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THE
NATURALIST:

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A
MONTHLY JOURNAL OF

NATURAL HISTORY FOR THE NORTH OF ENGLAND

EDITED BY

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WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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

JOHN W. TAYLOR M.Sc.

RILEY FORTUNE, F.Z.S.

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PRINCIPALLY FOR THE NORTH OF ENGLAND.

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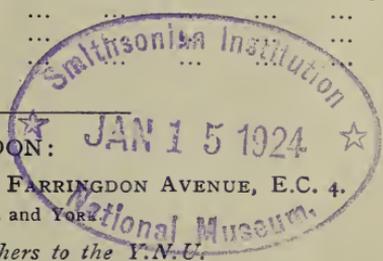
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LONGWORM (*A. longa*).
EARTHWORM (*L. terrestris*).
GILT-TAIL (*D. subrubicunda*).
BLUE WORM (*O. cyaneum*).
GREEN WORM (*A. chlorotica*).
BRANDLING (*E. foetida*).

THE NATURALIST

FOR 1924.

NOTES AND COMMENTS.

BRITISH EARTHWORMS AND HOW TO IDENTIFY THEM.*

As contributors to this Journal are aware, few people have done more to advance the study of the English earthworm than has our one-time frequent contributor, Hilderic Friend. The present handbook is a valuable contribution to the subject, and, by the aid of numerous illustrations, should appeal to all interested in this subject. We are kindly permitted to reproduce the frontispiece of the volume as Plate I., which speaks for itself. The price is very reasonable.

PHYSIOLOGY FOR GIRLS.†

In this handy, well printed and well illustrated volume, one of our contributors has written a text-book which will at once take its place among the institutions for which it has been written. As Headmistress of one of the largest girls' schools in the country, Miss Johnstone has practical knowledge of the requirements of the scholars, and in this way no words are wasted, but at the same time everything necessary for a knowledge of the subject seems to have been included. The book has not been written with the object of enabling scholars to pass examinations, but is in such a style that it will easily be read and understood. The fifteen chapters refer to the Skeleton ; Muscles and Tendons ; Position of Internal Organs ; The Cells of the Body and how they are Maintained ; How the Blood is Fed : Food, Digestion of Food, Absorption ; The Liver ; Respiration : How the Blood is Fed from Air ; Excretion : Removal of Waste by the Skin and Kidneys ; Regulation of the Temperature of the Human Body ; The Nervous System ; The Senses, etc.

SKELETON 25,000 YEARS OLD?

The above is the heading of an article in a recent issue of *The Daily Telegraph* ; but we ought to add that it is from their New York correspondent, and New York is in America !—the report tells us that :—‘ All theories of the geographical origin and early wanderings of the human race will be upset if the conclusions of Dr. J. P. Harrington are true, that he has discovered at Santa Barbara, California, the skeleton of

* By Hilderic Friend. London : Epworth Press. 64 pp. 1/6 net.

† By Mary A. Johnstone. London : Blackie & Son. vii. + 269 pp. 3/- net.

man at least 25,000 years old. This skeleton and a separate skull have been unearthed during the excavation of what is known to the scientific world as the Burton Mound, fronting on the Santa Barbara ocean beach.

MOUTH SEVEN INCHES ACROSS.

'The skulls show [so it is said] that the men who walked this [American] continent at that period—something which never had been even suspected—possessed mouths larger than those of any known human being of ancient or modern times. One mouth was widely opened, as though the man had died in great agony or fear. It measured between the jaws nearly seven inches. [Probably he was only just talking!].

RELICS FOUND.

'The average thickness of both skulls is three-quarters of an inch, which corresponds closely with that of the Neanderthal Man, and, like the latter, the skulls have a pronounced supra-orbital ridge, without depression between the eyes. The structure of the jaws is regarded as another proof of the antiquity of the skulls, being almost identical with that of the Heidelberg Man—long, crushing jawbones and bovine [!] teeth. One theory is that the first men to tread this continent crossed from Siberia on island to island in the Aleutian group. Another theory is that they came in canoes from the Pacific islands. Encrusted in the rock with the skulls were found instruments resembling pestles, crude fish hooks, and other relics.'

MUSEUMS ASSOCIATION—CONFERENCE OF DELEGATES.

In connection with the Annual Meeting of the Museums Association, to be held at Wembley, July 21st to 25th, the Corresponding Societies' Committee of the British Association is arranging for a Conference of Delegates to be held at Wembley during the week, and Professor J. L. Myres, M.A., F.S.A., one of the General Secretaries of the British Association, has kindly accepted the Presidency of the Conference, and will deliver an address which will doubtless be equally interesting to the members of the Museums Association and of the Conference of Delegates. As the members of the British Association visiting Canada will be leaving towards the end of that week, the President has expressed a hope that the Conference of Delegates may be held on Tuesday, the 22nd July.

MITES.

As Economic Series No. 13, the British Museum (Natural History) has issued 'Mites Injurious to Domestic Animals' (with an appendix on the acarine disease of Hive Bees), by Stanley Hirst (107 pp., 3s.). It is illustrated by nearly 100 remarkably clear sketches dealing with the parasites of

various mammals and birds which are put to the service of man, and gives methods of exterminating them. There is also a chapter on mounting mites for examination under the microscope, and a list of the principal books dealing with the subject.

‘ RESEARCH. ’

The following is a report of a recent meeting of what is described as the ‘ Hull Psychical Research Society ’ :— ‘ Psychometric delineations were given by a lady medium who met with success in reading past and present conditions in the lives of those who submitted articles for reading, and also in giving descriptions of persons passed on. A peculiar characteristic of the lady’s readings was the giving of warnings respecting accidents which were likely to occur to various members. One was especially striking in virtue of a somewhat minute description being given of the building in which it would occur, one of the departments of a well-known local firm. The members look forward with interest to the dates which were given in connection with the events, awaiting further evidence for the possession of the faculty of prevision. At the next meeting an address will be given on “ The Occult Significance of Genesis.” ’

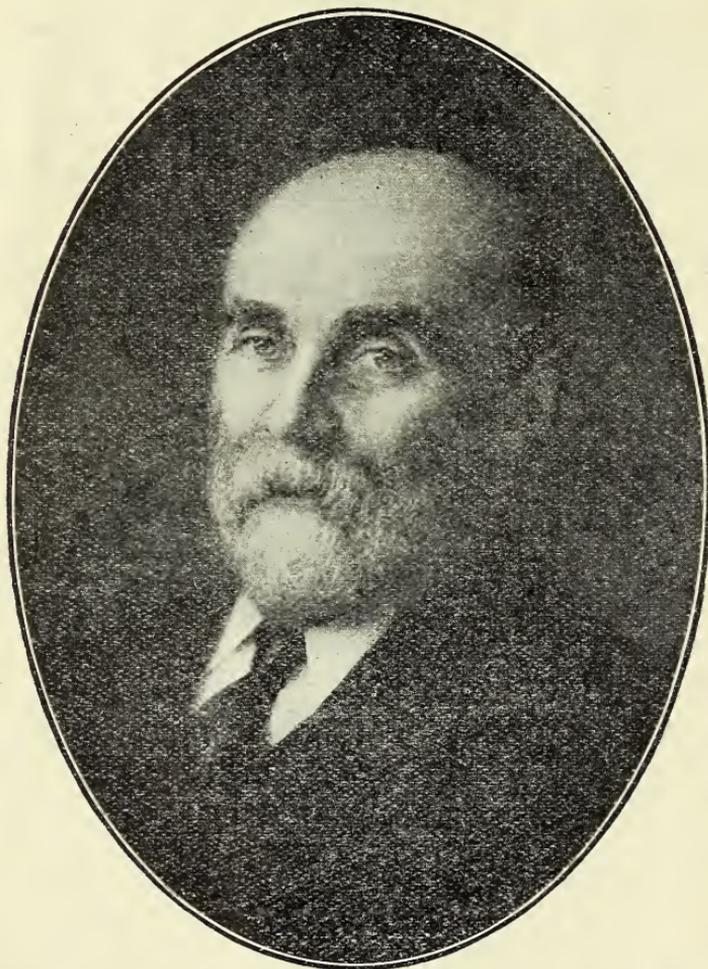
BIRDS OF PREY.

Major S. S. Flower, of the Zoological Service, Cairo, has favoured us with Publication No. 37, which is devoted to a List of Birds of Prey, 1898-1923, with notes on their longevity. In this he states :— ‘ As far as my experience goes, in studying animals in nature and in captivity, the Birds of Prey exceed in intelligence and individuality all other Orders of Birds except the Passeres. The intellectuality of many Hawks, Falcons, Eagles and Vultures appears to be only equalled or exceeded in the animal kingdom by certain Mammals of the Orders Primates, Carnivora, and Rodentia, by some of the groups of Passerine Birds, and possibly by some Crocodilians. The Owls appear to be more reflex animals, and agree with the Mammals of the Orders Insectivora, Chiroptera, Ungulata, etc., and with the majority of Birds, Reptiles, Batrachians, Fishes, and Invertebrates, in that their actions, independent of intelligent or individual will, are carried out in involuntary response to nerve-stimulation. Some kinds of Birds of Prey, such as the sensitive nervous Harriers, are unsuited for exhibition in a public garden ; others, for instance the Bateleur Eagles and some of the large Vultures, not only thrive for long years in captivity, but seem absolutely to revel in being looked at by human beings and behave like popular comedians before an appreciative audience. Whereas Monkeys, Bears, Parrots, or Goats may “ show off ” in order to be rewarded by gifts of food, Birds of Prey make friends with mankind

without expecting or receiving anything in return but notice, admiration, and loud amusement (probably the highest form of admiration to the bird's mind).'

DR. J. E. STEAD.

The October *Bulletin of the Cleveland Scientific and*



Technical Institution contains the accompanying portrait of 'our Founder and first President, John Edward Stead, D.Sc. (Manchester), D.Sc. (Leeds), D.Met. (Sheffield), F.R.S., F.I.C., and F.C.S., Past President Iron and Steel Institution, and of the Cleveland Institution of Engineers, and a Bessemer Medallist. By his death this Institution has lost its greatest friend and guide, whilst science has equally lost one of its greatest votaries.' The Institution kindly permits us to reproduce the portrait herewith.

10,000,000 YEARS AGO.

Under the above extraordinary heading *The Times* recently had a lengthy report from its Peking Correspondent, though what possible evidence there is for giving such an absurd heading, even assuming the discovery is authentic, it is difficult to understand. The report states that 'ten million years ago or thereabouts, the beast known as *dinosaur* was laying eggs in Mongolia. I have seen a dozen of the eggs in a fossilized condition, have handled them, weighed and measured them, and pored over the markings on the shells, as clear as those on the daily output of a well-regulated domestic hen. One of the eggs is broken across the middle, and, looking at it section-wise, there is plainly to be seen the pure white embryo skeleton of an unborn dinosaur embedded in the reddish rocky substance into which the egg has been transposed by the process of nature. These astonishing things are between four and eight inches long, all of the double-ended shape which reptiles effect, some flattened by pressure, one apparently quite perfect in contour, about three times its own diameter in length.'

A MOTHER?

'Five were found together in one place and nine in another, presumably as they were laid by the parent on the sand, to be hatched by the warmth of the sun. Moreover, hard by the five, with its posterior end within two feet of the nest, was found the complete skeleton of a dinosaur, in a position suggesting that it might have just deposited the eggs before there happened the sandstorm which covered beast and eggs, to preserve them so wonderfully for discovery long ages after. This extraordinary find, the very first of its kind in the history of science, proves what scientists never knew for certain before—that the primeval reptile reproduced by the same oviparous process as its descendants of the present time.'

LIVERPOOL GEOLOGISTS.

Under the editorship of Mr. C. B. Travis, *The Proceedings of the Liverpool Geological Society* for the Sixty-fourth Session have recently been issued. Besides the record of the Society's meetings it contains the following:—'Note on the Glacial Geology of the Alwen Valley above Pont-yr-Alwen,' by H. J. F. Gourley; 'The Petrology of the Permian Sandstones of the Parbold District,' by Mabel Workman; 'The Cronkley Mica Lamprophyres,' by D. Williams; 'The Lower Ludlow Rocks of the Northern Part of the Clwydian Range, North Wales,' by F. H. Edmunds; 'Note on a large Boulder of Carboniferous Limestone from the Gladstone Dock Excavations,' by W. A. Makinson; and 'Note on a Well-boring at Seacombe (Wallasey),' by T. A. Jones. Professor P. G. H. Boswell's

Presidential Address deals with 'Some Aspects of the Petrology of Sedimentary Rocks,' and is accompanied by a bibliography containing twenty-three pages of titles of monographs bearing upon the subject.

EXIT 'DISCOVERY.'

We are sorry to find that our ideas with regard to the probable life of *Discovery* expressed in March 20th, 1920, have proved to be true, and we learn that with the December issue this much-advertised publication ceases to be, having had its (very) little day. It has died with the same blare of trumpets which characterised its birth, and its own obituary notice of its own record of its great achievements, as given in its funeral issue, are quite characteristic. Notwithstanding the efforts of its editor, scientific adviser, trustees, and the whole army of societies from the National Union of Teachers to the British Psychological Society, the plain fact presumably is that the circulation of *Discovery* did not warrant its continuance. The index to the volume occupies one page.

A SHELLEY ODE.

We learn from the daily press that 'How the Shellfish sheds its Shell' is the title of an article by Professor Arthur Thomson. The rhythm of the thing seems to have got on the brain of the office poet, who writes:—

Would you learn the secret spell,
How the selfish, elfish shellfish
Sheds the shelter of his shell
As a hermit sheds his cell?

Is the elfish shellfish selfish
Since he sheddeth not his smell
With the shedding of the shell
That the shellfish sellers sell?

—: o :—

Leach's Petrel and Little Auk at Halifax.—During the great gale at the close of October, 1923, two storm-blown birds were picked up alive, but exhausted, and died later, in the Halifax district. The first was a Leach's Fork-tailed Petrel at Rippenden Road, Soyland, and the second a Little Auk at Wainstalls.—WALTER GREAVES.

Coprinus radians Fr. in Yorkshire.—In *The Naturalist* for March, 1923, p. 91, I reported the occurrence of *Pterula multifida* Fr. in a remarkable habitat. I sent a specimen to Mr. A. D. Cotton at Kew, who informs me that it is an abnormal growth of the mycelium of *Coprinus radians* Fr., named by the old authors *Ozonium auricomum*.—A. CLARKE, Huddersfield.

**TISOA SIPHONALIS MARCEL DE SERRES,
A SUPPOSED LIASSIC ANNELID.**

F. A. BATHER, D.S.C., F.R.S.

(Published by permission of the Trustees of the British Museum.)

VISITING my friend Prof. L. Cuénot at Nancy in October, I noticed in his collection some specimens labelled '*Tisoa siphonalis* Marcel de Serres, Charmouthien, St. Jérôme' [near Marseilles]. Of these he kindly gave me one for the Geological Department of the British Museum, where it is now registered as A2555.

Believing, perhaps wrongly, that British geologists share my previous ignorance of this curious form, and wishing to find out whether it does not occur in this country, where as yet it is unrecognised, as well as with the view of eliciting further suggestions as to its nature, I venture this brief note.

The previous published references to *Tisoa* are the following:—

D'HOMBRES-FIRMAS (Baron) April, 1839, Description d'une formation problématique observée aux environs d'Alais. Bibl. Univ. Genève, XX., pp. 412-413.

SERRES, Marcel de, 1840, Description de quelques mollusques fossiles nouveaux des terrains infra-jurassiques et de la craie compacte inférieure du midi de la France. Ann. Sci. Nat. (Zool.), ser. 2, XIV., pp. 5-25, pls. i., ii.

ROUVILLE, P. de, 1853, Description géologique des environs de Montpellier (Thèse: Montpellier), [p. 20].

REYNES, P., 1868, Essai de Géologie et de Paléontologie Aveyronnaises. 8vo., 110 pp., 7 pls., (Paris), [pp. 65, 67].

DUMORTIER, E., 1869, Etudes paléontologiques sur les Dépôts Jurassiques du Bassin du Rhône, pt. 3, Lias-Moyen (Paris), [pp. 173-184, pls. xxiv-xxvi].

FRIREN, A., 1876, Mélanges Paléontologiques I. Bull. Soc. Hist. nat. Metz, ser. 2, XIV., pp. 1-22, pls. i., ii., [p. 20, pl. ii., ff. 6-9].

FRIREN, A., 1887, Mélanges Paléontologiques, II. Bull. Soc. Hist. nat. Metz, ser. 2, XVII, pp. 49-80 [p. 79].

The short note by D'Hombres-Firmas is good and sensible so far as it goes. The paper by Marcel de Serres owes what value it possesses to its illustrations, and to the fact that a name was there first given to these objects. The misprint *Tysoa* occurs on p. 384 of the volume quoted. Rouvillé merely gives some localities. Reynès, who spells the name *Tissoa*, probably had not the true *Tisoa* before him. Dumor-

tier's account is the only one worth considering, and his interpretation is probably on the right lines. The Abbé Friren discusses a point of geographical distribution.

Tisoa is found throughout certain marls or calcareous shales, in the lower part of the Middle Lias, which attain a thickness of 65 to 80 metres, and contain fossils identified by Dumortier as *Belemnites clavatus*, *Ammonites margaritatus*, and *Avicula sexcostata*.

In the departments of Gard, l'Hérault, and Bouches-du-Rhône, where it was first known and studied, *Tisoa* occurs in the form of cylindroid, conical, or torpedo-shaped nodules, formed about an axis composed of two tubes, which are vertical to the bedding-plane. The greatest diameter of these nodules varies from 2.5 cm. to 16 cm., being usually 4 to 5 cm. The length is usually 12 to 15 cm., but may reach 50 cm. Similar concretions are recorded from the departments of Ain, Basses-Alps, Jura, and la Moselle.

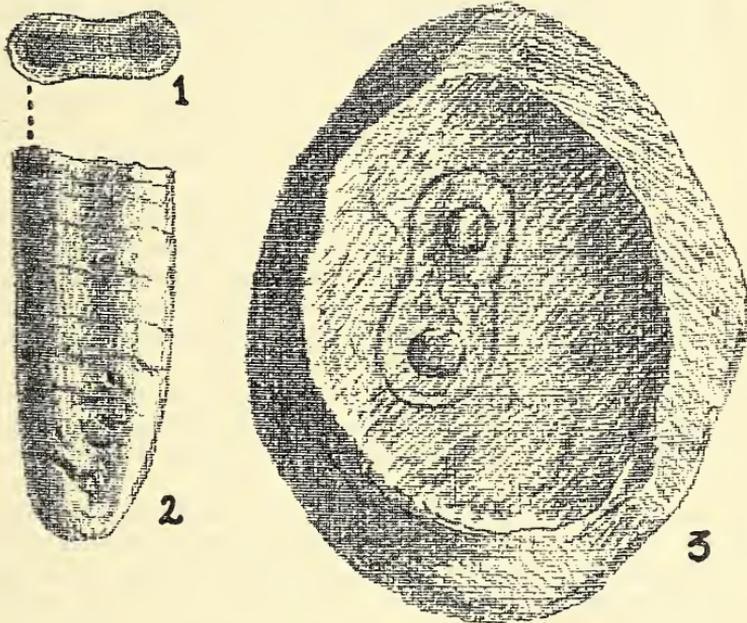
The tubes that penetrate the nodules are usually filled with calcite, which renders them conspicuous; they are approximately circular in cross-section, with a diameter of 6 to 8 mm.; they lie 6 to 7 mm. apart, and about equidistant from the long axis of the cylindroid. According to M. de Serres they come to the surface at the broader end of the cylindroid; what may happen to them at the other end is not stated. Each tube (or its calcite infilling) is surrounded by a thin layer of darker colour, which in some cases, at any rate, is due to an oxide of iron. Specimens with only one tube, or with additional irregular tubes, are rare, and have not been regarded as of much importance. Our specimen, which is a nodule ground down at both ends, shows at one end a dark line enclosing the two tubes in an area of irregularly elliptical outline. A similar dark line forming a somewhat hour-glass-shaped figure is shown enclosing the tubes in Dumortier's plate xxvi., fig. 2 (our fig. 3).

The meaning of this line seems to be explained by specimens, apparently of the same species, found at the same horizon in the Mont-d'Or lyonnais. Dumortier (p. 173) describes these as 'composed of a compressed ellipsoidal sheath, broadly rounded at the ends of the section, slightly depressed at the middle of its breadth; with a long axis from 12 to 22 mm., a short axis from 4 to 12 mm.; the exterior irregularly striated lengthwise, and, in some specimens, with slight swellings at intervals; the section shows two circular tubes.' 'The wall of these tubes is not 1 mm. thick.' 'The sheath seems to be covered by a pellicle .25 mm. thick, traces of which are seen with difficulty' (figs. 1 and 2).

The difficulty of interpreting this fossil was increased

for the earlier observers by the incompleteness of their specimens. 'Tachez donc d'en découvrir les bouts,' said Haüy a century ago. One end at least seems to be furnished by the specimen figured on pl. xxv., fig. 15 of Dumortier. This is part of a sheath with a regularly rounded base; Dumortier compares it to a greatly compressed *Belemnites irregularis*. The specimen suggests forcibly that at its rounded [? lower] end the two tubes met, so as to form an elongate U (fig. 2).

Various attempts have been made to explain these curious



TISOO SIPHONALIS.

Drawings of natural size, copied from Dumortier, 1869.

Figs. 1 and 2.—After Dumortier, pl. xxiv., ff. 16, 15. Cross-section and side-view of a specimen from Saint Fortunat, with no surrounding concretion.

Fig. 3.—After Dumortier, pl. xxvi., f. 2. Cross-fracture of a concretion from Vals, showing the outline of the sheath enclosing the two tubes.

fossils. M. de Serres, who regarded the concretion as an integral part of the supposed animal, claimed that it was some kind of siphonate mollusc. Even Terquem, in a letter published by Dumortier, regarded the tubes as the siphons of a lamellibranch. One objection to this hypothesis is the almost complete absence of lamellibranch shells in association with *Tisoo*.

The absence of carbonaceous matter suggests that the organism was of animal rather than of plant nature, and the evidence of the associated fossils shows that the animal was marine, and lived in mud-flats, which may well have been exposed at low tide.

The most probable suggestion hitherto made is that of Dumortier, namely that the tubes are the two limbs of a U-shaped worm-burrow. Such burrows are known from Cambrian times down to the lob-worm (*Arenicola*) of the present day. They appear, however, to be simple burrows, and devoid of any structure that could be compared with the sheath of *Tisoo*. The same objection appears to hold against the attribution of *Tisoo* to one of the so-called Gephyrea. Both *Priapulius* and *Echiurus* make U-shaped burrows in sand or sandy mud, and that of *Echiurus*, at any rate, is strengthened by a lining of mucus. But these creatures do not fashion bricks or tiles or *terre pisée*, as do some Terebelloids, for they have not the appropriate organs.

Tisoo, on the other hand, as it seems to me, did not merely burrow in the mud, but built up a distinct tube-wall about 2 mm. thick by pressing the surrounding mud, and impregnating it with body slime. On the death of the worm, this fairly solid tube remained, enclosing the decaying body, and forming a natural centre for concretion.

Many tubicolous polychaetes build tubes in this way out of the adjoining sediment, but these tubes are usually straight or slightly curved, and none of them, so far as I can find, is U-shaped.

Even if we concede that one of the U-shaped burrows, whether of polychaete or gephyrean, could be sufficiently stiffened with mucus to form a fossil like *Tisoo*, and that it could contain enough organic matter to serve as a good concretionary nucleus, still we are unable to find among recent forms a burrow or tube in which the limbs are relatively so close together. This is, naturally, not a fatal objection to the hypothesis, even though it may seek some explanation. It may be remembered that some of the straight tubes allow room for the animal to double on itself in them, so that there is no essential difference physiologically between a horizontal tube with an upturned opening at each end, a wide U-tube, and a straight vertical tube. The difference lies in the greater or less space and the varying amount of external matter (sand, etc.), between the head and tail ends of the curved body. *Tisoo*, thus regarded, is quite a natural passage-form between the normal U-shaped and the single tube.

Any criticisms of this interpretation and any further suggestions would be welcome. Also I should be glad to receive specimens of *Tisoo* found in the British Isles.

PENNINE PEAT.

CHRIS. A. CHEETHAM.

As the main part of the work done in connection with the Union's Peat investigation has been devoted to the hill peat, it may be useful to state the difference between it and the so-called fen peat. This is a question of the type of growth of the plants, the decay of which formed the peat.

Fen peat is produced under water; a lake gradually filling by the decay of water plants like Pondweeds, Bog-bean, Marsh Cinquefoil, Reeds, Rushes and Sedges will show the usual sequence. It should be noted that the depth of this peat is determined by the depth of the water, *i.e.*, it has a definite limit of thickness, except when conditions are favourable to the production of hill type peat afterwards. Fen peat is usually found in the low-lying land areas where the water conditions were favourable.

The hill peat is very different, and here there have been many misstatements. It is probably true that most people who have given the matter any thought, or have read published statements, will say that Bog Moss (*Sphagnum* sps.) is the Peat-forming agent. Braithwaite, in his *Sphagnaceæ*, p. 11, says:—'With regard to the function of these plants in the formation of peat I cannot do better than quote Prof. Schimper's words. He says:—"Unless there were peat mosses, many a bare mountain ridge, many a high valley of the temperate zone, and large tracts of the northern plains, would present an uniform watery flat, instead of a covering of flowering plants or shady woods. . . . As soon as plant detritus formed in this manner has elevated itself above the surface water it is familiar to us by the name of peat."'

Bog moss does produce peat, but it cannot do much better than the plants making fen peat, although it can grow slightly above the water level; it is a very small constituent of the Pennine peat. A worse mistake is that of thinking that the plants growing on dry peat, such as the Heather type, are concerned with peat production, whereas the usual case is that they are found where the peat is retrogressive. Our Pennine peat has a very simple history, and is mainly due to one plant, the single-headed Cotton-grass, *Eriophorum vaginatum*. Lewis and Moss, in 'Types of British Vegetation,' p. 267, state: 'Sphagnum peat is rare in the upland Pennine moors, and this fact, together with the very local occurrence of the association at the present day is interesting, seeing that the Sphagnum moor is generally considered the starting-point and type of the moor ("Hoch moor") series'; and on p. 268: 'The peat on which the Cotton-grass moors are

developed consists almost wholly of the leaf bases and leaf-sheaths of *Eriophorum vaginatum* (Cotton-grass).'

The only other similar type of plant growth in Britain is the cæspitose *Scirpus* which is not much in evidence in Yorkshire, but may enter as a factor further north. It is an object lesson to dig out a sod of cotton-grass and examine the old leaf bases with the new roots near the surface amongst the older leaf bases ; these can be traced downwards, and if a section of the peat is available they can be followed until all trace of structure is lost in amorphous peat ; even here microscopic examination will show that this structureless peat is derived from the same plant. This tufted growth producing peat is known in other parts of the world with different genera of plants. Darwin, in 'A Naturalist's Voyage round the World,' Chap. XIII., says :—' Here, within the Chonos Archipelago . . . every patch of level ground is covered with two species of plants (*Astelia pumila* and *Donatia magellanica*) which, by their joint decay compose a thick bed of elastic peat. . . . Fresh leaves are always succeeding one to the other round the central tap root ; the lower ones soon decay, and in tracing a root downwards in the peat, the leaves, yet holding their place, can be observed passing through any stage of decomposition, till the whole becomes blended in one confused mass.'

One necessary condition for the development of hill peat is a fairly constant supply of moisture, a rainfall of at least 35 inches per annum is essential for cotton-grass, given this there seems no limit to the thickness which may accumulate ; wherever Cotton-grass is growing there peat is accumulating, the whole area covered with it is gradually rising. Here we see something very different from the fen peat in-filling lakes, something that is not limited by the depth of water, but which can continue producing peat unlimited in thickness. A feature often noted in examining sections of hill peat is the presence of a layer or layers of birch, usually only the bark ; this indicates either a drier period or an alteration of drainage, leaving the surface in a drier condition. The preservation of the birch is very noticeable, and will be referred to later.

A report is in preparation dealing with the organisms found in the peats which have been examined microscopically during the last few years, but the two main points noted in the course of the work have been the frequent occurrence of seeds of rushes at the base of the peat, and the constant presence of Cotton-grass throughout the thickness. This seems to point to a commencement with a swampy rush growth turning into a level area of Cotton-grass growing up in mass, and the whole surface rising together. A question may be asked as to the trees sometimes found at the base of

the peat ; in these cases it is probably similar to those which have been noted many times in recent years ; Geikie in his 'Text Book of Geology,' mentions an ancient pine forest in Rossshire all dead in 1657, and fifteen years later a spongy bog into which a man could sink to his armpits, and this was used for fuel at the end of the century. Dr. Walker mentions a similar change at Drumlarig after the wood was overset in 1756. Lyell, in 'Principles of Geology,' says : 'Many bogs of North Europe occupy the places of immense forests, which have many of them disappeared within historical era. . . . Thus in Mar Forest (Aberdeenshire) large trunks of Scots fir which had fallen were soon immersed in peat.' The destruction of woodland at the base of the hills by the introduction of agriculture and iron smelting, or by military measures, as by the Romans in this country, by Edward I. in Wales, or Henry II. in Ireland, or by Act of Parliament for the suppression of outlaws and wolves ; all these would destroy the shelter belt, and winds would complete the destruction on the hill tops, blockage of drainage developing into swamp, and finally a Cotton-grass area would result. Such a forest base is not essential nor usual. Geikie, in his 'Great Ice Age,' p. 319, says : 'It is a mistake, however, to suppose that peat-moss always overlies a prostrate forest. There are cases where no trace of wood can be detected. Peat of this description is not uncommon on the upland district of South Scotland, where it frequently clothes the tops and slopes of considerable hills to a depth of from 6 to 12 or even 16 feet. . . . Again, in the mosses of the higher hill tops, where trees do occur, they are of small size—mere brushwood.'

An impermeable base is necessary to give the swamp condition to start the growth of the Cotton-grass, and where the surface is of a sandy nature this has been produced by the formation of a layer of what is termed 'Pan,' a red metallic-like mass varying in thickness, the average seen during this investigation being about one-eighth of an inch. The usual sequence from the peat base is 3 to 6 inches of bleached sand, stained somewhat purple, burning off to white ; then a dark red metallic pan, and below this the unaltered yellow sand, remaining yellow when burnt off. Many theories have been put forward to account for this (see Warming, 'Ecology of Plant Growth,' p. 62, Morison and Souther's *Journal of Agricultural Science*, January, 1914), but these seem all founded on a wrong basis by assuming the peat to be present in place first and to take a part in 'pan' forming ; one of the most noticeable features seen on examining sections is the mass of roots in the bleached layer above the 'pan,' and the definite way these cease at the surface of the 'pan,' it being perfectly obvious that the 'pan' was there, in place, before

the plants which produced these roots grew, forming the swamp and starting the peat formation.

At present the question of 'pan' formation is very unsatisfactorily answered, and field work should precede laboratory research and statements.

It is perhaps out of the scope of this paper to introduce the relation of peat to coal, but as it is now an accepted fact that peat was a stage in coal formation, may we not look to peat to help us to visualize how the coal-peat masses accumulated. Here again there have been many loose statements about forests turning into coal; only recently in *Nature*, 4/8/23, p. 163, we have been told how pine forests might grow in the Arctic, and such type of growth might have formed the coals found in those latitudes. At a meeting of the Quekett Microscopical Club, November, 1919, Dr. G. H. Rodman said: 'Coal is a product formed from the shedding of the leaves, fronds and spores of primeval forests.' Or, before the Past and Present Mining Students' Association, Mr. Jas. Lomax is reported as saying: 'After an exhaustive examination of a large number of seams he had come to the conclusion that almost all had their origin in vegetable matter grown and deposited on the spot where it now rested, the coal substance being formed chiefly by the droppings of leaves, twigs, etc.' Against such statements it is well to read what R. C. McLean speaking of the Forests of South Brazil in *The Ecological Journal*, VII., p. 122, says:—'Soil is extremely shallow: 10 cm. general average depth for hill forests. The great depths of humus soil spoken of by some of the older travellers occur only in valley forests, and even there only exceptionally, where circumstances of topography favoured accumulation. This shallowness of the soil has not been generally emphasized by those who have written about Tropical rain forests, but its effect on the vegetation is manifest. . . . The soil has a very low capacity for absorbing or retaining water; but in this latter respect its power is enhanced by the layer of decaying leaves 2-3 inches thick which everywhere covers it. This layer is not seasonal as with us, but perpetual, owing to the high percentage of ever-green trees present, so that while being continually destroyed by decay it is steadily renewed.'

There can be little doubt that any large tree-like growth on a soft boggy surface would have a very unstable support, and also the relative time taken to grow a large tree-like plant against the speedy destruction of fallen timber, etc., by fungus, bacteria and animals, unless under water, is against the possibility of accumulation. May not the growth of Cotton-grass and other similar peat-forming plants of a tufted habit give an insight as to how the enormous depths of peat

such as are needed for our coal seams may have been produced. It is a fair estimate to say 15 feet of peat are required to form 1 foot of coal by compression so that a 7-foot seam would require more than 100 feet of peat. A plant growth of a tufted habit like Cotton-grass possibly of a fern type, producing enormous numbers of spores and growing up as a solid mass, could give the necessary depth and is a reasonable way in which such peat masses could form.

It may be asserted that we find undoubted plants of tree-like growth in coal; if one could take 10 feet of amorphous peat, including one layer of birch, and compress it into 9 inches of coal, the only recognisable thing would be the birch layer, but it would be a mistake to assume that this coal was all formed from a birch wood; the tree trunks and stumps seen at the base of some peats might lead to similar wrong conclusions after such compression. A growth similar to the one postulated is seen in the recently described fossil Devonian plants *Rhinia* and *Hornea*.

