specimen.' Some doubt therefore naturally arises as to whether it was a genuine Pine Marten or not.—R. Fortune.

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BIRDS.

Abnormal Clutch of Blue-Tit Eggs.—On May 28th, I found a Blue Tit sitting upon seventeen eggs. The nest was in a nesting-box, fixed about twenty-five feet from the ground, in an Oak tree, in the centre of a large wood at Harrogate.—R. Fortune.

East Yorkshire Migration Notes.—April 11th, the Yellow Wagtail was seen by Mr. S. Waterhouse at Cottingham. April 17th, I saw the Willow Wren at North Ferriby; April 22nd, Chiff Chaff at Welton; April 24th, Whitethroat at Cliffe; April 25th, Garden Warbler at Ferriby; April 26th, Tree Pipit at Ferriby; April 27th, Cuckoo at Cliffe; May 8th, Swift and Sedge Warbler on the Humber side. It is perhaps of interest to record that Jno. Hodgson saw a Razorbill's egg at Bempton, May 1st, an unusually early date.—E. W. Wade, Hull.

Ornithological Notes from York.—All the usual summer visitors have arrived at the time of writing these notes, most of them considerably later than last year, the dates of arrival being

as follows :—April 10th, Swallow, Sandmartin ; April 14th, Willow Warbler, House Martin, Tree Pipit, Cuckoo ; April 21st, Redstart ; May 1st, Landrail ; May 10th, Whinchat, Garden Warbler ; May 12th, Turtle Dove ; May 15th, Nightjar ; May 16th, Swift ; May 24th, Sedge Warbler. On May 20th Mr. Oxley Grabham saw six Black Terns and a pair of Tufted Duck on a small lake within the York City boundary, but as these birds appear at the same place every year about this date, the exact locality is probably best not stated.—SYDNEY H. SMITH, York, June 7th, 1910.

Although many migrants were rather late in arriving, the nesting season appears to have been an early one. Swifts did not make their appearance at Harrogate until May 17th. I never knew them to be so late, the 6th of the month being their usual time of arrival, and they seldom vary more than a day.—R. FORTUNE.

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FLOWERING PLANTS.

Double-Flowered Variety of *Cardamine pratensis*.—At the field meeting of the Lindley Naturalist and Photographic Society on the 28th May, Mr. H. Liversedge brought some excellent specimens of a double-flowered variety of *Cardamine pratensis* which he had found at Rowley Mill, Lepton. The specimens included both double white and lilac-coloured forms, and had the appearance of a miniature ten-week stock.—W. E. L. WATTAM, Newsome.

This form has occurred here for over twenty years.—EDS.

The Journal of the Quekett Microscopical Club for April contains Mr. E. A. Minchin's Presidential Address—'Some Considerations on the Phenomena of Parasitism among Protozoa'; a 'Note on our Present Knowledge of the Choanoflagellata,' by Mr. J. S. Dunkerley, as well as particulars of the Society's Proceedings during the past winter.

From the Board of Agriculture and Fisheries we have received the **Annual Report of Proceedings under the Salmon and Freshwater Fisheries' Acts, etc., etc.,** [sic] **for the year 1908,** published in 1910. This contains 52 pages of closely-printed statistics, etc., and is sold at 3½d. The Report contains a mine of useful information relating to the freshwater fisheries of the country, and besides general remarks on the year's captures, has special reports for each district.

From Messrs. Longmans Green & Co., we have received Vol. I., pt. 1, of **The Journal of the East Africa and Uganda Natural History Society** (57 pp.). It contains papers dealing with Francolins, Nature Study, Botany, Butterflies, the Fishes of Lake Victoria, the Hagedash Ibis, Habits of the Elephant, the Karianduss Deposits of the Rift Valley, Trout, and a Strange Case of Snake Bite. The Editors are to be congratulated upon the smart appearance of their first publication, and particularly upon the fact that the papers deal with the East Africa and Uganda district. As a frontispiece is an excellent coloured plate of *Francolinus hubbardi*.

THE ZONES OF THE LOWER CHALK.

The combined excursion into Lincolnshire of the Geologists' Association and the Yorkshire Geological Society, which took place five years ago, has had at least one very beneficial result; for, quite apart from the value of any work which may have been done on that particular occasion, it has fortunately been the means of arousing among the residents of that part of the country, an interest in the many fascinating problems bearing upon the geology of their own county.

One evidence of this newly awakened interest is the paper on the Lower Chalk of Lincolnshire recently published by the Rev. C. R. Bower and Mr. J. R. Farmery.* Being residents in the district, the authors have naturally been able to devote much more time to the collection of fossils than was possible on the part of the officers of the Geological Survey who worked over that area, and they have therefore been able to make some useful additions to the previous lists.

It is, however, in my opinion, regrettable that the records of such useful field work should have been mixed up with an attempt to re-arrange the zonal classification of the Chalk, in a manner which practically revolutionises the existing system. The authors propose to designate the lowest part of the Chalk up to and including the Totternhoe Stone, the 'Zone of *Holaster subglosus*.' For the lower pink band above the Totternhoe Stone they create a new sub-zone characterised by *Terebratulina ornata*. The beds above this, up to the *Actinocamax plenus* marls, are to be the 'Zone of *Holaster trecensis*.' This is not suggested as a merely local arrangement, for they say (pp. 337-8)—

> "The zonal nomenclature adopted by the Geological Survey for the Lower Chalk of Lincolnshire seems to us to be unsuitable . . . . But the link in the chain of evidence supplied by a study of the Lower Chalk of Lincolnshire suggests that the use of the names of these two fossils (*Holaster subglobosus* and *Holaster trecensis*) might be made the basis of a zonal scheme which would apply to the whole of the Chalk area of England.'

The effect of this would be as follows :—

Current.		Proposed.
Zone of *Holaster subglobosus*	=	Zone of *Holaster trecensis*.
Zone of *Ammonites varians*	=	Zone of *Holaster subglobosus*

Let us see, then, how this works out. It is true that in Lincolnshire *Holaster subglobosus* does range down to the lowest beds of the Lower Chalk. But this is certainly not the case in many other parts of England. For example, in Kent, *Holaster subglobosus* does not occur in the zone of *Ammonites varians*, but is found associated with *Holaster trecensis* in the zone above. The same is the case in Surrey, Berkshire, Oxfordshire, Buckinghamshire, Bedfordshire, Cambridge, Hertford and Suffolk. In none of these counties has *Holaster subglobosus* been recorded below the horizon of the Totternhoe Stone. Neither is it so rare in the higher beds of the Lower Chalk as Messrs. Bower and Farmery seem to suppose, for in Devonshire, the Isle of Wight and in Norfolk, it is found right up to the *Actinocamax plenus* band. In Yorkshire it is common at this horizon, for Mr. W. Hill says †—

> '*Holaster subglobosus* occurs throughout the Lower Chalk in the Speeton cliffs. *Holaster subglobosus* occurs from the base of bed 3 to the Belemnite marls.'

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* 'Proceedings of the Geologists' Association,' Vol. XXI., part 6. 'The Zones of the Lower Chalk of Lincolnshire.'

† 'Q. J. G. S.', Vol. XLIV. (1888), part 3, pp. 345-352. 'The Lower Beds of the Upper Cretaceous Series in Yorkshire and Lincolnshire.'

This is confirmed by Dr. Rowe who, writing of the chalk exposed in the cliffs near ' Kit Pape's Spot ' (Flamborough Head), says*—

> " Below the horizontal fissure is the zone of *Holaster subglobosus*. . . . It would seem a hopeless quest to attempt to get fossils from such a matrix, but we had the good fortune to obtain two undoubted examples of *Holaster subglobosus* from it, and thus to place the horizon of this chalk beyond any possibility of doubt. '

It is clear from the context that the beds referred to are those immediately underlying the *Actinocamax plenus* marls.

Nor is the use of *Holaster trecensis* as a name fossil for the upper zone any more satisfactory, for in Sussex, the Isle of Wight, and in Dorset this fossil is found as far down as the lower part of the Chalk Marl.

Messrs. Bower and Farmery speak of a ' scheme which recognises dominant forms as the guides to zonal terminology.' But it is difficult to see how this description applies to their own proposals ; for, as we have already pointed out, in many parts of England, *Holaster subglobosus*, so far from being the ' dominant form ' in the beds below the Totternhoe Stone, is often entirely absent. In fact, it is impossible to find any fossil which can be used with absolute satisfaction, and without local exception, as an index species for the highest part of the Lower Chalk, but it certainly is not an improvement to make the peculiar zonal distribution of species in the Lincolnshire Chalk the basis of a general system of zoning. In fact, the authors of the paper seem quite prepared when it suits their purpose to treat the Lincolnshire fauna as of slight importance for they say (page 338) :

> ' *Holaster subglobosus* does not occur in the upper beds of the zone to which the name of the echinoderm has been applied, *with certain not very weighty exceptions*—the Isle of Wight, and Lincolnshire and Yorkshire.' (The italics are mine).

They seem to forget that zonal nomenclature adopted by Mr. Jukes-Browne in his memoir on the Lower and Middle Chalk, was intended to apply to the whole of England, and that being based upon the general distribution of fossils throughout the Chalk areas generally, very strong reasons must be given before any district should be excepted from its application. There is really no reason why *Ammonites varians* should not be employed as the index of the lower zone in Lincolnshire and Yorkshire, as in all the other parts of England. True it is not so abundant in the two counties mentioned as it is elsewhere, but then for some reason all Cephalopoda are more rare in Yorkshire and Lincolnshire than they are in the South of England. Still it does occur, and it is a species which has never been found for certain above the Totternhoe Stone in any part of England.

Messrs. Bower and Farmery seem to be unaware that this very question was discussed by Mr. Jukes-Browne so recently as 1906 (' Geological Magazine,' 1906, p. 510) *apropos* of Mr. Bosworth's suggestion to call the upper zone by the name of the ' Two *Holasters* zone.' He then remarked that *Haploceras austeni* may eventually prove to be a better index, although it is not so common and has once been found in the zone of *Ammonites varians*.

As regards the central part of the Lower Chalk, the evidence for the new sub-zone does not strike us as being particularly strong. The name fossil, *Terebratulina ornata*, has not been previously recorded in this country, and I am informed by Mr. Jukes-Browne that it is probably identical with *Terebratulina nodulosa* Eth. This latter fossil is quite common in the Totternhoe Stone, so if it be the same as the *Terebratulina* recorded from the Lower Pink Band, it is of no value as a zonal index for the latter bed. The authors of the paper do not give any information which would enable us to determine its identity. Another reason assigned for regarding these

* ' Proceedings of the Geologists' Association,' Vol. XVIII., part 4, page 201. ' The White Chalk of the English Coast—Yorkshire.'

pink beds as a separate 'sub-zone,' is the occurrence of a special variety of *Terebratula semiglobosa*, but the *Terebratula* in question (a transition form between *T. semiglobosa* and *T. carnea*) is by no means an uncommon fossil in Lincolnshire, and in the higher beds, *e.g.*, the Upper Chalk, it is quite a characteristic form.

Dr. Kitchin, who has kindly examined some of these specimens for me, says—

> 'It is probable that the name *T. semiglobosa* has been applied to a group of forms which is not homogenetic; in this sense the name *T. semiglobosa* (*sensu lato*) will apply to your specimen. The proper classification of the zonal mutations of *Ter. semiglobosa* still remains to be worked out. . . . The plication appears in concurrent forms to have reached very varied degrees of perfection, and this suggests that the character of plication has been acquired independently at different times by repeated offshoots from the parent non-plicate stock or stocks.'

As to the other fossils which the authors record as being common in the Lower pink band, most, if not all are species quite common in other parts of the Lincolnshire Chalk, either in the lower beds, *e.g.*, *Pecten orbicularis*, *Pecten inflata*, and *Cidaris dissimilis*, or in the Upper Chalk, *e.g.*, *Kingena lima* and *Plicatula sigillina*.

P.S.—Since writing the above I have learned through Mr. Jukes-Browne, that Dr. Rowe is responsible for the identification of *Ter. ornata*. He (Dr. Rowe) says—

> 'I have no doubt whatsoever that the *Ter. ornata* of Roemer and our abundant English form are identical.'

The English form referred to is, of course, the one previously listed as *Ter. nodulosa*.

ARTHUR BURNET.

—: o :—

NEW BOOKS ON BIRDS.

During the past few years it has been our misfortune to have to read dozens and dozens of new books on birds. In most cases they have been of the 'pot-boiler' type; have not advanced zoological science one bit; but have obviously been written for the same reason that a stoker fills a furnace. In many instances it is apparent that the author is the owner of a pair of field glasses, and a book or two on birds and eggs; is fortunate enough to see a cuckoo, and at once jumps before the footlights as a second Gilbert White, and simply *won't* be howled down! As a welcome relief to this kind of thing, there now and then appears a sound piece of work; the result of years of patient study on the part of a thoroughly qualified naturalist; and a volume which at once claims a prominent position on our book-shelves. Two such monographs, dealing with Kent and Cheshire respectively, have recently been published by Messrs. Witherby & Co., of London, who have done so much in the interests of ornithology. The first, **A History of the Birds of Kent**, is by **Norman F. Ticehurst** (10/- net), and contains over 600 pages, with twenty-four plates, and a map.

It is many years since Drayton wrote 'O famous Kent! What county hath this isle that can compare with thee? That hath within thyself as much as thou can'st wish: thy rabbits, venison, fruits, thy sorts of fowl and fish, etc.'; and to-day the home of the Dartford Warbler and Kentish Plover still has a fascination for the nature student. Its geographical position at the south-eastern corner of our island, and its nearness to the Continent, from which even men can fly and land on our shores, results in the avifauna being of especial interest. (The British public,

however, has not gone quite so far as some of our ornithological friends; and when an occasional Frenchman flies across the channel, alights on our shore, and is seen 'in the flesh,' he is not described to the world as 'British'). The volume has an added interest from the fact that the author has not rigidly adhered to the geographical boundary of the county, but in his monograph includes the whole of the Romney Marsh, which is so well known for its bird life.

The author gives a complete account of the occurrences of each species of birds recorded for the country; together with full references to records. the local names, etc., etc. He has not accepted the various records without careful investigation, and with many of the species his researches have resulted in important additions being made to our knowledge. As a frontispiece is, appropriately, an illustration of a pair of Kentish Plover nesting on Dungeness; and amongst the other plates we notice a reproduction of Pennant's plate of Dartford Warblers (1776); a bird which is now extinct in Kent, as it disappeared as a breeding species about 1891. The volume is well indexed; there is a Bibliography, and a list of subscribers.

The second work referred to is **The Vertebrate Fauna of Cheshire and Liverpool Bay,** and is edited by T. A. Coward (26/-). It is in two volumes, each separately paged and indexed, and in general 'get-up' is equal to the Kent volume. The first contains over 500 pages, and deals with the mammals and birds; Mr. C. Oldham assisting the editor in this section. Brief reference is made to the extinct fauna; amongst the species recorded being *Elephas antiquus*, *E. primigenius* (mammoth), *Bos primigenius*, *B. longifrons* etc. Then follows a description of the wild mammals at present inhabiting the area; particular attention being paid to the deer and white Somerford cattle. There are also records of whales, dolphins, and other marine species. The main part of the book, however, is devoted to the birds, and in connection with this the various records in 'The Naturalist' and other publications have been put to good account. The authors consider there is satisfactory evidence of the occurrence of 231 species of birds in the wild state in Cheshire; a number which compares very favourably with the 325 species recorded in the recent volume on 'The Birds of Yorkshire,' having regard to the superior advantages of the latter county. The Cheshire total does not include the Canada Goose and Mute Swan, species which were originally introduced, though they now exist in a more or less wild state. The second volume is about half the size of the first, and includes an interesting chapter on 'The Dee as a Wild Fowl Resort,' by Mr. John A. Dockray; Messrs. Coward and Oldham describe the Reptiles and Fishes, and Mr. James Johnstone has written on the Fishes of Cheshire and Liverpool Bay. As in the companion volume, the illustrations are principally the work of Mr. Thomas Baddeley. Reptiles only rarely occur in Cheshire, and amongst amphibians it is interesting to note the occurrence of the Natterjack. Mr. Johnstone's contribution is a welcome and very valuable addition to the work; rarely have we seen the fish fauna of an area dealt with so well. A useful bibliography is given, and a map.

The Time of the Singing of Birds. London: Henry Frowde, 1910. 126 pp. 3/6 net.

In this little volume have been gathered together about a hundred poems, by various writers, referring to birds and their song. They are arranged according to the seasons, and are taken from the writings of Burns, Keats, Kingsley, Meredith, Milton, Rossetti, Shakespeare, Shelley, Swinburne, Tennyson, Wordsworth, King James I. of Scotland, our old friend 'Anonymous,' and a host of others. The poems have been chosen with care, and there is an index of authors, index to first lines, etc. One need not be a naturalist to appreciate the book, and doubtless those writing on 'nature study,' etc., will find it useful for obtaining 'apt quotations.'

REVIEWS AND BOOK NOTICES.

We have recently received a number of interesting archæological publications. Mr. W. Paley Baildon favours us with a copy of his paper on 'Cup and Ring Markings,' reprinted from Vol. LXI. of 'Archæologia.' These curious primitive carvings found upon rock surfaces not uncommonly in Yorkshire, are carefully classified by the author. As regards their import, there seems to be as many theories as there are monographs on the subject. Many of these are quoted. Mr. Baildon, however, has a new theory. He considers them to be 'ghost-houses.' Each cup represents a hut, whilst the rings would be stockades or banks around them. Like every other writer, Mr. Baildon points out that his theory explains most of the difficulties with regard to the carvings. There is much to be said in favour of the recent theory, but who can say whether it is correct? The **Viking Club** has just issued part 2 of Vol. VI. of its **Saga Book.** It contains a valuable abstract of a paper on 'Danish Antiquities in York,' by Dr. G. A. Auden, which has several illustrations. Dr. Olrik gives a 'Viking Saga of the Danes in England'; Mr. A. W. Johnson writes on 'Grotta Söngr and the Orkney and Shetland Quern,' and there are other papers of interest. The Saga Book is published at the King's Weigh House, Thomas Street, Grosvenor Square, W.

The Norse Influence on Celtic Scotland, by **George Henderson.** 1910. Glasgow: James MacLehose. 385 pp., 10/- net.

In this scholarly and remarkably cheap volume, Mr. Henderson makes out an excellent case for the necessity of taking greater cognisance of the Norse element in Scotland than has hitherto been the case. The author's special studies have convinced him that the Norse have had much more influence upon the history, folk-lore and speech of northern Britain than has usually been supposed. When the late Dr. Alexander MacBain published his 'Etymological Dictionary of the Gaelic Language,' it was complained that he had derived too many words from the Norse. Mr. Henderson will not have this; in fact he considers that MacBain did not go far enough. The 'Norse linguistic influence' is the main feature of the book, and in a variety of chapters, dealing with the Household, Dress and Armour, Agriculture, Carpentry, Fishing, Scenery, etc., the frequent occurrence of Norse words and roots is pointed out. To the archæologist, perhaps the most interesting chapter deals with 'Relics of Scots-Norse Art.' This is illustrated, but is a trifle disappointing in its brevity. For example we expected to find rather full reference to the extraordinary wooden image found in the peat at Ballachulish in 1880, which is unquestionably one of the earliest relics of the Northmen that occurs in Britain. Yet it is dismissed in a few words, and is not even referred to in the index. The author is to be congratulated upon his fine piece of work, and especially upon the fact that his thorough acquaintance with current literature enables him to bring the book thoroughly up-to-date.

The Danes in Lancashire and Yorkshire, by **S. W. Partington.** Sherratt & Hughes. 246 pp., 5/- net.

This deals with a similar subject, but in rather a different way, and for a different area. Mr. Partington has taken up the study of our Scandinavian ancestors as a hobby, and during his visits from place to place has made every enquiry as to the papers, etc., thereon that have been published. He has also read the articles written by Collingwood, Boyle, Wagner and others. This has enabled him to prepare the chapters on Invasion and Conquest, Settlements, Place-names, etc., etc., forming this book. It is admittedly prepared to endeavour to create an interest in the study of the early Danish occupants of Lancashire and Yorkshire. It is written in simple language—even amateurish at times—and bears evidence of careless proof-reading. The words 'and Yorkshire' have evidently been added at a later stage, as the author is obviously more at home in Lancashire, and deals very largely with that county. There is a portrait of Canute as frontispiece. At a crown, the volume is cheap.

NORTHERN NEWS.

Nearly the whole of *The New Phytologist* for May is occupied by a paper on *Marchantiaceæ* by Dr. F. Cavers.

A note on the abundance of *Nemoura meyeri* at Huddersfield in March, appears in *The Entomologist's Monthly Magazine* for May.

M. Adrien Dollfus, the editor of *La Feuille Des Jeunes Naturalistes*, has an interesting article on 'La Protection des Monuments Naturels,' in the June issue of that journal.

We are sorry to see that the *Museums Journal* is printing advertisements on the same sheets as the text; and as these are in particularly heavy type, the volume will have an ugly appearance when bound up.

The Cambridge University has made a grant of £50 to Mr. C. E. Moss, toward defraying expenses of botanical investigations which he proposes to make on the Continent; and of £25 to Mr. R. H. Rastall, towards expenses of a visit to South Africa for geological investigations.

In a paper on 'Some Variations in the Skeleton of the Domestic Horse and their Significance' ('Sci. Proc. Royal Dublin Soc.' Vol. XII., No. 27, 1910), Major F. Eassie endeavours to shew that the domisticated horse frequently gives proof of deterioration from the type of the skeleton of the wild horse.

In the May *Geological Magazine* Mr. F. R. Cowper Reed describes some 'New Fossils from the Dufton Shales,' near Melmerby. These consist of Trilobites, etc., as under:—*Trinucleus nicholsoni*, *Acidaspis semievoluta*, *Homalonotus ascriptus*, *Beyrichia* (*Ceratopsis*) *duftonensis*, *B.* (*Ctenobolbina* ?) *superciliata*, and *B.* (*Tetradella*) *turnbulli*.

From an article on 'Additions and Corrections to the British List of *Muscidæ Acalyptratæ* in *The Entomologists' Monthly Magazine* for June, we learn that 'the species recorded by the Rev. W. J. Wingate in 1903 ('The Naturalist,' p. 284) as occurring in the county of Durham under the name *iners* Mg., is not that species, but a new one' named *Leria kerteszii* Czerny. From the same journal we find that an absolutely perfect specimen of the ordinary dark form of *Tryphæna pronuba* was taken at Sugar, near Sheffield, as early as April 20th.

We are indeed sorry to learn that the 'Record of the Hurst Street Chapel, Birmingham,' has ceased to exist, and that consequently the little leaflet which we learn was inserted by the kindness of the Missionary, has also ceased, as the result is that '*The Field Club*' has sprung into being. It is not the first journal of that name, and judging from the sympathetic appeal for support in its second number, its career will not be much better than its predecessors. There are evidently some ambitious 'authors' in Birmingham, who write much, and yet write nothing; whilst the silly nonsense written about 'We campers three,' is enough to kill any magazine. There is the usual spring poem, a prize [!] essay written by a K. E. G. S. (whatever that may mean); 'Nature Gleanings'; 'Stray [very] Notes'; in which we are informed that 'the young rabbits in the fields have now grown to a fair size'; presumably those in the woods are still small; and 'Bathing, didn't we enjoy it, just!' 'I have told you enough! If it does not suffice, at least it is all I am going to tell' [thank heaven for that]. 'I have spoken.' 'Farewell those times of the fallen leaf, the glory of the years innumerable that have passed o'er man, thou consummation of the whole year, farewell.' And so on. Would that we *could* say 'farewell.' We notice that this wonderful Club is the 'Head Quarters Birmingham Branch' of a Society that we believe does not now exist!

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NOTES AND COMMENTS.

THRUST MASSES IN THE DOLOMITES.

A geological work by Mrs. Ogilvie Gordon, entitled 'The Thrust-Masses in the Western District of the Dolomites' in South Tyrol, has just been published by the Edinburgh Geological Society in a Special Part of its Transactions, Vol. IX. The text extends to 91 pages, and is illustrated by 2 geological maps, 18 coloured geological sections, and a number of original photographs and sketches. Mrs. Gordon describes a series of gigantic thrust-masses composed, in that district, of Permian, Triassic, Jurassic, and Cretaceous rocks, that have travelled from east to west above the older crystalline rocks of the Central Alps, and have subsequently been downthrown along with the older rocks and suffered further deformation in the region of the Dolomites. The base of the series is composed of brecciated rock-material belonging to the floor over which the subjacent mass has passed and to the lower layers of the subjacent mass. The lower layers of each mass differ from place to place, as they were masses that had been already plicated in east and west direction, and in the course of the overthrust movements new plicational forms were superinduced both in north and south and in east and west directions. Similiarly the cross-faults intersect, or coalesce with, the east-west, E.N.E.-W.S.W. and W.N.W.-E.S.E. faults, and form fault-networks which completely isolate the adjacent areas in the crust. The chief Dolomite mountains, such as the Langkofl and Plattkofl Massive and Sella Massive, are areas of inthrow surrounded by faults, within which the higher thrust-slices have been preserved.

RABBIT MEAT.

We are glad to find that at last the botanists are following some of their geological friends in being able to see books in the running brooks, sermons in stones, and fun in everything. 'The Sportophyte, Volume I., Number 1,' issued on All Fools' Day, is said to be 'a British Journal of Botanical Humour.' The editor, a single lady, (presumably), insists on the first of the series (23 pp.) being a 'double number,' and threatens that if 'by the first of April there is not enough matter to make a number, what there is will be preserved in spirit, and the editor guarantees a *double number* [the italics are hers] the following year.' We are glad to find that the first serio-comic-botanico-sportophyte emanates from Manchester, and doubtless

the editor sees the funny side of things as a result of her visit to Japan. She certainly had the opportunity, if the stories in her charming 'Journal from Japan' are to be believed—and we see no reason to doubt them. Amongst the many pieces of botanical information to be found in the 'Sportophyte,' we learn that the morals of the Quad[!]rangle at Manchester University have recently been improved, because the hotbed of Weiss has been removed to another place since the additions to the botanical department have been completed.

WATER AND PLANTS.

Elsewhere, after a little 'scene' between Phyllis and Adonis, we learn that 'Weisdom leads Phyllis triumphantly to the Laboratorium to a special Service of Praise and Dance.' The magazine has strong teetotal tendencies, as we learn that 'from a plant's point of view, if one may use such a phrase, water is its best and almost only friend.' Moderate drinkers will agree that 'water is the food of a *green* plant'; 'In the ground water is needed,' and after that, ice, for some of us. We can only hope that the 'Flare of Northern Lights' assisting the 'Palæophytologist of Manchester University' will not feel 'put out' if the sale of their first sporting fight does not come up to their expectations. We can wish the journal the fate of the rabbit and cabbage that may be put in a hermetically sealed tube. This we learn would be, that as plants breathe in carbon dioxide and breathe out oxygen, and animals breathe in oxygen and breathe out carbon dioxide, the two would *live for ever.*' But what if the rabbit gets hungry? You never thought of *that!* Miss Palæophytologistsportophyte.*

A FROG WHO WOULD A-WOOING GO.

A letter addressed to this journal at 'Fleet Street, City, *or elsewhere,*' has safely reached us, we are glad to say. It is from an address in Catford (Kent), and invites us to pay a visit to the writer's garden, trusting that it will be an advantage to us as well as to himself, as he is out of employment. It seems that there is a frog 'in young,' nesting in a gooseberry bush. Apparently it has not built a nest for itself, but has occupied the disused nest of a robin. A well-known clergyman in Hull recently showed us an old nest in a bush in his garden, into which a toad regularly climbed and slept, though we must admit it never occurred to us that it was either 'in young'

* Pronounced *Stopes.*

or 'nesting.' In the circumstances we hardly care to go to Catford to see the frog nesting there, but if any of our readers wish to go, we shall be happy to supply the necessary address. We should like to congratulate the Catford froggy on having appropriately chosen a gooseberry bush in which to bring forth his, or should it be her, brood.

EARLY MAN.

In his presidential address to the Geological Society of London,* Prof. W. J. Sollas dealt with the question of early man, his evolution, etc. In this he points out that so far as the evidence extends, man seems to have attained at a comparatively early stage the full powers of his intellect; his subsequent advance has been due less to its continued development than to its constant exercise, and especially to the perfection of speech, its great instrument. The whole history of man, as far as it is known to us, has been one long continuous advance, marked stage after stage by momentous discoveries; already on his first emergence from obscurity in Mousterian times we find him in possession of the art of kindling fire; he knew how to fashion weapons and to weild them, and he had arrived at the belief that life is not ended with the grave.

PALÆOLITHIC AND NEOLITHIC MAN.

Through the succeeding stages of the palæolithic epoch we witness a rapid improvement of implements and weapons, as well as the invention of new ones, and, most remarkable of all, the birth of art and its early efflorescence. The close of the palæolithic epoch is marked by a considerable gap in our knowledge; but, as we enter the next succeeding or neolothic epoch, we discover evidence of another great forward step: the wild roaming life of the hunter has been exchanged for a pastoral existence in settled communities, man has learnt to domesticate the animals of the chase, and in so doing he has become domesticated himself. No great interval separates the neolithic epoch from the early civilizations of Mesopotamia and Egypt, which are distinguished by an extraordinary advance in every direction.

FINDS AT FILEY.

Judging from the periodical effusions in various London and provincial newspapers, Filey bids fair to take a first place amongst the silly-season attractions, and we are daily expecting

* Printed in the Quarterly Journal of the Geological Society, No. 262. 1910.

to hear that a sea-serpent has been caught on the Brig.* It is not so long ago that 'one of the oldest Roman coins ever found in England' was picked up on the beach at Filey, and was elaborately described in the press. On examination the coin proved to be part of a modern dress button. *This* fact was *not* published abroad. A little while ago a mammoth tooth was found in the cliff. Five pounds were said to have been offered for it; it was to go to the British Museum; and strict secrecy was made of the locality, in order that the rest of the animal might be found. The tooth is still at Filey, and likely to be. The latest discovery is a round glacial boulder 'which in the remote ages had rotated in some glacier pot.' According to the report, the boulder has been submitted to Dr. Tempest Anderson, of York (who, by the way, is the authority on volcanoes !), and that gentleman intended exhibiting it at the recent conference of curators. Somehow, he did not. The paragraph concludes with the following drivel: 'a close scientific inspection of the spot and surroundings from which the boulder was taken is to be made, as its height above present sea level will help approximately to define the height of the glacier at this point.' Perhaps they will find the glacier.

The Twenty-third General Report of the Free Library and Museum Committee of Bootle shews that in the re-arrangement of the collections, particularly the birds and Egyptian antiquities, much has been accomplished during the year. The additions to the museum, however, are a little disappointing.

The Report of the Colchester Museum of Local Antiquities for the year ending March 31st, 1910, is, as usual with the reports of that institution, surprisingly full of additions of a local and valuable nature. This is largely due to the energy of the Curator, Mr. A. G. Wright, who knows exactly what a local museum should contain. The report is illustrated by photographs of Roman, etc., antiquities. It contains thirty-eight pages, and is sold at the museum at twopence.

Amongst the Museum Reports recently to hand we notice the **Eighth Annual Report of the Horniman Museum,** Forest Hill, S.E. (29 pp., price 1d.). This contains two plates, lists of additions, etc. Mr. Horniman has offered to defray the cost of a lecture hall, at a cost of £4500. The list of additions to the Library has the items classified according to whether the volumes are bound or not, and there seems to be no rule as to which shall be bound and which not. For instance, 'Nature,' 'The Museums Journal,' and the 'Proceedings of the Zoological Society' are amongst the 'unbounds,' whilst 'Nature Notes,' 'The Museum Journal' (an earlier volume), and 'The Irish Naturalist' are amongst the bound volumes. It would surely simplify matters to have all in one list, those bound being marked with an asterisk.

* Since the above was penned, a shark of extraordinary dimensions has been caught here !

THE ORIGIN AND TENDENCIES OF PARASITISM IN FUNGI.*

G. MASSEE, F.L.S., V.M.H., ETC.

IT is now generally admitted that parasitism in an acquired habit on the part of fungi. One of the accepted proofs is the fact that fungi that are only known as pure saprophytes, can by a judicious course of training, be taught to become rampant parasites, and can afterwards be coaxed back to their original condition of saprophytism. On the other hand, fungi that at the present day are only known as parasites, can be educated to live on dead organic matter, or in other words to change their mode of life and settle down as saprophytes. From the standpoint of food or nutrition, fungi at the present day may be arranged under three groups. 1.—Pure saprophytes, or those fungi that obtain their food from dead organic matter, as dead wood, humus, etc. The common mushroom, and many toadstools that grow on rotton wood, dead leaves, etc., are examples. 2.—Compulsory parasites, that can only obtain their food from living plants or animals, as the rusts and smuts of cereals, ringworm, and the white fungus that forms a halo round a dead fly on a window-pane, are representatives of this group. 3.—A whole host of fungi that occupy a transition stage between groups 1 and 2, and are capable of living as saprophytes or as parasites respectively, depending on circumstances. Such fungi are considered as not having as yet perfected the various methods necessary to enable them to lead a truly parasitic life. A typical example of this group is furnished by the universally distributed, mouse-coloured mould called *Botrytis cinerea*, which is in reality the conidial condition of a Peziza or cup-shaped fungus.

The following experiments in the education of fungi, or weaning them from one habit, and teaching them to take up another, were conducted in the Jodrell Laboratory at Kew. The spores of certain fungi known only as saprophytes, of which *Trichothecium roseum*, may be given as an example, were mixed with a solution of the substance on which they normally grow. This solution with its contained spores, was injected, by means of a hypodermic syringe, into the living leaf of an

* Abstract of an Address given at the Annual Fungus Foray of the Yorkshire Naturalists' Union at Castle Howard.

1910 Aug. 1.

orchid just under the epidermis. In due course the fungus produced fruit on the surface of the leaf, coming through wounds made in the epidermis to admit of its exit. The spores of this crop were in turn injected into the orchid leaf, mixed with the natural food of the fungus. This method was constantly repeated, always using the preceding crop of spores for infection purposes. In course of time the fungus had become so accustomed to its new kind of food that the spores were injected mixed with distilled water instead of the original normal food solution, and in course of time produced fruit. In the case of two kinds of fungi experimented with, after the sixteenth crop had been produced, the spores when placed on the orchid leaf, germinated, entered the tissues and acted in every way as true parasites. No infection followed placing the spores on any other kind of living plant, save the particular species of orchid to which they had gradually become accustomed.

Among the true parasites, every grade of parasitism is represented. In what may be termed the incipient stage, the fungus attacks and promptly kills its host-plant, thus limiting its own period of existence to a matter of hours only. To this category belongs *Pythium debaryanum*, the 'damping off' fungus. Going to the other extreme, where all the niceties of a parasitic mode of life have been carefully worked out, we meet with fungi that manage to live at the expense of the host-plant, or plant upon which they are parasitic, without apparently causing it any injury, or even any inconvenience. The fungus causing 'smut' or 'slean' of oats illustrates this advanced stage of parasitism. The spores of the fungus, present in the soil, infect the oat seedling when it is only a few days old, and grow up with the host-plant until it has completed its vegetative period of growth, without causing the slightest injury; in fact the presence of the fungus in the tissues of the oat plant causes the latter to grow more vigorously than neighbouring plants that are not infected, and an expert can pick out smutted plants by their robust habit and deeper green colour, long before the smut appears externally. When the young ovaries are formed, they are attacked by the mycelium of the fungus, and in due course, instead of an oat grain, a mass of sooty powder, the spores of the fungus, is produced. Between the two extreme examples given, every grade in the progress of parasitism may be studied, even in our own country. This tendency towards parasitism on the part of many fungi

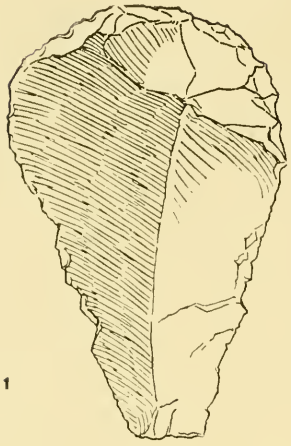
is followed by some remarkable modifications bearing on the life-history of the organisms concerned. The most pronounced change is that of cutting down the method of reproduction by means of spores, and depending entirely on a vegetative mode of reproduction. The disappearance of spores is in proportion to the progress made by the organism in parasitism. When the parasite has succeeded in establishing a perennial mycelium in the root, tuber, or seed of its host-plant, then the higher form of spore-formation is often arrested. As an example, *Phytophthora infestans*, the cause of the potato disease, forms mycelium in the tubers, which originates the disease the following season, if weather conditions are favourable for the extension of the fungus up the stem and into the leaves, also down into the new tubers. Now as this perrenial mycelium present in the tubers serves the purpose of continuing the fungus in time, or from one season to another, the oospore stage, which at one time answered the same purpose, has been completely suppressed, whereas the conidial stage of reproduction, which serves to extend the area of distribution of the fungus, has been retained. In the other species of *Phytophthora* which have not evolved a perrenial mycelium in the host plant, the oospore condition is present as a necessity, to continue the fungus in time or from one season to another.

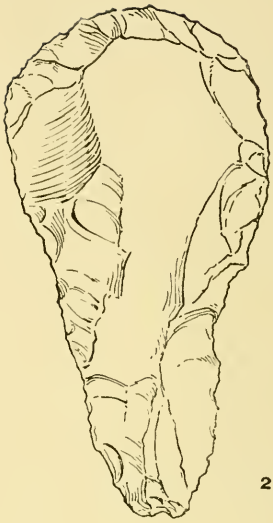
In other still more highly evolved parasites, the fungus never leaves the host-plant, and all traces of spore formation of every kind has disappeared, as in Darnel and Italian rye-grass, where the mycelium of the fungus is located in the seed. When the latter germinates the fungus grows along with its host-plant and again enters the new seed, which, when sown, is again accompanied by its internal fungus, and thus the cycle of host and fungus is continued from year to year. In this instance the seed is not in any way injured or prevented from germinating, as in the case of the oat grain when attacked by smut. It has been shown that over fifty per cent. of the seed of Darnel and of Italian rye-grass are infected with the fungus, hence we have two distinct races of these plants ; one race infected with the fungus, and must ever remain so ; another race that is free from infection and must always remain so, as there are no spores produced by the fungus to set up an infection. Owing to the entire absence of fruit the nature of the fungus infecting darnel cannot be determined. It has been shown that infected plants are more vigorous, and produce a heavier crop

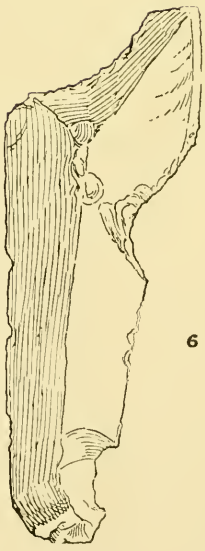
than uninfected ones, hence no injury is occasioned by the parasite; on the other hand the host-plant apparently benefits to some extent, and the case appears to approach the symbiotic condition where a fungus and an alga constitute a lichen.

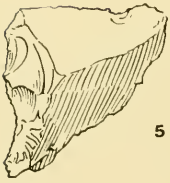
The earliest known and most primitive of fungi are truly aquatic, and their spores, known as zoospores on account of their power of spontaneous movement, required the constant presence of water to secure their dispersion. The great wave of parasitism set in when the fungi commenced to adapt themselves to dry land conditions. Their extension on dry land was considerably restricted, so long as zoospores, requiring the presence of water for their distribution, were alone produced. At this stage a second or supplementary formation of spores or conidia was gradually evolved, in addition to the primitive sexual fruit producing zoospores. This later conidial condition in most cases acquired parasitic tendencies. By this means a marked division of labour was introduced into the life-history of the fungi as a whole, the business of the later evolved conidial condition of the fungus being to extend the geographical range of the species, by producing immense numbers of conidia throughout the season when the host is in an active state of growth, in the case of parasitic species. On the other hand, the older or sexual forming fruit only appears late in the season, when the host-plant is on the wane, and remains in a quiescent state until the following season, when the host plant is again infected, and the same cycle of development is repeated. Thus it is seen that the primary function of the original type of fruit is to tide the fungus over that portion of the year when its host-plant is not in active growth. On the other hand the extension in geographical distribution of a fungus is due to its modern conidial form of reproduction, which, instead of being dependent on water for their distribution, are dispersed by wind, animals, insects, etc.

The *Quarterly Journal of the Geological Society* for May 31st (which, as is customary, was late in publication) contains a number of papers of particular interest to readers of 'The Naturalist.' Dr. A Smith-Woodward describes a fine skull of *Megalosaurus bradleyi*, n. sp., from the Great Oolite of Minchinhampton; Mr. R. H. Rastall has an elaborate paper on the Skiddaw Granite and its Metamorphism; Mr. W. G. Fearnsides has a similiarly detailed piece of work, accompanied by numerous sections and maps, dealing with the Tremadoc Slates and Associated Rocks of South-East Carnarvonshire; Mr. A. M. Finlayson writes on the Metallogeny of the British Isles, and also on the Problems of Ore-Deposition in the Lead and Zinc veins of Great Britain. There is also Prof. Sollas' presidential address, referred to elsewhere.









Neolithic Flint Weapons from Bridlington.

NEOLITHIC WORKSHOPS NEAR BRIDLINGTON.

T. SHEPPARD, F.G.S., F.S.A. (Scot.).

(PLATE XIII.).

For some time it has been known that the neighbourhood of Bridlington has been particularly prolific in pre-historic weapons and implements, and in former years collectors and dealers paid considerable attention to the district. When the supply of genuine implements was exhausted, a notorious character known as Flint Jack made very successful forgeries, which were circulated all over the country, and still adorn the shelves of many museums. In more recent years, however, important finds have been few and far between, though the falling away of the cliffs, and the plough, have brought some interesting examples to light.

The material from which most of the neolithic implements in East Yorkshire have been made is a tough, dark-coloured flint, which is very different indeed from the light-coloured splintery flint which occurs in the Yorkshire Chalk. It is clear that the neolithic implements are wrought from the far-travelled boulders of black flint which occur in the glacial clays and gravels, and which have been derived from the bed of the North Sea, or from the land on the eastern side thereof. It occurred to the writer that the cave inhabitants of East Yorkshire would probably come to the coast for the material for making their implements, as the absence of natural exposures where the boulders could occur in large quantities would prevent these primitive people from getting their supplies inland. For years, consequently, watch has been kept all along the Holderness coast, for anything approaching the appearance of a neolithic workshop. Whilst it is probable that such have existed, there can be little doubt that all trace of them has disappeared as a result of the erosion by the sea. Seeing that on an average no fewer than seven feet per annum have been denuded, it will be understood that since pre-historic times a considerable tract of country must have been swept away, and that consequently the sites of any workshops, which would naturally be upon the cliff edge in those far-off days, are now some miles out to sea.

In the vicinity of Bridlington, the retreat of the land is nothing like so rapid, and where, as north of the town, the cliffs are protected by a natural breakwater of solid chalk, erosion is

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comparatively slow. In such a situation therefore, it seems highly probable that sites of the implement manufactories might exist. During the past few weeks I have had opportunities of examining the district, and have been successful in finding at least four distinct places where, unquestionably, primitive man made the crude flint weapons and tools with which he hunted and fought. Two or these sites are south of the town, and two north; one being quite close to the so-called Danes' Dyke, which was probably erected by the same people; at any rate it is certainly much older than the time of the Danes.

The positions of these, the earliest of our known workshops, were first recognised by the enormous number of dark-coloured flint boulders, pebbles and splinters, which occurred. Each occupied the top of a slight rise in the ground. A close examination shewed that, whilst a few of the larger pieces of flint were in their natural state, or only slightly chipped, others were in various stages of manufacture, from the split nodule with squared edges, to the small conical cores, chipped all round, which had been thrown away simply because with their primitive tools, our early ancestors had been unable to strike any further flakes off. In all directions were the spoilt flakes or 'wasters,' as well as 'flake-knives,' the edges of which are still remarkably sharp. Occasionally a piece of flint was found which had some flaw, or was in other ways unsuitable for making into good implements, and had been discarded after several attempts had been made to put it to good purpose. In some cases it was clear that a large flint nodule had been entirely chipped to the core, as peculiarities in the texture of the flint could be detected in the dozens of pieces around. Of course the best flakes would be made into finished implements and be taken away. In the process many small chippings were made, which by some antiquaries are termed 'pigmy' flints, and are considered to be evidence of a pigmy race. One of the workmen seems to have had a particular fancy for pink flint, which, though occurring in the drift, is comparatively rarely met with. At one place almost all the flakes found were of this colour, and similarly, an unusual number of large pieces of pink flint were present. This is doubtless accounted for by the fact that boulders of this material are much more irregular in shape and contain more flaws than the black flint, and consequently a greater proportion would be discarded.

In addition to the cores and flakes, however, a number of complete and well-finished neolithic implements have been found, which had been accidentally lost, or for some other reason had been left behind. Amongst them are some types which are quite peculiar to the district, and, except in a few isolated instances, are not found in any other part of the country.

The commonest form of implement found was the oval or pear-shaped 'scraper' (Plate XIII., figs. 1-4); the circular form, which occurs in thousands on the wolds to the west, being only occasionally met with near Bridlington, and, so far, not at all on the sites of these workshops. The long scrapers average about two or two and a half inches in length, by about one and a quarter inches in breadth. One side is almost always flat, just as struck from the nodule, and shews no secondary chippings. The opposite side however, exhibits evidence of careful workmanship. Usually the end opposite the 'bulb of percussion' (made in striking the flake from the block) is semi-circular in form, and rendered sharp by many small secondary flakings, skilfully made. In addition, one of the long edges is usually flaked in the same way. These are thought by some authorities to have been used for striking lights, after the manner of the flint and steel of our great-grandfathers' days. By others they are considered to have been used for scraping the fat, etc., from the skins of animals. Probably the former view is the more correct.

Another type of weapon, which is by no means uncommon, is not so easy to account for, unless it has been used for making or straightening arrow and spear shafts (figs. 5 and 6). These vary in shape, but are usually portions of large, well-struck triangular flakes, the ends of which have been broken away. At first they may easily be passed over as ordinary 'wasters,' but a closer examination reveals the fact that at the ends, or sides, or both, there is a small semi-circular notch, with innumerable small flakings from one side only, thus leaving a sharp cutting edge, just such as would be necessary for working an arrow shaft. Of this particular type of implement (which has not hitherto received the attention it deserves), quite a number have been obtained.

Of the barbed arrow heads which have been found in such numbers in the Driffield and Fimber neighbourhoods, not a trace has been seen, though more or less complete arrow points and small spear heads of the lanceolate or leaf-shaped type, have

been obtained. Whilst the barbed arrow head is not nowadays common anywhere, its entire absence on the site of the four workshops is a little difficult to explain.

Near to one of these sites was found the flint axe head of unusually small size, which was figured in these columns for April last, page 144.

Perhaps the most remarkable find is a curved implement, in the form of a boomerang, and is considered by the authorities at the British Museum to have been used as a sickle (fig. 8). It was found at Bempton by a labourer whilst ploughing. It most resembles one of the long well-made flint axes, which are occasionally obtained on the wolds, but has a remarkable curve, or elbow, in the middle, which of course precludes it from being

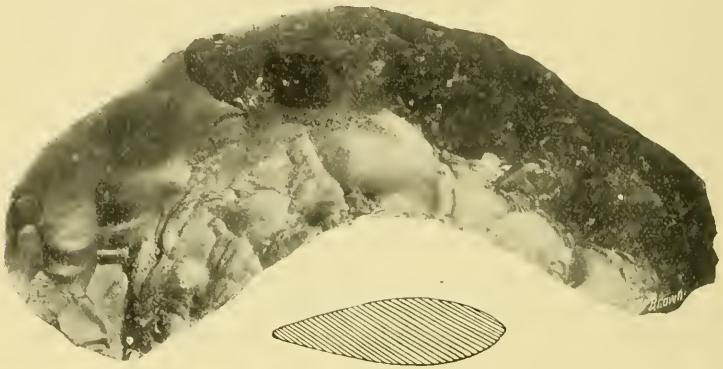

Fig. 8.—**Curved Flint Implement from Bempton (and Section).** (Natural size).

classed as an axe head. Both sides are carefully chipped to a sharp cutting edge, and one end is also sharpened after the manner of an axe. The edges are not quite parallel, but have a slight curve or twist, which is apparently intentional. Enquiries made at the British, Driffield, and other important museums and collections in the country, have failed to find that anything like it exists, though similarly curved flint weapons are recorded from Denmark and Egypt. Measuring along the outer curve, it is $5\frac{1}{2}$ inches in length, the cutting end is $1\frac{1}{4}$ inches across, it varies from $1\frac{1}{4}$ to $\frac{7}{8}$ inches wide, and is not more than half an inch in thickness. The nearest approach to this specimen is one figured by the late Sir John Evans in his 'Ancient Stone Implements of Great Britain' (second edition, page 355)* This was found at Sewerby, near Bridlington, and

* See also Proc. Soc. Antiq., 2nd Series, Vol. 7, p. 328.

is at present in the possession of Mr. Thomas Boynton. Though larger, the Sewerby example is not nearly so abruptly curved as the one just described, and is certainly more in the form of a knife. Another curved flint weapon, obviously a dagger, was found at Fimber, and is now in Mr. Mortimer's collection ; and slightly curved flint axes are in the Norwich and other museums. So far, however, the weapon recently found seems to be unique.

These specimens, together with other interesting finds which have been made in the Bridlington district (though not on the sites of the workshops), are being placed in the museum at Hull.

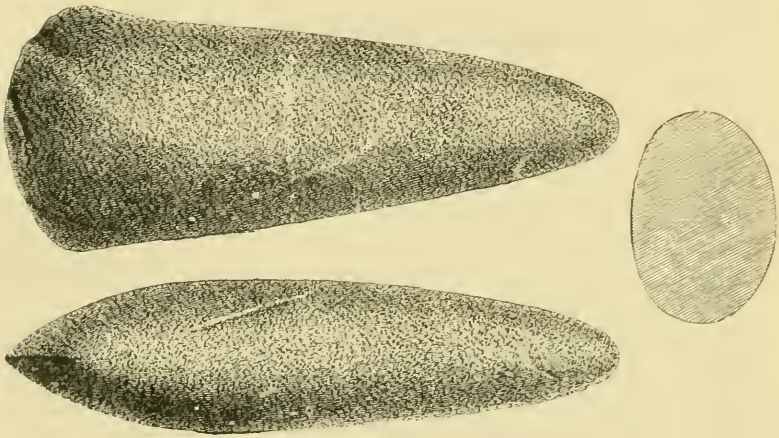

Fig. 9.—**Conical Axe-head from Bridlington (and Section).**

It is perhaps of interest here to refer to the fact that there are two other important types of neolithic weapons which are peculiar to the Bridlington district. This fact would seem to shew that the place was evidently of some importance in prehistoric times. One is a large triangular arrow or spear head (fig. 7), sometimes with a projection at one corner. Its principal feature, however, is the extraordinary way in which the flakes have been struck off parallel to each other, and extend across the implement without a break. These regular flakings have resulted in the name ' ripple-marked ' being given to this class of implement. Oddly enough, as in the case of the curved flint weapons, the nearest approach to the Bridlington ripple-marked flints occurs in Denmark and Egypt.

The other weapon is a conical axe-head (fig. 9), usually made from diorite or other allied igneous rock, which does not occur in situ for many miles. Like the black and pink flints, the material for making these axe heads has undoubtedly been obtained from the transported erratics in the glacial clays and gravels. Unlike the generality of East Yorkshire neolithic axe heads, these Bridlington examples have a point at one end, the broad end being rubbed down to a sharp edge. They are circular, or nearly so, in section. Specimens of this type which have been examined in various museums and collections up and down the country, have invariably proved to have been obtained in the Bridlington district.

PINE MARTEN REPORTED IN LITTONDALE.

ALFRED H. COCKS.

Considering what wanderers Martens are, the occurrence of one in Littondale * is not difficult to believe. The spot is not marked in the best map at hand, but presumably it lies in the N.W. quarter of the West Riding, and if so, it would only be a matter of a very few days' journey (from a Marten's point of view, even allowing for a circuitous route) from where a few of the species still linger.

The fact that only the Pine Marten occurs in the British Isles was finally shown by the late E. R. Alston, F.Z.S., as long ago as January 1880, in 'The Fauna of Scotland,' etc. (published by the Nat. Hist. Soc. of Glasgow, p. 12).

The statement that the breast of the Littondale specimen was noted as yellow, is fair proof that it was not an (escaped) Beech Marten; for while the breast of the Pine Marten may be of any shade from cream-white to bright gamboge-yellow, that of the Beech Marten (so far as my own limited experience goes) is always white, or at most with a very light buff or yellowish tinge, not deep enough to describe as yellow. The colour of the breast, however, can not be taken as affording a specific character; a much better one (as pointed out *loc. cit.*) is the colour of the under-fur, which in *Mustela foina* is greyish-white, and in *M. martes* reddish-grey. Also the last upper molar of the former is 'notched externally,' and in the latter is 'simply rounded externally.' The two species are not likely to be confounded by anyone who has seen even a single living speci-

* See 'The Naturalist,' July, p. 277.

men of each (though this was done, towards the end of his life, by the late A. D. Bartlett, for many years Superintendent of the London Zoo !)

Whether the Littondale animal was a Marten at all, or an escaped representative of some totally distinct genus from perhaps another quarter of the globe, can only be ascertained by the cross-examination of the taxidermist, the trapper, and any other persons who saw it. Can the skull, or even one or more of the long bones be recovered from the taxidermist's back-garden,* or was the specimen removed by the urban council's sanitary cart ? In the latter case, recovery may be allowed to be hopeless. It is not long since a reputed stoat captured in England, was presented to the Zoological Gardens in London, where it was found to be an example of one of the less-commonly imported species of *Herpestes*, I forget now which, but think *H. fulvescens*, a native of Ceylon.

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Edible and Poisonous Fungi. 25 Coloured Plates, 1/-. Board of Agriculture and Fisheries, Whitehall Place, S.W.

This excellent fascicle of coloured illustrations of Edible and Poisonous Fungi has been published by the Board 'with a view to enable residents in the country to distinguish accurately between poisonous and edible kinds, and thus to utilise to a greater extent those varieties as food.' Seventeen edible and eight poisonous species are illustrated. The best of the former and the worst of the latter are here so figured as to make it almost impossible for anyone to get wrong if they are armed with this book and a modicum of discrimination. A short popular description accompanies each plate and the figure is footed by both technical and common names. The original drawings were prepared by our contributor, Mr. G. Massee, of Kew, assisted by his daughter Miss Ivy Massee.

The **Transactions of the Hull Geological Society,** Vol. VI., part 2, for 1906-9 (A. Brown & Sons, Hull, pp. 95-170, 2/6), have just been published, and contain a record of the Society's work during the past four years. The contents clearly show that there is much work being carried on in the south-east corner of Yorkshire. Mr. C. Thompson has two remarkable papers on 'The Fossil Cephalopoda of the Holderness Drift' and 'the Belemnites of the Yorkshire Lias,' respectively, both of which indicate that the author is following profitable lines of research. The Hon. Secretary, Mr. J. W. Stather, writes on 'The Bielsbeck Fossiliferous Beds, and the Speeton "Shell-Bed,"' and there are the Reports of the East Riding Boulder Committee, and Notes on the excursions during 1905-9, which are some indication of the Society's enthusiasm. Mr. Sheppard contributes a lengthy paper, 'Recent Geological Work in the Humber District,' which is practically a summary of the various geological items that have appeared in 'The Naturalist' in recent years, and is illustrated. The same writer contributes a 'Bibliography, 1906-9,' in which an enormous number of geological papers relating to East Yorkshire and North Lincolnshire are included. There are other shorter items, one of which, dealing with the London Geological Society's Awards, shows that the Hull Society has been especially favoured by the parent Society.

* Enquiries are being made.—Ed.

DIMORPHISM IN THE EGGS OF THE HOUSE-SPARROW (*PASSER DOMESTICUS*).

C. J. PATTEN, M.A., M.D., Sc.D.
Sheffield.

(PLATE XIV.).

THE considerable range of variation to which the egg of the House-Sparrow is subject has no doubt struck many ornithologists. But until I came to collect large numbers of the eggs of this species, while prosecuting some investigations into avian embryology, I was not of the opinion that such marked dimorphism existed. Unlike the case which I published in this journal last year, of a clutch of Song-Thrush's eggs in which one was devoid of spots, and was non-fertile with an aborted condition of the yelk, all the shells in the eggs which I am now about to describe have pigmental markings deposited on the ground-colour. In some the markings are strikingly different even in eggs from the same nest; conversely in another case whilethe pattern is fairly uniform, there is decided dimorphism in size.

Before proceeding further with details, I may here point out that I have thought it worth while also figuring a very common form of dimorphism in which three or four of the clutch have a clear ground-colour with large and more or less discreet blotches and spots (*c.f.g.* Plate XIV., fig. 1); the remaining one or two eggs having a muddy whitish brown ground-colour in which there is a considerable diffusion between the latter and the pigment-markings (*h.* Plate XIV., fig. 1). From a large Sparrow-colony situated in an ivy-covered house-front, from which all the eggs in question have been taken, I estimated that some twenty-five per cent. of clutches displayed this peculiarity, and as I have found the same in Sparrows' eggs obtained from nests more or less isolated from their fellows, I am not inclined to think that here there is any mixing of the clutches of different birds. Moreover, I have found the same variation taking place in egg-clutches of the Redbreast, Willow-Warbler, Meadow-Pipit, and other birds in which the markings are numerous and well distributed over the shell. This form of variation I look upon as purely physiological, depending upon an alteration in the activity of the secretion of the pigment-glands, and the rate of rotation of the shell down the oviduct; and I believe

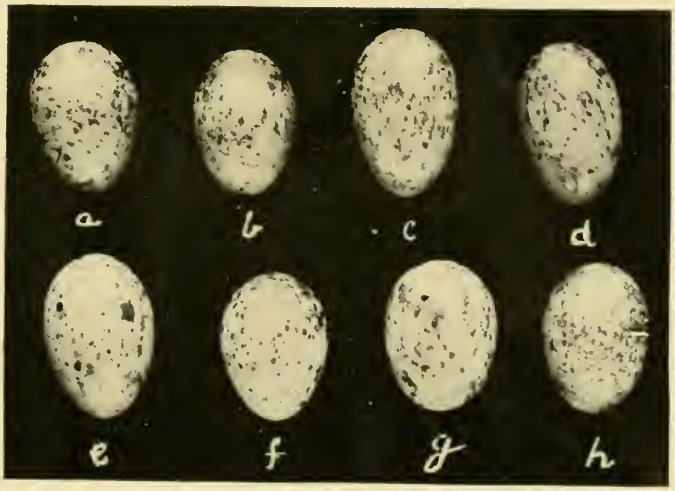

FIG. 1.
Two 'True-Clutches' of Eggs of the House-Sparrow.
(Approximately natural size).

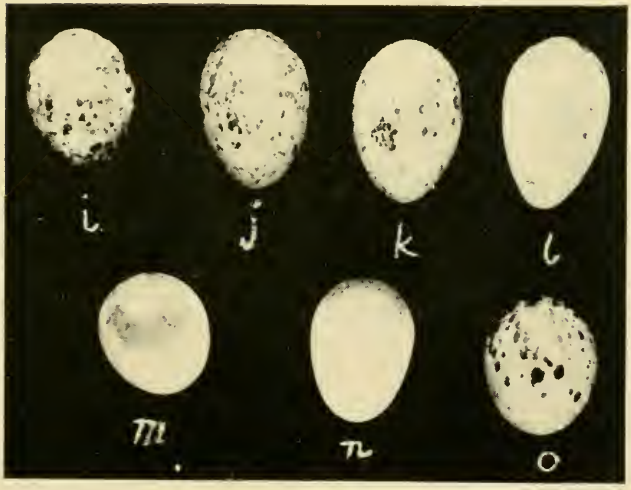

FIG. 2.
Two 'False-Clutches' of Eggs of the House-Sparrow.
(Approximately natural size).

that such clutches are as genuine and as sure of being laid by one bird as when no dimorphism at all occurs, which at the same time must be distinguished from individual variations which are (except in the cases of unspotted eggs), exceedingly common. In fact no two eggs are ever spotted exactly alike; they differ individually as human faces do, though both are capable of being grouped into types. In the above clutch of Sparrows' eggs we find two types evidently laid by the one mother-bird, the egg with the clean white ground-colour and more or less discreet spots, and the egg with the ground-colour diffused to a considerable extent by admixture with the fine pigmental markings.

I now proceed to describe three other sets of eggs, each set being the contents of one nest. I cannot call them all clutches, as from what follows I have reason to believe that in two cases more than one hen-bird laid in the nests. The top row in Plate XIV., fig. 1, shows four eggs marked (apart from individual variation) very similarly, but the discrepancy in size between *a*, *b*, and *c*, *d*, is so well marked that an interesting example of dimorphism in size is seen; as this is not a very uncommon occurrence, and as here the stages of incubation were fairly uniform, I am inclined to believe these four eggs form a true clutch.

The other two sets of eggs, figured in Plate XIV., fig. 1, are more remarkable, and as regard markings, show the converse condition to the last, and indeed in size and shape we see considerable differences also. In the bottom row *m* and *n*, while very similar in size and markings, are so unlike *o*, that at first one might be inclined to think that the former were not a House-Sparrow's eggs at all. I must frankly admit that I was doubtful myself until I received a general consensus of opinion from the ornithologists present at a recent meeting of the Yorkshire Naturalists' Union * in favour of the House-Sparrow being responsible for producing such an interesting variety of egg. In regard to this set I may here refer to a noteworthy fact about the contents. Originally the number of eggs found in the nest was five, but unfortunately two others of the same type as *o* became broken; however, though the contents were somewhat besmattered on the floor, I managed to find out that fertility had ensued and that a very early stage of the embryo had been reached, also that there were evident signs that the

* These eggs were exhibited at the meeting of the Vertebrate Section of Zoology, held at Leeds on Feb. 19th, 1910.

embryos were living when the eggs were at first removed. But quite a different state of affairs presented itself in the case of the two curiously marked eggs (Plate XIV., fig. 2 *m*, *n*). The contents were dried up, and could not be removed and they rattled about when the shell was shaken, like a pea in a whistle. Evidently the history points to this—the latter two eggs were long since laid, forsaken, and their contents allowed to undergo dessication (which readily takes place in small eggs laid in a dry situation) before another hen-bird took possession of the nest and laid three eggs. If this hypothesis be accepted, it is interesting to note that the hatching bird did not eject the old eggs before laying ; indeed their presence may have encouraged the bird to settle to the task of incubation all the more quickly, as is seen in the case of domestic fowls when a china egg is placed in the nesting-pen by the poultry-raiser.

In the top row of Plate XIV., fig. 2, is an interesting example of a set in which *l* is very sparsely spotted, and possesses a remarkably clear milky-white ground-colour, reminding one more of a Swallow's than a Sparrow's egg, but for the larger size. While I believe this egg was laid by a different bird, it is interesting to see there is a rather regular gradation in the pointing of the lower pole of the set, which is best marked in *l*.

It must be borne in mind that I have used the term dimorphism in a very general, perhaps partly in somewhat an inapplicable sense. For, contrary to the case of the eggs of the Thrush's nest above mentioned, which I believe constituted a genuine clutch, and therefore showed dimorphism in the eggs of an individual bird, in two of the cases of the Sparrows' eggs I have adopted the term dimorphism simply to indicate two very different forms found occupying the same nest, but not laid by the same bird. Hence while the value of the phenomenon of dimorphism may here be somewhat lessened, still the differences in the two types of eggs which constitute the ' false clutches,' figured in Plate XIV., fig. 2, are so pronounced that, laid as they have been by separate birds, these eggs seem to possess no small amount of interest.

EXPLANATION OF PLATE XIV.

FIG. 1.

Two True-Clutches of Eggs of the House-Sparrow. (Nat. size).

In the upper row while the eggs are marked very similarly, *a* and *b* are considerably smaller than *c* and *d* ; in the lower row, *e*, *f*, *g* belong to the type with a clear ground-colour with discreet blotches and spots, whereas *h*

shows a muddy whitish-brown ground-colour diffused with pigment markings.

MEASUREMENTS. (Nat. size).

	Length.	Breadth.		Length.	Breadth.
a ...	2 cm.	... 1.3 cm.	*e* ...	2.2 cm.	... 1.4 cm.
b ...	1.9 ,,	... 1.2 ,,	*f* ...	2 ,,	... 1.3 ,,
c ...	2.3 ,,	... 1.3 ,,	*g* ...	2 ,,	... 1.4 ,,
d ...	2.3 ,,	... 1.3 ,,	*h* ...	2 ,,	... 1.3 ,,

FIG. 2.

Two 'False-Clutches' of Eggs of the House-Sparrow. (Nat. size).

In the upper row, *l* is markedly different from the other three; in the lower row, *m* and *n* are very similar but strikingly unlike *o*; *m* is tilted to show on its broad end the zonular band of finely-dusted grey markings on a clear white ground; *n* is marked similarly, and both eggs are practically free over the rest of the shell from any other pigment-markings.

MEASUREMENTS. (Nat. size).

	Length.	Breadth.		Length.	Breadth.
i ...	2 cm.	... 1.3 cm.	*m* ...	2 cm.	... 1.2 cm.
j ...	2.2 ,,	... 1.3 ,,	*n* ...	2 ,,	... 1.2 ,,
k ..	2.3 ,,	.. 1.3 ,,	*o* ..	1.9 ,,	... 1.3 ,,
l ...	2.5 ,,	... 1.2 ,,			

The Journal of the Torquay Natural History Society (Vol. I., No. 2, pp. 49-86, 1/-) has been received from the Museum, Torquay. It contains a continuation of Mr. H. J. Lowe's 'Historical Notes' relating to the Society, short abstracts of papers on various subjects, read to the society (including a lengthy one on ancient earthquakes and crust movements in Devonshire, by Mr. A. Somervail), and a list of the Marine Mollusca of the Torquay District, by Mr. A. J. Jukes-Browne. The subjects discussed by the Society include Water Fleas and Dante's 'Purgatorio.'

The Annual Report and Transactions of the North Staffordshire Field Club for 1909-10, (Vol. XLIV., 227 pp., edited by Mr. W. Wells Bladon), contain a record of the Society's work, abstracts of various papers on as varied subjects, zoology, entomology, botany, meteorology, microscopy, archæology, etc., all of which appear to have a bearing upon the Society's sphere of work. The principal paper seems to be 'On some of the Rarer Birds of Staffordshire and their Migration across the County, with notes from adjoining counties,' by Mr. F. Coburn. This is illustrated by numerous blocks from photographs of stuffed specimens.

The Leeds Astronomical Society has just issued its **Journal and Transactions** (No. 17) **for the year 1909.** (Leeds: R. Jackson & Sons. 78 pp., 2/-). The publication is edited by Mr. Ellison Hawks, and besides containing abstracts of papers, original contributions, a record of the Society's meetings, etc., includes reprints of the various letters on astronomical subjects, written by the members to the *Yorkshire Post* and other papers. These are thus in a much more convenient form than a newspaper cutting book. Amongst the contributions we notice 'Some recent Observations of the Moon,' made, appropriately enough, by Mr. Mann; 'Some recent Observations of Mars,' made with the eagle eye of Mr. E. Hawks; and 'Star-Drift,' by A. Burnet, who thinks that researches in the not distant future will 'throw a great amount of light' upon the problem. Mr. Whitmell takes Mars as a view-point, and Mr. Edwards deals with Creation from a Maori standpoint.

THE RECENT CLOUD-BURST IN NORTH-EAST YORKSHIRE.*

J. T. SEWELL.

THE storm of May 20th last appears to have passed north by way of Weaverthorpe and along the boundary of Sherburn and Heslerton parishes. It then crossed the valley, and heavy rain is reported to have fallen a little to the east of Ebberston, increasing in intensity over Staindale moor. Crosscliff and Bickley probably experienced the storm, although very little extra water is reported to have flowed into the Forge Valley and Ayton drainage ; no extra water found its way into the Newton-Dale stream except a small amount from the Saltergate area.

The Staindale rain-fall caused a rise of about four feet in the beck at Thorntondale (very little rain at the village although the storm of the 21st was very heavy here), Ebberston was also badly flooded with the moor drainage.

An immense rainfall occurred immediately west of Lilla Howe and continued on the western side of the watershed as far as Grosmont ; no streams to the east of the watershed flowing into the Flyingdale district were effected, nor were those west of the railway line nor near Goathland village. Probably the volume of water that fell on these moors equalled, or more than equalled the downpour on the wolds. The Ellerbeck stream rose nine feet, and at Goathland the bridge immediately south of the station was unable to take the water, which, getting on to the line, flowed between the station platforms. Grosmont suffered from the water which came down the hillside fields ' in waves following one another.'

The storm now appears to have taken more of a north-west direction. It crossed the line a little north of Grosmont, passed over Aislaby village, and broke with renewed violence on the northern slope of Skelda moor and over Hutton Mulgrave ; it possibly continued to sea, passing between Sandsend and Runswick.

Whitby escaped this storm except for an ordinary thunder shower with a rainfall of ·22 during the night, the sky as

* For an account of the storm in the Driffield district the reader is referred to the article by the Rev. E. Maule Cole, F.G.S., in 'The Naturalist' for July, pages 255-256.

seen from the town between 5 and 6 a.m. was 'dark yellow-green;' thunder was heard from about 4 a.m. Happily the tide was out when the flooded Esk discharged into the sea between 8 and 9-30 a.m. As far as can be judged, the river deposited far more mud in Whitby harbour than the current took sand to sea; the water was like soup of a light-stone colour, the sediment being the Oolitic shaley earth of the Goathland district.

The heaviest downfalls occurred on the Wolds, and between Lilla Howe and Sil Howe; while very violent rain was experienced on Staindale moor and over the Mulgrave-Dunsley district. An observer at Dunsley states that 'the cloud he was watching suddenly appeared to drop on the ground and deluged everything.' The Sandsend and Eastrow streams draining this area did great damage, the county bridge over the latter being choked with trees washed out of the Mulgrave woods, was destroyed. An observer at Goathland says, 'after watching a violent storm in the south-east, I noticed the wind-vein suddenly veer round from the north-west, when a dark cloud appeared to drop out of the sky from that direction, and everything was obscured by falling water.'

The track of the storm as already stated, had been north, with a slight deviation to the west. After passing Goathland, its track turns more to the west, unless the above observer is correct in his surmise of two storms, one from Sandsend and the other from the Wolds meeting on the moor to the east of Goathland.*

The effect of this mass of water on the moorland streams is very marked, and a greater alteration than has taken place in the previous one hundred years of ordinary rainfall was made in half an hour, small waterfalls were converted into rapids, and blocks of stone, some of several tons in weight, being dislodged out of the bank, were carried into the bed of the stream, where forming a block, masses of stone were piled up

* Since the above was written, the writer has read the interesting description of the storm given on page 256 of 'The Naturalist' for July, and the 'meeting of two heavy rain-clouds' may possibly account for the Lilla Howe downpour. The writer also has been able to trace the effect of the storm in all the sea-flowing streams northward to Saltburn; at Dalehouse (Staithes) another county bridge was undermined, and is now being rebuilt. The only time obtainable as to the downpour is 'early morning'! Does not this lend additional weight to the idea of a storm moving from the west and continuing near the coast, until it turned south to meet the northward moving storm as already described?

behind them, raising the bed of the stream several feet. Over this the water poured in a fierce cascade, scooping out the stream bed, and carrying everything before it. Another stone block was formed, and the process was repeated. Now the storm is past, the water finds its way, in many cases, under the stones that it piled up in its fury. Probably thousands of tons of stone are left in the river bed where the two streams met at Darnholme, and also just below Thomasson Foss. This waterfall has been very much shortened, principally by the raising of the water level in the pool at the foot of the fall. In time of flood the salmon will probably be able to get into the higher streams. The river from here to its junction with the Murk Esk has undergone a great amount of alteration.

Ancient Plants, by **Marie C. Stopes, D.Sc., Ph.D., F.L.S.** London: Blackie. pp. vi. and 198. 4/6 net.

Any book coming from Dr. Stopes is sure to be interesting, and this one, dealing with a phase of plant life she has advanced in no small degree, will prove both attractive and stimulating. It is written from the point of view of the general reader, and with the hope that it will also prove useful to the college student in 'presenting the most interesting discoveries and general conclusions of recent years.' Its language is often simple, at times very expressive, and even grandiloquent as the writer warms to her subject. Occasionally, we gather that outsiders hardly take palæobotanists at their own valuation, and here and there is a little unnecessary protesting concerning the supreme importance of the subject, but this we can forgive in an enthusiast. There are nineteen short chapters dealing with such topics as various kinds of fossils, coal, the seven ages of plants (a very arbitrary division), stages in plant evolution, minute structure of fossil plants compared with living ones, and ten chapters dealing with the past histories of plant families. Plant histology cannot be understood by the general reader without much effort. Still the clear and excellent illustrations prove a great help. For students' use (and we think these would have been better kept in mind), we are too often met with such expressions as 'they are too complex to describe in detail' and as these often refer to fructifications, about which the most important discoveries have recently been made, it becomes rather disappointing. This, however, is to some extent compensated for by the series of useful comparative diagrams illustrating the evolution of the seed from the spore. Considering the nature of the subject, we cannot agree with her dictum that Scott's 'Studies' are 'hard and impossible reading,' for many of the structures she finds too complex to describe, Scott renders perfectly clear, and in language often simpler than some we find in 'Ancient plants.' Errors are not numerous, though at times she is carried into making too sweeping assertions, apparently out of sheer exuberance. On page 78, chapter XIII. should be XII., and in the figures illustrating minute structures, many of the photo-micrographs are labelled 'micro-photos,' and as no indication of magnification is given, a distorted notion will be obtained by the 'general reader,' if he or she refers to a dictionary for its meaning, which we find is not included in the glossary at the end of the book. These, however, are minor points, and a book at once so ably written on the whole, and so well illustrated, cannot fail to secure the object the writer has in view of suggesting 'enough of atmosphere to show the vastness of the landscape spreading out before our eyes back into the past and on into the future.'

Naturalist,

THE CORRELATION OF THE YOREDALE AND PENDLESIDE SERIES.

WHEELTON HIND, M.D., F.R.C.S., F.G.S.

Mr Cosmo Johns' paper in the July number of 'The Naturalist' on 'the Lower Carboniferous Rocks of Mill Gill, Wensleydale,' calls for some criticism.

Our present knowledge of the palæontology of the Yoredale Series of Wensleydale does not warrant the conclusions which he formulates. He seems to have neglected, or dismissed with a casual allusion only, the important facts of faunal distribution; and he has exaggerated the significance of isolated occurrences of single, and often unimportant, members of a fauna.

For example, he regards the occurrence of *Posidonomya becheri* in the Shales above the Great Scar as absolute evidence that the beds in which it occurs may be correlated with the *becheri* beds at the base of the Pendleside Series. This, I feel is not permissible for two reasons:—First, that *Posidonomya becheri* is known to occur in Derbyshire at a much lower level than the Pendleside Series, and second, the Pendleside Series is zoned by a series of *Goniatites*. In one of the zones *Posidonomya becheri* occurs in great abundance, but the important factor is the fauna associated with it, and not the occurrence of the species with a totally different fauna. If *P. becheri* can be shown to occur in the true Yoredale Series with *Nomismoceras rotiforme*, and the associated fauna, then, and then only, will that lamellibranch indicate a definite horizon, and in a secondary sense be useful for purposes of correlation.

Mr. Cosmo Johns lays stress on the occurrence of *Ctenodonta lævirostris* and *Stroboceras sulcatus* in shales above the Great Scar Limestone, with the comment—'Their occurrence so near the level of *Posidonomya becheri* is significant.' In the first place, objection may be taken to his assumption that this horizon is *the* level of *P. becheri*; and secondly I would ask of what horizon are these two species significant? *C. lævirostris* is known from many horizons, (Lower Carboniferous Limestones to Coal Measures), and *Stroboceras sulcatus* has a known range from Upper *Dibunophyllum* to Millstone Grit inclusive. I ask, therefore, what possible significance these two species can have on correlation; both of them are known in a definite lithological succession to occur below the zone of *Nomismoceras rotiforme*.

1910 Aug. 1.

The importance of the faunas of the Hardraw Limestone and Middle Limestones is very great, and Mr. Cosmo Johns' case largely depends on them ; but the coral fauna he gives as typical of this portion of his sequence is typically Upper *Dibunophyllum* and therefore below the lowest Pendleside horizon, and utterly demolishes any import that the presence of *P. becheri* below it might have had.

I have long been convinced that the Main Limestone and the Great Limestone of North-West Yorkshire, Durham and Northumberland were probably on the same horizon, a fact supported by the coral, cephalopod, and indeed the whole fauna, and that this was identical with that of portions of the *Dibunophyllum* zone of Derbyshire, Staffordshire and South-West Yorkshire, *i.e.*, the fauna correlates the Main or Great Limestone with a series always succeeded by *P. becheri* beds containing the Pendleside fauna, and never below it.

Mr. Cosmo Johns says, ' Dr. Wheelton Hind brought forward convincing evidence that the Pendleside Limestone was the equivalent of the Whittington Limestone." I presume he refers to the paper by myself and Mr. J. A. Howe.* I cannot see any evidence at all, much less evidence that merits the term ' convincing.' I quote what we said at length :—' We examined the bed of limestone north of Whittington village, and found an extensive section in the stream and neighbouring quarry. The limestone was yellowish, about twenty-five feet thick, and had shales above and below it. It contained crinoids, a fish tooth [identified subsequently as *Pseptodus magnus*], and shell fragments, but the shales were more fossiliferous, yielding crushed *Productus* and other limestone forms.' We went on to detail a list from a calcareous shale, presumably below this limestone, which contained a fauna which I should certainly put down as Upper *Dibunophyllum* in facies.

Further on Mr. Cosmo Johns says: ' the fauna which characterises the Lower Pendlesides has been obtained from beds unquestionably of Yoredale age.' If this is so, it is new to me, and no details or reference is given. Whatever faunal evidence has occurred to me up to date is decidedly against this statement, and until the peculiar cephalopods which characterise the Pendleside Series are found in the Yoredale succession, it will be impossible to accept Mr. Cosmo Johns' dictum that

* ' Q. J. G. S.', Vol. LVII., p. 364.

it is now possible to correlate the Yoredale Series with the Pendleside Series and the culm.

There is much important palæontological evidence that Mr. Cosmo Johns totally ignores, to which I will now briefly refer.

The Redbeds Limestone at the top of the Yoredale Series in Wensleydale contains a very rich fish fauna, collected very carefully by Mr. J. Horne, of Leyburn, and described by the late J. W. Davis, of Halifax. This fish fauna, is that which characterises the uppermost beds of the Carboniferous Limestone of Lancashire, Derbyshire, Staffordshire, North Wales, etc., and is always succeeded by the lowest Pendleside fauna, with fish remains of an entirely different facies.

The fish fauna of the Pendleside Series is wholly different in facies from that of the uppermost Yoredale beds. Dr. Welburn has written on this aspect of the question.* That evidence of the fish fauna, therefore, is diametrically opposed to Mr. Cosmo John's contention, and must be explained away if he wishes to correlate the Yoredale limestones with the Pendleside group.

Again, with regard to the fauna of the Felltop Limestones. Mr. D. Tait of the Geological Survey of Scotland collected from sixteen localities on this horizon in the neighbourhood of Alnwick, in 1906, and the results of his work were given in my report to the British Association at York.† The fauna collected contained fifty forms including corals referred by Dr. Vaughan to—

Zaphrentis aff *enniskilleni.*
Aulophyllum aff *winschi*
Dibunophyllum aff ψ.
Cyclophyllum aff *pachyendothecum.*

a group which must be considered as indicating a *Dibunophyllum* facies, a view which the rest of the fauna fully supported.

In face of these criticisms I think Mr. Cosmo Johns has still to prove that the Yoredale Series contain any indication of a Pendleside fauna.

The view that Mr. Johns now puts forward is very old, and

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* 'Proc. York. Geol. Soc., 1902', Vol. XIV., p. 465. Ibid. 1905, Vol. XV., p. 380.

† *Vide* Report, p. 308 *et seq.*

was universally held till I was able to show that the Black Shales Series which succeeded the Limestone massive of the Midlands, contained a totally different fauna from that which characterised the Yoredale Series. He has simply returned to the view then held by the Geological Survey (1881), as shown by his table. With the object of testing the grounds for my conception that the Yoredales of Wensleydale and the north were the equivalents of the upper part of the ' massif ' Carboniferous Limestone of Cracoe, Clitheroe, Derbyshire and Staffordshire, several sections were examined by expert collectors. The result of Mr. Rhodes' work was published in the ' Report of the British Association for 1901, and the faunas which were shown to occur in the Upper Yoredale beds seemed to me identical with that which was well known in the upper beds of the massif in the Midlands. There was no question of a single species occurring in association with different fauna at widely separated localities ; but the palæontological conceptions are formed from the examination of the whole fauna. A similar examination was made by myself of the limestones of Weardale, and published in ' Proc. Yorks. Geol. Soc.*, in which publication are tables showing the species common to both the Yoredale and Pendleside faunas, and emphasising the important and radical difference between them.

Stratigraphical difficulties are not going to be solved by haphazard palæontological methods, and as the old proverb says, ' one swallow does not make a summer,' the occurrence of a single species of any fauna does not warrant correlation of beds in distant areas which contain dissimilar faunas, especially when that species is a lamellibranch, a family many of whose members are known to have a large vertical range.

The *Archæological Journal* for March contains an elaborately illustrated paper, by Count Paul Biver, on ' Some Examples of English Alabaster Tables in France.' The material from which these were made in the middle ages was apparently obtained from either Nottinghamshire or Yorkshire.

The July *British Birds* contains a confirmation of the record of the Peregrines at Bempton, which was made in ' The Naturalist ' by Mr. E. W. Wade a month previously. In the same journal is a note recording the nesting of the Little Tern at Teesmouth. This species has ' not previously nested at the Tees Mouth within the memory of living man.' There is also a record of the fact that ' since the publication of "The Birds of Yorkshire," three of the climbers therein referred to have been placed *hors de combat*.' We hope it is only a coincidence.

* Vol. XIV., p. 446, *et seq.*

BOTANICAL SURVEY OF TEESDALE.

Wm. G. SMITH, Ph.D., and T. W. WOODHEAD, Ph.D.

The following sketch gives a few impressions on some aspects of Teesdale vegetation. During the excursion, opportunity was afforded of a visit to the three main portions of the Upper Teesdale district, including Lunedale and Balderdale. In the neighbourhood of Middleton the valley presents few features of note as it consists mainly of enclosed grassland passing over at higher elevations to grassy and heathy fell. These in the main are the features of Lunedale, the grassy slopes being rarely broken by cliffs or scars. In Balderdale the influence of the largely non-calcareous nature of the Yoredales is well marked on the vegetation. Here we have an extensive development of relatively impervious, and mainly non-calcareous beds with swampy grasslands and moors dominated by bogmoss and Junci, while the drier pastures were studded with *Viola lutea* in strong contrast to the blue form (*V. amœna*) of Upper Teesdale. In the latter dale the rocky river bed, often with precipitous sides, the fine cliffs of basalt and limestone, provide a contrast and variety both in scenery and vegetation, absent in the dales of the Lune and Balder. The richness of the flora is notorious, and although the visit was early and the season backward, the pastures showed signs of a coming wealth of flowering plants. Anemone and early purple orchis were already abundant among the grasses, and many other characteristic species were in leaf. The bright green pastures here, recalled those of Craven, rather than the dull and less varied grasslands of the Calder and other millstone grit valleys of South Yorkshire.

At Holwick, on the right bank of the Tees, Juniper became prominent, forming an extensive and fairly dense thicket on the scarred slopes near the river. This interesting plant extended up to Cronkley Scars as a more or less continuous scrub. On the left bank the Juniper began below High Force, and was abundant on the steep heathery slopes up to Widdy Bank Farm, and after being broken by the grass fields, it again appeared abundantly on Falcon Clints up to Cauldron Snout. Mr. F. J. Lewis, in his memoir on the 'Vegetation of the Basins of the Rivers Eden, Tees, Wear and Tyne' ('Geographical Journal,' 1904), records this as the most extensive development of Juniper in that area, and states that this plant association is

entirely confined to the exposure of the ' Whinsill ' basalt and dolerite, and does not occur higher up the valley. This apparent geological distribution is due, we think, not so much to soil conditions as to the roughness of the whinsill scars which renders them not easily accessible to sheep, and where the heather is rarely burnt. The Juniper has a fairly wide distribution in Britain as regards geological substrata, but like most other shrubs and trees, it has disappeared from most places where grazing and heather burning are in operation. A constant associate of the Juniper here is worthy of notice, namely the wood sorrel (*Oxalis acetosella*), which occupied the deep-shaded ground beneath the bushes to the exclusion of all other species. As Wiesner and Rübel have pointed out, this is one of the most extreme shade endurers among European flowering plants.

On Widdybank Fell the features of the vegetation so well described by Mr. J. Gilbert Baker in ' North Yorkshire,' were easily recognised. The general tone of the Fell is a dull heathy grassland splashed here and there with bright green grassy patches. Sheep's Fescuegrass, Field Rush (*Luzula*), and dwarf Sedges seem to form the groundwork of these patches, but quite a number of rare or local species have been recorded from them, including *Gentiana verna*, which now studded the carpet with its wonderful blue flowers so suggestive of the Alpine ' wiesen ' in early summer. This plant-association coincides with the occurrence of the sugar limestone, and on Widdybank this is derived from several beds of limestone altered by the intrusion of the ' whinsill ' (see geological report in *The Naturalist*, July, p. 268). It was interesting to find below Cronkley Scars a similar patch of vegetation on the Yorkshire side of the Tees, here also on sugar limestone, but this time *below* the ' whinsill.'

This interesting association is therefore developed on peculiar rock soils, and in the main over an unglaciated area. From this point of view it well deserves more detailed study, as the facts seem to indicate that it is a relic of the pre-glacial flora, modified to some extent by later invasions.

One day was spent by a small party whose mission was on the whole regarded as on a footing with another botanical excursion of which a witty Scottish professor said :

" Some folk 'll tak' a heap o' fash, for unco little end, man ;
An' meikle time an' meikle cash, for nocht ava' they'll spend, man."

The object was to examine the somewhat inaccessible head-

waters of the Balder valley where Mr. Lewis has recorded an extensive area of Sphagnum bog. The excursion attracted the bryologists, and they rendered good service, furnishing the list of mosses (see pages 265-267). Above Balder Head farm there is no cultivation and the valley is narrow with steep slopes on both sides, and continues thus above the junction of the Balder and Black Beck. Nowhere was there any exposure of the whinsill, and the steep rounded slopes are covered with rough pasture, except where lateral streams descend from the upper fells and cut deep V-shaped valleys, with shaley sides so steep that there is little or no roothold for plants. The landscape is therefore different from Teesdale, where the river winds in a broad valley bottom flanked with high rocky scars. The valley slopes of the Balder are mapped by Lewis as Grass Heath, but it is a very wet type, and consists quite as much of sedges and rushes as of grasses. Ling, dwarfed Bilberry and Cotton Sedge (*Eriophorum vaginatum*) are present, and form patches on drier soil. Everywhere, even on steeper slopes, there was some *Sphagnum* and other mosses of wet places, and underfoot was always wet.

The surface soils, according to the geological maps, are boulder clay, and weathered shales. The area mapped as sphagnum bog forms a horse-shoe, curving round all the head-waters of the Balder, and is continued westwards almost to the watershed of the Eden valley. The part marked Schacklesboro Moss was traversed westwards for about two miles, and another part above the Black Beck was visited later. The land is a plateau, almost flat, extending from the valley slopes southwards and westwards to a prominent summit (1489) on Cotherstone Moor. The east end of Shacklesboro appeared to be Ling and Cotton Sedge, but a closer inspection revealed much *Juncus squarrosus, Erica tetralix* and scanty bits of Crowberry. Under foot there was everywhere a squelchy carpet of bog-mosses and hepatics, so that the bryologists were busy, and the list furnished by Mr. Ingham is an important contribution. It was noteworthy that there were few signs of peat erosion, and that almost every channel and pool was filled with vivid green moss, or held masses of the taller Junci, while the 'grips' cut some seven years ago have become choked with *Sphagnum recurvum*.

In the few eroded water-courses remains of Birch were found at the base of the peat, and this suggests that the moor

was drier once, before it had become covered with bog-mosses. The most tempting place for lunch was a boundary stone and a broken-down wire fence, there was plenty of water in one's boots, but none to drink, but the sandwiches were good.

After traversing other parts of the bog, including a large area where Ling was entirely absent, a return was made to the Balder valley-slopes, and after a few more observations over a few miles of rough wet walking, we sought our conveyances, satisfied with the day's work which had added the Sphagnum Bog as a plant association new to all.

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FIELD NOTES.

BIRDS.

Cuckoo's Egg in Sedge Warbler's Nest.—Whilst with Rev. Mr. Woods near Driffield, I came across a Sedge Warbler's nest containing four eggs, one of which was a Cuckoo's, and was practically fresh. It seems late to find these eggs in July.—H. G. WILLIAMS, Bainton, Driffield.

—: o :—

LEPIDOPTERA.

***Abraxas grossulariata* var. *varleyata* at Huddersfield**—I have again bred the rare variety—*varleyata* of *Abraxas grossulariata*, and also another beautiful dark form of the same species. I have now bred the variety *varleyata* four out of the last five years.—ALFRED KAYE, Huddersfield, July 18th, 1910.

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MOSSES.

***Plagiothecium silesiacum* B. & S. in the East Riding.**—At the meeting of the York and District Field Naturalists' Society at Fimber on Saturday, the 9th July, I found the above moss in fruit. It is extremely rare and of great interest to bryologists. Its name in Braithwaite's 'British Moss Flora' is *Isopterygium repens*. The last time it was found in the British Isles was in 1847, when Dr. Spruce discovered it in Arncliffe Wood, near Goathland. The previous and first record was by Mitten in Kent, in 1843. At the present time the moss is known only in Yorkshire and Kent. The Fimber Station adds the moss to the East Riding flora. Its habitat is a curious one, on rotten wood, and pine needles.—WM. INGHAM, York, 11th July, 1910.

Naturalist,

RELICS OF A PRE-HISTORIC FLORA IN LINCOLNSHIRE.

T. SHEPPARD, F.G.S., F.S.A. (Scot.).

In 'The Naturalist' for January 1889, pages 3-4, the late C. P. Hobkirk recorded a species of moss, *Plagothecium undulatum*, which he had detected in material sent to him, which had been obtained from the pre-historic boat found at Brigg in 1886. This craft, which was made from a single oak tree, and is 47 ft. 6 in. long, and averages 4 ft. 6 in. wide, is now in our Museum at Hull. It was found that the stern-board and other parts had been made watertight by a caulking of moss. This material has been submitted to Mr. M. B. Slater, F.L.S., of Malton, who has kindly examined it, and has supplied the following list of species therefrom :—

MOSSES.

Thuidium tamariscifolium (Neck.) Lindb.
Hypnum confertum (Dicks) B.& S.
,, *rutabulum* L.
,, *striatum* Schreb.
,, *rusciforme* Neck.
Plagiothecium undulatum (L.)B.&S.
? *Hylocomium proliferum* (L.)Lindb.
Fissidens bryoides Hedw. (fruit).
Mnium punctatum L.
,, *hornum* L.
Schwartzia montana Lindb.
Dryum sp. ?

HEPATICS.

Metzgeria furcata (L.) Raddi.
Kantia Trichomanis (L.) G. & B. (fruit).
Lophocolea cuspidata Limpr.
Pellia epiphylla L.
Diplophyllum albicans (L.) Dum.
Plagiochila asplenioides (L.) Dum.
Aneura sp. ?
Scapania sp. ?
Cephalozia bicuspidata (L.) Dum.
Lunularia cruciata (L.) Dum.
Lepidozia reptans (L.) Dum.

The specimens have been mounted on glass and exhibited in the museum, and are interesting as being representatives of the very few relics of the pre-historic flora of Lincolnshire which we possess.

——:o:——

A meeting of the Marine Biological and the Conchological Sections of the Yorkshire Naturalists' Union will take place at Redcar from Friday, September 2nd, to Tuesday, September 6th. It is an excellent centre for marine conchology. It will be the first of a series of annual meetings to be held at different parts of the Yorkshire coast, and it is hoped that there will be a good attendance. Fuller particulars will be sent to members in due course.

We are glad to see that Mr. Edward Owen Greening, the editor of the 'Agricultural Economist and Horticultural Review,' is agitating against the excessive charges made by the Post Office for the postage of monthly magazines. It certainly does seem absurd that a small paper like that referred to, because it is issued monthly, should cost twopence, or that a magazine like 'The Naturalist,' with thirty-two pages and a single plate, octavo, should cost a penny, whilst publications like *The Graphic*, *The Illustrated London News*, etc., which are issued weekly, though much greater in size and weight, can be sent for a half-penny.

NORTHERN NEWS.

Records of the Past (Vol. IX. part 2), contains an interesting paper on 'The relations of the great museums and institutions to the independent local investigator,' by Mr. F. B. Wright.

There is an admirable address on 'The Pioneers of Geology in the Glasgow District' by Sir Archibald Geikie, in the *Transactions of the Geological Society of Glasgow*, Vol. XIII., part 3, recently published.

The Perthshire Natural History Museum Report for 1909-10 contains a list of the year's accessions, with particulars of the work accomplished. There is also an 'Abstract of Meteorological Observations' by the Curator, Mr. A. M. Rodger.

From Mr. L. Richardson, F.G.S., we have received a copy of his paper 'On the Correlation of the Neozoic Rocks of Yorkshire' (Proc. Ashmolean Soc.), in which he compares the Yorkshire beds with those in Gloucestershire and elsewhere.

According to the *Museums Journal*, the following entry occurs in a recent auctioneer's catalogue :—'Stuffed animal (Hicknewman) in glass case.' Assuming that it is our old friend 'ichneumon,' it would be interesting to know what it was 'stuffed' with.

We are pleased to hear that the Royal Society of Edinburgh has awarded its biennial Kieth gold medal and prize to a past-president of the Yorkshire Naturalists' Union, Dr. Wheelton Hind, for a paper published in the Society's Transactions, entitled 'On the Lamellibranch and Gasteropod Fauna found in the Millstone Grit of Scotland.'

In the *Journal of Conchology* for July there is the first part of a list of 'The Marine Mollusca of the Yorkshire Coast and the Dogger Bank.' Oddly enough the compiler of the list seems familiar with most of the work that has been accomplished, with the exception of the work which has been and is being done by the Yorkshire Naturalists' Union.

The final part of Vol. IX. of the *Museums Journal* is the last that is to appear in the demy octavo size, as future parts, we understand, are to be royal octavo in size, in order to better accommodate the illustrations, etc. Personally, we consider the change will have many disadvantages. Appropriately appearing in part 12 of volume IX. are admirable 'Indexes to papers read before the Museums Association, 1890-1909,' which have been compiled by Mr. Charles Madeley, of Warrington.

There has been some amusing correspondence in the *Yorkshire Post* recently, in reference to the alleged attack upon some climbers by 'bustards' in the Lake District. Judging from the 'unexaggerated' report of an average climber, the attack was so severe, that an appeal was made for gallant volunteers to shoot the birds. It was pointed out, of course, that the bustard had been extinct in this country for many years. In the same week's *Yorkshire Weekly Post*, the writer of the Angling Column, who is said to be related to George Washington, in 'answers to correspondents,' states :—'Up-stream worm or clear-water minnow by day, and *bustard by night!*' What does Mr. Murdock say to that ?

We have received Vol. I., part 1 of the *Bulletin of Entomological Research*, issued by the Entomological Research Committee (Tropical Africa), appointed by the Colonial Office (Longmans, Green & Co. 88 pp., 4/-), under the editorship of the scientific secretary, Mr. G. A. K. Marshall. Amongst the papers we notice 'A New Genus and two new Species of African Fruit Flies' ; and 'A New Species of *Cordylobia*,' by E. E. Austen ; 'Blood-sucking Diptera of Abyssinia,' by Dr. R. E. Drake-Brockman ; 'West African Hemiptera Injurious to Cocoa, and Parasites of Two Species of West African wild Silk-worms,' by Mr. G. C. Dudgeon ; 'the Study of Mosquito Larvæ,' by Dr. W. M. Graham ; 'Scale Insects from Uganda,' by Mr. R. Newstead ; and 'Larval and Pupal Stages of West African Culicidæ,' by Mr. W. Wesché. The articles are illustrated by excellent plates, one of which is coloured.

SEPTEMBER 1910.

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(No. 422 of current series).

THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL OF
NATURAL HISTORY FOR THE NORTH OF ENGLAND.

EDITED BY
T. SHEPPARD, F.G.S., F.S.A.Scot.,
The Museums, Hull;
AND
T. W. WOODHEAD, Ph.D., F.L.S.,
Technical College, Huddersfield.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
J. GILBERT BAKER, F.R.S. F.L.S., GEO. T. PORRITT, F.L.S., F.E.S.,
Prof. P. F. KENDALL, M.Sc., F.G.S., JOHN W. TAYLOR,
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Hull Museum Publications, No. 63.

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NOTES AND COMMENTS.

BRITISH BOTANICAL ASSOCIATION.

An Association which aims at promoting the study of Nature, as represented by plant life, throughout all classes of the community, is one which should certainly command the interest and support of readers of 'The Naturalist.' The British Botanical Association of York has carried on a very useful work for some years in an unobtrusive, but by no means inefficient manner by Dr. A. H. Burtt, and has steadily gained for itself a reputation in all parts of the country amongst those engaged in the teaching and study of Botany. More recently the sympathies of influential naturalists and educationalists have been enlisted in an effort to broaden the constitutional basis of the undertaking, and to place the work on a sound financial footing, and make it still more efficient and permanent. We have a personal acquaintance with the work, and, in its newly-acquired character of a public institution, wish it the success and general support which it deserves. With its already widely-extended influence, this should soon be assured. Information in regard to membership and other details can be obtained from the Director and Secretary, Dr. A. H. Burtt, the Laboratory, Holgate, York.

THE SHEFFIELD HANDBOOK.*

When the British Association last visited Sheffield, in 1879, the 'Guide to the Town and District' consisted of viii. + 160 pages, $6\frac{1}{2}$ inches $\times$ 4 inches, with an uncoloured map ($\frac{1}{4}$ inch to 1 mile). The present volume contains iv. + 502 pages, $7\frac{1}{4}$ inches $\times 4\frac{3}{4}$ inches, and is accompanied by a coloured contoured physical map ($\frac{1}{2}$ inch to 1 mile), a geological map ($\frac{1}{4}$ inch to 1 mile), and a plan of Sheffield ($2\frac{1}{2}$ inches to 1 mile). The description of the archæology of the district occupies 92 pages, that of the modern city 103 pages (including 5 on meteorology), and the account of the industries of the district, including 45 pages on Armour and Ordnance, 154 pages. 'The Geology of the District,' by Messrs. B. Hobson, C. Johns and C. Bradshaw, is described in 42 pages, including a Bibliography of 50 items. 'The Botany of the District' (accom-

* British Association, Sheffield, 1910. Handbook and Guide to Sheffield prepared . . . under the direction of the Local Publications Sub-Committee. W. S. Porter, M.D., Editor; A. T. Watson, Hon. Sec.; J. W. Northend, Printer, Sheffield, 1910.

panied by a sketch map) by Messrs. B. H. Bentley, E. Snelgrove, T. Gibbs, and M. H. Stiles, occupies 43 pages. 'Zoology,' by Messrs. A. Denny, C. J. Patten, P. E. Allen, W. D. Roebuck, L. S. Brady, C. J. Hardy, E. G. Bayford, G. S. Brady, T. J. Evans, J. M. Brown and H. Moore is described in 55 pages. This last article contrasts remarkably with the article on the natural history of the district, in the 1879 handbook, which ignored living animals, and was purely palæontological. In all respects, except two, the new handbook shows a great superiority to its predecessor. Both books are without an index, and the local places of interest, so well described in the earlier volume, are now relegated to a separate Excursions-Guide.

THE WOODLANDS OF ENGLAND.

A paper which appears in a recent number of the 'New Phytologist (pp. 113-149) on the above subject, shows that very substantial progress has been made towards a better appreciation of the vegetation of this country by the Central Committee for the Survey and Study of British Vegetation. This is the first time that a really satisfactory attempt has been made to give a bird's-eye view of English Woodlands as a whole, and to reduce these diverse and complicated associations into something like order. The paper is an elaboration of the one read by Mr. Tansley at the Dublin meeting of the British Association in 1908, with the further assistance of Dr. C. E. Moss and Mr. W. M. Rankin.

After discussing the status of Bri ish Woodlands, in which six types are distinguished, from virgin forest to recent plantations—and the relations of climate and soil, they deal very fully with the classification of English Woodlands. Three main series are recognised :—

(1.) THE ALDER-WILLOW SERIES.

This is a lowland type occurring on very wet soils, and is characteristic of low-lying alluvial districts as along the banks of the slow streams of the New Forest, the remoter valleys and lowland peat-moors of the North of England, and in the fens of Norfolk. The woods of this series at present existing, probably represent merely fragments of a once extensive development, by now greatly reduced in consequence of drainage and cultivation. At least two plant associations occur in it, *e.g.*, the Carrs of Norfolk fed by alkaline and calcareous waters

harbour several woody species characteristic of chalky and limestone soils, such as *Rhamnus catharticus* and *Viburnum Lantana*, while in the Alder-willow thickets occurring on soils fed with neutral or acidic waters, calcicole species are absent. From this lowland type two great systems occur, the distribution of which follows, in the main, two chief classes of soil, siliceous and calcareous.

(II.) OAK AND BIRCH SERIES.

The woods in this series occur on all the 'siliceous' (*i.e.*, non-calcareous) soils, ranging from the stiffest clays to sand and gravel, and derived from rocks of various ages. Within this series three associations occur, but more or less merging into one another.

(*A*) An Oakwood Association, by far the most widely distributed of British Woodlands. The dominant tree is *Quercus Robur* (=*Q. pedunculata*). Owing to the great variety of soils on which the oak is dominant, the associated trees and especially the ground vegetation, show a wide range, and two groups of associations are distinguished—(*a*) *Damp Oakwoods* on clays and loams of the London Clay, the Gault, the Weald Clay, etc., in the south of England; these are connected by every gradation with (*b*) the *Dry Oakwoods*, found on coarsely-grained, siliceous, shallow soils of the Palæozoic and igneous rocks of the west and north of England. In these woods *Q. sessiliflora* is usually dominant, but with a varying admixture of *Q. Robur*.

(*B*) The Oak-birch-heath association is a type characterised by the presence in the ground vegetation of bilberry, hair grass and ling. Such woods cover wide areas in Kent, Surrey, Sussex, and locally as far north as Cheshire and Nottingham. This wood is probably a stage in the degeneration of oak forest to heath land, similar to that described by Graebner in the great heaths of the north-west German plain. In the hilly districts of the north of England, the woods on non-calcareous soils are dominated by *Q. sessiliflora*, but this tree becomes

rare above 1000 feet, and owing to climatic influences tends to be replaced by

(*C*) the Birchwood association. Floristically these woods are very similar to the Oakwoods, but the ecological differences appear in the re-arrangement of the dominant members of the two associations. Judging from the remains of Scots pine in the peat of the Pennines, this tree was doubtless a constituent, but probably not an abundant one, of the primitive Pennine birch forests.

Sharply marked off from the two previous series is the

(III.) BEECH AND ASH SERIES.