The microscopic examination of peat is a slow process, but sufficient has been done to show the composition of hill peat and how it is practically pure Cotton-grass. What is wanted now is a survey over the whole of the peat area showing roughly how much is Heather-covered (retrogressive), and how much covered by Cotton-grass (accumulating), and also over what area is there a tree base. This is work which can be done by everyone living near a peat area, and the Union's members will doubtless see that this is soon completed.

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REVIEWS AND BOOK NOTICES.

The Archæology of the Cambridge Region, by Cyril Fox. London: Cambridge University Press, xxvi.+360 pp., 31/6 net. In view of the extraordinary interest now being taken in the study of archæology, resulting in much unreliable, and in some cases absurd information being published, it is particularly satisfactory to find a volume like the present, based on sound and authentic lines, the result of considerable research, and illustrated in a way which we should expect from the Cambridge University Press. The author has successfully searched in all manner of directions for information bearing upon his remarkably complete account of the Neolithic, Bronze, Iron, Roman and Saxon remains in the Cambridgeshire area, which has proved particularly rich in all these five directions. He has taken considerable care to examine and sift the information recorded in scores of publications, in addition to which he has seen the actual specimens in various institutions and private collections; in fact, the volume is a model of what a work of this character should be. In a pocket at the end of the book are coloured maps upon which are shown various discoveries made during the Neolithic, Bronze, Early Iron, Roman and Anglo-Saxon Ages. These alone convey an amount of information of inestimable value to the historian, and represent an amount of work which only those who have undertaken duties of this kind can appreciate. We have nothing but praise for Dr. Fox's book.

Lawns, Links and Sportsfields, by **J. Macdonald**. London: 'Country Life,' ix. +78 pp., 5s. net. Owing to the spread of golf and other games in which good turf is a desideratum, Mr. Macdonald's little volume will prove of considerable value, in view of his practical knowledge of the subject. In addition to such questions as Drainage, Cultivation, Levelling, Seeding, Selection of Seeds, Turfing, Mowing and Rolling, the author deals with Golf Courses, Tennis Courts and Croquet Lawns; Cricket, Football and Polo Grounds; Bowling Greens, and ends up with Lawn Pests and Manures.

Essays of a Biologist, by **Julian Huxley**. London: Chatto & Windus, xiv. +306 pp., 7/6. net. Following the example of his illustrious grandfather, Mr. Julian Huxley has reprinted a number of his essays under the above title, and the many people who admire his work will be glad to have the volume in the present form, particularly in view of the reasonableness of the cost. The essays are 'Progress, Biological and Human,' 'Some Bearings of Biology on Sociology,' 'Sex Biology and Sex Psychology,' 'Philosophic Ants: a Biological Fantasy,' 'The present relations between Science and Religion.'

Guide to the Birds of Europe and North Africa, by **R. G. Wardlow Ramsay**. London: Gurney & Jackson, xi. +355 pp., 12/6 net. The late Colonel Wardlow Ramsay spent many years in the preparation of a concise Guide to the Birds of Europe and North Africa, but unfortunately did not live to see his work published. It was, however, so far advanced that its publication was not a difficult matter, and it has been seen through the press by his friend, a former editor of this journal, Dr. W. Eagle Clarke, who gives a Memoir of the author with a list of his papers, etc. The volume is prepared for the use of the working ornithologist, to whom it will be of great service.

Under the general editorship of Mr. Hugh Richardson, who is well-known to our readers, the Cambridge University Press has issued a Nature Study Series, in simple language, well illustrated, some of which we have already noticed in these columns. The series includes **The Gateways of Knowledge**, by **J. A. Dell** (171 pp., 3/6); **Lessons on Soil**, by **E. J. Russell** (132 pp., 3/-); **Pond Problems**, by **E. E. Unwin** (119 pp., 3/-); **Nature Study Lessons**, by **J. B. Philip** (147 pp., 4/6); **The Story of our Trees**, by **M. M. Gregson** (160 pp., 3/6); **Bird Studies**, by **W. P. Westell** (152 pp., 3/6); **The Study of the Weather**, by **E. H. Chapman** (131 pp., 4/-); and **Weeds**, by **R. Lloyd Praeger** (108 pp., 2/6). The volumes will be appreciated by teachers in secondary schools and others.

Photographing Wild Life Across the World, by **Cherry Kearton**. London: J. W. Arrowsmith, Ltd. 319 pp., 25/- net. In this massive volume the publishers have produced something rather novel in the way of books dealing with natural history, inasmuch as about one-third at the bottom of each page is left blank, whereas frequently half, or two-thirds, of a plate is also blank. We presume, however, the object is to 'bulk large,' one possible result of the fact that it is dedicated to the late Theodore Roosevelt, and another that it deals with American experiences. However, we find that Mr. Cherry Kearton, in his usual style, describes his experiences in the natural history world, though in this case he has gone a little further afield than usual, and we are introduced to the large mammalia, birds and insects of Borneo, East Africa, South Africa, India, Canada and the American Rockies. Several of the illustrations, such as the photographs of the lion at close quarters, indicate that the author has taken a certain element of risk in his work. Much of the information in the present volume has already appeared in a previous book by the same author, but more recent experiences and photographs are now included. We are glad to see that the author has much to say about the useless destruction of wild life.

FIELD NOTES.

Birds and Plants near Sowerby Bridge.—For many years seagulls have visited various parts of the Calder Valley, and since the various sewage systems were constructed their numbers have greatly increased. In other places they may frequently be seen in the summer months, and I have many times watched them in their flights over the length of river in view of my window. The river and canal run parallel for some distance here, but I never saw the gulls on the latter until the summer of 1922. Previous to that year barge traffic was fairly busy on the canal, but when, owing to bad trade, the company stopped business, a great change came about. Shoals of roach made their appearance, and the gulls quickly discovered this. Their attention was subsequently divided between the river and canal. I have watched them many times as they flew over the canal, both in the summer of 1922 and of 1923, but I never saw them take anything. One or two birds then began to stand on the canal bank in order to watch the fish. They would wait with all the proverbial patience of the fisherman, but without any luck; when a fish leaped the bird would rise and fly over the place, then return to the bank; I never saw one catch a fish. Tennyson, in 'In Memoriam,' has the lines:—

' Where now the seamew pipes, or dives
In yonder greening glade.'

But I never saw the gull dive; when flying over the river, even at quite a high altitude, it seems to be able to detect floating objects quite easily. It then lowers in its flight and travels swiftly over the current, passing the object, then turns and, meeting it, endeavours to catch it. Sometimes it misses, when the process is repeated and success is achieved. Also it often happens that the gull drops what it has caught, showing that it does not always discriminate beforehand between desirable food and otherwise.

Another change that has been brought about by the passing of the canal-barge is in the vegetation of some parts of the canal bank. A short patch of bank alongside the mill and on the side opposite the towing-path, much trodden by boatmen when manipulating the lock-gates, consists of shallow soil well mixed with coal-ashes. Here a few plants used to eke out a miserable existence. Dandelions, with thin anæmic leaves, formed rosettes close to the ground. Other plants with the rosette habit were plantains and crepis, and a hawkweed with a leaf dwarfed to the likeness of a herring-bone. There were several patches of white clover, and in a corner close to the mill was a bed of gipsywort. Now that the patch is untrodden by the boatmen, these plants have re-asserted themselves, and

several additions to their number have occurred. They have lost their sickly, stunted appearance, and quite a decent miniature flora is the result. The dominant plant now, as in many similar habitats, is the tall hawk-weed *Hieracium boreale*, which, when in full bloom, forms a pleasing picture from a mill window. A correspondent in *The Naturalist* recently called attention to the great frequency of *Claytonia Siberica* in the Ryburn Valley. A similar feature of the Calder Valley, where the river is joined by the Ryburn at Sowerby Bridge, is the prevalence of a handsome balsam for many miles along its banks. The writer is old enough to remember the time when neither of these plants was to be found near Sowerby Bridge.—E. HALLOWELL.

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Winter Purslane (*Claytonia perfoliata*).—A native of the north-west coast of America, *Claytonia perfoliata* is now well represented among our immigrant plants, and it had found its way into the Wirral Peninsula where it is naturalised in abundance. It thrives exceedingly well on light soils in the dune pastures at Wallasey and about Leasowe. Its bright green succulent leaves under the common name of Winter Purslane are now used for 'winter and spring salading.' They are said to be of mild flavour and quite free from bitterness.—JOE FIRTH, Liverpool.

***Omphalia pseudoandrosacea*, etc., in Yorkshire.**—On September 22nd, at Edlington Wood, near Doncaster, I observed *Omphalia pseudoandrosacea* (Bull.) Fr., and also *Erysiphe tortilis* Fr. parasitic on *Cornus sanguinea*. The first named has not been previously recorded for any Yorkshire district, and *Erysiphe tortilis* has only been recorded for Anston in September, 1886, by Rev. H. Friend, in Lees' 'Flora of West Yorkshire.' The specimens were kindly identified by Mr. F. A. Mason.—(Miss) E. M. HOWKINS, 54 Highwoods Road, Mexboro'.

***Vitrea lucida*, etc., at Market Rasen.**—Mr. Beetlestone, formerly of Market Rasen, has submitted to me a few shells collected by him at and near Market Rasen. Among them were three specimens of *Vitrea lucida*, found in his garden, in 1910, the largest specimen measures 15 mm. at its greatest breadth. There was also a very interesting caddis case from Walesby, 1921. In addition to quartz and other granules adhering thereto, were eight specimens of *Carychium minimum*, one immature *Limnaea pereger*, one *Planorbis fontanus*, a considerable number of *Planorbis crista*, and several *Pisidium milium*. *Vitrea lucida* and *Pisidium milium* have not been previously recorded for Division 7N.—C. S. CARTER, Louth, November 8th, 1923.

VERTEBRATE ZOOLOGY IN YORKSHIRE.

E. WILFRED TAYLOR.

A MEETING of the Vertebrate Section of the Yorkshire Naturalists' Union was held in the Library of the Leeds Philosophical Society on Saturday, October 27th, Mr. C. F. Procter presiding. The Sectional Meeting was preceded by a meeting of the Yorkshire Wild Birds and Eggs Protection Acts Committee, and of the Yorkshire Mammals, Amphibians, Reptiles, and Fishes Committee.

The Reports of the Yorkshire Wild Birds and Eggs Protection Acts Committee, and of the Yorkshire Mammals, Amphibians, Reptiles, and Fishes Committee were read and approved.

A paper was read by Mr. H. B. Booth on 'Some Birds Noted in Southern Spain and Morocco.' The author first described a general migration of the Gannet which he witnessed while crossing the Bay of Biscay on March 10th, and which lasted the whole day. None of the birds was fishing, but all were resolutely pursuing a northerly course, flying singly, two or three yards above the surface of the water. Many thousands were seen, all apparently actuated by the same overmastering instinct. After leaving the Channel the British Herring Gull soon gave place to the Yellow-legged Herring Gull which was plentiful south of $39^{\circ} 30'$ North Latitude. Similarly the British Black-headed Gull gave place to the Mediterranean Black-headed Gull which became plentiful south of $38^{\circ} 45'$ North Latitude. The most noticeable differences were in the jet black head and the paler primaries of the latter species, while the immature birds seen around Gibraltar showed no sign of the darker head which characterises the immature British Black-headed Gulls in their first spring.

The Mediterranean Black-headed Gull is not known to nest in Spain, nor even in Hungary, though it nests abundantly in Asia Minor, Syria, and in the East. In the case of the Lesser Black-backed Gull there appeared to be no geographical dividing line between the habitats of the allied species. The British species is now classified as a sub-species to the Scandinavian form on slight differences of colour. In the author's opinion, Scilly Island birds are more entitled to sub-specific rank, while the Farne Island birds are in colour intermediate between them and the Scandinavian birds. He thought these slight colour differences between allied species very difficult to account for, especially where it was only a question of the colour of the legs as in the Herring Gull. The author briefly referred to the nesting habits of the British Willow Tit, which he believed to differ from those of the Marsh Tit, as in his experience the Willow Tit excavated its own nesting hole.

In the discussion which followed the paper, it was evident that several members did not think the British Willow Tit entitled to rank as a distinct species.

Mr. Edmondson exhibited a young male Stonechat found dead at Thornton Dale, Mr. Moore recorded two white Sparrows and a white Starling in the Greetland District, and Mr. Fysher drew attention to a newspaper report, from which it appeared that mice living in refrigerators made the best of it and developed a long, furry coat.

At the evening meeting, Mr. R. Chislett read a paper entitled 'Notes on the Ring Ouzel and Nightjar.' He called attention to the marked similarity in appearance of the Blackbird and Ring Ouzel, and the dissimilarity in their choice of habitats, the latter species invariably frequenting the craggy hill sides. Its partiality for this type of country does not seem to be a question of food supply, nor to a particular desire for solitude, and he was driven to conclude that the species was naturally shy, and retreated to the lonelier hillsides as man settled in the more fertile valleys. This theory would account for its migratory habits,

as its summer habitat would furnish a very scanty food supply during the winter months. Although this species is often fairly plentiful in its own chosen haunts, it may be looked for in vain elsewhere; and in Derbyshire, while it regularly haunts the escarpments of Millstone Grit, which generally crown the valleys, it is rarely seen on the level stretches of heather. The favourite nesting site is among the stones and heather at the foot of the escarpments, though it will sometimes nest below the ground level in the side of a pit or on the bank of a stream, usually preferring an altitude of 1000 to 1500 feet. The Nightjar frequents similar country, but prefers the bracken-covered slopes, nesting at a slightly lower elevation than the Ring Ousel. Slides were shown illustrating the breeding habits of both species, and the lecturer was complimented on the excellence of his photographs.

A paper was then read by Mr. T. M. Fowler entitled 'Some Notes on the Buzzard,' in which he described a district in which the Buzzard was protected by the farmers, and was in consequence not uncommon. Photographs were shown of three nests, one in the bowl of an Ash tree about 40 feet from the ground, one in an ivy-covered Oak tree in a plantation, and one in an Alder tree on the bank of a stream and about 15 feet from the ground. The nests were lined with green leaves and in each case three young were reared, and the lecturer's observations did not support the theories put forward by Mr. Oliver Pike to the effect that the stronger nestling invariably preyed on the weaker ones. The adults rarely visited the nests, and bad lighting conditions made photography very difficult. On arrival at the nest with a rabbit, or in one instance a mole, the birds simply smashed their way through the branches of the tree to the nest, and if, as sometimes happened, the prey was accidentally dropped, no attempt was made to retrieve it. Even when carrying a rabbit in its talons a Buzzard has no difficulty in perching on a branch. The period of incubation was 28 to 31 days, and the eggs in one nest were chipped on May 19th; the young remained about 6 weeks in the nest. Photographs were shown of the young and adult Buzzards, followed by a series of excellent slides of the Lesser Black-backed Gull, Storm Petrel, Gannet, Stonechat, Corn and Yellow Bunting.

In a discussion which followed it was pointed out that birds seem to have an aversion to picking up dropped food or nesting material and an instance of a Buzzard striking and securing a flying Wood Pigeon was recorded.

Several slides of sea birds were exhibited by Mr. Bennet. Finally, votes of thanks were accorded to the Lecturers and the Lanternist.

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Sphaerites glabratus F. is recorded for Yorkshire in the *Entomologist's Monthly Magazine* for December.

'The Hydrogen ion concentration of the Soil and of Natural Waters in relation to the Distribution of Snails,' by W. R. G. Atkins and M. V. Lebour, occurs in *The Scientific Proceedings of the Royal Dublin Society*, Vol. XVII., No. 28.

The Geological Society of Glasgow has issued Part 1 of Volume XVII. of its *Transactions*, a substantial publication, which contains among other matter, 'The Glaciers of Spitzbergen,' by G. W. Tyrrell; 'The Fracture of Homogeneous Media,' by James W. French; and 'Notes on Four Nautili,' by Robert Dunlop.

Hutchinson's *Animals of All Countries*, Part XVII., deals particularly with bird life, commences with the Archæopteryx, and gives details of many important families of birds. There is an excellently coloured plate of 'Wonderful Birds' Nests.' Part XX. seems largely to be devoted to the 'ugly ducklings' of the bird world. Personally we should award the apple to the Shoebill. In Part XXI. an admirable coloured plate of the Crested Ibis appears.

YORKSHIRE NATURALISTS' UNION: ENTOMOLOGICAL SECTION.

B. MORLEY.

THE Annual Meeting was held in the Leeds City Museum during the afternoon and evening, October 20th, 1923, Mr. G. T. Porritt presiding. The afternoon meeting was devoted to the exhibition of specimens, and that of the evening to the election of officers, and reading and adoption of the various reports. Each report laid special emphasis on the disappointing results of the year's work. All orders of insects had appeared in much below average numbers, and the general opinion was that the past season had been the worst of a succession of bad years. Nevertheless, the knowledge of the distribution of species in the county has advanced considerably, and many new species have been discovered, especially in the Diptera. Some specimens of great interest were exhibited.

COLEOPTERA.—Mr. M. L. Thompson showed **Acupalpus exiguus* Dej., **Gymnusa brevicollis* Payk., from Skipwith; **Philonthus fulvipes* F., *Micrurula melanocephala* Marsh; †*Phyllotreta atra* Payk., and **Ceuthorrhynchus asperifoliarum* Gyl. from Helmsley.

†*Sphaerites glabratus* F., from Kildale in Cleveland, and †*Phytonomus fasciculata* Hlt., taken by Mr. R. S. Bagnall at Redcar.

Mr. H. Maxwell Stuart showed **Anaglyptus mysticus* L., **Leiopus nebulosus* L., and **Saperda populnea* L., from Everingham; Mr. E. G. Bayford *Miscodera arctica* Payk. from Haworth Moor, and Mr. Kitchen *Chlaenius vestitus* Payk., Bridlington; *Serricornia* and *Malacodermata* taken during recent years in the Leeds district. Species marked † are new to the county, and * are new to the respective Ridings in which they were found.

LEPIDOPTERA.—Mr. Porritt showed a series each of *Polia chi* and *Hadena glauca*, both common West Riding species of exceptional interest on account of their wide range of variation, more especially the former, the exhibit containing the five forms of the variety *Olivacea*, all obtained at Huddersfield, and mostly during the present year.

Mr. H. Maxwell Stuart:—Specimens from Everingham as follows: *Hypsipetes furcata*, of extreme forms; *Eugonia quercinaria*, *Taeniocampa incerta* and *Hydroecia lucens* and *paludis*, the last two being put on record for the first time for the county. Also specimens of *Oporabia dilutata* var. *melana*, *Calocampa exoleta*, a peculiar bleached *Triphaena pronuba*, and a most extraordinary melanic example of *Taeniocampa gracilis*.

Mr. T. Ashton Lofthouse:—*Tinea lapella* and the white northern form of *Peronea variegana*, both from Middlesbrough.

Dr. H. D. Smart:—*Piev's napi*, varied series of spring emergence bred from Oxford ♀, including suffused ♀s, one with discal spot almost absent, and heavily veined yellow undersides; also specimens of a delayed spring emergence from Monk's Wood, Hunts., emerging VII., 23 from 1922 pupæ, and having spring facies; and very heavily spotted summer ♀s from Donegal.

A tawny ♀ *Epinephela jurtina* from Wansford, with bleached patch on one primary; an underside of *Coenonympha pamphilus* from Wansford, showing large double, bi-pupilled apical spot.

Lycæna corydon var. *semisyngropha*, Royston, *Bombyx quercus* var. *cullunæ*, a ♂ with yellow bands distally suffused on fore-wings and nearly absent on hind-wings, and a ♀ with no development of ova, from the South Yorkshire moors, and from the same place a pair of *Saturnia carpini* with the finer transverse lines largely obsolete, and markings suffused.

Arctia caja, an example with bleached hind-wings, and another with

yellow rayed hind-wings, both from South Yorkshire. Also a series of *Dianthoecia carpophaga* from Sussex, ranging from near type to extreme white forms.

Mr. B. Morley :—Specimens of *Eupithecia lariciata*, *Ecophora stipella*, *Stigmonota coniferana*, *Coccyx splendidulana*, *Hypermercia angustana*, *Brachycrossata cinerella* and *Argyresthia ephippella*, all additions to the Skelmanthorpe district list with the exception of the first, which has only one previous record. Also the following from the Skelmanthorpe district : *Lithocolletis kleemannella*, apparently a scarce species in the county; *Gelechia solutella*, only before recorded from Scarborough; *Argyresthia atmoriella*, only previously recorded from Middlesbro', and *Grapholitha nigricana*, new to the county list.

HYMENOPTERA. — Mr. Rosse Butterfield showed *Vespa austriaca* Panz.; Mr. A. E. Bradley, a series of *Colletes daviesana* Smith, from Lowestoft, in which the sexes showed their normal size and appearance, the males being smaller than the females; alongside these was a series from Skipwith taken by Mr. Fordham, in which the females were of the male size only. He also showed *Epeolus productus* Thorne, a parasite upon *Colletes*, and *Metopsis leucocephala*, a dipterous parasite on the same species.

A most interesting exhibit, also by Mr. Bradley, consisted of a long series of queens of many species of *Bombi* both British and foreign, showing regional convergence of weaker species mimicking stronger forms.

ORTHOPTERA.—Mr. Beanland showed a species of *Blatta* imported in a case from India.

NEUROPTERA.—Mr. H. Maxwell Stuart showed *Raphidia xanthostigma* from Everingham, where it is fairly common. Reports were read on the Coleoptera by M. L. Thompson; Hymenoptera by R. Butterfield, which added four species to the county list, taken by Mr. Fordham; Lepidoptera by Mr. Morley; Neuroptera and Trichoptera by Mr. Porritt; Mr. Brown's report on the Hemiptera was read by Mr. Bayford; and Mr. C. A. Cheetham's report of the Diptera gave an addition to the county list of seventy species, one of which is new to the British Isles.

All the above reports were adopted. The general officers were all re-elected.

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'The Growing Importance of Entomology,' by H. S. Fremlin, appears in *The Entomologist's Record* for September.

The Curator of the Museum at Newark-on-Trent, Mr. A. Smith, has issued his *Publication* No. 1, which deals with 'Sieges of Newark during the Civil War,' by W. Bradley; and 'Catalogue of the Civil War Relics in the Newark Museum,' by the Curator.

The Lancashire and Cheshire Naturalist for August-September is particularly full of notes which principally bear upon the area covered by the Journal. There is a strong botanical flavour, occasionally geological items, and there are illustrations of forms of *P. betularia* and Sulphur-tuft Fungi.

The Journal of the Ministry of Agriculture for November contains 'Bird Migration and the Introduction of Foot and Mouth Disease,' by Sir S. Stockman and Miss Marjory Garnett; 'The Hedgehog,' by H. M. Batten; 'Prevention of Bunt in Wheat'; and 'Peppermint: Its Cultivation and Distillation.'

The Autumn Number of *The Geographical Teacher* is, as usual, full of information likely to interest geographers, viz., 'The Island and the Empire,' by Sir Charles P. Lucas; 'Geography in Elementary Schools,' by Ernest Young; 'Irish Place Names,' by Elenor Butler; 'Report of an Excursion, Spring, 1923,' by H. A. Hinton; and 'Geography and Language,' by E. J. G. Bradford.

THE YORKSHIRE NATURALISTS' UNION'S SIXTY-SECOND ANNUAL REPORT

FOR 1923.

(Presented at Barnsley, December 8th, 1923).

The **Sixty-first Annual Meeting** of the Union was held at Scarborough on Saturday, December 9th, 1922. A report appeared in *The Naturalist* for January, 1923. The Presidential Address on 'Botanical Survey and Ecology in Yorkshire' was delivered by Dr. T. W. Woodhead, F.L.S., and has since appeared in our journal (1923, pp. 97-128).

President.—At an Executive Meeting held on November 11th, 1922, Dr. A. Smith Woodward, F.R.S., was unanimously elected President of the Union.

Field Meetings have been held as follows:—Bridlington, April 21st to 23rd; Helmsley, May 19th to 21st; Middlesmoor, June 16th; Penistone, July 14th; Bedale, August 4th to 6th. Reports of these meetings have appeared in *The Naturalist*.

Additional sectional field meetings have been held by the Bryological, Mycological, Entomological, Marine Biology and Plant Galls Sections, and notes on these have also appeared in *The Naturalist*.

The Railway Companies are not yet prepared to grant reduced fares to members on production of membership cards, but some facilities have been enjoyed in travelling, especially from the London and North Eastern Railway Company.

The Excursions for 1924 are:—

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|----------------|-----------------------------------|----------------------------|
| S.W. Yorks., | Easter, April 19th to 21st : | Barnoldswick. |
| S.E. ,, | May 17th, Holme-on-Spalding Moor. | |
| N.E. ,, | Whitsuntide, June 7th to 9th : | Robin Hood's Bay. |
| Mid.W. ,, | July 12th : | Church Fenton for Saxton. |
| N.W. ,, | Bank Holiday, August 2nd to 4th, | Darlington for Croft area. |

The Annual Meeting (1924) will be held at Sheffield on the invitation of the Sorby Scientific Society.

Membership.—While there has been a satisfactory increase of members during the year, the Executive hopes that efforts to increase the membership will not be relaxed, as working expenses remain unavoidably high. The membership now stands at 423, the following having been elected during the year:—

- Archibald, Chas. F., Rusland Hall, Ulverston, Lancs.
 Bennett, W., Parker's Hotel, Upper Briggate, Leeds.
 Broome, Herbert C., Netherthorpe, Failsworth, Nr. Manchester.
 Cattley, Major R., M.B., C.M., B.Sc., F.R.M.S., 43 Main Avenue, Heworth, York.
 Cowling, G. H., M.A., 16 Cromer Terrace, Leeds.
 Dundas, F. J., Barnborough Hall, Nr. Doncaster.
 Farrell, R. Vernon, Brunswick House, 299 Glossop Road, Sheffield.
 Frankland, J. N., Middlesber, Austwick, Lancaster.
 Grange, Miss M. E., Old Manor House, Micklethwaite, Bingley.
 Hudson, R. G. S., M.Sc., F.G.S., The University, Leeds.
 James, C. H., 1 Grange View, Chapeltown, Leeds.
 Lawson, Major, 19 Marshall Avenue, Bridlington.
 Mainprize, S. L., F.G.S., Wydale, St. John's Avenue, Bridlington.
 Mason, Harold, 29 Frankland Terrace, Leeds.

Maxwell-Stuart, H., Elleker House, Weringham, York.
 Nelson, Rev. Edmund, The Vicarage, Lowthorpe, E. Yorks.
 Newbold, Major J. N., 29 St. Michael's Crescent, Headingley, Leeds.
 Orde-Powlett, Hon. Nigel A., Bolton Hall, Leyburn, Yorks.
 Robinson, Miss F., 47 Athol Road, Heaton, Bradford.
 Russell, P. L., Broughton Rise, Malton.
 Ryan, Miss E., Gledhow Mount House, Harehill's Lane, Chapeltown, Leeds.
 Sledge, W. A., 38 Kelso Road, Leeds.
 Stainton, E., 70 Jubilee Road, Doncaster.
 White, Miss E., B.Sc., Brough, E. Yorks.
 Willatt, Major W. H., Reighton Hall, Reighton, Bridlington.
 Wilson, A., F.L.S., F.R.Met.S., Havera Bank, Sedburgh.
 Wray, Miss E. M., 9 Park View, Beeston Hill, Leeds.
 Wright, T. R. D., J.P., St. Gregory's, Bedale, Yorks.

Affiliated Societies.—The number of affiliated societies remains unaltered. The total numerical strength of the Union is now 3923.

Obituary.—The Executive much regrets to record the deaths of Messrs. C. H. Moss, Percival Ross and J. W. Sutcliffe.

The British Association was attended, as usual, by our delegate, Mr. T. Sheppard, who took part in the discussion at the Conference of Delegates, and was re-elected Vice-Chairman of the Corresponding Societies Committee. The meeting place this year being near our county, quite a large number of our members was present. Mr. Sheppard's report has already appeared in *The Naturalist*, as well as summaries of many of the papers read, and a series of special articles on the work of the Association.

The Presidency for 1924 has been offered to and accepted by Mr. P. F. Grimshaw, F.R.S.E., F.E.S., of the Royal Scottish Museum.

VERTEBRATE ZOOLOGY.

West Riding (H. B. Booth):—The following notes are in addition to those recorded in *The Naturalist*. A Green Woodpecker was shot by mistake on Grassington Moor (August 14th). Dr. K. C. Crosbie records the nesting of this bird near Grassington this year, and states that the bird shot was one of the young ones (*The Field*, October 25th, p. 591). Mr. T. Fenton Greenwood reported a pair in Flasby Wood, near Gargrave, on April 28th.

On September 4th, in fine weather, a Cormorant descended on the lake at Royd's Hall, Low Moor, Bradford, and commenced diving (Mr. R. Hardy). Snipe are decreasing both as breeding birds, and as sporting birds in the autumn, and one never hears of a Jack Snipe now-a-days. Partridges have had a bad season, and it is reported from some parts of Upper Wharfedale that they are suffering from a very infectious form of enteritis. Ravens have become almost common among the fells in the N.W. of the Riding, while most of them nest just beyond the boundary of the county. I know of three nesting sites in the West Riding. The oft repeated story that they nest at Goredale Scar is incorrect.

Heron.—The Eshton Herons nested in Flasby Wood this season. Mr. T. Fenton Greenwood reports that on April 28th, there were twenty-three nests in all, some obviously old. He could not be certain that more than fifteen nests were occupied. Two nests were examined, one contained eggs, and the other two young ones about ten days old.

Great Crested Grebes are increasing and extending their breeding range in a North-westerly direction in the West Riding. Mr. A. Ward informs me that two pairs nested on Malham Tarn this season, and that one reared one, and the other two, young. The pair at Coniston Cold

Lake nested, but did not succeed in rearing any chicks (Mr. R. Butterfield). Mr. W. S. Bramley tells me that at the least six pairs nested at Fairburn.

Gulls.—The gamekeeper at Malham Tarn (Mr. A. Ward) reports that a few pairs of Lesser Black-backed Gulls have been hanging about there all the summer, but that he has not known a nest, and has not encouraged them. It is probable that they may now be nesting somewhere else in that wild neighbourhood.

British Willow Titmouse (Parus borealis kleinschmidti)?—What appeared to me to be most probably a pair of this species endeavoured to nest in Manningham Park, Bradford. About the middle of April the birds hollowed out a hole in the rotten branch of an Elm about 30 feet up, and littered the ground below with small chips for several yards. They were frustrated by a pair of House Sparrows, which filled up the hole with straws, until they could not get into it, and then abandoned it. I saw the birds on April 18th, but they were far too high up for identification even with my field glasses, as the hen sparrow was then guarding the hole, and driving them away. I submitted full particulars to the Rev. F. C. R. Jourdain, who considers that the facts are too scanty to make an actual record, with which I entirely agree; although in my own mind I have very little doubt. This is the only case in this district where I have known tits *entirely* to dig out a nesting hole; although when I lived in N.W. Norfolk I saw several—but usually in rotten Silver Birch stumps, and much nearer to the ground. I have to thank Mr. F. Rhodes for first drawing my attention to the occurrence.

Other Nesting Notes.—The Dunlin has again nested on Rombald's Moor; probably two pairs. Woodcocks are still increasing as nesting birds in this district. The Rev. C. F. Tomlinson and I examined the nest of a Spotted Flycatcher at Bolton Abbey, in which all the five eggs were pale blue, and apparently quite unmarked. Mr. W. H. Parkin reports that he found a pair of Long-tailed Tits (locally uncommon birds), nesting in Grass Woods. Mr. W. G. Bramley remarks that for two seasons Yellow Wagtails have been absent from the Fairburn and Castleford district, where formerly they nested.

Migration Notes.—I again saw a Spotted Flycatcher in April. This was at Ilkley on April 21st. The bird was catching flies from off boulders in the river Wharfe. I believe it perished, because, although I went round several times, I never saw another Spotted Flycatcher near to the same place until May 12th. The Willow Warbler arrived very early, one being heard by Mr. S. Longbottom at Bingley on April 11th, and by the 14th and 15th they were widely but thinly distributed; although it was a week later before I noticed any females. The Cuckoo was rather late, not being authentically reported at Ben Rhydding before April 29th. From May 2nd to the 6th it was numerous, and very noisy on the moor edges in spite of vile weather. Since May 6th we have rarely heard one, and I have similar reports from others. It has been by far the worst year for Cuckoos during my fifteen years' residence in Wharfedale. I believe they were killed off—or perhaps starved to death—because caterpillars were apparently absent in the area. Willow Warblers lived for the first two or three weeks after their arrival here by catching insects in the air, instead of on leaf caterpillars—their usual food. A young Cuckoo (with part of its tail feathers missing) lingered on in a suburb of Keighley, until September 22nd, when probably it perished. A Merlin ringed as a nestling on Barden West Moor, on July 7th 1922, was reported from near Berwick-on-Tweed on September 16th, 1922 (*British Birds*, Vol. XVI., p. 302). Finally, are Corncrakes changing their habits and becoming more silent? I am frequently getting reports that they have been *seen* but not heard! Personally, I don't remember having heard, or seen, one this year.

East Riding (E. W. Wade):—The opening months of 1923 gave promise of an early season. The absence of severe winter weather stimulated resident and partially migrant birds to a premature outburst of song, the following being noted in full song: 31st December, Chaffinch; 4th January, Missel Thrush and Hedge Sparrow; 7th January, Ringdove; 12th March, Yellow Hammer. Thrushes were laying by the second and Blackbirds by the third week in March.

Unfortunately, these activities were nipped in the bud by an abnormally cold and sunless spring, with wet weather. The birds generally were late and irregular in breeding, frequently laying short clutches, and the Marsh breeders suffered severely from flooded land, eggs being flooded after incubation had commenced.

The breeding of Owls was normal except the Barn Owl, which suffered from scarcity of mice. The Brown Owl seems to feel this the least of any species, owing to its more catholic diet, and clutches of 5 eggs were observed.