These woods are found on calcareous soils such as marl, chalk and limestone, where the lime content of the soil is high. Here three associations are distinguished :—

(*A*) an Ash-Oakwood association ; (*B*) an Ashwood association, and (*C*) a Beechwood association. (*A*) and (*B*) are the characteristic woodland types on all highly calcareous soils, except those of the south-east of England, where the beech is dominant on the chalk. The area of natural and semi-natural beechwoods appears to have a western extension on the Inferior Oolite of the Cotswold, but for the most part it does not extend north-westwards of the chalk escarpment.

In each of the associations of these series considerable lists are given of the subordinate woody species, as well as the characteristic species of the ground vegetation. We are glad to note that the paper has been separately printed as a shilling pamphlet.

Mr. H. Brantwood Maufe, formerly of Bradford, has been appointed Director of the Geological Survey of Southern Rhodesia.

In the *Geological Magazine* for August, Mr. G. C. Crick describes two rare cephalopods from the chalk of Lincolnshire. One, *Pachydiscus farmeryi*, is from Boswell, near Louth ; the other, *Heteroceras reussianum*, is from North Ormsby. In the same publication Mr. T. Sheppard describes a Burial Valley at North Sea Landing, Flamborough, which has been exposed by a recent landslip.

Birmingham is to have a Natural History Museum at last. It has just been decided that the necessary accommodation shall be provided in an extension of the Council House which is now being carried out. Several important collections have already been presented to the city. It is astonishing that this go-ahead city, with its University, Art Gallery, etc., etc., should have been without a natural history museum so long.

THE CHEMISTRY OF SOME COMMON PLANTS.

P. Q. KEEGAN LL.D.,
Patterdale, Westmorland.

Marsh Cinquefoil (*Potentilla Comarum*). This tenant of marshes and the spongy peat bog both of high and meadow moors would be more appropriately designated by the title of 'Bog Strawberry.' Systematically it is very nearly allied at once to tormentil and to strawberry. The watery medium in which it thrives influences both its external and internal structure; suberous tissues, for instance, prevailing over lignified ones. Like the Rosaceae in general, it is a pretty strong 'chemical plant,' although without any special or striking feature.

On 10th July the dried whole leaves yielded 3.1 per cent. wax with considerable carotin, a little fat, and much crystalline resin-acid soluble in potass ley. There was about 3.8 per cent. quercitrin and tannin, which latter is iron-blueing and precipitates gelatine and tartar emetic; also some free phloroglucin, but no gallic acid or resin. There was little sugar, but large amounts of pectosic mucilage, pararabin, starch and oxalate of calcium. It would seem that in this plant the fibre (or rather the suberin) attracts and absorbs much tannin, for on adding ammonia to the dilute HCl extract (after benzene, alcohol, water, and dilute soda) a deep violet precipitate was thrown down which was turned mostly to a red-brown by acetic acid. The ash of the overground parts contained 31.2 per cent. soluble salts, 2.7 silica, 24.5 lime, 4 magnesia, 3.5 P^2O^5 and 4.4 SO^3, with some 10 per cent. oxides of iron and manganese. The plant is a powerful producer of starch and tannin, *i.e.*, the physiological processes are active and complete.

Pink Campion (*Lychnis dioica*)—This is one of the most brilliant and abundant of wild flowers, imparting a wonderful gaiety to the wood edges, damp hedge-banks, and stream-side rocks, which it delights to embellish. Sterile soils produce male plants, while fertile lands induce female broods, and true hermaphroditism is very rare. As regards the root organs, it develops accidental buds, *i.e.*, it is between a plant whose roots are quite incapable of furnishing buds, and one which multiplies normally by its roots; in other words, it does not generally produce root-buds, but may be provided with them by artificial means. On 21st June, the dried leaves yielded 2 per cent. carotin and wax; the alcoholic extract contained no tannoid or tannin,

but only a kind of saponin not precipitated by baryta water and seemingly similiar to the scillain of Squill; there was no free sugar or phloroglucin; most of the mucilage was extracted by dilute soda; there was much reserve starch and oxalate of calcium (localised in the cells immediately beneath the palisade tissue). The ash amounted to 16.6 per cent., and had 50.7 per cent. soluble salts, 4.3 silica, 17 lime, 5.2 magnesia, 3.8 P^2O^5, 2.5 SO^3, and 6 chlorine. The foregoing analysis is evidently that of a nitrate plant, with no mycorhiza, and no strong water-excretion, but a powerful producer of starch, carotin, chlorophyll, and oxalates. The 'saponin' of the roots and seeds is most probably a decomposed glucoside. Oxalate of calcium is deposited in all the organs.

HULL MUSEUM PUBLICATIONS, Nos. 61, 62, 64-72.

The Hull Municipal Museum has been established over nine years, and it might be supposed that by now the rate of progress, so far as additions to the collection are concerned, would show a tendency to fall off. It is therefore very gratifying to learn from the Annual Report for 1909 that on no previous occasion have there been so many valuable additions as during that year, and that these are not confined to a few departments, but embrace almost all. A perusal of the four quarterly records of additions fully bears out this statement. Coins and tokens, stone implements, Roman remains, Anglo-Saxon and old-English antiquities of various kinds, forgeries and counterfeits, old chinaware, ethnographic specimens, biography and portraiture, natural history and geology contribute to the general stock of interest and information. The rapidly increasing collection of exhibits appropriately placed in the Wilberforce Museum, must be a source of pleasure and pride to every Hull man who takes any interest in his native city. The fact that the well-illustrated guide has reached a third edition is strong evidence that the house and its contents meet with wide appreciation, and have served to attract to themselves rare portraits and other objects of whose existence very few had any knowledge. The special pamphlets on Anglo-Saxon vases, East Yorkshire Neolithic implements, Roman antiquities from South Ferriby are of great interest, and the excellent plates elucidate the text and make the work of permanent value to those whom fortune has placed at too great a distance from Hull to study the things themselves on the spot. The educational character has also been well sustained, and the additional museum at Wilberforce House has not only created a fresh centre, but has extended the scope of the instruction given. The teaching of history ceases to be mere words to which the scholar pays no more attention than the personality of the teacher demands. Here, however, in Wilberforce House, lessons may be given on the histroy of Hull and the abolition of the slave trade, subjects which may be treated from many points of view, and illustrated step by step with exhibits ready to hand. The scholar must be dull indeed, who fails to enjoy these lessons given by such a splendid teacher as the Curator is known to be.—E.G.B.

KEYS TO THE FAMILIES AND GENERA OF BRITISH SPIDERS, AND TO THE FAMILIES, GENERA AND SPECIES OF BRITISH HARVESTMEN AND PSEUDO-SCORPIONS.

WM. FALCONER,
Slaithwaite, near Huddersfield.

(*Continued from page 242*)

SUB FAM. ERIGONEAE.

A. Abdomen with a scutum.

I. Fang sinuous, set in the hollowed extremity of the falces. Fang groove without teeth .. .. Group 1.

II. Fang not sinuous, falces not hollowed out, and the groove with teeth.. .. Group 2.

B. Abdomen without a scutum.

I. Tibiae I. and II. (in *Maso*, also metatarsi I. and II.) with two rows of long, slender, divergent spines beneath .. Group 8.

II. Tibiae and metatarsi without such rows of spines.

1. Sternum as wide as long, or nearly so.

(*a*) Anterior row of eyes curved forward. See also *Notioscopus* and *Maro* in Group 7 .. .. .. Group 3.

(*b*) Anterior eyes straight, or nearly so

(i.) Posterior row of eyes curved backwards (except *Savignia* and *Lophomma*). Central eye space usually much longer than wide. Cephalic lobes and protuberances in the male. where present, within the ocular area.

(*α*) Eyes extremely small, and posteriors very widely separated .. .. Group 5.

(*β*) Eyes larger and in a more compact group .. .. .. Group 4.

(ii.) Posterior eyes straight, or nearly so. Central eye space (exc. *Notioscopus*) usually about as wide as long. Cephalic lobes and protuberances in the male, where present, always placed behind the eyes Group 7.

2. Sternum much longer than wide .. Group 6.

Group 1.

A. Fangs and falces characteristic .. .. *Ceratinella* Emer.

Group 2.

A. Posterior eyes very strongly curved backwards, nearly equidistant. Anterior row curved backwards .. .. *Lophocarenum* Menge.

B. Posterior eyes moderately curved backwards, centrals nearer to each other than to the laterals. Anterior row straight .. *Cnephalocotes* Sim.

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Group 3.
A. Anterior row very strongly curved forward. Posterior eyes straight, or nearly so, equidistant .. .. *Caledonia* Cb.
B. Anterior eyes slightly curved forward ..
I. Central posterior eyes much nearer to each other than to laterals .. ..
1. Legs short. Tarsi I. not shorter than metatarsi I. Tegument coriaceous *Troxochrus* Sim.
2. Legs long. Tarsi I. much shorter than metatarsi I. Tegument not coriaceous *Baryphyma* Sim.
II. Posterior eyes equidistant or centrals nearer to the laterals than to each other.
1. Posterior eyes straight, small, widely separated .. .. *Tiso* Sim.
2. Posterior eyes more or less curved backwards .. .. *Araeoncus* Sim.

Group 4.
A. Posterior eyes in a straight line.
I. Posterior eyes fairly large, interspaces not wider than the eye. All tarsi much shorter than the metatarsi. Caput of male longly, and conically prolonged *Savignia* Bl.
II. Posterior eyes moderate, interspaces much wider than the eye. Tarsi I. a little shorter than the metatarsi. Caput not elongated .. .. .. *Lophomma* Menge.
B. Posterior eyes more or less curved backwards.
I. This curve strong.
1. Posterior eyes small, widely separated, centrals much nearer to each other than to laterals. Clypeus half as wide as the ocular area .. .. .. *Panamomops* Sim.
2. Posterior eyes larger and more closely grouped. Clypeus not or not much narrower than the ocular area.
(*a*) Posterior central eyes closer to each other than to the laterals. ♂ without cephalic lobe or post-ocular impressions .. .. .. *Eboria* Falconer.
(*b*) Posterior eyes equidistant or centrals a little farther from each other than from laterals. ♂ with cephalic lobe.
(i.) Anterior eyes nearly touching each other. Tarsi I. not shorter than metatarsi I. .. *Minyriolus* Sim.
(ii.) Anterior central eyes contiguous but narrowly separated from laterals. Tarsi I. equal $\frac{2}{3}$ metatarsi I.
(*α*) Legs short and stout. Tegument brownish yellow, with short hairs .. .. *Peponocranium* Sim.
(*β*) Legs long. Tegument black with strong long hairs .. *Pocadicnemis* Sim.

II. Curve slight (exc. *Diplocephalus beckii* Camb).

1. Posterior centrals farther from each other than from laterals. Anterior eyes nearly touching.

(*a*) Clypeus much narrower than the ocular area. Tarsi I. and metatarsi I. about equal. Anterior eyes straight .. .. *Tapinocyba* Sim.

(*b*) Clypeus not narrower than the ocular area. Tarsi I. about $\frac{1}{3}$ shorter than metatarsi I. Anterior eyes curved backwards .. *Metopobactrus* Sim.

2. Posterior eyes equidistant or centrals nearer to each other than to laterals.

(*a*) Anterior central eyes widely separated from the laterals. Tegument coriaceous .. .. *Dicymbium* Menge.

(*b*) Anterior central eyes narrowly separated from the laterals. Tegument not coriaceous.

(i.) Posterior eyes moderate in size, interspaces not wider than the eye. Laterals on feeble prominences. Metatarsi IV. as long as tibia IV. .. .. *Diplocephalus* Bert.

(ii.) Posterior eyes small, interspaces always wider than the eye. Metatarsi IV. shorter than tibia IV.

(α) Clypeus distinctly wider than the ocular area. Lateral eyes not on prominences. Cephalothorax of ♂ with strong post-ocular impressions .. .. *Evansia* Camb.

(β) Clypeus equal or less than the ocular area. Lateral eyes on strong prominences.

* Femora I. furnished beneath with many slender, flexible bristles, diminishing in length from base to extremity. Cephalothorax of ♂ without lobe or ocular impressions .. .. .. *Styloctetor* Sim.

** Femora I. without such bristles. Cephalothorax of ♂ with a lobe and ocular impressions .. .. .. *Entelecara* Sim.

Group 5.

A. A dweller in ants' nests, characterised by the minuteness and wide separation of its eyes, the posterior row being very strongly curved backwards .. .. *Thyreosthenius* Sim.

Group 6.

A. Posterior eyes curved strongly backwards, equidistant or nearly so. Caput of ♂ deeply impressed. Eyes large .. .. .. *Wideria* Sim.

B. Posterior eyes straight or curved very slightly backwards. Caput of ♂ not impressed.
I. Eyes small, not occupying the whole of the wide caput. Thorax often punctate — *Walckenaera* Bl.
II. Eyes occupying the whole of the narrower caput.
1. Posterior eyes large, close, interspaces less than the diameter of an eye .. .. — *Prosopotheca* Sim.
2. Posterior eyes moderate or small, interspaces not less than the diameter of an eye.
(*a*) Anterior eyes straight. Legs short, with short hairs. Tarsi I. stout, not shorter than metatarsi I. Thorax without a longitudinal impression .. .. .. — *Cornicularia* Menge.
(*b*) Anterior eyes curved slightly forward. Legs long. Tarsi I. slender, much shorter than metatarsi I. Thorax with a short, slight longitudinal impression .. — *Tigellinus* Sim.

Group 7.
A. Eyes minute, widely separated, interspaces much wider than the eye. Central posterior eyes much nearer to each other than to the laterals .. .. — *Typhochrestus* Sim.
B. Eyes large or moderately so, interspaces not or not much wider than the eye.
I. Falces very convex externally, where there is a row of teeth or granulations. Cephalothorax with a sub-marginal impression, marking off a very distinct border .. .. — *Erigone* Aud.*
II. Falces normal. Cephalothorax without the sub-marginal impression and distinct border.
1. Posterior central eyes nearer to each other than to the laterals.
(*a*) Posterior eyes slightly curved forward, and anterior eyes slightly backwards. Clypeus convex and prominent at the lower edge. Tarsi I. a little shorter than metatarsi I. .. .. — *Dismodicus* Sim.
(*b*) Posterior eyes slightly curved backwards. Clypeus vertical and flat. Tarsi I. much shorter than metatarsi I. Anterior eyes curved slightly forward .. .. — *Gongylidium* Menge.†
2. Posterior eyes equidistant or centrals farther from each other than from the laterals.
(*a*) Caput wide, eyes not occupying the whole width. Tarsi I. not shorter than metatarsi I. Males

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* Includes *Gongylidium graminicola* Sund.—B.I.S.
† *G. rufipes* Sund. only.—B.I.S.

without cephalic lobes or lateral impressions.

(i.) Anterior eyes straight. Tibial joint of ♂ palpus with a distinct apophysis .. .. *Gongylidiellum* Sim.

(ii.) Anterior eyes distinctly curved forward. Tibial joint of ♂ palpus slightly produced only. *Maro* Camb.

(*b*) Caput moderately wide, eyes occupying the whole width. Tarsi I. shorter than metatarsi I.

(i.) Anterior eyes straight or curved forward. Tibial setae long.

(*α*) Anterior eyes straight. Central eye space not or scarcely longer than wide .. .. *Œdothorax* Bertk.*

(*β*) Anterior eyes curved forward. Central eye space much longer than wide .. *Notioscopus* Sim.

(ii.) Anterior eyes slightly curved backwards. Tibial setae very short.

(*α*) Clypeus much wider than the ocular area. Male without cephalic lobe, tibiæ I. strongly compressed, and slightly swollen at extremity. Metatarsi I. with a double row of strong bristly hairs beneath *Neriene* Bl.

(*β*) Clypeus not wider than ocular area. Males with cephalic lobes, tibiæ I. cylindrical. Metatarsi I. without rows of bristly hairs beneath .. .. *Enidia* F. P. Smith.

Group 8.

A. Legs shorter and stouter. Posterior central eyes much closer to each other than to the laterals. ♂ without cephalic lobe .. .. *Maso* Sim.

B. Legs longer and slenderer. Posterior eyes equidistant. ♂ with very large cephalic lobe .. .. *Hypselistes* Sim.†

15. Fam. Mimetidæ.

A. Abdomen with tubercles. Legs, falces, maxillae and labium all long .. .. .. *Ero* C. Koch.

16. Fam. Uloboridae.

A. Cephalothorax always longer than wide. Eyes a little unequal .. .. *Uloborus* Latr.

B. Cephalothorax at least as wide as long. Eyes very unequal in size .. .. *Hyptiotes* Walck.

17. Fam. Argiopidae‡

A. Maxillae longer than wide. Digital joint

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* The remaining species of *Gongylidium*.—B.I.S.

† Introduction from N. America.

‡ The genera *Nesticus* Thor. and *Theridiosoma* Cb. have affinities with, and are by some placed with the Theridiidæ, but their mouth parts, falces, sexual organs, and tarsal claws bring them nearer to groups of this family.

of the male palpus divided into two branches .. .. Sub. fam. TETRAGNATHINAE.

B. Maxillae as wide or wider than long. Digital joint of the male palpus undivided Sub. fam. ARGIOPINAE.

I. Sub. fam. TETRAGNATHINAE.

A. Fold of the under abdomen curved strongly backward. Sexual organs very simple and genital aperture placed some considerable distance behind the openings of the laminal tracheae.

I. Maxillae more or less converging, not prominent externally. Legs short without spines. Lateral eyes touching .. .. *Pachygnatha* Sund.

II. Maxillae straight, prominent externally. Legs long with spines. Lateral eyes not touching.

1. Both rows of eyes nearly straight, but laterals on same side closer than anterior centrals are to posterior centrals .. .. .. *Tetragnatha* Latr.

2. Rows of eyes nearly equally curved in opposite directions, so that laterals on same side are farther from each other than the anterior centrals are from posterior centrals *Eugnatha* Sav.

B. Fold of the under abdomen straight. Sexual organs a little more complex, and genital aperture placed between the laminal tracheae. Lateral eyes touching.

I. Eyes sub-equal. Clypeus narrow .. *Meta* C. L. Koch.

II. Anterior central eyes much smaller than all the rest. Clypeus wide .. *Nesticus* Thor.

II. Sub. Fam. ARGIOPINAE.

A. Posterior row of eyes curved.

I. Both rows curved strongly forward Labium very obtusely triangular.. *Cyclosa* Menge.

II. Both rows curved backwards. Labium semi-circular .. .. *Theridiosoma* Cb.

B. Posterior eyes straight, or nearly so.

I. Legs IV. longest .. .. *Cercidia* Thor.

II. Legs I. longest.

(1) Labium nearly as long as wide, narrowed and obtuse at extremity *Zilla* C. L. Koch.

(2) Labium wider than long, semi-circular.

(*a*) Anterior central eyes much nearer to each other than to the laterals .. .. *Epeira* Walck.

(*b*) Anterior eyes more nearly equidistant.

(i.) Anterior centrals larger than the posterior centrals. Thoracic impression transverse, straight or curved forward .. .. *Singa* C. L. Koch.

(ii.) Anterior centrals equal to the posterior centrals. Thoracic impression long, deep, and longitudinal .. *Mangora* Cb.

18. Fam. Thomisidae.

A. Clypeus inclined, as wide as ocular area. Lateral eyes on anterior face of a common conical tubercle .. .. *Thomisus* Walck.

B. Clypeus vertical, not so wide as ocular area.

I. Central eyes forming a group as wide or wider than long. Caput obtuse, but not produced. Lateral eyes on low obtuse tubercles.

1. Posterior eyes equal. Anterior eyes nearly equal, equidistant, and in a line strongly curved forward. Tubercles merging into each other.. *Misumena* Sim.

2. Laterals of posterior eyes larger than the centrals. Anterior row straight or nearly so, centrals smaller than the laterals. Tubercles separate .. *Xysticus* C. L. Koch.

II. Central eyes forming a group longer than wide.

1. Posterior eyes very strongly curved forward, nearly forming a semicircle, centrals much closer to each other than to laterals. Tubercles well separated .. .. *Oxyptila* Sim.

2. Posterior eyes equidistant, slightly curved forward.

(*a*) Anterior eyes strongly curved forward. Lateral eyes on the side of a very obtuse oblique angular projection of the caput.. *Pistius* Sim

(*b*) Anterior row of eyes nearly straight. Lateral eyes on separate, very obtuse, round tubercles, the anterior ones being very strong .. .. *Dioea* Thor.

19. Fam. Philodromidae.

A. Cephalothorax a little longer than wide. Legs IV. longest .. .. *Thanatus* C. L. Koch.

B. Cephalothorax as long or longer than wide. Legs II. longest.

I. Cephalothorax as long as wide. Posterior eyes equidistant or nearly so .. .. *Philodromus* Walck.

II. Cephalothorax much longer than wide. Posterior central eyes much closer to each other than to laterals .. .. *Tibellus* Sim.

20. Fam. Sparassidae.

A. Central eyes forming a group much longer than wide. Clypeus low. Maxillae straight *Micrommata* Latr.

21. Fam. Oxyopidae.

Sufficiently characterised by the arrangement of its eyes in four rows, those of the second being the largest and those of the third the most widely separated .. .. *Oxyopes* Latr.

22. Fam. Pisauridae.

A. Central eye space longer than wide. Anterior central eyes smaller than the laterals .. .. *Pisaura* Sim.

B. Central eye space not longer than wide. Anterior central eyes larger than the laterals .. .. *Dolomedes* Latr.

23. Fam. Lycosidae.

A. Front of cephalothorax high, sides straight, nearly vertical. Labium not longer than wide or wider. Posterior metatarsi at least not shorter than the tibia and patella together.. .. .. .. *Lycosa* Latr.

B. Front of cephalothorax low, wide below and narrow above, sides inclined and convex. Labium always a little longer than wide. Posterior metatarsi nearly always shorter than the tibia and patella together.

I. Upper spinners longer than the lower, second joint very distinct .. .. *Pirata* Sund.

II. Upper spinners equal to the lower, second joint indistinct.

1. Clypeus equal to or less than the diameter of a front eye .. .. .. *Trochosa* C. L. Koch.

2. Clypeus clearly greater than the diameter of a front eye .. .. .. *Tarentula* Sund.

24. Fam. Salticidae.

Section I.—Pluridentati Sim.

Species having the inferior margin of the falces armed with many teeth.

A. Sternum very long, prolonged between the posterior coxæ of legs. Pedicle between the abdomen and cephalothorax very long and visible from above. Coxæ of legs II. well separated from coxæ of legs III. Falces of ♂ very long and horizontal .. *Myrmarachne* McLeay.*

B. Sternum oval, more or less wide. Pedicle short and not visible from above. Coxæ of legs on same side contiguous. Legs III. and IV. without spines. Falces short and vertical .. .. *Ballus* C. L. Koch.

Section II.—Unidentati Sim.

Species having the inferior margin of the falces armed with a single tooth (in *Sitticus* and *Attulus* Sim. the tooth is absent).

A. Sternum very long, prolonged between the posterior coxæ. Pedicle between the abdomen and cephalothorax long, and visible from above. Coxæ II. well separated from Coxae III. Falces of both sexes short and vertical. .. .. *Synageles* Sim.

B. Sternum oval, more or less wide. Pedicle short and not visible from above. Coxæ of legs on same side contiguous.

I. Inferior margin of falces with 0 or 1 small slender tooth.

1. Legs III. much longer than IV. (exc. in *Phlegra* where they are shorter). Legs with strong spines. Thorax without or with very slight impression. Inferior margin of falces one toothed.

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* *Salticus* Lat., B.I.S.—Priority of name.

(*a*) Quadrilateral of dorsal eyes parallel or somewhat narrower behind than in front.
(i.) Cephalothorax longer and narrower. Tibia + patella III. shorter than tibia + patella IV. *Phlegra* Sim.
(ii.) Cephalothorax shorter. Tibia + patella III. not shorter than tibia + patella IV. .. .. .. *Ælurillus* Sim.*
(*b*) Quadrilateral of dorsal eyes wider behind than in front. Metatarsi and tarsi III. and IV. much shorter than tibia and patella III. and IV. *Pellenes* Sim.

2. Legs III. much shorter than IV.
(*a*) Thorax with impression behind the eyes. Legs with numerous strong spines. Inferior margin of falces without a tooth.
(i.) Cephalothorax fairly long. Thorax at least $\frac{1}{4}$ longer than caput. Quadrilateral of dorsal eyes parallel or nearly so. Sternum fairly wide .. .. .. *Sitticus* Sim.†
(ii.) Cephalothorax shorter. Thorax only $\frac{1}{5}$ longer than caput. Quadrilateral much wider behind than in front. Sternum narrow *Attulus* Sim.†
(*b*) Thorax without an impression behind the eyes. Inferior margin of falces, with a small tooth. Legs III. and IV. without spines .. *Neon* Sim.

II. Inferior margin of falces with a strong conical tooth.

1. Tibia + patella III. not shorter than tibia + patella IV.
(*a*) Anterior metatarsi with both lateral and inferior spines. Anterior row of eyes curved forward *Philæus* Thor.
(*b*) Anterior metatarsi with inferior spines only Anterior row of eyes nearly straight by summits .. *Evarcha* Sim.‡

2. Tibia + patella III. shorter than tibia + patella IV.
(*a*) Second row of eyes much farther from the posterior row than from the anterior.
(i.) Quadrilateral of dorsal eyes much wider behind than in front.
(*α*) Thorax longer than caput, with an impression behind the eyes .. .. *Dendryphantes* C. Koch.
(*β*) Thorax very wide, not longer than the caput, without an impression or a scarcely per-

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* *Æluropa* Thor., B.I.S.—preoccupied.
† *Sitticus* and *Attulus* Sim. make up the genus *Attus* Walck.—B.I.S.
‡ *Hasarius falcatus* Bl. and *H. arcuatus* Clerck.—B.I.S.

ceptible one between the posterior eyes .. .. .. *Bianor* Peckham.

(*b*) Second row of eyes in middle or nearly in middle, between the posterior and anterior laterals.

(i.) Sternum abruptly narrowed before. Coxæ I. nearly touching. Thoracic impression fairly long, somewhat behind the posterior eyes. Posterior metatarsi longer than tarsi.

(*α*) Anterior tibiæ and metatarsi without spines. Metatarsi IV. with a circle of spines at extremity. Falces of male very long and horizontal .. .. *Salticus* Latr.*

(*β*) Anterior tibae with two rows of spines (at least 3-3) beneath.

* Posterior metatarsi without apical spines. Tibia + patella I. longer than cephalothorax. Digital joint of male palpus narrow .. *Hyctia* Sim.

** Posterior metatarsi with apical spines. Tibia + patella I. shorter than cephalothorax. Digital joint of male palpus very wide *Marpessa* C. Koch.

(ii.) Sternum not narrowed before and widely truncated between anterior coxae.

* Posterior legs with numerous strong spines. Thoracic impression very minute. Tibia III. much shorter and stouter than tibia IV. *Euophrys* C. Koch.

** Posterior legs with few small spines. Thoracic impression fairly long, somewhat behind the eyes. Tibia III. slenderer than tibia IV. .. .. *Heliophanus* C. Koch

Section III.—Fissidentati Sim.

Species having the inferior margin of the falces armed with one tooth-like apophysis bifid at its apex.

A. Posterior eyes large. Superior margin of the falces with two teeth. Anterior metatarsi much longer than the anterior tarsi .. .. *Hasarius* Sim.

(*To be continued*).

* *Epiblemum* Hentz.—B.I.S.—priority of name.

YORKSHIRE NATURALISTS AT MALHAM.

The members of the Yorkshire Naturalists' Union held their 223rd meeting in the Malham district on Saturday, June 4th, 1910. The geologists had the advantage of the leadership of Messrs. Cosmo Johns and W. Robinson. The former has recently published a new map of the area, showing the position of the great 'faults.' These were demonstrated to occupy a very different position from those shown on the geological survey maps. The well-known Malham Cove was also visited. This great wall of cliff, about 300 feet in height, now the breeding-place of innumerable house martins and other birds, was at one time the site of a huge waterfall. Above it the old dry river valley, down which the water flowed, is still clearly to be seen. Now the water has found its way down the innumerable fissures which occur in the hard white limestone, and travels for great distances underground. At Janet's Cave waterfall, on the other hand, the rock appears to be growing and increasing the height and width. This was visited by the party, and it was clear that there was a growth of travertine, which was accumulating to a large extent. This travertine is deposited from the water, which is super-saturated with lime.

In the evening a general meeting was held, presided over by Mr. G. T. Porritt. The recorders of the various sections presented their reports, and a vote of thanks was passed to Mr. W. Morrison for the facilities he had given to the members.

The results of the work of the sections is given in the following reports:—

Vertebrate Zoology.—Mr. H. B. Booth reports:—Some of the moorland birds, such as the Golden Plover, Redshank and Lapwing, were in smaller numbers than is usual here. A very fine view was obtained of the semi-wild goats on the cliffs above the Tarn.

[1]On the moor were the Curlew,† Redshank,† Red Grouse, Partridge, Lapwing,*† Golden Plover, Dunlin and Wheatear. At the Tarn were Mallard,† Teal,† Tufted Duck,* Coot,*† Water-hen, † Common Sandpiper, Black-headed Gull and Little Grebe.* The Black Indian Ducks which were introduced on to the Tarn several years ago by Mr. Morrison, were puzzling to those ornithologists who were not aware of this fact.

[1] The species marked * were noted with eggs, and those marked † had young.

In the woods around the edge of, and above the Tarn (at an altitude of 1350 feet or over), were the Mistle Thrush, Song Thrush, Blackbird, Hedge Sparrow, Robin, Wren, Redstart, Garden Warbler, Tree Creeper, Sedge Warbler,* Willow Warbler, Wood Warbler, Goldcrest, Bullfinch, † Chaffinch, House Sparrow, Cuckoo, Pheasant†, Ring Dove, etc. In the valley of the Aire below, the following (amongst other species) were noted:—Dipper, Grey Wagtail,† Yellow Wagtail, Carrion Crow, Rook, Jackdaw, House Martin and Kestrel. In a small plantation near to the Tarn a nest of the Mistle Thrush was seen, the exterior of which was composed almost entirely of wool.

Fishes.—A couple of fine large Trout taken from the Tarn, were 'inwardly digested' by a 'chosen few' of the members. Many large Perch were lying dead on the banks of the Tarn, as is usual after the spawning season.

Lepidoptera.—Mr. J. W. Carter writes:—The following are the species worthy of note observed:—Imagines, *Venilia macularia, Emmelesia albulata, Cohemia ferrugata, Cidaria silaceata*; larvæ of *Nudaria mundana* and others.

Coleoptera.—*Cychrus rostratus, Leistus rufescens, N. gyllenhali, Corymbites cupreus* and its var. *æruginosus, Telephorus pellucidus, T. nigricans,* and var. *discoideus, Cryptohypnus riparius, Dolopius marginatus, Chrysomela fastuosa, Phytodecta pallida, Phyllobius oblongus, P. urticæ, P. viridicollis,* and two or three species which are as yet undetermined.

Neuroptera and Trichoptera.—Mr. G. T. Porritt worked the river Aire for Neuroptera and Trichoptera, and in the latter order a very interesting species occurred, in the local *Tinodes dives.* This species had only once previously been recorded for Yorkshire, when Mr. Porritt took two specimens on the river Wharfe at Grassington, on the Union's excursion there on June 13th, 1891. At Malham it occurred in profusion. The other species noticed were all common, and included *Chloroperla grammatica, Nemoura meyeri,* and *N. cinerea* in abundance; *Perla cephalotes, Hemerobius micans, H. lutescens, H. subnebulosus,* and *Agapetus comatus.*

Arachnida.—Mr. Falconer writes:—'The arachnologists had a most successful day, twenty-eight species being added to the local list. Two of these are also exceedingly good additions to the araneidal fauna of the county. One, of which I secured two females, the male not being in season, *Leptyphantes angu-*

latus Camb., was originally found by Mr. James Hardy on the Cheviots in North Northumberland in 1871, and recorded by the Rev. O. Pickard-Cambridge in the 'Trans. Linnæan Society,' Vol. XXVIII., under the name of *L. angulipalpis* Westr. Until re-discovered by the Rev. J. E. Hull in the south of the same county in 1907, at an elevation of 1400 feet (the female was new to science), it was represented only by the type male. Dr. A. Randell Jackson met with a female on the summit of Bow Fell, Cumberland, August 1903, at an elevation of 2960 feet, but was not aware of its identity at the time. Its present discovery at an elevation of 1250 feet thus greatly enlarges its known distributional range. The other, of which I obtained one male and two females, *Entelecara trifrons* Camb., has previously been taken in Dorset, Norfolk, Cumberland, Northumberland, Mid-Lothian and Ireland. Quite recently (in June), I named males of this species collected at Cleethorpes in Lincolnshire by Messrs. Stainforth and Parsons of Hull. Considerable time was spent in the neighbourhood of Janet's Fall, the adjacent rocks and wood being well searched. The most plentiful spider here was *Diplocephalus cristatus* Bl., which frequented the bark of both living and dead trees; the most noteworthy, *Oonops pulcher* Templ., *Linyphia hortensis* Sund., *Tmeticus abnormis* Bl., *Microneta conigera* Camb., and *Diplocephalus latifrons* Camb. Except at the Tarn, very few spiders were seen along the remainder of the route, but in Goredale, *Clubiona diversa* Camb., one male, and *Metopobactrus prominulus* Camb., one female, occurred; and near the Cove, *Minyriolus pusillus* Wid., one female. It was in damp ground on the shores of the Tarn itself (the enclosed part) that the two new Yorkshire species were obtained. It is a matter for regret that more time could not be spent here, as doubtless further and closer search would result in the capture of other rarities. It is to be hoped that someone to whom the locality is more accessible will devote some time to its investigation. Examples of the *Lycosids* and the male *Tarentula pulverulenta* Clerck. were handed in by Messrs. Beanland, Haigh, Lumb and Jowett. Of allied forms, the common pseudoscorpion, *Obisium muscorum* Leach, was several times observed, and the harvestman, *Oligolophus alpinus* Herbst. was frequent along the whole route. It is probable that *O. cinerascens* C. L. Koch, is merely the young of this species which is itself merely an Alpine form of the common *O. morio* Fabr. Young examples, probably of

Phalangium saxatile C. L. Koch, were noted near Janet's Force. Altogether, forty-two species of true spiders, four of harvestmen and one pseudoscorpion were noted.

In the following complete list, those marked 'W' were obtained by Mr. Winter only; 'F' by myself only; and those uninitialled, by both :—

Oonops pulcher Templ. F.
Drassus lapidosus Walck. F.
Clubiona diversa Camb. F.
Amaurobius fenestralis Stroem.
Cryphoeca silvicola C. L. Koch. F.
Coelotes atropos Walck.
Textrix denticulata Oliv. F.
Hahnia montana Bl. F.
Robertus lividus Bl. F.
Linyphia peltata Wid.
L. hortensis Sund.
Labulla thoracica Wid.
Leptyphantes blackwallii Kulcz.
L. ericæus Bl. F.
L. angulatus Camb. F.
Bathyphantes concolor Wid. F.
Hilaira excisa Camb. (Tarn). F. ♀
Tmeticus abnormis Bl. F.
Micronela conigera Camb.
Œdothorax tuberosus Bl. F.
Dicumbium tibiale Bl. F.
Neriene rubens Bl. F.
Enidia bituberculata Wid. F. (Tarn). ♀
Dismodicus bifrons Bl.
Diplocephalus fuscipes Bl. F.
D. cristatus Bl.
D. permixtus Camb. F.
D. latifrons Camb. F.
Entelecara trifrons Camb. F.
Minyriolus pusillus Wid. W.
Pocadicnemis pumila Bl. F.
Metopobactrus prominulus Camb. W.
Cornicularia cuspidata Bl. W.
Meta segmentata Clerck.
M. merianæ Scop.
Epeira diademata Clerck. F.
Nysticus cristatus Clerck.
Tarentula pulverulenta Clerck (handed in)
Lycosa amentata Clerck. F.
L. pullata Clerck.
L. palustris Linn.
Neon reticulatus Bl. F.

Phalangium saxatile C. L. Koch.
Megabunus insignis Meade. W.
Oligolophus alpinus Herbst.
Nemastoma lugubre O. F. Mull. F.

Obisium muscorum Leach.

Conchology.—Mr. F. Booth writes:—The conchological section devoted its attention to the Tarn and the Tarn platean. The greater part of Saturday was devoted to the investigation of the Tarn, by the hand-scoup where the water was shallow, and a small trawl net in the deeper parts. The number of species was large, but nearly all were in a very immature stage. Mature specimens of *Limnæa stagnalis* var. *fragilis-variegata*, recorded on the Union's previous visit, were only represented by dead shells which were occasionally dredged; all the live specimens being very small. *Bithynia tentaculata*, *Valvata piscinalis*, and two other species were found adult, and of good size.

Some time was spent in collecting *Pisidia*, in an endeavour to ascertain the number of species of these small bivalves inhabiting the Tarn. Of those collected, Mr. J. W. Taylor suggested from a casual survey, that there would be four species. Other interesting things were a small though much elevated form

of the freshwater Limpet (*Ancylus fluviatilis*), also *Sphærium corneum* vars. *nucleus* and *flavescens*; and *Planorbis contortus*.

Exclusive of the above-mentioned *Pisidia*, ten species were noted as inhabiting this sheet of water. Taking into consideration the size and condition which they reach on arrival at maturity (and in some instances they rival in size the same species which occur in the valley bottoms), the molluscan fauna of this mountain tarn is astonishing seeing that it is situated at over a thousand feet in altitude.

A number of interesting land shells were also noted, viz.:—*Hyalinia radiatula*, *Helix nemoralis* var. *albolabiata* (1 specimen), *Ena obscura*, *Clausilia cravenensis*, etc., and amongst the slugs, *Limax arborum*, *Agriolimax lævis*, *Arion intermedius*, etc. The parts investigated for land shells were the wood near Tarn House, the screes above the wood, and the boggy ground south of the Tarn. The total number of land species noted was thirty-three, including eight slugs.

LIST OF SPECIES.

LAND SHELLS.

Vitrina pellucida.
Hyalinia crystallina.
,, *cellaria.*
,, *alliaria.*
,, *nitidula.*
,, *pura.*
,, *radiatula.*
,, *nitidus.*
,, *fulvus.*
Punctum pygmæum.
Pyramidula rotundata.
,, *rupestris.*
Hygromia hispida.
,, *rufescens.*
Helicigona arbustorum.
Helix nemoralis.
Ena obscura.
Cochlicopa lubrica.
Pupa cylindracea.
Balea perversa.
Clausilia bidentata.
,, *cravenensis.*
Succinea putris.
,, *elegans.*
Carychium minimum.

SLUGS.

Limax arborum.
Agriolimax agrestis.
,, *lævis.*
Arion ater.
,, *subfuscus.*
,, *intermedius.*
,, *hortensis.*
,, *circumscriptus.*

FRESHWATER SHELLS.

Limnæa pereger.
,, *truncatula.*
,, *palustris.*
,, *stagnalis.*
Planorbis albus.
,, *contortus.*
Bithynia tentaculata.
Valvata piscinalis.
Ancylus fluviatilis.
Sphærium corneum.
Pisidium fontinale.
,, *pusillum.*
,, *nitidum.*

BOTANY.—Mr. J. Beanland writes:—In a district so classical, worked by so many eminent botanists for the last two hundred years, it would be marvellous to have done more than record the known and expected. Everyone seemed satisfied to see

the rich profusion of *Trollius*, *Menyanthes*, *Primula farinosa*, *Saxifraga granulata* and *Viola lutea*. A note of warning respecting the diminution of two or three species is perhaps needed to preserve the old records, viz. :—*Polygonatum officinale*, *Actæa spicata*, and *Potentilla alpestris* are considerably reduced in quantity compared with two years ago, from no conceivable reason but over-collecting. The following out of a list of over one hundred and thirty species, were in flower :—*Trollius europæus*, *Actæa spicata*, *Thlaspi alpestre* var. *occitanum*, *Hippocrepis comosa*, *Antennaria dioica*, *Polemonium cæruleum*, *Bartsia alpina*, and *Saxifraga hypnoides*.—T.S.

The **Eighty-seventh Report of the Whitby Literary and Philosophical Society** (26 pp., 1910), has been received, and is distinctly encouraging. In addition to the annual report there are notes on the decay of the East Cliff at Whitby, 'drawn up at the request of the Council, by E. H. Chapman and H. Power, Esqrs.', and a valuable Rough Guide to the Records (mainly local) stored at the Whitby Museum. The collection of ammonites in the museum is becoming more than usually valuable, in view of Mr. S. S. Buckman's researches, and an illustration of a fine specimen of *Harpoceras mulgravium* appears as frontispiece. The report contains a number of printers' errors, such as 'Stocholm'; 'relable,' for 're-label,' etc.

The **Annual Report of the Scarborough Philosophical and Archæological Society for 1909,** is also to hand, and includes the reports of the Scarborough Field Naturalists' Society. The two Societies seem to work well together for the common good. In addition to the reports, there is the usual useful summary of Natural History work in the district, in the form of Recorders' reports. Mr. W. J. Clarke writes on the birds and fishes; Mr. H. Witty and Mr. Tetley on Lepidoptera; Mr. J. A. Hargreaves on Conchology, recording that a variety of '*Hel. aspersa*' has been found, which he believes has not previously been noticed in Britain. 'It is described by Taylor as var. *lutescens*.' Other species are mentioned, though what the '*Hel larnellata*' is, we are not quite sure. If it is a Helix, it would be better to say so, or else put in the point after the abbreviation. Mr. E. A. Wallis writes on Isopods; Dr. Irving on Marine Zoology; Mr. E. R. Cross on Botany; Miss Hibbert Ware on Fungi and Galls; and Messrs. Lotherington and Bevan on Geology. We notice there is a record of *Epiaster gibbus*, 'an urchin new to Yorkshire,' respecting which we should like further information. According to the Philosophical Society's balance sheet, the Rev. W. C. Hey's collection of insects was purchased by the Society for £12. We understood his collection was bequeathed to the York museum: this being so, it would be interesting to know what it is that has been secured for Scarborough. Of course, Mr. Hey had a miscellaneous collection of duplicates, etc., but it would hardly be worth the amount mentioned. The Field Naturalists' Society's balance is not so easy to understand, as the details of the expenditure are not given. Though we know it cannot be so, the only conclusion we can arrive at is that the funds of the Society are distributed amongst the more prominent members!

Naturalist,

COLEOPTERA OF THE GRANGETOWN SLAG-HEAPS.

GEO. B. WALSH, B.Sc.,
Middlesbrough.

On the banks of the Tees, east of Middlesbrough, there are numerous slag-heaps, covering many acres, and rising, in some cases, fifty or sixty feet or even more above the level of the reclaimed marshland near them. Some of them are very old, and, in course of time, partly owing to the decomposition of the original slag, and partly owing to material brought by the wind, they have become covered with a thin layer of soil upon which an interesting vegetation has sprung up. Under the loose pieces of slag, at the roots of the plants, and in the thicker tufts of moss which cover the sides, and more especially the base, many beetles are to be found, despite the decidedly uninviting appearance of the place. Many of these are doubtless survivals of the beetle fauna which occupied the locality before it was utilised for its present purpose; these, indeed, are found under almost the original conditions only a mile away. The following is a list of these species which I have taken up to the present on the slag-heaps themselves.

Nebria brevicollis F. (common).
Loricera pilicornis F. (occasional).
Bradycellus verbasci Duft. ,,
Harpalus aeneus F. (common).
Pterostichus madidus F. ,,
,, *niger* Schal. ,,
,, *nigrita* F. ,,
Amara apricaria Payk. (occasional).
,, *convexiuscula* Marsh. (common at times).
Calathus cisteloides Pz. ,, ,,
,, *flavipes* Fourc. (in abundance and decidedly the commonest beetle of the locality).
,, *mollis* Marsh. (occasional).
,, *melanocephalus* L. (common).
Taphria nivalis Pz. (occasional).
Pristonychus terricola Hbst. (one).
Anchomenus puellus Dj. (occasional).
Trechus minutus F. (common).
Agabus conspersus Marsh. (found under stones near stagnant pools).
Tachyporus hypnorum F. (common).
Quedius fulginosus Gr. ,,
,, *molochinus* Gr. ,,
Ocypus fuscatus Gr. (occasional).
Philonthus marginatus F. (one).
Othius fulvipennis F. ,,
Coccinella 10-*punctata* L. }
,, 11-*punctata* L. }
(Both common in the winter, hibernating in the holes in the slag).
Byrrhus pilula L. (common).
,, *fasciatus* F. (occasional).
Otiorhynchus rugifrons Gyll. (abundant).

The most interesting species, however, are two which are usually associated with mountains and high moorlands rather than with the banks of a tidal river. These are *Miscodera arctica* Payk. and *Pterostichus vitreus* Dj. The latter exists in large numbers and is, next to *Calathus flavipes* Fourc. and *Otiorhynchus rugifrons* Gyll., the most abundant beetle. I

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had never found the former until June 15th of this year. Further long-continued search on later occasions brought more to light, until now I have taken about a dozen. These insects are found as a rule under the smaller stones, and invariably remain quite still when the stone is removed instead of scuttling into shelter immediately, as do the commoner beetles inhabiting the same spot. In appearance they resemble strongly the large wingless females of the Black Ant.

This is a decidedly rare beetle in this locality. In the 'Proceedings of the Cleveland Naturalists' Field Club' for 1907-8, Mr. M. L. Thompson records one as having been taken on Stanghow Moor, in July 1891, and, with the exception of this, I can find no other local record. *Pterostichus vitreus*, however, is found in fair numbers on Eston Nab, as well as in other localities in the district.

Two explanations suggest themselves for the existence of these two moorland species in such a spot. Eston Nab, the nearest moorland, which is eight hundred feet high, is only about two miles away, and it is quite possible that insects may have flown or have been carried by the wind this short distance; or again, it is possible that specimens may have been carried down from the moors by one of the streams which empty here. The former seems the more likely, as it is difficult to believe that any insect could live long in the evil-smelling water that flows near by, contaminated as it is by refuse from iron and chemical works.

ARCHÆOLOGY.

Hoard of Bronze Celts at Kirkby Malzeard.—From an entry in an old 'Log Book' of the Mechanics' Institute, Kirkby Malzeard, it appears that a hoard of socketted bronze celts was discovered whilst draining a field known as 'Ellers,' close to the 'Willow House,' near the eastern extremity of the village. A faded photograph accompanies the entry, showing some of the axes. No date is attached, but from enquiries, it seems to be twenty-five years ago. Twenty-eight implements were found, all socketted celts, but only twelve are now traceable, and these are in the possession of Colonel Cathcart, of Mowbray House, upon whose land they were discovered. They vary in length from 2 inches to 3½ inches, and are ornamented with one or more vertical ribs upon the faces, of varying length. —A. Leslie Armstrong, Harrogate.

Naturalist,

THE NATURAL HISTORY OF SPURN.

The 224th meeting of the Yorkshire Naturalists' Union was held at Spurn, the south-east extremity of the county, during the week-end commencing July 9th. The district is particularly attractive, being one of the wildest tracts of land in the county ; whilst the sea-beach, sand-dunes and mud-flats have a characteristic fauna and flora. The recent ravages of the sea, and the low-lying flooded lands, were also worthy of attention, the floods being of so serious a nature as to have interfered with the character of the tongue of land at two or three points. In one place, near Kilnsea Beacon, the sand, which has washed over the fields, has resulted in the formation of a new breeding colony of the Lesser Tern.

Headquarters were at the Marquis of Granby Hotel, Easington, where the party was well looked after. On Saturday evening Mr. J. W. Stather presided at the general meeting, at which reports on the work accomplished in the various sections were given by the respective officers.

Mr. J. W. Stather writes :—The boulder-clay cliffs of South Holderness, especially in the neighbourhood of Easington and Kilnsea, are being rapidly cut backward by the sea, and geologists interested in glacial problems never fail to see something worthy of note in the ever-changing sections exposed in the cliffs, and the wonderfully numerous and varied collection of boulders on the beach. Large numbers of these boulders are known to have come from far distant and widely separated localities, and among them is a small but well-known group of Scandinavian rocks, hailing chiefly from the Christiania district.

One of the objects the geologists taking part in the excursion had before them was to add to the list of Norwegian rocks known to occur in the Holderness drifts. In this quest they were materially assisted by Mr. V. Milthers, a Danish geologist, who had kindly sent over to the Secretary of the Glacial Committee a collection of between thirty and forty Scandinavian rocks found as boulders in the Quaternary deposits of Denmark.

Beginning on the beach opposite Kilnsea Lane end, the party worked for several hours both north and south of that point, returning late in the afternoon to Easington with heavy satchels and aching backs.

At the sectional meeting the rocks collected were carefully compared with the specimens from Denmark, and while a large number of them bore a close general resemblance to Scandinavian types, there seemed little room for doubt that three of the Kilnsea specimens were absolutely identical with three sent over by Mr. Milthers, viz., the Bredvard porphyry, the Gronklitt porphyrite from Delaine, and the Kinnediabase from Sweden.

At Kilnsea it is not surprising that coast erosion is the topic of universal thought and conversation. In the wall of the Blue Bell Inn there is a tablet stating that the house was built in 1847, and was then 534 yards from the sea. The distance is now reduced to 272 yards. A similar tablet in an adjacent barn confirms the above. The distance of the old ruin at Out Newton (Dimlington) from the cliff edge was also measured, and found to be 29 feet 3 inches. In 1882 the distance was 120 yards.

Ornithology.—Mr. E. W. Wade writes:—July 9th was a specially unfavourable day for observing birds, a strong N.W. wind and absence of sun making them particularly shy, and difficult to approach. The time of year, just at the end of the breeding season, and before the commencement of migration, is also perhaps the worst of the whole year for the ornithologist. An extremely high tide the same morning had, likewise, flooded out all but the highest breeding ground. The Ringed Plover was observed with young, nesting, hatched, and with eggs. As this bird commences to lay in April, and finishes in July, it is probable that some, at least, of the birds rear three broods. The Lesser Tern was still rearing its young at Kilnsea Beacon, where the inroads of the sea have made a conveniently sheltered beach for the birds, and also at the extreme point of the peninsula. Two pair of Oyster Catchers were breeding, one having hatched out young, the other still sitting upon a solitary egg. The Shelduck are reported by the watcher to have reared five broods, a satisfactory increase. All the protected birds appear to be doing well. The Brown Linnet, Titlark and Skylark were in song. One Tern (Common or Arctic), was observed, and a few Gulls, Black-headed, Herring, Lesser Black-backed, and Great Black-backed.

Coleoptera.—Mr. E. G. Bayford reports that although the weather was unfavourable for collecting, and consequently the number of species seen much below what should have been in

evidence in July, the following list of species identified is a fairly satisfactory one :—

Leistus ferrugineus L.
Nebria brevicollis F.
Broscus cephalotes L.
Harpalus æneus F.
Pterostichus madidus F.
,, *nigrita* F.
Calathus melanocephalus L.
,, *flavipes* Fourc.
Bembidium mannerheimi Sahl.
Trechus minutus F.
Agabus nebulosus Forst.
Tachyporus chrysomelinus L.
Oxytelus sculpturatus Grav.
Ægialia arenaria F.
Anomala frischii F.
Crepidodera ferruginea Scop.
†*Crypticus quisquilius* L.
Heliopathes gibbus F.
Nacerdes melanura L.
Notoxus monoceros L.
Apion dichroum Bedel.

Lepidoptera.—The following Lepidoptera were also observed, mostly on the 11th, in walking back from Kilnsea to Withernsea on the coast line :—

Euchelia jacobeæ L. (Larva, one seen).
Vanessa urticæ L.
Epinephile janira L.
Epinephile tithonus L.
Zygaena loniceræ Esp.