The Corvidae were later in nesting and much less prolific than usual. Peewits commenced nesting in March, but were again in diminished numbers. The bird seems to be dying out as a breeding species in Holderness.

Of the migrants, Sand Martin, Willow Warbler, Common Whitethroat, Cuckoo, Sedge Warbler and Spotted Flycatcher were late in arriving. The rest normal.

The Goldfinch shows no increase on 1922. The Whinchat though scarce and local, does not diminish. Swallows generally reared two broods, and had departed by 30th September, a week earlier than usual. Three belated House Martins were seen on 15th October. Swifts, though arriving at the average date, were late in breeding. Family parties were seen on 26th August, and the last bird recorded on 15th September. The Warblers generally were late in nesting, and frequently short clutched.

A further decrease in the numbers of Corncrakes was observed, three pair being noted east of the wolds, one of which was known to rear young, and four pair on the western edge of the wolds. The Little Owl is still extending its range on the edge of the wolds, and fresh stations are recorded.

One Stone Curlew was seen on migration on the coast in April, but the species is practically extinct on the wolds. The Woodcock has again nested in this district, three pair being recorded.

The breeding range of the Magpie in South Holderness is still extending, two pairs nested in the hedges at Kilnsea. The Quail, formerly a regular breeder in the Beverley-Driffield area, near Lowthorpe, and Pickering Valley, nested this year at Little Driffield, as already recorded.

The Waxwing occurred at Filey on 25th December, 1922; Hornsea, 20th January, 1923. Very few winters pass without this species being seen in the East Riding. On 27th April, two Rough-legged Buzzards were seen at Burton Constable.

The Razor Bill and Guillemot were exceptionally early in laying, the weather seeming to have no effect upon their breeding date. No doubt some unknown food conditions are the deciding factors in the date of egg production. On 27th December, 1922, numbers of dead and dying Guillemots came ashore with feathers clogged by oil. This year, for the first time, I have seen oil-stained eggs brought up the cliffs. Apparently the three mile limit for the discharge of refuse oil, if observed, is ineffective in protecting these birds.

Partridges have suffered severely on all lowlands from the July storms, and wild Pheasants have not done so well as in 1922.

North Riding (W. J. Clarke):—There has been a steady spread of the Fulmar Petrel, which during the spring of 1923, occupied every bit

of available cliff along the coast, and bred in several places. The colony of Black-headed Gulls had a set back this year owing to the unsympathetic action of the landowner who erected a scarecrow upon the ponds where they breed, the result being that on May 31st not a single nest was to be seen. Shags were very numerous in the vicinity of Scarborough during the early spring, and on four successive days, 26, 25, 43, and 23 were seen fishing in Scarborough Harbour. A Whooper Swan visited the Scarborough Mere during February, and several pairs of Mallards nested on the same sheet of water. Common Scoters were not so numerous as usual during the winter, the considerable flocks which used to assemble near Whitby and further south being absent. The pair of Peregrines which occupied a new nesting station on the coast in the spring of 1922, did not return this year. Merlins nested in several places on the moors, and in two instances laid their eggs in old Carrion Crows' nests, one in a Birch tree at a height of 14 feet from the ground. Three young were hatched. In the other case a crow's nest was also occupied, in a Scots Fir, 25 feet up, the old birds being destroyed by the gamekeeper.

A considerable increase of Kestrels is reported in the Whitby district. A male Hen Harrier was seen on the moors, near Glaisdale, on January 16th.

Whitethroats, Wheatears, Blackcaps, Yellow and Common Buntings, Bullfinch and Grey Wagtails and most of the moorland species, except Curlew, showed a decrease in numbers in the Scarborough district. The Reed Bunting which returned to the Scarborough Mere in 1922, after many years' absence, again bred there this year, and the young were seen. Cuckoos were reported to be less numerous near Whitby, but appeared in usual numbers in other areas. Fieldfares were scarce, but very great numbers of Redwings were present during the winter. Goldfinches were not so numerous around Scarborough, but continue to increase further north. Very large numbers of Bramblings were seen about Whitby during the winter.

Whinchats, Chiffchaffs, Greenfinches, and Linnets appeared in greater numbers than usual in the Scarborough district. The pair of Yellow Wagtails which usually nest near Scarborough each year did so last spring, and the young were seen. Turtle Doves keep up the increase noticed in recent years. Two Great Grey Shrikes were observed in the Whitby district, one in November, 1922, and the other in April, 1923. Siskins were reported in fair numbers near Whitby, and at Goathland, and 20 Mealy Redpoles were seen near Ruswarp on January 14th.

Little Grebes have been absent from the Scarborough district during the year. Kingfishers have kept up their numbers, and a considerable increase is reported in the Whitby district. Single specimens each of Grey Plover and Greenshank were noticed at Whitby. A Starling was feeding young in the nest near Scarborough on March 22nd. A Dipper's nest containing eight eggs was found near the same place. At least three pairs of Woodcocks nested in the Scarborough district. On October 11th, four Swallows were seen, two adults and two immature. The recorder is indebted to Mr. F. Snowden of Whitby, and Mr. T. N. Roberts of Scarborough, for information of great service in compiling this report.

York District (Sydney H. Smith) :—All immigrant birds were late in arrival, and few in numbers. Decreases are particularly noticeable in Landrails, Swallows, House Martins and Cuckoos. The former have almost disappeared, and I heard one where, 20 years ago, I could hear 40 or 50. On January 18th, a Red-necked Grebe was killed in the River Ouse at Poppleton, and proved to be a young male weighing 2 lbs. 2½ ozs. A Heron was flushed from some swampy ground in the City of York early in the morning of January 24th, probably attracted by the numbers of small fish collected by the warm water overflow at the electricity station. A Great Crested Grebe arrived on the Dringhouses

pond on January 12th, and stayed until the middle of March ; this may be one of the Castle Howard Grebes, as the species nested again quite successfully on the large lake there. A big flock of gulls visited the Knavesmire on March 2nd, but my informant was unable to describe the species. Other birds on passage were a gaggle of geese (probably pink-footed) flying over the City in the N.E. direction on March 24th, and a party of Stone Curlews, whistling distinctly as they passed overhead, about 10-45 p.m. on April 5th. On January 22nd I flushed about 100 Snipe from some marshy ground behind my house in York, and I often notice smaller parties busily probing in this place, quite unmindful of the people who constantly pass by. On March 9th a Pied Blackbird, very prettily speckled all over with white, was seen at Bishopthorpe, and as far as is known escaped being killed. On April 17th, a Lark's nest with three eggs was discovered near York, an early date for such an inclement season. A Hawfinch's nest with five eggs was found in a pear tree at Cawood on June 12th, and about the same date several nests of Goldfinches, Wheatears, and Whinchats were observed. At least three pairs of Curlew successfully reared young on Strensall Common, and Redshanks have been well in evidence at Cottingwath and Skipwath, and three pairs are thought to have bred at Whenby. Numbers of Carrion Crows frequent Strensall Common, and during April and May a York boy collected 54 eggs of this species with little apparent effect on the numbers of ' carrions ' still about the district. Jays are fairly numerous, and Magpies are particularly abundant. The effect of the protection orders is most marked in the case of Owls ; Barn, Tawny and Long-eared Owls have increased very much, and a country walk at night speedily verifies the fact, as their hooting can be heard on every hand.

Kingfishers and Dippers have apparently increased on the River Ouse and various becks in the district, and Herons seem to be far more plentiful than was the case a few years ago. Black-headed Gulls are still very numerous in their breeding colony on Skipwath Common. Last year I mentioned a tendency on the part of some species of birds towards segregation of the sexes at certain times of the year, particularly Chaffinches. On May 6th, at Thirkleby, I saw a very large flock of these birds—all females. Another incident concerns the Yellow Wagtail—several males of this species arrived on April 24th, but no females were seen until a fortnight later.

I am greatly indebted to Messrs. V. G. F. Zimmermann, E. W. Taylor, and H. Shorney for their valuable help with local records.

ARRIVAL OF MIGRANTS, 1923.

Chiff Chaff.—Heworth, March 25th ; Askham Bogs, March 29th ; York, March 30th.

Willow Warbler.—Thirkleby, March 30th ; York, April 17th ; Strensall, April 18th.

Swallow.—Acomb, April 6th ; Stillington, April 7th ; Howsham, April 13th ; York April 27th.

Wheatear.—Wass, April 7th.

Sand Martin.—York, April 15th ; Thirkleby, May 5th.

House Martins.—York, April 17th and 25th ; Dringhouses, May 7th.

Whitethroat.—Strensall, April 18th ; Dringhouses, May 7th.

Blackcap Warbler.—Moreby Park, April 22nd.

Sandpiper.—River Ouse, Cawood, April 22nd ; Pickeringh, May 5th.

Yellow Wagtail.—Dringhouses, April 24th.

Redstart.—Flaxton, April 25th.

Sedge Warbler.—Flaxton, April 25th ; Thirkleby, April 29th ; Dringhouses, May 7th.

Swift.—Dringhouses, April 25th ; Heworth, May 2nd ; York, May 5th.

Tree Pipit.—York, April 22nd ; Dringhouses, April 26th.

Whinchat.—York, April 28th.

Cuckoo.—Dringhouses, April 28th ; Strensall, April 28th ; York, May 2nd.

Landrail.—Fulford, May 1st ; Dringhouses (1 picked up dead), May 5th ; Flaxton, May 6th ; Thirkleby, May 10th.

Nightjar.—Flaxton, May 6th.

Turtle Dove.—Dunnington, May 6th.

MAMMALS, AMPHIBIANS, REPTILES AND FISHES COMMITTEE.

Mammals (Sydney H. Smith):—The usual common Yorkshire Mammals retain their average, Foxes are perhaps too numerous as viewed by the poultry keeper, Badgers occur in all their usual haunts, and reports of their capture or observation are plentiful. Otters have slightly increased in some parts of the county, and records are numerous. Two Otters occurred in the River Ouse at York, in the mid-morning of January 26th, in full view of scores of spectators, when one of the animals dived and came up with a roach in its mouth. The season may have been too wet and cold to suit Hares and Rabbits, as both are not near so common as they were the previous year. On July 22nd, at Thirkleby, I saw a Stoat hunting through the Water Voles run along the bank of the stream, and fearlessly taking to the water at short intervals in its keen pursuit of its quarry. On seeing me it kept on with its task, and being joined by its mate, the pair of Stoats continued until lost to sight beyond a bend in the stream. Squirrels, both Grey and Red, maintain their numbers, and smaller Mammals such as Weasels, Rats, Water Voles, long and short-tailed Field Voles and Shrews appear to be in their usual numbers. In the Scarborough district, Mr. W. J. Clarke reports Squirrels to be almost extinct, and it would be of interest to know the cause of this local decrease. He further adds that Otters and Badgers maintain their numbers in spite of persecution.

Many notes on Yorkshire Mammals, Fishes, etc., have appeared in *The Naturalist*, as will be seen from the index to that volume.

Fishes (S. H. Smith):—Besides the species already recorded in *The Naturalist* :—

A *Blue Shark* was caught in Bridlington Bay during September (*County Life*, September, p. 400.)

An *Eel*, 3 feet 3 inches long, weighing 4 lbs, was caught by a Mr. Banford in an old brick pit near York on August 6th.

A *Barbel*, 5½ lbs., was caught in the River Ouse at Beningbrough in September.

A *Rudd* weighing 1 lb. 10 ozs., was caught in a pond at Market Weighton by Mr. T. Wood of York, on September 23rd, and a *Roach* weighing 1 lb. 11ozs. was caught in the River Ouse at York on February 23rd, by Mr. L. Horsley.

East Riding (C. F. Procter):—The season seems to have been a favourable one for the nesting period, since the game birds (the best test of these conditions) are more than usually plentiful, and Hares and Rabbits have bred freely. It may be thought that Rabbits always breed freely ; this is not so, and in certain seasons, Rabbits are very responsive to favourable conditions. There is an increasing abundance of Kestrel Hawks : they are everywhere. There is the usual steady increase in Grass Snakes in Holderness. I nearly trod on a very fine coiled specimen as recently as October 13th. I am very much inclined to the opinion that this increase is entirely a response to the creation of the swamp land interspersed with sheltered sunny situations at Kelsey Hill, owing to the activities of the Railway Company. This has now become a

real sanctuary for reptiles, and the water courses which run alongside are a steady means of distribution.

WILD BIRDS AND EGGS PROTECTION COMMITTEE.

Mr. F. H. Edmondson reports :—

The Breeding Season, 1923, has not been very satisfactory, the only two places to be reported as a success are Hornsea Mere and the Fulmar Petrel on Bempton Cliffs.

The Peregrine Falcon in North West Yorkshire.—Unsatisfactory. I think one pair reared its young; the pair we specially protect has not. I was there at Easter and saw three Falcons in the air at the same time, but could not find the eggs, nor have I any report of eggs or young having been seen later.

Stone Curlew, North Riding.—Two pairs are reported having been seen about on the usual ground. During the summer five birds were seen the first week in August, and three on the 14th of August. Three or four pairs have bred on the North, young ones having been seen. When I was there at Whitsuntide I did not see the eggs.

Stone Curlew, East Riding.—The Keeper reports that he has not seen any birds this year.

Spurn.—At Spurn we have not had too good a year, neither the Lesser Tern nor Ring Plover being numerous. A Marsh Harrier was reported on May 20th, but only stayed four days. On June 10th many nests were destroyed by the sea. Crows and Magpies have been a very serious problem this year; they are reported breeding at Skeffling, and have repeatedly raided the Terns' nests. Ten Crows and five Magpies have been destroyed. The Terns apparently tried to nest two or three times, and in July were sitting on one and two eggs.

Hornsea Mere.—The expense for Hornsea Mere has been the same as last year, and our income has been less, so we must get a larger subscription list. The Keeper reports 'all well,' and a report from the shooting tenant and owner indicates that all is satisfactory. Several pairs of Crested Grebes, Mallard, Tufted Duck, and Pochard have bred, Reed Warbler, and Sedge Warbler in good numbers.

Fulmar Petrel.—Protection was given to both the bird and its eggs by the County Council on our recommendation. The Fulmar Petrel has bred at Speeton in considerable numbers. Although I have reason to believe that the climbers are taking a few eggs, they certainly left a nice number to hatch; I saw a climber pass several sitting birds, and if the increase continues another year or two I hope we may be able to take away the protection we got for the birds and still have them as regular breeding species. I saw the remains of several eggs, the contents of which had been sucked by the Herring Gull.

Green Plover, in the North and West Ridings.—There has been a fair increase of breeding birds and, judging from the flocks seen in August and September, I think they have had a good year.

The Merlin in the West Riding.—On the Duke of Devonshire's estate two or three pairs have again reared their young, and I notice that a bird bred there, ringed by Mr. Birch in 1922, was shot this spring in the North. On the borders of Lancashire and Yorkshire the report is as last year, "reasonably well."

(To be continued).

CORRESPONDENCE.

FOX HUNTING.

SIR.—I thank you for your mention of my booklet 'Reynard: the case against the Fox,' in your issue for November, 1923. I cannot, however, congratulate R.F. on his summing up of its contents, for not only does he show surprising ignorance on the whole subject of fox-hunting, but he also introduces a certain amount of unfairness in the way he misrepresents—by misquotation, repression and unwarranted imputation—my views on the matter.*

There is at the present moment a marauding fox in this district. Already it has killed eleven Rhode Island Red Pullets, belonging to the foreman of this farm, twenty-nine fowls belonging to a farmer, and twenty-seven turkeys, that were being fattened for Christmas, belonging to someone else. It has probably done some more damage since. The owners of these fowls cannot afford such losses, and it is both unreasonable and unfair to expect them to do so. Fox-hunters are a privileged class, the majority of whose members are of an exceptionally idle and vicious disposition; and it is not right that such people should amuse themselves, by the torture of dumb animals, at other people's expense.

Fox-hunting, by debarring many people from obtaining fresh eggs, is helping to undermine the health of the Nation.—G. W. CLARK.

Evidently Mr. Clark's idea of a book review is that it should only be a favourable one.

The writer of the review introduced no unfairness, nor did he misquote. As it is impossible to deal with the whole of the matter in the pages of *The Naturalist*, certain paragraphs in the booklet were quoted, word for word, and left to speak for themselves.

The present writer stated that he held no brief for fox-hunters; indeed, with some of the things they do he entirely disagrees; but over thirty years' experience with foxes and hunting does not tend to ignorance on the matter.

Mr. Clark says 'Fox hunters are a privileged class, *the majority of whose members are of an exceptionally idle and vicious disposition.*' This shows that Mr. Clark on this matter is both ignorant and vicious. It may (or rather may not) interest him to know that in the West Riding, a great (if not the greatest) proportion of the riders to hounds are business men, who find health and relaxation in a pursuit which is encouraged by both farmers and landowners, and without whose good will it would be impossible to carry on.—R.F.

—: O :—

Britain's Life-boats: The Story of a century of Heroic Service, by **Major A. J. Dawson.** London: Hodder & Stoughton, xiii. + 279 pp., 7/6 net. This admirable and well illustrated volume contains a complete account of the excellent work achieved by the Royal National Life-boat Institution, and in addition gives much interesting information relating to life-boats of various periods, and the work they have accomplished. There is, as frontispiece, an excellent portrait of the Prince of Wales, who has written an introduction; and a foreword by Joseph Conrad. The map published at the end showing the positions of the life-boats in the country is an indication of the extent of the Institution's activities.

* We have had to omit much of Mr. Clark's letter—ED.

NORTHERN NEWS.

Mr. E. Snelgrove, B.A., a well-known member of the Yorkshire Naturalists' Union, has been elected a member of the Sheffield City Council. We should like to congratulate Mr. Snelgrove, and the Sheffield City Council.

The ex-Lord Mayor of Leeds (Alderman Frank Fountain), kindly favours us with a copy of the souvenir of the official opening of Temple Newsam, Leeds, of which only a very few copies were printed and the edition was soon out of print.

The Report of the Manchester Museum, Publication No. 86 (19 pp., 6d.) gives the usual full summary of the progress made by that well-known institution, in its various branches, notwithstanding the way in which it is somewhat crippled as regards finances.

At a recent meeting of the Geological Society of London, the President announced the donation, by the executors of the late Prof. W. Crawford Williamson, of two armchairs, formerly the property of William Smith (1769-1839), and bequeathed by him to John Williamson, of Scarborough.

Our contributor, Mr. A. A. Dallman (17 Mount Road, Higher Tranmere, Birkenhead) has in hand 'The Flora of Flint and Denbigh,' particulars of which he will be glad to send to anyone interested. The work is practically complete, but its publication depends upon the support received.

The third edition of Economic Series, No. 4, issued by the British Museum (Natural History) entitled *Mosquitoes and their Relation to Disease*, by F. W. Edwards, has just been issued, and speaks for the popularity of these useful pamphlets. It is well illustrated, and can be had for the small price of fourpence.

The members of the Fell and Rock Climbing Club of the English Lake District have perpetuated the memory of their fellow members who fell in the Great War by the creation of a unique memorial. They have purchased for this purpose, in the heart of the most romantic part of Lakeland, about three thousand acres of land, which embraces some of the stiffest climbs in this country.

We seem to have missed some of the 'celebrations' in connexion with the recent Jubilee meeting of the Leeds Geological Society, as, according to the press, the President of one Society attending 'gave a very interesting account of his visit as delegate of the Society to the recent jubilee meeting of the Yorkshire Geological and Polytechnic Society at Leeds'; from which we assume there has been 'celebrating' indeed!

His Majesty the King of Sweden recently paid a visit to the Linnean Society's rooms, Burlington House, London, and inspected the collections of Linnæus, comprising the herbarium, insects, shells (including the artificial pearls produced by Linnæus), fishes' skins affixed to sheets of paper; the letters received and preserved by the recipient, and the interleaved and copiously annotated volumes, such as the 'Species Plantarum,' and 'Fauna suecica.'

We learn from the daily press that 'A consignment of earwigs in the pupæ stage formed part of the cargo of the White Star liner *Athenie*, which left Southampton recently for New Zealand. They are to be liberated in orchards infected with parasites. The earwigs, which were packed in specially constructed wooden boxes with gauze panels for ventilation, are the foes of the microbes [!] which are destroying great quantities of fruit, and they have been sent as a last resort in the hope that the threatened crops may be saved this season.'

THE
GEOLOGICAL MAGAZINE

OR
Monthly Journal of Geology.

WITH WHICH IS INCORPORATED

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EDITOR - R. H. RASTALL, Sc.D., M.INST.M.M.

ASSISTED BY

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Jan., 1924.

THE NATURALIST

A MONTHLY ILLUSTRATED JOURNAL
PRINCIPALLY FOR THE NORTH OF ENGLAND.

EDITED BY

T. SHEPPARD, M.Sc., F.G.S., F.R.G.S., F.S.A.Scot.,
The Museums, Hull;

AND

T. W. WOODHEAD, Ph.D., M.Sc., F.L.S.,
Technical College, Huddersfield,

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF

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

JOHN W. TAYLOR, M.Sc.

RILEY FORTUNE, F.Z.S.

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YORKSHIRE NATURALISTS' UNION.

VERTEBRATE SECTION.

President of the Section : C. F. PROCTER, Hull.

Two Meetings will be held in the Library of the Leeds Philosophical Society, on Saturday, **February 16th, 1924**, at **3-15 p.m.** and **6-30 p.m.**

Papers will be given as follows :—

'The Fulmar Petrel' (illustrated), by E. W. Wade.

'Some Bird Legends,' by W. G. Bramley.

'The Work of the Yorkshire Wild Birds and Eggs Protection Acts Committee' (illustrated), by F. H. Edmondson.

'The Status and Distribution of the Commoner Birds of Shetland' (illustrated), by R. Chislett, M.B.O.U., F.R.P.S.

Members or Associates are invited to attend and bring notes, specimens and lantern slides.

Will officials of Affiliated Societies kindly notify their members.

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Chester Soc. Nat. Science: Ann. Reports, i.-iv.

Cleveland Lit. & Phil. Soc. Trans. Science Section or others.

Croydon Nat. Soc. 6th Report.

Dudley and Midland Geol. etc., Soc. Vols. II-IV.

Discovery. (Liverpool, 4to). 1891.

Derby Arch. and Nat. Hist. Soc. Part 21.

Devonshire Assoc. Adv. Science. Vols. I., II., III.

Dublin Geol. Soc. Vol. I., pt. 1, 1830?; Vol. VII., parts 1-3 (or complete Vols.). 1855.

Eastbourne Naturalist (1 part).

Eastbourne Nat. Hist. Soc. Vols. II.-III. (or parts), and part 6 of new series.

Frizinghall Naturalist. (Lithographed). Vol. I., and part 1 of Vol. II.

Geol. and Nat. Hist. Repository, Mackie's. Vols. II., III.

Geol. Assoc. Proc. Vol. I., Part 1.

Geol. Soc., London, Trans. 2nd ser., Vol. VI., and Pts. 1-3 of Vol. VII (or Vol.)

Geological Magazine, 1894.

Huddersfield Arch. and Topog. Society. 1st Report, 1865-1866. (38 pp.).

Illustrated Scientific News. 1902-4. (Set).

Journ. Micrology and Nat. Hist. Mirror. 1914—

Keighley Naturalists' Society Journal. 4to. Part 1.

Lancs. and Cheshire Antiq. Soc. Vols. IV., V., VIII., XXV).

Louth Ant. and Nat. Soc. Reports, 1-12, 19.

Liverpool Geol. Association Proc. Parts 1, 3, 16.

Liverpool Nat. Journ. Parts 1, 3, and 20.

Manchester Geol. Soc. Trans. Vols. XV., XVI., XXIII.

Naturalists' Guide (Huddersfield). Parts 1-38.

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Newbury District Field Club Transactions. Vols. III. and on.

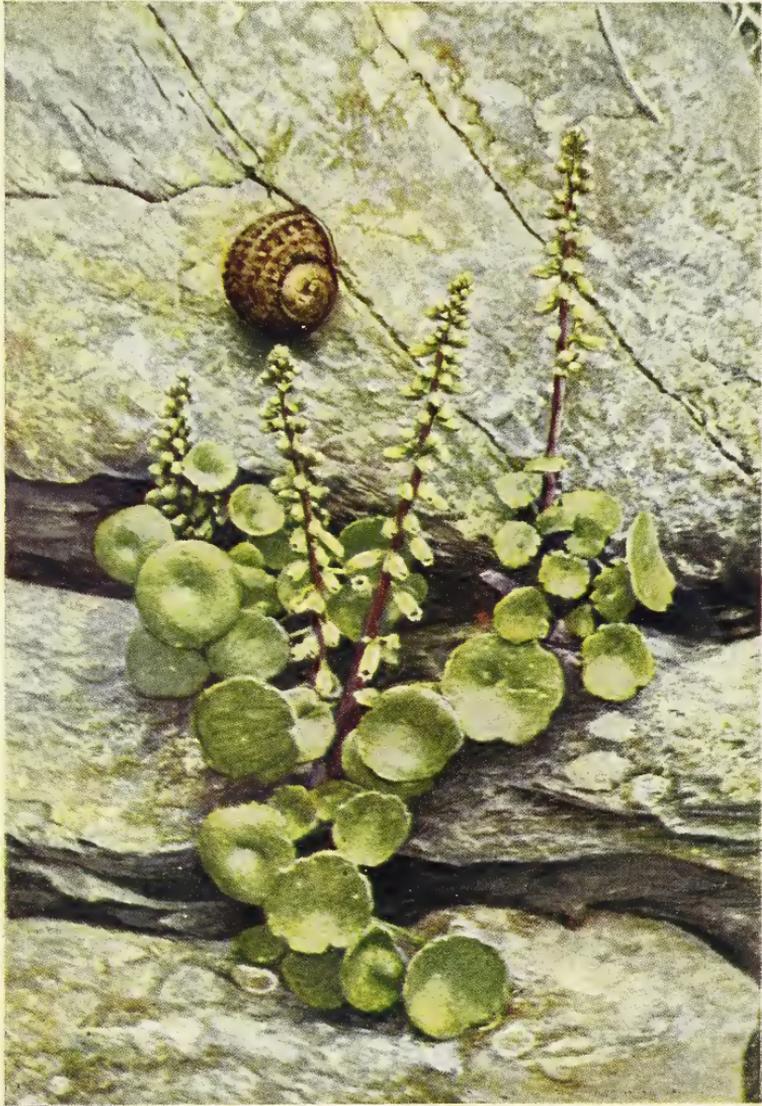
North Staffordshire Field Club Reports for 1869, 1871-2, 1876.

Peterborough Natural History Society. Reports 1-8, 11-12, 14-25.

Quarterly Journal of Science. 1878-9, 1882-3, and 1885.

Quekett Club Journ. 1st Series, No. 25.

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Snail (*Helix aspersa*) and Wall Pennywort.

NOTES AND COMMENTS.

THE BRITISH ASSOCIATION.

Circumstances have rendered it necessary to alter the date of the British Association meeting in Toronto this year, which had been provisionally announced for September 3rd-10th inclusive. It has now been fixed for August 6th-13th, and will be followed, not preceded, as previously contemplated, by any official excursions. The Association, which will meet in Southampton in 1925, has received an invitation from the University and City of Oxford to meet there in 1926, which will in due course be presented to the General Committee.

WAYSIDE AND WOODLAND.*

We have previously referred to the excellence of the publications issued by Messrs. Warne, and the present handy little volume* (which easily fits the pocket, notwithstanding that it contains over 200 pages and over 100 plates) seems to deal with most aspects of wild life; mammal, bird, fish, insect, mollusc, wild flowers, fungi, etc. The striking feature on opening the volume is the wealth of illustration, which so far as the numerous coloured plates are concerned, will be very difficult to improve upon. The fact that the text is written by Mr. T. A. Coward, who has already been responsible for some of the volumes in this series, is all that is necessary to guarantee that the text is as good as the illustrations. We are kindly permitted to reproduce an example of the coloured plates, with this issue (Plate II.).

CUCKOO HABITS.

In *Natureland*, Vol. II., No. 2, Mr. G. J. Scholey states that recently several new facts revealed the Cuckoo in a most unfavourable light, pursuing her evil ways with a deliberate and ruthless cunning hitherto unsuspected. One bird, on April 26th, a few days following her arrival, deliberately destroyed sets of incubated Wagtails' eggs and young birds which were too far advanced for her purpose, causing the fosterers to rebuild nests in which she could deposit her own eggs at the right time! To prove her deliberate intention to cause the Wagtail to forsake its nest, in one instance, being unable to get to a clutch of incubated eggs (so restricted was the entrance hole), she remained outside and frustrated all endeavours of the Wagtail to enter. The eggs became chilled and the Wagtail deserted: a new nest was immediately built and received the egg of the Cuckoo a week after the desertion of the first.

* 'Life of the Wayside and Woodland,' by T. A. Coward. London: Messrs. F. Warne & Co. 10/6 net.

PROTECTION OF WILD BIRDS.

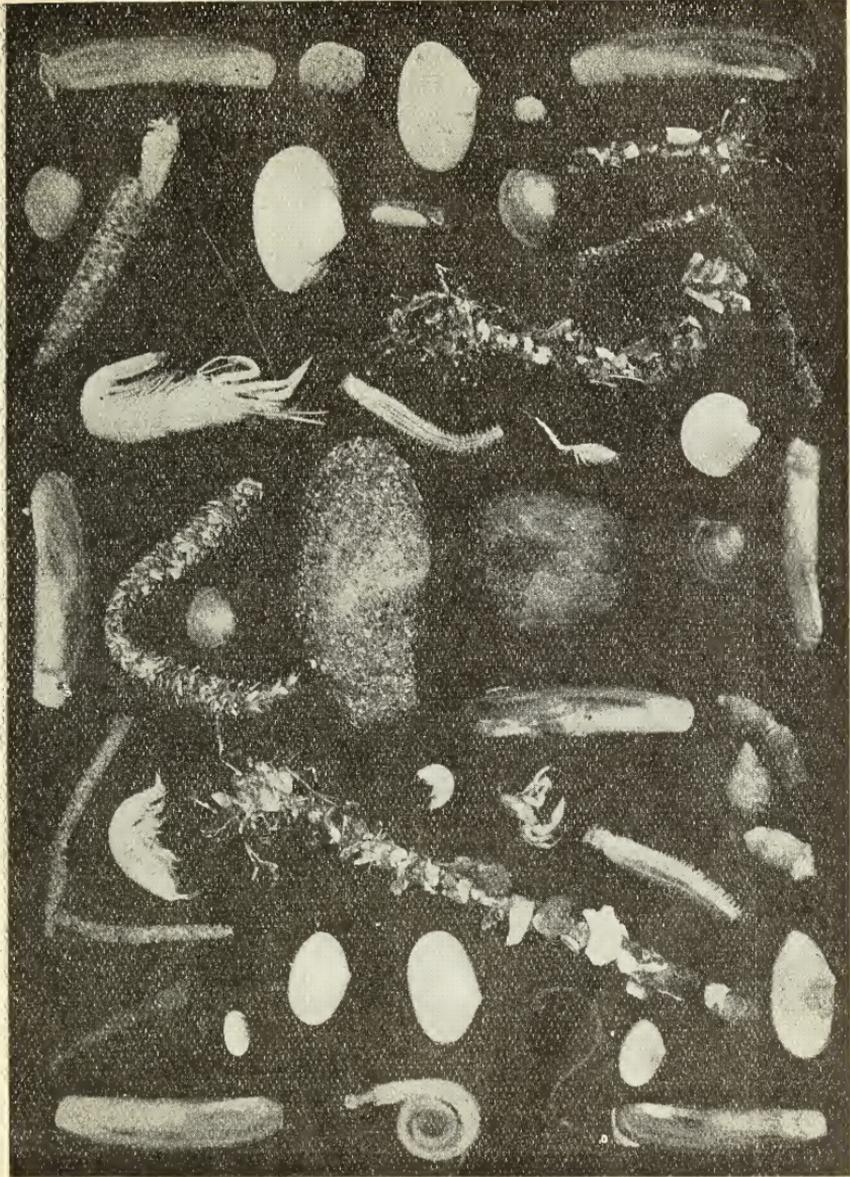
The first case under the Wild Birds' Protection Act, East Riding Order of 1922, was taken at Withernsea in December. According to the press, the defendant was catching linnets, and had three grey and two green linnets in his possession when caught. Some of them were dead, but the remainder were released at Withernsea Police Station. Defendant admitted the offence, saying he was unaware of the Order, and thought he was all right, as he had permission from Mr. Atkinson, of Owthorne, whose land he was on, to catch birds. He added that he caught the birds for a pastime, it was his hobby. The Chairman said it was necessary seriously to warn defendant not to repeat the offence. He would have to pay the costs, and his tackle would be confiscated.

MARINE ANIMAL COMMUNITIES.

Among many valuable contributions to Marine Biology appearing in the recently issued *Journal of the Marine Biological Association* is one dealing with Animal Communities of the Level Sea-bottom in the waters adjacent to Plymouth, by E. Ford. This is illustrated by a large number of charts and photographs of samples of communities taken from different parts of the sea floor of the Plymouth district; and a reference to the paper and the numerous illustrations, one of which we are kindly permitted to reproduce, demonstrates the extraordinary wealth of marine life in the area investigated.

SAMPLES.

Mr. Ford tells us that from May, 1922, onwards the square meter bottom-sampler has been used to collect samples of the bottom deposits with their animals in the waters off Plymouth. The animals have been removed as soon as possible after capture by passing the samples through a series of sieves, and have been preserved in alcohol, to be identified and counted ashore. The present report deals with the distribution of the species represented, in the light of Petersen's Community investigations in Danish waters. The extensive use of his bottom-sampler in Danish waters and elsewhere has enabled Dr. C. G. Joh. Petersen to advance an opinion that 'as a rule it is best to regard the animals living on the sea-bottom as communities, just as botanists group together the vegetation of the land into plant communities, even though in the present state of our knowledge it is impossible to show how intimate the mutual relations are between the animals of the sea in the single cases.' In addition are valuable contributions by J. H. Orton, C. F. A. Pantin, Marie V. Lebour, W. R. G. Atkins, H. W. Harvey, G. R. Lumby, D. L. Thomson, R. Gurney, etc.