Conchology.—Mr. J. F. Musham writes that Messrs. Fierke and A. J. Moore examined the low-wall surrounding the Churchyard at Easington, and were rewarded with *Vallonia pulchella* and *V. costata* in large quantities, also *Hygromia hispida* var. *subrufa* and examples of *Hyalinia alliaria*, *Hy. crystallina*, *Cochlicopa lubrica*, *Pupa muscorum* and two dead specimens of *Vitrina pellucida*.

Beyond Kilnsea a brief search soon revealed *Arion minimus*, *A. circumscriptus* and *Agriolimax agrestis*, together with *Helicella caperata* and var. *ornata*, *Helicella virgata*, *Helix aspersa* and *Helix nemoralis*. In point of numbers, *H. nemoralis* was by far the commonest.

These local forms of *H. aspersa* and *H. nemoralis* produced a large amount of interest. *H. aspersa* shewed several examples which were very diaphanous, and others almost bleached to whiteness. Mr. Moore has submitted several specimens to Mr. J. W. Taylor, who has identified them as agreeing with vars. *minor*, *undulata*, sub-var. cf. *albescens* and *conoidea*, as well as the usual forms. Several examples of *H. nemoralis* were uniform with *H. aspersa* in shewing much tenuity and erosion, which was to be expected in such an exposed position. Some

† This species is new to the County List. There is nothing remarkable in the fact that it has been discovered at Kilnsea, seeing that it has long been known to occur at Cleethorpes on the other shore of the Humber.

pretty forms of this species were found in vars. *punctata* and *interrupta*, which were not uncommon, and were represented both in their libellula and rubella forms. These vars. are, I believe, restricted in Yorkshire to Spurn, and the river banks at Barlby, also in the East Riding.

In banding, Mr. Moore secured two shewing var. *rufozonata*, to which I can add one with the formula reading (12)0(45), which is very unusual.

Marine Mollusca.—Mr. A. J. Moore gives the following list of those found :—

Mytilus edulis.
Tellina tenuis.
Macoma balthica.
Cardium edule.
Patella vulgaris
Trochus cineraria.
Calliostoma zizyphinus.
Littorina rudis (banded var.).
,, *littorea.*
Buccinum undatum.
Purpura lapillus.
Lacuna divaricata, very fine. (Ident. by Rev. F. H. Woods).
Hydrobia ulvæ.

Arachnida.—Messrs. E. A. Parsons and T. Stainforth report that a strong north-east wind does not produce the best conditions for spider collecting, and that on this account the results of the excursion were somewhat disappointing. Most of the species peculiar to the Spurn area were taken, but, in addition, little of note. Collecting was carried out on the Headland itself, and on a stretch of the Humber shore, south of Kilnsea and Easington. The best discovery was *Cornicularia kochii* Camb., three females of which were taken on the Humber side of the headland, and six females on the Humber shore, south of Easington. The species was first added to the British fauna last year, on the authority of several male examples taken on the Humber shore at Barton, Lincs., and soon after was found at various other points on both the Yorkshire and Lincolnshire shores of the estuary. The most westerly known limit of its distribution, as far as Yorkshire is concerned, is Brough ; its easterly limit, Spurn ; and as it has occurred at intermediate points, we may justly conclude it is to be found all along the Humber shore. Immature examples of *Hyctia nivoyi* Luc., were taken, and many more were seen. This species seems very generally distributed over the headland, and always occurs at the base of the thick tufts of sand-grasses. It also occurs on a sandy part of the Humber shore, south of Easington.

The following were found on the headland :—

Drassus lapidosus Walck.
Prosthesima latreillii C. L. Koch.
Micaria pulicaria Sund.
Clubiona grisea L. Koch.
,, *neglecta* Camb.
,, *holosericea* De Geer.
,, *subtilis* L. Koch.
Leptyphantes ericæus Bl.
Gongylidium apicatum Bl.
Erigone promiscua Camb.
Peponocranium ludicrum Camb.
Pocadicnemis pumila Bl.
Cornicularia kochii Camb.
Ero thoracia Wid.
Xysticus cristatus Clerck.
Trochosa ruricola Degeer.
,, *picta* Hahn.
Lycosa amentata Clerck.
,, *pullata* Clerck.
Hyctia nivoyi Luc.
Euophrys frontalis Walck.

HARVESTMEN.

Phalangium opilio Linn.

PSEUDOSCORPIONS.

Chelifer latreillii Leach.

The following were taken on the Humber shore, south of Kilnsea and Easington :—

Clubiona grisea L. Koch.
,, *holosericea* De Greer.
,, *subtilis*.
Phyllonethis lineata Clerck.
Stemonyphantes lineata Linn.
Leptyphantes blackwallii Kulcz.
,, *tenuis* Bl.
Gongylidium fuscum Bl.
,, *gibbosum* Bl.
Erigone longipalpis Sund.
,, *atra* Bl.
Enidia bituberculata Wid.
Dismodicus bifrons Bl.
Pocadicnemis pumila Bl.
Cornicularia kochii Camb.
Ero thoracica Wid.
Trochosa terricola Thor.
,, *picta* Kahn.
Hyctia nivoyi Luc.

HARVESTMEN,

Oligolophus morio Fabr.

For assistance in identification they are indebted to Mr. W. Falconer.

——: o :—— T. S.

BIRDS.

Lincolnshire Bird Notes.—On April 29th this year, an exceedingly fine adult Gos-Hawk, ♀, was trapped near Louth. It had been seen capturing young pheasants, hence its fate.

On October 9th, 1909, an immature ♀ Lesser Kestrel was shot at Grainthorpe.

On July 9th, 1910, Mr. W. L. Cribb found an adult Crossbill dead in the lifeboat-house garden, Donna Nook.—C. S. CARTER, Louth.

—: o :—

FISHES.

Tope (*Galeus vulgaris*) at Scarborough.—In "The Fishing Gazette" of August 27th, Mr. Alfred Hedges, of Scarborough, records the capture of one of these fishes weighing 23lbs., which he caught two miles off Scarborough. Mr. W. J. Clarke saw the specimen and identified it, remarking that although he is quite sure it has occurred before, yet this is the first specimen he has been able to critically examine, and add to their local list of fishes, without any possible doubt.—R. FORTUNE, Harrogate.

FIELD NOTES.

GEOLOGY.

Shap Granite at Kirkby Malzeard.—From information gleaned at Kirkby Malzeard, near Ripon, it is evident that a large boulder of Shap Granite was met with whilst carrying out the village drainage scheme in 1905. The boulder was embedded at a depth of about 10 feet in the drift, midway between the Church and the Market Cross ; the drift consisting of sand and small gravel. The portion exposed projected 3 ft. across the trench, and was roughly 3 feet in extreme diameter. It was removed by blasting, and the actual length of the boulder not ascertained, but as it was not seen when cutting a parallel trench later, about five feet distant ; the long axis cannot have measured more than six feet or so. Many fragments of the granite are preserved in the locality, and there is also a fine piece of Fluor-Spar taken from the same trench as the boulder. Kirkby Malzeard is situated close to the Western limit of the great glacier which descended from the North and North-west into the Plain of York, and the ridges forming its marginal moraines are well defined in the vicinity, several good sections being exposed, in which immense quantities of finely striated limestones and volcanic rocks from the Lake District are in evidence.—A. Leslie Armstrong, Harrogate.

Lincolnshire Red Chalk, etc., Fossils.—I am indebted to Mr. C. Davies Sherborn for the identification of a collection of fossils from the Red Chalk in Lincolnshire. It includes the following, which, as far as I can ascertain, have not been previously recorded for that strata in the county :—*Nautilus hunstantonensis* Foord and Crick, found in the Railway Cutting, near Donnington-on-Bain Station ; *Oxyrhina angustidens* Reuss (a tooth), from the same locality ; *Pentacrinus agassizi* Hagenow, Redhill, near Goulceby ; ? *Parasmilia* sp., base, on a *T. capillata*, Redhill, near Goulceby.

I also recently sent to Mr. W. K. Spencer, M.A., a small collection of Asteroid ossicles, and along with them one from the Lower Pink Band in the Lower Chalk in Hallington Pit, near Louth. This Mr. Spencer identifies as *Calliderma mosaicum*.

As I have been credited with being ' the first to observe the abundance and constancy ' of the occurrence of *Terebratulina ornata* Roemer (=*T. gracilis* Schloth) of the Geol. Surv. Mem., East Lincs., 1887, and Hill's paper on the Lower Beds of the

Upper Cret. Series, Lincs. and Yorks., and *T. nodulosa* of the Geo. Sur. Mem., 1904), in the Lower Pink Band of the Lower Chalk in the Louth District, I should perhaps record that I have also found it fairly common in the Totternhoe Stone, together with *Terebratula* cf. *semiglobosa*, in a pit in Welton Vale, near Louth.—C. S. CARTER, Louth.

—: o :—

FLOWERING PLANTS.

***Mimulus Langsdorffii* at Beniworth.**—On August Bank Holiday last, a fine plant of *Mimulus Langsdorffii* (=*M. luteus*) was found on the west bank of the River Bain, Beniworth, Lincs. Div. 7.—C. S. CARTER, Louth.

—: o :—

VERMES.

Land-Planarian in Welton Vale, near Louth.—Since Mr. H. Wallis Kew recorded ('Naturalist,' April 1897) the Land-Planarian (*Rhynchodemus terrestris* Mull) for Burwell and Haugham Woods, where it is still common, few, if any, other records have been made. On the 7th of July last, examples were found under decaying timber in Welton Vale, near Louth. —C. S. CARTER, Louth, August 7th, 1910.

—: o :—

LEPIDOPTERA.

Note on a Yellow Underwing Moth.—During the evening of July 22nd, a Yellow Underwing Moth (*Tryphœna pronuba*) was seen crawling on the mantle-shelf in my room, which had the door wide open to the garden. On examining the specimen, I found it had a number of knobbed projections on its proboscis, and the microscope showed that they were pollinia from one of the Orchidaceae. The members of the order are so rare in our immediate district that it seemed difficult to account for the fact, but it happened that a few days before, I had received some half-dozen specimens of *Orchis pyramidalis* from Gloucestershire. These were in a vase in the same room, and careful comparison showed that the pollinia were those of this orchis. Evidently the moth had been visiting the flowers quite freely previous to his capture, as his proboscis had no fewer

than six pairs of pollinia upon it, placed at distances of 2, 4½ (2), 5½, 6½, 9 mm. respectively from the free distal tip. The whole length of the proboscis from base to tip was 12 mm., and the average length of the spurs from the tip to the rostellum, 8 mm., so the moth could reach the tissue of the spur from end to end. Some had evidently been gathered by the moth when resting above the flower, for the pollinia were attached on the under (inner) surface of the proboscis, but most were on the outer side. Some of the stigmatic surfaces had already received pollinia, so that the number observed on the insect was possibly not the whole number carried, and altogether, it suggests that this moth may play an important part in pollinating this particular orchis.—W. P. Winter, Bradford.

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NORTHERN NEWS.

The Annual Conference of Museum Curators this year was held at York, from July 4th to 8th. Amongst the subjects discussed were the following: 'Projection of solid objects on the screen without photography,' and Presidential Address ('Photography, etc., in Museums'), Dr. Tempest Anderson; 'Notes on the Japan-British Exhibition,' Dr. F. A. Bather, F.R.S.; 'Cleaning Bones by a dry Sand Process,'' Dr. R. F. Scharff; 'A Method of Exhibiting Corals,' Mr. E. L. Gill, M.Sc.; 'A Simple Way of Exhibiting the Reverses of Coins or Medals,' Mr. L. E. Hope; 'The Natural History Record Bureau at the Carlisle Museum,' Mr. L. E. Hope; 'On the Use of a Skeleton Case,' Mr. H. Bolton, F.G.S.; 'An Experiment in Geological Diagrams for Museum Purposes,' Mr. H. Bolton, F.G.S.; 'The Use of Photographs in Museum Work,' Mr. B. H. Mullen, M.A.; 'The Plans for the National Museum of Wales,' Mr. W. E. Hoyle, M.A., D.Sc.; 'Some Recent Work in the Exeter Museum,' Mr. F. R. Rowley, F.R.M.S.; 'Models Illustrating the Optical Properties of Rock-forming Minerals,' Mr. E. E Lowe, F.L.S.

In addition, was a special exhibition of work and appliances in connection with museums, including the following items:—Messrs. F. Sage & Co., 58-62 Gray's Inn Road, W.C.—Iron Cases and Fittings (a representative was in attendance to demonstrate); Messrs. Flatters & Garnett, 32 Dover Street, Manchester—Various Preparations and Appliances (Mr. J. B. Garnett was in attendance); Messrs. W. Potter & Sons, Aldersgate Street, E.C.—Museum Appliances; Messrs. Blickensderfer Co., Cheapside, E.C.—Typewriter for Label Writing, Duplicator for Circulars, etc; Mrs. A. Hollis, 9 Church Street, Aylesbury—Fish painted in Natural Colours; Mr. Henry Irving, the Rowans, Horley—Photographs of Trees, etc.; Messrs. Bennett's Suction-Brush Co., Station Road, Gravesend—Dustless Brushes; Messrs. Bastin Bros., 7 Upper Redlands Road, Reading—Preparations Illustrating Economic Zoology.

During the Conference the members had the opportunity of examining the Minster, under the guidance of the Rev. Canon Watson, formerly of Hull. A collection of art objects, antiquities, silver, etc., at Micklegate Hall House; the Mansion House; the Treasurer's House, Castle Howard, etc. Some of the papers discussed were of particular service.

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NOTES AND COMMENTS.

THE BRITISH ASSOCIATION

During the first week in September the British Association met at Sheffield. There were sufficient suitable rooms within easy reach of the Reception Room at the Cutler's Hall, though some were not the most convenient for the purpose of lecturing. It was apparent, however, that whilst at some towns a visit of the British Association was everything; to Sheffield it was merely an incident. Beyond an occasional cardboard notice on a lamp-post, and perhaps a greater proportion of weirdly-dressed patriarchs than usual, Sheffield might not have known that the nation's annual parliament of science was being held in its midst. Many of the visits to works, etc., were pleasant enough, and profitable; but seemed to lack that hearty welcome which has been so apparent at previous meetings.

AT SHEFFIELD.

Whilst the local botanists, geologists, zoologists and others had taken the matter in hand in their usual thorough way, as was shewn by the hand-book, the arrangements for excursions, etc., there seemed to be a lack of general public interest in the Association and its work. This, in a centre which depends so very much upon the 'Advancement of Science,' was, to say the least, a little unexpected. The effect was also disappointing, as when the time came for the allocation of funds for the various committees of research, the curtailed income of the Association from members' subscriptions, meant that expenses had to be cut down all round, and the various committees will thus be handicapped between now and the Portsmouth meeting in 1911. It will, therefore, be seen that the 'success' of a meeting of the British Association, looking at it from the point of view of the 'advancement of science,' does not so much depend upon the brilliance of the garden parties and receptions, as upon the numbers who enroll themselves as members for that particular year.

THE ATTENDANCE.

For some reason not quite apparent, the attendance at Sheffield (about 1300 !) was much below expectations. At Dublin in 1908 there were 2297 members; at York in 1906, 1972 members; at Cambridge in 1904, there were 2789 members; and even at South Africa in 1905 there were 2130 members. The only recent meeting at which there was a low attendance was at Leicester in 1907, when there were only 1647 members; though

we think this can be readily accounted for by the unusually early date (July 31st) of the meeting in that year; a factor which did not obtain at Sheffield. The cause for the decrease in the attendance is perhaps a little difficult to explain. It is apparently local. There does not seem to have been that number of persons joining for the meeting, that we should have expected at Sheffield, in view of its population, its industries, and its University. Judging from the correspondence in the local press, there has been some misunderstanding or difficulty with regard to the necessary information being given to people likely to be interested. This is unfortunate. In future, we would suggest to the officials of the Association, that persons attending the various sections, etc., should be requested to shew their members' cards on entering. As it is, it is quite possible for anyone to attend most of the meetings, and many of the excursions of the Association, without contributing anything towards the funds.

THE SECTIONAL MEETINGS.

In the interests of the future of the Association, also, it is most imperative that some steps should be taken to inform the readers of papers what is expected of them; and more care will have to be exercised in the acceptance of contributions from unknown authors, no matter how many 'handles' they may have to their names. Some of the exhibitions at Sheffield were deplorable, and hours of valuable time were wasted. In fact, it can certainly be said that the meetings of at least one section were continued a day longer than would have been necessary had all the unsuitable papers been eliminated. There were various types of these 'undesirables.' Sometimes an unmitigated bore would wallow in subjects far beyond his depth, the principal object apparently being to inform those present that he was a student of science nearly a quarter of a century ago. This type of 'lecturer' seems to think that the British Association has met for his special paper, and he is greatly incensed at being 'pulled up' for far exceeding his time, notwithstanding that he has practically emptied the room! Another type, which is perhaps pardonable, is the (generally young) man who appears for the first time, and has obviously been to considerable trouble in preparing a paper; say one that takes 1½ to 2 hours to read! When his allotted twenty minutes have expired, he naturally feels aggrieved that he has not been allowed to finish! In other instances papers have consisted of an extra-

ordinary amount of minute detail, usually badly read, and certainly never grasped by more than one per cent. of the audience. There is also the ' trumpeter,' who warms up a lot of old scientific ' chestnuts '—not always his own !—in order to bring his name before the public. There are some who whisper to the MSS. in their hands, or turn their backs to the audience, and apparently speak to their diagrams. For all practical purposes they may as well have been deaf and dumb. There are also others ! But year after year the nuisance seems to increase, and the rushes for the smoke-room become more and more frequent !

SECTION ' C.'

There was a surprise in store for the Committee of this Section : viz., a suggestion from headquarters that it should be amalgamated with the Geographical Section. Probably this was made in order to reduce the number of officials, which is certainly reaching almost unwieldy proportions. However, both the Sections were equally convinced that such an amalgamation would be undesirable, and would not further the interests of the two branches of science. Occasionally, as was the case at Sheffield, joint meetings might be held ; but to try to bring all the geological and geographical papers together, in one week, and under one set of officers, would not only be impracticable, but disastrous. As one shrewd geologist pointed out, it was not an uncommon thing for two people to get on admirably together, and on the best possible terms with each other; but let them get married, and— ! Fortunately, the geographers and geologists are still free !

THE PRESIDENTIAL ADDRESS.

There can be little doubt that, to a very large extent, the Presidential Address acted as a wet blanket to the whole of the subsequent proceedings of the Sheffield meeting. And we say this with every respect to the venerable scientist, the Rev. Canon Bonney, whose activity was such that few could realize he was approaching four-score years. But we fear that, for once, the President had overlooked the fact that the British Association was for the *Advancement* of Science. The theme he selected was most unfortunate ; the subject was dealt with in anything but a masterly manner, the conclusions arrived at were admittedly nil, whilst the address has unquestionably been an attempt to put back the clock of geological progress at least twenty years.

A LOST OPPORTUNITY.

We don't know what was in the mind of the Committee when Professor Bonney was selected as the President for the Sheffield meeting, but certainly the general wish of the scientific world was that the esteemed professor would deal with that branch of science which he has made particularly his own, and towards which he has made such valuable contributions, viz., petrology. Certainly no place could have been more appropriate for such an address than Sheffield, Sorby's city, where petrology had its birth. As yet no sufficient appreciation has been made of the extraordinary pioneer work which Sorby did ; work which has been of such enormous practical and economical importance. Sheffield has benefitted from his researches as much as any other place, if not more. Professor Bonney might well have taken advantage of his high position in the scientific world, in his capacity as President of the British Association, and devoted his address to a review of the various far-reaching directions which the results of Sorby's work have attained. Or he might well have confined his address to some purely petrological subject. In fact, the Professor evidently anticipated that something of the kind would be expected, as he stated: 'I do not, however, propose, as you might naturally expect, to discuss some branch of petrology, though for this, no place could be more appropriate than Sheffield, since it was the birthplace and the life-long home of Henry Clifton Sorby, who may truly be called the father of that science.'

GLACIERS

Instead, the Professor preferred to deal with a much less stable subject—ice-work in western Europe. He is one of the old school of 'wind and water' geologists (as one writer has expressed it), and in his seventy-seventh year, he still prefers to adhere to the views he published years and years ago, and to endeavour to bolster them up by new arguments, rather than follow in the wake of almost every other geologist of note, and admit that land ice has had a great share in the moulding of the present surface features of many parts of Britain.

PAST AND PRESENT.

Those who have closely followed the glacial controversy in recent years, and have witnessed the change that has taken place (and nowhere more noticeable than at the meetings of Section C at the British Association), will perhaps be able to

understand why Professor Bonney has thought fit to thrash a dead horse. Year by year the controversies respecting land-ice *versus* submergence have grown more feeble, as year by year each champion of submergence has 'gone under.' To-day they are exceedingly few—perhaps two or three; and Professor Bonney is their arch-priest. In making his 'last stand,' however, he has taken a characteristic advantage. He has 'discussed' the subject from the Chair of the British Association, which means that his views are published in every paper of importance the world over; whilst the recognised laws of the Association preclude any discussion thereon taking place at the meeting.

WANTED: A DISCUSSION.

We can imagine nothing finer than that the President had allowed his paper to be discussed in Section C. It would have presented a sorry sight when done with. As it was, paper after paper, by different authors, and dealing with various areas, shewed over and over again that there were serious weaknesses in the President's arguments, serious objections to his assumptions, and, at times, even serious doubts as to his 'facts.'

MAN AND THE GLACIAL PERIOD.

Eighteen years ago Professor G. F. Wright published his 'Man and the Glacial Period' in the well-known International Scientific Series. That work was a particularly clear exposition of the land-ice theory. It was of exceptional value to English geologists from the fact that it contained a lengthy chapter on the 'Glacial Geology of the British Isles,' by Mr. P. F. Kendall. That chapter may be taken as the first concise account of the glacial geology of our island. It came most opportunely; and was largely instrumental in the formation of that new school of glacial thought which so soon held the field, though all along there had been an increasing number of students who were convinced that there was more upon the earth than could be accounted for by a universal deluge. 'Man and the Glacial Period,' therefore, was not liked by the 'submergers.'

ICE-WORK, PRESENT AND PAST.

A few years later, Professor Bonney replied, in a way, by publishing, in the same Series, a volume entitled, 'Ice-work, Present and Past.' In this he professed to 'follow the example of a judge rather than of an advocate; that is to sum up the

evidence on each side of a case, and leave the verdict to the jury.'* The way he gave the evidence was worthy of an 'expert witness.' Naturally, the volume, being published in the ordinary way, was reviewed and criticised. This was done thoroughly. Professor Kendall (who was, in a way, largely responsible for the appearance of 'Ice-work'!), and many others, were easily able to demonstrate that Professor Bonney's theories would not 'hold water.'

THE PRESENT ADDRESS

Years have gone by. The 'submergers' seem to have gone and left not a rack behind; scores of observers have added hundreds of facts to the previous list of proofs of land-ice having occupied the greater part of Britain; and in the year 1910 we again find ourselves back in the old-fashioned times, amongst old-fashioned ideas, and with old-fashioned theories. Worse than all, it is apparent to anyone who is well-acquainted with 'Ice Work, Present and Past,' which was published in 1896, that the present presidential address is merely a summary of that work (and a poor summary at that!), with a few further arguments which have been brought forward in order to deal with recent discoveries. The same unfair method of presenting 'facts' is apparent; the same ideas are propounded, and the same unsatisfactory account of the author's own views exists. Professor Bonney's concluding words at Sheffield were: 'the difficulties in either hypothesis appear so great that, while I consider those in the "land-ice" hypothesis to be the more serious, I cannot as yet declare the other one to be satisfactorily established.' We quite agree with the Professor that 'this may seem a "lame and impotent conclusion" to so long a disquisition,' and we heartily endorse his remarks that the best service we can do is to attempt 'to separate facts from fancies, by demanding that difficulties should be frankly faced, instead of being severely ignored.' The address is evidently another example of the well-known 'you should do as I say, not as I do.' Would that the Rev. Professor Bonney had 'frankly faced' the difficulties of his own theories, instead of 'severely ignoring' them.

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* He also appropriated quite a number of blocks, maps, etc., from Professor Wright, and put them to his own use, without any permission or acknowledgment whatever; though that is a detail.

AND ITS DANGERS.

The great harm likely to arise in connection with a contribution of this sort, lies in the fact that the Presidential Address delivered at a British Association meeting is published far and wide; probably more than is any other address to any other body. Every newspaper of importance, and many scientific journals, publish it in extenso; and few are even the halfpenny evening papers that do not contain a lengthy summary of it. To most people, the opinion of the President of the British Association, on any given subject, is final. There are thousands who have not the time nor the opportunity of looking at a subject from all points of view; who will, naturally, be prepared to accept the verdict of the leading scientist of the world for the time being. Principally we have in mind the average teacher, whose views are quickly transferred to scores of scholars. In this way we consider that, even were the theme worthy of being taken as the Presidential Address, its delivering and publication has not been in the best interests of 'the advancement of science.' Geologists abroad, who are 'landicers' to a man, will have a strange impression of the present state of English geology.

FACTS AND FANCIES.

We wish our space permitted us to deal in detail with Professor Bonney's remarks, but we may perhaps refer to one or two points. On pages 23-24 of the official copy of the address, we find it stated that 'The [British] ice must have been curiously inconstant in its operations. It is supposed in one place to have glided gently over its bed, in another to have gripped and torn out large masses of rock. Both actions may be possible in a mountain region, but it is very difficult to understand how they could occur in a lowland or plain.' On pages 11-12, when speaking of the time when the Rhone glacier covered the lowlands of Vaud and Geneva, Professor Bonney says: 'it ought to have given signs of its erosive no less than of its transporting power. But what are the facts? In these lowlands we can see where the ice has passed over the Molasse (a Miocene sandstone); but here instead of having crushed, torn, and uprooted the comparatively soft rock, it has produced hardly any effect. The huge glacier from the Linth Valley crept for not a few miles over a floor of stratified gravels, on which, some eight miles below Zurich, one of its moraines, formed

during the last retreat, can be seen resting, without having produced more than a slight superficial disturbance.' Thus Professor Bonney shews us (and we accept his facts) that the ice in Vaud and Geneva has been 'curiously inconstant in its operations,' Why will he not allow the ice which once existed in Britain to have acted similarly ?

STRIATED SURFACES.

On page 13 we find that 'so far as I am aware, rocks thus affected [striated and polished] have not yet been discovered in the Wirral peninsula. On the eastern side of England similar markings have been found down to the coast of Durham, but a more southern extension of land-ice cannot be taken for granted.' From this it is pretty obvious that Professor Bonney either does not care to read up the recent literature on a subject which he looks upon as of such great importance, or he has wilfully ignored it. As has been described in several important papers from 1876 onward, there are in the Wirral, acres in extent of surfaces which are continuously striated. On the Yorkshire coast, too, striated surfaces have been known for a quarter of a century, and have been described by Lamplugh, Stather, Kendall, Maufe and the present writer, in various papers. Inland also they occur in considerable numbers, and have been frequently mapped by the Geological Survey. Oddly enough, one of the papers recording striated surfaces on the Yorkshire coast is referred to in Professor Bonney's 'Ice Work,' published in 1896; but in his 'present attempt to separate facts from fancies,' he has thought it expedient to ignore it.

A HUDDERSFIELD WANDERER.

One of Professor Bonney's 'facts' which even the most ardent glacialist would not have dared to have accepted without very careful verification, is the record of rhomb-porphyry at 'Lockwood, near Huddersfield.' It is certainly not mentioned in the paper referred to in the footnote to Professor Bonney's note, nor is it in either of the British Association or Yorkshire Boulder Committee's reports. Perhaps Professor Bonney will give his data for the record ? If not, we must assume that as he states on page 3, 'a statement of facts without mention of an authority, means that I am speaking from personal knowledge,' the record is his own. With all due respect to his petrological knowledge, we doubt the record.

YORKSHIRE GLACIAL GEOLOGY.

Whilst we are proud to think that Yorkshire, and Yorkshire geologists, have occupied so great a part of Professor Bonney's address, we rather fear the limited area makes his remarks too parochial in character, and hardly of world-wide interest. We were a bit surprised to find it stated however (p. 24), that ' the so-called moraines near York (supposed to have been left by a glacier retreating up that Vale), those in the neighbourhood of Flamborough Head and of Sheringham (regarded as relics of the North Sea Ice Sheet), do not, in my opinion, shew any important difference in outline from ordinary hills of sands and gravels, and their materials are wholly unlike those of any indubitable moraines that I have ever seen or studied in photographs.' All we can say is that we are sorry the Professor's experience of moraines is so limited. We thought he had seen several. Dozens of other geologists, whose names even Professor Bonney would admit were amongst the front rank, have seen and described these resemblances over and over again. The way also, in which Professor Bonney dismisses in a few words, the ' so-called ' overflow channels in Cleveland ; Lake Pickering, etc., is typical of the ' judgment ' throughout the address. Personally, we consider the Rev. Professor would have made a much better advocate than a judge !

BIRDS.

Great Crested Grebe in Yorkshire.—Rather more than twenty Great Crested Grebes are to be seen on the large lake at Castle Howard. All of them bred there this year, the bad weather appearing to have suited the successful nesting of this beautiful bird.—SYDNEY H. SMITH, York, September 16th, 1910.

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FLOWERING PLANTS.

***Gentiana Pneumonanthe* at Clapham, Yorkshire.**—This plant, which seems to have been overlooked for many years, still flourishes in fair quantity near Clapham Station. Lees' Flora says :—' A quarter of a mile beyond Clapham, in a field going the middle way to Engleton : *Mr. Newton* ; *Ray, Syn.*, III., 274 (1724) ; *Derh. Litt.*, 222 (1718). It is lost between Clapham and Ingleton, where Mr. Newton observed it, as Mr. Thornbeck informs me : *Blackst., Spec.* (1746).' It is interesting to know that it is still in the district.—A. R. SANDERSON and C. A. CHEETHAM.

GEOLOGY AT THE BRITISH ASSOCIATION.

COSMO JOHNS, M.I.Mech.E., F.G.S.

Rarely have the various sections of the British Association been so centrally housed as was the case in Sheffield. Section C had the Victoria Hall, where there was ample accommodation for Sectional and Committee meetings. Mr. Bernard Hobson was unwearying in his efforts to facilitate the work of the Section. His arrangements for the various excursions were admirably conceived, and the smoothness with which they worked will leave many pleasant recollections in the minds of the geologists who were present.

As the President of the Association was the Rev. Dr. Bonney, the opening address was on a geological subject. The veteran geologist, who was warmly received by the brilliant audience, undertook a critical survey of the glacial problem, and the many hypotheses that have been put forward. In the course of the address, he discussed the drift deposits of north-western Europe, and pointed out the inadequacy of the land-ice and submergence theories, and of the lake hypothesis of Carvil Lewis, to explain the facts. His opinion, however, that the 'overflow channels' of the Cleveland Hills more closely resembled remnants of ancient river systems rather than the overflow channels of ice-dammed lakes, would not find support among Yorkshire geologists familiar with the ground. In his final summing up, he declared that neither the land-ice nor the submergence hypothesis had been completely established, and his closing counsel was to work on in the hope of clearing up the many remaining perplexities.

There was a departure in the opening proceedings of Section 'C,' for the President, Professor Coleman, did not give his address until several papers had been read. The present writer commenced with an account of the stratigraphical and faunal evidence on which he based his conclusion that the equivalence of the Yoredale and Pendleside series had been established, and correlating the *Posidonomya becheri* beds of Germany, North Devon, South Wales, and Pendle Hill, with the base of the Yoredale Series of north-west Yorkshire.

In the discussion which followed, the most striking feature was that, while the suggested correlation was generally accepted, most of the speakers referred to the indebtedness of workers in Carboniferous geology to Dr. Wheelton Hind. Dr. Marr followed with an account of the Palæozoic Rocks of Cautley, and thus prepared the way for a discussion of the graptolitic

zones of the same rocks, by two lady students. Dr. Bonney, having now arrived, took the chair, while Professor Coleman gave a most lucid address on the ' Canadian Shield.' Illustrating his address with lantern slides, he described the Archean Rocks, and insisted that these had been deposited originally as normal sediments and volcanic rocks, and even included an ancient till with scratched boulders, relics of the oldest Ice Age known. Sir Archibald Geikie voiced the opinion of those present when he said he had hardly ever listened to a more luminous address. To complete the morning session, Dr. Falconer read a paper on Northern Nigeria, and Dr. Hatch gave an account of the geology of Natal.

On Friday, there was a joint meeting with the geographical section. The writer gave an account of the local geology, and Professor McWilliam gave a delightful exposition of the relation of the metallurgical industries of the city to the geology of the district; and in the discussion, Professor Kendall drew timely attention to the vast reserves of unoxidised ores available in the Midlands. Mr. T. Sheppard described ' the Humber during the Human Period ' ; Dr. Tempest Anderson discussed a new volcano in one of the Samoan Islands, and the Rev. E. Spicer, ' The Present Trias Conditions of Australia.'

The most important feature of Monday's session was the striking description of the recent shelly boulder clay left as a result of the advance and retreat during the last few years of the Sefström glacier, at a level high above the sea, by Mr. G. W. Lamplugh, who triumphantly asked ' whether any one could deny after this, that glaciers could " nose up " the sea bottom, with its shells, and deposit it at a higher level as boulder clay.' When several speakers had followed with corroborative evidence, it became the turn of another well-known land-ice advocate, in the person of Professor Kendall, to express the pain he felt in playing the part of the ' Devil's advocate,' and having to suggest that the deposit described by Mr. Lamplugh was perhaps not true boulder clay at all.

The very important discussion on the extent of the concealed portion of the great Midland Coalfield was opened by Professor Kendall, who gave a most interesting resume of the evidence on which he based his conclusions, and in the course of his remarks, made the announcement that in the boring, which had been in progress at Scunthorpe for some time, the coal measures had been reached. The only further information he was able to

communicate was that the data pointed to the nearness of the eastern margin of the coalfield.

Dr. Walcot Gibson, who followed, was rather more pessimistic, and while pointing out that recent explorations had considerably increased the proved area, suggested caution as regards the south-eastern portion of the area. Mr. Culpin's account of the recent additions to our knowledge of the marine bands in the coal measures of the Doncaster district,* was warmly received, while Mr. Usher discussed the probable influence of the Caledonian and American systems of earth movements on the limits of the basin.

There was general regret that Professor Milne was not present to communicate the Seismological Report, which was read in his absence by Sir Archibald Geikie.

To sum up the results of the meeting, one can say that if no startling communications were made, the papers were quite up to the average. The President's address, the Seismological Report, the Carboniferous Zones Report, with its correlation of the Belgian Lower Carboniferous Rocks with those of the Avon district, by Dr. Arthur Vaughan; the opening of the discussion on the eastern extension of the Midland coalfield, by Professor Kendall, and Mr. Lamplugh's description of the oscillations of the Sefström glacier, were perhaps its outstanding features.

Tooth of *Elephas antiquus* in Holderness.—Professor W. Boyd Dawkins, F.R.S., recently made an examination of the remains of extinct animals in the Hull Museum. Amongst a number of elephant teeth from the Yorkshire coast he identified one as belonging to the Straight-tusked Elephant (*Elephas antiquus*). The tooth measures 6 inches by 4 inches by $1\frac{3}{4}$ inches, and consists of eight plates. It was found on the beach at Withernsea in 1903, and had doubtless been washed from the cliffs in the same way as were dozens of other teeth and tusks found on this coast. Remains of *Elephas antiquus* have not previously been recorded for the Holderness coast, but as they occur in the pre-glacial beach at Sewerby, it is quite possible that the tooth may have been derived from some such source, and carried southward by glacial action. Professor Dawkins' determination adds another species to the list of animal remains from the glacial beds of Holderness.—T. SHEPPARD.

* See page 375.

BOTANY AT THE BRITISH ASSOCIATION.

Wm. G. SMITH, B.Sc., Ph.D.

The proceedings of Section K are generally fairly placid, and this year was no exception. There was nothing very startling to give rise to fierce discussions, nor was there any undercurrent of hot criticism in the smokerooms, such as was evident, say, in Section C. The presidential address of Professor Trail was the appeal of a veteran field botanist (who has probably spent more of his life out-of-doors than any other British botanist) for more work to be done on the British flora. In spite of numerous country and county floras, much remains to be done in ascertaining the distribution of species, how they came to be where they are, and in what surroundings they live. Many smaller contributions are in danger of being lost, and field naturalists as a body really know much which has never been published. What is wanted is a closer grouping of botanists to carry out "a well-organised botanical survey of the British Islands.' In Committee, the President carried his suggestions further, by having a small Committee appointed to promote such a survey.

The reading of papers occupied the whole or part of six days. The quality of the contributions varied considerably, some certainly carried the stamp of careful study, others gave the impression of being scrappy. As usual, many authors introduced long and laborious details, quite forgetting that a Section is not a body of submissive students, but is made up mainly of speakers, and therefore bad listeners. It is a relief to hear a theme neatly and tersely handled, if details are wanted these can generally be got from the author at some of the many social functions, or will appear when the paper is published. Plant physiology produced several good papers, notably the contributions on the Biochemistry of Respiration, by Dr. F. F. Blackman and members of the Chemistry Section. Translocation of sugars in green leaves was neatly handled by Mr. S. Mangham, and Dr. F. Darwin described a useful apparatus for observing the action of stomata. The 'nuclear' papers included a demonstration by Professor Blackman, of Leeds, on some new features in the male nuclei of Lilium. The energetic workers on past and present Gymnosperms and Pteridophytes were also well to the fore. Ecology was

represented by contributions on salt marshes of the Severn, and on the woodlands of north-east Kent. The semi-popular lecture by Professor Bower was a sketch, amplified by excellent lantern slides, of the growth of sand dunes from their earliest phases onwards, till they become the 'tees,' 'putting greens,' 'bunkers,' and all that goes to make the sea-links so dear to the keen golfer.

On the Saturday an excursion took place, attended by over sixty members, and led by Messrs. Bentley and Snelgrove. The route was typical of Derbyshire, beginning with the Millstone Grit escarpment Oakwoods at Grindleford, passing to the Carboniferous Limestone dale at Eyam, and finishing with a typical piece of dry Grit Moorland with Ling, Bilberry, and Cowberry on the way to Hathersage.

The Handbook, as far as Botany is concerned, was entirely the work of members of the Yorkshire Naturalists' Union. Mr. E. Snelgrove strikes a happy medium between descriptive topography and details of plant species, and the photographs by Mr. Bentley convey a very good idea of the types of vegetation. The Fungi by Mr. T. Gibbs, and the Algæ and Diatomaceæ by Mr. M. H. Stiles, also give a good general summary of what is known of these groups in the district.

The work of another Section, that of Agriculture, also included matter of botanical interest. The President, Mr. A. D. Hall, sketched the progress of knowledge bearing on the food-supply of plants, from its earliest stages through the 'chemical period' of potash, phosphates and nitrogen, to the more recent 'biological period,' when the life in the soil is being demonstrated to be such an important factor. Perhaps the most striking contributions were those from Rothamsted, on the great increase in soil-fertility, which has been traced when soil is partially sterilised by heat or otherwise. There is strong evidence to show that in the soil two opposing forces of micro-organisms exist, one set assists in the preparation of available plant food, the other set preys on these; hence if the latter be destroyed, the useful organisms increase, and provide crop-plants with greater supplies of food. Leeds smoke and its influence on the growth of grass in the neighbourhood, provided Dr. Crowther and Mr. Ruston of Leeds University with a theme; a series of observations and experiments confirm the popular opinion that grasslands near grimy cities suffer directly from the products of combustion of coal.

ANTHROPOLOGY AT THE BRITISH ASSOCIATION.

GEORGE A. AUDEN, M.A., M.D., F.S.A., ETC.

In point of general interest, the proceedings of the anthropological section were fully equal to those of previous years. The prominent position taken by archæology, and by classical archæology particularly, shews how useful a function is served by Section H in giving to the general public the most recent achievements of the scholar's spade, which would otherwise be only accessible in the volumes of the Proceedings and Transactions of learned Societies.

In his Presidential Address, Mr. W. Crooks dealt with the Ethnology of India, and with the anthropological questions arising therefrom. At the outset he shewed the imperative need of a central bureau for the study and classification of the mass of material which is being now culled from all sources by investigators of all degrees of knowledge. All sound administration of a native population by a foreign minority must be based upon a thorough understanding of the religious and social customs of the country. The failure to grasp this principle, and a disregard of native prejudices in India, has been one cause of our administrative difficulties. Recognition of these facts has been the secret of the success of the American Government in their dealings with the Philippine Islanders. Adequate instruction in native habits and customs should therefore be provided for intending Indian Civil Servants.

Dealing with the prehistoric races of India, he shewed that the palæolithic implements appear to be somewhat later in date than those of Europe, and that this period was widely separated in point of time from the neolithic period. This culture period, however, continued down until comparatively recent times, and was continuous with the Iron Age without the intervention of any period of bronze. On the other hand, a well-marked Copper Age, with a long period of development, is evident from the researches of Mr. A. V. Smith.

In conclusion, he pointed out the important part which Anthropology must play in the evolution of problems of home government. ' One of the chief tasks must be the examination of the physical and moral condition of the depressed classes of our home population and the effect of modern systems of education on the mind and body of the child.'

The importance of this last point was emphasised by the joint meeting of the Anthropological and Educational Sections, to discuss the measurement of the intelligence of the child. The papers upon this question were of a highly technical character, and the discussion proved the more interesting in that it called forth a singularly apposite speech from Sir George Reid, High Commissioner for Australia.

The value of a physical anthropological examination was illustrated by Prof. Fleure in his report of the anthropological survey of the people of Cardiganshire. By an appeal to patriotism, family pride and genealogical knowledge, he has been enabled to examine 526 persons of true Cardigan descent. Amongst these the dark dolichocephalic ' Mediterranean ' type predominates. There is also a broad-headed dark type, which is more numerous along the coast, while from the district around Newcastle-Emlyn comes a fair-haired light-eyed type, having a cephalic index about 79. This survey is about to be extended to other Welsh counties.

Egyptian anthropology was well represented. Prof. Flinders Petrie described the excavations at Memphis, and the discovery of the earliest private stone tomb that can be dated with certainty, *i.e.*, before the building of the Pyramid of Sneferu, B.C. 4650. Prof. Elliot Smith contributed a paper upon the people of Egypt. The pre-dynastic people are shewn to have extended to Abyssinia, and perhaps to Somaliland. This population appears to have become mixed at the period of the IIIrd Dynasty with people entering by the Delta on the north and from Nubia on the south, with a resulting modification of physical type. Anatomical evidence strongly points to the Levant as the source of the white immigration.

Dr. Seligmann described a neolithic site at Jebel Gule in the Southern Soudan. The finds, which were all surface finds, included a large number of pigmy implements, scrapers, blades, discs, and one axe-head. The finds are of an entirely different type from the worked stones which have hitherto been found in the Meroitic civilisation. Messrs. Woodward and Ormerod contributed a paper upon a group of nineteen prehistoric sites in south-west Asia Minor. Some of the sherds consisting of a red hard polished ware are assignable to the Bronze Age, but the evidence points to the civilisation being independent of the pre-historic Cappadocian culture.

Important results attended the excavations at Tsangli in

Thessaly (Messrs. Wace and Thompson). The remains of several neolithic houses were found, in one of which several good vases and twelve celts were obtained. In another large house, destroyed by fire at the end of the first neolithic period, and never rebuilt, several vases were found associated with many celts and some interesting terra-cotta statuettes. The excavations carried on at Rachmani have enabled the authors to divide the prehistoric remains of Thessaly into four periods. These results are about to be published in book form.

The report of the investigations in Sardinia under the supervision of Dr. D. Mackenzie (who has recently taken over from Mr. Macalister the charge of the explorations in Palestine), is extremely interesting to British archæologists. 'We can now say definitely not only that the great tombs of the Giants were developed from an earlier type of dolmen tomb, as has been conjectured by Montelius and others, but that this development took place in Sardinia itself. The mysterious civilisation of the dolmen people has long been a puzzle to archæologists. We can now, however, confidently say that in Sardinia at least this dolmen culture represents an early episode in the great Bronze Age civilisation of the Nuraghi.'

The Committee for determining the age of Stone Circles has suspended operations for the present year, but proposes to continue the excavations at Avebury Circle in the spring of 1911.

The Committee for the exploration of Lake Villages in the neighbourhood of Glastonbury reported the results of their first systematic digging of the Meare site. These included the examination of three dwellings. The season's work has been productive of a large number of relics, which enable the settlement to be dated with a considerable accuracy to B.C. 200. Nothing attributable to Roman workmanship has been found. Bronze objects have so far been much more abundant than those of iron, and that the alloy was worked on the spot is proved by the discovery of four crucibles, upon the inner surface of one of which was still adhering a mass of fused bronze. Several glass objects were found, including several fine blue-glass beads.

The occupation of this site must have been lengthy, for one of the dwelling mounds shewed eight superimposed floors with thirteen hearths, twelve of which were superimposed. Further exploration will be awaited with interest.

At Caerwent the exploration of the Romano-British site has been continued under the supervision of Dr. Ashby, Director of the British School at Rome. The ground plan of the Forum and Basilica has now been completed. A post-Roman burial ground was also discovered. It is to be hoped that a careful anthropometrical examination of the bones will be made before re-interment.

Mr. Sidney Hartland supplied another suggestive folk-lore paper upon 'The Origin of Mourning Dress.' It will be remembered that Professor Frazer suggests that mourning is a survival of the idea of a protective disguise to deceive the easily-cozened ghost of the departed. Mr. Hartland suggests that the real intention seems to have been an expression of sorrow and abasement in order to deprecate the malice of the disembodied spirit. This suggestion is interesting.

Other papers of interest were Rev. Dr. Irving's on the discovery of a skeleton of a prehistoric horse at Bishop Stortford; Miss C. Fletcher on 'Archæological Activities in the United States'; Mr. H. D. Acland on 'Prehistoric Monuments in the Scilly Isles'; and Mr. Sutherland on 'The Excavation of the Broch of Cogle, Caithness.'

Synopsis of the Orthoptera of Western Europe, by **Malcolm Burr, D.Sc., F.L.S., etc.** London: Oliver Janson & Son, 44 Gt. Russell Street, W.C. This is a most useful book, and one that was much needed. It consists really of a series of papers which have appeared from time to time in the pages of the 'Entomologists' Record,' and it is well that they have now been put into such convenient form for work by students of this interesting order of insects. In the 160 pages the book contains will be found concise but clear descriptions of all the species known to occur in Europe on the western side of the Carpathians; and these, with the Tables of Genera and Species, cannot fail to help the systematic collector immensely. Many of the known localities of the various species are given, though Dr. Burr has evidently overlooked not a few of the records for the British species. As an instance (among many) only five English localities are given for *Xiphidium dorsale*, its well-known habitat in South Devon, and Wicken and Chippenham Fens in Cambridgeshire, being entirely omitted, although the species has probably been taken more abundantly at Chippenham than anywhere else. The great value of the book to British collectors will be the descriptions of those European species which have not yet been recorded from Britain, but some of which, owing to their close relationship to one or two of our commonest species, have probably been overlooked; and we shall be surprised if the publication of this book does not, in the near future, be the means of adding species to our meagre list of British representatives of the order. The book is nicely got up, and the arrangement of the type is everything that can be desired. At the modest price of three shillings, it should be in the library of every working entomologist. The thanks of all orthopterists will be ungrudgingly given to Dr. Burr for this contribution to the literature of their special order.—G. T. P.

PROMINENT YORKSHIRE WORKERS:

IV.—C. CROSSLAND, F.L.S.

(PLATE XV.).

It is always a pleasure to appreciate the sterling work of a conscientious naturalist, and when it happens that his position in the scientific world has been due entirely to his own efforts and exertions, the pleasure becomes increased tenfold. In Mr. Charles Crossland it can be safely said we have as eager and enthusiastic a botanist as any in the county, and Yorkshire is the proud possessor of many. In him we likewise have one who has accomplished much for the benefit of botanical science in general, and for his county in particular.

Rather over a quarter of a century ago the subject of our sketch, then at forty, and without the slightest botanical knowledge, assisted one of his daughters to collect wild flowers for a competition in connection with a Sunday School. A few of the surplus flowers were dried and mounted; the mounts proving attractive, more followed. These brought him in contact with Mr. U. Bairstow, and Mr. J. Wms. Sutcliffe, members of the Halifax Scientific Society, and now members of the Yorkshire Naturalists' Union. They, and a few others, with the aid of Hooker's Students' Flora, at once settled down to the technical study of the classification of British flowering plants. Very soon plant morphology and physiology were added to their hobby, and the best and latest text books on these branches of study were bought. This little group of enthusiasts worked steadily away, with no teacher but their books, entered for the Government Examinations, and several eventually succeeded in qualifying as teachers of botany.

They were the means of forming a Natural History section of the Halifax Scientific Society, which has proved very useful for beginners. During the course of their studies they familiarized themselves with their local flora, and with Mr. Crossland as secretary, laid the foundation for the ' Flora of Halifax.'

Mr. Crossland's method of mounting his dried plants has always been admired. It may be stated that the light blue tint of his mounting-sheets has led to several museum authorities adopting the same colour for lining their cases. It certainly improves the appearance of any natural object to which it forms a background.

After several years' close work with the flowering plants, he commenced the study of Cryptogamic botany. The Phanerogams were not forsaken, but occupied a minor place in his studies. He attended the Yorkshire Naturalists' Union Fungus Foray at Bramhope and Harewood, with Leeds as centre in 1888, and desired to know more about Fungi. On the recommendation of Mr. G. Massee, who was present as leader, he took up its study, Mr. Massee pointing out that if he wanted to do any original botanical field work he must study the fungi, as certainly numerous species remained undiscovered. This prophesy has been fulfilled. Mosses and Hepatics also shared his attention for a while.

In his efforts to work up the Cryptogamic Flora of the extensive old parish of Halifax, he was ably seconded by Mr. James Needham, of Hebden Bridge, who collected extensively in that district; and who rarely missed a week sending a consignment of Cryptogams of one kind or another to Halifax for examination. This occurred during eight or nine months of the year, for nearly twenty years.

Mr. Crossland, who is always ready to acknowledge assistance, says that our old and valued contributor Mr. M. B. Slater, of Malton, Mr. J. A. Wheldon, of Liverpool, and Mr. S. M. Macvicar, of Invermoidart, rendered him considerable help with the Mosses and Hepatics; Mr. W. West, with the Algæ, and Mr. J. A. Martindale with the Lichens, for the 'Flora of Halifax.'

Eventually, however, he found that he must practically confine himself to the fungi, as this group began to occupy most of the spare time from his business as a Knight-of-the-Cleaver, which he commenced in 1864. Since 1890, when he took in a managing partner, he has had a fair share of time for botanical work, and became, as he once said, a 'half-timer.'

Much time has been devoted to describing and drawing fungi in their natural colours. These drawings have been exhibited at the meetings of the Yorkshire Naturalists' Union, and have always attracted attention for their faithful drawing and colouring, as well as for their picturesque effect. It is doubtful whether there is more than one private collection in the kingdom, drawn direct from nature by the owner, to equal it. The drawings of the Discomycetes are the most numerous, as Mr. Crossland specialised on this section.

The knowledge he acquired in any branch of botany he

Yours Faithfully
Chas Crossland

has always been ready to impart, and whether on an excursion of an important natural history society, or in the company of the veriest beginner, he spares neither pains nor time to create an interest in his questioners. In fact, the good he has done in this way cannot be over-estimated. His desire to get the benefit from a day's excursion is well known.

The late H. T. Soppitt, whose collection the Union was able to acquire, largely through Mr. Crossland's efforts, was a constant companion for five or six years, and, ' by mutual confidence and mutual aid,' these two were able to contribute much that was new to Yorkshire.

It is with his work amongst the fungi that Mr. Crossland's name will be known to Yorkshire for all time. Amongst these usually neglected forms workers were exceedingly few when he took up their study. Not only was the question of their identification a serious stumbling block, but the difficulty of preservation had debarred many from paying attention to them. He started his studies under circumstances which would have caused many to have left the fungi severely alone ; but, plodding on, he eventually got to know them well, and his acquaintance with Mr. George Massee, of Kew, and Mr. A. Clarke, of Huddersfield, and the correspondence, meetings, and excursions which ensued, gave him an extensive knowledge of matters mycological. So much so that the growing number of specimens sent to him for his opinion from all quarters of the land is becoming rather burdensome.

His publications form a very substantial and valuable contribution to the mycological literature of Britain. Largely through his efforts, the Yorkshire Naturalists' Union a few years ago published the first county fungus flora ever issued. This, with the co-operation of Mr. Massee, developed into a substantial volume of nearly 400 pages, in which no fewer than 2626 species were recorded and classified, with full details of distribution, etc. In connection with this, no one knows so well as does the present writer, of the enormous amount of detail work which Mr. Crossland accomplished—one task which he voluntarily undertook being the entire re-writing of the enormous manuscript in order to save the Yorkshire Naturalists' Union a little expense in the matter of printing. During the compiling of the ' Fungus Flora,' no fewer than 16,700 records were systematised.

A few years ago, when the Halifax Scientific Society com-

menced the publication of the 'Halifax Naturalist,' Mr. Crossland was one of those who were largely responsible, and in connection with the Flora of Halifax, for which the magazine was principally published, he had sole charge of the Cryptogamic portion beyond the ferns. The portion dealing with the fungi is unquestionably the most complete of any parish flora ever issued. In 'The Naturalist,' too, our readers have from time to time benefitted from his work. On the excursions of the Yorkshire Naturalists' Union he has on almost every occasion, added to our knowledge of the fungus flora of the districts visited, and frequently new species to science have, in conjunction with Mr. Massee, been described and figured in the pages of our journal. The names attached to some of these have been given in honour of their fellow-workers and supporters—Soppitt, Needham, Cheesman, Gibbs and Farrah.

In addition to the specimens which he has described and named, a number of new species have been named in his own honour by other writers.

On the occasions of the annual Fungus Forays of the Yorkshire Naturalists' Union, which are known the country over for the success which attends them, Mr. Crossland has, since 1893, invariably undertaken the preparation of the reports. These Fungus Forays are renowned for the excellent way in which they are managed, and the good results which accrue from them, and this is unquestionably owing to the industry and personality of Mr. Crossland.

In 1906 his colleagues on the Executive Committee of the Union conferred upon him the highest honour that was within their power, and during 1907 he was President of the Union. At the Annual Meeting held at Halifax, in December 1907, he gave an address on 'The History of the Study of Fungi in Yorkshire.'

He was elected a Fellow of the Linnean Society of London in 1899. He is a worthy disciple of the celebrated James Bolton who trod the same district in search of nature's treasures from 1758-1799, and published the first British works on Ferns and Fungi. In addition to natural history, Mr. Crossland has taken an interest in the study of Dialect, Place-names and Surnames.

To refer in detail to the whole of the work which Mr. Crossland has accomplished would be a very lengthy process, but sufficient has been said to indicate that in him we have one well worthy of the county, and we all wish that he may long

remain with us to encourage us in our work, and to benefit us from his knowledge.

LIST OF PUBLICATIONS BY C. CROSSLAND, F.L.S. IN 'THE NATURALIST.'

NEW WEST YORKSHIRE FUNGI AND ADDITIONAL LOCALITIES FOR OTHERS PREVIOUSLY RECORDED.—'The Naturalist,' September 1892, pp, 261-268.

NEW AND RARE FUNGI NEAR HALIFAX.—'The Naturalist,' December 1892, pp. 371-372.

FUNGUS FORAY AT POCKLINGTON, ALLERTHORPE, AND EVERINGHAM, SOUTH-EAST YORKSHIRE (1893). List of Species found.—'The Naturalist,' March 1894, pp. 71-76.

ADDITIONS TO THE WEST RIDING FUNGUS FLORA.—'The Naturalist,' June 1894, pp. 165-172.

FUNGUS FORAY AT SELBY: Report and List of Species found.—'The Naturalist,' December 1896, pp. 355-365.

FUNGUS FORAY AT BARNSLEY: Report and List of Species found.—'The Naturalist,' November 1897, pp. 341-348.

FUNGUS FORAY AT HAREWOOD AND EAST KESWICK: Report and List of Species found.—'The Naturalist,' December 1898, pp. 357-362.

NEW BRITISH FUNGI FOUND IN WEST YORKSHIRE; 21 figs., Joint paper with the late H. T. Soppitt.—'The Naturalist,' January 1899, pp. 27-31.

FUNGUS FORAY AT SUTTON, NEAR ASKERN: Report and List of species found.—'The Naturalist,' December 1899, pp. 367-372.

NEW AND CRITICAL BRITISH FUNGI FOUND IN WEST YORKSHIRE, with figures.—'The Naturalist,' January 1900, pp. 5-10.

FUNGUS FORAY AT MULGRAVE WOODS, WHITBY; Report and List of Species found.—'The Naturalist,' November 1900, pp. 337-346.

NEW BRITISH DISCOMYCETES, PART I., with 21 figures: Joint paper with Mr. G. Massee.—'The Naturalist,' June 1901, pp. 177-189.

FUNGUS FORAY AT CADEBY, MELTON, SPROTBOROUGH, AND WARMSWORTH: Report and List of Species found.—'The Naturalist,' November 1901, pp. 337-350.

NEW YORKSHIRE AGARICS: Joint paper with Mr. G. Massee.—'The Naturalist,' January 1902, pp. 1-2.

Fungus Foray at Egton Bridge and Arncliffe Woods, near Whitby: with List of Species found.—'The Naturalist,' November 1902, pp. 355-365.

Fungi of Masham and Swinton.—'The Naturalist,' May 1903, pp. 177-181.

Fungus Foray at Helmsley: Report and List of Species found.—'The Naturalist,' November 1903, pp. 425-436.

New Fungi, contributed by the Mycological Members of the Union.—'The Naturalist,' January 1904, pp. 1-8.

The Plants of Pecket Wood: Joint Paper with Mr. James Needham.—'The Naturalist,' June 1904, pp. 165-175.

Fungus Foray at Rokeby: Report and List of Species found.—'The Naturalist,' November 1904, pp. 329-342.

Fungus Flora of a Cast-out Hearthrug: Joint Paper with Mr. James Needham.—'The Naturalist,' December 1904, pp. 359-363.

Fungus Foray at Maltby: Report, and Photo. of the work-room, by A. Clarke.—'The Naturalist,' November 1905, pp. 337-340, 367-370. List of Species found.—'Y.N.U. Trans.', No. 34.

New and Rare British Fungi, with three figures: Joint paper with Mr. Massee.—'The Naturalist,' January 1906, pp. 6-10.

Fungus Foray at Farnley Tyas (1906): Report and List of Species found.—'The Naturalist,' February 1907, pp. 50-57.

Fungus Foray at Grassington, Bolton Woods, and Buckden: Report.—'The Naturalist,' November 1907, pp. 397-401. List of Species found.—'Y.N.U. Trans.', No. 34.

The Study of Fungi in Yorkshire (being the Presidential Address delivered to the Yorkshire Naturalists' Union at Halifax, December 14th, 1907).—'The Naturalist,' March 1908, pp. 81-96, 147-156.

Recently Discovered Fungi in Yorkshire.—'The Naturalist,' June 1908, pp. 214-218.

The Fungus Flora of Mulgrave Woods (Fungus Foray, 1908). Report and List of Species found.—'The Naturalist,' January 1909, pp. 21-27.

Recently Discovered Fungi in Yorkshire.—'The Naturalist,' May 1909, pp. 178-182; June,.pp. 220-223.

Fungus Foray at Castle Howard: Report and list of species found.—'The Naturalist,' December 1909, pp. 415-422.

[In addition are a number of shorter notes and records].

Other Publications.

Mollisea cinerea and its Varieties.—'Trans. British Mycological Society,' 1898-99, pp. 106-109.

The Place-name 'Royd.'—The Halifax Naturalist,' Vol. III., February 1899, pp. 109-112.

Origin of Some Halifax Surnames.—'The Halifax Naturalist,' Vol. V., April 1900, pp. 1-8; June 1900, pp. 21-29.

Norland Clough (Hx.): Its Fungi.—'The Halifax Naturalist, Vol. V., December 1900, pp. 102-107.

The Vowel Sounds and Substitutions of the Halifax Dialect.—'Trans. Yorks. Dialect Soc.', Part II., November 1899, pp. 49-53.

Henry Thomas Soppitt: Memoir.—'The Halifax Naturalist,' Vol. IV., 1899, pp. 31-36.

The Collecting, Drying, and Mounting of Plants for the Herbarium.—'The Halifax Naturalist,' Vol. VI., June 1901, pp. 39-44.

Some Place-names in the Parish of Halifax considered in Relation to Surrounding Natural Features.—'Trans. Yorkshire Dialect Society,' Part IV., June 1902, pp. 2-23.

The Fungus Flora of Yorkshire in Collaboration with Mr. G. Massee, F.L.S., F.R.H.S., etc., Royal Herbarium, Kew.—'Trans. Y.N.U.', Part 28, November 1902, pp. 7-52; Part 32, July 1905, I.-VI.+53-396.

Woodland Studies I.: The Flora of a Boulder in March.—'The Halifax Naturalist,' Vol. VIII., April 1903, pp. 8-10.

Woodland Studies II.—The Flora of a Stream Course.—'The Halifax Naturalist,' Aug. 1903, pp. 45-47. Joint papers with Mr. James Needham, Hebden Bridge.

The Distribution and Associations of Mosses and Hepatics in the Parish of Halifax.—'The Halifax Naturalist,' Vol. VIII., October 1903, pp. 66-72.

The Cryptogamic Portion of the 'Flora of Halifax' (Crump and Crossland), published by the Halifax Scientific Society, 1904, pp. 146-304.

A Reprint of the Fungus Flora of Halifax, with the addition of two Hand-coloured Plates, issued by the Author, 1904. A second Reprint with revised preface, 1909.

Fungi.—'Bradford Scientific Journal,' Jan. 1906, pp. 1-7.

Omitted Asci Measurement of some British Discomycetes.—'Trans. British Mycological Soc.', 1908-09, pp. 85-91.

Halifax Bibliography and Authors, Part I.—'Trans. Halifax Antiquarian Society,' 1909, pp. 317-346.

Pleasant Walks Around Halifax, published by E. Mortimer, Halifax, May 1910, pp. I.-IV.+5-52.

An Eighteenth Century Naturalist: James Bolton, Halifax, ⟵ 1758-1799. Reprinted with slight revision, from the 'Halifax Guardian,' August 1910, pp. 1-32.

T. S.

Mammoth Tooth from a Chalk Fissure in North Lincs.—In the south of England one is familiar with the fissures in the chalk, which contain mammalian remains; but hitherto these do not appear to have been noticed in the north. On visiting the well-known chalk quarry at South Ferriby recently, I obtained an elephant's grinder, which had been 'taken from the chalk,' at a considerable depth, towards the west end of the quarry. As it was picked out from amongst loose chalk, its precise depth could not be ascertained, though it certainly could not have come from the upper portion of the quarry. Traces of sand in a very narrow fissure could still be seen at the place where the tooth was taken, and there is no doubt that at some remote period the specimen had been washed into the crevice. The soil had recently been removed from the top of the adjacent chalk, and a large pipe of sand was met with, though its depth cannot be ascertained until the chalk is blasted.

The grinding surface of the tooth is considerably worn, and evidently belongs to a very old individual. It is quite white and chalky in appearance; so much so, that the impression the workmen had obtained that it was really found in the solid chalk is excusable. It measures $6\frac{1}{2}$ inches in length by $2\frac{3}{4}$ inches across the grinding surface, and is $4\frac{1}{2}$ inches in depth. Mr. E. T. Newton, F.R.S., late Palæontologist to the Geological Survey, has kindly examined it, and has expressed the opinion that it is of the Mammoth (*Elephas primigenius*), though the crown is so much worn that it almost reminds one of the older form, namely, *Elephas meridionalis*.

Professor W. Boyd Dawkins recently called at the Hull Museum and saw the specimen, and also expressed the opinion that it was a tooth of the mammoth. The specimen is the lower grinder, and fourth milk or first true molar.—T. Sheppard, Hull.

Naturalist,

MARINE BANDS IN THE YORKSHIRE COAL MEASURES.*

H. CULPIN.

(PLATE XVI.).

As the result of examinations of the ground gone through recently in sinkings to the Barnsley coal in the neighbourhood of Doncaster, four marine bands can be added to the list of five marine bands hitherto recorded in the Yorkshire Coal Measures.

The five bands previously known are—(*a*) the one with *Pectens*, *Posidonomya* and *Goniatites*, which occurs in connection with the thin coal lying on the Rough Rock of the Millstone Grit; (*b*) the *Pecten* bed, with pectens and cephalopods, which forms the roof of the Ganister or Hard Bed Coal, about 80 feet above the Millstone Grit; (*c*) a *Lingula* bed about 80 feet above the Silkstone Coal; (*d*) the '*Aviculopecten*' (*Pterinopecten*) bed below the Ackworth Rock; and (*e*) a *Posidonomya* bed seen at Frickley Hall in measures above the Ackworth Rock.

The following is a summary of the positions of the four recently discovered marine bands, and of the previously known '*Aviculopecten*' (*Pterinopecten*) bed below the Ackworth Rock, as observed at Brodsworth, 4 miles north-west of Doncaster; at Bentley, $2\frac{1}{2}$ miles east of Brodsworth; and at Maltby, 10 miles south of Brodsworth. The particulars as to Maltby are inserted through the kindness of Mr. W. H. Dyson, the Engineer in charge there, who has paid special attention, with remarkable success, to the marine and other fossils met with. The figures are stated in feet above the Barnsley Seam.

MARINE BANDS.

HEIGHT IN FEET ABOVE BARNSLEY COAL.

	Brodsworth.	Bentley.	Maltby.
'*Aviculopecten*' (*Pterinopecten*) bed, below the Ackworth Rock	1157	1131	$1244\frac{1}{2}$
Marine Band with Limestone base	705	$675\frac{1}{2}$	709
Marine Band (*Lingula*)	Not seen.	589	564
Marine Band above Cannel Coal..	382	393	340
Marine Band (*Lingula*)	111	Not seen.	Not seen.

The band about 700 feet above the Barnsley Coal is the most important one of the new series, and its distinctive characteristics make it an excellent datum line, easy of recog-

* Read at the meeting of the British Association at Sheffield, Sept., 1910.

nition in the exploration of the concealed Coalfield in south-east Yorkshire. As seen at Brodsworth and Bentley, it is 15 to 16½ feet thick. At the top it consists of blue shales marked with fucoids, and having a soapy feeling. Similar shales below these are crowded with *Lingula mytiloides*. Beneath these are greyish-blue, hard shales, which in turn rest on a hard greyish-blue limestone. The lower shales are very fossiliferous, and the limestone moderately so. The fossils obtained include five species of brachiopods, sixteen species of lamellibranchs, three species of gasteropods, thirteen species of cephalopods, and a crustacean. Among the fish remains is *Listracanthus wardi*.

Marine fossils have also been found recently in four clay pits in the Yorkshire Coal Measures. The relation of these places to one another in the geological sequence has not yet been worked out, but they are mentioned with a view to stimulate investigation elsewhere. One of them is at Darfield, eight miles north of Rotherham. It contains a limestone with *Goniatites*. At Walton, two miles south-east of Wakefield, there is a limestone with *Posidoniella* and *Syncyclonema*. At Nostell, five miles south-east of Wakefield, the marine band below the Ackworth Rock may be seen. At Castleford is a section with greyish-blue shales containing *Lingula*. The accompanying photograph shows the marine band in the Nostell clay pit. The hammer-head is resting on the *Pterinopecten* bed.

CRUSTACEA.

***Platyarthrus hoffmannseggii* near Scarborough.**—Referring to the note on *Platyarthrus hoffmannseggii* on page 176 of the April 'Naturalist,' I should like to add that whilst engaged in taking cinematograph films of the Wood Ant at Barnscliffe near Scarborough, with Mr. F. Martin Duncan, on July 29th, 1910, we found two of these Isopods in one nest; and I quite agree with Mr. Stainforth's remarks that if investigations were pressed forward, we should most probably find it is generally distributed in various districts.—HARRY WITTY, 30 Nansen Street, Scarborough.

We regret to learn of the death during the past few days of Mr. J. R. Dakyns, formerly of H.M. Geological Survey. Mr. Dakyns was well known to Yorkshire geologists, and is responsible for many maps and memoirs bearing upon the county. He had passed his three score years and ten some time ago.

Photo by] [*H. Culpin.*

Marine Band in Clay Pit at Nostell.

GLACIAL EVIDENCES NEAR SCUNTHORPE.

ARCHIBALD C. DALTON.

It is recorded that 'between Messingham and the Humber the only direct evidence of Glacial action is furnished by a small patch of Grey Boulder Clay with flint fragments . . . on the road from Frodingham to Burton, east of Flixbro'.'*

In North Lincolnshire there are three parallel escarpments

Map of the Scunthorpe District.

which run nearly due north and south, viz.:—the Liassic, Oolitic and Cretaceous.

In the Ancholme Valley large areas of Boulder Clay have been mapped by the Geological Survey; but, with the exception of the small patch of boulder clay referred to above, none has been recorded for the Trent Valley.

* Geological Survey mem. sheet. 86, p. 134.

Scunthorpe lies roughly about half way between the Humber and Messingham. Since this district was surveyed, many sections have been exposed whilst mining for Ironstone, which is fortunately near the surface, and consequently the sections can be easily seen and examined.

As will be seen from the following list, a considerable quantity of erratics of a varied and interesting nature has recently been recorded.

As a rule, the Ironstone is covered by sand, which varies considerably in thickness, though in two pits at Scunthorpe, there are only about two feet of 'Blown Sand,' with no clay amongst it. In other pits there is a covering of dark green clay, averaging about three feet in thickness, and containing numerous flints.

Though nearly all the erratics recently found are little more than pebbles, there are some quartzites weighing several pounds. These are principally found in the sand, the clay containing a comparative few only.

In the Trent pits the clay rests upon the Lower Lias Clay, which contains nodules full of *Ammonites capricornus*. Above the clay there is gravel and sand, and a thin stratum of peat. The gravels make well-marked 'pockets' and 'pipes' in the clay beneath, the pockets being very numerous. The gravels contain numerous Gryphœas, but up to the present have not yielded any erratics.

Further south the sand gets thicker, and the bed of peat increases in some places to as much as three feet.

With regard to the erratics, very few show striæ, and they are all very much water-worn.

An analysis of the erratics gives the following:—

From the	Lake District	11.5 per cent.
,,	Scandinavia	5.7 ,,
,,	Scotland	3.8 ,,
,,	Trias	13.4 ,,
,,	Cheviots	1.9 ,,
,,	Yorks. or Lincs. ..	11.5 ,,
	Local	1.9 ,,
	Not identified	50.0 ,,

Mr. T. Sheppard records that 'there is evidence that the western-most limit of the Scandinavian ice was reached precisely where Ferriby now is. There is certainly no true boulder

clay with Scandinavian erratics visible to the west of this point.'*

In the light of the specimens now recorded, we shall have to extend the western limit from Ferriby to Scunthorpe as far as the erratics themselves are concerned, though the clay at Scunthorpe is certainly unlike true Boulder Clay, and appears to have been re-distributed.

Whilst it is perhaps not safe to assert that the Scandinavian Ice Sheet came as far as where Scunthorpe is now situated, it seems highly probable that we have there the remains of a true Boulder Clay.

My list is not by any means exhaustive, as I have only examined the few sections referred to, and there are many others; but as a Naturalists' Society has recently been formed in Scunthorpe, it is to be hoped that some useful work will be accomplished.

I wish to express my thanks to Dr. A. R. Dwerryhouse, for the trouble he has taken in naming the fifty odd specimens I sent him; to Professor Kendall; and to Messrs. H. Culpin, J. W. Stather and T. Sheppard for valuable advice given in the field.

LIST OF ERRATICS FOUND AT SCUNTHORPE.

Specimen No.	Remarks.	Name.	Nearest Parent Rock.
1	On Surface of ground ..	Elaeolite Syenite	Scandinavia.
2	In Sand	Andesite	Lake District
3	,, ,, 6″×4″×3″ ..	Andesite	Lake District
4	,, ,, and Gravel 4″×2″×3″	Augite Andesite	Lake District
5	,, ,, ...	Diorite	?
6	,, ,, ...	Fine grained Granite ..	?
7	,, ,, ...	Dolerite	?
8	,, Clay	Quartzite	? Trias.
9	,, ,, ...	Sandstone (Secondary)	Lincs. or Yorks.
10	,, Sand	Micaceous Grit	?
11	,, ,, and Gravel ..	Fine Grit (probably Silurian)..	Scotland
12	Centre of Clay Pocket $1\frac{3}{4}$″×2″×4″	Andesite	Lake District
13	In Sand	Carboniferous Limestone	West Yorkshire
14	,, ,, ...	Andesite Ash	Lake District
15	,, ,, ...	Sandstone	?
16	,, Clay	Quartzite	? Trias

* T. Sheppard, F.G.S., 'Geology of South Ferriby,' Trans. Lincs. Nat. Union, 1905.

LIST OF ERRATICS FOUND AT SCUNTHORPE—*contd.*

Specimen No.	Remarks.	Name.	Nearest Parent Rock.
17	In Sand	Coarse Grit	?
18	,, ,, ...	Dolerite	?
19	,, ,, ...	Porphyrite	?
20	,, ,, 1″×8″×6″ ..	Dolerite	?
21	,, ,, ...	Mica-schist	Scotland ?
22	,, ,, ...	Andesite	?
23	,, ,, ...	Porphyrite	Cheviot
24	On Talus of Clay	Hornblende-Granite ..	? Scandinavia
25	In Sand	Quartzose Breccia (? Fault)..	?
26	,, ,, (very common)	Quartzite	? Trias
27	,, ,, ...	Hard Chalk	
28	,, ,, ...	Sandstone	Yorks. ?
29	,, Clay	Quartzite	? Trias
30	,, Sand	Limestone (Secondary)..	Yorks. or Lincs.
31	,, ,, ...	Dolerite	?
32	,, ,, ...	Sandstone (? Secondary)	?
33	,, ,, ...	Limestone (Secondary)	Yorks. or Lincs.
34	,, ,, 1′×5″×6″×3″	Andesitic Breccia	Lake District
35	,, ,, ...	Sandstone (? Carbonif.)	?
36	,, Clay	Quartzite	? Trias
37	,, ,, ...	Mica-schist	?
38	,, Sand, contained fossil	Limestone from Secondary Rocks	Yorks. or Lincs.
39	,, Clay, 4″×3½″×2″ ..	Quartzite	? Trias.
40	,, Sand, 3½″×5″×3″ ..	Sandstone, Secondary ..	Yorks. or Lincs.
41	,, Clay	Quartzite	? Trias
42	,, Sand	Oolitic ironstone	Local
43	,, ,, ...	Chert with Oolitic structure	,,
44	,, Clay, 3″×2″×2″ ..	Chert	?
45	,, Sand, 3″×1½″×1″	Felspathic-grit with blue quartz	Highlands (?)
46	,, ,, 3″×¾″×1¼″	Mica-chlorite-schist ..	?
47	Rifle Hill, (Site of 'British Camp,' 200′ 250′ Blown Sand on Oolitic escarpment). 4″×2½″×1½″	Vein-quartz	?
48	2″×¾″×¼″	Mica-schist	?
49	1¾″×2″×2″	Millstone-grit	?
50	2″×1½″×½″	Hornblende-schist ..	?
51	1½″×1½″×1″	Quartzite	?
52	6″×2″×2½″	Mica-schist	?

Mr. E. W. Wade, M.B.O.U., has been unanimously elected President of the Hull Scientific and Field Naturalists' Club for the ensuing year.

On September 23rd the Scarborough Field Naturalists' Society celebrated its twenty-first birthday by holding a Conversazione, at which four of the original members were present.

The recent Fungus Foray of the Yorkshire Naturalists' Union which was held in Mulgrave Woods, was very well attended, and proved very successful in every way. About 450 species of fungi were secured, including the following six, which are new to Britain :—*Inocybe cookei*, *Clitopilus angustus*, *Omphalia bibula*, *Hypholoma melantinum*, *Lactarius tabidus*, and *Marasmius xerotoides*. A report of the excursion will appear in these pages shortly.

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THE NATURALIST

A MONTHLY ILLUSTRATED JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND.

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T. SHEPPARD, F.G.S., F.S.A.Scot.,
THE MUSEUMS, HULL;

AND

T. W. WOODHEAD, Ph.D., F.L.S.,
TECHNICAL COLLEGE, HUDDERSFIELD.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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T. H. NELSON, M.B.O.U.,
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RILEY FORTUNE, F.Z.S.

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YORKSHIRE NATURALISTS' UNION.

THE ANNUAL MEETING OF THE SECTION FOR VERTEBRATE ZOOLOGY.

(*President*:—**Prof. C. J. PATTEN, M.A., M.D., Sc.D., F.R.A.I.**).

Two meetings will be held in Room C 8 at the Leeds Institute, Leeds, at 3-15 p.m. and 6-30 p.m., respectively, on Saturday, November 19th, 1910.

BUSINESS (at the afternoon meeting) :—

To consider and pass the Sectional Reports for 1910, and to elect Officers for 1911.

To consider and pass the General and Financial Reports of the Yorkshire Wild Birds' and Eggs' Protection Acts Committee for 1910, and to elect the Officers and Committee for 1911.

To consider and pass the Report of the Yorkshire Mammals', Amphibians', Reptiles' and Fishes' Committee for 1910, and to elect this Committee for 1911.

Mr. Arthur Whitaker will exhibit specimens of all the Yorkshire Bats, with remarks upon their chief characteristics.

Short lecturettes (mostly illustrated by lantern-slides) will be given by the following gentlemen:—"The Life History of the Gannet," by Mr. Riley Fortune, F.Z.S. ; "Recent Notes on a Young Cuckoo," by Mr. Thos. M. Fowler ; "Some of this Season's Work with my Camera in Yorkshire," by Mr. Oxley Grabham, M.A., M.B.O.U. ; "The Thrush and the Worm," by Prof. C. J. Patten. Professor Patten will also give a short demonstration on "Instantaneous Telephotography of Birds."

Any Member or Associate of the Y.N.U. is invited to attend, and to bring notes, specimens, lantern-slides, etc. ; and is requested to bring forward matters of interest connected with the work of the Section, and to take part in any discussion.

Will Officials of the Affiliated Societies kindly notify their Members.

Any further particulars from H. B. BOOTH, Ryhill, Ben Rhydding.

Hull Museum Publications, No. 63.

A Descriptive Catalogue

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NOTES AND COMMENTS.

NAMES OF BIRDS.

In the October 'British Birds' Mr. Ernst Hartert has some notes on various species of British birds. In these he points out that, according to the rule of priority, the scientific name of White's Thrush is not *Turdus whitei*, nor the later *T. varius*, but *Turdus dauma aureus*. It seems that Holandre described the bird in 1825 as *T. aureus*. Similarly the Redwing should be called *T. musicus*, as it was so described by Linnæus in 1758. The Song-Thrush, being described by Brehm in 1831 as *T. philomelos*, 'therefore must henceforth be called by that name.' Similarly, we learn that 'The Black Redstart is now generally known as *Ruticilla tithys*, but its correct name is *Phoenicurus ochruros gibraltariensis*,' and so on. As we have so long known the Song-Thrush as *T. musicus*, and as it has been so described in thousands of ornithological works, confusion can only arise, particularly to future workers, by describing the Redwing as *T. musicus*, notwithstanding the fact that, according to the law of priority, by *T. musicus* is meant the Redwing. How are future workers to know whether an author is 'old-fashioned' or 'new-fashioned' in his nomenclature? Besides, supposing that *T. musicus* were, by common consent, on account of its prior claim, to be applied to the Redwing in the future, how are we to know but that some ultra-enthusiastic naturalist, poring over some long-forgotten work, may find the Redwing described, still earlier, as *Turdus nondamsense*, or some such name? This will mean changing all again, and as for the Black Redstart having for its proper name *Phoenicurus ochrurus gibraltariensis*, it may be all right, or it may not; but we prefer *Ruticilla tithys*. We think that our ornithological friends should fall into line with other zoologists, and waive the strict rule of priority where a name has got a good hold in nomenclature; otherwise, serious confusion will result.

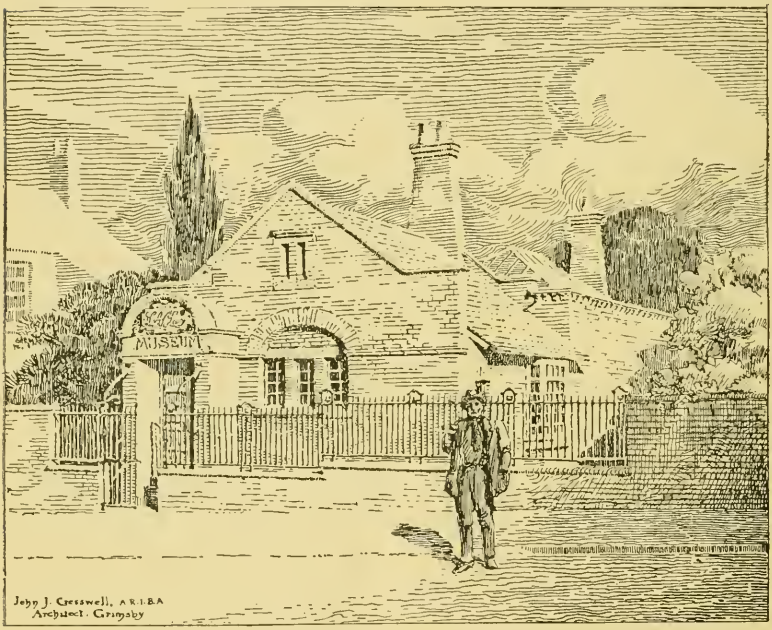
NATURE STUDY IN EAST YORKSHIRE.

The East Riding Nature Study Committee, formed for the encouragement of natural history amongst teachers, held its Annual Meeting and Conference at Bridlington, on October 22nd. Mr. W. H. St. Quintin, an ex-president of the Yorkshire Naturalists' Union, presided, and addressed the meeting on the necessity of the preservation of our local flora and fauna. He referred to the many ways in which plants and

animals were being exterminated, and urged those present to keep a watchful eye upon the wild plants, etc. Prof. W. Garstang followed with a lantern lecture on 'The Natural History of the Sea Shore,' and dealt particularly with the common forms of marine life occurring at Bridlingron. The Secretary's report, presented by Mr. W. J. Algar, included an account of the excursions, etc., held during the year.

THE LOUTH MUSEUM.

After a quarter of a century's hard work, the Louth Naturelists', Antiquarian and Literary Society was able, on October 18th, to open its museum to the public. A substantial sum of money had been subscribed locally, including a grant of



Museum for Louth Naturalists', Antiquarian and Literary Society.

£250 from the Pahud Trustees, £100 from Sir Robert W. Perks, Bart., and £100 from the Rector, the Rev. Canon Wilde. The Louth Corporation has given an excellent site in Enginegate, and the building was designed by one of the Society's members, Mr. J. J. Creswell, to whom we are indebted for the drawing reproduced herewith. There is land to enable the museum to

be extended, and doubtless this will be necessary soon, as the available space is already fairly fully occupied. The museum largely owes its existence to the energy of the Hon. Secretary, Mr. J. Larder.

The museum was declared open by the Rector, and addresses were given by the Mayor (Councillor T. Gelsthorpe), the Curator (Mr. C. S. Carter), and others. In the evening a public meeting was held at the Town Hall, which was presided over by Mr. H. L. Brackenbury, M.P. At this meeting Mr. T. Sheppard gave an address on 'The Educational Advantages of Local Museums,' and was followed by Prof. W. W. Watts, F.R.S., the President of the London Geological Society, who gave an interesting lecture on 'Scientific Progress during the last Century,' paying particular reference to the work of Charles Darwin.

A BRADFORD SCHOOL.

The Board of Education has recently issued, as one of its educational pamphlets (No. 21), a paper by Miss Mary Johnstone, of Bradford, entitled 'A School Week in the Country Grange Road School, Bradford (Girls' Dept.)'* The report is a delightful account of a delightful week in the country spent by some of the girls under Miss Johnstone's care. The paper deals with general arrangements:—house-keeping; dress (in which 'hob-nailed boots with reasonable heels' are advocated); school training; botany; geography and geology; animal life; history; literary associations, and art. After reading the report we feel confident that some of the girls in Bradford have advantages over scholars at many other towns. And we can certainly recommend teachers in our Secondary Schools to 'Read, mark, learn and inwardly digest' all that is written in this pamphlet, which we learn is 'for official use,' though in its characteristically guarded manner we perceive that the Board in publishing the report 'do not thereby necessarily commit themselves to the approval of the arrangements of work advocated in it, nor of any opinon expressed in the report.' We presume, however, that the Board does not seriously disapprove of a report published at its expense.

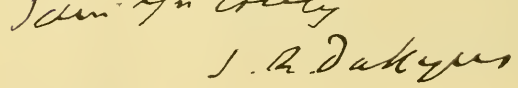
---

* 36 pp. London, Eyre & Spottiswoode. 4d.

In Memoriam.

JOHN ROCHE DAKYNS.
(1836—1910).

Of late, death has struck heavily into the foremost rank of Yorkshire geologists. Sorby, Hudleston, Fox-Strangways are gone. And now we have to lament the loss of another veteran



in the death of J. R. Dakyns, which occurred, after a mercifully brief illness, on September 27th, at Snowdon View, Gwynant, near Beddgelert, where he had resided for some years past. Though his residence in Yorkshire terminated over twenty-five years ago, he will be well remembered by the older geologists of both the East and the West Riding, and by his many friends outside the geological circle.

John Roche, the eldest of six sons, was born on January 31st, 1836, in the island of St. Vincent, West Indies, where his father, Dr. T. H. Dakyns, held estates and pursued his medical profession. The family removed to Rugby in 1845, and the future geologist was educated there, at first in a preparatory school, under the Rev. T. L. Bloxam, and afterwards at Rugby School. In 1855 he went up to Trinity College, Cambridge; was elected a scholar of his College in 1858; and graduated with distinction in 1859, being bracketed 27th Wrangler in the Mathematical Tripos. He took the degree of M.A. in 1864.

In 1862 he was appointed to the staff of the Geological Survey as Assistant-Geologist, proceeding to the rank of Geologist in 1868. His earlier work for the Survey was done mainly in the West Riding and just across its border in Westmorland, Cumberland, Lancashire and Derbyshire.

About the year 1877 his field of work was changed to the East Riding—much to his distaste, for the Dale country had cast its charm over him. During the next three or four years he mapped the northern part of Holderness and the neighbouring Wolds. After some further work in the west of our county, he was transferred in 1884 to the South-west Highlands of Scotland, where his field lay chiefly in the shires of Perth and Argyle.* Ten years later he was sent to assist in the mapping of South Wales, and spent two years there. In 1896 he retired from the Survey, after a service of thirty-four years.

During the course of his official work he contributed, as part-author, to fourteen memoirs (of which the titles are given in the Bibliography printed below), nearly all relating to Yorkshire. He wrote also numerous short pithy papers (see Bibliography), always packed with acute observations and enlivened by a characteristic style, which were published in the Quarterly Journal of the Geological Society, the Geological Magazine, and the Proceedings of the Yorkshire Geological and Polytechnic Society. Those of us who know him best, however, have felt that his published work gave but a faint reflection of the extent of his knowledge and attainments. This discrepancy was due partly to his dislike for writing, but perhaps still more to the severely logical turn of his mind, which was never satisfied with anything short of absolute

* The photograph which we reproduce was taken soon after he went to Scotland. It is enlarged from the original in which Dakyns, in a reclining posture, forms one of a group.

demonstration, even when, from the nature of the case, the full evidence he desired was palpably unattainable. In geology, as in the practical affairs of life, it is often only possible to strike the balance of probabilities; but this was a course to which Dakyns hated to be driven.

When his retirement from the Survey gave him freedom of choice, he went with delight to dwell among the mountains of North Wales, for which from the time of his early holidays he had maintained a longing affection; and there the remaining years of his life were spent. At first he came down occasionally in the winter to visit his friends on the plain, but latterly he never left his valley under the peaks of Snowdon; and now he lies buried at Beddgelert, overlooked by the peaks that he loved so well.

During these years in Wales he applied himself to the arduous task of mapping the Snowdonian massif geologically on the six-inch scale. A large portion of the work was accomplished, but it is left incomplete and unpublished. There is hope, however, that his labour will not be lost, for it is likely to be continued by one of his closest friends.

His bent toward Natural Science was indicated in his boyhood by his devotion to the study of birds, and by his gentle care for them—traits which were sustained to the end of his life. (I vividly recall his agitation, during my penultimate visit to him in Wales, lest a big owl that had strayed into the valley should become victim to the gunners who were in chase of it). During his college career, mathematics and astronomy were the subjects that especially attracted him; but the range of his intellectual interests became ever wider and more varied, and he read deeply and earnestly in philosophy, history and anthropology, while the old folk-lore stories were always his recreation and delight. Combined with an intellect of exceptional acuteness and insight, he possessed a charming frankness and simplicity of character that gained him friends in every rank. His personality was striking; his disposition truly lovable; and his life's path was everywhere marked by deeds of unobtrusive generosity and kindness. He remained unmarried, though his tenderness towards children was always notable. His affection for all dumb animals was unbounded; and his whole-hearted devotion to his favourite dog is likely to become legendary in the valley of his last abode.

Such are the main facts of his life. And finally, let me touch

a note of personal appreciation and gratitude, for, by the death of J. R. Dakyns, I have lost a friend to whom I owe more than can ever be expressed. We became acquainted on his first coming into the East Riding, over thirty years ago, while I was still in the rawness of youth, and our companionship from that time onward was constant. He had travelled much in his younger days, in Iceland, Norway, Switzerland; and not only had he read widely and wisely, but he had also counted among his friends some of the keenest intellects of his time; so that our converse was indeed to me 'a liberal education.'

At first, I remember, I was almost alarmed by the sudden fierceness of his denunciation when some act of cruelty or injustice came to his notice, or occasionally, it may be, when I had slid into some crude sophistry or slack logic; but the storm would pass quickly into sunny tolerance and gentle reprimand; and the lesson was the more memorable from its vigorousness. His dislike for any inaccuracy of statement was intense, and the pains he constantly took to convey the exact impression of what was in his mind could not fail to have its influence upon any companion. The sincerity and earnestness of his mental attitude was such that no one, and especially no young man, could have the privilege of his friendship without benefitting greatly thereby; and I well know that it was not in my own case alone that this benefit was felt and acknowledged. The full measure of his service to science is not comprised within the limits of his personal achievement; his influence remains among us in many quarters; and he has left a lasting memory in the hearts of his friends.

G. W. Lamplugh.

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1869.—Part of the Yorkshire Coal Field (Quarter-Sheet 88 SE.).
1870.—The Carboniferous Rocks north and east of Leeds and the Permian and Triassic Rocks about Tadcaster (Quarter-Sheet 93 SW.).
1871.—The Neighbourhood of Dewsbury, Huddersfield and Halifax (Quarter Sheet 88 NE.).
1878.—The Yorkshire Coal Field.
1879.—The Country between Bradford and Skipton (Quarter-Sheet 92 SE.).
1885.—Bridlington Bay (Quarter-Sheet 94 NE.).
1886.—The Country around Driffield (Quarter-Sheet 94 NW.).
1886.—The Country between York and Hull (Quarter-Sheets 93 SE., 94 SW., and part of 86).

1910 Nov. 1.

1888.—The Country around Kendal, Sedbergh, Bowness and Tebay (Quarter-Sheet 98 SE.).
1890.—The Country around Ingleborough (Quarter-Sheet 97 SW.).
1891.—The Country around Mallerstang (Quarter-Sheet 97 NW.).
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Other Publications.

1869.—Notes on the Geology of the Lake District. 'Geol. Mag.', 1869, pp. 56-58.
1869.—Additional Note on the Unconformity between the Green and Skiddaw Slates. 'Geol. Mag.', 1867, pp. 116-117.
1872.—On the Glacial Phenomena of the Yorkshire Uplands. 'Quart. Journ. Geol. Soc.', Vol. XXVIII., 1872, pp. 382-387; and 'Geol. Mag.', 1872, pp. 329-530.
1873.—On Some Points connected with the Drift of Derbyshire and Yorkshire. 'Geol. Mag.', 1873, pp. 62-64.
1873.—On the Geology of Part of Craven. 'Rep. Brit. Assn.', 1873, [publ. 1874], pp. 78-79.
1875.—[With J. Clifton Ward]. Volcanic Rocks of the Lake-Country. [Letter], 'Geol. Mag.', 1875, p. 95.
1875. The Sedimentary Theory of Drift. 'Geol. Mag.', 1875, pp. 168-172.
1876.—On Silurian Erratics in Wharfedale. 'Proc. Yorks. Geol. Soc.', Vol. VI., pt. 3, 1876, pp. 159-163.
1877.—On a Base to the Carboniferous Rocks of Teesdale. 'Proc. Yorks. Geol. Soc.', Vol. VI., pt. 4, 1877, pp. 239-242.
1877.—Glacial Origin of Carboniferous Terraces. 'Geol. Mag.', 1877, p. 17.
1877.—Base of Carboniferous Rocks in Teesdale. 'Geol. Mag.', 1877, pp. 58 and 140.
1877.—High Level Terraces in Norway. 'Geol. Mag.', 1877, p. 72.
1877.—Victoria Cave, Settle. 'Geol. Mag.', 1877, pp. 285.
1877.—Prof. Hull's Carboniferous Classification. 'Geol. Mag.', 1877, pp. 312.
1877.—Geology of Keighley, Shipton, and Grassington. 'Geol. Mag.', 1877, pp. 346.
1877.—Antiquity of Man. 'Geol. Mag.', 1877, pp. 439.
1878.—On the Southward Flow of Shap Granite Boulders. 'Proc. Yorks. Geol. Soc.', Vol. VII., pt. 1, 1878, pp. 60-65.
1879.—Glacial Beds at Bridlington. 'Proc. Yorks. Geol. Soc.', Vol. VII., pt. 2, 1879, pp. 123-128.
1879.—The Calder Valley [Letter]. 'Geol. Mag.', 1879, pp. 46-47.
1879.—The Hitching Stone [Letter]. 'Geol. Mag.', 1879, p. 96.
1879.—The Bridlington and Sewerby Gravels [Letter]. 'Geol. Mag.', 1879, pp. 238-239.
1879.—Glacial Trough between the Glacier des Bossons [Letter]. 'Geol. Mag.', 1879, pp. 239-240.
1879.—Lenticular Hills of Glacial Drift [Letter]. 'Geol. Mag.', 1879, pp. 382-383.
1879.—The Purple Boulder-Clay at Holderness [Letter]. 'Geol. Mag.', 1879, p. 528.
1879.—The Parallel Roads of Glen Roy. 'Geol. Mag.', 1879, pp. 529-531.
1880.—On Glacial Deposits north of Bridlington. 'Proc. Yorks. Geol. Soc.', Vol. VII., pt. 3, 1880, pp. 246-252.
1880.—Yorkshire Coalfield. 'Geol. Mag.', 1880, p. 175.
1881.—On 'Flots.' 'Proc. Yorks. Geol. Soc.', Vol. VII., pt. 4, 1881, pp. 381-383, also 'Rep. Brit. Assn.', 1881, [publ. 1882], p. 634.

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1883.—Bridlington Crag. 'Geol. Mag.', 1883, p. 93.
1886.—Geology of Bridlington Bay. 'Geol. Mag.', 1886, p. 86.
1890.—On the Changes of the Lower Carboniferous Rocks in Yorkshire from south to north. 'Proc. Yorks. Geol. and P. Soc.', Vol. XI., pt. 3, pp. 353-362; abstract in 'Rept. Brit. Assn.', for 1890, (publ. 1896), pp. 811-812.
1890.—Geology around Ingleborough. 'Geol. Mag.', 1890. p. 565.
1892.—[With J. J. H. Teall]. Plutonic Rocks of Garabal Hill and Meall Breac. 'Quart. Journ. Geol. Soc.', Vol. XLVIII, 1892, pp. 104-120, and abstract in 'Geol. Mag.', 1892, p. 135.
1892.—The Geology of the Country Between Grassington and Wensleydale. 'Proc. Yorks. Geol. and P. Soc.', Vol. XII., pt. 2, pp. 133-144.
1894.—Glacial Phenomena of Wharfedale between Bolton Abbey and Kettlewell. 'Proc. Yorks. Geol. and P. Soc.', Vol. XII., pt. 4, 1894, pp. 299-305.
1894.—A Sketch of the Geology of Nidderdale and the Washburn, north of Blubberhouses. 'Proc. Yorks. Geol. and P. Soc.', Vol. XII, pt. 4, 1894, pp. 294-299.
1899.—The Limestone Knolls below Thorpe Fell, between Shipton and Grassington in Craven. 'Quart. Journ. Geol. Soc.', Vol. LV., 1899, pp. 359-361; abstracts in 'Proc. Geol. Soc.', 1899, p. 89; 'Nature,' May 25th, 1899, p. 54; and 'Geol. Mag.', June, 1899, p. 281.
1899.—The Limestone Knolls of Craven [Letter]. 'Geol. Mag.', 1899, p. 573.
1899.—On the Probable Source of the Upper Felsitic Lava of Snowdon. 'Geol. Mag.', 1899, pp. 79-80, and 'Rept. Brit. Assn.', 1898 (publ. 1899), p. 874.
1900.—Glacial Notes at Rhyd-ddu, Carnarvon. 'Rept. Brit. Assn.', 1900, (publ. 1901), p. 763.
1900.—Modern Denudation in North Wales. 'Geol. Mag.', 1900, pp. 18-20.
1900.—Some Snowdon Tarns. 'Geol. Mag.', 1900, pp. 58-61, and letter on p. 143.
1900.—The Colour of Glaslyn and Llyn Llydaw [Letter]. 'Geol. Mag.', 1900, pp. 92-93.
1900.—Firstfruits of a Geological Examination of Snowdon. 'Geol. Mag.', 1900, pp. 267-273.
1900.—A Felstone Dyke on Llechog [Letter]. 'Geol. Mag.', 1900, pp. 375-576.
1901.—Origin of Coal. 'Geol. Mag.', 1901, p. 135.
1901.—Cheviot Porphyrites in the Boulder-Clay of East Yorkshire. (Letter). 'Geol. Mag.', 1901, p. 143.
1901.—Curious Breccias in the Highlands [Letter]. 'Geol. Mag.', 1901, pp. 332-333.
1901.—Intrusive Igneous Rocks in Ireland [Letter]. 'Geol. Mag.', 1901, p. 526.
1901.—Faxe or Faxoe [Letter]. 'Geol. Mag.', 1901, p. 575.
1902.—Effects of Lightning near Snowdon [Letter]. 'Geol. Mag.', 1902, pp. 142-143.
1903.—Note on the Millstone Grits of Grassington Moor. 'Geol. Mag.', 1903. p. 223-225.
1903.—The Colour of Glaslyn and Llyn Llydaw. 'Geol. Mag.', 1903, p. 140.
1904.—Notes on the Glacial Phenomena of Part of Wharfedale, near Grassington. From my MS. written in 1878. 'Proc. Yorks. Geol. Soc.', Vol. XV., pt. 1, 1903, (publ. 1904), pp. 52-58; noticed in 'Geol. Mag.', July, 1904, p. 326.

T. S.

PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

The thirty-ninth Annual Report of the **Chester Society of Natural Science Literature and Art** (48 pp.), has recently been published. It contains a record of the Society's work during the year, and particulars of the additions to the Grosvenor Museum, Chester. The latter includes a molar of a mammoth, 'believed to be the only authentic Cheshire example.'

The **Manchester Literary and Philosophical Society** is one of the very few societies that has retained its literary and philosophical character. Its memoirs (Vol. LIV., part 3) recently to hand, contain several valuable papers, those of particular interest to our readers being—'The Sauropterygia of the Whitby Museum,' by Mr. D. M. S. Watson; 'A Third List of the Adventitious Vegetation of the Sandhills of St. Anne's-on-the-Sea,' by Mr. Charles Bailey; 'The Anatomy of *Calamostachys Binneyana*,' by Dr. George Hickling; and a 'Note on the Variability of the Colour of the Flowers of a Tropæolum Hybrid,' by Dr. F. E. Weiss. Mr. Watson deals in detail with the remains of Blake's *Plesiosaurus propinquus*. The printed 'Proceedings' of this Society are also of much greater general interest than is usually the case with these societies.

The **Hebden Bridge Literary and Scientific Society** has published 'A List of the Vertebrate Fauna of the Hebden Bridge District' (32 pp.), compiled by Mr. Walter Greaves. It is an excellent piece of work. As we know from personal experience, the Society and Mr. Greaves have made exhaustive enquiry as to past records; and this is also apparent from the very clear and carefully-written introduction. Particulars of the distribution, etc., of each species are given. There is a total of 234 species recorded, including 185 birds, 23 mammals, 3 reptiles, 4 amphibians, and 19 fishes. The mammals should properly have appeared before the birds. The list is an admirable piece of work, and might well serve as a model for compilations by other societies in the county. It is appropriately dedicated to Mr. J. B. Brown, who has shewn such a practical interest in the Society's work since its inception.

Lincolnshire Naturalists' Union Transactions, 1909 (pub. Oct. 1910), pp. 67-158. We are glad to find that there is a distinct improvement in the editing of this publication. Mr. G. W. Mason contributes Part III. of 'The Lepidoptera of Lincolnshire,' and seems to have done his work very thoroughly. Mr. W. Denison Roebuck's presidential address on 'The History and Present Conditions of the Investigation of the Land and Fresh-Water Mollusca of Lincolnshire,' traces back the study of Lincolnshire mollusca to 'the time of the great revival of human knowledge which followed the commotions of the Civil Wars.' The Rev. A. Thornley and Mr. W. Wallace contribute their third instalment of 'Lincolnshire Coleoptera,' which has evidently been very carefully compiled. There are 'Further Notes on Lincolnshire Galled Plants,' by Miss S. C. Stow, and a report on 'Field Meetings, 1909.' There is a portrait of the present President, Dr. G. M. Lowe, and an article on 'The Presidents [query President] of the Lincolnshire Naturalists' Union, George May Lowe, M.D.', etc., which reads rather like an obituary notice, though we are glad to find it isn't. Bibliographers will regret that there is no indication of either the volume or part on this publication, though the pagination, at any rate, would seem to indicate that it is not still another 'part I.' It was certainly hard lines that some of the sheets of the Rev. E. A. Woodruffe-Peacock's 'Check list of Lincolnshire Plants, Part I.' had been omitted 'through the sticking of the sheets of the orginal manuscript.' But we hardly see that it was necessary for him to have done penance by telling us all about it twice over (on page 118 and 147 respectively), although in the first case he tells us that three of the species were omitted, and in the second that four were omitted.

NATURALISTS AT SCUNTHORPE.

A MEETING of the Yorkshire Naturalists' Union was held at Scunthorpe on Aug. 25th, in conjunction with the Lincolnshire Naturalists' Union, the object of the excursion being the investigation of the natural history and geology of the district. The ironstone mines have entirely changed the aspect of the area, and rare mammals, shells, insects and plants which once occurred are now no more. In view of the changes that have taken place, and a probability of still further changes in the near future, it was felt that a thorough scientific survey should be made, and to some extent this was undertaken by about fifty members from various parts of Yorkshire and Lincolnshire, representing almost every branch of science.

The party had the advantage of the local guidance of Messrs. A. M. Cobham and A. C. Dalton, who conducted the members round the moors and ironstone mines.

A meeting held at the Blue Bell Hotel at the conclusion of the ramble was presided over by Canon W. Fowler, and he, along with the owners of the property who had granted permission to explore, was accorded a hearty vote of thanks.