ECVG COMMUNITY. b dominant over (b).

Number of animals per 1/10 sq. meter (11/10 natural size).

	No.		No.		No.
<i>Nucula nitida</i>	4	<i>Natica alderi</i>	1	<i>Nephtys</i> sp.	2
<i>Tellimya ferruginosa</i>	1			<i>Sthenelais limicola</i>	1
<i>Syndosmya alba</i>	5	<i>Echinocardium cordatum</i>	1	<i>Owenia fusiformis</i>	1
<i>Syndosmya prismatica</i>	1	<i>Echinocyamus pusillus</i>	1	<i>Goniada maculata</i>	1
<i>Dosinia lupina</i>	1	<i>Anapagurus laevis</i>	1	<i>Pectinaria</i> sp.	1
<i>Cultellus pellucidus</i>	7			<i>Lanice conchilega</i> , tubes	frequent
<i>Lyonsia norvegica</i>	1	<i>Nika edulis</i>	1	<i>Polychaeta</i> , tubes	frequent
		<i>Diastylis</i> sp.	1		
<i>Bullinella cylindracea</i>	1	<i>Ampelisca</i> sp.	1	<i>Nemertinea</i>	1

Station 104. Borough Island E., Revelstoke Point N.E. by N. June 12th, 1923.
Silty sand with some flaky shell fragments.

WILD LIFE IN DEVON.*

Here fine photographs of scenery and wild life are a prominent feature in this popular work, and the book gives an insight into the natural history of this charming county. The principal chapters deal with Foxes, Otters, Owls, Polecats, Wood Pigeons, Curlew, Buzzard, Sparrow-Hawk, Golden Plover, etc. A typical illustration is reproduced herewith.



A Healthy Appetite: Otter Cub at Dinner.

by kind permission of the publishers, this being from a photograph by Miss Frances Pitt.

INDEX ANIMALIUM.

We are pleased to announce the appearance of Part III. of the Second Volume of *Index Animalium*, which is being published by the British Museum (Natural History) at £1. The present part contains pages 385-640, and brings us up to *baileyi*. As illustrating the extraordinary amount of research in the compilation of this volume, there are over two pages devoted to the word *axillaris*, *apicalis* occupies about seven pages, while the word *ater* and its allied forms occupies about eight pages. As each page contains something like fifty-five entries, this gives an indication of the thoroughness in which this work has been carried out.

* Compiled from notes by W. H. Hudson by Linda Gardiner. London J. M. Dent & Sons, Ltd. xix. + 120 pp. 10/6. net.

THE SPIRIT OF THE DOWNS.*

In this case the author has selected an admirable title, and it precisely describes the nature of his charming and well-illustrated volume. He deals with the South Downs and their People, Old Time Pastimes, Dew-ponds, Antiquities, Place-names, Fairs, Ploughing Matches, Fairy Rings, South Country Characters, The Bird of Downland (Wheatear), etc. Throughout evidence is given of his intimate acquaintance



The Spirit of the Downs.

with the antiquities and natural history of the area with which he deals, and our readers who are familiar with the Yorkshire Wolds will find the volume of value in comparing these two somewhat similar districts. A characteristic illustration we are permitted to give herewith.

MARINE DEPOSITS OF THE NORTH SEA.

Those who recollect the admirable address given by Mr. J. O. Borley at the Hull Meeting of the British Association will be delighted to find that the Ministry of Agriculture and

* By Arthur Beckett. London : Methuen & Co. xv. + 303 pp., 8/6 net.

Fisheries has issued a valuable report on The Marine Deposits of the Southern North Sea, as Vol. IV. of Series II. of the Fishery Investigations (62 pp. and plates, 15/- net). All the information given by Mr. Borley at Hull, and considerably more, is included in this valuable publication, which is accompanied by a large number of plates containing coloured and photographic illustrations of samples of the sea floor at different depths and in various localities, as well as a most useful series of charts, upon which are indicated the positions from which the specimens were taken, and the distribution of the various materials. As a sample we may specially refer to the series of charts showing the distribution of stones, very coarse gravels, coarse gravels, medium gravels, fine gravel, coarse sand, medium sand, fine sand, and silt. Those interested in the former geological conditions of the North Sea area must have this report.

WILD BIRD ADVENTURES.*

The reputation of Mr. Kearton is such that it is not neces-



Redshank on Nest.

sary nowadays to do more than draw attention to the fact that one of his publications has appeared. In the present case the volume is a store-house of photographs of wild birds and their nests. We are enabled to reproduce one of the numerous illustrations herewith, entitled 'Mrs. Redshank on her Nest.'

* By Richard Kearton. London : Cassell & Co. ix. + 181 pp. 5/-.

SHETLAND PIRATES.*

Our readers are already familiar with the painstaking work of Miss Pitt, and our pages, from time to time, have been made valuable by her records. She has now produced under the above title a charming set of essays dealing with the Pine Marten, Wild Cat, Owls, Raven, Orkney Vole, Rook, and other subjects. Miss Pitt is a keen observer of the habits of our rarer birds and mammals, and has the ability to express her thoughts in language which is not only easily understandable, but very entertaining. Some of the chapters



Pine Marten.

seem familiar, having previously been in the periodicals, but they are none the less welcome in this handy and more permanent form. We are able to give a reproduction of one of her beautiful photographs as a sample.

A NORFOLK 'ALBATROSS.'

The annual meeting of the Yorkshire Naturalists' Union at Barnsley served to clear up a doubtful record. A sportsman of that town had shot a large bird on Hickling Broad several years ago, which he firmly believed to be an Albatross. Unfortunately, the gentleman had since died, but his widow very kindly showed the bird to us, and it proved to be a fine adult specimen of the British Gannet (*Sula bassana*)!

* And other Wild Life Studies, by Frances Pitt. London: G. Allen & Unwin, Ltd. 248 pp. 10/6 net.

BRITISH HYMENOPTERA.*

With the above title, Messrs. Edward Arnold & Co. have produced a quarto publication (48 pp. and 8 plates) dealing with this by no means simple branch of natural history, but the numerous blocks in the memoir should do much to make our readers familiar with the principal forms. In addition,



Sirex gigas. 34 × 60 mm.



Sirex juvenus. 28 × 35 mm.

there are sixteen figures in the text, which describe the structure of different parts of these insects. The families are dealt with on general lines in a way likely to be instructive to the collector and naturalist. We are kindly permitted to reproduce two of the illustrations of species which often cause confusion.

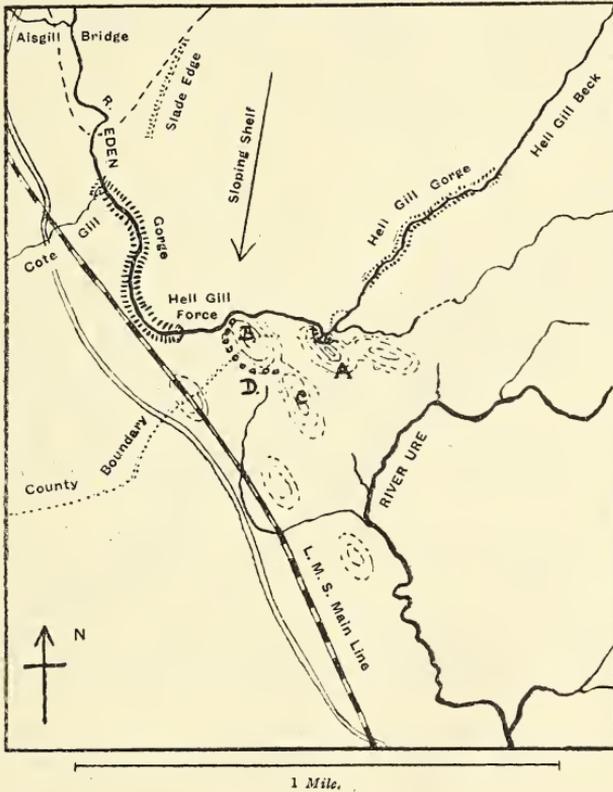
* 'British Hymenoptera,' by A. S. Buckhurst, L. N. Staniland and E. B. Watson. 9/- net.

RIVER CAPTURES IN THE LUNDS, YORKSHIRE.

W. B. R. KING, M.A., F.G.S.

THE area to be described is in the north-western corner of Yorkshire, called the Lunds, where the upper reaches of the Ure are being attacked on the one hand by the Eden, and on

SKETCH MAP OF EDEN-URE CAPTURES.



the other hand by the River Clough, belonging to some of the head waters of the Lune drainage.

This area has seen much adjustment of the river systems, and the state of affairs is far from stable at the present time. One of the results of these adjustments has been the formation of the two-way pass through the heart of the Pennine Chain which has been utilised both by the roads and railways.

The glacial conditions in this district have been so admirably described by Goodchild that during short visits to the neighbourhood I have been unable to add anything to his

conclusions regarding the direction of the ice flow and centres of dispersal. It would appear, however, that the main river captures had actually taken place or were about to take place prior to the glaciation, although modifications of some importance have been brought about as the result of glacial action.

The general geological structure of the immediate vicinity is simple. The greater part of the district is formed of alternations of limestones, shales and sandstones, belonging to the Yoredale series of the Carboniferous, while the hill tops are capped by Millstone grit. All these beds have a gentle easterly dip, which persists with little change throughout Wensleydale (valley of the Ure or Yore).

The geological factors controlling the various rivers are most important in considering the development of the river systems. The Ure, for instance, from Yore Force (near the Moor Cock Inn) to Aysgarth, a distance of fourteen miles, is winding through a wide alluvium-filled valley showing many signs of maturity. It is, in fact, working to the local base level formed by the massive limestones which cause the famous Aysgarth Falls. It is clear, from the gorges below each individual fall, that these falls, as a whole, are receding at a fairly rapid rate, but since the dip of the strata nearly coincides with the slope of the valley bottom for a considerable distance above the falls there is little chance that the upper Ure will be able to lower its thalweg to any considerable degree, in fact, until the gorges of the present Aysgarth falls have been cut back a distance of about ten miles to a point beyond Hawes.

The conditions of the rivers which are attacking it, however, are very different. In the case of the Eden; this river for a great part of its course is flowing over soft Permian and Trias rocks, which are denuded with such ease that the river has cut down to 600 feet above sea-level at Kirkby Stephen, only six miles from its natural head (*i.e.*, the place where its head would be if no captures had taken place). In the upper part, with a fall equal to twice that of the Ure, it is undercutting the Yoredale beds, and is cutting back at a pace sufficiently great to enable it to make extensive captures from the Ure.

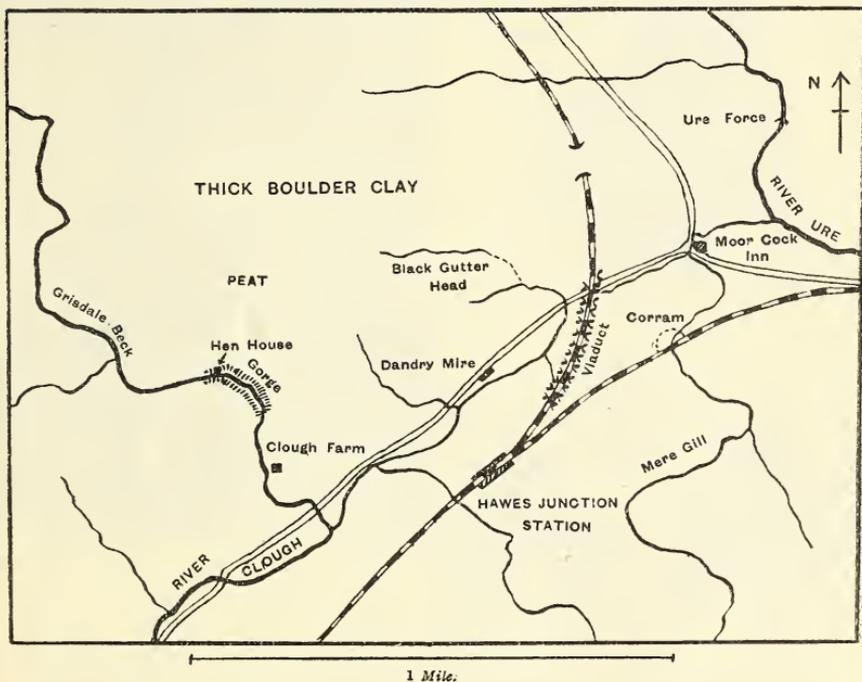
The other stream, which is also situated favourably for making captures in this district, is the River Clough, a tributary of the Rawthey, and thus of the Lune. This river drains off Baugh Fell, and has an exceptionally short course to the nearest sea coast. Prof. Marr has pointed out to me that in its middle reaches it has cut down to a low level by reason of shatter belts, which enable it to erode the hard rocks. Thus it has no local base-levels formed by the massive limestone bands, as is the case of the Ure, but it is able to undercut the Yoredale beds, and by its rapid fall and short course is able

to effect captures from the Ure, which is already weakened by loss of water to the Eden.

It may be interesting to give further details of these captures, and to trace their history and possible future development.

The captures naturally fall into two main groups : (a) the captures by the River Eden ; (b) those by the River Clough. Dealing first with those of the Eden : a glance at a map

SKETCH MAP OF CLOUGH-URE CAPTURES.



shows that Hell Gill Beck, the present head of the Eden, runs in a south-westerly direction, and is alligned as a tributary of the Ure, but where it ceases to define the county boundary it turns due north to flow into the main Eden valley.

This capture had almost certainly nearly taken place in pre-glacial times, and it is interesting to try and separate the pre-glacial and post-glacial effects.

Firstly it should be noted that this locality was near the dividing line of the ice (see Goodchild's Map), and therefore it was somewhat stagnant, tending to deposit boulder clay in the valley bottom in the form of drumlins rather than do any active erosion.

Viewing the district from the hill slopes on the west of

the valley, a marked shelf is seen sloping gradually towards the Ure but ending abruptly towards the Eden in the scars of Slade Edge. This shelf is not formed of one limestone bed, but would seem to be part of the old Ure valley before the pre-glacial captures took place. The ground below Slade Edge and around Aisgill Bridge has the general appearance of being the natural corrie-like head of the Eden valley. At the head of this hollow the valley narrows, and the Eden enters a deep narrow gorge in the valley bottom; this gorge appears to be largely post-glacial, and extends for half-a-mile up to the fine waterfall of Hell Gill or Aisgill Force. This waterfall marks the point to which the Eden has reached 'in consolidating' its captures from the Ure.

The narrow gorge of Hell Gill itself would seem, from its very nature, to belong to a recent post-glacial episode, being, in fact, a series of great potholes connected together, helped possibly by the falling in of a subterranean watercourse. Whether the gorge is entirely post-glacial or not does not, however, affect the problem of capture to any extent. On issuing from the gorge the stream comes out on to the shelf mentioned above, and appears, at one time, to have swung somewhat to the north in an arc-like bend; this has recently been straightened out, as is evidenced by a series of old terraces. At the present time the river flows south-west, straight from Hell Gill gorge, until it strikes a drumlin of boulder clay about 40 feet high, lying with its long axis athwart the stream. The water is forced to turn either to the north-west or to the south-east to get round it. It happens that a second drumlin almost merges with the first to the east, and therefore the stream is diverted to the north-west, and so into the Eden valley, already well prepared for the capture. Since this capture has been effected, however, the drumlin (A of sketch) has been, and is still being, slowly eaten away by the river which strikes it at right angles, and it is a question whether the Eden will work back the position of Hell Gill Force to the point of impact of the river on the drumlin before the stream has completely eroded away the north-western end of the drumlin. If the recession of the Force is the faster, then, naturally, the capture will be stabilised; but as the position of the fall recedes, a greater thickness of solid limestone will be exposed in the fall, and therefore recession will become slower. On the other hand the river will soon have cut away more than half the drumlin, whereupon less and less material will have to be removed for each foot of ground won by the stream. It therefore appears probable that the north-western end of the drumlin will be removed before the fall has receded to any great extent.

(To be continued).

GEASTER RUFESCENS VAR. MINOR PERS. IN YORKSHIRE.

F. A. MASON, F.R.M.S.

IN a column devoted to Notes of the Country-side, which appeared in the *Yorkshire Evening Post*, November 23rd,

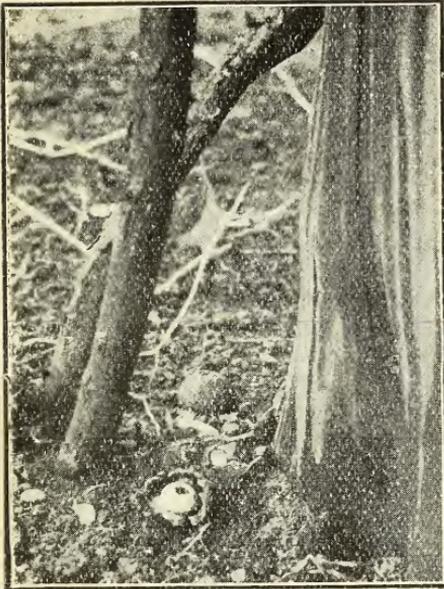


Photo by]

Fig. 1.

[F. A. Mason



Fig. 2.

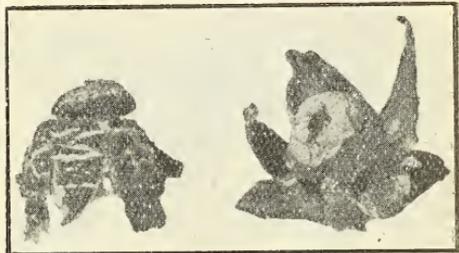


Fig. 3.

1923, reference was made to Geasters, or 'earth-stars,' discovered by Mrs. Scott Stanley, in her garden at Roundhay, Leeds. By the courtesy of Mr. Henry Crowther, I have been able to examine the fungi, of which there were two specimens, and found them in a dry and mature condition, as illustrated herewith (Fig. 3). I first regarded them as small specimens of *G. rufescens*, which explains a later note, *loc. cit.*, December 14th, 1923. More careful examination, however, led me to believe that they were not merely small specimens of Persoon's species *rufescens*, as represented by the fungus collected by Mr. R. W. Butcher, at Bolton,* and now illustrated (Fig. 2),

* Mason, F. A. : ' *G. rufescens* Pers. in Yorkshire,' *The Naturalist*, 1921, p. 74.

but, that they must be referred to the variety *minor*, also of Persoon, a conclusion with which Mr. Carleton Rea expresses himself in agreement. One may, perhaps, be excused an attitude of scepticism with regard to the value of varieties *minor* among the fungi, but, apart from the fact that Persoon was the least likely among mycologists to recognise and describe a variety without adequate reason, there appears to be little doubt that in var. *minor*, of the present species, we have a diminutive form of constant character.

The variety is rare in Great Britain, and Mr. Rea informs me that he has known it only from Dinmore, in Herefordshire, and from a locality near Cromer, in Norfolk. The Roundhay specimens vary in size from one-third to two-thirds that of the Bolton example of the species; the endoperidium, 1-2 cm. diam., exoperidium, 2-4 cm. diameter. Microscopically, the spores, which are minutely verrucose, are 4-4.5 μ diam., but I find that the capillitium threads vary considerably from the dimensions given for the type,* and in each of three specimens, they had diameters varying between 2.5 μ to 5.6 μ . Mixed with the spores in the older, dry specimens, were innumerable crystals of calcium oxalate of all sizes from 5 μ up to 13 μ diam., whereas, a mature, but still moist, specimen from the gathering referred to below, did not contain any such crystals.

According to Mr. Rea's experience, *G. rufescens* has been reported more frequently than usual during the year 1923, and he has collected it for the first time in Wyre Forest, which he has worked mycologically for 30 years. Nothing appears to be known with regard to the conditions determining the appearance of many fungi of uncommon occurrence, such as those belonging to the Geastreae, for instance, and consequently a visit was paid to Mrs. Stanley's garden on December 16th, exactly a month after the date on which the first specimens were collected. There I was fortunate enough to find a group of the fungi in various stages of development, and, incidentally, to show that the two original examples had not grown where they were picked up, but had been removed from their soil matrix where the group had been overlooked, about 2 feet away, by the agency of animals or of the wind.

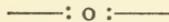
The soil in which the fungi were growing was between the base of a dead larch and a cultivated rose-bush. The ground over an area of about a square foot was permeated with a white mycelium, having threads much branched, and rather woolly, and swelling out into thicker, cushion-like extremities, wherever a fruiting body was produced. It extended right

* Rea, Carleton: *Brit. Basidiomycetae*, p. 43.

up to the roots of the rose on the one side, and to the larch trunk on the other. The geasters themselves were thickly clustered, two of them expanded so as to expose the endoperidium, and three still closed, as shown in the photograph, (Fig. 1). The last, although the exoperidium in each case remained unsplit, had matured, but had suffered from the severity of the weather experienced in November. The inner sides of the thick fleshy segments of the exoperidium of each of the expanded specimens, varied in colour from cream to a bright ferruginous tint. The unopened fungi were of a dark chestnut colour, shading off into pale pink-red at the base.

The district is on the Millstone Grit, and is characterised by acid soils, although it is very near to the borders of the Magnesian Limestone region. The soil proved to be loose garden tilth, black from the soot content peculiar to the top soils of the Leeds area; Roundhay, according to Dr. A. G. Ruston,* ranks with Weetwood as possessing the least smoke infested atmosphere within the three mile radius of the centre of Leeds, the annual deposit of soot amounting to 42 tons per square mile. In addition, the soil was well permeated with living root-fibres of grasses and chickweed, and contained much decaying vegetable matter. Its reaction, in terms of hydrogen ion concentration, determined by Medalia's comparator method, was found to be pH 6.3.

G. rufescens var. *minor* Pers. is new to the Yorkshire flora, Mid.-West Div., V.C. 64. Specimens are preserved in the Leeds City Museum.



Picture Book of Animals, by C. A. Johns. London: Sheldon Press, 126 pp., 2/6. This book is specially prepared for children. It is written in simple language, printed with large type, and has a coloured frontispiece. The articles refer to the Zebra, Goat, Dolphin, Leopard, Bat, etc., and each is illustrated by a block, which in most cases is familiar.

Social Life among the Insects, by W. M. Wheeler. London: Constable & Co., vii.+375 pp., 16/- net. The Professor of Economic Entomology at the Harvard University has written a fascinating account of the extraordinary traits in the character of the different members of the insect world. The author has obviously a tremendous knowledge of the literature of the subject, and we are pleased to see the work of our contributor, Mr. T. Petch, is frequently recognised and referred to. The Ants and their ways, of course, occupy a large proportion of the volume, but in addition the beetles, wasps and bees receive a good share. So remarkable are some of the descriptions that they read more like fairy tales than actual scientific observations. There is a 'documentary appendix' consisting of 70 pages of closely printed matter, and an excellent index of subjects and an index of authors.

* Ruston, Arthur G.: 'The Plant as an Index of Smoke Pollution,' *Annals App. Biol.*, 7, 1921, p. 391.

WEST YORKSHIRE BOTANICAL NOTES.

 A. WILSON, SEDBERGH.

THE following notes on the flora of the Sedbergh district are supplementary to those published in this journal, December, 1922, pp. 397-398, and refer to Yorkshire North-west, V.C. 65.

I have to thank Mr. Colin G. Trapnell, of Bristol, for many valuable notes. Some of these are inserted here and are marked C.G.T.

Sisymbrium Thalianum Gay. A puzzling plant, which is probably a condensed stemless form of this, occurs in a ravine on Cautley Crag at 2000 feet. I have it under cultivation, and hope to report upon it further.

Geranium sylvaticum L. This ascends to 1400 feet, near Cautley, C.G.T.

Potentilla sterilis Garcke. Found at 1900 ft. near Cautley, C.G.T. Also at 1850 ft. on Dent Crag.

Saxifraga hypnoides L. Descends to 410 ft. in lower Dentdale, C.G.T.

Taraxacum officinale Weber. var. *palustre* DC. Rough fell-pasture below Siccars Fell, C.G.T.

Neottia nidus-avis Rich. A second locality has been found for this in the neighbourhood of Cautley. The plant was growing under hazels, C.G.T.

Orchis mascula L. At 1500 ft. above Cautley, C.G.T.

Polygonatum multiflorum All. Wooded bank of stream, Howgill, in considerable quantity, C.G.T. Perhaps native.

Luzula sylvatica Gaud. Ascends to 2100 ft. on The Calf, Howgill Fells, C.G.T.

Melica montana Huds. Bank of the Rawthey near the foot of Uldale, C.G.T.

Nitella opaca Agardh. Pond near the Cross Haw Beck, C.G.T. Also found in a deep clear pool on Holme Fell at 1100 ft. by Mr. J. A. Wheldon, M.Sc., and the writer, July, 1923.

Ædipodium Griffithianum Schwaeg. In company with Mr. Wheldon I gathered this in rock crevices near Cautley Spout in July last. This is not recorded for V.C. 65 in the Moss Census Catalogue, but there is an old record by George Stabler for the west side of Deepdale, given in Lees' 'Flora of West Yorkshire,' p. 559.

Hypnum exannulatum Gumb. A curious form of this with very long awn-like points to the leaves, which I gathered on Baugh Fell in July, 1921, is referred by Mr. Wheldon to *Warnstorfia Rotae* (De Not.) Wheld. var. *trichophylla* (W.) Wheld. It appears to be new to Britain.

The following were mostly found while I was with Mr. Wheldon, who has determined the Sphagna and most of the Lichens :—

- Sphagnum Russowii* W. var. *rhodochroum* Russ. Ulgill Rigg, Howgill Fells at 1600 ft.
S. rubellum Wils. var. *sordidum* W. f. *immersum* Wheld. Holme Fell, Dentdale.
S. quinquefarium W. var. *viride* W. f. *heterocladum* W. Holme Fell.
S. plumulosum Roll. var. *viride* W. f. *griseum* W. Combe Scar and Cautley Spout.
S. plumulosum Roll. var. *caerulescens* W. Ulgill Rigg at 1600 ft.
S. plumulosum Roll. var. *purpureum* W. f. *gracile* W. Baugh Fell.
S. recurvum P. de Beauv. var. *majus* Angstr. f. *silvaticum* Russ., Ashbeck Gill ; f. *subundulatum* W., Baugh Fell.
S. recurvum P. de Beauv. var. *parvulum* W., f. *flavescens* W. Holme Fell.
S. auriculatum Schimp. var. *ovatum* W., f. *intortum* W. Holme Fell.
S. platyphyllum W. var. *teretiuseulum* W. Fair Mile Gate, Howgill.
S. rufescens Nees et Hornsch. var. *magnifolium* W., f. *bicolor* W., sub-f. *intortum* W., Baugh Fell at 2100 ft.
S. papillosum Lindb. var. *normale* W., f. *confertum* W. Holme Fell.
S. cymbifolium W. var. *pallescens* W. Ashbeck Gill and lower Dentdale.
Lecanora polytropa Schaer. Cautley Spout.
Diplochistes scruposus Norm. Cautley Spout and lower Garsdale.
Gyrophora polyphylla Hook. Howgill Fells, Swarth Fell and Baugh Fell.
Cladonia gracilis Willd. Holme Fell and Dent Crag, abundant at 2220 ft.
Lecidea granulosa Schaer. Frequent on peat on the fells.
L. uliginosa Ach. Above Cautley Spout.
L. immersa Ach. Dovecote Gill.
L. confluens Ach. Cautley Spout.
L. sylvicola Flot. var. *Hellbomii* Leight. Cautley Spout.
L. sanguinaria Ach. Cautley Spout.
Rhizocarpon calcareum Th. Fr. Cautley Spout.
Graphis elegans Ach. Dovecote Gill.
Opegrapha zonata Koerb. Cautley Spout.
Dermatocarpon aquaticum Zahlb. Cautley Spout.
D. lachneum A. L. Sm. Garsdale and Dentdale.

Verrucaria aquatilis Mudd. Cautley Spout.
V. margacea Wahl. Great Dummacks.
V. calciseda DC. Dovecote Gill.
Acrocordia epipolaea A. L. Sm. Dovecote Gill.

CORRECTION.—*Weisia tenuis* C.M., recorded in *The Naturalist* for December 1922, p. 398, from Backside Beck, Cautley, was inserted for V.C. 65 in error. The locality is just over the Westmorland border and belongs to V.C. 69.

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FIELD NOTES.

GEOLOGY.

Remains of Birds from the Holderness Peat.—Referring to notes which appeared in *The Naturalist* for June, 1922 (pp. 187-188), the specimens there figured are now, and always will be, on exhibition in the Geological Gallery at the Museum at Hull, where they can be seen by anyone interested.—T.S.

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INSECTS.

Ploiariola culiciformis De G.—This delicate little insect, one of the Hemiptera-Heteroptera, does not appear to be common in the northern counties of England. During the past ten years I have only met with four specimens, all taken on the wall in a lavatory attached to a house on the outskirts of Carlisle. It bears a great superficial resemblance to some species of Diptera which frequent such places, and on this account is probably overlooked. Its long slender antennæ, and slow deliberate movements help to distinguish it. I have looked through a number of volumes of *The Naturalist*, and only find two references, by Mr. F. H. Day (1916, p. 254) and Mr. Fordham (1921, p. 336); The latter is an old record from Saunders (*Brit. Hemip.* p. 160). It is not mentioned in Whittaker's Lancashire and Cheshire list. Both Douglas and Saunders say it is not uncommon, occurring in old thatch, ivy, etc. My last two specimens were taken in 1923, an immature example on May 6th, and a fully grown one on July 1st.—JAS. MURRAY, Kelsick, Wigton.

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Part XLIII. of Buckman's *Type Ammonites* includes two Yorkshire species, viz., *Toxosphinctes pickeringius* from Pickering, and *Cawtoniceras cawtonense* from Cawton.

We extend our congratulations to Sir Archibald Geikie, who has recently attained his eighty-eighth birthday, and to Sir William Boyd Dawkins, who has recently celebrated his eighty-fifth birthday. Both names occur on the list of Presidents of the Yorkshire Naturalists' Union.

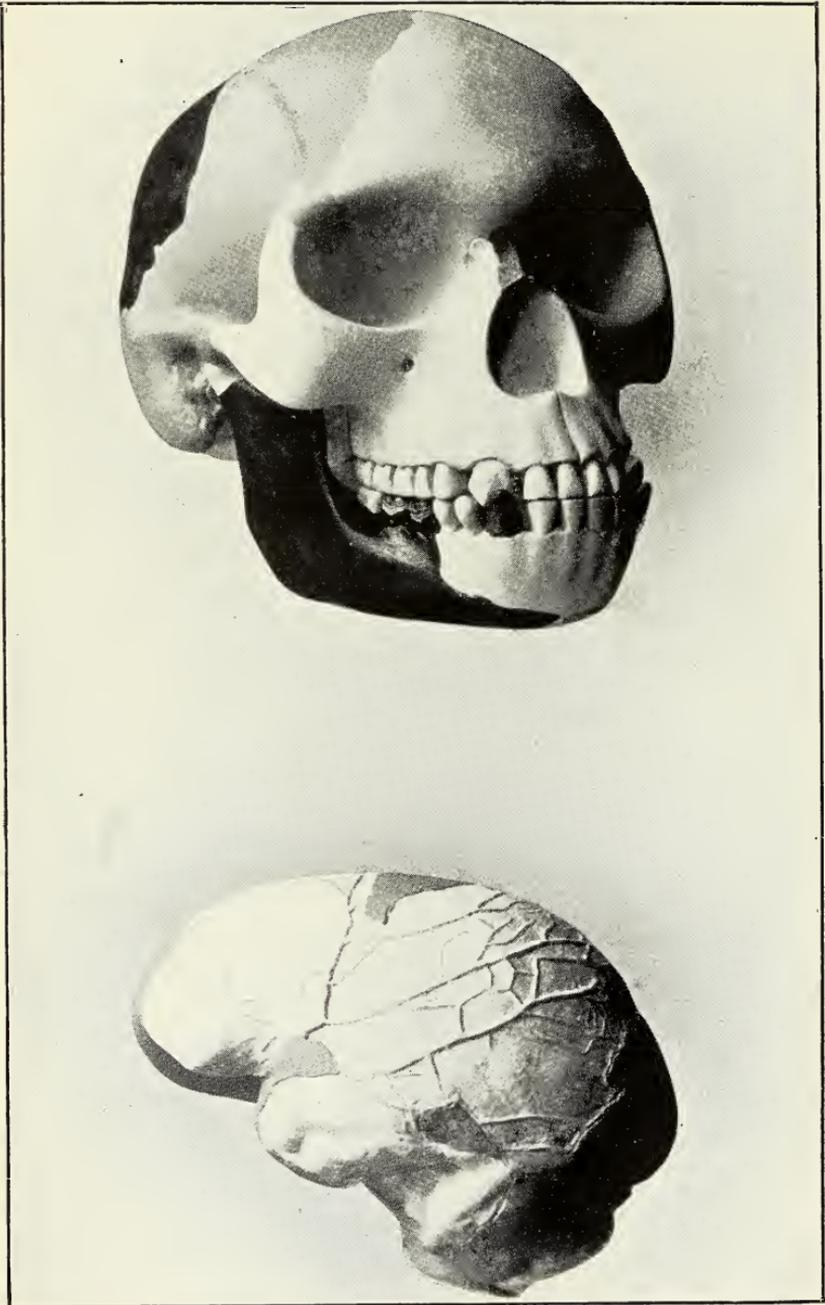


Fig. 1.

Restoration of *Eoanthropus dawsoni*, and cast of brain cavity.

REMAINS OF EARLY MAN.

BEARING in mind that the Mortimer Collection of Prehistoric Remains, containing the human and other objects from over 300 burial mounds in East Yorkshire, collected by the late J. R. Mortimer, is now in the possession of the Hull Corporation, the Museums Committee has supplemented this excellent series by reproductions of many of the more important early

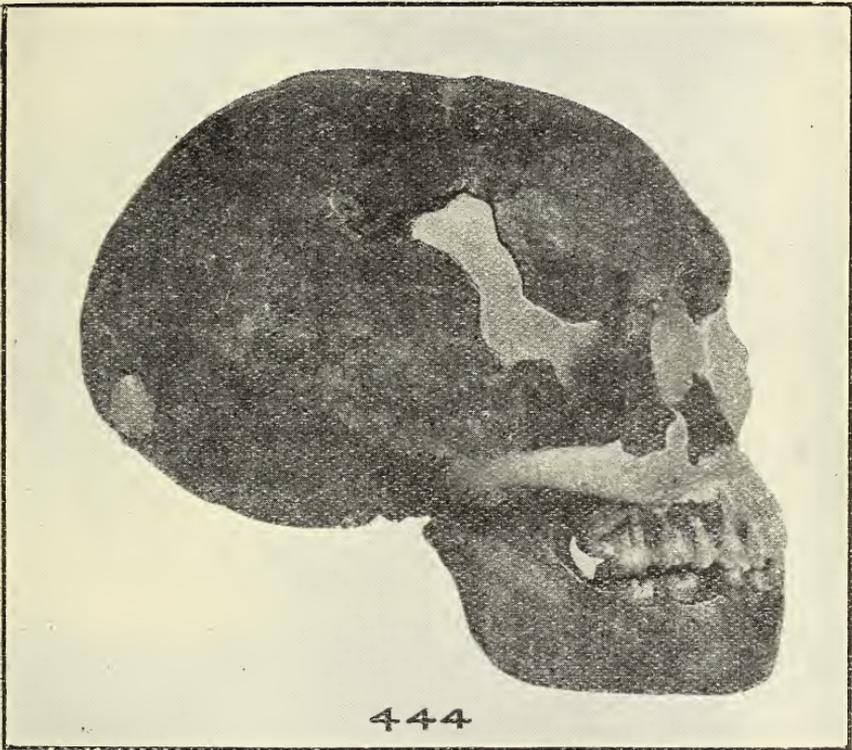


Fig. 2.

New restoration of the Mousterian Skull (*Homo mousterensis hauseri*).

relics of the human race. In view of the meeting of the British Association at Hull, in 1922, and the Museums Association there in 1923, special efforts were made to give a representative series of these remains. Through the kind help of Dr. F. A. Lucas, of the American Museum of Natural History, New York, copies of the somewhat striking restorations of Trinil Ape-man (*Pithecanthropus erectus*), Neanderthal Man (*Homo neanderthalensis*), and Cro-Magnon Man (*Homo sapiens*), were kindly sent, in addition to which an example

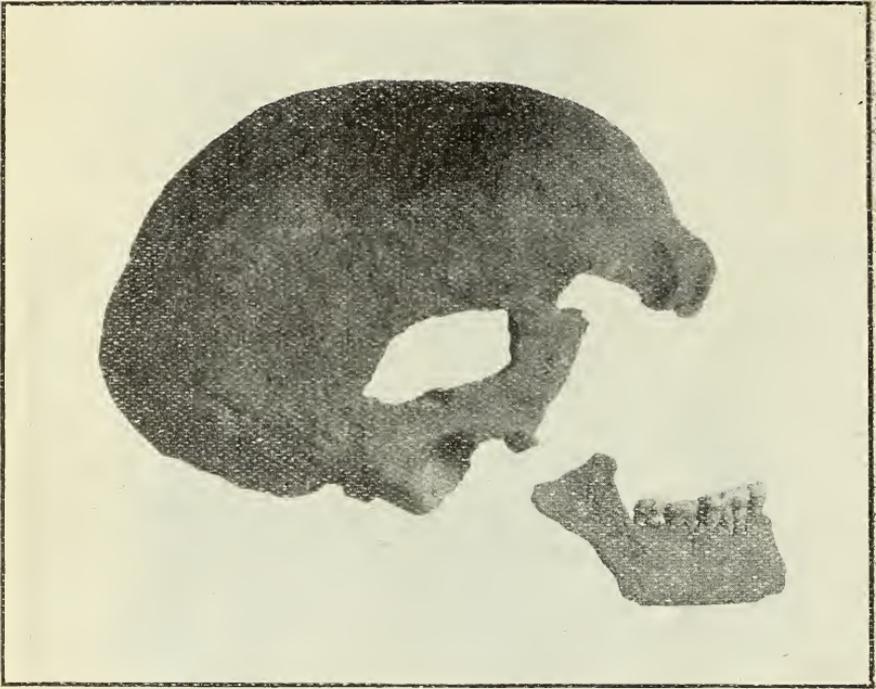


Fig. 3.
Galley Hill Skull.

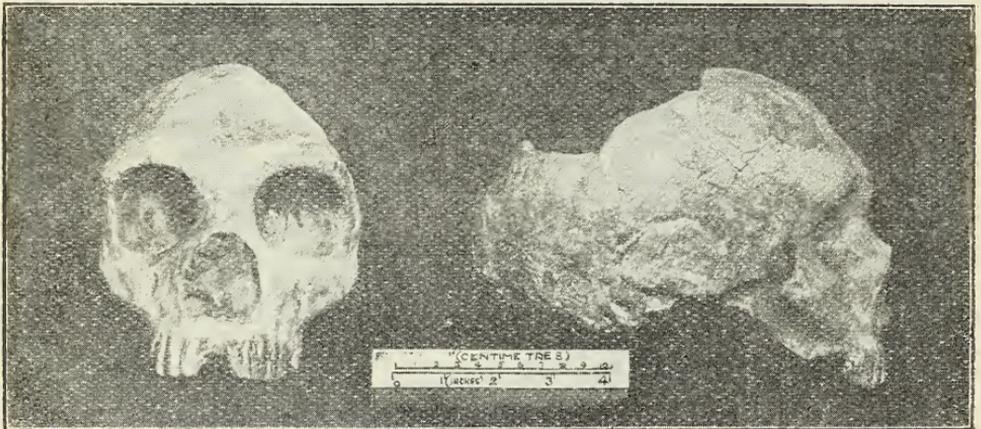


Fig. 4.
The Gibraltar Skull.

was supplied, half restored, and half showing the skull, in this way illustrating the relationship between the bones and the restoration, and the methods adopted by the American Museum in their work.

From the well-known establishment of R. F. Damon, of Weymouth, a series of casts was secured, part of which that firm kindly enables us to reproduce by means of the blocks which are printed herewith. All these specimens are exhibited at Hull, in addition to which is an extensive collection of over fifty specimens illustrating the various engravings upon bone, ivory, etc., from well-known Palæolithic sites, principally on the continent. These include most of the examples figured in the various text-books, and enable students in the provinces to study them, the reproductions being so excellently made that for almost all practical purposes they are as useful as the actual specimen, to see which would mean an extensive and expensive tour.

Fig. 1 (Plate III.) illustrates a restoration of Pilt-down Man (*Eoanthropus dawsoni*), and of the brain cavity.

Fig. 2 is a new restoration of the Mousterian Skull (*Homo mousterensis hauseri*).

Fig. 3 shows the famous Galley Hill Skull described by Mr. E. T. Newton, but respecting the Palæolithic date of which doubts have been expressed in recent times.

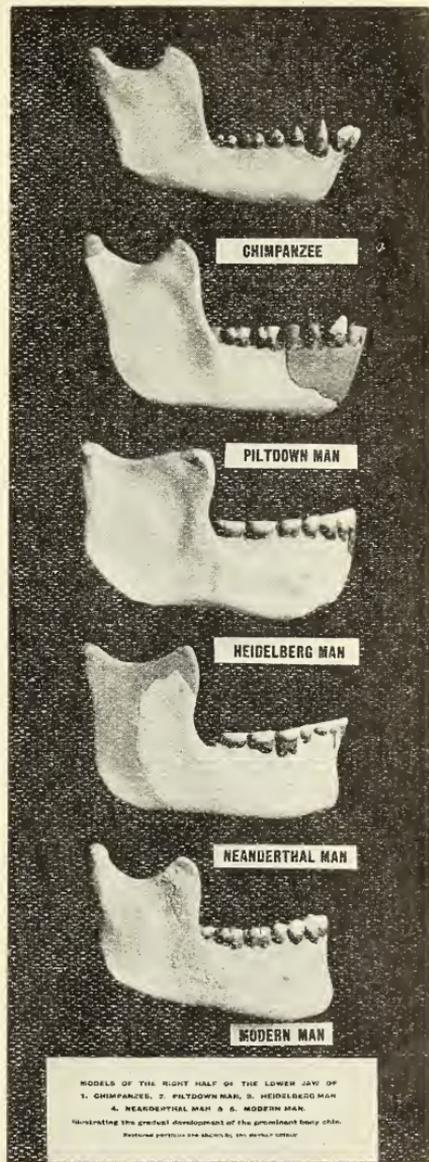


Fig. 5.

Fig. 4 gives two views of the Gibraltar Skull, said by Professor Keith to be one of the most important Palæolithic Skulls known.

Fig. 5 is a series of casts showing the construction of the lower jaw of various species from the chimpanzee to modern man.

The collection also includes casts of the Neanderthal Skull, Java Skull, and others.

Exhibited in the same case are typical examples of Bronze Age, Iron Age, Roman, Saxon, and Mediæval Skulls, as well as modern skulls (European, African, Australian, etc.).

Among the reproductions of Palæolithic carvings are many of the specimens figured in *Repertoire de l'Art Quaternaire, Reliquiæ Aquitanicæ*, and other well-known works.—T.S.

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HULL MUSEUM PUBLICATIONS.

THE Hull Museum probably publishes more literature annually than any other provincial museum in the kingdom. This is doubtless due to the inordinate appetite for work of the Curator, Mr. T. Sheppard, M.Sc. We have before us Nos. 126 to 136 inclusive, and they cover an astonishingly wide field. The first is an illustrated catalogue of love tokens and other engraved pieces—no fewer than 200 in number—full of human interest, although often crude in design and execution. An introductory note explains the various methods by which these tokens were produced.

Publication No. 127 deals with Yorkshire Tramway Tokens and Counters; also Yorkshire Seventeenth Century Tokens. A most unusual collection to find in a museum, but thoroughly appropriate in a town like Hull, where transport is a leading occupation. In design many of these tokens resemble early English coins, and are worth preservation upon artistic grounds.

The next publication (No. 128) takes us into quite other regions of museum work. Starting with the remains of the famous elk found in East Yorkshire, two bronze axes from the same neighbourhood, a bronze mould, 'British' pottery made by 'Flint Jack,' and recent glacial sections found in Holderness; it ends with 'Some Yorkshire Arthropods. Could the most exacting public ask for more varied diet?

The Andrew Marvell Centenary Celebrations at Hull fully justifies Publication No. 129. A Hull man who was contemporary with Oliver Cromwell, Milton, and Dryden, and a worthy acquaintance of all these celebrities, naturally evokes some sense of pride in his native town, which he represented in Parliament for 18 years. It is a matter for congratulation not only to Hull, but to the country, that an Englishman with such a record, who breathed his last in obscure London lodgings, should 240 years later be—so to speak—rescued from oblivion, recognised, and his memory revered.

Publication No. 130 is a history of the Hull Museum and its collection. Those of us who are acquainted with museums all over the country know what a need there is for such a record in every provincial museum. Curators come and go, often forgetting that the history of their institution will be of more than passing interest to those who come after them. We commend this example for general adaption, if only in the brief form in which Mr. Sheppard gives his story.

The 'Record of Additions,' No. LXIV. (Publication No. 131), illustrated, is one of a series which gives a short account of objects acquired from time to time. These 'Records' serve the double purpose of directing attention to recent acquisitions, and giving information about them in a popular form. This particular publication relates to a collection of antique watches, old Hull bank-notes, a White Ensign carried by a steam trawler through an engagement with a German submarine, a collection of Hull barometers, Roman coins, Hull medals, a newly discovered shell, a Corinthian dish 2000 years old, Hull pottery, and various other examples, which illustrate the all-embracing instincts of a many sided collector.

Publication No. 132 deals with the old farming implements and methods of East Yorkshire. It illustrates examples which will be of ever increasing local interest as time passes.

'Record of Additions' No. LXV. (Publication No. 133), is mainly devoted to bronze axes and moulds purchased for the Hull Museum.

An interesting Anglo-Saxon gold ring, set with an oval garnet, is the subject of publication No. 134. The history of this example reads like a romance. Other objects of importance are also dealt with in this number.

'Roman Remains at Middleton-on-the-Wolds,' etc., are explained in Publication No. 135; while No. 136 is Mr. Sheppard's Presidential Address to the Museums Association Conference at Hull in July, 1923, on 'The Place of the Small Museum.'

We congratulate Mr. Sheppard on the indefatigable and useful work he is doing to popularise the museums of his city.—J.B.

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PEAT INVESTIGATION.

At the Liverpool Meeting of the British Association, a Committee was appointed to investigate the Quaternary Peats of the British Isles. This consists of Prof. P. F. Kendall (Chairman), Mr. L. H. Tonks (Secretary), Prof. P. G. H. Boswell, Miss Chandler, Prof. H. J. Fleure, Mr. E. Greenly, Prof. J. W. Gregory, Prof. G. Hickling, Mr. W. B. Hinch, Mr. R. Lloyd Praeger, Mrs. Reid, Mr. T. Sheppard, Mr. J. W. Stather, Mr. A. Stelfox, Mr. J. Travis, Mr. A. E. Truman, Mr. W. B. Wright.

In connection with this, a meeting was held in the Museum, Hull, on the 18th October. Present: Professor P. F. Kendall (in the chair), Messrs. W. H. Crofts, J. W. Stather, A. Charlesworth and T. Sheppard.

Professor Kendall pointed out the method of enquiry to be adopted, and suggested that at present investigations should be carried out in the Humber area on the east, and the Mersey area on the west; that a local Committee should be appointed for each centre: that for the Humber area consisting of the members appointed by the British Association with the addition of Miss Whitaker, Captain Butterfield, Messrs. W. H. Crofts, A. Charlesworth, J. F. Robinson, W. S. Bisat, G. R. Newton, Chris. A. Cheetham and W. A. Massey, with power to add to their number.

Mr. Sheppard was asked to act as Secretary *pro tem*.

The Chairman pointed out that it was desirable that a bibliography should be prepared of papers dealing with the peat deposits of the Humber area, and this Mr. Sheppard undertook to carry out.

The Chairman offered to lend the six-inch maps for the district, and also a set of boring tools.

It was suggested that a section should be prepared from the vicinity of Goole to Spurn, showing the proved depths at which the forest bed or other peat deposits had been met with in their relation to Ordnance datum, and that Mr. Charlesworth be responsible for this.

It was also thought desirable to have a meeting of the suggested local Committee at an early date.—T.S.

YORKS. NATURALISTS' UNION AT BARNSELY.

THE Annual Meeting of the Union was held at Barnsley on Saturday, December 8th. The General Committee met in the afternoon, presided over by Dr. T. W. Woodhead, and the Annual Report and Treasurer's statement of accounts were approved. Special appreciation was expressed of the generosity of Mr. W. N. Cheesman, F.L.S., and of Mr. H. B. Booth, M.B.O.U., for their recent substantial donations to the funds of the Union.

The members and guests at the evening meeting were received by the Mayor of Barnsley, Mr. G. F. Wood. At 6-30 p.m. the usual business preliminaries of the General Meeting commenced, during which eight new members were elected. The President, Dr. A. Smith Woodward, F.R.S., then vacated the chair, which was occupied during the remainder of the meeting by the Mayor. The President then delivered his Address to a large and appreciative audience, the subject being 'The Animals of the Carboniferous Period,' illustrated by lantern slides, and dealing especially with the relation of Yorkshire fossils to this subject. At the close, Professor A. Gilligan moved a hearty vote of thanks to the President; this was seconded by Mr. W. S. Bisat, and carried unanimously. A vote of thanks was also accorded to the Mayor for his good offices during the evening, on the motion of Mr. H. B. Booth, seconded by Mr. W. Holmes Burrell. A further unanimous vote of the Union's appreciation, proposed by Mr. F. A. Mason, and seconded by Dr. T. W. Woodhead, was expressed to the Barnsley Naturalists for their kindness in inviting the Union to Barnsley, and in entertaining them. This was coupled especially with the names of Mr. John Fletcher, the President, and of Mr. A. Wade, who had carried out the local arrangements with much success. The meeting concluded with a *conversazione* and refreshments, provided through the courtesy of the Barnsley Naturalists' Society. Members of this society shewed a number of interesting exhibits of local naturalistic features. These, and the lantern lecturettes on 'The Photography of Bird-life,' by Mr. T. M. Fowler, and 'Beauty Spots of the Barnsley Neighbourhood,' by Mr. W. R. Barker, were much appreciated.

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The Geological Magazine for December completes its sixtieth volume, a fact upon which all concerned should be congratulated.

'Irish Sphagna,' by W. A. Lee, and 'Stray Reflections on the Irish Alpine Flora,' by R. F. Scharff, occur in *The Irish Naturalist* for December.

British Birds for December contains notes on 'The Whimbrel in Shetland,' by R. Chislett; 'Nesting Kingfishers,' by R. H. Brown; and 'The Birds of Lundy,' by L. R. W. Loyd.

The Revue de Géologie et des sciences connexes, makes its appearance promptly each month, and contains summaries of papers on various branches of geology. It is issued from the University of Liège.

We notice that two further names have been added to the Editorial Staff of *The Entomologist*, namely, Dr. H. Eltringham and Dr. J. W. H. Harrison. The proprietorship of the journal also changes hands with the January issue.

The Journal of Conchology for December includes 'Dredging in Loch Alsh,' by H. C. and R. Winckworth; 'Additions to the Mollusca of Somerset,' N. G. Haddon; and L. Pfeiffer's English Specimens of *Helix gigaxii*, Dr. F. Haas.

Among the contents of *The Scottish Naturalist* for November are 'Bird Notes from Fair Isle,' by J. H. Stenhouse; 'Spread and distribution of the Woodcock in Scotland,' by E. V. Baxter and L. J. Rintoul; 'Hemiptera of the South Ebrudes,' by G. E. Hutchinson.

YORKSHIRE NATURALISTS' UNION'S REPORT.

(Continued from page 30).

BALANCE SHEET.

RECEIPTS.	£	s.	d.	PAYMENTS.	£	s.	d.
Balance brought forward	9	10	3	Mr. J. Medcalf ...	18	7	6
Mr. Albert Hirst ...	5	0	0	Mrs. Capstick ...	1	0	0
Mr. W. H. St. Quintin	5	0	0	Mr. J. Hodgson ...	20	0	0
Mr. J. W. Dent ...	2	2	0	Mr. J. Green ...	3	0	0
Capt. C. Scott-Hopkins	2	2	0	Mr. J. R. Hind ...	0	5	0
Mr. L. Gaunt ...	2	2	0	Balance in Bank ...	0	8	5
Messrs Waterhouse, Messrs. J. Wilkinson, P. Lips- comb, Chas. O. F. Saner, Mrs. Bishop, Messrs. J. Atkinson, H. B. Booth £1 1s. each ...	7	7	0				
Mr. F. H. Edmondson	1	0	0				
Messrs. W. G. Bramley, E. B. Gibson, W. H. Parkin, W. N. Chees- man, A. H. Lumby, S. H. Smith, John F. Musham, H. J. Beh- rens, E. W. Wade, 10s. 6d. each ...	4	14	6				
Messrs. J. V. Granger, G. T. Porritt, C. F. Procter, E. Cockshaw R. Chislett 10s. each	2	10	0				
Messrs. E. W. Taylor, G. Fysher, G. W. Mason, 5s. each ...	0	15	0				
DONATIONS.							
Collected by Mr. Edmondson ...	0	15	0				
Bank Interest to June 30th	0	3	2				
	£43	0	11		£43	0	11

Audited by W. E. L. WATTAM.

J. WILKINSON, Hon. Treas.

ENTOMOLOGICAL SECTION.

All recorders note that the season has been very unfavourable. Even the commoner forms have been scarce or absent.

Coleoptera (M. L. Thompson):—Some interesting notes of new localities have reached me, referring to some uncommon insects, and three species have been added to the county list. A single specimen of *Sphaevites glabratus* L. is recorded in a fungus at Kildale, Cleveland, this being only the third English record of this rare species. *Longitarsus holsaticus* L. has only recently been determined, though found in August, 1922, by W. J. Fordham, near Cloughton. I took *Ceuthorrynychus asperifoliarum* Gyll. on *Myosotis* in Duncombe Park, Helmsley, in May. The re-discovery of *Bledius dissimilis* Er. at Bridlington by Mr. Walsh, who also took the rare *Acrulia inflata* Gyll. in Forge Valley, near Scarborough, give us two other notable results of this season's work. Further reports will appear in *The Naturalist*.

Hymenoptera (R. Butterfield):—Under the weather conditions during 1923, the Aculeates have not been much in evidence. The genera *Bombus* and *Psithyrus* have had a bad time; and I never remember to have seen them less numerous. The social wasps rallied towards autumn, but obviously a large number of fertile queens perished. On August 14th I captured a queen of *Vespa austriaca*. This is a late date for a queen to be at large, for it is now recognised that the species is parasitic on social wasps, and the example was a last year's queen in search of a host. On Allerthorpe and Skipwith Commons, Mr. W. J. Fordham has added one or two species of Aculeata to the county list.

On September 9th, Mr. A. E. Bradley paid a visit to the colony of *Mellinus* at Woodhall Bridge, near Collingham. He reports a banded form of *Andrena clarkella*, females, at Adel; males in the colony of *Andrena ruficrus* were seen on March 30th.

Neuroptera and Trichoptera (G. T. Porritt):—Unlike most of the other orders, these insects seemed to have been up to their normal numbers, except, perhaps, the Odonata, but nothing had been observed which had not been recorded in previous years. Mr. H. Maxwell-Stuart had found *Raphidia xanthostigma* at Everingham, a new locality for it, more commonly than it had been taken anywhere else in the county, or possibly anywhere else in Britain. The Rev. C. D. Ash had sent to him *Chrysopea vulgaris* from Saxton, a new locality for it. This species, so common in many parts of England, is not at all so in Yorkshire.

Diptera (Chris. A. Cheetham):—The list of additions is swollen by the examination of previous years' collecting, and the number added to our list will be about seventy. One of them, *Molophilus undulatus* Goet., taken on the bank of the River Burn, near Masham, is recorded for the first time as a British species. Unfortunately, the special entomological meetings were not favoured with good weather conditions, and consequently had poor results in Diptera captures.

Interest is maintained in the group and the number of workers is increasing. Mr. J. H. Ashworth writes a note in agreement with the above remarks, and we hope to hear of Mr. G. Grace's work on the Chironomids in the near future.

Hemiptera (J. M. Brown):—During the early summer the only Hemiptera at all plentiful were the numerous species of *Aphides* which appeared in swarms. The small Homoptera which are usually swept in plenty from grass, such as the species of *Deltocephalus* and *Delphax*, were almost entirely absent. Beating oaks, usually yielding some good species, was unprofitable. Noticeable absentees during the season, were the species of *Calocoris*, the only one met with in fair numbers being *C. sexguttatus*.

W. J. Fordham reports *Piezodorus lituratus* and *Zicrona coerulea* from Skipwith, and *Picromerus bidens* from Allerthorpe; Rev. C. Ash took the last species at Skipwith; *Bryocoris pterydis* was obtained during the Union Excursion to Penistone; *Cixius similis*, *Rhinocola ericæ* and *Gastrodes ferrugineus* during the Entomologists' Meeting at Skipwith; while *Microphysa pselaphiformis*, hitherto recorded twice only in the county, occurred in two localities near Sheffield.

Two species of Heteroptera and one variety of Homoptera can at present be reported as new to the county: *Heterocordylus tibialis*, *Globiceps dispar*, and *Alebra albostrigella* var. *wahlbergi*, all taken near Sheffield.

Lepidoptera (B. Morley):—No species of Butterfly has been common, not even the *Pierids*, but *Vanessa atalanta* and *V. cardui* managed to get about the district some time during the summer, for the larvae of both were common during September, especially the former, but very few have matured.

Moths also have been generally very scarce, but few species have occurred in good numbers. A notable exception to the general rule has been the plentiful occurrence of *Triphosa dubitata* at flowers during

September. *Bombyx quercus* var. *callunae* occurred abundantly also. Mr. Porritt noted it quite plentiful on the moors near Huddersfield, as it was also on the Penistone Moors on the day of the Union Meeting there.

The capture of a specimen of *Zygaena filipendulae* at Skelmanthorpe, on 8th July, 1923, was an event of some interest, as no colony of the species is known to exist in the neighbourhood. I have been told that a good colony flourished near the village about fifty years ago, but it dwindled away, and beyond the taking of two or three individuals about twenty years ago, nothing has been seen of the species here, so it is difficult to account for its re-occurrence. *Macroglossa stellatarum* was seen a few times at flowers in the garden at Wind Mill during July.

The following have been taken in the Skelmanthorpe district for the first time, *Hypermaecia angustana*, a few from sallow in July; *Argyresthia ephippella*, common about wild cherry in July; *Coccyx splendidulana* found on oak trunks in May; *Stigmonota coniferana* from pines in July; and *Brachycrossata cinerella* in July. Specimens of *Grapholitha nigricana* were obtained from spruce in Deffer Woods on 12th July, 1922, 17th June, 1923, and again on 14th July, 1923, these being the first records for the county.

On the Union's visit to the Penistone Moors, *Æcophora stipella* was found on pine trunks, being new to the southern part of the county. On 15th June, 1922, I took an *Argyresthia* flying about spruce in Deffer Wood, and on the 17th June last, it appeared again rather commonly in the same place. These have been submitted to Mr. Ashton Lofthouse, who refers them to *A. atomiella*, which has only previously been taken before in the county near Middlesborough. *Gelechia solutella*, only previously reported from Scarborough, I took on Royd Moor, near Penistone, on 25th June, 1921, and on 27th August, 1922, in Bank Hall Wood, Emley. *Lithocolletis kleemannella* was obtained. Little seems to be known of the distribution of this species in the county, and it does not appear in the lists for the area south of Harrogate.

Mr. Porritt writes that it has been almost a blank year for Lepidoptera in the Huddersfield district.

The exceptions are *Bombyx quercus* and the larvæ of *Dianthoecia capsincola*, which again were common on *Lychnis vespertina* at Waterloo Tip. He saw no larvæ of *D. carpophaga* this year. He expresses a conviction that many species which formerly were common have now disappeared or are fast disappearing.

Mr. E. G. Bayford sent me an example of the melanic form of *Odontoptera bidentata* found at Barnsley in June. For many years the form seems to have been common in the area around Wakefield and Horbury, in the Calder Valley, but has made little progress in spreading into other parts.

Arachnida (W. Falconer):—Very little field work has been done during the year in this branch of the Union's activities. A tube filled for me by the Superintendent, Mr. Smedley, from the green-houses of Beaumont Park, Huddersfield, contained an adult pair of *Meta menardi* Latr. (probably introduced), not before recorded from V.C. 63, and one male of the harvestman, *Phalangium parietinum* Degeer.

The following papers have been published in *The Naturalist*: (1) 'Two British Mites new to Science and a new Sub-genus of *Macrocheles* Latr.,' April, pp. 151-3, illustrated; (2) 'The Mites of Yorkshire,' completing the enumeration of the county's Arachnida, May, pp. 181-4, June, pp. 215-221, and August, pp. 267-283. In 'Yorkshire Naturalists at Bedale,' November, p. 383, Mr. W. P. Winter records five gall mites, one, *Eriophyes tristriatus* Nal. var. *erinea* Nal. on the Walnut tree, being new to the North of England.

BOTANICAL SECTION.

Botany (C. A. Cheetham and J. Fraser Robinson):—Edaphic and

geographical conditions under which plants live being fairly constant throughout the years, it is chiefly to the meteorological that one must look for an explanation of the variability in the growth, flowering and fruiting of plants. From this point of view, the past year may be summed up as 'a winter lacking frost followed by a summer without sunshine.' The comparative mildness of the weather last December would explain, to some extent, how so large a number as 36 species of plants could still be found near the sea coast of Yorkshire at Christmas, 1922. In January and early February the same mild weather brought out the flowers of the Lesser Celandine and Coltsfoot earlier than usual.

In mid-February came a fairly heavy fall of snow, which persisted in drifts on the hills right into March, but was followed by open weather giving signs of an early spring. As examples, it may be mentioned that *Hutchinsea petraea* was in full flower on March 17th, and *Saxifraga oppositifolia* seen flowering on Inglebro' on March 30th was still in flower on April 21st. In April and May, and, indeed, well into June, northerly winds prevailed almost continuously over the northern counties, making a spell of very cold weather, not infrequently accompanied by rain and showers of hail. At the same time, each day was not without hours of sunshine, as a rule; but the weather vagaries of that period were extremely perplexing. One of your secretaries saw freshly fallen snow on the Pennines on the 16th day of May last, and on the 17th, in N. Cheshire, had the unique experience of being awakened before six in the morning by the songs of Thrushes, whilst the sunshine was streaming into his room and a shower of snow falling at the time! Sunshine, and its own cold resisting internal economy, would account for the common Whin (*Gorse and Furze*) making such a fine golden show, as it did, last spring—perhaps the only shrub that did actually well at blossoming in the early part of the season. After the marvellous display of Hawthorn blossom in 1922, it was scarcely surprising, but very disappointing to have such an exceedingly poor show of 'May' blossom last spring. It was then quite remarkable to see large quantities of the previous year's 'haws' being gradually enveloped by the fresh green foliage of this year's growth. The crop of Hawthorn fruit which we have looked for of late weeks is practically nil, or at best only very scanty and poor.

Of fruit crops, especially of cultivated species, reports differ very curiously. For example, one orchard had no gooseberries; another a good average crop. The same has been said of apples; although all seem to agree that plums and pears with us are a failure. In fact, from our various contributors we gather that, on the whole, the fruit crop of both cultivated and wild species is, this year, very much below the average. The abnormally heavy cropping of the previous year, with the natural and consequent reaction, and the inclement weather at the blossoming time, and even later, may be largely responsible for the deficiency.

About 25 or 30 trees and shrubs have been reported upon in common by several members of the Section, and, besides these already mentioned, in the cases of the Oak, Beech, Ash, Broad-leaved Elm, Sycamore, Horse Chestnut, Crab Apple, Bullace, Sloe and Larch, the crops are said to be of the most meagre description possible. Of Wild Service and Mountain Ash, Hazel, Elder, Guelder-rose, Bilberry, Red Cowberry, Bittersweet, etc., the reports are that the fruit crop is fairly good, although frequently of poor quality.

Wild Roses, both of the *canina* and *arvensis* species, have fruited moderately, or perhaps fairly well, although it is noticeable that the 'hips' are maturing and colouring very slowly, the crop of the latter being the better of the two.

(To be continued).

SOUTH-WEST YORKS. ENTOMOLOGICAL SOCIETY.

By the kind invitation of Mr. W. Barraclough, Holly Hall Farm, Low Moor, Bradford, a well-attended and enjoyable meeting, presided over by Mr. B. Morley, was held by the members of the above society on November 18th, 1923.

During the afternoon the exhibits passed around for inspection consisted only of lepidoptera, and comprised the following: By Mr. G. T. Porritt, a series each of *Hydroecia nictitans*, *H. crinanensis*, *H. paludis* and *H. lucens*. He remarked that the two last named species had been added to the Yorkshire List by specimens taken by Mr. Maxwell Stuart, of Everingham, during 1923. By Mr. J. Hooper—a remarkable local, almost white, but perfect *Hybernia rupicaprariva*, a dark brown *Himera pennaria*, a melanic *Odontoptera bidentata*, showing the sub-terminal transverse line, and a fine series of *Smerinthus populi*, comprising pink, grey and bluish forms. By Mr. H. Spencer—about a thousand specimens of micro lepidoptera, mostly taken during the past season at Elland; most of the commoner West Riding species were represented. By Mr. W. Barraclough—Pale yellow forms of *Odonestis potatoria*, *Vanessa urticae* and variable undersides of *Euchloe cardamines* from the Lake District. By Mr. B. Morley—Light and dark forms of *V. urticae*, *Arctia caja*, *Saturnia pavonia* from Skelmanthorpe district; a melanic *Acronycta psi*, a long series of *Cidaria suffumata*, containing intermediate forms between the type and extreme var. *porrittii*, which was represented by two specimens, *C. populata*, a unicolorous brown, and other dark forms also from Skelmanthorpe. A long series each of *Bryophila perla* and *B. muralis*, showing similar variation, and a varied series of *Polyommatus phlæas*. By Mr. H. D. Smart—*Lycæna corydon* and *L. arragonensis*, *Melitæa athalia* and *M. pseudathalia*, *Syrichthus malvæ* and *S. malvoides*, and the various species of *Hydroecia*, all for comparison.

Mr. Smart read a paper on 'Species,' dealing with some of the recent theories of heredity. He called attention to the diminishing importance assigned to environment as a cause of variation, and emphasized the value of breeding experiments in solving questions of specific identity. A discussion followed.

After tea the evening was spent in looking over Mr. Barraclough's fine collections of British and foreign lepidoptera, and foreign coleoptera.

Mr. and Mrs. Barraclough were heartily thanked for their kind hospitality and entertainment.—B. MORLEY.

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The Leeds Institute of Science, Art and Literature has published an Historical Sketch of One Hundred Years' Work (1824-1923) in connection with its Centenary Celebrations.

The Gresham's School Natural History Society Report for 1923 is to hand, and contains a useful record of the work accomplished by the Society, including particulars of new entomological and other captures.

The Annual Report of the Chief Librarian and Curator of The Northampton Libraries and Museums Committee contains valuable lists of additions, including a mammoth tusk found at Islip, a landau, lead coffin, spring gun, and numerous other interesting exhibits.