The ironstone of this district is buried beneath beds of peat, blown-sand, etc., which has to be removed. During this process interesting relics of the pre-historic inhabitants of the district are occasionally found. Two of these were obtained on this excursion, and are now in our museum at Hull. They are cinerary urns, of unusually crude workmanship, and contained cremated human remains. That shewn on the right of the accompanying photograph is devoid of any ornamentation whatever, and clearly shews the impression of the fingers of the potter. This is particularly the case at the bottom of the vessel, where the impressions of the finger tips are remarkably well shewn. As is usual in the case of these funeral vessels, the edge slopes inwards, and is nearly half-an-inch across. The vase is 10 inches high, 10½ inches at the shoulders, varies from 9 to 9½ inches across the top, and is 5½ inches across the base. The collar is perfectly plain, and is 1½ inches wide.

This specimen seems to lend colour to the theory that in British times ordinary domestic vessels were used as cinerary urns, as was also the practice in Roman times; and were not specially made. This particular vessel was certainly cracked an

repaired before it was used for funeral purposes. A portion of the rim was broken away, and the crack extended for some distance down the side. A small hole was bored in the rim on each side of the crack, in which a thong or cord was inserted and tightened. One of the holes is shown in the photograph.

The other example is rather more cylindrical, though very similar in construction, and is as crudely made. This pot is

British Cinerary Urns from Scunthorpe.

rather thicker, and the rim is about half-an-inch wide. The vessel is 11 inches high, 9 inches across the top, 5 inches across the bottom, and has the merest suspicion of a shoulder at a distance of $2\frac{1}{2}$ inches from the rim. There are marks of the workman's fingers all round the pot. The collar, to the depth of 2 inches, is very crudely ornamented by alternate diagonal scratches, forming a series of M's or W's, the bases of the triangles being about $1\frac{1}{4}$ inches in length.

Geology.—Mr. A. C. Dalton, who acted as guide, writes: The geologists first visited the Appleby Clay Pits, where a fine section of the Lower Lias Clay was exposed, showing its junction with the Pecten Ironstone. The clay was some thirty feet thick, and contained many nodules from which some good fossils were obtained. The Pecten bed is a thin seam of ironstone, poor in iron, but full of Pecten, and was used by the

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Geological Survey as marking the base of the Middle Lias. The party proceeded to the ironstone mines, where sections were seen showing the junction with the clay and ironstone. In most pits the ironstone is covered with sand from which numerous erratics have been found.*

After a lengthy tour through the ironstone mines, the party proceeded to the Scunthorpe Brick and Tile Works, where a fine example of tufa was seen. It is locally called the 'Sunken Church' or 'Stone Curtain,' to which are attached the customary legends; the tufa is a fine example of a calcareous deposit, and the channel through which the water flowed is still well seen. After a lecturette on this interesting formation, by Mr. Henry Preston, F.G.S., the party proceeded to the lime works, whence a new section was examined. The section here seen was thought to represent the Basement beds of the Lower Oolites. Fine examples of typical Lias, etc., fossils were secured.

COLEOPTERA.—Dr. W. Wallace reports that about one hundred species were taken in all. The following list contains those of principal interest, a few marked (*) being new to the county:—

Notiophilus aquaticus L.
Broscus cephalotes L. A most interesting capture so far from its favourite haunts on the seashore.†
Amara bifrons Gyll.
Amara tibialis Pk.
Calathus fuscus F.
Calathus flavipes Fourc.
Calathus mollis Marsh.
Anchomenus gracilis Gyll.
**Bembidium bruxellense* Wesm. (H.H.C.).
Hydroporus gyllenhali Schiod.
**Aleochara cuniculorum* Kr., near a rabbit burrow, (W.W.).
Aleochara nitida Gr.
Homalota atramentaria Gyll.
Autalia impressa Ol.
Staphylinus stercorarius Ol. Two specimens on the wing.
Agathidium nigripenne Kug.
Cholera angustata F.
Cholera grandicollis Er.
C. fumata Sp.
Saprinus nitidulus Pk.
Nitidula bipustulata L.
Pocadius ferrugineus F., in large numbers in *lycoperdons*.
**Cryptophagus scanicus* L. (E.G.B.).
**Cryptophagus lycoperdi* Hbst., in large numbers in *Scleroderma vulgare*. (W.W.).
Aphodius scybalarius F.
Cis alni Gyll.
**Cis pygmæus* Marsh. (E.G.B.).
Longitarsus atricillus L.
**Longitarsus gracilis* Kuts. (E.G.B.)
Helops striatus Fourc.
Scaphidema metallicum F.
Apion affine Kirb.
Rhinoncus castor F.
Cionus blattariæ F.
Otiorrhynchus sulcatus F.
O. ovatus L.

Specimens marked (W.W.) were captured by Dr. W. Wallace; (E.G.B.) by Mr. E. G. Bayford; and (H.H.C.) by Mr. H. H. Corbett.

* See 'The Naturalist,' October, 1910, pp. 377-380.

† Mr. E. G. Bayford informs us that this species is not uncommon on the golf links at Rossington, very much further inland than Scunthorpe.—ED.

LEPIDOPTERA.—Mr. G. W. Mason writes :—Considering the general dullness of the weather, the Lepidopterists had a satisfactory day on the whole. The best find was a fine specimen of *Agrotis praecox,* which was taken by Mr. C. P. Arnold, at rest on the sand. This species is usually taken on the coast, and it is interesting to find it established so far inland. It was taken by Dr. Corbett in the same locality in 1901. Some examples of the curious *Rhacodia caudana* were beaten out of sallow bushes. Appended is a list of Lepidoptera taken and observed. The mark † signifies that the moth is new to the district :—

Coenonympha pamphilus.
Polyommatus phloeas.
Lycaena icarus.
Agrotis nigricans.
A. praecox.
Triphaena pronuba.
Xanthia fulvago.
Camptogramma bilineata.
Cidaria testata.
Eubolia limitata.
Scoparia truncicolalis.
Scopula lutealis.
†*Crambus hamellus.*
C. inquinatellus.
C. culmellus.
†*Rhacodia caudana.*
Bactra lanceolana.
†*Pædisca solandriana.*
Symaethis oxyacanthella.
Plutella cruciferarum.

Larvæ of some species of *Eupithecia* were common on ragwort, and those of *Euchetia jacobeæ, Euplexia lucipara,* and *Hadena pisi* were also taken.

ORTHOPTERA.—Mr. Bayford took the following :—*Forficula auricularia* L., *Stauroderus bicolor* Charp, *Gomphocerus maculatus* Thunb.

ARACHNIDA.—Mr. T. Stainforth writes that he obtained the following spiders on the route followed by the botanists, etc. :—

SPIDERS.

Drassus lapidosus Walck.
Clubiona reclusa Camb.
Agroeca proxima.
,, *gracilipes* Camb.
Amaurobius fenestralis Stroem.
Antistea elegans C. L. Koch.
Bolyphantes alticeps Sund.
Stemonyphantes lineata Linn.
Linyphia clathrata Sund.
Leptyphantes blackwallii Kulcy.
Œdothorax (*Gongylidium*) *fuscus* Bl.
,, ,, *apicatus* Bl.
,, ,, *dentatus* Wid.
Erigone promiscua Camb.
,, *dentipalpis* Wid.
Lophomma punctatum Bl.
Neriene rubens Bl.
Peponocranium ludicrum Camb.
Pachygnatha clerkii Sund.
,, *degeerii* Sund.
Xysticus cristatus Clerck.
Pirata piraticus Clerck.
Trochosa picta Hahn.
Lycosa pullata Clerck.
Neon reticulatus Bl.

HARVESTMEN.

Phalangium opilio Linn.
Oligolophus morio Fabr.
,, *agrestis* Meade.

These have been identified by Mr. W. Falconer.

Mr. G. Grierson adds the following :—

Erigone atra Bl. | *E. arctica* White. | *Licosa nigriceps* Thor.

Conchology.—Mr. W. Denison Roebuck reports that while the general results of the day were disappointing, only seventeen species having been found, one of them was a most important discovery—*Limnæa glabra*. This was found by Dr. Wallace, in company with its usual associate, *Planorbis spirorbis* var. *rotundata*, and was an addition to the fauna of North Lincolnshire, the only previous record for the county having been in South Lincolnshire. It had long been expected to occur, considering that it exists in various Yorkshire localities, even close to Lincolnshire. The other species found were :—

Arion ater.
A. minimus.
A. hortensis.
Agriolimax agrestis.
Helix aspersa.
H. nemoralis.
Helicella cantiana.
H. caperata.
Hygromia hispida.
Vallonia pulchella.
Hyalinia cellaria.
H. alliaria.
Vitrina pellucida.
Zua lubrica.
Limnæa peregra.

Botany.—The botanists were led by the Rev. E. Adrian Woodruffe Peacock, who writes that the course taken rewarded the study given to the ground, which, before the iron was worked, was remarkably rich. In all, 132 species of flowering plants, horsetails and ferns were observed, and their associations and frequency noted.

The sand flora of the exploited iron-stone pits was first studied. They gave nothing very interesting :—*Carex arenaria*, *Centaurium umbellatum*, *Cerastium arvense*, still rarely in flower, *Erigeron acre*, *Œnothera odorata*, local and in masses, and *Senecio sylvaticus* var. *typica* and *auriculatus*. *Sisymbrium sophia* was in two forms.

The as yet untouched moorland flora, from which the pits have been evolved, has been much influenced by the constant pumping from the iron pits. *Cerastium arvense* was not as common there as in the iron pits. *Galeopsis tetrahit* only by ditches ; *Fragaria vesca* on the higher ground, rare. *Galium saxatile* was galled by *Cecidomyia galii*, *Hypericum humifusum*, sporadic and rare ; *Narthecium* local and still in flower ; *Leontodon hirtum* rare ; *Ornithopus perpusillus* local and very rare ; *Sagina ciliata* was most curiously varied with *S. procumbens* ; *Viola riviniana* was known by its seeds.

The damp spots, flashes and shallow ponds lying on the Lower Lias Clay supplied the most interesting combinations of the day. *Betula glutinosa* is here only found when the soil is wet. *Calamagrostis epigeios* is still common. *Chenopodium*

rubrum v. *pseudo-botryoides* has no doubt been brought there by wild fowl. *Filago minima, Galium palustre* var. *Witheringii* and *G. uliginosum* were in *Juncus conglomeratus* beds. *Gnaphalium uliginosum, Hottonia* was curiously rare; *Hypericum elodes* still in quantities. *H. tetrapterum* (Fr.) *Myrica, Polygonum hydropiper, Potentilla palustris*, but I saw no old plants. *Rumex maritimus* is still left, but the plants were very small. *Scutellaria minor, Solanum dulcamara (flore albo), Utricularia vulgaris* in flower, and rare. *Viola palustris* in leaf only.

The ditch flora was nothing particular. *Potamogeton polygonifolius* seems now to be rare. *Samolus* which is rare in N.-W. Lindsey, was there too.

The cultivated moorland here is a new thing since my last visit. *Lycopsis, Scleranthus annuus* and *Urtica urens* were well established, but there were no new interesting associations one had not studied before.

Many insect visitors were noted, but the day was not a good one for the purpose. *Thrips*, which was in every flower, examined the day before, was only once seen.

Compared with the glory of this ground even thirty years ago, but few good things are left, and those, we fear, are doomed. The common on the west of Scunthorpe is freer from disturbance, and still supplies *Epipactis palustris, Rumex maritimus, Gentiana Pneumonanthe, Narthecium* and *Pinguicula.*

The Rev. W. Fowler sends the following list of plants growing in, above, and below Crosby Warren in 1854.

I.—In the dry parts :—

Teesdalia nudicaulis Br.
Cerastium arvense L.
Ornithopus perpusillus L.
Galium hercynicum Weig.
Erigeron acris L.
Filago minima Fr.
Carlina vulgaris L.
Calluna vulgaris L.
Erica cinerea L.
Gentiana pneumonanthe L.
Echium vulgare L.
Solanum nigrum L.
Teucrium scorodonia L.
Salix repens and vars.
Carex arenaria L.
Sieglingia decumbens Bernh.
Blechnum spicant With.
Lycopodium alpinum L.
Lycopodium clavatum L.
Rhacomitrium lanuginosum Brid.
Rhacomitrium canescens Brid.
Cladonia pyxidata Fr.
Cladonia cornucopioides Fr.
Cladonia rangiferina Hffm.
Peltigera canina L.
Marasmius oreades Fr.
Polyporus lentus Berk. On stump.

II.—In the wetter parts :—

Viola palustris L.
Hypericum elodes L.
Potentilla palustris Scop.
Parnassia palustris L.
Pimpinella major Huds.
Cirsium palustre Scop.
Oxycoccus quadripetalus Gilib.
Erica tetralix L.
Lysimachia vulgaris L.
Anagallis tenella Murray.

Menyanthes trifoliata L.
Utricularia vulgaris L.
Scutellaria minor Huds.
Rumex maritimus L.
Myrica gale L.
Narthecium ossifragum Huds.
Juncus conglomeratus L.
Juncus inflexus L.
Butomus umbellatus L.
Potamogeton polygonifolius Pourr.
Equisetum palustre L.
Dryopteris spinulosa Kuntze.

He adds that many of these plants are still to be found, some below Frodingham Cutting, as *Gentiana, Parnassia, Butomus, Pimpinella major*, but the majority on the sandy land east of the cutting. *Lycopodium alpinum* and *L. clavatum* were both growing on the escarpment above the warren in 1854, where a wood was planted many years ago, north of the site of the 'neolithic remains.' Is it possible that they still lurk in some out-of-the-way corner, or are they lost to Lincolnshire, like other species, victims to cultivation ?

I have not used the terms 'Dysgeogenous,' 'Eugeogenous,' 'Xerophilous,' 'Hygrophilous,' etc., lest any of your readers should take them for diseases, which the plants included under them were 'good against'; and to any who are not 'up-to-date' in botanical nomenclature, I would say that *Galium hercynicum, Oxycoccus quadripetalus*, and *Sieglingia decumbens*, are only our old friends, *Galium saxatile, Vaccinium Oxycoccus*, and *Triodia decumbens*, in an older or newer dress. A few very common plants are not included in the above lists, as not being specially characteristic. Some have gone since 1854, and others have taken their place ; and, as the author of Ecclesiastes says, 'the thing that hath been it is that which shall be.' In another fifty-six years, there will be more and greater changes than in the last to be chronicled by the botanists who shall come after us.'

Mycology.—Mr. Crossland writes :—Mr. W. N. Cheesman and the writer spent a very pleasant time in Soke Nook Wood, whither they were conducted early on, by the leader of the botany section. All the time at our disposal was spent in this comparatively small wood, and on the sand hills above. Scots fir and larch are the principal trees. There are a few scattered oaks. The best finds were three or four specimens of *Hydnum auriscalpium* on decaying cones of *Pinus sylvestris*. One of the prettiest sights was a little forest of *Mycena sanguinolenta*, with their fibrillose bases growing on a rotting fir cone—a picture neither of us remember having seen before. Another uncommon find was a pair of *Volvaria parvula* growing from the sand on the hill among the rabbit burrows. In the same

habitat were quantities of *Bovista caepeformis, Rhizina inflata* was seen in plenty in one part of the wood, near some charcoal. We were pleased to meet Canon Fowler later on, who assisted in determining the specimens found.

The following is a full list of the species seen :—

Crucibulum vulgare.
Bovista caepeformis.
Scleroderma vulgare.
Amanita rubescens.
Armellaria mellea
Tricholoma rutilans.
,, *carneum.*
Collybia conigena.
Mycena rugosa.
,, *galericulata*
,, *acicula.*
,, *sanguinolenta.*
,, *discopoda.*
Volvaria parvula.
Entoloma sericellum.
Leptonia lampropoda.
Nolanea pascua.
Pholiota togalaris
Galera tenera.
,, *ovalis.*
,, *hypnorum.*
Psaliota campestris.
Stropharia æruginosa.
Psilocybe semilanceata.
,, *foenisecii.*
Hygrophorus niveus.
,, *coccineus.*
,, *obrusseus.*
,, *conicus.*
Lactarius turpis.
,, *quietus.*
Russula cyanoxantha.
Marasmius peronatus.
,, *oreades.*
,, *androsaceus.*
Fomes annosus.
Polystictus versicolor.
Poria vaporaria.
Hydnum auriscalpium.
Grandinia granulosa.
Thelephora laciniata.
Stereum hirsutum.
,, *purpureum.*
Corticium lividum.
Hirneola auricula-judæ.
Dacryomyces deliquescens.
,, *stillatus.*
Calocera viscosa.
Puccinia poarum. *Æcidium* on Coltsfoot. [*garis.*
Coleosporium senecionis on *S. vul-*
Claviceps purpurea = Ergot on Rye.
Nectria cinnabarina.
Rhytisma acerinum.
Rhizina inflata.
Geopyxis cupularis.
Dasyscypha calycina.
Helotum citrinum.
Pilaira anomala. On rabbit dung.
Ramularia calcea. On living leaves of ground ivy.
Stilbum fimetarium. On rabbit dung.
Tilmadoche nutans.
Fuligo varians.

Mr. W. Denison Roebuck sent me the following, gathered in and near Appleby Woods on Friday :—

Mycena sanguinolenta.
Laccaria laccata.
Leptonia incana.
Hygrophorus obrusseus.
Russula consobrina.
Stereum sanguinolentum.
Calocera viscosa.
Hirneola auricula-judæ.
Tubulina cylindrica.

T.S.

Mr. J. Wilfred Jackson kindly sends us some 'Notes on Shropshire Mollusca' (presumably reprinted from the Journal of the Conchology).

The Annual Meeting of the Yorkshire Naturalists' Union will be held at Middlesborough on December 17th, when Professor A. C. Seward, M.A., F.R.S., F.G.S., etc., will deliver his Presidential Address entitled 'The Jurasic Flora of East Yorkshire in relation to the Jurassic Floras of the World.' It will be illustrated by lantern slides.

Naturalist,

THE NATURAL HISTORY OF KIRBY MOORSIDE.

The members of the Yorkshire Naturalists' Union held their 225th meeting at Kirby Moorside, in August Bank Holiday week-end, 1910, under very favourable conditions.

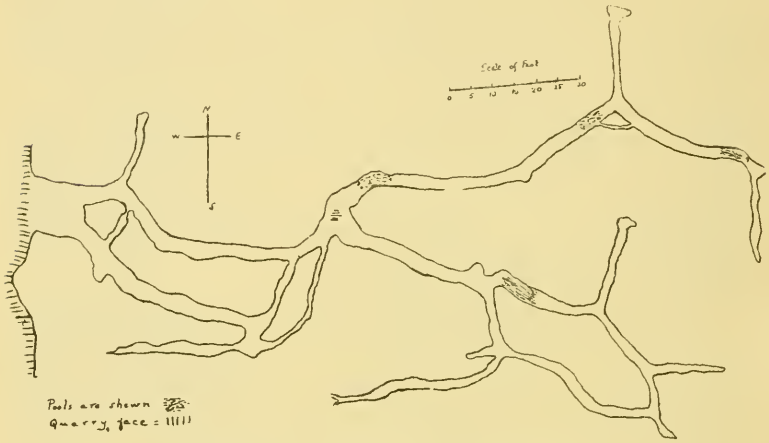
The greater part of the first day was spent in investigating the picturesque village of Kirkdale, with its famous cave, and recently restored church. The cave is situated in an oolitic limestone quarry, which has been worked for over a century. This was shown to be in an ancient coral reef, which yielded a very fine series of corals, sea-urchins, univalves and bivalves. The cave, which was discovered so long ago as 1821, was made famous by Buckland, who described it in a series of papers and volumes which are now classic. It was a hyæna den of enormous dimensions, and yielded thousands of bones, teeth, etc., of hyænas, as well as remains of the mammoth, rhinoceros, hippopotamus, reindeer, red deer, horse, and ox. The bones were in a very fragmentary condition, just as left by the hordes of hyænas which made this cave their home. The cave is now difficult of access.

The church at Kirkdale was found to be in the hands of the restorers. Over the doorway is the largest Saxon inscription in stone that exists in England. It records that Orm, the son of Gamal, erected the building in the days of King Edward, and in the days of Earl Tosti. This fixes the date as between 1055 and 1065. Built into the walls of the church are numerous fine early crosses, and it seems a pity that whilst the alterations recently made were in progress, that these were not taken inside.

At the evening meetings two communications were read. The first was by Mr. W. N. Cheesman, on some Myxomycetes which he had collected in Canada. These lowly organisms in the earlier stages of their existence have many characteristics peculiar to the animal kingdom, whilst at a later stage in their life history they certainly resemble plants. Probably the correct explanation is that they represent the primitive stage of life from which spring both animals and plants.

Mr. T. Sheppard read a paper on the cave and church at Kirkdale. Of the former he exhibited a recent plan, made by Mr. T. R. Nash, which shewed many details not exhibited in Buckland's book. He also referred to the numerous remains of extinct animals which were found.

One day was spent in the vicinity of Lastingham, where the scenery was much admired, and where the well-known crypt in the church was examined. Hutton-le-Hole, Appleton-le-Moors, and Douthwaite Dale were also visited, the flowering plants in the latter being particularly beautiful. On the Monday the party divided, one section visiting Gillamoor and Douthwaite Dale, the other travelling by wagonettes to Helmsley and Rievaulx Abbey. This excellent building was examined, and a short description thereof was given by Mr. H. E. Wroot.



Recent Plan of Kirkdale Cave, by Mr. T. R. Nash.

At the business meeting Mr. J. J. Burton presided, and the usual reports on the work accomplished were given.

Vertebrate Zoology.—Mr. S. H. Smith writes that his party proceeded through Manor Vale and across the fields to Gillamoor, and then back by way of Tadmoor and Douthwaite Dale to Kirby Moorside. The country is densely wooded, and affords plenty of cover for bird life, which doubtless accounted for so few birds being seen. Of the more uncommon species noticed, the Green Woodpecker appears to be in fair numbers, some half dozen being seen and heard, and their borings in the dead branches of the trees were noticed repeatedly. A little party of five Pied Flycatchers was seen at the top of Douthwaite Dale, three were young birds. Here, also, but higher up on the moor, three grouse were flushed; they all appeared to be old birds.

In the vicinity of the shooting box a lot of young Spotted Flycatchers and young Chaffinches were seen, and other common species were numerous. In Douthwaite Dale there was plenty of evidence of the presence of foxes; hares, on account of special protection, are ubiquitous; and rabbits are also very much in evidence. Along the banks of the River Dove, brown rats and water voles were noticed, and several common shrews were picked up dead on the footpaths, and numerous dead moles were hung from sticks placed in the fields where they had been trapped.

Coleoptera.—Mr. M. L. Thompsom reports having met with the following beetles in Kirkdale :—

Notiophilus biguttatus F.
Leistus rufescens F.
Nebria gyllenhali Sch.
Anchomenus albipes F.
Hydroporus planus F.
Anacæna globulus Pk.
Cercyon hæmorrhoidalis F.
Megasternum botetophagum Mrsh.
Aleochara lanuginosa Grav.
Homalota elongatula Grav.
Homalota fungis Grav.
Hypocyptus longicornis Pk.
Tachyporus obtusus L.
Tachyporus chrysomelinus L.
Tachinus marginellus F.
Bolitobius trinotatus Er.
Stenus impressus Germ.
Stenus picipes Steph.
Oxytelus tetracarinatus Block.
Anthobium ophthalmicum Pk.
Brachypterus urticæ F.
Meligethes æneus F.
Meligethes picipes Jtn.
Coninomus nodifer West.
Cryptophagus pilosus Gyll.
Atomaria atricapilla Steph.
Elmis volkmari Panz.
Adrastus limbatus F.
Agriotes pallidulus Ill.
Telephorus flavilabris Fall.
Rhagonycha fuscicornis Ol.
Rhagonycha fulva Scop.
Malthodes marginatus Lat.
Malthodes minimus L.
Dryophilus pusillus Gyll.
Lema lichenis Vat.
Chrysomela staphylea L.
Chrysomela polita L.
Phytodecta pallida L.
Phædon tumidulus Germ.
Phyllotreta undulata Kuts.
Sphæroderma testacea F.
Apteropeda orbiculata Marsh.
Crepidodera transversa Marsh.
Crepidodera ferruginea Scop.
Crepidodera rufipes L.
Plectroscelis concinna Marsh.
Cassida viridis L.
Apion apricans Hbst.
Apion virens Hbst.
Apion pisi F.
Apion humile Germ.
Otiorhynchus picipes F.
Strophosomus coryli F.
Sciaphilus muricatus F.
Omias mollinus Boh.
Tropiphorus tomentosus Marsh.
Polydrusus pterygomalis Sch.
Phyllobius urticæ De G.
Phyllobius viridiæris Laich.
Sitones puncticollis Steph.
Liosoma ovatulum Clair.
Orchestes quercus L.
Cionus blattariæ F.
Cæliodes geranii Pk.
Cæliodes quadrimaculatus L.
Ceuthorhynchus ericæ Gyll.
Ceuthorhynchus contractus Marsh.
Ceuthorhynchidius troglodytes F.
Scolytus destructor Ol.

Dr. W. J. Fordham noted the following insects at Lastingham :—

COLEOPTERA.

Notiophilus biguttatus F.
Nebria brevicollis F.
Nebria gyllenhali Sch.
Harpalus ruficornis F.
Harpalus æneus F.
Pterostichus madidus F.
Pterostichus vulgaris L.
Calathus cisteloides Pz.
Meligethes æneus F.

LEPIDOPTERA.

Pieris rapæ Lat.
Pieris napi Lat.
Cænonympha pamphilus West.
Vanessa urticæ F.
Polyommatus phlæas F.

DIPTERA.

Mesembrina meridiana.
Cecidomyia urticæ (galls on Nettle).
Cecidomyia veronicæ (on Speedwell).
Cecidomyia ulmariæ (on Meadow Sweet).

Mr. Laverack took a *Sirex gigas* in Douthwaite Dale in the wood.

ARACHNIDA.—Mr. H. C. Drake, F.G.S., writes that the following Arachnida, which have been identified by Mr. W. Falconer, were obtained :—

Clubiona corticalis Walck.
Cælotes atropos Walck.
Linyphia hortensis Sund.
Gongylidium rufipes Sund.
Meta segmentata Clerck.
Neriene rubens Bl.
Erigone dentipalis Wid.
Diplocephalus cristatus Bl.

HARVESTMEN.

Oligolophus morio Fabr.
,, *agrestis* Meade.
Liobunum rotundum Latr.
Nemastoma lugubre O. F. Muller (taken by Dr. W. J. Fordham).

Mr. C. P. Gledhill writes that there was nothing unusual amongst the lepidoptera, the following being noticed :—

Pieris brassicæ.
,, *rapæ.*
,, *napi.*
Vanessa urticæ.
Satyrus semele.
Leucania impura.
Noctua augur,
Triphæna comes.
Triphæna pronuba.
Miana strigilis.
Abraxas grossulariata.
Larentia didymata.
Boarmia repandata.
Scopula lutealis.
Tortrix corylata.

BOTANY.—Dr. W. J. Fordham writes :—During the week-end 242 flowering plants and ferns were noted by the members of the botanical section, and this list would have been considerably augmented had time allowed. Two plants stand out for special notice, viz., Baneberry or Herbchristopher (*Actæa spicata*) and Deadly Nightshade (*Atropa belladonna*), both of which were mentioned in the excursion circular. Some fine examples of the former were found at the top of the wood in Douthwaite Dale, and the latter was obtained in both flower and fruit on the dry hillside at the lower end of the dale, together with *Verbascum thapsus*, on the leaves of which the larvae of the Mullein Moth (*Cucullia verbasci*) were feeding,

and such characteristic xerophilous species as *H lianthemum chamœcistus, Carlina vulgaris* and *Carduus eriophorus.* Here also were several plants of *Prunella vulgaris,* with perfectly white flowers. The greater part of the day on Bank Holiday Monday was devoted to an examination of the woods and stream sides in Douthwaite Dale and here, in addition to the above noted plants, were found :—

Campanula latifolia.
Rubus saxatilis.
Viburnum opulus.
Asperula odorata.
Scabiosa succisa.
Scutellaria galericulata.
Circœa lutetiana.
Crepis paludosa.
Orchis maculata.
Myrrhis odorata.
Sanicula europœa.
Valeriana mikanii.
Epilobium hirsutum.
,, *angustifolium.*
Mimulus luteus.
Melica uniflora.
Listera ovata.
Lysimachia nemorum.
,, *nummularia.*
Solidago virgaurea.
Lactuca muralis.
Melampyrum pratense.
Prunus padus.

The Enchanter's Nightshade (*Circœa lutetiana*) in some places in the wood was so luxuriant and massed together as to produce a very pretty effect, whilst elsewhere the wood was carpeted with brilliant purple blue by *Prunella vulgaris.* One or two trees of the Bird Cherry (*Prunus padus*) were stripped of foliage by the gregarious larvae of the Ermine Moth (*Yponomenta padellus* L.), the webs of which were very numerous on the affected trees, whilst on another tree, which had somewhat escaped the onslaught, were found the nail-like galls of the mite *Eriophyes padi,* on the upper surface of the leaves. In a swampy osier bed by the stream was a glorious patch of the garden escape *Mimulus luteus,* which naturalises itself with extreme facility in suitable situations.

On the previous day the route selected was rather long for any detailed examination of the flora, but one or two interesting observations were made. On Spaunton Moor bracken was dominant, but it was closely challenged by four members of the thistle family—*Carduus nutans, C. lanceolatus, C. palustris* and *C. arvensis.* Although the underlying formation is calcareous, the absence of plants usually associated with such a formation was remarked till between Appleton-le-Moor and Lastingham, where were found *Hippocrepis comosa, Arabis hirsuta, Plantago media, Origanum vulgare* and *Thymus serpyllum,* all more or less limestone lovers. At Lastingham was obtained *Rubus rusticanus,* and, near the village, Balm (*Melissa*

officinalis) was found well established as a garden escape on a grassy bank. Between Lastingham and Hutton-le-Hole was a patch of moorland, and here were found the hoary form of Ling (*Calluna Erica* var. *incana*), and a host of interesting bog and moorland plants, including—

Erica cinerea.
,, *tetralix.*
Pinguicula vulgaris.
Triglochin palustre.
Juncus squarrosus.
,, *glaucus.*
Myrica gale.
Vaccinium myrtillus.
Anagallis tenella.
Veronica scutellata.
Ranunculus flammula.
Hydrocotyle vulgaris.
Narthecium ossifragum.
Drosera rotundifolia.
Empetrum nigrum.
Blechnum boreale.
Potentilla tormentilla.

A specimen of the Hard Fern (*Blechnum boreale*) was found here with the midrib bifurcating about an inch from the tip; also several 'Tassel Galls' on *Juncus articulatus*, made by the gall fly *Livia juncorum* Latr. These galls are composed of numerous terminal leaves, imbricating and forming one to four groups all springing from the same part of the stem, usually near the ground, and suffused with red. The gall is local in distribution, and somewhat uncommon.

The Barberry (*Berberis vulgaris*) was found near Nawton on the Saturday. Other plants in the immediate vicinity of Kirby Moorside include *Silaus flavescens* (abundant in a pasture near the church), and

Erophila verna.
Lychnis flos-cuculi.
Hieracium pilosella.
,, *murorum.*
,, *boreale.*
Rosa villosa.
Erythræa centaurium.
Stachys betonica.
Glyceria plicata.
Viola segetalis.
Lychnis githago (very abundant in a cornfield near Gillamoor).
Hypericum hirsutum.
,, *tetrapterum.*
Montia fontana.
Epilobium palustre.
,, *parviflorum.*
Ballota nigra.
Veronica officinalis.
Polygala vulgaris.
Arenaria serpyllifolia.
Geranium pratense.
Geum rivale.
Agrimonia eupatoria.
Conopodium denudatum.
Valerianella olitoria.
Chenopodium bonus-henricus.
Veronica serpyllifolia.

The Foxglove (*Digitalis purpurea*) was seen in one or two places, but it was not at all frequent.

The Mycological Committee was represented by Messrs. W. N. Cheesman, T. Gibbs, J. W. H. Johnson and R. H. Philip. Mr. Gibbs reports as follows:—

The August Bank Holiday excursion comes at a season when the main fungus crop is just beginning to appear, and, given a suitable district and favourable weather, it serves as a good opening for the real autumn campaign. This year both these factors united to promise a profitable time, and the mycologists met prepared to make the most of their opportunities. The woods which clothed the sides of the deep river valleys, though somewhat dry in the higher parts, had in the lower portions and along the stream sides plenty of moist places with deep leaf mould and abundance of rotting twigs and branches, suitable habitats for saprophytic fungi. To these spots the mycologists chiefly devoted themselves, and the list which follows shows a large proportion of woodland species, especially those which grow on dead wood. The Agarics were better represented than is usual so early in the season; altogether fifty-seven species being seen. Among the more uncommon may be noted *Paxillus atrotomentosus*, only once previously recorded for the county, and that from the neighbouring district of Pickering; *Naucoria sobria* var. *dispersa*, and *Hypholoma cascum*. Pasture Agarics were scarce, only two specimens of the common mushroom being seen. The *Hygrophori* were represented by single specimens of *H. conicus* and *H. coccineus*, and such common species as *Nolanea pascua* and *Stropharia semiglobata* were also represented by solitary examples. Among the lower Hymenomycetes the most interesting species seen was *Merulius rufus*. airly common on dead branches. A feature of the excursion was the abundance of Myxomycetes or Mycetozoa; almost every dead branch or twig had its little tenants belonging to this half-plant half-animal family. Particularly numerous was *Physarum* (= *Tilmadoche*) *nutans*, and some fine batches of its close ally *P. leucophaeum* were also found. *Trichiae*, and especially the usually abundant *T. varia*, were less common than usual. *T. fallax* was much infested by the parasitic mould *Stilbum tomentosum*. The commonest *Arcyriae* were *A. incarnata* and *A. cinerea*, the only group of *A. punicea* was on an unusual matrix, bare clayey soil in a woodland path.

Altogether, 140 species were identified. Of these three species and one variety are new to Yorkshire, and are marked * in the list which follows; the one marked † is a new record for north-east Yorkshire.

List of species seen :—

AGARICACEÆ.

Amanitopsis vaginatus.
Armillaria mellea.
Clitocybe fragrans.
Collybia clusilis. Among Sphagnum on moors near Lastingham.
Mycena galericulata.
M. leptocephala.
M. filopes.
M. acicula.
M. haematopoda. On dead wood, Kirkdale.
M. galopoda.
Omphalia fibula.
O. camptophylla.
O. bullula.
Pluteus cervinus.
P. phlebophorus. Two small specimens on the ground in wood.
Entoloma nidorosum.
Nolanea pascua.
Claudopus variabilis.
Pholiota mutabilis On stumps, Manor Dale.
Inocybe cincinnata.
I. rimosa.
†*Naucoria scolecina.*
**N. sobria* var. *dispersa.* On bare soil, under hedge, near Gillamoor.
Galera tenera var. *pilosella.*
G. hypnorum.
Cortinarius elatior.
Agaricus campestris.
Stropharia semiglobata.
Hypholoma fasciculare.
**H. cascum.* Among grass, Manor Dale.
Psilocybe semilanceata.
P. foenesecii.
Psathyra fibrillosa.
Psathyrella disseminata.
P. atomata.
Coprinus macrocephalus.
C. cordisporus.
C. radiatus.
C. gibbsii. These four on horse dung.
Paxillus involutus.
P. atro-tomentosus. In fir plantation.
Hygrophorus coccineus.
H. conicus.
Lactarius turpis.
L. pyrogalus.
L. piperatus..
L. quietus.
L. fuliginosus.
L. subdulcis.
Russula cutefracta.
R. foetens.
R. fellea.
R. emetica.
R. ochroleuca.
R. puellaris.
R. alutacea.
Cantharellus cibarius.
Marasmius ramealis.
M. rotula.
Lentinus cochleatus. On stump, Manor Dale.

POLYPORACEAE.

Boletus flavus.
B. subtomentosus.
Polyporus adustus.
P. chioneus.
Polystictus versicolor.
Fomes annosus.
Poria vaporaria.
P. mollusca.
Daedalea quercina.
**Merulius rufus.*

HYDNACEAE.

Hydnum niveum.
**H. molluscum.*
Radulum quercinum.
Grandinia granulosa.
Odontia fimbriata.

THELEPHORACEAE.

Stereum hirsutum.
S. sanguinolentum.
Corticium calceum.
Hymenochaete rubiginosa.
Peniophora ochracea.
P. hydnoides.
Coniophora sulphurea.

TREMELLACEAE.

Exidia glandulosa.
Tremella mesenterica.
Dacryomyces deliquescens.

UREDINACEAE.

Melampsora farinosa.
M. circæae.
Coleosporium sonchi.
Uromyces polygoni.
U. alchemillae.
Puccinia poarum.
P. suaveolens.

PYRENOMYCETES.

Epichloe typhina.
Hypocrea rufa (conidial form only seen).

Dialonectria sanguinea.
Xylaria hypoxylon.
Rhytisma acerinum.
Diatrype stigma.
Eutypa lata.
Lasiosphaeria ovina.
Melanomma pulvis-pyrius.
Heptameria doliolum.

DISCOMYCETES.

Humaria granulata. On cow dung.
Lachnea hemispherica. On the ground.
Dasyscypha virginea.
D. nivea.
D. hyalina.
D. calycina. On larch twigs.
†*Erinella Nylanderi.* On nettle stems.
Helotium cyathoideum.
H. scutulum.
Belonidium ventosum.
B. Clarkei.
B. pruinosum. On *Eutypa.*
Mollisia cinerea.
Orbilia leucostigma. The var. *xanthostigma* was much commoner than the type.
Coryne sarcoides. (Conidial form).
Ascobolus immersus.
Ascophanus carneus.
Saccobolus kerverni.
The three last on horse dung.

PHYCOMYCETES.

Empusa muscae.

HYPHOMYCETES.

Stilbum tomentosum.

MYXOMYCETES (=MYCETOZOA).

Ceratiomyxa mucida.
Stemonitis fusca.
S. typhina.
Reticularia lycoperdon.
Lycogala epidendrum.
Arcyria punicea.
A. incarnata.
A. nutans.
A. cinerea.
Trichia varia.
T. abrupta.
T. fallax.
T. affinis.
Physarum nutans.
P. leucophaeum.
P. viride.
Fuligo varians.
S. friesiana.

T. S.

The **Proceedings of the Geologists' Association** (Vol. XXI., pt. 8), contain the presidential address of Prof. W. W. Watts, entitled 'Fifty Years' Work of the Geologists' Association.' In this Prof. Watts classifies the various contributions made to the Association during the past half-century; his address being an admirable summary of the work accomplished by that body. He also suggests that an additional £50 a year should be spent on illustrations for the Society's Proceedings, in order to keep them to the highest and best level.

The Transactions of the **Manchester Geological and Mining Society** (Vol. XXXI., pts. 14 and 15), contain a valuable paper on 'Sinking into the Lower Coal-Measures at Hulton Colliery,' by Mr. A. J. Tongue. It is illustrated by details of the section, and by an enormous folding plate containing reproductions of a number of photographs of the fossil plants, etc., found during the excavations. This plate contains enough blocks for five ordinary plates, and it would have been much better had they been printed and bound in the ordinary way. As it is, the plate is almost sure to be 'guillotined' by the binders.

The **Birmingham Natural History and Philosophical Society** has just issued its Annual Report and List of Members for 1910, as well as some separate papers, including one by E. Wace Carlier on 'Hibernation: a suggestion as to its origin in the Mammalia'; Mr. J. Hall-Edwards writes on 'The X-Rays'; Mr. Olive Hood on 'Rhizophidium Eudorinae: a New Chytridiaceous Fungus'; Mr. T. H. Waller on 'The Phosphatic Rocks of Redonda.' There are also two parts of 'The Fauna of the Midland Plateau,' viz., 'A preliminary list of the Thysanura and Collembola,' by Mr. W. E. Collinge (14 pp., 6d.), and 'The Mycetozoa,' by Mr. W. B. Grove (23 pp., 6d.).

MARINE BIOLOGY AT REDCAR.

Rev. F. H. WOODS, B.D.

The meeting of the Marine Biological Section of the Yorkshire Naturalists' Union at Redcar was on the whole very successful, in spite of drawbacks. The coast abounds in marine life; but this is confined to rocks (scars), which are only exposed at low spring tides, and several of which can only be reached by a boat. The time for exploring is confined, therefore, to barely two hours a day. There was also a stiff gale blowing from the west and north on Saturday and Sunday, and it was not till Tuesday that there was any considerable drift of sea coal and shingle suitable for microscopic examination.

Of the molluscs the most interesting finds were *Dentalium entalis*, the empty shells of which are washed up at a particular spot, shewing that there is a small colony of them in the sands to the west of the Pipe Scar, *Venus fasciata*, which is very rare on the Yorkshire coast, and the beautiful little *Philine catena*, which is not uncommon at Scarborough. On the Pipe Scar there is a large colony of *Zirphæa crispata*, and with it the boring variety of *Tapes pullastra*, as well as a specimen of *Barnea candida*, which usually prefers to bore in the softer boulder clay, as at Bridlington.

In the following list of shell molluscs those found in the living state are marked with a †.

†*Craspedochilus cinereus.*
Tonicella rubra.
Nucula nucleus.
Anomia ephippium.
,, *patelliformis.*
†*Mytilus edulis.*
Volsella modiolus.
Ostrea edulis.
Pecten pusio.
,, *opercularis.*
,, *varius.*
Turtonia minuta.
Cyprina islandica.
Montacuta bidentata.
Tellimya ferruginosa.
†*Kellia suborbicularis.*
Syndosmya alba.
Tellina tenuis.
,, *fabula.*
Macoma baltica.
Donax vittatus.
Mactra stultorum.
,, v. *cinerea.*
†*Spisula solida.*
Lutraria elliptica.
Venus gallina.
,, *fasciata.*
Tapes pullastra.
† ,, v. *perforans.*
Cardium echinatum.
,, *fasciatum.*
,, *edule.*
Mya truncata.
Ensis ensis.
,, *siliqua.*
†*Saxicava rugosa.*
†*Barnea candida.*
†*Zirphæa crispata.*
Dentalium entalis.
†*Patella vulgata.*
†*Helcion pellucida.*
† ,, v. *lævis.*
Acmæa testudinalis.
,, *virginea.*
Eumargarita helicina.
†*Gibbula cineraria.*

†*Lacuna divaricata.*
† ,, *pallidula.*
†*Littorina obtusata.*
† ,, *littorea.*
Alvania punctura.
Onoba striata.
Cingula semistriata.
†*Trivia europæa.*
Natica catena.
,, *alderi.*
Odostomia unidentata.
,, *turrita.*
Brachystomia rissoides.
Pyrgulina interstincta.
Spiralinella spiralis.
Turritella communis.
†*Buccinum undatum.*
Neptunea antiqua.
Tritonofusus gracilis.
†*Purpura lapillus.*
†*Nassa incrassata.*
Bela turricula.
,, *rufa.*
Mangilia costata.
,, *nebula.*
Clathurella linearis.
Tornatina truncatula.
Philine catena.

With regard to Sea-anemones, Crustaceans, etc., Dr. Irving of Scarborough writes: 'I saw no *Actinia mesembryanthemum* (common beadlet), and can only account for its apparent absence in the neighbourhood where I worked by the fact that there were no exposed rocks where it could have regular air and sun-baths—the zone was beyond its usual range. Other anemones however, were numerous. Those I saw were:—

Tealia crassicornis v. *meloides.*
,, v. *insignis.*
,, v. *aurea.*
Dianthus plumosa (young specimens, salmon colour).
Sagartia troglodytes.
,, *pura.*
,, *ornata.*
,, *pallida* v. *rufa.* ?
,, *coccinea.* ?

The Nudibranchs were also numerous:—

Goniodoris nodosa.
Acanthodoris pilosa (dark variety).
Lamellidoris aspera.
Jorunna johnstoni.
Archidoris tuberculata.
Æolidia papillosa.
Coryphella rufibranchialis.
Polycera quadrilineata.

Crustaceans abound:—

Carcinus mænas
Cancer pagurus
Maia squinado
Pagurus bernhardus

and several species of small crabs, besides *amphipoda*, *isopoda* and the Spectre Shrimp (*Caprella*).

Echinoderms seen were:—

Solaster papposa.
Asterias rubens.
Cribella oculata.
Ophiothrix fragilis.

I chipped off a small white patch from a rock which I thought was a young colony of *Alcyonium digitatum.* It measured perhaps ½ inch by ⅓ inch. Examining it at home, I found about

twenty coral polypes of a light yellowish-brown colour, each projecting from a ribbed calcareous corallum of perfect whiteness. Each corallum was made up of ten or twelve ribs. I cannot name this, though it may belong to the *Caryophyllia smithii*.

On the under sides of large stones, and on sides of cavernous rocks I found fairly thick masses of the compound ascidian, *Botryllus smaragdus*, and doubtless other varieties are to be found. There were also specimens of *Cynthia aggregata*, another ascidian.

Sponges were fairly common, but I only noted—

Halichondria panicea. | *Grantia compressa.* | *Halisarca.*

Mr. J. Thompson, of Hull, sends the following list of Zoophytes and Algæ :—

HYDROIDS.

Clava multicornis.
Sertularia pumila.
Sertularia operculata.

POLYZOA.

Encratea chelata.
Scrupocellaria scruposa.
,, *reptans.*
Bugula turbinata.
Crisia cornuta.
,, *eburnea.*
Amathia lendigera.
Alcyonidium hirsutum.

ALGÆ.

Chondria dasyphylla.
Delessera alata.
Phyllophora membranifolia.
Polysiphonia fibrata.
Philota plumosa.
Callithamnion granulatum.
Sphacelaria filicina.
Rytiphlæa complanata.

The chief value of the meeting did not consist, however, in the records of various species, but in the local interest which it excited. Many residents, especially school teachers, visited the collection which was made and arranged in order, and will carry on their study for themselves. A hope was expressed that Scarborough would be visited next year.

A List of British Birds, by **Mr. W. R. Ogilvie-Grant** (Witherby & Co., 326 High Holborn, W.C., 1/6), will be found most useful to ornithologists. It is brought up to date, and shews at a glance the exact status of each species. It also gives, in a most concise form, the information under heads, as to whether a resident breeding species, a summer visitor breeding, an autumn, winter, or spring visitor now breeding, occasional visitor used to breed, and occasional visitor never having been known to breed. It is printed only on one side of each page, and can thus be of great use for labelling specimens. The printing and paper are of good quality.

FIELD NOTES.

FLOWERING PLANTS.

***Geranium Columbinum* at Marsden.**—This interesting geranium was shewn to me by Dr. Aspinwall, of Marsden, at the latter end of September. He found it at Inner Hey, Marsden, which, so far as I know, is the second definite known locality for this plant within the Huddersfield District.—W. E. L. Wattam, Newsome.

***Triglochin palustre* in the Parish of Halifax.** — In view of the thoroughness with which the flora of the parish of Halifax has been worked up, it is rather surprising that a new flowering plant should have to be recorded from Hebden Bridge. During August I found *Triglochin palustre* (marsh arrow grass), in what seems to be a very natural situation in Crimsworth Dene. The plant is established over about a yard of ground in a woodland swamp. The occurrence was anticipated in the 'Flora of the Parish of Halifax' (Messrs. Crump and Crossland), where it is stated: 'It might be found in marshy ground, and there are many likely localities for it.'—Wm. Nowell.

—: o :—

BIRDS.

Albinism in a Song Thrush.—Throughout the greater part of August and September a prettily marked variety of the Song Thrush has frequented the Allotment gardens at Newsome. The whole of the neck, the entire back and tail, and the right wing were patched with white feathers, making the bird a most conspicuous object.—W. E. L. Wattam, Newsome.

—: o :—

HYMENOPTERA.

***Colletes daviesiana* Kirby, etc., at Selby.**—On May 24th, 1909, I was fortunate enough to secure a pair of these interesting little bees on the flowers of *Chrysanthemum maxima* in a garden at Selby. The Rev. F. D. Morice has kindly identified them, and they constitute a new West Riding record.

It may also be of interest to note the frequent occurrence this summer of the black variety ♂'s of the parasitic humble bee—*Psithyrus campestris*, Panzer, in the East Riding; on the flower heads of the family's favourite plant *Centaurea nigra*.—John F. Musham, Selby, Oct. 16th, 1910.

NEWS FROM THE MAGAZINES.

The *Museums Journal* (Vol. X., No. 3) has an illustrated article on 'Some Recent Work in the Exeter Museum,' by the Curator, Mr. F. R. Rowley.

The *Journal of Conchology* for October contains illustrations and description of a 'curiously distorted *Anodonta cygnæa*' from the Valley pond at Scarborough.

The Animal World for October contains a photograph of the Rorqual recently stranded at Cloughton Wyke. It measured 51 feet in length, 7 feet in height, and 9 feet across.

In the *Geological Magazine* (No. 553), Mr. F. R. Cowper Reed describes some new fossils from the Dufton Shales, and Mr. Bernard Smith has an illustrated paper on 'The Upper Keuper Sandstones of East Nottingham.'

In an article on 'British Scorpion Flies,' in *The Entomologist* (No. 566), Mr. W. J. Lucas figures a Huddersfield specimen of *Panorpa germanica*, though Yorkshire does not appear in the list of localities in which the species has been recorded.

'Recorder,' writing in the *Geological Magazine* for October, asks a certain Yorkshire Society 'what possible use it is to publish generic names under combinations of letters,' instead of giving them in full. This point has recently been referred to in these columns.

We have received Part 1 of Vol. I. of another publication bearing the title of *The Museum Journal*, issued by the University of Pennsylvania. It is well illustrated, and deals with the administration of the museum, its recent additions, etc.

Dr. Tempest Anderson's presidential address to the Museums' Association appears in Vol. X., part 1, of the *Museums Journal*. It deals with 'Volcanoes and their Museum Treatment.' Dr. Anderson points out that 'you cannot stick a pin through a volcano and mount it *in a cabinet like a beetle*.'

The *Irish Naturalist* for September is a 'special Rosapenna Conference number.' It is devoted to a Report of the Sixth Triennial Conference and Excursion of the Irish Field Club Union, held at Rosapenna, July 8th to 13th. There are several excellent plates, and notwithstanding its increased size, it is issued at sixpence.

The *Irish Naturalist* for October contains a memoir on the late Samuel Alexander Stewart, of Belfast. Stewart 'was the most remarkable, it might almost be said,' the only example 'of a working-man naturalist in Ireland.' An excellent portrait accompanies the notice, and there is a list of his papers, etc.

In a recent issue of *The Zoologist* (No. 830), Colonel C. E. Shepherd gives some comparisons of Otoliths found in fishes, with illustrations; Mr. A. H. Swinton writes on 'The Vocal and Instrumental Music of Insects'; and Mr. F. J. Stubbs has a note on 'The Nightingale in Lancashire: a New Record.'

Part 17 of Mr. J. W. Taylor's *Monograph of the Land and Freshwater Mollusca of the British Isles* has been published, and deals with *Helix pomatia*, *H. aspersa* and *H. nemoralis*. Each is dealt with in the author's characteristically thorough manner. There are numerous excellent illustrations, including two beautiful coloured plates shewing the varieties of *Helix pomatia*.

In *The New Phytologist* (Vol. IX., Nos. 1 and 2), Dr. C. E. Moss has a lengthy paper on 'The Fundamental Units of Vegetation.' It is accompanied by a good bibliography. In Nos. 6 and 7 of the same journal, Dr. F. Cavers has an important memoir on 'The Inter-relationships of the Bryophyte,' and Dr. M. C. Stopes describes Adventitious Budding and Branching in *Cycas*.

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A MONTHLY ILLUSTRATED JOURNAL OF
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EDITED BY
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Yorkshire Naturalists' Union.

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Prof. A. C. SEWARD, M.A., F.R.S.

In connection with the Annual Meeting to be held at Middlesbrough on December 17th,

A SPECIAL EFFORT

is being made

To enrol at least FIFTY New Members,

in order that the work of the Union may not be retarded.