The Isle of Wight Natural History Society, which was formed quite recently, is now in a healthy state, and at present has a membership of over 250. The Society has also been able to produce the third part of Vol. I. of its *Proceedings*, which is full of valuable records of the fauna and flora of the island, meteorological notes, etc. Among the more important items are 'New Records of Fungi,' by J. F. Rayner; 'Diptera,' by H. G. Jeffery; and 'Birds killed by Migration, at St. Catherine's Lighthouse,' by the Editor, Mr. F. Morey. The publication can be obtained from the Hon. Secretary, at Wolverton, The Mall, Newport, I.W., for 1/6 post free.

CORRESPONDENCE.

INSTANCES OF INVERTED SEXUALITY.

SIR.—Some cases recently have been brought forward by the press of the domestic cock having, to all intents and purposes, become a hen, and laid eggs, and also, of a hen or hens having not only assumed the outward insignia of the male, but even functioned as such. Bearing on this, may I be allowed to refer to the fact that, in the course of many years' observation in field ornithology, I have witnessed and recorded instances of inverted sexuality, of varying degree, in the case of three wild species, and to invite scientific attention to the subject, from a larger point of view, by giving chapter and verse as follows:—

GREAT CRESTED GREBE.—Inverted sexual actions preliminary to coition, but not, in the cases observed, followed by this. *Zoologist*, May, 1901, pp. 179-181.

RUFF.—Unisexual coition of males, and courting display actions between same (*Zoologist*, May, 1907, p. 164). Unisexual coition of females, and characteristic male courting display actions between same (*tom. cit.*, pp. 168-9).

MOORHEN.—Inverted sexual functioning (coition) as between the two sexes, with preliminary display action, on the part of the female so functioning (*Zoologist*, May, 1902, pp. 196-7).

LITTLE GREBE.—Inverted sexual actions preliminary to coition between the two sexes, but not followed by this (*Wild Life*, August, 1915, pp. 40-41). Unsuccessful attempt at coition, with inverted sexual functioning, between the two sexes (*Wild Life*, September, 1915, p. 98). Inverted sexual functioning (coition) between the two sexes (*Wild Life*, July, 1915, pp. 31-33, and August, 1915, p. 42).

From these observations, it would appear that the whole sexual psychology is affected, and I contend that my own explanation, viz., that the separation of the sexes, in nature, has been a physiological process only, and not—or, at any rate, not to the same extent—a psychological one, is the only hypothesis which accounts for all the facts. In other words, birds, and probably all other vertebrates, are still mental hermaphrodites, either latently or patently.—EDMUND SELOUS.

AMERICAN GREY SQUIRREL IN YORKSHIRE.

Since the note in *The Naturalist*, No. 797, p. 221, I have heard of another Yorkshire locality colonized by this species, namely, the Howsham estate near York. Grey Squirrels were first observed there in 1914, and Mr. A. Card, now head-keeper at Edenhall, Carlisle, informs me that they came from Scampston Hall, like those which Mr. H. B. Booth mentions as occurring in Duncombe Park (p. 252 *ante*). At Howsham, in spite of trapping, they have increased, and when Mr. Card left the district in 1921, he estimated the number as about 300. He had trapped over 100 then, and as they were suspected of taking the eggs of game-birds, the stomach of each one caught was examined, but the contents were entirely vegetable. Mr. Card says that they had completely ousted the native red squirrel, and adds that the salvation of the last-named is in the pine-woods, where the grey squirrel, for some reason, does not thrive as in a hardwood district. Mr. Card remarks that the grey squirrel is not met with in the Carlisle district, but that the red squirrel is very numerous there, and also in Northumberland.—HUGH BOYD WARR, London, 5th December, 1923.

No doubt the Grey Squirrels at Howsham are descendants of those turned down here in 1906. They have reached Birdsall and Ganton in other directions. They are active foragers, and soon find where poultry are fed, and if too troublesome, are better destroyed. We constantly see them round our foster-mothers; but they have not been known to touch even the youngest chicken, being attracted by the grain, etc. As

regards small birds' eggs, no instance of the Grey Squirrels interfering with nests has been noticed here. The Red Squirrel is by no means entirely blameless in this respect, and I do not say that the Grey one may not on occasion give way to temptation !

But a very large portion of the time of the Grey Squirrel is spent on the ground, and he is a great eater of the fine grasses which spring up under trees in pleasure grounds, or in open places in woods.

The only serious mischief caused by these squirrels occurred many years after they came here, and that was the peeling of the bark of young Sycamore trees (in July, a curious time !). They attacked the bases of the lateral branches, as well as of the leaders, and in a few weeks had done serious harm to young plantations of about thirty years' growth. I was abroad, but when I returned, we started a crusade, and we had no difficulty, in a very few weeks, in reducing their numbers, and have never since allowed them to become numerous enough to be troublesome. I cannot understand how any difficulty was found in keeping them down at Howsham. In any wood frequented by them, where there are streams or ditches, a few 'Brailsford' wire traps (stoat size) laid on narrow planks bridging the ditches catches them readily, for, in my experience, they are very simple and unsuspecting.

The above instance of barking Sycamores is the only charge we can bring against the Grey Squirrels of injury to trees. Here they do not nip off the young shoots of Horse Chestnuts, nor clip the conifers ; and I never see them in spring feeding on the Larches, as one does the Red Squirrel. In fact, they avoid coniferous trees, and thus do not come much into competition with the little red native. The Red Squirrel, far more beautiful and interesting than the 'Alien,' was becoming very scarce in this district, as Mr. Fortune remarks in the July number of *The Naturalist*, before the Grey Squirrel came on the scene.

In Warwickshire, Sussex and Hampshire this was noticed. In the New Forest there was an old custom of annually hunting the squirrel, even in the enclosures, with a loaded stick called a 'Squail.' Mr. Gerald Lascelles, before he ceased to be Deputy-Surveyor, had to stop this, for, as he says in 'Thirty-five Years in the New Forest,' published in 1915, 'Though very abundant formerly, an epidemic had reduced them for a long time to small numbers.' Before the Red Squirrels became almost extinct in this district, we noticed how easily our terriers could catch them, for they could not climb a tree quickly. The last I saw was on October 10th of last year, when a three-quarter grown squirrel ran to a hedge from some distance out in a pasture field ; something in its movements attracted my attention, and I went to the fence. The little animal had only climbed a few feet up into an old Thorn, and it allowed me to put my hand within a few inches without moving. It seemed thin and weak, though its coat and brush were in good order, and last autumn food was exceptionally abundant. I have not seen one this year at all ; but I certainly have no reason to blame the Grey Squirrels.—W. H. ST. QUINTIN.

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The Liverpool Museum has issued an admirable *Handbook and Guide to the Egyptian Collection*, largely written by Professor Newberry, and completed by Professor Peet. It contains 48 pages and 12 excellent plates, and is sold at sixpence, which is remarkably cheap.

The New Phytologist for December contains 'On the Phenomena attending Seasonal Changes in the Organisation in Leaf Cells of *Picea canadensis* (Mill) B.S.P., by Francis J. Lewis and G. M. Tuttle ; ' *Primula vulgaris* var. *caulescens*, by Miller Christy ; and the concluding portion of the 'Monograph on Permeability,' by Walter Stiles, in connection with which there are over forty pages of 'literature cited.'

NORTHERN NEWS.

A. Sharp gives 'Notes on the Pine Marten' in *The Animal World* for December.

'Great Wood-Wasp on Arthur's Seat' is the title of a note in a recent issue of *The Scottish Naturalist*.

Lord Chalmers has been elected a Trustee of the British Museum, in succession to the late Sir Henry Howorth.

Mr. F. Elgee has been appointed Curator of the Middlesbrough Museum, a position he has virtually occupied for some time past.

According to the daily press, the American Museum of Natural History hopes to get £10,000 for one of its recently acquired Dinosaur Eggs.

A fine Iron Age mirror, found at Desborough in 1908, which has been on loan in the Northamptonshire Museum, has been purchased and presented to the British Museum.

We learn from the daily press that lobsters have a great dread of thunder, and when the peals are very loud they will swim to deeper water. Oysters, too, are filled with nervous dread at hearing the ominous report of a cork leaving a bottle of stout.

The Fifty-third Annual Report of the Bradford Libraries, Art Gallery and Museums Committee contains a valuable list of additions to the Museum collections made during the year, particulars of the exhibitions at the Cartwright Memorial Hall, and a report of the work of the Natural History Museum.

We have received from Sir Herbert George Fordham his 'Address on the Evolution of the Maps of the British Islands,' in which he points out that in one respect England is a pioneer, namely with regard to the publication of Geological maps. The address was delivered in Manchester last year.

The Journal of the Ministry of Agriculture for January contains: 'The Prevention of "Bunt" in Wheat,' by E. A. Salmon and H. Wormald; 'The Common Cause of Failure of Spring Oats—Frit Fly,' by F. R. Petherbridge; and 'Dodder, and its Removal from Clover Seed,' by C. B. Saunders.

The death is announced of William Morfitt, of Atwick, East Yorks., whose collection of local antiquities and geological specimens, arranged in a glass-covered 'museum' attached to his cottage, is well-known to visitors on the East Coast. He paid particular attention to the remains of red deer and other mammals from the peat of this district, and had a large collection of teeth and portions of tusk of mammoth, which, according to the press reports, represents 700 pounds of ivory.

We learn from *The Yorkshire Post* that early in January a beautiful golden bittern, measuring 3 ft. 9 ins. in length and 4 ft. 8 ins. from wing tip to wing tip, was found wounded and dying in a field at Ellesmere, Salop, by a farmer. The bird had been shot in the bill. After being put out of its agony, it was taken to a local taxidermist to be stuffed. He noticed something moving in the bittern's throat, and on examination found a large-sized frog, alive. Naturalists say that food must be scarce when the bittern takes to eating frogs!

The Council of the Geological Society has this year made the following awards: Wollaston Medal, Arthur Smith Woodward, LL.D., F.R.S.; Murchison Medal, Walcot Gibson, D.Sc., F.R.S.E.; Lyell Medal, William Wickham King; Murchison Fund, Leonard Frank Spath, D.Sc.; Wollaston Fund, Cecil Edgar Tilley, Ph.D., B.Sc.; Lyell Fund, J. W. Tutcher and Hugh Hamshaw Thomas, M.A. It is satisfactory to find that the work of so many of our contributors has been recognised by the Geological Society, and it is particularly gratifying that the past-President of the Yorkshire Naturalists' Union, Dr. Smith Woodward, has now received the Society's most important award.

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PRINCIPALLY FOR THE NORTH OF ENGLAND.

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NOTES AND COMMENTS.

BIRDS AND THEIR YOUNG.

Illustrated by a number of charmingly coloured plates by Roland Green, and mounted upon tinted paper, together with pencil sketches in the text, Mr. T. A. Coward has produced an attractive volume on 'Birds and their Young' (Gay and Hancock, viii. + 151 pp., 10/6 net), which should prove to be a very suitable present to a young naturalist. Mr. Coward's work is well known, is of a reliable character, and his stories of Nests, Eggs, Nestlings, Behaviour of the Young and of the Parents, Food, Language, etc., are written in a very pleasant style. The excellent plate (IV.) herewith is a sample of the coloured illustrations.

THE YOUTHFUL NATURALIST.

As has already been explained in these pages, there certainly seems to be some reason for the lack of interest nowadays in field natural history among the younger generation, and while our schools are receiving addresses and instruction in nature study in a way which previously was never dreamt of, the fact remains that the subject seems to lose its charm for the children immediately they leave school. We have frequently mentioned this, and now the Editor of *The Scottish Naturalist* refers to the matter. He states 'All naturalists are, of course, youthful; years can never dim the pleasure which stirs the blood at the discovery of a beast or bird unknown, or of an unsuspected trait or habit in a familiar animal. It is not such youthful naturalists, however, but the *young* naturalist that concerns us for the moment. What has become of the young naturalist. He does not frequent museums in the numbers of twenty or thirty years ago, when he was often to be seen pondering over the exhibits, comparing with them his own laborious collections. He is most strikingly absent from the gatherings of many natural history societies, which leave an impression on the mind of a faithful band of youthful naturalists who were boys forty to sixty years ago. He is not indeed extinct, because rarely an enthusiast turns up; but for some reason or other boy naturalists seem to be fewer than they once were.'

SCOTTISH NATURALISTS.

'Now that, if it be true, is a curious situation, as it is a serious one. It is serious when we recollect that it was the growing up of the boy naturalist that gave Scotland its fine band of competent field observers, the names of some of which are known throughout the length and breadth of the land. It is a curious situation, because at no period has the youth of the nation received so much school instruction in nature knowledge as during the past

twenty years. When could it have been claimed, till now, that so large a proportion of the teachers in elementary schools had passed through a qualifying course in nature study, or that so many taught definite nature study lessons to their pupils?'

BORN NOT MADE?

'Can it be that the naturalist shares with the genius the distinction of being born and not made, or is there something wrong with our endeavour to create the naturalist spirit? May it even be that the formal teaching of the schoolroom checks rather than encourages the free out-of-door's observation and the enthusiasm which are essential to the growth of an unbounded love of nature. We cannot elaborate the point here, but we set it down as worthy of serious consideration, for we have a suspicion that the training of the teachers themselves may sometimes have been at fault, in tending towards the formal study of details of structure, and away from that education in accurate field observation (natural history as contrasted with formal zoology) which ought to be the aim of nature study.'

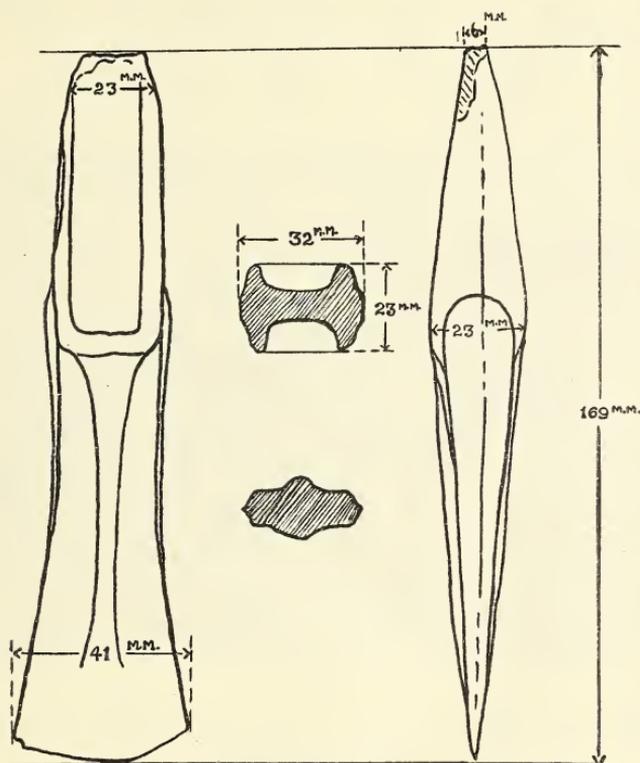
A DERBYSHIRE CAVERN.

In the *Journal of the Royal Anthropological Institute*, Vol. LIII., is a 'Description of a Sepulchral Cave at Tray Cliff, Castleton, Derbyshire,' by Leslie Armstrong. There is an account of what are described as Human 'Skeletal' Remains, and after a full consideration of these, Dr. A. Lowe states 'One is hardly justified in drawing any very definite conclusions from a single skull, and that immature,' yet he adds: 'but the high, short, broad type of skull presents features characteristic of the Bronze-Age race.' In view of the absence of any Bronze-Age relic found in association, the last conclusion seems a bit unfortunate, as the skull can certainly be matched, precisely, in the streets of Sheffield to-day. Mr. Armstrong, however, seems to go further, as under the head of 'Associated Relics,' he refers to a small polished and re-chipped celt of greenish volcanic rock, said to have been found by one of the workmen four feet south of the human remains, and upon the same level 'therewith.' In this case 'associated' seems to be wrongly used, as it is very unlikely that the axe has anything whatever to do with the skeleton. Mr. Armstrong seems particularly fortunate in whatever excavations he undertakes in finding a single Bronze or Stone Axe head in 'association' with the remains. Of the Mollusca recorded, three species are given of the commonest forms we have living at the present day (though one of them is spelled incorrectly), and the Mammalian Remains also seem to be of common species, and do not assist

in giving the great age to the 'Skeletal remains' which seems to be so fashionable nowadays in describing discoveries of this nature.

'DANISH' BRONZE CELT IN ENGLAND.

The Antiquaries Journal for October contains the following note under the above heading, 'By the courtesy of the Curator of Scarborough Museum, it is possible to substantiate the report that the palstave here illustrated was found in British



The 'Driffield' Palstave.

soil, and is therefore a link between Denmark and this country in the Bronze Age. According to Mr. Robert Orr it was given to his father about 1870 by Mr. Christopher Bell, a cabinet-maker of Driffield, East Yorks., and had been found some time before in opening a barrow on the outskirts of that town, known as the King's Mount, or Mound, or else in the King's Field. He is under the impression that more grave-goods were found as well as a skeleton, and that they were shared among some of the burgesses of Driffield. Mr. Bell was curious to know what sort of an edge it would take, and put it on the grindstone, but found the metal intensely hard.

Apart from this the palstave is intact, and still shows the seam of the double-mound in which it was cast. The type is unmistakable, and comparison may be made with a Danish example in the Bronze Age Guide (British Museum), second edition,* fig. 138 (right). The date may be as early as 1300 B.C., and more traces of intercourse may be expected on the East Coast.'

NOT FROM A BARROW.

Unfortunately the note, together with a similar one on an alleged Scandinavian strike-a-light said to have been found near Northampton, is neither signed nor initialled. Consequently it is difficult to know what reliance can be placed upon opinions expressed, which may or may not meet with general approval. It seems a pity that our premier antiquarian journal should allow apparently authoritative opinions to be expressed in this anonymous fashion. We had the privilege of examining the axe some time ago, and then gave the opinion that it was not British, and had not been found in a barrow associated with other burial relics. This opinion we still hold. Axes of this type do not occur with burials in barrows. Our own experience is that nearly everything of this kind in the possession of farm servants and others is said to have been found 'in a barrow,' or, as is occasionally mentioned, a 'tumoloo,' which is presumably the singular of tumulus! In this way a greater value, archæological or intrinsic, is thought to be added. Mr. Orr is, no doubt, quite sincere in repeating the account of the alleged discovery of the axe given to him by his father, who obtained it from a Mr. Bell, who presumably obtained it—possibly not direct—from the persons who are said to have found it in the barrow, *or in the King's Field*. But was the first account reliable? In any case, had it been of any local interest we imagine the late J. R. Mortimer would have obtained it for his Museum at Driffield.

OTHER EXAMPLES.

As an example, quite recently, I had four bronze axes offered to me from Scarborough, which had been found there 'with the hoard of socketed axes a little while ago' (see *The Naturalist*, April, pp. 143-146). None was a bit like any of the Scarborough hoard, the patination was totally different, two were palstaves, and two were unquestionably Irish axes. Of course, the man who sold them to me had merely repeated what was told to him, etc. But it did not make the axes

* While it is satisfactory to find these useful British Museum guide books reaching into new editions, it is unfortunate that it seems necessary to alter the figures and numbers in each edition; in our copy no such figure occurs as that quoted; and it surely is inconvenient to have to purchase each edition of each guide?

part of the Scarborough hoard any more than the Danish axe figured in *The Antiquaries Journal* is proved to have been found with other 'grave goods' in an East Yorkshire barrow. All the thousands of 'antiquities' made by 'Flint Jack' were also 'found in barrows.' More recently, objects of this kind occur in peat, at fabulous depths! We are indebted to Mr. A. L. Armstrong for the sketch accompanying these notes.

RAVEN.

An instance of the value of the information in Hutchinson's *Animals of All Countries*, which is now appearing in fortnightly parts, and to which we have made many references, is an article appearing in the instalment Part XXIII. of that publication. This is entitled 'Rollers, Kingfishers, Horn-

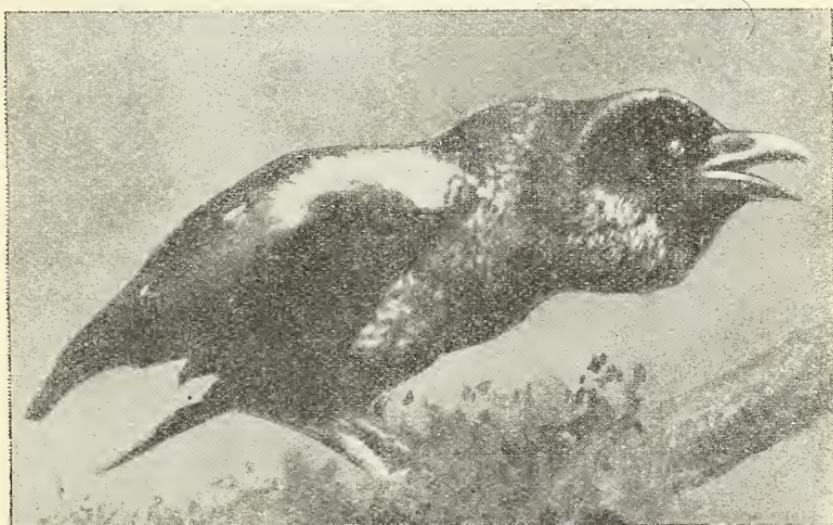


Photo by]

Raven.

[F. W. Bond.

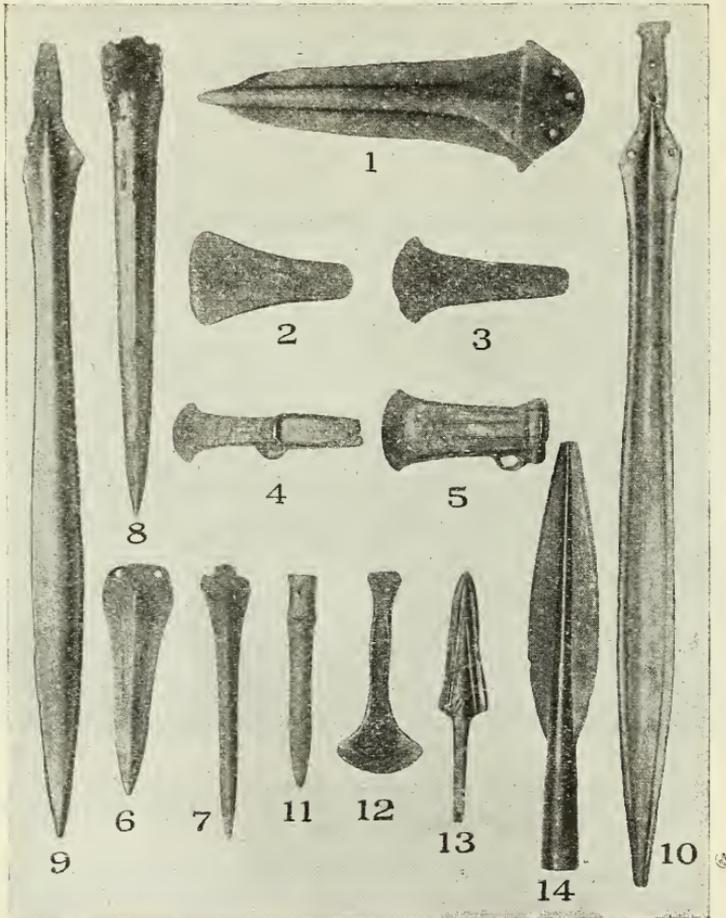
The Raven is distributed throughout the northern parts of both hemispheres, and is represented by a smaller race, with duller plumage, in Japan, Ceylon and the Malayan Islands. It breeds in Britain in the early spring.

bills and Hoopoes,' and is by no less an authority than W. P. Pycraft, of the British Museum. One of the illustrations accompanying this article we are permitted, by the courtesy of the publishers, to reproduce herewith, though something seems to be wrong at the tail-end!

WELSH BRONZE IMPLEMENTS.

The National Museum of Wales has issued a *Short Guide to the Collections* (24 pp.) which contains a summary of the nature of the collections in the various departments, each written by the keeper in charge. The Guide contains an illustration showing a very representative collection of Copper (?) and Bronze Age implements, which we are kindly

permitted to reproduce, as it apparently represents all the important types found in Wales. It will be noticed that many are practically identical with those found in other parts of the British Islands, and Yorkshire and Lincolnshire have yielded exact counterparts of most of them. No price is



1=Halberd. 2=Axe. 3=Axe. 4=Palstave. 5=Axe.
6=Dagger. 7=Dagger. 8=Rapier. 9=Sword. 10=Sword. 11=Knife.
12=Chisel. 13=Spear. 14=Spear.

stated, but we hear the pamphlet is sold at one penny, which is very cheap. We are inclined to think that none of these types is pure copper, and that 'bronze implements' would be a quite correct description.

SILK FROM SLATE DUST.

We learn from *The Quarry* for December that a correspondent of the *Liverpool Post* assures us that 'some years ago

an ingenious inventor devised a process for manufacturing fine silk-like threads of beautiful colours from slate dust.' The difficulty of obtaining cheap power in the Welsh quarrying districts prevented the successful commercial exploitation of the discovery at the time it was made, but the advent of the North Wales Power Company has now obviated this difficulty, and the invention has just found practical application, we are informed, at the Penrhyn Slate Quarries, near Bethesda. Further, to convince the credulous reader, we are told that Lord and Lady Penrhyn recently visited the quarries in order to inspect the machinery, which has been installed for converting the slate waste into artificial silk. On these premises the correspondent builds up his inevitable vision of the 'tapping of the almost unlimited wealth of the Welsh slate dumps,' etc. After this the manufacture of glass railway sleepers from slate waste is a very humdrum affair. Our hopes, however, are rudely dashed by a letter from Mr. W. D. Hobson, correcting the statement that it is proposed to manufacture silk from slate dust at the Penrhyn Quarry. He says: 'We do not propose to do this; we have never said that we propose to do so, and we are not aware that it is possible that it can be done.'

'DISCOVERY.'

After singing a most beautiful swansong in its December issue, and bidding an affectionate farewell, *Discovery* makes its appearance in January, due largely to the generosity of a gentleman who desires to remain anonymous. As we are now informed that *Discovery* is unique among all English magazines on account of its guarantee of the soundness of its matter, etc., it is to be hoped that its sale will be such that it will enable this unique publication to pay for itself. We can only express regret that *Nature* and other of our contemporaries are not in the same category, though at any rate they pay their way! As the first article in the January issue is a seven-column criticism of the Editorial Policy of the Journal, by one 'CIVIS,' there should be some hope for the future of this magazine. We notice that in its short career its first editor, Dr. A. S. Russell, retired, the second editor, Mr. Liveing, has also retired, and we now have Mr. R. J. Pulvertaft, B.A.

GOVERNMENT PUBLICATIONS.

We hope the timely protest made in *Nature* recently against the recent action of the Government in restricting the distribution of its publications, will meet with the support it deserves. Every scientific worker with any patriotism must long ago have been ashamed at the parsimonious manner in which the world's greatest government distributes the

results of the scientific activities of its various departments. The type, paper, and so-called covers of the publications of the Geological Survey, for example, have been a disgrace to any scientific institution, and now that the valuable work these publications unquestionably contain is to be made even more inaccessible, the time has surely arrived when everyone should use his utmost to protest. Not long ago, on somewhat similar lines, and presumably for somewhat similar reasons, the Government decided that the hand-coloured editions of its geological maps should be increased in price in proportion to the amount of work contained in each map. If this system were logically carried out, the cost of the preparation of the map, including field work and office work, should have been taken into consideration, in which case probably not a single copy would have been sold. As it is, the unreasonable prices charged for these maps has considerably interfered with, if not in some cases entirely stifled, amateur research in certain geological regions, and as such amateur work costs the government nothing, and is invariably placed at its disposal through the media of the publications of the learned societies, the Government Department concerned is cutting its own throat by this action.

FOREIGN PUBLICATIONS.

Writing as one whose work necessitates consulting scientific publications on a fairly large scale, we have been struck by the facilities given for research not only by our American friends, who unquestionably lead the way, but also by most of the countries the publications of which it has been our lot to examine. In every instance there is an anxiety to be obliging, which makes us truly ashamed of ourselves when asked to reciprocate in the way of supplying information or publications issued by our own Government. The Journals, Magazines and Reports issued by the scientific departments of H.M. Government are of inestimable value, and surely the value is greater or smaller according to the extent to which they are readily available to the public, and any attempt to curtail their distribution is certainly interfering with the scientific progress which the very issue of these publications would seem to indicate.

OPEN AIR.

The editor of *Open Air* Magazine has enabled us to state that his publication contains quite a number of interesting chapters likely to interest our readers. It is essentially a journal for those who delight in touring, and in taking an interest in out-door life. The magazine is published at 20 Tavistock Street, Covent Gardens, W.C.2, and is particularly well illustrated, as will be seen from the specimen (Plate VI.), which we are permitted to give herewith.



Robin Hood's Bay, Yorks.

YORKSHIRE NATURALISTS' UNION'S REPORT.

(Continued from page 60).

At quite the normal blossoming time, the Brambles were seen to flower profusely in most districts, but the promise of a very good crop of fruit has not been kept. As it is, the quantity of ripe fruit is not more than an average, if, indeed, it reach an average; whilst the quality is slightly below par.

With regard to germination of seeds last spring, the consensus of opinion is that it was unusually extensive, especially in the case of Beech, Sycamore, Mountain Ash and Birch, as well as in many of the herbaceous plants. Beech seedlings were noted in thousands, *e.g.*, along the road-sides bordering Beech Woods on the Yorkshire Wolds; but, as in the West Riding, very few seedlings have persisted. The same may be said of Sycamore and Ash, but of the moderate crop of seedlings of Oak, Birch, and Mountain Ash, a good majority is becoming well established.

On the systematic side, at least one plant new to Yorkshire has been recorded, *viz.*, *Viola calcarea*, from woods near Ledston Park.

Botanical Survey (W. H. Pearsall):—A considerable amount of work has been done, as indicated by the reports of meetings in *The Naturalist*. Some field investigations of soil sourness and plant distribution are in progress, and additional notes on the Yorkshire 'Gill-woods' have accumulated. Dr. Woodhead's excellent Presidential Address serves to demonstrate how much has been done in the past, and how much remains to be attempted in the future.

Bryology (F. E. Milsom):—Several new records, both in Mosses and Hepatics, have been made to the county list. In addition, the distribution of several species has been critically examined.

Orthodontium gracile was reported from Raikes Dyke last year, and during the current year has been seen at Ingleton by Miss Hewlett, in the Rivelin valley by Mr. Snelgrove, and at Penistone on the occasion of the Yorkshire Naturalists' Union Excursion in July. Its preference for peat, and some characters of the inflorescence and capsule, have suggested that it may be specifically different from the rock plant growing at Bolton Abbey and Plumpton.

Among the Hepatics, *Anastrepta orcadensis*, found near Sedbergh, V.C. 65, is new to Yorkshire, although it is recorded for Cumberland and Westmorland.

The small Hepatics growing among sphagnum have been studied in some detail. The *Cephalozia macrostachya* group repay careful study, and search shows that *C. macrostachya* itself has a much wider distribution than hitherto recorded. *C. Loitlesbergeri* is another member of the group which may be expected to occur in Yorkshire.

Plant Galls Committee (W. Falconer):—The Committee has held two combined field meetings with the Entomological Section during the year, Selby to Skipwith, June 23rd, and Grassington, August 18th, but no results have been published. Mr. W. P. Winter, however, reports from the latter place: DIP.—*Perrisia urticae* Perr. (nettle), *P. ulmariae* Bremi. (meadow sweet); HOM.—*Psyllopsis fraxini* Linn (ash), *Aphis viburni* Scop. (*V. opulus*); AC.—*Phyllocoptes acericola* Nal. (sycamore), *Eriophyes geranii* or *dolichosoma* Can. (*G. sanguineum*) (the latter new to Yorkshire); FUN.—*Epichloe typhina* Pers. (*Poa nemoralis*) and *Puccinia saniculae* (*Sanicle*); and published a list of the 36 forms observed during the Yorkshire Naturalists' Union Meeting at Bedale, in *The Naturalist*, November, p. 383, including AC.—*Eriophyes tristriatus* var. *erinea* Nal., new to the North of England (walnut); HOM.—*Siphocoryne loniceræ* Sld. (honeysuckle), new to the county; *Janetiella lemeii* Kieff, and DIP.—*Ametropidiosis thalictricola* Rüb. (meadow rue), second Yorkshire records.

In the Mycology reports furnished by Mr. F. A. Mason in the printed accounts of the Yorkshire Naturalists' Union Meetings at (A) Bridlington (*The Naturalist*, June, pp. 210-211; (B) Helmsley (*Ibid*) July, p. 248, and (C) Upper Nidderdale (*Ibid*), September, p. 308, various parasitic fungi are entered, in most cases, without any mention of their gall producing effects.

- (A) *Nectria ditissima* Tul., ash canker, Sewerby and Boynton Woods.
- (B) " " " " Beck Dale and Riccall Dale.
- (A) *Exoascus turgidus* Sadeb., witches' brooms, on birch.
- (C) *E. pruni* Fckl., on bird cherry. Mr. Mason seems to have overlooked my record for Whitfield Force, Wensleydale.
- (B) *Urocystis Anemones* Schroet., Beck Dale, on *Helleborus viridis*, a new host, at least for the county; and Duncombe Park, on *Anemone* and *Ranunculus*.
- (B) *Cystopus candidus* Lév., cultivated *Arabis*, Duncombe Park.
- (B) *Uromyces alchemillae* Lév., *Puccinia saniculae* Grev., *P. tumida* Grev., *P. fusca* Wint., *P. caricis* Reb., Beck Dale and Riccall Dale.
- (C) *U. alchemillae* Lév.

Mr. H. Stansfield, Mytholmroyd, forwarded *Lasioptera carophila* F. Löw., on earthnut in June, new to Yorkshire.

A comprehensive list of the Plant Galls of the Huddersfield District is in type.

Mycology (A. E. Peck):—Various interesting local records have appeared in *The Naturalist* during the year. The Mycological Committee has been represented at the Bridlington, Helmsley, Middlesmoor and Penistone Excursions, and reports by Mr. F. A. Mason upon the Mycology of these districts have appeared in our journal for June, July, September and October respectively.

The Annual Fungus Foray held at Masham was a well attended and successful gathering. Mr. W. A. Thwaites, of Masham, who acted as guide to our party, has had a deep interest in the Fungi ever since 1901, when the late Chas. Crossland was one of a party of Yorkshire Naturalists which visited Masham. A report of the Foray appears in *The Naturalist* for December.

The City of Sheffield at last has a representative on the Mycological Committee in the person of Councillor E. Snelgrove, B.A.

Micro-Biology (W. H. Pearsall):—The principal piece of work completed this year is Mr. R. W. Butcher's investigation of the Wharfe plankton, which is now ready for the press. The investigation is being extended to other areas, particularly the Washburn Reservoirs. The finding of *Genicularia elegans* near Leeds is also of great interest. This rare Desmid is only known in Great Britain. It was described by Messrs. W. and G. S. West from some Hebridean locks, but has since been found in several of the English Lakes, and now in Yorkshire. The Committee is being re-organised, and members interested are asked to get into communication with Mr. R. W. Butcher.

Mr. J. W. H. Johnson has carried out laboratory work with regard to the metabolism of the smaller aquatic fauna. By means of a specially devised apparatus the rate of respiration under given conditions has been determined, and from the results it appears that a large percentage of the oxygen required, reappears in the form of carbon-dioxide, but in no instance has this amount been equal to the volume of oxygen required.

Marine Biology Committee (Dr. J. Irving):—About a dozen species of *Medusae* (Hydrozoa), recorded by Mr. E. Percival, B.Sc., from Robin Hood's Bay, have been added to our marine lists. Several interesting nudibranchs, found in South Bay, Scarborough, have been added during the year. *Lucernaria campanulata*, classed with the Scyphozoa, was recorded in 1913 for Scarborough; after an absence of ten years it has again made its appearance in precisely the same locality.

The Annual Meeting of the Committee summoned in September was poorly attended.

Committee of Suggestions (C. A. Cheetham) :—The work instituted by the Committee on Peat and also the Rivers investigation has been furthered on every occasion both at the Union's meetings and by private work. It is proposed to summarize the results of the microscopic studies of peat and also of the field work during the winter, and an effort will be made to hold a meeting and discussion in the early part of the year suggest further work.

Geology (J. Holmes) :—Reports of the work done by the Section on the excursions have appeared in *The Naturalist*. The zoning of the Millstone Grit has been considerably advanced during the year. Field work has been continued along the eastern slope of the Pennines from Wharfedale to Derbyshire. Lancashire geologists and officers of the Geological Survey have confirmed the existence of many of the zones on the western side.

Geological Photographs Committee (Major A. J. Stather) :—The work of this Committee is now being actively renewed, and an interesting number of prints has been added to the already extensive collection of Yorkshire photographs of geological interest in the Union's albums.

There are no restrictions now as to the size of the prints, which should be sent unmounted to the Hon. Secretary (Major A. J. Stather, 206 Westbourne Avenue, Hull), who will be glad to receive them, together with particulars of the exposures.

The following are details of the prints added since our last list was published, and the descriptions give an idea of the type of photographs desired. The committee is particularly anxious to secure records of temporary sections made in connection with various engineering operations, etc. :—

By J. T. Dyson, Hull :—A series of sections in the quarry west of South Cave station, showing displaced Oolitic Limestone and intervening glacial beds.

By Mr. Jas. Rowntree, Scarborough :—The King and Queen Rocks and the adjacent cliffs, Flamborough Head, a few years ago.

By J. W. Stather, Hull :—Blackey Topping, from Lockton Low Moor ; Newton Dale, from Pifelhead ; Newton Dale from Wilden Moor ; Newton Dale, near Raindale Mill ; Newton Dale, near Black Howe ; Whinstone Dyke, Sneaton High Moor, showing 'spherical weathering' ; Weathered blocks of Estuarine Sandstone, showing ripple marks, fucoïd markings, worm tracks, etc., near Blea Wyke ; The King and Queen Rocks, Flamborough, to-day.

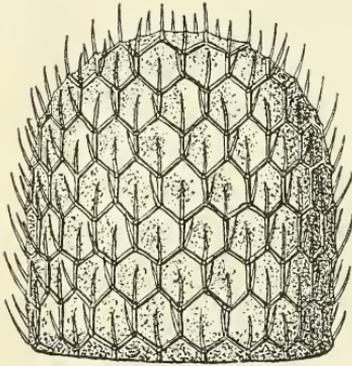
By Mr. J. W. Jackson, Manchester :—*Calamities gopperti* E. H. (half natural size), found near Hebden Bridge, Yorkshire.

By W. S. Bisat, F.G.S. :—(1) Gorge of the Ure, Hackfall, near Tanfield, showing 'Cayton Gill' shellbed. (2) Outliers of Kinderscote Grit looking west over Ashopton, Derbyshire.

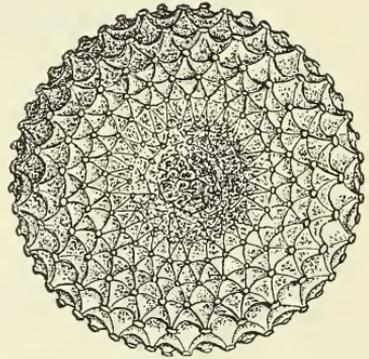
Glacial Committee (J. W. Stather) :—Under this head there is little to report additional to what has been described previously. Careful watch is being kept, and record made of temporary sections in the Glacial Series. In the way of erratics there is little that is new to record, beyond teeth of mammoth and *Elephas antiquus* which occur as erratic boulders in the drift series, three or four interesting records of which have recently been made at Robin Hood's Bay, Sewerby, Withernsea and Easington.

In view of the work being done on the Continent and in America in connexion with the evidence which there seems to exist relating to different glacial epochs, with long mild periods in between, it seems desirable that a look-out should be kept for any such evidences in our county and, if possible, more information should be obtained as to the conditions existing in the North Sea area during this glacial period or glacial periods.

We may call attention to the author's definition of a species, as being a form in which 'the two sexes mate together, and any two kinds of creature which are sufficiently distinct to preclude normal mating are of different species' (p. 15). The descriptions of the warning colours of many caterpillars of both butterflies and moths; the formation of the irritating spicules of the Gold-tail and other caterpillars (p. 44); the wonderful account of the making of the hard cocoon by the Puss Moth larva, and the emergence of the moth from it afterwards (p. 84); the extraordinary history of the Large Blue and other *Lycænid* Butterflies in their relation to Ants' Nests (p. 140); the wonderful mimicry of the *Heleconine* Butterflies of South America, and of the *Danaid* Butterflies, with the explanation of it by Bates and Müller, form only a part of the great interest of this little book. Although the author has much to say about the antennæ of butterflies and moths, he makes no allusion to the recent theory of vibration as a sexual attraction, and apparently is no believer in it. He says, indeed, that 'the power (sexual) possessed



Egg of 'White Admiral' Butterfly
(magnified).



Egg of 'Holly Blue' Butterfly
(magnified).

by these moths is attributed to their sense of smell. There is no other sense of which we have any knowledge which can explain it' (p. 114). Later (p. 116) he says the seat of scent is in the antennæ. One statement in the book to which we are inclined to take exception is that 'the female of *Acentropus niveus* actually lives in the water, and the male follows her beneath the surface' (p. 73). We have no remembrance of ever having seen any record of such occurrence, and should think it very unlikely. Many of the females of the species (not all) have more ample wings than the males, and it seems to us far more likely that, although emerged from pupæ which may be among leaves growing under water, the females would climb up stems of plants or of stones outside, where mating would take place. That the females would descend again into the water to deposit their eggs is possible enough, but one can scarcely conceive that the males follow them there. We would have liked to have seen a chapter on 'Melanism,' which would fitly have followed that on 'Concealment, Mimicry and Polymorphism,' but this is the only omission in the book that occurs to us. As it is, that a volume of only 163 pages (exclusive of Index) can contain the amount of really first-class information it does, is marvellous, and it is a long time since we read an entomological book with so much pleasure. The delightful and affectionate way, too, in which Dr. Eltringham dedicates the little book to his mother, is not the least charming part of it. The book should be on the shelves not only of everyone interested in insects, but in every Public and School Library in the kingdom.—G.T.P.

FARNE ISLANDS.

R. FORTUNE, F.Z.S.

IN 1921, both in the columns of *The Naturalist* and *Country Life*, the writer advocated the purchase of the Farne Islands, with a view of handing them over to the National Trust. He pointed out the danger to which the birds, owing to the increase in motor-boat traffic, and the cupidity of the fishermen, were now subject, and the necessity for the Association, which for years have employed watchers to protect the birds during the nesting season, to have their hands strengthened.

There is now a strong movement on foot to buy the islands and hand them over to the Trust, the present Farne Islands Association to continue with the management. The islands are in two groups, each having a different owner. A sum of £2200 is required to effect the purchase; of this amount the Association has had promised among its members and friends, subscriptions amounting to £700, and the public are now asked to subscribe the remaining amount.

Practically all the important papers in the country have given publicity to this appeal; there should not, therefore, be much difficulty, even in these hard times, in securing the amount needed. Readers of *The Naturalist* may send their subscriptions to the Secretary of the Farne Islands Association, J. Collingwood Thorpe, Esq., Belvedere, Alnwick.

The Farne Islands are the most important breeding haunt of sea-fowl on the British coasts; not only from the multitudes that are found there, but for the great variety of species resorting to them for nesting purposes. No fewer than 15 species breed regularly and one or two others less frequently.

In view of the rapidly changing conditions in this country, it is an urgent matter that this important breeding centre should be placed outside the danger zone. It is the only English breeding place of the Eider Duck, and for this reason alone, bird lovers should do their utmost to insure that the islands should be made a permanent sanctuary.

Among other species nesting are some remarkably fine colonies of Sandwich Tern, and a small colony of the rare Roseate Tern. The Farnes are the northern breeding limit of the Sandwich Tern.

Among the Terns, Arctics were predominate in numbers until 1921, when, for some mysterious reason, the Common Tern, hitherto represented by comparatively few pairs, quite outnumbered the Arctic; indeed, the status of the two species had been completely reversed.

In 1921 the Terns in a body deserted their usual headquarters on the Knoxes and Inner Wide-opens, and migrated to the Brownsman, where there was already a considerable

colony, thus causing great overcrowding. During this season vast numbers of young birds died owing to the scarcity of suitable food fishes; and in 1922, after commencing to nest, the Terns left the islands in a body, no doubt from the same cause, as other breeding places suffered in a similar manner that season.

The charming Kittiwake has increased in numbers amazingly, while the other nesting species, Guillemots, Razorbills, Lesser Black-backed Gulls, Herring Gulls, Cormorants, Oystercatchers, Puffin, Ring Plovers, Rock Pipits, etc., continue to do well.

The Common Gull has nested several times on the Inner Farne, and the Fulmar has for some years frequented the higher cliffs of the Inner Farne, but up to 1922 had not attempted to nest.

In many of the press notices it is stated that the Manx Shearwater, Storm Petrel, Shag, Ivory Gull, etc., breed on the islands. This is an error, none of these species nests there. Parties of Shags, immature non-breeding birds, may be seen frequenting the islands all through the summer, but they do not breed.

A full illustrated account of the birds of the Farnes was given by the writer in *The Naturalist* for July, 1907.

It is absolutely necessary that the Association should obtain greatly extended powers, especially to deal with the motor boat traffic and the predatory fishermen of the locality, otherwise the islands are likely to be deserted by their feathered hosts in the near future. It is the only breeding place on the East Coast of the Great Grey Seal.

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The Forty-third Annual Report of the Manchester Microscopical Society, besides the usual details of its interesting meetings, contains 'The Growth of Crystals in Igneous Rocks,' by Professor O. T. Jones; and 'Chromosomes and Inheritance,' by Professor F. E. Weiss.

Among the contents of the *Annual Report of the Scottish Marine Biological Association* recently received, we observe notes on Investigation on the effects of Oil Tanker Discharge; Observations on Young Herring; A Relation between Weather and Herring; and Faunistic Notes.

Under the editorship of the Rev. James A. Balleine and H. L. Earl, *The Torquay Natural History Society* has issued Part 1, of Vol. IV., of its *Transactions and Proceedings* (Oxford University Press, 100 pages), which contains among many other interesting items, 'An Autobiographic Sketch of the Rev. Thomas Roscoe Rede Stebbing'; 'The Excavation Products of Kent's Cavern and their Distribution,' by Harford J. Lowe; 'A Note on the Urn discovered near Marlton,' by H. G. Dowie; 'Food Chains in the Sea,' by Marie V. Lebour; 'Some features of Plant Distribution in Devon,' by C. E. Larter. We must congratulate the Society upon the excellence of its publication, though it does not seem to have carried out the recommendations of the Conference of Delegates to the British Association, with regard to the size of its journal, having altered it from demy octavo (the size of its previous *Transactions*), to the present part which measures 10 ins. by 6½ ins.

RIVER CAPTURES IN THE LUNDS, YORKSHIRE.

W. B. R. KING, M.A., F.G.S.

(Continued from page 44).

It is interesting to speculate on what may happen when this has taken place. The stream, having cut away the north-western end of the drumlin A will strike against the south-eastern end of drumlin B; it may temporarily turn back towards the north into its old course, but soon it will certainly cut away sufficient of the drumlin B to flow into the low hollow which exists at D. Now this hollow drains towards the Ure, and thus it may come about that the waters of Hell Gill Beck will be returned once more to their former river system. This, however, can only be temporary, for the water-shed between this peat-filled hollow and the Eden is low, and sooner or later the river cannot fail to be recaptured by the Eden. This will be brought about by the operation of the law of unequal slopes, for the rate of fall to the Eden (below Hell Gill Force) is greatly in excess of that of the Ure. Should the adjustment take place the capture will be permanent.

A complication may, however, arise, for a series of swallow-holes exists in the limestone round the western edge of the drumlin B, and it is possible that the stream, having removed part of the drumlin, may be swallowed by these holes, thus bringing unknown factors into play.

Captures by the Clough River (Garsdale):—

The head waters of the Clough River are known as Grisdale Beck and Grisdale Gill, the latter running parallel to some of the headwater streams of the Rawthey River. Both Grisdale Gill and Rawthey Gill, with other small tributaries, rise on the northern flanks of Baugh Fell, and after a rapid fall they reach a flat tract, which drains both north-west to the Rawthey and east to Grisdale and the Clough.

At the foot of Rawthey Gill there is a marked delta of rubble, but it does not appear that this ever acted as a corram. There does not, therefore, seem here to be any evidence of post-glacial capture. There is, however, on the flank of west Baugh Fell, above the Rawthey, the faint trace of a ledge sloping towards Grisdale, which may indicate the former drainage of the head waters of the Rawthey to Grisdale. This, if it ever were thus, must have been in pre-glacial times, and the capture by the Rawthey probably took place when Grisdale Beck was a tributary of the Ure, at which time the west flowing streams would have great advantages over those

flowing to the east owing to the shortness of their course to the sea.

Leaving the headwaters and following the stream to the east down Grisdale it is seen to flow between a mass of drumlins, though solid rock occurs in the stream bed at intervals as far as Galey Hill; below this, for a mile, nothing is seen but boulder clay, often rising in great drumlins to a height of 40 feet or so above the valley bottom. About one-third of a mile above Clough Farm the stream takes a sharp bend to the east, and soon solid rock again appears in its bed; though for some distance the boulder clay comes down to within a few feet of the water level, but near the hen-house, just before the stream swings round again to the south, the solid rock is seen to rise rapidly on the north bank, so that within a few yards the whole bank, about forty feet high, is cut in solid rock instead of boulder clay. From this point there is a gorge to below Clough Farm, both banks of which are composed of shales and limestones. The whole ground to the north of this gorge is seen to be covered with peat and to rise but gradually to the north, and all exposures in the streams draining the peat to the east show nothing but boulder clay.

It is clear that under this peat, drift blocks the old valley of the Grisdale Beck, and at the entrance to the gorge there may be seen the south bank of this old pre-glacial stream which flowed towards the east, and the cut in the solid rock is the work of post-glacial capture.

The question now arises as to whether, in times immediately preceding the glaciation, the Grisdale Beck was a tributary of the Ure or had already been captured by the Clough at some point east of Clough Farm.

The open valley of 'Garsdale Head' below Hawes Junction Station suggests that the capture had taken place in pre-glacial times, and that the Grisdale Beck flowed east to some point a little short of Dandry Mire, and was then captured and turned south-west to the Clough Valley. If this be the true explanation, the present capture near Clough Farm is merely making a 'short circuit' on the elbow bend formed by the earlier capture.

As is mentioned in the Survey Memoir on Mallerstang, 'The water parting between the Ure Valley and Garsdale Head is so ill-defined that while crossing it you scarcely perceive you are passing from one dale to another, and the stream . . . runs sometimes into one dale and sometimes into the other.' This stream, known as Mere Gill, has a well marked corram immediately north of the Railway (Hawes Branch), but the culvert at its head now diverts the water to the Ure.

The stream flowing from Black Gutter Head towards the north end of the Railway viaduct turns sharply south and

then west to the Clough, although there is a depression with a small stream running straight ahead to the Ure at the Moor Cock Inn. This has so much the appearance of a very recent capture, that if it were not for the evidence of old maps, it might be tempting to say that it was the result of man's work when constructing the railway.

It has been shown that both in respect of the Eden and the Clough, some of the captures had probably taken place in pre-glacial times, and that other important captures, such as Hell Gill Beck and Grisdale Beck, were about to take place, if not actually completed. The glacial and post-glacial effects have been largely of the nature of minor modifications, but of such importance that Hell Gill Beck may temporarily be recaptured by the Ure, while the effect on Grisdale Beck has been to remove all chance of the Ure ever recapturing this part of its lost waters.

It has also been shown that both the Eden and the Clough are attacking the Ure at points about three miles apart. What is to happen in the future to this three miles of river? Will it become Eden or Clough?

The Eden is in the more favourable position as respects the size of the tributaries conning off Abbotside; these, as the Ure looses its head waters, will tend to build up corrams, which will facilitate capture by the Eden; on the other hand the Clough has only very small tributaries; even Mere Gill, through man's action, has been deprived of its natural function to the detriment of the Clough; the distance, however, that the Clough has to cut back to tap the main Ure river is not great. It seems therefore that, on the whole, the chances are about equal, and we may speculate that, at some distant date in the future, the drainage of the Lunds will be halved between the Eden and the Clough instead of belonging to the Ure as at present. Then the two victors will become opponents, and it is difficult to predict which will eventually be the conqueror.

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The Journal of the Ministry of Agriculture for February contains the following items likely to be of interest to our readers, 'The Stoat,' by H. Mortimer Batten; 'Woodlice in Glasshouses,' by E. R. Speyer; and 'Destruction of Wireworms,' by A. Roebuck.

The Lancashire and Cheshire Naturalist for December contains a variety of local matter, although the splitting up of certain articles, the wealth of headings and sub-headings, and of spaces, suggest that considerable saving might be made with a little care, and incidentally the bibliographer's task would be lessened. Issued with this number is a 'supplement' which is entitled 'Notes on Myriapoda, XXIX.: A Preliminary Communication on Economic Status.' It is separately paged, and has a separate cover on, and does not appear to be referred to anywhere on the cover of the *L. & C. N.* It is inserted loosely, and we think it is a mistake in inserting matter of this kind which can easily be misplaced without leaving any trace.

DIPTERA NOTES AND ADDITIONS.

CHRIS. A. CHEETHAM.

RECENT work has resulted in several additions to our County list and two species are added to the British list. In one case this is possibly only through an error of previous identification.

The first group, mostly Mycetophildæ, have been identified by Mr. F. W. Edwards, they were all captured by the writer.

- Trichonta melanopyga* Ztt. Ryedale, 21/5/23.
T. atricanda Ztt. Austwick, 20/10/23.
T. submaculata Staeg. Austwick, 20/10/23.
Exechia hammi Edw. m.s. Austwick, 23/6/23.
Allodia borealis Lundst. Austwick, 23/6/23. This is an addition to the British list.
Acnemia nitidicollis Mg. Allerthorpe, 5/9/23.
Cælosia thoracica Winn. Austwick, 20/10/23.
Boletina basalis Mg. Austwick, 10/6/23.
Sciophila (Lasioma) lutea Mg. (a black var.). Farnley, 18/6/23.
S. (Lasioma) hirta Mg. Austwick, 16/6/23.
Mycomyia (Sciophila) exigua Winn. Ryedale, 21/5/23.
Erioptera griseipennis Meij. Austwick, 23/6/23.

Mr. Edwards has recently examined my *Biblios.*, and pointed out where I have been led astray by the tables in Wingate. The chief difficulty is *lacteipennis* Ztt., which apparently is one of the widely distributed species in the county. I had several ♀♀ of these under *nigriventris* Hal.

The *venosus* Mg. and *varipes* Mg. from Helmsley were not these, but *lacteipennis* Ztt., *leucopterus* Mg., and two doubtful ♂♂ which may be a variety of *laniger* Mg. or some undescribed species.

Recently, whilst looking over the genus *Pachyrrhina*, I noticed that the insects placed under *imperialis* Mg. did not agree with the description, but that they were all *crinicanda* Riedel., a species not previously recognised as British. I was fortunate in having continental specimens of the true *imperialis* Mg. for comparison, and the character by which the two are most easily differentiated is the black ventral side of the abdomen in *imperialis* Mg., that of *crinicanda* Riedel. being pale, and contrasting with the black part of the dorsal surface; the male genitalia are quite distinct. In answer to enquiries, Mr. Edwards informs me all the *imperialis* Mg. in the British Museum are *crinicanda* Riedel., and Mr. Hamm of the Oxford Museum, and Mr. Britten, of the Museum in Manchester, state the same for those in their care.

Mr. Edwards recently drew my attention to a difference between *Tipula alpinum* Bergr. and *T. obsoleta* Mg. In *The Naturalist*, 1923, p. 408, I gave these as synonyms, our

insect is *alpinum* Bergr., and I have not seen a Yorkshire specimen of *obsoleta* Mg. Mr. Edwards finds the latter frequently in the London district. Riedel figures to forms of part of the ♂ genitalia which Mr. Edwards finds are representative of the two species. He also pointed out that recently Nielsen had examined Staeger's type of *signata*, and finds this is not the insect now known by that name, but is the one known as *anonyma* Bergr. Nielsen suggests the name *staegeri* for the insect we know as *signata* Staeg. (see *The Naturalist*, 1922, p. 120.) The matter will now stand.

T. staegeri Nielson (*signata* Staeg.).

T. signata Staeg. (*anonyma* Bergr.).

T. marmorata Mg. (*confusa* v.d. Wulp.).

Mr. J. E. Collin has recently examined the following for me ; all are my collecting.

Rhamphomyia nitidula Ztt. Gormire, 9/5/23.

R. albihorta Coll. m.s. Gormire, 9/5/23.

R. anomalipennis Ztt. Pateley, 25/6/23.

Hilava bistrinata Ztt. Ryedale, 21/5/23.

Tachydromia annulipes Mg. Bedale, 4/5/23.

T. notata Mg. Whernside, 11/8/22.

Microphorus velutinus Mcq. Farnley, 18/6/23.

Sympycnus spiculatus Gerst. Whernside, 11/8/22.

S. cirripes Wlk. Whernside, 11/8/22.

Mr. Collin does not agree with Becker that *brachydactylus* = *pullatus* Kowz. Mr. Collin says that *pullatus* Kowz. = Walker's *cirripes*, and that Kowarz's *cirripes* Wlk. is not Walker's insect, but a distinct species.

Mydæa anceps Ztt. Bedale, 4/8/23.

Chloropisca glabra Mg. Farnley, 18/7/22.

Tephritis ruralis Lev. Pateley, 26/5/23.

The following are also addition to the list :—

Eristalis æneus Scop., 31/8/23, Eshton, Cleveland. Mr. M. L. Thompson who found this interesting addition states it was in a semi-torpid condition under a stone on the sea-shore.

Pales pavida Mg. (*Phorocera cilipeda* Rnd.) bred from larvæ of *O. antiqua* from Nidd.

Pegomyia iniqua Stein. Bred from larvæ in *Agaricus campestris* from Austwick.

Cyrtoma nigra Mg. Pateley, 5/6/23, C.A.C.

Empis lutea Mg. Grassington, 18/8/23, C.A.C.

Dolichopus rupestris Hal. Whernside, 11/8/22, C.A.C.

Cetema (Centor) elongata Mg. Skipwith, 20/8/22, C.A.C.

My thanks are due to Messrs. Edwards and Collin for their help without which these additions could not have been made.

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F. W. Shurlock writes on ' Erasmus Darwin ' (with plate) in *Science Progress* for January.

A YORKSHIRE CARBONIFEROUS (BOWLAND SHALE) FAUNA IN OKLAHOMA, U.S.A.

W. S. BISAT, F.G.S.

YORKSHIRE Carboniferous field geologists have been faced for many years with a puzzling problem, namely, the relationship of the Yoredale Series of Wensleydale and the Bowland Shales ('Pendlesides') of the South Craven area. As was pointed out by Wheelton Hind, the fauna and lithology of each is quite distinct, and as observed by Tiddeman the two facies abut against one another, and do not intermingle.

The object of this article is not to attempt a correlation of the two, but to draw attention to the remarkable parallel that exists to our problem in that of the Caney shale of Oklahoma, U.S.A.

The fauna and lithology of this formation has been described by Girty (*U.S. Geol. Surv. Bull.*, 377-1909) in considerable detail, and the cumulative evidence for its identity with the Bowland Shales (together with part of the Sabden Shales) is irresistible. Girty's opening sentence strikes a note familiar to Yorkshire geologists who have studied the Cracoe area: 'Owing partly to a deficiency of evidence, and partly to the ambiguous or even conflicting character of what we have, the problems presented by the Caney shale are peculiarly baffling. They involve two distinct areas in Oklahoma. . . . Although so close geographically that one can be seen from the other, the Arbuckle and Ouachita Mountains present sections which are in some respects strikingly different.' If we substitute the terms 'Pendle Hill' and 'Ingleborough' for these two American mountains, the last sentence would be agreed to readily in Yorkshire. We also read that the Caney shale 'consists of black and blue argillites with local sandy strata in the upper part,' and further, (on p. 14) 'While I have thus spoken of the Caney fauna as a unit, and regard it as such, there thus appear to be two different facies of a sort contained in it. A typical example of one of these—from a position but little above the Woodford chert—comprises brachiopods and some pelecypods [compare with Cracoe knolls]. The other facies consists characteristically of goniatites and some other cephalopods, with one or more species of the pelecypod genus *Caneyella* [*Posidonomya*] usually accompanying them. Other types are rare. The goniatite fauna comes in at Wapanucka near that containing the brachiopods, and at a slightly higher horizon.' The last observation compares absolutely with the incoming of the goniatite fauna at the top of the Ravensholme Limestone on Pendle, where the goniatites follow an abundant brachiopod fauna.

We thus have a remarkable lithological parallel between the Caney shales, which overlie the Woodford cherts, and the Bowland Shales, which overlie the cherty Pendleside limestone.

The goniatite fauna is strikingly similar, and nearly identical. English species represented in the Caney shale are *crenistria* (see Girty's illustrations, Pl. XIII., figs. 1-8), a species akin to *striatum* (Pl. XIII., figs 10-11), present also at Dinckley, *spirale* (Pl. XII., figs. 4-10, except? 7, 7a7 and 9). Girty's *bisulcatum* (Pl. XI., fig. 15-19) is the well-known but hitherto undescribed goniatite found at Weston Beck, Otley, and various other localities in Yorkshire, Lancashire and Derbyshire, and possibly Scotland. Girty's species *meslerianum* is very close to our *micronotum*, though specifically distinct, and his *richardsonianum* is akin to our *diadema*, though again specifically distinct.

Girty, unfortunately, makes no mention of any division of the series into goniatite zones, but a study of his faunal lists and localities (*op. cit.*, pp. 9-10) yields some remarkable information. One notices first that the goniatites mentioned by Girty as occurring in the Caney shale fall into two groups, which are not present in the same localities. Thus, 'caneyanum' (*spirale*) and 'choctawensis' (*crenistria*) are associated in many instances, sometimes accompanied by *meslerianum* (near *micronotum*), whilst *bisulcatum* and *richardsonianum* occur also together, but from a different set of localities from the first group. A study of the register of localities (*op. cit.*, pp. 73-75) helps to an idea of the relative horizons of the two groups, for we learn that locality 2084, with *bisulcatum*, is 100 feet above the chert, but locality 2088, with *crenistria*, is probably near base of shale and top of chert. Here, then, are two of the zones known in Yorkshire occurring in the same relative position in central North America.

It is curious to note that 'caneyanum' (*spirale*) occurs in one locality, and one only, associated with *bisulcatum*, a curious parallel to the occasional occurrence with us of a badly preserved *spirale*-like form with *bisulcatum* as at Warley Wise Bridge, Gill Beck, Cowling, near Silsden, Yorks.

The most striking goniatite parallel is provided, however, by Girty's *Trizonoceras lepidum*, the suture of which (Pl. XI., fig. 13b) is strikingly like our *Dimorphoceras discrepans*, except for an additional lateral lobe, which is apparently conjectural only. To make the parallel complete, this species, like our *Dimorphoceras*, is present at both horizons forming, as with us, a connecting link between the two.

So much for the goniatites. The lamellibranchs are obviously the same as our Bowland shale forms, at any rate, to a superficial inspection, and Mr. J. W. Jackson, of the Man-

chester Museum, who is studying this group, has kindly confirmed this, saying :—

Caneyella vaughani is *Posidonomya becheri*.

Caneyella richardsoni is *Actinopteria* cf. *persulcata*.

Caneyella percostata is *Posidonomya radiata* (Hind)?,

all occurring in the Bowland Shale.

This correlation shews that our local conditions at the close of the Lower Carboniferous period were paralleled with scrupulous fidelity of detail at a great distance from these shores, and suggests that our local problems may have much light shed on them by work in other countries ; that, in fact, they are not unique, but merely a portion of the greater problem of the distribution of land and water in the Northern hemisphere during the Carboniferous period.

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Birds in Legend, Fable and Folklore, by Ernest Ingersoll. Longmans, Green & Co., 1923, 292 pp., 12/6 net. Mr. Ingersoll has produced an extremely interesting book, which brings to light many new legends and fables, in addition to recalling many old ones. That the author's researches in this direction have been extensive is proved by the long list of books he has brought under contribution to produce his volume. No fewer than 113 works are mentioned in this list. The fifteen chapters deal with widely different subjects, as, for instance, 'Birds as National Emblems,' 'The Folklore of Bird Migration,' 'Birds in Christian Tradition and Festival,' 'A Primitive View of the Origin of Species,' etc. An interesting account is given of the evolution of the Eagle in the American Coat of Arms. Benjamin Franklin thought they ought to have a thoroughly native and useful fowl, like the wild turkey, figuring there. He thought it would make a far truer emblem for a new and busy nation, extolling it as a bird of courage, whereas the bald eagle 'is a bird of bad moral character ; he does not get his living honestly,' and 'besides, he is a rank coward ; the little King-bird attacks him boldly. He is therefore by no means a proper emblem.' The Indian legends are especially interesting, as they follow very closely the legends in our own country. The little Wren is classed by them as a real nosey-parker, getting up early in the morning, fussing round and prying into every lodge in the settlement, where she gathers the news which she afterwards retails at the birds' council. When she reports the birth of a boy, the birds, knowing the traditional cruelty of the species, lament, and break into a mournful chorus : 'Alas ! the whistle of the arrow ! my skins will burn,' anticipating the time when he grows up and turns his infant hunting instincts in their direction. The birth of a girl is welcomed because 'Thanks ! The sound of the pestle ! At her home I shall surely be able to scratch where she sweeps.' knowing well that when she sweeps out the lodge there will be scraps of grain from the corn grinding, and crumbs to reward them. The tameness and friendliness of the Robin, according to the Chippeways, was brought about by a young Indian who could not stand the spartan initial ceremonies through which he had to go before taking his place in the ranks of the warriors of his tribe. He therefore turned himself into a robin, and said to his father, 'I shall always be the friend of man and keep near their dwellings. I could not gratify your pride as a warrior, but I will cheer you by songs.' There is a host of similar charming fables which every student of bird life will enjoy.—R.F.

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(To be continued.)

FIELD NOTES.

Varieties of Blackbird at Thorparch.—Near Thorparch at the present time may be seen three Blackbirds, one entirely white, another marked very like a Magpie, while the third has a white head.—R. FORTUNE, 18th January, 1924.

Pine Marten in Yorkshire.—Mr. T. R. Cuckney, of Arnside, reports in *The Yorkshire Post* (17th January, 1924) that he saw a Pine Marten, the distinctive features of which he was able to see, on Simon's Fell, Wharfedale, in November last.—R. FORTUNE.

Crossbills near Thornton-le-Dale.—Mr. J. Green states that in December he saw a pair of Crossbills in Lewisham Woods, and that his son saw quite a dozen Crossbills at Brampton, about eight miles from Thornton-le-Dale, about the same time.—H. B. BOOTH.

White Blue Titmouse at Thornton-le-Dale.—Mr. J. Green, gamekeeper, of Thornton-le-Dale, informs me that in December last he got a white variety of the Blue Titmouse. As albinos in this species are extremely rare, I enquired whether the bird had pink eyes, but Mr. Green is not quite sure, but believes the bird had light grey eyes.—H. B. BOOTH.