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T. SHEPPARD, F.G.S., Hon. Sec.,

The Museum, Hull.

NOTES AND COMMENTS.

BIRDS' EGGS AND 'PROTECTION.'

Notwithstanding the various Acts of Parliament and other methods which have been adopted for the preservation of our rarer birds, it is apparent that not only is the law being repeatedly broken, and rare eggs are being regularly taken, but dealers continue to publish lists of rare eggs for sale, with 'British taken' clutches specially indicated. We have before us a 'Special offer of choice eggs in clutches with full data,' dated October 1910, published by a naturalist in Gloucestershire, the prices ranging up to 57/6 a clutch. Amongst the 'British taken' sets we notice Golden Eagle, Chough (two sets), Raven (two sets), Great Skua, Greater and Lesser Spotted Woodpeckers, Green Woodpeckers, Short-eared Owl, Rock Pipit, Grasshopper Warbler, Black Grouse, Shell, Eider, and Tufted Ducks, Mute Swan, etc. It would be interesting to get the 'full data' of some of these.

NEW NATURAL HISTORY SERIALS.

The enormous number of popular natural history publications being issued by various houses is distinctly encouraging, and is some indication of the continued interest that is being taken in natural science generally. Many of these are being produced in a way which leaves nothing to be desired, either for the excellence of the matter, type, illustrations, or for cheapness. Some, perhaps, are a little more 'popular' than scientific, but it is a welcome sign to find that the greatest publishing firms now secure the services of our leading naturalists and do not merely republish the so-called natural history of decades ago.

A HISTORY OF BRITISH MAMMALS.

Perhaps the work for which there is the greatest need is that with the above title, now being issued in half-crown parts by Mr. G. E. H. Barrett-Hamilton. When completed, it will consist of three volumes, with 81 plates (27 being coloured), and over 250 illustrations in the text. Hitherto Tomes and Alston's edition of Bell's History of British Quadrupeds has been the standard work of reference on the subject, but it is obviously out of date now. We have the first part of the work before us, and though we have been anxiously looking forward to it for some time, it certainly far exceeds our greatest anticipations.* No naturalist can possibly do without it, and all will

* Gurney & Jackson, pp. i-xvi., 1-8, and 49-88.

share our anxiety to see the work completed. The present part deals with a section of the bats, and if the remainder of the work is done in the same thorough and scientific manner, it can be safely said that no other such work will exist in the English language. It is also gratifying to us to find to what a large extent 'The Naturalist' and the work of the members of the Yorkshire Naturalists' Union have been put to use by the author. On every page there is evidence not only of Mr. Barrett-Hamilton's thorough acquaintance with the subject with which he deals, but it is also apparent that he is in close touch with the various workers, as well as with the somewhat extensive literature. The various diagrammatic sketches and other illustrations, by Mr. E. A. Wilson, are also all that can be desired.

HARMSWORTH NATURAL HISTORY.

Under this heading is perhaps the cheapest 'Natural History' that has appeared in recent years. The work is being issued in about forty sevenpenny parts. Each part has many illustrations in the text, and four excellent coloured plates. Sufficient has already been published to indicate that by the time the three volumes are complete the possessor will have a thoroughly reliable and fairly comprehensive account of the animal kingdom. The subjects, too, are dealt with in a scientific manner, and not merely catalogues under the heads of name, size, locality, habits, etc., as was the case with the 'natural histories' of years ago, When we bear in mind that the principal contributors are Mr. R. Lydekker, Sir Harry Johnston and Prof. Ainsworth-Davis, it is apparent that the scientific accuracy of the publication is assured. As a matter of fact, we have had occasion to refer to the work on one or two points, and have found it most helpful. As regards the text illustrations, these are numerous, but of varying quality. Some are obviously from recent photographs and sketches; others, however, have an ancient, not to say 'wooden' appearance.

KEARTON'S NATURE PICTURES.

In an attractive cover, Messrs. Cassell are publishing a wonderful series of pictures by the brothers Kearton, in twenty-four fortnightly parts, at a shilling net. Each of these contains eight pages of letterpress (with illustrations) and four plates, one of which is coloured. The plates alone are worth the money, and we confess we like the uncoloured ones the best.

We should recommend natural history museums, etc., to purchase this series. We know of one museum at any rate that exhibits the plates in its natural history gallery, where they make a very attractive, as well as an educationally valuable exhibition. Whilst, as might be expected, most of the photographs reproduced relate to bird life, this is not exclusively the case; and mammals, reptiles, etc., are represented. We have seen many of the photographs previously, but they are nevertheless welcome in their present form. The descriptive matter is in Mr. Richard Kearton's characteristic style.

FAMILIAR WILD FLOWERS.

By the time these notes appear, another edition of Hulme's 'Familiar Wild Flowers' will have been completed. This publication also is issued by the house of Cassell. Forty-five sixpenny parts have appeared, containing no fewer than three hundred and sixty coloured illustrations of our chief wild flowers, and each has four pages of descriptive letterpress, in which the plants, their habitats, folk-lore, etc., are described. With this work in hand it should be an easy matter to identify almost any plant likely to be found on a ramble in the country Mr. Hulme's well-known drawings are excellently reproduced by the three-colour process. Artists and teachers will also find the work most helpful to them.

THE WONDERS OF THE WORLD.

Under this title Messrs. Hutchinson are issuing twenty-four fortnightly parts dealing with 'The Marvels of Nature and Man as they exist to-day.' Each part is sold at sevenpence, and contains thirty-two pages, admirably illustrated by carefully-chosen photographs, beautifully reproduced. Whilst these depict wonderful geological and botanical features, the principal photographs come under the heading of 'Marvels of Man.' Even these, however, are of great value to the anthropologist. It is difficult to decide which to admire most, the extraordinary nature of the subjects illustrated, or the excellent way in which the photographs have been reproduced. There can be no question that when the work is completed, it will be a most acceptable record of the many extraordinary objects to be found in this wonderful world.

THE COUNTRY HOME.

This charming monthly magazine, published by the Sphere and Tatler, Ltd., at the small price of 6d., is certainly a magazine for all lovers of the country. Perhaps its most attractive

feature is the excellence of the numerous illustrations. The articles also are such as will appeal to all lovers of nature. Besides dealing with various aspects of country homes, there are articles on old sun-dials, windmills, old-fashioned industries, duck-decoys, beech trees, natural history of the garden, prehistoric implements, old fire-places, snails, megaliths, etc., etc. Amongst the names of the contributors, we notice a well-known worker, Mr. Wilfred Mark Webb.

THE MINERAL KINGDOM.

This well-known work, by Dr. Bernard Brauns, Professor of Mineralogy in the University of Bonn, is appearing in twenty-five parts, at two shillings each. It is being published by Messrs. Williams and Norgate, and has been translated, with additions, by Mr. L. J. Spencer, M.A., F.G.S., of the British Museum. The specimens before us each contain twenty pages of letterpress, and two excellently-coloured plates; in fact, the difficulty of adequately representing the metallic colours and beautiful tints of many minerals, seems almost to have been overcome. When complete, the work will contain ninety-one plates, seventy-three being coloured, and two hundred and seventy-five illustrations in the text. Though originally published in Germany, 'The Mineral Kindgom' contains many references to British specimens. English students will find the publication of great value to them, particularly as it is obtainable in instalments.

EUROPEAN GLACIAL DEPOSITS.

Some little time ago Mr. Frank Leverett, of the United States Geological Survey, paid a visit to Europe for the purpose of investigating the glacial deposits of that continent. Mr. Leverett's excellent work among the more recent deposits of North America, makes a perusal of his report of peculiar interest to English glacialists. It has been issued and printed in Berlin in Vol. IV. of the Zeitschrift für Gletscherkunde,' though we are thankful to say it is printed in English. The report, which is entitled 'Comparison of North American and European Glacial Deposits,' is an extensive one, and is accompanied by a valuable series of maps of Great Britain, the Alps, North Germany, North America, etc., showing the glacial features of these areas. Mr. Leverett's remarks on the young Morainal Drift of England are of so much interest that we take the liberty of giving them in full.

LIMITS OF THE ICE SHEET.

'The young drift of England seems to find its limits, in

part at least, at moraines described by H. Carvill Lewis, and thought by him to mark the full limits of the ice sheet. The older drift outside was regarded as a deposit by floating ice. The writer examined these moraines in the district east of the Pennine Hills, both in the Vale of York and at points along the east coast between Whitby and Hull. The studies along the coast were in company with Professor Kendall and Mr. G. W. Lamplugh, who have each contributed important papers on the glacial features. In the district between the Pennine Hills and the mountains of North Wales glaciation extended southward to Shrewsbury and possibly to Wolverhampton. A large part of Wales seems also to have had the later glaciation.'

YORKSHIRE DRIFTS.

'The drift shows great complexity in exposures along the coast south from Flamborough Head, and between Scarborough and Flamborough Head, there being at least three distinct boulder clays of unlike rock constituents. There evidently has been an ice movement here from Scandinavia, as well as from the local ice sheets of the British Isles. Mr. Lamplugh, who has studied these exposures more closely than anyone else, and who began the study with the idea that the several drifts mark deposits of different stages of glaciation, has reached the conclusion that they are all the deposits of one glacial stage though from separate glacial centres. At least he has found no decisive evidence of any great difference in age or of any wide gaps between the drifts.'

ASPECT OF THE DRIFTS.

'The aspect of all the drifts impressed the present writer as rather fresh, and differing no more perhaps than the upper drift and the middle drift of Germany. The aspect is much fresher than in the old drift on the Norfolk coast. The moraines are the product of an ice movement from the British contres, for they overlie the Scandinavian deposits. They present gentle swells and sags of a subdued type, similar to those of the outer moraines on the Wisconsin glaciation in America. The weathering and leaching is but little more than a metre in depth, and the weathered part is much lighter brown colour than in the old drift on the Norfolk coast.'

MORAINES.

'The moraines just discussed seem more likely to correlate with the upper drift than with the löss-covered middle drift of

the north German lowland. It is possible that the rather fresh deposits of the Scandinavian ice field, that are buried beneath the morainic drift, will correlate with the middle drift of north Germany. They mark an extension of Scandinavian ice that seems greater than would be consistent with the extent of the upper drift in Germany, but which would fall in naturally as a continuation of the middle drift border from north eastern Holland across the North Sea basin.'

BRITISH ICE SHEETS.

'The district ice sheets and mountain valley glaciers of Great Britain are thought by Geikie to be so widely separated from the glaciation that produced the morainic drift just discussed, as to be referable to distinct stages of glaciation named the Lower Turbarian and Upper Turbarian. The evidence seems clear that the ice sheets of the north part of Great Brtain were subject to increase and decrease in response to climatic variations, and that there have been times of low elevation and incursion of the sea that correspond somewhat to enlarged glaciation. This evidence is of great value in bringing out the later history of the ice sheets, and is of similar import to evidence found in Scandinavia in showing there has not been a steady amelioration of climate, since the culmination of the last stage of glaciation.'

CONCLUSIONS.

'The writer is not disposed to minimize these results in the least. The dissent from Geikie's interpretation is merely a matter of the proper terms to apply to such climatic changes. It has been shown in the course of the present discussion that there are very pronounced differences in amount of weathering and erosion, and in general aspect as to age in deposits that have been referred to different glacial stages. The differences are so great as to seem to require more time in each interglacial stage than has elapsed since the outer portion of the drift of the fourth glacial stage became exposed to weathering and erosion. These expanded glacial conditions which Geikie has ranked as stages are so much briefer than any of the previous glacial stages that it seems more fitting to rank them as stadia of the waning portion of the fourth stage of glaciation, and to class the breaks between them as interstadial rather than interglacial, for it is not known that the ice completely disappeared between the times of expanded glaciation.'

Naturalist,

NOTES ON BATS.

ARTHUR WHITAKER,
Worsbrough Dale, Barnsley.

(PLATE XVII.).

In 'The Annual Report of the Yorkshire Naturalists' Union' for 1909*, mention was made of a 'brood of young Pipistrelles,' taken in the Northallerton district. The phrase is a somewhat misleading one, seeming to imply that the Pipistrelle produces several young ones at a birth, and as attention was drawn to this, and a query raised about it, in 'Nature,' (February 1910), a fuller account of the incident referred to may be desirable.

On July 20th, 1909, Mr. Denison Roebuck sent me some bats which he had received from Mr. J. F. Musham, of Selby, whose cousin had captured them in a farmhouse at Alne, in the Northallerton district.

Upon examination I found the specimens, six in number, consisted of two adult female Pipistrelles (*P. pipistrellus*), both of which had evidently, from the condition of the breasts, been suckling young; two largish young bats of the same species, nearly equal in size, and apparently, judging by the growth of hair on back, head and chin, etc., of about the same age. Previous experience of the young of this species led me to judge the age of these two juveniles at fourteen or fifteen days. The remaining two specimens were baby bats, and, like the pair last described, apparently of about the same age, which in their case, however, would not be more than eight or nine days.

It might naturally be assumed that these six bats comprised two families, each consisting of mother and twins. I wrote to Mr. Musham, hoping to obtain further information. I had especial interest in the matter, having had previous experience, at various times, of the birth of thirteen young bats (six being Pipistrelles), and in all these cases a single young one only had been produced.

Mr. Musham very kindly gave me the following information as to the capture of the specimens:—On the evening of July 18th, his cousin had retired to bed with his window left partly open at the top. After about half an hour he was disturbed by squeaking, and saw the two adult bats flying wildly round

* 'The Naturalist,' 1910, p. 46

the room. He knocked them down with a slipper, placed them on the table, and turned into bed again.

He was soon disturbed, however, by further squeaking, continued in a minor key, and thinking the bats he had knocked down were coming round again, he lighted a candle to see, but found them quite still.

The squeaking continued, and he at last located it as proceeding from one of the juveniles, which was hanging on the bed curtain about half way between the floor and ceiling. He killed it and placed it with the others, but the squeaking still continuing, he had another search, and at length discovered a second young bat, suspended from one end of the blind roller, which he promptly added to his bag.

But his hunt was not yet ended, for before he could get to sleep he was again disturbed by further squeaking, and, losing his temper, got up once more, and made a thorough search of the room, which resulted in two more baby bats being found, the one suspended from the top edge of the skirting board, and the other clinging to the bed vallance.

Although he allowed the window to remain open, no more bats were heard or seen, either on that or subsequent nights. One night, about a fortnight previous to that on which the six bats above referred to were captured, two adult Pipistrelles, one of each sex, had been captured in the same room.

It will be seen from the foregoing account that, although there seems to be some support given to the idea that these young bats represented two cases of the birth of twins, it is not by any means safe to conclude that this was actually the case.

The following records of the occurrence of the Hairy-armed Bat (*V. leisleri*) are of interest, this species still being looked upon as one of the rarer English species.

On August 7th, 1909, Mr. Armitage and I went to examine a colony of bats, which had been heard squeaking in a decayed limb of a large oak tree at Rockley, near Barnsley.

The day was very hot, and one could not remain many minutes in the vicinity of the tree without having one's attention arrested by fitfull bursts of squeaking from the bat's den. Previous experience would lead me to say that the arboreal colonies of Noctule and Hairy-armed bats are far more noisy and restless during hot weather than during cool.

When we climbed up to the hole, which was situated in a

partly decayed branch, and at an altitude of about twenty-five feet from the ground, we found it differed from any we have previously examined. The entrance was in the form of a longish slit, and the hole ran *downwards* from it at an angle of about forty-five degrees. The bats were huddled together on the top of a disused Starling's nest, at the *bottom* of the hole. In all holes we have formerly found tenanted by bats, the entrance has been at the bottom and the bats had crawled *upwards* for hiding and shelter.

We had expected to find a colony of Noctule bats in the hole, but on getting to it, and finding it lacked the strong, disagreeable smell, so characteristic of the Noctule bat, and its den, we were at once led to suspect that the occupants were Hairy-armed Bats, and this proved to be the case.

The bats were all wide awake by the time we reached the hole, and before we could get my net over it, they began to crawl out and fly away. Even when we held the net in front of the entrance it was not large enough to cover the entire length of the slit, so that about a dozen bats escaped. Some of these flew about in the vicinity for five or six minutes before we finally lost sight of them. When flying they looked noticeably smaller than Noctule bats, and the wings appeared much narrower.

We actually secured nineteen bats, all proving to be *V. leisleri*, and found that seventeen were females and two males, and that fourteen of the former appeared to be adult bats which had suckled young during the year.

The remaining five, although about equal in size to the others, appeared to be young bats of the season, judging by the undeveloped condition of the mammæ (in the three which were females); the smoother and softer texture of the wing membranes, etc., and the softer and less brittle condition of the bones in several which were skinned and mounted for cabinet specimens. These five young bats were also noticeably greyer in colour than the adults.

I have an increasing conviction that the Hairy-armed bat is by no means uncommon in this district, and I feel quite confident in saying that I often see it upon the wing. Two bats shot in my own garden at Worsbrough Dale on July 21st, 1910, as they were flying at an altitude of about thirty feet, proved to be of this species, one being a male, and the other a female.

It is not improbable that distinct racial differences may exist in bats from different localities. On September 8th, 1909, I took ten adult Long-eared bats (*P. auritus*) from an old disused tramway tunnel near Barnsley. Two were males, and the remaining eight were females. The average wing expanse of these ten specimens was 9½ inches, the smallest being 8.90 in., and the largest 10.15 in. All these bats were of a distinctly warm, almost a reddish, brown above, and of a pretty pale creamy colour on the under parts. Both in colour and size, I should say these specimens were typical of all I have ever had from this neighbourhood.

On the following day I received seven Long-eared bats, taken the previous day at Christchurch, in Hants. These were also adult specimens, five being females, and two males. The average wing expanse of these seven bats was 10·15 inches, three-quarters of an inch more than the average of the Barnsley specimens, which had been captured on the same day. The smallest individual was exactly 10 inches in wing expanse (*i.e.*, above the average of the Yorkshire specimens), whilst the largest measured 11·10 inches from one wing tip to the other. This specimen, a female, is quite the largest individual of its kind I have ever seen.

Not only were the Christchurch bats noticeably larger than the Yorkshire specimens, but the moment I saw them I was also struck by the difference in their colour. They were all very much paler and greyer than any specimens I had previously handled, having nothing like the same warmth of colouring, and with the pale creamy brown of the underparts, characteristic of Barnsley specimens, replaced by a cold whitish grey.

In the 'Naturalist' for 1906 (pp. 148-9), I published some account of the wonderful power a blindfolded Natterer's Bat (*V. nattereri*) exhibited in flying about among strange surroundings without coming into contact with anything. I find that this power is not possessed by the Long-eared bat, for even with the full use of all its senses, a captive specimen will occasionally collide with fine wires or strings if they are held in the path of its flight. The more I see of this species, the more I am drawn to the conclusion that it uses the senses of sight and hearing, and especially the former, more than any of our other British bats.

Any wild caught bat of this species will readily hunt for

and secure moths, insects, and even meal-worms, if they are thrown into its cage, without the least trouble being spent in training it to do so. In the case of other kinds of bats it is almost invariably a long and tedious business to train them to pick up their own food from a cage floor, and this is especially the case when it comes to meal-worms, which are, of course, a somewhat unnatural food for them.

A delightfully tame little Long-eared bat, kept by my friend Mr. Armitage during the autumn of 1908, by its habits in captivity threw interesting light upon the difficult question of the extent to which these little creatures hunt by sight. This bat was so tame that when allowed the run (or 'fly') of the room it would readily respond to a chirruping call, and come and take a meal-worm from one's fingers, flying away with it and settling, usually somewhere on the floor, to eat it. We were interested to find, however, that if the gas were fully on and the room consequently brightly illuminated, the bat would fly up in a hesitating, fluttering manner when called, and settle somewhere on my friend's coat or sleeve, and crawl or flutter about some little time before it succeeded in finding the meal-worm. Similarly, if all lights were turned out and the room in perfect darkness, it would behave in just the same way, but if, on the other hand, a faint illumination were given by a very tiny gas flame, it would usually dart straight up when called, and even take the worm directly from one's fingers without settling at all. It was quite evident that it was much more at home in a very subdued light than in either bright light or total darkness.

During the autumn if 1909 I had the pleasure of keeping several Daubenton's bats (*M. daubentoni*) for some three or four months. It is a species of which I had previously had little experience in captivity. I found them inclined to be quarrelsome, and when this was the case they were sometimes quite noisy, and made a sound which might easily be mistaken for that made by sparrows when fighting. One of these Daubenton's bats became well accustomed to the artificial conditions of captivity, and after some time displayed considerable ability in securing meal-worms and other insects thrown into its cage. These bats would consume on an average about twenty meal-worms each per day.

Mr. J. Fincham Turner, of Doncaster, recently submitted to me two bats' skins for identification. These proved to be

specimens of the very interesting, and by no means common Barbastelle (*B. barbestellus*). They had been caught by him at Feversham (Cambs.), on the 17th of May, 1910, where he found them resting inside an old shed, much frequented by Long-eared bats. They were hanging side by side on the wall, almost, but not quite touching one another. Mr. Turner kept these bats alive for a short time, but being unable to get them to take food in captivity, he was obliged to kill them. Before doing so, however, he obtained the two excellent photographs of one of them, shown on Plate XVII., figs. 2 and 3, which he has very kindly given me permission to have reproduced here. Although not hitherto recorded for Yorkshire, there is no reason to suppose that this rare bat may not yet be found in our county, for, though generally looked upon as a south-country species, it has nevertheless been taken as far north as Carlisle.

On Plate XVII., figs. 1 and 2, are shewn two photographs of Natterer's bat (*M. nattereri*), and also two views of a Noctule bat (*P. noctula*), figs. 5 and 6. The latter shews the bat in the same position as No. 5, but snarling because it has been touched. These pictures were taken by Mr. Riley Fortune, of Harrogate, from my specimens.

The Annual Report of the **Spalding Gentlemen's Society** for 1909 (4 pp.), includes a list of donations to the Museum and Library, many of which are of great local interest. We notice that the donations to the Society's Building Fund now nearly reach £1200—a very creditable amount.

The **Huddersfield Naturalist and Photographic Society's** Annual Report for 1909-10 (8 pp.), includes 'Sectional Reports' as follows:—'Ornithology,' by Mr. E. Fisher; 'Entomology,' by Mr. C. Mosley'; 'Phanerogamic Botany,' by Mr. W. E. L. Wattam; and 'Cryptogamic Botany,' by Mr. J. W. H. Johnson. The Society is fortunate in having over £20 in hand, notwithstanding the fact that there has been a 'loss on the year's working' of over £5.

We have received the neatly-printed 'Proceedings of the **Holmesdale Natural History Club** for the years 1906-7 (Reigate, 1910, 88 pp.). In addition to the reports of meetings, list of members, etc., there are some papers of general interest. Mr. A. B. Gough writes on 'The Primitive Savage in Early Art and Tradition'; Mr. E. S. Salmon, on 'The Economic Aspect of Fungus Diseases'; Mr. E. Dukinfield-Jones, on 'Some Methods of Protection and Defence in Caterpillars'; The Rev. E. W. Bowell on 'The Developement [sic] of Conchology.' Presumably this is the first printed report of this society, though there is nothing to indicate whether anything has been printed previously. As, from page 18, we gather that the society was in existence in 1859, it would have been interesting if a brief history had been given in this publication.

A PUGNACIOUS GROUSE.

R. FORTUNE, F.Z.S.

I was photographing the deer in Studley Park on Sept. 24th, when I was surprised to hear a somewhat familiar note, and one which seemed quite out of place there. A hearty 'Go back, go back!' from the top of the palings surrounding the ornamental gardens convinced me that I had made no mistake in diagnosing the note as that of a grouse. The bird soon spied me, and, flying down into the grass, came running across towards me, showing himself to be a fine cock grouse in magnificent plumage. I thought he probably wanted to be fed, but soon found out that he looked upon me as an intruder, for he attacked me right manfully, flying at me, giving my hand severe blows with his wings, and pecking so lustily at it that he brought blood, and so violent were the blows given by his wings, that he caused one of them to bleed at the shoulder. I crouched down, and he partly ran, partly flew up my arm to buffet and peck at my face, and when I flicked my cap at him he seized and tugged at it in an endeavour to get it away from me. I then threw my cap on the ground near him. He stamped and tore at it with his beak in a very vindictive way. All the time when not attacking he spread himself out and strutted about, uttering guttural notes, and the well-known 'Go back, go back!' I was able to get a few photographs of him, though even with a lens of six inches focus this was not an easy matter, as I could hardly keep him far enough away from the camera. I was lucky in having a short focus lens with me. When I had exposed all my plates I stayed admiring him for some time, and then turned to go. He followed me up for quite five hundred yards, and every time I stopped, which I did frequently, he renewed his attack with vigour. I have had experience with falcons 'stooping' at me when photographing at their eyries; gulls have buffeted me; terns have pecked at the

R. Fortune, F.Z.S.] [*Photo.*

top of my head, and once a tawny owl attacked me, striking my face several times, causing blood to flow, but I have never experienced anything so determined as this attack by the grouse. I admired him tremendously as, apart from his courage (characteristic of most grouse), he was in splendid feather. It was quite a treat to have such a handsome fellow strutting about and crowing defiance at such close quarters. I learned that he had been reared by hand, and was left perfectly at liberty.

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MUTILATED BEES.

J. W. CARTER, F.E.S.,
Bradford.

During August last, whilst walking on the Patterdale Road, just at the head of Ullswater, Mr. Haxby and I noticed a large number of dead bees (*Bombus terrestris*) under a large lime tree, which was densely hung with flowers, as indeed all the lime trees in the district were. Each bee had a neat circular hole in the thorax, as finely done as if it had been executed with a mechanical drill, and in addition to this, ninety per cent. had the terminal segment of the abdomen entirely eaten away, and the contents of both thorax and abdomen were removed.

On seeing them my mind reverted to the early days of 'The Naturalist,' in fact, to the note contributed by the late James Varley ('Nat.', Vol. III., 1877-8, p. 40). He there describes a similar phenomenon at Woodsome, near Huddersfield, where he found a large number of bees under exactly similar circumstances. In this case specimens were sent to Mr. F. Smith, of the British Museum, who was then our greatest authority on the British Aculeate Hymenoptera. Mr. Smith replied that the specimens were workers of the common *Bombus lucorum*, and expressed the opinion that this destruction was the work of some species of bird or birds, perhaps a butcher-bird!

In a note in the same volume of 'The Naturalist,' (p. 92), Mr. S. L. Mosley states that an egg of the Red-backed Shrike was exhibited at a meeting of the Huddersfield Naturalists' Society, on October 20th, of the same year, 'taken from the neighbourhood of Farnley,' not more than a couple of miles

from the place where Mr. Varley found his dead bees. This, he thought, confirmed Mr. Smith's theory.

My specimens were exhibited at a meeting of the Bradford Natural History and Microscopical Society, the circumstances related above were detailed, and several members expressed the opinion that this destruction of bees was not the work of birds. At a more recent meeting, Mr. F. Booth gave an interesting solution of the problem from information given him by Mr. Wood, gardener to Mr. Firth, of Saltaire, and an ardent apiculturist.

In August 1909, Mr. Wood stated that a large lime tree in the garden at Saltaire was in full flower, and was visited by thousands of bees, and that large numbers were found daily, dead and dying, on the ground underneath. After a few days he determined to find the cause of this. A ladder was placed in a position so that he could see the whole proceedings. A bee was located as it was feeding on a flower. Presently a wasp suddenly descended and settled on its back; both fell to the ground, and after a brief struggle the bee became quiescent, and evidently exhausted, when the wasp at once began its work of mutilation, and soon cleared it of its contents. Bee after bee dropped to the ground, each in the grasp of a wasp, and exactly the same process was repeated. Thus the mystery was unravelled.

SOME BRITISH EARTHMITES.

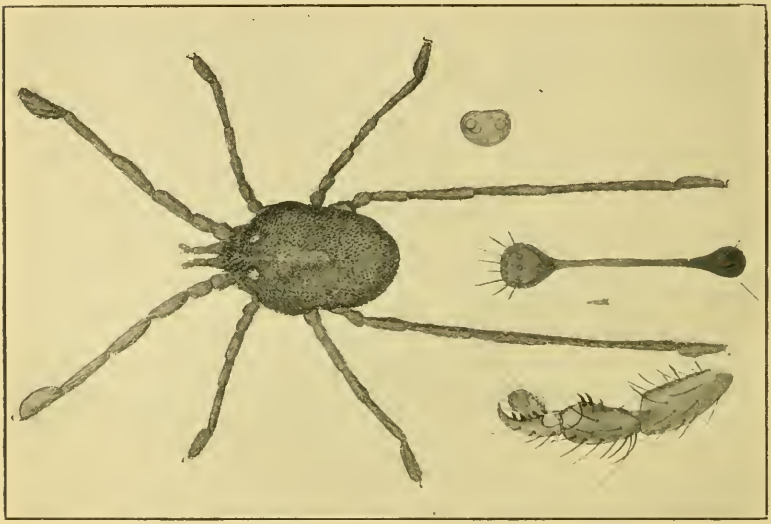
RHYNCHOLOPHIDÆ.

C. F. GEORGE, M.R.C.S.,
Kirton-in-Lindsey.

Rhyncolophus communis.—In the July number of 'The Naturalist' for 1907, page 259, I gave a description of a *Rhyncholophus* which I was not able to name, nor have I yet seen or met with a figure or description of the mite recorded by anyone. It is evidently fairly common, and being of considerable size, must be very conspicuous, and tolerably nimble. Mr. Soar's figure, on page 260 of the same number of 'The Naturalist' was drawn from a mounted specimen from Guernsey. The body was flattened and out of shape by pressure; but was otherwise characteristic. I have, however, received

specimens since that time, from Scotland, sent by Mr. Evans.

Mr. Soar has been kind enough to draw the dorsal aspect of this mite, from a preserved specimen, without much pressure, and it gives a good idea of the recent mite, there is also an enlarged figure of one of the palpi, and of the sternite and eye capsule. The description of the mite in 'The Naturalist' for July, 1907 will serve. I may say that Mr. Evans has found this mite on several occasions. It had been suggested that it



Rhyncholophus communis.

Drawn from dead specimens. Dark brown. White patch in centre of dorsal surface, about $\frac{1}{3}$ length of body. Sternite 0·6 mm. long. Eye capsule 0·10 mm. long.

might be Koch's *Rhyncholophus regalis*, but I doubt this, and Koch does not give any description or enlarged figure of the sternite, or the proboscis ; nor do I know of any more recent author who has done so. These very beautiful and interesting creatures are worthy of more study than they seem as yet to have received ; and I trust that some of your readers will take up this subject, and give their researches to 'The Naturalist.' At present we know little about the anatomy of the males, those I have received being females. The males are probably smaller than the females, and so less conspicuous, and passed over as small or immature specimens.

Naturalist.

Bats.

CONTRIBUTION TOWARDS THE LIFE HISTORY OF *DASYPOLIA TEMPLI.* *

B. MORLEY.
Skelmanthorpe, Huddersfield.

THE lepidopteron *Dasypolia templi* is one of my earliest memories. As a child I clearly remember the late James Varley spending week-ends at our home, and along with my father going out in search of this insect. Amongst others, besides Mr. Varley, the names of the late Rev. J. Johnson, of Denby, and the late J. Harrison, of Barnsley, were familiar to me, when quite a youngster. The visits these gentlemen paid to our village were mostly on account of the species in question being frequently found there.

It naturally became fixed on my mind that *templi* mus be a very pretty insect, so eagerly was it sought after. Experience has taught me, however, that its rarity was its charm, for surely it ranks amongst our most sombre species, and its great liability to become greasy, makes it a nuisance to the collector. Its outline is not graceful, and its colours are dingy and unattractive.

In the old days collecting this species was no child's play, owing to its habit of hiding in dry stone walls, quarries, or amongst stone heaps. All these features abound in our neighbourhood, consequently there is plenty of scope for the collector who has to rely on stone turning for his *templi*. Formerly this method was largely practiced, and tons of old rubble were carefully turned over, the undersides of the stones being closely searched for the hybernating moths. I have myself worked in this way hour after hour without finding a single moth. At other times one was more fortunate. An average of one per hour would be considered very good indeed, but, personally, such good results were never experienced by me.

Another way of collecting the species, is by examining the street lamps. In the villages, within the area of its occurrence, the males visit the lamps on fine nights during October, but the manner in which they dash repeatedly at a street lamp, before they settle down and crawl under the dark edges of its frame, certainly does not add beauty to their condition.

* A paper read at the Annual Meeting of the Entomological Section of the Yorkshire Naturalists' Union, held at Leeds, October 29th, 1910.

During the month of October the females are fertilized, and at once hide themselves in stone heaps for the winter, the early frosts destroying all the males. I have never seen the perfect insect feed either at 'sugar,' flowers, or on honey-dew. A female, after pairing, will comfortably pass the winter in a box, and deposit her ova in spring, without having the chance of food or showing the least need of it.

Late in October, 1906, I found a moth of each sex in a quarry hill at Denby. I kept them seperately in chip boxes. The male died sometime during the last week in November. The female took up her position near the centre of the lid, and apparently never moved until the last week in the following March.

In the hope that the female would eventually give me fertile ova, I prepared a suitable breeding cage in the garden to rear the larvæ in. Inside this I planted twelve pounds of garden parsnips, which made really fine growth by the end of April. On the 4th of April she deposited about one hundred ova, fastening them singly on the sides of the box. After five months of close captivity this moth was in perfect cabinet condition.

The ova period was twenty-six days; little larvæ emerged on the 30th of April, and were distributed on the parsnip leaves. The larvæ mined into the mid-ribs of the leaves, and their progress could be easily traced by the latter withering. They slowly descended the centres of the leaf-stems until at last all the leaves collapsed and became a rotting covering over the earth inside the cage. The roots were then attacked, and in eight weeks' time, little was left of the parsnips. Carrots were then thrust into the earth and the larvæ pupated before they were all consumed. The larval period lasted fourteen weeks. Forty-six perfect insects, or nearly half the number of the ova, emerged. I have since had experience with wild larvæ. The descriptions of the ovum and larva given in Newman's British Moths are perfect.

Wild larvæ of this species thrive principally on the common hogweed (*Heracleum sphondylium*), and occasionally on Wild Angelica (*Angelica sylvestris*). They feed head downwards in the centres of the flower stems, in the stems of the stock leaves, and also in the roots. They always eat their way to the roots. When the plant is destroyed, they crawl away to other plants, which they ascend outside, gnawing holes for

entrance at various heights from the ground, up to four feet in height. Their feeding habits are exceedingly filthy, as can be readily conceived.

A few days after a larva has entered, the plant decays above the point where it is feeding, and becomes wet and very putrid, and the frass which is thrust backward or upward in the mine, mixed with the rotten vegetable matter, quickly becomes an indescribable mess, stored in the cavity above the larva.

These larvæ, however, have no other option than to feed head downwards. If they started at the bottom and fed upwards, they would soon destroy the tissues through which the sap flows, and consequently by the quick death of the plant, would deprive themselves of food; whereas their downward habit of feeding, in spite of the filth they live amongst, ensures for them all the food the plant contains until they have eaten the last sound particle.

They never pupate in the mines they have made in the plants. I have found three larvæ in one stem, on one or two occasions, and frequently two.

These creatures are cannibals when opportunity offers. They do not appear to hunt each other with an over-powering desire for each other's flesh, but if two larvæ are feeding in one stem, one having entered at a point higher than the other, the upper larva soon works a way through the frass and other refuse, and straightway proceeds without further ceremony to devour the one lower down. I have frequently found a larva eating another of its kind in this manner.

When a plant has been mined throughout, and the larva has descended into the root, there will still remain a few inches of decaying stem. If this is pulled it will break off at the junction of the root.

No matter how large a cavity the larva has made in the root, when not actually feeding, it entirely fills up the entrance in the stem. Indeed, so tight is it squeezed into the hole, that it is killed if an effort be made to extract it. I attribute this habit to the fact that if they did not guard against drainage in this way, they would soon have their mines filled up with water.

Apparently, these larvæ have not the power of making silk. When they have done feeding, many of them burrow about four inches under the soil and pupate without the least pretence of a cocoon. Some, however, pupate on the very

surface of the ground. Six weeks seems to be the average time of the pupal stage. Two or three days before emergance the chrysalis becomes very rigid and seems unable to move any of the segmental joints.

The time of emergence is invariably between 9-30 and 11-30 a.m. Of the scores of this insect that I have reared, not one emerged after mid-day. This seems a strange time for a night-flying insect to leave the pupa, but in this case it appears to be a necessity, for usually it is 3 or 4 p.m. before the insects are perfectly developed, and I know of no other lepidopterous insect requiring such a length of time to thoroughly harden its wings. The extraordinary number of scales which clothe the body and wings may account for it, and considering the cold damp places chosen for hybernation it would appear that this extra clothing is absolutely necessary.

My experience of this species leads me to suppose that it is remarkably free from parasitic attacks. I have always bred a very good percentage of moths from wild larvæ, and I have not yet obtained a parasitic fly.

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The Report and Proceedings of the **Manchester Field Naturalists' and Archæologists' Society** for the year 1909 (97 pp.), recently published, is for the fiftieth year, and is a great improvement upon its predecessors. It is much better printed, and the cover is also more suitable. We also miss (gladly) many of the obtrusive advertisements, though there are still some, and unfortunately one is printed on the same page as some of the ordinary matter, so that it cannot be torn out. The volume is practically devoted to a chatty account of the Society's various excursions during 1909, and is principally of botanical interest. The report is illustrated by a number of borrowed blocks, which are not at all unsuitable. The list of members is a very good one.

The Proceedings of the **Liverpool Botanical Society,** Third and Fourth Sessions (76 pp., 1/6), have recently been published. The volume contains no definite botanical papers, but there are valuable and elaborate reports of the proceedings at the Society's meetings, and the Hon. Secretary (Mr. A. A. Dallman) writes a lengthy resume of the field meetings for 1908-9, the two years covered by the report. There are also some useful 'lists of plants observed at the field meetings,' reports of the South Lancashire Flora Committee, etc. The volume shews that in Liverpool the botanists are carrying out the wishes of the President of Section K, expressed at the recent meeting of the British Association, with regard to investigating the distribution, etc., of plants. There is an obituary notice (with photo) of the late J. J. Ogle; and an excellent portrait of Mr. J. A. Wheldon, the President for 1909, appears as frontispiece. The Liverpool Society is fortunate in having no fewer than two hundred members. There is nothing to shew whether any previous parts of the Proceedings have been published. It would be an advantage if they were numbered, especially as the pagination begins afresh in each part.

NOTES ON ARACHNIDA ON THE NORTH EAST COAST OF YORKSHIRE.

WM. FALCONER,
Slaithwaite, Huddersfield.

As the result of another visit to the North-east Yorkshire coast in August of the present year, I am able to add to the list of Arachnida given for that district in 'The Naturalist,' January, 1910, pp. 21-2, the following species. *A*.—Nine spiders and one harvestman new to the N. Riding and *B*—twenty-two others for which additional records, either for the county or North Riding, are desirable. Most of last year's species were again met with, but although I went twice to Eston Moor, and spent a considerable time in the search, I failed to locate the spot where Mr. J. W. H. Harrison, of Middlesborough, obtained the two remarkable spiders both new to the British list, and recorded by the Rev. J. E. Hull in 'Some Northern Records,' in Trans. Nat. Hist. Society of Northumberland, Durham, and Newcastle-upon-Tyne, Vol. III., pt. 3, viz.: *Hypselistes florens* Camb., a North American species, found nowhere else in Europe, and *Notioscopus sarcinatus* Camb., a Central European spider, concerning both of which their discoverer holds strong opinions as to their being indigenous to Britain, and not merely introductions. I found Kilton Wood the best hunting ground, and my thanks are due to Mr. J. J. Burton, Nunthorpe, for permission to enter it.

A. New to the North Riding.

Scotophæus blackwallii Thor., one adult female in a cranny of the outer wall of a wash-house in St. Germain's Lane, Marske. Odd examples are on record for the other Ridings.

Clubiona terrestris Westr., both sexes, Riftswood, Saltburn, and Kilton Woods. Few records for county.

Clubiona grisea L. Koch., males at Coatham Marshes, and near Tees Mouth. Few records for county, mostly from E. Riding.

Clubiona neglecta Camb., females, Marske and near Tees Mouth. Rare in Yorkshire, mostly reported from E. Riding.

Robertus arundineti Camb., one male, Coatham Marshes (with one abnormal palp). Three examples previously reported from W. Riding.

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Sintula cornigera Bl., one female, Kilton Wood. Four examples previously noted for W. Riding.

Œdothorax apicata Bl., one male, Coatham Marshes; Previous records few, chiefly E. Riding.

Dicymbium tibiale Bl., one male, ascending Eston Nab, from Lazenby. Not yet taken in E. Riding, but common in hillier parts of W. Riding.

Evarcha falcata Bl., one male, from heather in Kilton Wood. County records very few.

Oligolophus alpinus Herbst., Eston Moor.

B. Additional Records.

Harpactes hombergii Scop., Kilton, several examples.

Oonops pulcher Templ., not uncommon on coast at Marske, and at Riftswood, and Kilton Wood.

Clubiona diversa Camb., Eston Nab, near tower, two adults of each sex. Most commonly reported from W. Riding.

Zora maculata Bl., Kilton Wood, two females. Few county records.

Dictyna uncinata Westr., Lazenby, adult and immature examples.

Dictyna latens Fabr., Kilton Wood, many immature examples on furze. Few county records.

Antistea elegans C. L. Koch., Eston Moor, one female. Not uncommon in sphagnum bogs in W. Riding.

Theridion denticulatum Walck, Lazenby, one of each sex beneath tree bark.

Theridion pallens Bl., Kilton Wood, one female. Commoner in W. and E. Ridings.

Labulla thoracica Wid., commoner in N. Riding than existing records show. Riftswood, Kilton Wood, Marske, Lazenby.

Leptyphantes pallidus Camb., one female, Coatham Marshes.

Bathyphantes parvulus Westr., both sexes, Marske and Lazenby. Few county records.

Microneta innotabilis Camb., one female, between Riftswood and Skelton, where the male was taken last year. This example showed plainly the characteristic white blotch on the abdomen above spinners. The only two Yorkshire records.

Micronета saxatilis Bl., three females, ascent of Eston Nab, by Lazenby.

Diplocephalus permixtus Camb., one male, two females, Eston Moor.

Entelecara acuminata Wid., one female, Kilton Woods. County records few, but reported from all the Ridings.

Metopobactrus prominulus Camb., one female, Kilton Woods. Not yet for East Riding, but not infrequent in hillier parts of W. Riding.

Troxochrus scabriculus Westr., two males and some females on cliffs, West of Marske. Recently found also in E. Riding, but not yet recorded; absent from W. Riding.

Tapinocyba pallens Camb., one female, Eston Nab, via Lazenby. Not uncommon in parts of W. Riding.

Tetragnatha solandrii Scop., one male, Kilton Wood. Few county records, though usually abundant where found.

Neon reticulatus Bl., several females, Kilton Wood, Not yet observed in E. Riding, but common in parts of W. Riding.

Salticus cingulatus Panz. Eston Nab, via Lazenby. Two females beneath tree bark.

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The Proceedings of the **Liverpool Geological Association** for 1907-9 (published in 1910, 52 pp.), contain a number of papers of local and general interest. Mr. C. B. Travis gives notes on 'Field Work among Igneous Rocks,' and also a 'Note on the Chemical Solution of Carboniferous Limestone at Warton Crag, Carnforth'; Mr. T. A. Jones describes the 'Augite Porphyrite of Scarlett Stack, Isle of Man,' and 'the Rise and Progress of Modern Petrography.'; Mr. H. W. Greenwood gives an account of an 'Exposure of an old Beach-surface at Leasowe'; and 'Some Problems of Rock Genesis and Metasomatism.' Mr. J. G. Learoyd has a paper on 'Pressure in relation to thickness of Ice.' We are pleased to learn that the Liverpool Geological Association is now amalgamated with the Liverpool Geological Society, and that in future, therefore, there will be only one purely geological society in that city. From the lists of members, etc., we have long felt that there was not room for two geological societies in Liverpool; and the two sets of publications have frequently caused confusion.

A NEW NATURAL HISTORY MUSEUM.

(PLATE XVIII.).

On Saturday, November 12th, His Worship the Mayor of Hull (Councillor T. S. Taylor) opened the new Natural History Museum in that city. This occupies the rooms, formerly the Art Galleries, which have now been connected with the Municipal Museum at the Royal Institution, by two new entrances. There was a particularly large and representative gathering, and the visitors were entertained to tea by the Chairman of the Museums Committee, Alderman Brown, and Mrs. Brown. Amongst those present were His Worship the Sheriff of Hull, Sir Luke White, M.P., Mr. T. R. Ferens, M.P., Sir James Reckitt, Mr. and Mrs. Wickham-Boynton, members of the Hull Museums and Educational Committees, and the Presidents or other representatives of the Hull Literary and Philosophical Society, the Yorkshire Naturalists' Union, the Hull Geological Society, the Hull Scientific and Field Naturalists' Club, East Riding Antiquarian Society, East Riding Nature Study Committee, and other similar institutions which encourage the museum in its work, and most of which have helped with their collections.

There are three galleries: one devoted to the birds, one to mammals, and one to osteology. A part of the birds' room is shewn in the photograph reproduced on Plate XVIII. In this and the adjoining corridors is housed the collection of British birds, which is particularly representative. It includes the Sir Henry Boynton collection, which has recently been lent to the museum, the Pease collection, the Riley Fortune collection of Yorkshire birds recently purchased, the Anderson collection, as well as those formerly in the museum. All these have been amalgamated, and the duplicates—over sixty cases—have been distributed amongst the Higher Grade Schools in Hull, the School of Art, etc. There are in all about 900 birds in the museum, occupying 420 cases. Along one side of the room are a number of cases shewing the various types of eggs in their natural surroundings, those of the birds at Spurn being particularly attractive. Below these are several cabinets containing birds' eggs, etc., and in a corridor is a large case shewing the heads, feet, etc., of typical forms of birds.

The mammal room is also instructive, as the various species are grouped and represented in their natural surroundings, the groups of otters, badgers, etc., being well shewn. The

osteological room contains many recent acquisitions, as well as some important specimens, such as the skeleton of the original 'Wallace,' the celebrated lion; a narwhal with two tusks, and a good series of locally caught whales.

In his remarks, Mr. Wickham-Boynton caused some amusement by explaining how the curator had been 'inspired,' paid him a visit at Burton Agnes, and took the collection away! He added that so far as Mrs. Boynton and himself were concerned, the collection could be looked upon as at Hull for ever.

Reference was also made to the fine collection of natural history specimens and fishery models from the Japan-British Exhibition, which had just been presented to the Hull Corporation by the Japanese Government. It was stated that in all probability arrangements would be made for a further museum for Hull, to be devoted entirely to fishes and specimens connected with the fishing industry.

FIELD NOTES.

Variety of Rook.—On September 18th, while cycling through Wheldrake, I noticed one member of a flock of Rooks had all the primary feathers of the wings pure white, this variation made the Rook quite a handsome bird when he spread his wings in flight.—SYDNEY H. SMITH.

***Inoceramus lingua* v. *lobatus* Schlueter (non Muenster).**—During a recent visit to Bridlington I collected on the foreshore, west of Danes' Dyke, a large specimen of what appeared to be *Inoceramus lingua*, but on examination, every fourth rib of the shell appeared to be slightly thicker than the others—a feature quite distinct from the ordinary *lingua*. I forwarded the specimen to Mr. C. Davies Sherborn, who kindly sent me the following notes on the fossil. It was, he said, unquestionably a specimen of *Inoceramus lingua*, but belonged to a variety named by Schlueter *lobatus* of Muenster, It was not, however, *lobatus* of Muenster, as this is a cordiform shell with fringed ribs, but as it corresponded to Schlueter's figure, the specimen under consideration was named *I. lingua* Schlueter (non Muenster) thus fixing it. It is really *lingua* and is typical of the flattened form assumed by the typical *cuvieri*-group as it reaches the Upper Senonian, for the strong ribs of *cuvieri* gradually disappear, and the convexity of the shell also disappears as it ascends in the zones.—GEORGE SHEPPARD, Withernsea, Hull.

KEYS TO THE FAMILIES AND GENERA OF BRITISH SPIDERS, AND TO THE FAMILIES, GENERA AND SPECIES OF BRITISH HARVESTMEN AND PSEUDO-SCORPIONS.

WM. FALCONER,
Slaithwaite, near Huddersfield.

(*Continued from page 332*).

NOTE ON THE GENUS *TMETICUS* MENGE., Etc.

Some of the genera contained in the foregoing tables include species which are either obscure in their affinities or based on unique females, or possessed of characteristics which tend to dissociate them from others of the same genus. Such are *Tmeticus* Menge, *Porrhomma* Sim., *Microneta* Menge and *Sintula* Sim. (p. 241) which are therefore greatly in need of revision. The members of the genus *Tmeticus* Menge. in particular form a very heterogenous group. From time to time essays have been made by both foreign and British authors to place them on a more satisfactory and scientific basis by removing certain of them from the group and creating new genera for their reception. The latter, however, are not always accepted by other authorities who raise more or less valid objections to their adoption. Moreover, if adopted, opinions very often greatly differ as to which species should or should not be included in them. Owing to the difficulty of reconciling these conflicting views, some considerable time will probably elapse before an arrangement agreeable to all can be produced. These points should be borne in mind when consulting the subjoined tables. Mr. F. P. Smith in the 'Journal of the Quekett Microscopical Club,' November 1908, elevated *T. simplex* F.O.P. Camb. to generic rank under the name of *Lessertia*, relying on the following distinctions (both sexes, other difference in the ♂s noted).

A. Sternum as broad as long. Spines on tibiæ extremely minute, shorter than the diameter of the joint. Falces (at least in ♂) without definite striæ on outer side .. .. Gen. *Tmeticus* Menge

B. Sternum considerably longer than broad, produced in a parallel-sided prolongation between the hind coxae. Spines on tibiæ strong or moderately so, at any rate longer than the diameter of the joint. Falces with well-marked transverse striæ on outer side .. .. .. Gen. *Lessertia* Smith

A valuable and comprehensive contribution to the subject is that of the Rev. J. E. Hull, 'The Genus *Tmeticus* and some Allied Genera,' in the 'Trans. of the Nat. Hist. Soc. of Northumberland, Durham and Newcastle-upon-Tyne,' New Series, Vol. III., part 3, pp. 573-586 (1910). His arrangement is based in great measure upon the number, size and position of the teeth with which the outer and inner margins of the fang groove are armed. Mr. Hull kindly sent me a copy of his interesting paper, and from it the following table has been compiled :—

TABLE OF THE TMETICINI.

A. Outer margin of fang groove with three teeth, inner 0. *Maxillae* quadrate. Labium very short and broad. Femora of legs I. at least with a spine or spines. Anterior eyes very unequal in size.

I. Tibiæ of legs without a double row of spines beneath. Metatarsi I. at most one feeble spine, the rest spineless. Dorsal tibiæ spines of posterior legs larger and stronger than those on the anterior legs. Falces granulate .. .. Gen. *Centromerus* Dahl.

II. Tibiæ of legs with two rows of spines beneath. Metatarsi IV. with several spines. Dorsal tibial spines of equal size and strength. Falces not granulate .. .. Sub-Gen. *Centromeria* Strand

B Outer margin of fang groove with four or five teeth. Maxillae oblong. Labium comparatively long. All femora spineless. Anterior eyes not so greatly unequal in size.

I. Outer margin of fang groove with four teeth.

1. Metatarsi spined. Maxillae much longer than wide. Tibiæ of legs with lateral and inferior spines. Fourth tooth of fang groove least, ♂s without a falcal tuber .. .. Gen. *Mengia* F.O.P. Cb.

2. Metatarsi unspined. Maxillae a little longer than wide. Tibiæ of legs without lateral spines. Fourth tooth largest. ♂s with a centrally placed falcal tuber .. .. Gen. *Tmeticus* Menge.

II. Outer margin of fang groove with five teeth.

1. Inner margin of fang groove with three or four teeth. Tibiæ of all legs with two dorsal spines. Tibiæ I. generally with a lateral spine.

(*a*) Falces tumid at base, granulate, projecting beyond clypeus. Labium reaching to the middle of the maxillae. ♂s with a falcal tuber not centrally placed .. .. .. Gen. *Macrargus* Dahl.

(*b*) Falces not tumid at base, not granulate and not projecting beyond clypeus.

i. Labium not reaching to the middle of the maxillae, much broader than long, and constricted below the middle. Copulatory organs highly developed .. .. Gen. *Oreonetides* Strand.

ii. Labium reaching to the middle of the maxillae.

(*a*) Labium large and as wide at the middle as at the base. Tarsal joint of ♂ palpus small. Epigyne of ♀ very simple. ♂s without falcal tuber .. .. Gen. *Leptorhoptrum* Kulcz.

(*b*) Labium widest at base. Tarsal joint of ♂ palpus large. Epigyne of ♀ more highly developed. ♂s with falcal tuber .. .. Gen. *Halorates* Hull.

2. Inner margin of fang groove with five teeth. Tibiæ IV. with one dorsal spine—no lateral spines.

(*a*) Labium not reaching to the middle of the maxillae, much wider than long, and distinctly constricted below the middle. Legs rather short. ♂s without a falcal tuber .. .. Gen. *Diplocentria* Hull.

(*b*) Labium reaching to the middle of the maxillae, widest at base, and not constricted. Legs long and slender. ♂s with a falcal tuber .. .. Gen. *Coryphæus* F.O.P. Cb.

The species which Mr. Hull includes in these genera are respectively those given in Rev. O. Pickard-Cambridge's 'List of British and Irish Spiders,' 1900, under the following names plus newer discoveries :—

Centromerus :—*T. silvaticus* Bl., *expertus* Cb., *prudens* Cb., *arcanus* Cb., *emptus* Jacks, *serratus* Sim., *similis* Kulcz, (?) *commodus* Cb., (?) *adeptus* Cb.

Centromeria :—*T. bicolor* Bl., *concinna* Thor.

Mengia :—*T. scopigera* Grube, *M'arburtonii* Cb.

Tmeticus :—*T. affinis* Bl., *Gongylidium graminicola* Bl., *G. dentatum* Wid.

Macrargus :—*T. rufus* Wid.

Oreonetides :—*T. abnormis* Bl., *adipatus* L. Koch, *firmus* Cb., *contritus* Cb.

Leptorhoptrum :—*T. hardii* Bl., *huthwaitii* Cb.

Halorates :—*T. reprobus* Cb.

Diplocentria :—*T. rivalis* Cb.

Coryphaeus :—*Gongylidium distinctum* Sim., *T. simplex* F. Cb., *fortunatus* Cb.,

Hilaira :—*H. excisa* Cb., *uncata* Cb., *pervicax* Hull, *T. montigena* L. Koch.

The author's two new genera will probably maintain their ground, and the rest, with the exception of *Orconetides* and *Centromeria*, may now be considered as definitely established in this country, where they have for some time been in use. As already stated, criticism will centre not so much upon the validity of the genera as upon the allocation of the species.

Mr. Hull in the same paper separates *diluta* Camb. from *Sintula* Sim. (p. 241), making it the type of a new genus *Rhabdoria*, which will also take rank. The discriminatory characters are :—

A. Outer margin fang groove with five teeth, inner five. Cephalothorax very broad, narrowed towards eyes .. .. Gen. *Sintula* Sim.

B. Outer margin fang groove with three teeth in ♀ and two in ♂, inner teeth O. Cephalothorax rather long, not much narrowed at caput .. .. Gen. *Rhabdoria* Hull.

The members of the Genus *Microneta* Menge as given in Cambridge's ' List of British and Irish Spiders,' 1900, naturally fall into four well-marked and compact sections. One of these, *innotabilis* Camb., properly belongs to another genus, *Syedra* Sim., and the others will probably in any future revision be raised to generic rank. One of the most characteristic of the latter Mr. Hull forms into a new genus, *Agyneta*.

A. Cephalothorax broad oval, thorax nearly circular. Falces short. Eyes small, very closely grouped and not occupying the whole width. Legs shorter .. .. Gen. *Agyneta* Hull.

B. Caphalothorax elongate oval, thorax much longer than broad. Falces longer and stouter. Eyes larger, not so closely grouped and occupying the whole width. Legs longer .. .. .. Gen. *Microneta* Menge.

THE FAMILIES, GENERA, AND SPECIES OF BRITISH HARVESTMEN AND PSEUDOSCORPIONS.—I. Phalangidea.

TABLE A.—FAMILIES.

A. Transverse folds behind the eye eminence, two : palpi with a terminal claw ; second pair of legs with maxillae .. .. Phalangiidae

B. Transverse folds behind the eye eminence, none : palpi without a terminal claw ; second pair of legs without maxillae.

I. Coxæ of legs free : cephalothorax not prolonged into a hood ; palpi long, at least twice the length of the body .. .. Nemastomatidæ.

II. Coxae of legs soldered to underside of body ; cephalothorax prolonged into a hood ; palpi short, not equal the length of the body .. .. Trogulidæ.

TABLE B.—GENERA.

1. Fam. Phalangiidæ.
   - A. Margin of cephalothorax without lateral pores: abdomen with strong denticulations; body covered with a large scutum; palpi short .. .. *Sclerosoma* Lucas (1)
   - B. Margin of cephalothorax with lateral pores: Abdomen either smooth or with small denticulations: scutum absent; palpi long.
     - I. Eye eminence without denticulae; lateral pores small. Tibiae of second pair of legs with false articulations .. *Liobunum* C. Koch. (2)
     - II. Eye eminence with denticulae; lateral pores large. Tibiae of legs II. without false articulations.
       1. Palpi without or with only small apophyses.
          - (*a*) Cephalothorax with three spines in a line near the anterior margin. Legs I. metatarsi without false articulations .. .. *Oligolophus* C. Koch. (6)
          - (*b*) Cephalothorax without these frontal spines; Legs I. metatarsi with false articulations (except *P. saxatile*) .. .. *Phalangium* Linn. (3)
       2. Palpi with more or less strong apophyses.
          - (*a*) Both cubital and tibial joints of palpi with apophyses; spines on eye eminence small and blunt.. *Platybunus* C. L. Koch. (4)
          - (*b*) Cubital joints of palpi only with apophyses; spines on eye eminence, 5-5 long, divergent and pointed .. .. *Megabunus* Meade (5)

II. Fam. Nemastomatidæ.

Eye eminence low, very near anterior margin of cephalothorax. .. .. *Nemastoma* C. Koch. (7)

III. Fam. Trogulidæ.

- A. Legs I. and II. tarsi of two articulations; legs III. and IV. tarsi of three articulations; two posterior abdominal segments surrounding the anal plate .. *Trogulus* Latr. (8)
- B. Legs I. and II. tarsi of three articulations; legs III. and IV. tarsi of four articulations; last abdominal segment only surrounding the anal plate .. .. .. *Anelasmocephalus* Camb. (9)

TABLE C.—SPECIES.

(1) *Gen. Sclerosoma.*

- A. Tibiae of legs without spines; abdominal denticulae short and blunt .. *quadridentatum* Cuvier.*
- B. Tibiae of legs with strong spines; abdominal denticulae sharp and pointed *romanum* L. Koch.*

* Professor Kulczynski in 'De Opilionibus' (1904), p. 79, states that *S. romanum* L. Koch. is merely the young of *S. quadridentatum* Cuvier.

(2) *Gen. Liobunum.*

A. Eyes rimmed with black: two blunt projections below the front edge of the cephalothorax .. .. *rotundum* Latr.

B. Eyes rimmed with white; these projections absent .. .. *blackwallii* Meade.

(3) *Gen. Phalangium.*

A. Two prominent adjacent teeth below the front edge of the cephalothorax .. .. *opilio* Linn.

B. These teeth absent.

I. Size larger; without central abdominal line of conspicuous white spots.. .. *parietinum* C. Koch.

II. Size much smaller; with central abdominal line of conspicuous white spots *saxatile* C. Koch.

The doubtful species *Ph. minutum* is omitted.

(4) *Gen. Platybunus.*

Apophysis of cubital joint of palpi = ½ length of joint itself: adult form: falces ♂ with a strong hornlike protuberance .. .. *corniger* Herm.

Apophysis of cubital joint of palpi = ⅔ length of joint itself: falces ♂ without this protuberance; immature .. forma *triangularis* Herb.

(5) *Gen. Megabunus.*

Eye eminence large with a pedicle; a long spine projecting from the front edge of the cephalothorax .. .. *insignis* Meade.

(6) *Gen. Oligolophus.*

A. The three frontal spines of the cephalothorax small.

I. Frontal spines equal, wide apart.

1. Legs short, without spines or denticulae .. .. *cinerascens* C. Koch.*

2. Legs long; femora and genuæ with minute denticulae.

(*a*) Spines on tibiae of legs I. none, or few and weak .. .. *morio* Fabr.*

(*b*) Spines on tibiæ of legs I. numerous and strong .. .. *alpinus* Herbst.*

II. Frontal spines closer together, central one slightly longest.

1. Central frontal spine a little in advance; all directed slightly forward; genital plate with a circular indentation .. .. *agrestis* Meade.

2. Frontal spines in a straight line, vertical or nearly so; genital plate without indentation.

(*a*) Lighter coloured; femora of legs angular; frontal spines slenderer and a little separated .. .. *tridens* C. L. Koch.

(*b*) Dark coloured; femora of legs cylindrical; frontal spines stouter and contiguous .. .. *hansenii* Kraepl.

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* In 'De Opilionibus,' p. 80, Kulczynski states that *cinerascens* C. Koch. is merely immature *alpinus* Herbst., which is itself only an alpine form of *morio* Fabr.

B. Frontal spines strong.
I. Frontal spines unequal, in straight line.
1. Frontal spines nearly vertical ; central one slightly longest ; abdomen without denticulae .. .. *palpinalis* Herbst.
2. Frontal spines directed forward ; central one equal at least twice the lateral ones ; abdomen with numerous strong denticulae .. .. *meadii* Camb.
II. Frontal spines equal.
1. Frontal spines directed a little forward ; central one a little in advance ; femora and genuae of legs with minute, and two larger, denticulae .. .. *ephippiatus* C. L. Koch.
2. Frontal spines directed much forward, in a straight line ; these joints of legs without denticulae.. *spinosus* Bosc.

(7) *Gen. Nemastoma.*
A. Black : hind part of cephalothorax marked with two conspicuous yellowish marks ; legs short .. .. *lugubre* F. O. Muller.
B. Legs long and very slender ; abdomen marked with pairs of dull golden metallic spots .. .. *chrysomelas* Herm.

(8) *Gen. Trogulus.*
Inner edge of hood with closely set tuberculous spines ; a fringe of similar spines on outer side of femora of legs I... .. *tricarinatus* Linn.

(9) *Gen. Anelasmocephalus.*
Front edge of hood and the legs (except the tarsi) with strong spines ending with curved bristles .. .. *cambridgii* Westw.

II. Chernetidea.

TABLE A.—GROUPS AND GENERA.

1st GROUP. EYES 4.

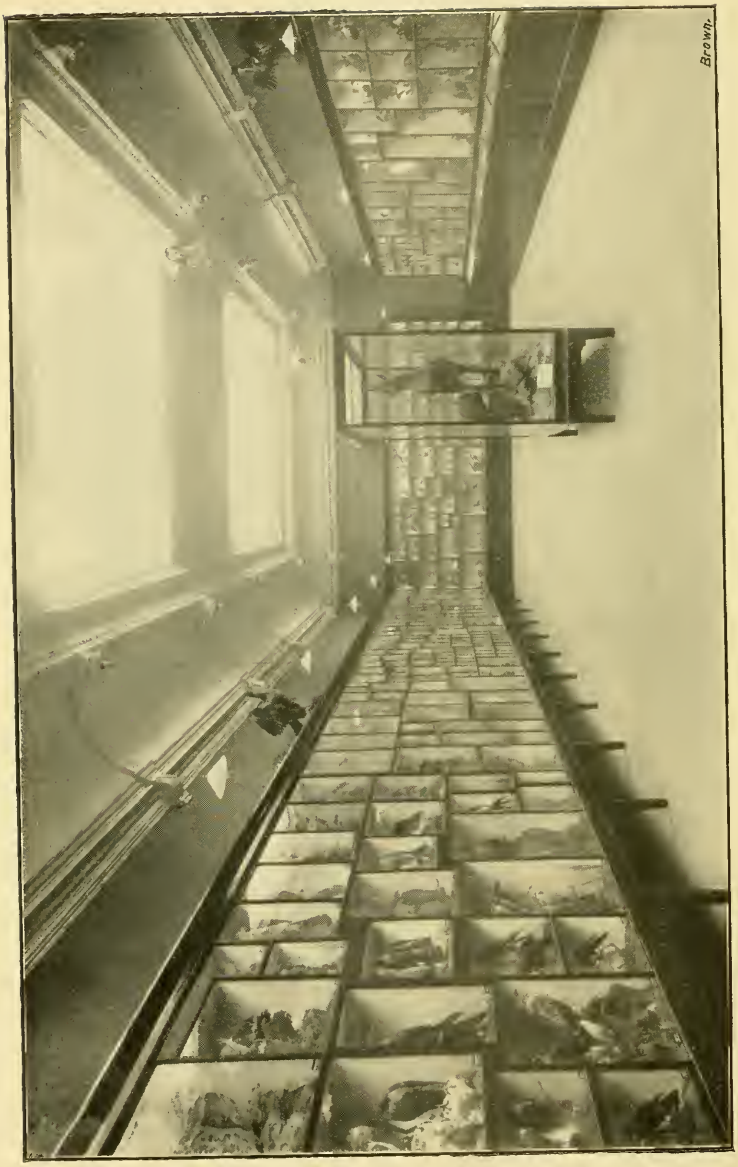
I. Limbs of forceps curved ; legs I. and II. femora and tarsi divided into two pieces *Obisium* Leach. (1)
II. Limbs of forceps straight or nearly so ; legs I. and II. femora and tarsi undivided *Chthonius* C. Koch. (2)

2nd GROUP. EYES 2.

I. Falces small ; cephalothorax divided into three parts by two grooves, rounded in front ; abdomen with a central longitudinal line .. .. *Chelifer* Geoffr. (4)
II. Falces large ; cephalothorax without grooves, truncated in front ; abdomen without a central longitudinal line .. .. *Roncus* L. Koch. (3)

3rd GROUP. EYES 0.

I. Cephalothorax divided into two parts by a groove ; legs I. and II. without a trochantin (a small extra joint attached to base of femora) .. .. *Chiridium* Menge. (6) .



Part of the Bird Collection in the Hull Museum.

II. Cephalothorax divided into three parts by two grooves; legs I. and II. with a trochantin .. .. *Chernes* Menge. (5)

TABLE B.—SPECIES.

(1) *Gen. Obisium.*

A. Cephalothorax reddish. Fixed fang of falces with small teeth and movable fang with a high rounded tubercle. Limbs of the forceps of the palpus longer than the bulb.

I. Median process of the cephalothorax obsolete. Bulb of palpus variable, more or less tumid, and moderately long; teeth of fixed limb of forceps equal in size, those of movable limb distinct. Size 2·8 mm. .. .. .. *muscorum* Leach.

II. Median process of cephalothorax prominent. Bulb rather long and broad; teeth of fixed limb of forceps unequal in size, those of movable limb almost obsolete. Size 3·3 mm. *carpenteri* H. W. Kew.*

B. Cephalothorax brownish. Limbs of the forceps of palpus about equal in length to the bulb.

I. Median process of the cephalothorax prominent. Bulb not so stout, somewhat oval; humeral joint of palpus longer in proportion to the cubital joint. Fixed fang of falces with large teeth and movable fang with a long, low, subangular tubercle .. .. .. *maritimum* Leach.

II. Median process of cephalothorax obsolete. Bulb stout; humeral joint shorter in proportion to the cubital joint .. .. *sylvaticum* C. L. Koch.

(2) *Gen. Chthonius.*

A. Limbs of forceps a little longer than the bulb; bulb with a depression near the base of the fixed limb .. .. *tetrachelatus* Preyss.

B. Limbs of forceps much longer than the bulb; bulb without this depression.

I. Bulb of same colour as the rest of the palpus; limbs of forceps straight.

1. Size smaller, under 2 mm.; eyes one diameter apart; cephalothorax a little wider in front than behind.. *orthodactylus* Leach.

2. Size larger, over 2 mm.; eyes nearly two diameters apart; cephalothorax much wider in front than behind; falces with a small obtuse projection near the end of the movable fang .. .. *rayi* L. Koch.

II. Bulb black brown, rest of palpus yellow brown; limbs of forceps very slightly curved .. .. *tenuis* L. Koch.

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* *O. muscorum* Leach.—Simon ['Araneides de France,' tom 7. p. 54]—*Vide* 'Irish Naturalist,' June 1910, pp. 108-112.

(3) *Gen. Roncus.*

A. Humeral joint of palpus equal in length to the cubital joint ; and the limbs of the forceps equal to the bulb ; eyes rather more than one diameter from the fore margin of the cephalothorax .. .. .. *cambridgii* L. Koch.

B. Humeral joint of palpus clearly longer than the cubital ; and limbs of forceps longer than the bulb ; eyes ½ diameter from the fore margin of the cephalothorax *lubricus* L. Koch.

(4) *Gen. Chelifer.*

A. Hairs simple. Clear reddish forceps and reddish extremities of femoral and cubital joints of palps characteristic .. *latreillii* Leach.

B. Hairs clavate.

I. Palpi stout.

1. Limbs of forceps much shorter than the bulb ; hairs on palpi mostly obtuse, some clavate ; caput and thorax (from front to back) about equal in width ; palpi longer and less strong .. .. *subruber* Sim.

2. Limbs equal to the bulb ; hairs all clavate ; caput broader (from front to back) than the thorax ; palpi shorter and stronger .. .. .. *meridianus* L. Koch

II. Palpi long and slender ; bulb equal in length to the cubital joint which is clearly but not greatly shorter than the humeral joint .. .. *cancroides* Linn.*

(5) *Gen. Chernes.*

A. Hairs simple.

I. Posterior segment of the cephalothorax with a deep impression. Limbs of forceps visibly shorter than the bulb.. *cyrneus* L. Koch.

II. Posterior segment of cephalothorax without a depression.

1. Size smaller, 2 mm. ; bulb distinctly longer than broad, and equal in length to the limbs of the forceps ; palpi strong.

(*a*) Cephalothorax mostly smooth and glossy. Abdomen minutely shagreened. Cubital joint and bulb of palpus, particularly above and below, smooth and glossy .. *nodosus* Schr.

(*b*) Cephalothorax granulated. Abdomen coarsely shagreened. Cubital joint and bulb more granulated .. .. *chyzeri* Tömös.

2. Size larger, 3 mm. ; bulb nearly or quite as long as broad, and a little longer than the limbs of the forceps ; palpi much stronger .. .. .. *insuetus* Camb.

B. Hairs clavate.

I. Bulb very much swollen, but slightly longer than broad, and about equal in length to the limbs of the forceps .. *cimicoides* Fabr.

* *C. hermanii* Leach. (Cambridge's ' British False Scorpions,' p. 219) is the young of this species.

II. Bulb less swollen, but distinctly longer than broad, and at least a little shorter than the movable limb of forceps.

1. Hairs strongly and uniformly clavate (some simple on legs and palpi); caput and thorax equal in width from back to front.

(*a*) A strong impression in the middle at the posterior margin of the caput .. .. *phaleratus* Sim.

(*b*) No impression at the posterior margin of the caput.

* Cephalothorax with strong granulations: size smaller .. .. *scorpioides* Herm.*

** Granulations less strong: size larger .. .. *panzeri* C. L. Koch.†

2. Hairs less strong, many simple; caput wider from back to front than the thorax .. .. *dubius* Camb.

(6) *Gen. Chiridium.*

Small; body regularly oval, wide behind and pointed in front .. .. *museorum* Leach.

PROCEEDINGS OF PROVINCIAL SOCIETIES.

The **Hull Literary Club Magazine** (Vol. IV., pt. 1), is a record of the club's work during the past session. Under the somewhat unexpected title of 'An Early Flitting' Mr. J. Scarisbrick gives a study of local race origins. Mr. Alfred Jordan has an interesting paper on the 'Significance of Thomas Henry Huxley,' and there is the President's address on 'Some Famous English Allegories.'

The Transactions of the Leicester Literary and Philosophical Society (Vol. XIV., pts. 1 and 2), contain a number of papers, literary and scientific. Those likely to interest our readers are:—'Crystallization of Igneous Rocks' by Mr. J. McKenzie Newton; 'Mountain Structure,' by Prof. W. S. Boulton; 'The Conditions under which the Triassic Deposits of England were formed, with special reference to the Keuper Marls,' by Mr. F. Creswell.

The Transactions of the Norfolk and Norwich Naturalists' Society (Vol. IX., part 1), contain several papers of particular interest to East Anglian naturalists. Amongst them are several valuable botanical notes by Messrs. W. G. Clarke, Arthur Bennett, and W. H. Burrell. Mr. A. H. Patterson gives notes on a Decayed Trawl Fishery, and Natural History Notes from Yarmouth; Mr. J. H. Gurney contributes a paper on the Great Migration of the Crossbills, Mr. T. J. Wigg writes on the Herring Fishery of 1909; Mr. F. W. Harmer describes the local Glacial Deposits; Mr. A. W. Preston gives meteorological notes, and Mr. Frank Leney gives particulars of the recent additions to the Norwich Museum. Few societies can shew such an excellent record of local work as can the Norwich Society.

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* *C. minutus* Elling is the ♂ of this species.

† *C. rufeolus* Sim. by priority.

CERASTIUM CERASTOIDES BRITT. IN CUMBERLAND.

ARTHUR BENNETT.

This species the *Cerastium trigynum* Vill. of many floras, and the C. *lapponicum* Crantz of the 9th ed. of Babington's Manual, is reported from the above county in the 'Bulletin of the Geological Institution of Upsala,' Vol. X., No. 19-20, 1910, in a paper by Gunnar Samuelsson on 'Scottish Peat Mosses: a contribution to the knowledge of the late quarternary vegetation and climate of North Western Europe,' p. 232, footnote—'An interesting find was made by me on Cross Fell in Cumberland at an altitude of about 450 m. I found *Cerastium trigynum*, which seems not to have before been met with in England (see J. D. Hooker, the Students' Flora of the British Islands).'

This low elevation will come as a great surprise to British botanists. Cross Fell is recorded as 2892 feet in altitude, and had the find occurred near the summit, it would have been less surprising.

Watson's lowest record* is 2700 feet on Ben Nevis, near snow. Dr. Williams† gives no lower limit for this species in his 'The High Alpine Flora of Britain.' In Arctic Norway ‡ its lowest altitude is 143 m., (its highest, 1558 m.) near Tromso.

In another part of Norway it occurs at 150 feet 'Sulpellebraen' (Blytt in Norges Fl.), this is the lowest altitude I can find below the Arctic Circle.

Its Linnean name was *Stellaria cerastoides* Sp. Pl. (1753), p. 442.

The Redshank in Airedale—The Redshank is not a common breeding species in Airedale, so it may, perhaps, be as well to record that another breeding station for this species was pointed out to me this year; and what, perhaps, was the most remarkable feature, the breeding place was at no great distance from two important industrial centres, where it has bred for the last two or three years. When there in June last it was evident that they had just brought off their young.—E. P. BUTTERFIELD.

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* Cyb. Britt., Vol. IV., p. 352, 1859.
† Ann. Scot. Nat. Hist. (1909), p. 166.
‡ Norman. Norges Arh. Fl. (1895), p. 158.

FIELD NOTES.

MAMMALS.

Lesser Shrew at Hebden Bridge.—Previous to September 18th, the only evidence of the occurrence of the Lesser Shrew at Hebden Bridge was the finding of a jaw bone in the castings of a Kestrel. On the above date a specimen which Mr. T. A. Coward describes as adult, was put into my hands by Mr. Wm. Nowell, found dead by him in a garden situated at an altitude of about one thousand feet above the sea level.—WALTER GREAVES.

BIRDS.

Gannets in Yorkshire.—On October 20th, a fine specimen of a Gannet (*Sula bassana*) was picked up near Wetherby. It was a bird of the year, in fine immature plumage, and had evidently been slightly injured by a gun shot. Unfortunately, I did not hear of the bird until a few days after its capture, and ten days elapsed before I was able to go over and see it. In the meantime its captor had kept it tethered with a string to its leg, by the side of a ditch, and had fed it upon unsuitable food, such as bread, oats, etc. Directly I saw the bird I took it home and gave it a good feed of fish, and photographed it, but it was too late to save its life, the bird next morning being found in a state of collapse, having vomited up the fish I had given it, together with a quantity of oats, etc., and a quantity of evil smelling bile. Of the latter there would be over a gill. Acute gastric catarrh had evidently made it impossible for the stomach to retain the food. The man who found the bird states he saw another one flying over at the same time. Mr. F. Boyes in 'The Field' for November 5th, records a further specimen, picked up at Tickton, near Beverley, about the same date. The stormy weather prevailing at this date had no doubt driven them inland. Mr. Sheppard informs me that he saw a specimen, an old bird, washed up on the beach at Bridlington on October 30th.—R. FORTUNE.

R. Fortune, F.Z.S.] [*Photo.*

Young Gannet.

HYMENOPTERA.

Hymenoptera at Doncaster during 1910.—The cold sunless season made insects of this order particularly scarce. Only a few of the commonest *Andrenæ* were seen during the Spring, and nothing but *Bombi* during mid-summer. In August and September there were some sunny days on which a few species were abundant. Of these *Mimesa bicolor* was in quantities on flowers of *Torilis anthriscus*, and along with them were many *Crabro cribrarius*. On the same species of flower I also took the only aculeate new to the county list, with which I have met this year. This was *Oxybelus uniglanis*. Of the Siricidae I have had several fine specimens of *Sirex noctilio*, but not one *S. gigas* brought to me.—H. H. Corbett, Doncaster, 4th November, 1910.

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COLEOPTERA.

***Amara curta* Dej. in Yorkshire.**—In April of the present year I had the good fortune to meet with a specimen of *Amara curta* Dej., under a stone on the coast at Eston, in Cleveland. This insect must be very rare in the north of England, as the species does not appear in the local catalogues for this part of the country. Fowler says of it '(Brit. Col., Vol. I., p. 77') 'common on the sand-hills at Deal, also taken at Brighton. In the spring of 1877, I took a single specimen in my garden at Repton, near Burton-on-Trent; I know of no other English locality.' *A. curta* is, therefore, a very interesting addition to the list of Yorkshire beetles.—M. Lawson Thompson, Middlesbrough, October 13th, 1910.

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GEOLOGY.

Large Scandinavian Erratic in East Yorkshire.—At a height of about 70 feet above the high water mark, on the north Humber shore at Hessle, has recently been found what is perhaps the largest Scandinavian erratic, of its kind, found in England. It occurred on a bed of marl, under five feet of boulder clay, on the top of Marshall's chalk quarry. It is of augite-syenite (*Laurvikite*), which occurs in situ near Christiania, and measures over 3 ft. by 2 ft. by 1¼ ft. Mr. Marshall has presented it to our museum, where it takes a place by the side of the large glaciated boulder from Burstwick, already figured in these pages. We now want a good-sized erratic of Shap Granite.—T. Sheppard, Hull.

REVIEWS AND BOOK NOTICES.

SOME NEW BOOKS—GEOLOGY.

Several useful geological books have recently been published, some of particular interest to northern readers.

Geology in the Field, edited by **H. W. Monckton** and **R. S. Herries** has been issued by the Geologists' Association in commemoration of its recent jubilee. It is issued in four parts at 5/- net each, and these contain 900 pages in all, with several plates and illustrations. In 1891 this society issued its 'Record of Excursions,' under the editorship of T. V. Holmes and C. D. Sherborn, which is still a useful book of reference. The present work, like the preceding, is divided into districts, and specialists have written the accounts of the geology of each. In some cases the best authority possible has been secured; in others, the editors have not been quite so successful. The whole of England and Wales is not covered by the volume; and some of the contributions do not refer to a particular area as a whole, but deal with certain aspects of it. For example, Mr. H. H. Arnold-Bemrose describes the lower Carboniferous Rocks of Derbyshire; but otherwise that county is neglected; Mr. F. W. Harmer describes the Pliocene and Pleistocene deposits of Eastern England, whilst there is nothing on the more solid rocks of Norfolk, Suffolk, etc. East Yorkshire is dealt with by Mr. R. S. Herries; there is no reference to the rest of the county. There also seems to be no uniformity as to the length of the chapters: the description of East Yorkshire takes up as much space as almost half of that devoted to Wales. The same lack of uniformity applies to the quality of the contributions. Some are excellently written; others are decidedly weak. The illustrations, too, are sometimes very good; at others, bad; in fact we should not be surprised if some of the blocks were not applied for to be placed in the antiquarian section of a certain museum. The sections of the Yorkshire coast (plate XVIII.), attributed to Blake and Herries, look remarkably like tracings from Phillips' sections in his well-known Geology of Yorkshire; though it is odd to read that 'the apparent dislocation of the strata at Runswick Bay is due to an error in drawing.' As the 'drawing' is not a creditable one, we think the editors would have been wise in omitting it. However, a volume that contains contributions by Lapworth, Marr, H. B. Woodward, Watts, and a host of others, is one that will commend itself to all field geologists, for whom very largely it has been prepared. The Society is certainly to be congratulated upon the way it has celebrated its jubilee.

Fossil Plants. A Text-book for Students of Botany and Geology, by **A. C. Seward, M.A., F.R.S.** Vol. II., 1910. Cambridge. xxii.+624 pp., 15/- net.

So long ago as 1898 Prof. Seward published the first volume of this work* It contained nine chapters, viz.: Historical Sketch; Relation of Palæobotany to Botany and Geology; Geological History; The Preservation of Fossil Plants; Difficulties and Sources of Error in the Determination of Fossil Plants; Nomenclature; forming the first section of the volume; and then chapters on the Thallophyta; Bryophyta; Pteridophyta; Equisetales; and Sphenophyllales.

The volume was written with Prof. Seward's characteristic care and regard for accuracy of detail. Also, as is almost essential in a work of this kind, it was profusely illustrated, many of the figures being specially drawn by Mrs. Seward. As a frontispiece is an excellent view of the well-known Conboniferous forest at Victoria Park, Glasgow, right on the top of which were living trees. This work at once took its place amongst students of Palæobotany, who have waited patiently for its successor.

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* 452 pp., 10/-.

During the year of his presidency of the Yorkshire Naturalists' Union, Prof. Seward has produced the long-expected volume II. And it has been worth waiting for. Whilst pressure of work has been largely responsible for the delay in the appearance of the second volume, this has to some extent been advantageous. Had the volume been published a decade ago, much of its contents would have been out of date. This would have been especially so with regard to the ferns and the extinct members of the gymnosperms; recent contributions to palæobotany having materially altered our outlook in these directions. Fortunately this does not obtain with regard to volume I., most of which is as 'up-to-date' to-day as it was then. Though beginning with page 1, in the second volume, its first chapter is chapter XII., thus following on from the first volume. Chapter XII. concludes with Sphenophyllales;* and the following chapters deal with the Psilotales; Lycopodiales; Arborescent Lycopodiales; Sigillaria; Stigmaria; Bothrodendreae; Seed-bearing Plants closely allied to members of the Lycopodiales; Filicales; Fossil Ferns; Marattiales (fossil); Psaronieae; Ophioglossales (fossil); Coenopterideae; Hydropterideae and Sagenopteris; and Genera of Pteridosperms, Ferns, and *plantae incertae sedis*. In perusing this work it is apparent that it has been thoroughly revised almost on the eve of publication, and throughout there are indications of the author's acquaintance with the most recent papers on the various sections with which he deals. For the benefit of the student, also, full references are given to the authorities for the statements made, and to the papers where more detailed information may be obtained. References occur on almost every page, and on many there are quite a number. In this way a worker in any particular branch can easily ascertain what has already been done. In fact it can safely be stated that Seward's 'Fossil Plants' is as necessary to the palæobotanist as Geikie's well-known Text Book is to the geologist.

Some idea of the usefulness of this volume can be gathered from the fact that it contains over 250 carefully prepared illustrations, either from photographs or drawings, shewing plant structure, etc. Mrs. Seward has again rendered excellent service with regard to the illustrations. We are glad to learn that a third volume is to appear, which will be devoted to the seed-bearing plants, etc., and it is pleasing to notice also that it is the author's intention to complete Volume III., with as little delay as possible.

A Treatise on Ore and Stone Mining, by **Sir Clement le Neve Foster,** revised by **Prof. S. H. Cox.** Seventh Edition, London: Charles Griffin & Co. 800 pp., price 28/- net.

The fact that a seventh edition of this enormous work has been called for within so short a period of the appearance of the sixth edition, speaks for itself. There have been so many poor books published recently, professing to be guides to mining, etc., that it is a pleasure to see one that is obviously prepared by a master hand. In addition to the contributions by the late Sir Clement Le Neve Foster, the Treatise contains the results of the work of many recognised mining experts, including the late Bennett H. Brough. The publishers have also been fortunate in securing the services of Prof. Cox, of the Royal School of Mines, who has revised the present edition. The names mentioned, alone, are every guarantee that the Treatise is of the first rank. An idea of the extent and scope of the work can be gathered from the headings of the chapters, which are, Occurrence of Minerals; Discovery; Boring; Breaking Ground; Supporting Excavations; Exploitation; Haulage; Hoisting; Drainage; Ventilation; Lighting; Access; Dressing; Legislation; Condition of the Miner; Accidents, and Principles of Employment of Mining Labour. Each of these chapters is sub-divided; sometimes with as many as forty

* Spelt *Spenophyllales* in the Table of Contents.

sections. An unusually valuable feature is the very fine bibliography appearing at the end of each chapter, by the aid of which anyone can refer to plenty of literature on a subject in which he may be particularly interested. The index is also very full, and obviously carefully made. Wherever possible, a description has been illustrated by the aid of a diagram, sketch, or photograph; there being over 700 illustrations in the volume. No one interested in mining (and the number has enormously increased just recently!), can afford to be without this Treatise.

The Witham and The Ancaster Gap, a study of river action, by **F. M. Burton, F.G.S.** London: A. Brown and Sons. 32 pp.

In this little pamphlet Mr. Burton continues his physiographical studies in the county of Lincoln, and well explains the various changes which have occurred in the course of the Witham from time to time. These changes are summarised in a 'Syllabus' given in the pamphlet, and some of them are illustrated by a tracing from an old map, which forms the frontispiece. Unfortunately there is nothing in the pamphlet to indicate the year in which it was published. For the benefit of Bibliographers, etc., we may state that our copy was received on August 27th, 1910.

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RECENT GEOLOGICAL PAPERS, Etc.

We have recently received a number of interesting geological papers and pamphlets which should be brought before the notice of our readers. Mr. A. R. Horwood sends a report on the 'Investigation of the Fossil Flora and Fauna of the Midland Coalfields,' in which he urges the members of the Warwickshire Association of Mining Students to forward specimens to him for identification. Mr. S. H. Smith has an interesting paper in the Northumberland Society's Transactions, dealing with the 'Faunal Succession of the Upper Bernician.' In this the author gives lengthy lists of fossils from the Lower Carboniferous Series of Northumberland, and also a list of localities at which exposures occur, with details. There are some plates of the typical fossils. The same author reprints from the Proceedings of the Durham Philosophical Society a note on 'The Grainsgill Greisen,' in which he records the presence of Wolfram.

Mr. W. Morley Egglestone has published an admirable memoir on 'The Geology of the Little Whin Sill, Weardale, co. Durham.' In this he gives petrological details of the rock and of its associated minerals, pectolite, iron pryites, zinc-blende, galena, quartz and calcite. It is interesting to notice that the whinstone is used in Weardale for bushes and bearings for the axles of waterwheels at corn mills. An interesting discussion on the paper, together with the author's reply, also appears in Vol. XXIX. of 'The Transactions of the Institute of Mining Engineers.' Mr. J. W. Jackson has published a 'Preliminary Report on the Exploration of "Dog Holes" Cave, Warton Crag, near Carnforth, Lancs.', in 'The Transactions of the Lancashire and Cheshire Antiquarian Society,' Vol. XXVII. Details are given of the various animal remains found, which have already been referred to in these columns. There are illustrations of bone and earthenware relics and of other objects found in the cave. Mr. T. S. Ellis, 9, Denmark Road, Gloucester, sends an article on the 'Winding Course of the River Wye' (10 pp., 1/-), in which he describes the later history of the river, and its relation to its neighbours, the Severn and the Usk, the Towy and Ystwith. The same writer also favours us with a copy of his paper on 'The Lower Severn Valley, River and Estuary, from the Warwickshire Avon to the Bristol Avon' ('Proceedings of the Cotteswold Naturalists' Field Club,' Vol. XVI, pp. 241-263). The pamphlet is illustrated by a number of plates and diagrams illustrating the changes in the course of the river.

PROCEEDINGS OF PROVINCIAL SCIENTIFIC SOCIETIES.

In the **Proceedings of the Geologists' Association** (Vol. XXI., part 10), Mr. M. A. C. Hinton has 'A Preliminary Account of the British Fossil Voles and Lemmings,' with some remarks on the Pleistocene Climate and Geography. In this he describes *Mimomys*, *Evotomys*, *Arvicola*, *Pitymys*, *Microtus*, *Lemmus*, and *Dicrostonyx*. Of these, one is extinct; and three are extinct in Britain, though living elsewhere.

The Annual Report of the **Yorkshire Philosophical Society** is satisfactory, the balance of income over expenditure being nearly £400. This is partly due to the profit the Society made in connection with the York Historic Pageant, which was held in its grounds. In addition to the Council's Report, the list of additions to the Museum, and the Meteorological Report, there are two valuable papers dealing with that important period of the history of York, the Roman occupation. The first is an illustrated paper on 'The Roman Pottery in the York Museum,' by Mr. Thomas May, of Warrington. This is a continuation of the work published by Mr. May in the previous report. Mr. George Benson writes on 'Excavations on the site of the North-West Gateway of Eboracum.' The present writer has recently had an opportunity of examining the Roman work exposed in Mr. Millburn's yard, and can speak as to its interest and importance, and also as to the excellence of Mr. Benson's plan and description. York is fortunate in having an antiquary such as Mr. Benson, who takes detailed particulars of important excavations.

Transactions of the Leeds Geological Association, Part XV, 1908-10 (52 pp., 2/-). These contain a record of the Leeds Society's work during the past two years. Besides the Secretary's report, report of the field excursions, etc., there are abstracts of most of the papers read, some being of distinct local interest. The editor and secretary, Mr. E. Hawkesworth, writes on some boulder-like masses in Fireclay; and Recent Deposits in Airedale; Mr. F. W. Branson writes on 'Radio-active Elements and Geology;' Dr. H. Lapworth on the Application of Geology to Public Works Construction; Prof. Kendall on Physical and Biological Changes at the close of the Cretaceous period; Mr. T. Sheppard on the 'Glacial History of Holderness'; 'The Origin of Lakes,' by Mr. C. T. Whitmell; 'Cannel and its Affinities,' by Mr. S. Nettleton; 'Fossil Plants,' by Mr. W. Hemingway; 'The Origin of the Trias,' by Prof. Kendall; 'Reef Knolls,' by Mr. E. Parsons; and a 'Section in the Ganister,' by Mr. A. Gilligan. The printers seem to have a good supply of broken type (see particularly page 41), and we don't like the inverted commas to some of the headings.

The Proceedings of the Cleveland Naturalists' Field Club, 1908-9 (Vol. II, part 4, pp. 202-266, 2/-), form an unusually interesting report of the work accomplished by that Society. Among the papers we notice 'Notes on the Glacial Geology of the country between Loftus and Kettleness,' by Mr. F. Elgee; the Rev. G. J. Lane gives notes on the 'Jurasic Flora of Cleveland,' a subject also referred to by Mr. J. J. Burton in his report of the Geological Section. Mr. M. L. Thompson has a valuable report on Cleveland Coleoptera, and Mr. T. A. Lofthouse writes on the Lepidoptera of the same area. Mr. J. W. H. Harrison gives a list of the local Spiders; and Mr. T. W. Saunders contributes a list of local Marine Mollusca; Mr. Saunders having been greatly assisted in his work by the Rev. F. H. Woods. There is a short note on some fragments of Roman pottery, found in the churchyard at Whorlton, by the Rev. J. C. Fowler, though we are not convinced that he has made out his case that 'This find proves occupation.' Judging from the variety of subjects dealt with there would appear to be something in the statement made by the editor that 'there is surely plenty to employ the keenest observer between a live beetle and an extinct mammoth, and between 'the Cedar of Lebanon and the hyssop that groweth on the wall.' There are several interesting plates in the volume.

MUSEUM NEWS.

The Report for 1909 of the **Museum** of the **Brooklyn Institute** of Arts and Sciences, contains some interesting information in reference to the method there adopted of keeping dry plants, and there is also an excellent portrait of Robert Fulton.

The report of the Curator of the **Stockport** Museum is included in the report of the Borough Librarian and Superintendent of the Parks. The principal addition has been a collection of 20 cases of British Mammals. The birds have also received attention, and the rock specimens have been overhauled.

The **Fifth Annual Report of the Manx Museum** has been issued under the guidance of Mr. P. M. C. Kermode, who is thoroughly familiar with the Archæological treasures of the island, and has done so much to preserve them. The report contains illustrations of querns, etc., and there are two excellent plates of coins found on the island.

Introduction to the Study of Minerals and Guide to the Mineral Collections in the Kelvingrove Museum, by Peter Macnair, Glasgow, 1910 (70 pp. price 3d.). This valuable work is not only a guide to the exceptionally fine collection of minerals at Glasgow, but may also be regarded as an introduction to the study of minerals generally. There is an excellent introductory chapter, and a large number of illustrations showing the systems of crystallization, forms of crystals, etc. As a frontispiece are illustrations of the curious crystals of pseudogaylussite which occur in the Clyde muds; though oddly enough this name does not appear in the index to the pamphlet.

Catalogue of Antiquities in the Norwich Castle Museum (152 pp., price not stated). We should like to congratulate Mr. F. Leney upon the publication of the catalogue of the 1,320 Archæological specimens which are under his charge in the well-known museum at Norwich. Mr. Leney has very carefully classified and described the whole of the specimens in order of date, beginning with the Pre-historic period and ending with 'By-gones' of comparatively recent times. The museum is particularly well represented in British and Roman remains. Many curators will envy the fine series of specimens relating to Mediaeval and later periods, preserved at Norwich. The catalogue is illustrated, and is greatly increased in value by the elaborate general index, and index of localities, which are given.

From the **Manchester Museum** we have received publication 68 dealing with **The Tomb of Two Brothers,** by Margaret Alice Murray (80 pp., 21 plates, price 5/-). This contains a thoroughly detailed description of a tomb of the XIIth dynasty, discovered at Ryfeh, in 1907, which was offered to the Manchester Museum for £500. Nearly £600 was promptly subscribed by friends of the museum, the balance being expended in the publication of the report. The tomb contained two complete Sarcophagi, with coffins and mummies; two perfect boats with sailors 'models', a Canopic Chest, and five statuettes; all of the finest work. One of the bodies was of Nekht Ankh, and the other of Khnumu Nekht; the former being eunucoid, and exhibited many anatomical pecularities. The mummies were unwrapped and scientifically examined at the Manchester University. There are reports on the anatomy of the mummies by Dr. John Cameron; the chemistry of the remains by Dr. Paul Haas, Professor H. B. Dixon, and Mr. E. Linder; the textile fabrics by Mr. T. W. Fox, and the colouring matter of the fabrics by Professor Julius Hübner. The illustrations are all that could be desired; the coloured plate of the mummy cases forming the frontispiece being particularly fine. The only fault we can possibly find with the book is its shape (size $9\frac{1}{2} \times 7\frac{1}{4}$ ins.), which is different from any other already issued by the Manchester Museum, and makes it awkward for the publications of this institute to be kept together on one shelf.

NEWS FROM THE MAGAZINES.

The Journal of the Manchester Geographical Society, Vol. XXV., parts 3-4, 1909 (1910), contains Mr. J. Howard Reed's Address, given at the inaugural meeting of the Kingston upon Hull Geographical Society, on December 3rd, 1909.

In 1864 *Luperina gueneei* was recorded at Rhyl, and seems to have been overlooked, or at any rate not recorded, until quite recently, when large numbers have been taken on the Lancashire coast.—*Entomologist's Monthly Magazine* for November.

The latest achievement in connection with the use of the X-Rays is the investigation of the internal structure of fossils, and Dr. Alfred Gradenwitz shows in *Knowledge* for November what can be made out in the inside of a petrified sea urchin, claiming that even the digestive tube can be seen quite clearly.

In the *Museums Journal* for October, Dr. Tempest Anderson has a paper on ' The Decay of Stone Antiquities," in which he states he ' hewed Prof. Boyd Donkins ! ' We hope this is only a misprint. The paper is illustrated by a photograph of the attendant at the York Museum, in a doorway ! In the same journal Mr. E. L. Gill, of the Newcastle Museum, has a paper on ' A Simple Method of Exhibiting Corals.'

The Annals of Scottish Natural History (No. 75) contains an elaborate paper on ' The Insect Fauna of Grouse Moors,' by Mr. Grimshaw, who spent some time during June and July on various grouse moors, principally for the purpose of investigating the nature of the food of grouse chicks. Four localities were investigated, three in Scotland, the fourth being Burley-in-Wharfedale, Yorks. Lists of the species obtained are given.

There seems to be a difficulty in finding new names for minerals, and we can only hope that some of those recently described are exceedingly rare. In *The Mineralogical Magazine* just to hand, Mr. L. J. Spencer gives a fifth list of new mineral names. This includes Amatrice, Benitoite, Bityite, Bravoite [an American !], Pulleite, Tawmawite, Vorobyevite, Pseudodeweylite, Paramontmorillonite, Oxykertschenite, Ferripurpurite, Calciopalygorskite, etc.

In *The Entomologist's Monthly Magazine* (No. 555), Mr. J. Ray Hardy describes a Dipteron new to the British fauna. The specimens have been identified as *Fannia* (*Homalomyia*) *insignis*, and were obtained from a large and old nest of *Vespa vulgaris*, found on a farm at Northern Etchells, in Cheshire. In the same journal Commander J. J. Walker describes the Lepidoptera in the Dale Collection, now in the Oxford University. This includes the type specimen of *Acentropus niveus* Oliv., which is said to have been described in *The Naturalist* for 1837, p. 14, though we cannot trace it.

The *Bradford Scientific Journal* commences its third volume with an account of Shipley Glen, by Mr. W. P. Winter ; Mr. E. E. Gregory describes an unrecorded Roman road and camp at Swinden, near Hellifield, though the evidence does not seem to be the most conclusive ; there is a note by the late W. Cudworth on ' Rombalds Moor Antiquities ' ; Mr. H. B. Booth has an ornithological item ; Mr. J. H. Ashworth describes the ' Local Flies in 1909,' and Mr. B. Spencer writes on Plant Lore. In the last note we observe that an old Anglo-Saxon herbal gives this prescription against a ' talkative woman : '—' Against a woman's chatter taste at night fasting, a root of radish ; that day the chatter cannot harm thee.' In Vol. III., part 2, there is a further contribution from Mr. Winter on Shipley Glen ; Mr. S. R. Illingworth has a suggestive paper on ' The Shale Heap, why should it be a waste heap ? ' Mr. A. Haigh-Lumby writes on The Migration of Birds ; there is a lecture on Bolton Abbey, by Mr. H. E. Wroot ; and Mr. J. Beanland writes on the Vegetation of Chellow Dean. We learn from the ' Annual Report ' that unless the Subscription List to the Journal is not materially increased during the next half year, it will not be continued.

NORTHERN NEWS.

We regret to notice the announcement of the death of the Rev. W. O. Massingberd, the well-known Lincolnshire Archæologist.

Mr. James Reeve, who has recently retired from the Norwich Museum, has presented a very fine Great Auk's egg to that Institution. He bought it a few months ago for £250.

We learn from the daily press that a species of sword fish has been taken from the River Nene near Sutton Bridge, Lincolnshire, by a local fisherman. The length of the fish was eight feet, the sword being about three feet long.

The Rev. A. Hunt kindly sends us a list of his lectures on 'Lincolnshire Past and Present.' We notice one refers to 'Paleolithic [sic] Messeolithic [sic] Neolithic and Bronze Age' periods. Presumably the *Messeolithic* will refer to the little Lincolnshire pigmies.

Dr. W. G. Smith has an interesting paper on the 'Improvement of Cereals—Patrick Shirreff's work (Trans. of the Highland and Agricultural Society, Scotland.)' In this the author outlines the work of Patrick Shirreff as an improver of cereals, and shows its influence on the choice of crops grown on the farms.

We are glad to see that a former editor of this journal, Mr. W. Eagle Clarke, has in preparation a new and revised edition of Yarrell, Newton and Saunders' History of 'British Birds.' The same author also has in the press 'Studies in Bird-Migration,' a subject upon which, of course, he is particularly able to write.

Mr. James M. Brown favours us with a copy of his paper on 'Fresh water Rhizopods from the English Lake District,' reprinted from the Linnean Society's Journal. This is illustrated by a plate showing *Amœba vespertilio* Penard; *Difflugia rubescens* Penard; *Difflugia oviformis* Cash; *Nebela militaris* var. *tubulata* var. nov.; *Englypha compressa* Carter; *Corythion dubium* Taranek; and *Paulinella chromatophora* Lauterborne.

The Rev. Hilderic Friend, of 110 Wilmot Road, Lincolnshire, informs us that he is preparing a monograph of British earth and water worms, for the Ray Society, and it is very desirable that accurate information should be supplied therein respecting the species of worms, which are harmful, found in plant-pots. As our knowledge of this subject is very imperfect, he would be greatly obliged if gardeners and others would send him specimens of living worms for identification.

Mr. C. S. Middlemiss (formerly of Hull), has written a memoir of 400 pp., dealing with the Kangra earthquake of April 4th, 1905, which has been issued as Vol. XXXVIII. of the 'Memoirs of the Geological Survey of India.' The writer illustrates the report with a number of plates from photographs, all of which clearly indicate the extraordinary effects of this great Indian earthquake. It will be remembered that some little time ago Mr. Middlemiss was at work on the geology of East Yorkshire, and described the cuttings in the railway sections at South Cave.

Mr. C. Crossland favours us with further evidence of his energy in the form of three papers recently published. The first 'An Eighteenth Century Naturalist, James Bolton, Halifax,' (32 pp. 6d.), is an admirable account of the life and work of one of the first of the many prominent naturalists who have lived in Halifax. We are sorry that it is not accompanied by a portrait of Bolton; which, we presume, it was not possible to obtain. From the Bradford Scientific Journal is reprinted an article on 'Fungi' which has a very useful bibliography. From the British Mycological Society is the reprint of a paper on 'Omitted Asci Measurements of some British Discomycetes.'

CLASSIFIED INDEX.

COMPILED BY W. E. L. WATTAM.

It is not an index in the strictest sense of that term, but it is a classified summary of the contents of the volume, arranged so as to be of assistance to active scientific investigators, the actual titles of papers not always being regarded so much as the essential nature of their contents.

CONTRIBUTORS.

CONTRIBUTORS—*continued.*

BOOK NOTICES.

BOOK NOTICES—*continued.*

BOOK NOTICES—*continued.*

Societies' Reports.

BOOK NOTICES—*continued.*

ILLUSTRATIONS.

SPECIES AND VARIETIES NEW TO SCIENCE DESCRIBED IN THIS VOLUME.

SPECIES AND VARIETIES NEW TO BRITAIN BROUGHT FORWARD IN THIS VOLUME.

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