Quails in the Wilsden District.—In *The Naturalist* for February, 1922, I recorded a small flock of Quail from Bingley Wood on the 12th December, 1921, and on 12th January my wife and I flushed another flock of from ten to fourteen in number, near the same place. It is not often met with in winter, but Mr. Fred Boyes had one brought to him on 28th December, 1878, and one was obtained on 20th February, 1866, near Beverley. I have never seen it here in the breeding season, which is late, but it is said to have bred near Keighley in 1879, an egg being now in the Museum of that town (Nelson's 'Birds of Yorkshire,' p. 532), and in various other parts of Yorkshire, but in recent years it appears to have become quite scarce. Both the flocks I flushed were not feeding, but resting on migration, as was manifest from the ground, which was littered with their droppings. They evidently migrate during the night.—E. P. BUTTERFIELD.

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A. P. Pavlow discusses 'Époques glaciaires et interglaciaires de l'Europe et leur rapport a l'histoire de l'homme fossile' in *Bull. de la Société des Naturalistes de Moscou*, 1922.

Vol. XXXVII. of the *Proceedings and Transactions of the Liverpool Biological Society* contains the Presidential Address of Dr. W. J. Dakin on 'The Problem of Sex Determination, with special reference to the Honey Bee'; as well as the Thirty-sixth Annual Report of the Marine Biological Station at Port Erin and the Report for 1922 on the Lancashire Sea Fisheries Laboratory at the University of Liverpool, and the Sea-Fish Hatchery at Piel, near Barrow. These include many interesting items such as 'Seasonal Changes in the Chemical Composition of the Mussel (*Mytilus edulis*).'

YORKSHIRE BRYOLOGISTS AT GRASSINGTON.

F. E. MILSOM.

A SMALL party braved the elements on Saturday, November 17th, and found the moors and hills thickly covered with snow, so nothing could be done on the open ground.

In Grass Wood, the most outstanding plants were *Hypnum molluscum* and *Plagiochila asplenioides*, which covered nearly every boulder. The scree formation on the north side of the wood was notable for the quantity of *Lophozia quinquedentata* growing among the rocks.

Dib Scar, being more open, did not yield much, but a large growth of *Bartramia œderi* in fine fruit was found. The Scar was also notable for the Alpine sports indulged in by the party!

On Sunday the party was diminished in numbers, and the day was spent in making another survey of Grass Wood.

In all, fifty-eight mosses and eighteen hepatics were noted, of which the following are selected as types :—

MOSSES.

<i>Seligeria pusilla.</i>	<i>Camptothecium sericum.</i>
<i>Fissidens pusillus.</i>	<i>Brachythecium populeum.</i>
<i>F. decipiens.</i>	<i>Eurynchium tenellum.</i>
<i>Tortula ruralis.</i>	<i>Amblystegium confervoides.</i>
<i>Barbula rigidula.</i>	<i>Hypnum commutatum.</i>
<i>B. rubella.</i>	<i>H. molluscum.</i>
<i>Trichostomum mutabile,</i>	<i>H. Schreberi.</i>
var. <i>cophocarpum.</i>	<i>Ditrichum flexicaule.</i>
<i>Bartramia œderi.</i>	<i>Dicranum majus.</i>
<i>Porotrichum alopecurum.</i>	<i>Hylocomium loreum.</i>
<i>Anomodon viticulosus.</i>	<i>H. squarrosum.</i>
<i>Thuidium Philiberti.</i>	

HEPATICES.

<i>Metzgeria pubescens.</i>	<i>Scapania aspera.</i>
<i>Lophozia quinquedentata.</i>	<i>Madotheca platyphylla.</i>
<i>Plagiochila asplenioides</i> var. <i>majus.</i>	<i>Lejeunea cavifolia.</i>

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'Nest-building and other Breeding Habits of the Long-tailed Tit,' by R. H. Brown, appears in *British Birds* for February.

Maud J. Delap gives 'Further Notes on the Plankton of Valentia Harbour, 1906-1923,' in *The Irish Naturalist* for January, and there are numerous shorter notes.

There is an account of the work of the Entomological Section of the Yorkshire Naturalists' Union, by E. G. Bayford, in *The Entomologist's Monthly Magazine* for January.

Under the somewhat comprehensive title 'Man and the Ice Age,' in *Man* for February, Mr. J. R. Moir describes two or three implements found at Ipswich; very old ones.

An interesting account of the Silver Cauldron of Gundestrup, Jutland, and its bearing upon English Antiquities, by Lieut-Col. G. R. B. Spain, occurs in *The Museums Journal* for February.

The Entomologist for February contains 'British Mosquitoes, 1920-23,' by R. W. Edwards; and 'Notes from the Log-book of a Cumberland Garden,' by H. D. Ford, among other useful notes.

There are descriptions of the *Elephas antiquus* Bed at Clacton-on-Sea, and S. H. Warren's report on 'the late Glacial Stage of the Lea Valley,' in *The Quarterly Journal of the Geological Society*, No. 316.

'Bird Migration in Relation to Foot and Mouth Disease' is the subject of a paper by A. Landsborough Thomson in *Nature*, No. 2828. The author considers that a case against the birds has not been proved.

NORTHERN NEWS.

At the Anniversary Meeting of the Geological Society of London, on February 15th, Dr. J. W. Evans, F.R.S., was elected President.

The Council of the Yorkshire Philosophical Society has elected Professor Percy F. Kendall an Honorary Life-member of that Society.

The death is announced of W. M. Pybus, a North of England ornithologist, at the age of seventy-two; and of Mr. J. H. Allchin of the Maidstone Museum.

A second edition of the interesting 'Handbook to the Cases illustrating adaptations for Locomotion in Animals,' has been issued by the Horniman Museum, Forest Hill (40 pp., 2d.).

In No. 264 of *The Journal of the Royal Microscopical Society*, H. B. Milner writes on 'The Microscopical Investigation of Sands, for various Industrial Purposes,' and Prof. A. C. Seward on 'The Use of the Microscope in Palæobotanical Research.'

We notice that Mr. J. Reid Moir has been writing to *The Times* advising caution in interpreting red or brown stains on fossil bones as marks of blood, most of these being evidently due to the deposit of oxides of iron by percolating water. Kettle!

We have received from the Department of Agriculture and Technical Instruction for Ireland a valuable 'Guide to the Collection of Irish Animals,' by R. F. Scharff (50 pp., 6d.); 'The Report of the Board of Visitors for 1921-22 of the National Museum'; and a valuable 'Memoir and Map of Localities of Minerals of Economic Importance and Metalliferous Mines in Ireland,' by Grenville A. J. Cole (155 pp., 7/6). As frontispiece to the latter is a photograph of a bust of Sir Richard J. Griffith, Bart., who had much to do with the mapping of the geological features of the island.

Messrs. H. F. & G. Witherby ask us to draw our readers' attention to the fact that they are issuing a volume under the title of 'A Romance of the Rostrum, being the business life of Henry Stevens, and the history of 38 King Street, together with some accounts of famous sales held there during the last hundred years, compiled by E. G. Allingham, with a preface by The Rt. Hon. Lord Rothschild, F.R.S.,' and that a limited edition only is being issued to subscribers. A prospectus will be sent to anyone applying, which contains an illustration of a Great Auk and its egg.

We learn from *The Yorkshire Post* that 'a curious angling experience has befallen a Grimsby man who was fishing from the Humber bank at Stallinbro'. He had two rods out, and, as the sport was poor, he left them on the bank and moved to watch a "school" of porpoises which were disporting some distance away. Suddenly he noticed that one of the rods was moving along the bank. He dasked after it and secured it, and then saw that a porpoise, *probably eight feet in length*, had taken the bait (a mussel), and was making off with the rod in tow. On feeling the line jerk taut, the porpoise disgorged the hook and bait, and went wheeling off to rejoin the "school." We wish he had told us something about his other line!

The British Museum (Natural History) has this year issued an almanack, which, we understand, is for sale at one shilling. It contains particulars of the hours of admission, official tours, collecting, and publications. There is a representation in colours of a beautiful butterfly, but in a very un-museum way it is not labelled, and among the six interesting 'accessions' is a White-tailed Sea-eagle which has been shot in Kent, presumably by some-one who has broken the law! On the back of the almanack is a list of the staff in the various departments from the Director to the boy, and details of postal rates. However, we must congratulate the Museum upon making an attempt to get its collections better known.

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The information given in this list is brought up to the end of 1923. The right-hand pages have been left blank for the use of observers' notes, local lists, or for cutting up for labels or catalogues.

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Mar., 1924.

THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL
PRINCIPALLY FOR THE NORTH OF ENGLAND.

EDITED BY

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The Museums, Hull;

AND

T. W. WOODHEAD, Ph.D., M.Sc., F.L.S.,
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WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS

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

JOHN W. TAYLOR, M.Sc.

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NOTES AND COMMENTS.

RARE, VANISHING, AND LOST BRITISH BIRDS.*

We remember over a quarter of a century ago being fascinated by a pamphlet on Lost British Birds by the late W. H. Hudson, and we are glad to see that the memory of this great naturalist will be kept green in many ways, one of which is the production of the present publication, which has twenty-five excellent coloured plates by the well-known artist, H. Gronvold, one of which we are kindly permitted to reproduce as Pl. V. The volume originally appeared in 1894, but in its present form is a great improvement. The price is very reasonable.

HALIFAX NATURALISTS.

The Halifax Scientific Society has recently celebrated its Jubilee by holding an exhibition, which was open for inspection by the general public for a week, and lectures were given on suitable subjects during the evenings. Judging from the excellent report in the *Halifax Daily Courier* the effort was thoroughly successful, and we are glad to see that Halifax still takes its prominent part in the scientific history of Yorkshire, as it did fifty years ago, when J. W. Davis, Percy Sladon, William Cash and others were alive.

JOURNAL OF EXPERIMENTAL BIOLOGY.

One result of the specialisation in scientific research has been the increased number of valuable publications issued by the more prominent of the publishing firms throughout the country. Messrs. Oliver & Boyd have recently issued Part I. of *The British Journal of Experimental Biology*, the Managing Editor of which is Dr. F. A. E. Crew, of the Animals Breeding Research Department of the University, Edinburgh, and there is a strong Editorial Board. In the well-printed and well-illustrated publication of over 150 pages, the following monographs appear:—‘Studies on Internal Secretion, II.: Endocrine Activity in Fœtal and Embryonic Life,’ by L. T. Hogben and F. A. E. Crew; ‘Studies on the Comparative Physiology of Digestion, I.: The Mechanism of Feeding, Digestion, and Assimilation in the Lamellibranch *Mya*,’ by C. M. Younge; ‘Parthenogenesis in the Mollusc *Paludestrina jenkinsi*,’ Part I., by G. C. Robson; ‘Further Data on Linkage in *Gammarus chevreuxi*: and its Relation to Cytology,’ by J. S. Huxley; ‘Historical Studies on the Gonads of the Fowl, I.: The Historical Basis of Sex Reversal,’ by H. B. Fell; and ‘Tissue Culture: A Critical Summary,’ by H. M. Carleton. The titles of these alone give an impression

* By Douglas Gordon. London: John Murray. ix.+239 pp.-7/6 net.

of the far-reaching influence of Experimental Biology in these times. We should like to congratulate the Editorial Board upon the value and appearance of its first publication, and trust that it may be followed regularly by others.

JOURNAL OF ECOLOGY.

The Journal of Ecology for January, under the editorship of Professor A. G. Tansley, is a substantial volume, and contains a number of valuable memoirs, together with a summary of recent literature by W. H. Pearsall. The contributions are: 'Phases of Vegetation under Monsoon Conditions,' by W. T. Saxton; 'The Hornbeam (*Carpinus Betulus* L.) in Britain,' by Miller Christy; 'Wilting of Plants in its connexion with Drought Resistance,' by N. A. Maximow and T. A. Krasnoselsky-Maximow; 'The Influence of Manuring on the Weed Flora of Arable Land,' by Katherine Warington; and 'The Temperature of the Surface of Deserts,' by P. A. Buxton, though particular interest attaches to Mr. Miller Christy's monograph on The Hornbeam, in which he points out that 'In the present day, owing to the almost complete disuse of the Hornbeam for industrial and other purposes, its culture (formerly of some importance, especially in France) is neglected almost entirely. Nurserymen are still able to supply young plants, raised from seed, for the planting of game-coverts, shelter hedges, and the like; but that is about all.' Mr. Miller Christy's map showing the approximate natural range of the Hornbeam in Britain indicates that in his opinion this area is round London, extending as far as Suffolk on the north and Hampshire towards the west.

YORKSHIRE SPAS, ETC.*

Mr. Smith has gathered together a tremendous amount of information relating to the folk-lore of streams and wells in the East Riding, and has had the valuable co-operation of Mr. John Nicholson, of Hull, whose knowledge on these matters is well known. Curious legends and traditions are brought together, information is given of the marvellous curative properties of some of the waters, which we can understand when, as for instance, in the case of the Filey Spa, the dose was 'from one to six pints.' There are illustrations of various kinds in the book, and altogether it is a very readable and valuable contribution to the subject dealt with. If we could be callous enough to make a criticism it would be that we should have preferred another view of one of the delightful springs and streams of the East Riding, to that called 'A Corner of the Author's Study,' which appears as frontispiece.

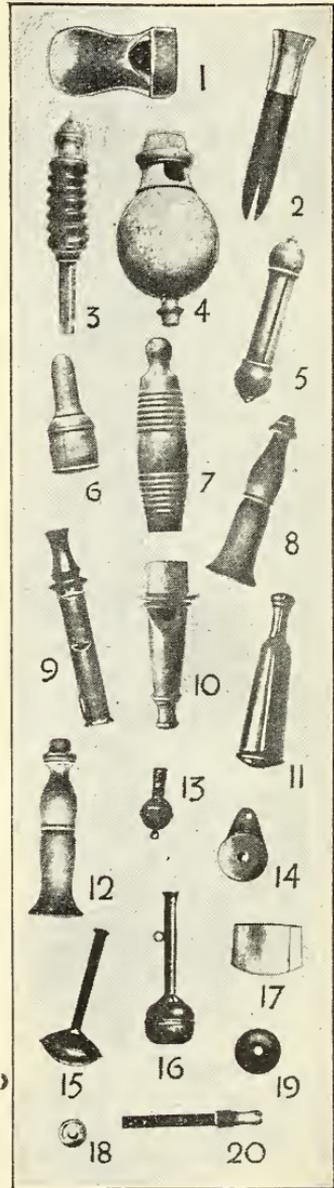
* 'Ancient Springs and Streams of the East Riding of Yorkshire,' by W. Smith. London: A. Brown & Sons, Ltd., 186 pp., 6/-.

BIRD CALLS.

While the manufacture and sale of various forms of bird calls may not be strictly in accordance with the ideals of the field naturalist, the fact remains that a naturalist obtains advantages by use of some of these, and it is interesting to find from a prospectus received from Messrs. Spratts that a large variety of these is on sale. The forms used for some of these are evidently of great age, and it is interesting to find that some of them have not altered for a considerable number of years. The accompanying illustrations, taken from the catalogue*, indicates the variety of forms in use.

LIST.

- 1.—Owl (boxwood).
- 2.—Wild Goose (nickel and teak).
- 3.—Pheasant, Quail (leather, boxwood and brass).
- 4.—Wood pigeon (boxwood).
- 5.—Green Plover or Pee-weet (boxwood, with screw ends and tape stretch).
- 6.—Hare (boxwood, metal sounder).
- 7.—Wild Duck (boxwood, screw bottom and sounder).
- 8.—Rabbit (boxwood).
- 9.—Curlew (boxwood, brass cone).
- 10.—Golden Plover (boxwood or antelope horn).
- 11.—Canada Goose (boxwood or *lignum vitae*).
- 12.—Canada Goose (another pattern).
- 13.—Ring Plover (lead or composition).
- 14.—Partridge (silver or nickel).
- 15.—Red Grouse, Black-game and Magpie (metal).
- 16.—Jay (metal).
- 17.—Green Plover or Pee-weet (Yorkshire pattern metal).
- 18.—Snipe (bone).
- 19.—Partridge (boxwood).
- 20.—Teal (metal and horn).



* These can be obtained from Messrs. Spratts Patent, 24 and 25 Fenchurch Street, London, E.C.3.

GEOLOGICAL LITERATURE.

What is described as 'Geological Literature added to the Geological Society's Library during the years 1915, 1916, 1917, 1918, and 1919,' is a volume consisting of 545 pages, which is supposed to be a record of the acquisitions to the Society's Library during those years. The first 313 pages contain the list of the literature added, which averages 62 pages per annum. The list for 1912 contains 147 pages; 1913, 130 pages; 1914, 106 pages; and that for 1920 contains 123 pages, so that there has been an apparent considerable drop in the production of geological literature during the years covered by the present volume, which can hardly be explained as entirely due to the war.

ERRATA.

Shortly after the publication a lengthy list of Errata was circulated, from which, it might be assumed, that while there are corrections pretty well throughout, there are apparently none whatever between pages 192 and 314, nor between 343 and 410, whereas, as a matter of fact, there are considerable numbers on these, as on other pages. The subject index also, which occupies pages 314 to 545, is mechanical rather than analytical. However, in order to see to what extent this printed record of geological literature compares with the actual card catalogue in the Society's Library, the present writer took the trouble to compare the entries in the volume with the cards, with a result clearly indicating that, in order to be anything like accurate, a massive supplementary volume should be issued. This is particularly regrettable, as we believe the Society's anxiety in the interests of economy has resulted in a large sum of money being wasted, or nearly so, as, if this printed list of geological literature is incomplete it is of little value to the workers for whom, presumably, it has been prepared.

AN EXAMPLE.

For example, under 'T. Sheppard' are twenty entries for the five years. Two of these are dated 1906 and 1911 respectively, so that the number is reduced to eighteen. Of these, six refer to bibliographies relating to the Geology of the Northern Counties (Yorkshire excepted) which appeared in *The Naturalist*, though the bibliographies of Yorkshire Geology which appeared in the Yorkshire Geological Society's *Proceedings*, and which are in the Society's own card catalogue, are not mentioned in this printed list. Similarly, there are in this list particulars of ten obituary notices of geologists, usually of a page or less in length, separate copies of which were not sent to the Society, whereas what are referred to elsewhere as important memoirs dealing with (a) Martin

Simpson, of Whitby, and his numerous valuable contributions to Palæontological Literature, and (b) 'William Smith, his Maps and Memoirs,' though duly entered in the card catalogue, are entirely ignored in the Geological Literature. The Smith Memoir, dealing with the Father of English Geology, in its original form in the Yorkshire Geological Society's Proceedings and in the re-issue which was published later, contains nearly 200 pages, together with numerous plates and diagrams, and the Society has at least three copies on its shelves. Yet even this does not appear in the List of Geological Literature.

OMISSIONS.

Eliminating these bibliographies and obituaries, it leaves two items to this writer's credit, namely an abstract of a paper on 'Geological Maps,' published by the Society itself, and 'Yorkshire's Contribution to Science,' a volume published in 1916. Actual contributions to Geology, such as a new species of *Lima* from the Yorkshire Chalk; new records of fossils from the Quaternary Deposits, etc., are ignored, although these are duly recorded in the card catalogue in the Society's Library. This card catalogue is by no means a complete record of the contributions of this particular individual which are possessed by the Society, but some of these occur in periodicals which it is possibly much too great an undertaking to examine; but surely it is not asking too much to expect that a publication for which the Fellows now have to pay an extra charge, should at least conform with the card catalogue which is available to the Fellows and presumably to the compiler of this Geological Literature.

BRITISH ASSOCIATION WORK.

The British Association for the Advancement of Science has issued the report of the Conference of Delegates of Corresponding Societies, held at the Liverpool meeting in September, 1923, 66 pp. Many suggestions, covering a wide range, were recommended to the Council of the Association, which included assistance to local scientific societies; town planning; care of sites of historic or scientific interest, or of natural beauty; and an objection to the change of the English gallon to 4 litres, pointing out that as a gallon of water weighs 10 lbs., it is an important factor in physical and engineering practice. In addition to the report are bibliographical lists of papers published in the year 1922 on the Zoology, Botany and Pre-historic Archæology of the British Isles. These are very comprehensive, including even the shortest notes, and will be invaluable for reference. The writer and compiler is our indefatigable member and editor, Mr. Thomas Sheppard.—H.B.B.

ESSEX BRONZE IMPLEMENTS.

As Publication No. 1, the Colchester Museum has issued 'Essex Bronze Implements and Weapons in the Colchester Museum,' by Charles H. Butcher (12 pp., 1s.). Emulating other Museums, the Colchester curator has reprinted this pamphlet from the Transactions of the local Antiquarian Society. The paper includes illustrations of a number of



Portion of Bronze Founder's Hoard from Hatfield Broad Oak, showing Spearheads, Socketed Hammer, Caldron Rings, and portions of the rim of a Bronze Vessel.

interesting hoards of bronze implements, together with palstaves, socketed axes, etc., one of which we are permitted to reproduce herewith.

YORKSHIRE PHILOSOPHERS.

The annual report of the Yorkshire Philosophical Society, presented recently, contained a record of activity. The Committee has received a collection of herbarium specimens of British ferns, and marine and freshwater algæ, collected by the late William Bean, of Scarborough, and presented by his son, Mr. Eugene Bean. Among the more important additions to the British bird collection are: White's Thrush, shot at

Waplinton Manor, near Pocklington, January, 1882; cases of nesting birds, and albino and other varieties of different species have also been added.

BIOLOGICAL SCIENCES.

Without any preliminary blare of trumpets, without even an editorial note, Vol. I., Part 1, page 1 of the *Proceedings of the Cambridge Philosophical Society*, Biological Sciences (Cambridge University Press, 62 pp., 12/6) commences in a business-like way with F. A. Potts' interesting paper on 'The Structure and Function of the Liver of *Teredo*, the Shipworm,' which is much more comprehensive than the title suggests. Other memoirs are 'The Structure and Life-History of *Lipotropha* n.g., a new type of Schizogregarine, parasitic in the Fat Body of a Dipterous Larva (*Systemus*),' by D. Keilin; 'The Determination of the Salt Error of Indicators and the Accurate Estimation of the pH of Solutions by Colorimetric methods,' by J. T. Saunders; 'The Measurement of the Carbon Dioxide output of fresh water Animals by means of Indicators,' by J. T. Saunders; 'Specific Gravity as a Factor in the Vertical Distribution of Plankton,' by D. Eyden; 'On the Invasion of Woody Tissues by Wound Parasites,' by F. T. Brooks and W. C. Moore; 'On the Structure of a Middle Cambrian Alga from British Columbia (*Marpolia spissa*, Walcott),' by J. Walton. We trust this valuable publication will meet with the support it deserves.

THRINAX MIXTA AND T. MACULA.

In a paper on the Biology of the above species, based upon observations made upon specimens found in Durham (*Proc. University of Durham Phil. Soc.*, Vol. VI., p. 5), Mr. A. D. Peacock gives new features of the distribution, life history and biology of *T. mixta*, and an account of the life history and biology of *T. macula* for the first time. The two species are 'parallel species,' and their larvæ are differentiated; the method and rationale of the laying of the peculiar eggs, and the operation of burrowing by *macula* are described in detail. Both species may defer emergence for a year; one specimen of *mixta* shows signs of postponing emergence for two years. The author concludes:—'Both species are arrhenotokously parthenogenetic; the result is at variance with v. Rossum's findings in the case of *mixta*.'

ROCK SALT IN YORKSHIRE.

The Quarry for February contains Dr. R. L. Sherlock's paper on 'British Rock Salt Deposits,' read at the Liverpool meeting of the British Association. In this he states 'Salt has been recorded in several borings in Yorkshire, and notably at Market Weighton. The section of this boring can be correlated in a broad way with the Middlesbrough succession.'

At Market Weighton salt occurs at two horizons in the Upper and Middle permian marls above and below the Upper magnesian limestone. If the permian has any real existence, then Middlesbrough and Yorkshire salt are permian ; but it happens that if the new rocks are mapped from Nottingham northwards, they undergo a lateral change and at the same time a great thickening. At Nottingham the so-called Middle permian marl is the base of the bunter, and further north the Upper magnesian limestone comes in as a thin wedge in the bunter, ceases to be recognisable as such, and by imperceptible stages the Middlesbrough succession comes on.'

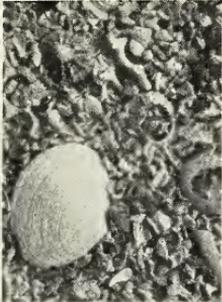
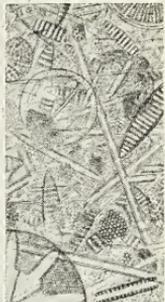
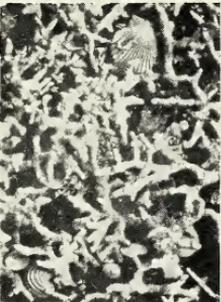
RARE PLANTS.

At a recent meeting of the Linnean Society of London Mr. A. J. Wilmott exhibited specimens of *Myosotis sicula* Guss., discovered by him in Jersey in 1922 ; of *Alchemilla pastoralis* Buser, rediscovered in Teesdale by him last year ; of *Alchemilla glomerulans*, discovered in the herbarium of Rev. J. Roffey, and now presented to the Natural History Museum ; of *Pulmonaria* from the New Forest, which he identified with *P. longifolia* (Bast.), a West European species, and not as formerly with *P. azurea* Bess., a species of Middle and Eastern Europe ; of the British *Viola*, which has been incorrectly named *V. epipsila* Fr., but which may be the Portuguese *V. Juressi* K. Wein ; and of the rediscovered *Geranium purpureum* of the 'English Botany' which he has named var. *Fosteri*. Various points of interest concerning them were indicated with the help of additional specimens.

OCEANOGRAPHY.

Dr. Johnstone has produced a charming volume,* which will do much to further the study of the science of Oceanography, in connection with which he is so important a pillar. 'The subjects on this book are the physical phenomena of the Ocean ; the water itself ; the foreshore and sea bottom ; the great current systems ; the tides and tidal predictions. These chapters lead up to a discussion of the movements of the earth's crust that have led to the formation of the great oceanic abysses and the continental lands. The book is intended for students of oceanography in general, but it also supplies the material necessary for a connection between the study of oceanography on the one hand and geology and geography on the other.' There are some excellent illustrations, one of which we are kindly permitted to reproduce—Plate VII.

* 'An Introduction to Oceanography, with Special Reference to Geography and Geophysics,' by James Johnstone. University Press of Liverpool, xii. + 351 pp., 15/- net.

 <p><i>Neritic: Shelly and Nullipore gravel</i></p>	 <p><i>Pelagic: Pteropod and Globigerina ooze</i></p>	 <p><i>Pelagic: Diatom ooze</i></p>
 <p><i>Neritic: Nullipore gravel</i></p>	 <p><i>Pelagic: Globigerina ooze</i></p>	 <p><i>Manganese nodule</i></p>  <p><i>Earbone of whale</i></p>
 <p><i>Neritic: Coral Sand</i></p>	 <p><i>Pelagic: Radiolarian ooze</i></p>	 <p><i>Shark's tooth</i></p>  <p><i>Cosmic spherule</i></p>

Typical deep-sea and shallow-water deposits. The shelly and nullipore gravels are reduced; the coral sand, pteropod and globigerina oozes are moderately magnified; the radiolarian and diatom oozes are highly magnified. The cosmic spherule is highly magnified while the manganese nodule, the whale earbone and the shark's tooth are slightly reduced.

THE ANIMALS OF THE CARBONIFEROUS PERIOD, WITH SPECIAL REFERENCE TO DISCOVERIES IN YORKSHIRE.

BY ARTHUR SMITH WOODWARD, LL.D., F.R.S.

IN 1878 the late Prof. L. C. Miall published a most interesting account of the animal life represented by fossils in the Coal Measures.¹ During the 'seventies and the next decade both he and the late James William Davis, of Halifax, were actively occupied with researches especially on the fishes of the Coal period, and it was they who first attracted me to pay frequent visits to Yorkshire. With Mr. Davis I traversed most of the county and was introduced to many of the naturalists of his time; with him I also travelled widely on the continent to study the collections of fossil fishes which were helpful in the investigations in which we were both interested. Miall and Davis, however, were among the pioneers who still lacked the material needed for the due appreciation of the fossils with which they were dealing. Miall, indeed, in 1878, came to the conclusion that during the Coal period 'the great majority of the principal types of animal life existed, just as distinct from each other, just as specialised in their structure then as now.' Davis even compared some of the fish-remains with supposed corresponding structures in one of the most specialised groups of bony fishes of the present day.² Subsequent research has led to a very different result. The more we learn of the fossils, the more we realise the distinctness of the Carboniferous fauna from any that has existed in later times, and the more we are convinced of the truth of the doctrine of organic evolution.

During recent years there seems to have been less activity in collecting from the Yorkshire Coal Measures and the immediately underlying formations, and I propose in this address to try to stimulate renewed interest in the work. So much progress has been made elsewhere that it is now possible to formulate many problems which specially need solution, and the Carboniferous shales and limestones of this county are as hopeful sources of material as those of any other region. We need, especially, collections from the ironstone nodules and other concretions, for we have now among such fossils not only well-preserved hard parts, but also many impressions of soft organs which we never expected to see.

¹ In "Coal, its History and Uses," edited by Prof. Thorpe (London, 1878), pp. 110-163.

² Ann. & Mag. Nat. Hist. [5] vol. v (1880), p. 349 (*Pleuracanthus*).

From personal experience I can only refer to the fishes and higher vertebrates, but any review of recent progress would be incomplete without at least a mention of some of the invertebrates. Even if the larger groups of invertebrates are not much different from those of the present day, the relative abundance of their component smaller divisions is strikingly different; and there are many strange annectant types which we should expect to find in a fauna so much nearer in time to the origin of life. The Arthropods are particularly interesting. Although the majority of the Crustaceans remind us of the existing open-ocean and deep-sea shrimp-shaped *Mysis*, many are much more primitive—much more like the theoretical common ancestor—with their nearest modern representative, the Syncarid *Anaspides*, stranded in the remote freshwaters of Tasmania and Australia.¹ There are also the aquatic Arachnids, such as *Belinurus*, surviving from a race that was previously much more flourishing, but is to-day represented only by the king-crab (*Limulus*). Scorpions found in the Coal Measures show signs of having only just become air-breathers. Spiders seem to have been more important and more highly developed than at any subsequent period.² A remarkable collection was made from the nodules of the Coal Measures near Littleborough, Lancashire, by the late W. H. Sutcliffe, and similar nodules should be well examined in the Yorkshire Coal Measures. There are many curious Centipedes among the fossils,³ and Insects are especially numerous.⁴ All the Insects belong to the lower groups in which there is no complete metamorphosis, and there are many types which seem to foreshadow existing orders, but can scarcely be referred to them. The very abundant Cockroaches, for instance, have transparent fore-wings, and their wing-neuration is comparatively primitive. *Meganeura*, with many of the characters of the Dragon-flies, is the largest Insect known, with a span of wing of about two feet. Most of these Insects are known only by one or two specimens, and every fragment is of importance for the study of them.

Among Carboniferous fishes it was formerly supposed that the Sharks and Skates (Elasmobranchii) did not differ in any essential respects from those now existing. Later discoveries, however, have proved that most of them belong to very distinct orders, much nearer to the theoretical common

¹ H. Woodward, Geol. Mag., 1908, p. 385; W. T. Calman, Geol. Mag., 1911, p. 488.

² R. I. Pocock, "The Terrestrial Carboniferous Arachnida" (Mon. Pal. Soc., 1910).

³ H. Woodward, Geol. Mag., 1887, pp. 1, 116.

⁴ H. Bolton, "Fossil Insects of the British Coal Measures" (Mon. Pal. Soc., 1919-20).

ancestors than any Sharks and Skates of Mesozoic and later times. Some of them also exhibit structures which are no longer found in Elasmobranchs, but which remind us of higher sub-classes. Of the latter the Acanthodians and the Cratose-lachians are especially noteworthy.

The Acanthodians are shark-like fishes, of which the numerous scattered fragments in the Yorkshire Coal Measures are well worth collecting. They attained their greatest development and variety in the Upper Silurian and Devonian periods; and those of the Carboniferous are either much elongated, almost eel-shaped (*Acanthodes*),¹ or comparatively gigantic, broad and stout for grovelling in the mud (*Gyracanthus*). Each fin, except the caudal, is armoured with a spine in front, and the body is completely covered with very regularly arranged shagreen, which has an unusually

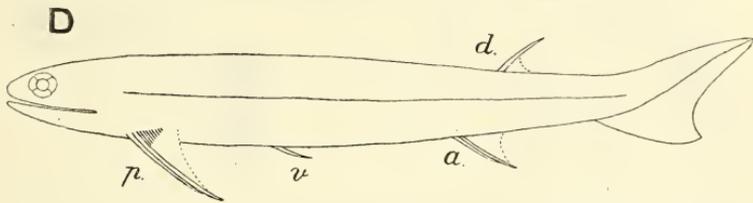


FIG. 1.—*Acanthodes wardi* Egerton; English Coal Measures. Outline of fish showing spines in front of the anal (*a*), dorsal (*d*), pectoral (*p*), and pelvic (*v*) fins. About one-quarter natural size.

complex microscopical structure. The internal skeleton is unique among sharks in having some of the ordinary cartilages sheathed in hard plates which have the structure of dentine. We already know a little of these plates in the earlier Acanthodians, but those of the Carboniferous *Acanthodes* and *Gyracanthus* still remain to be found and studied. Of *Gyracanthus*, indeed, we know only the familiar pectoral fin-spines, triangular paired spines, and shagreen, which are common at several horizons in the Yorkshire Coal Measures. Some comparatively good specimens of the allied genus *Gyracanthides* from the Lower Carboniferous of Australia² show how interesting this fish is likely to prove when complete examples are met with.

The Cratose-lachians have only just been discovered in the Lower Carboniferous of Belgium, and they are known merely by one good specimen;³ but I mention them because some of the problematical calcified plates found in our Carbon-

¹ J. W. Davis, Trans. Roy. Dublin Soc. [2] vol. v (1894), p. 249.

² A. S. Woodward, Mem. Nat. Mus. Melbourne, no. 1 (1906), p. 3.

³ A. S. Woodward, in forthcoming jubilee volume of the Geological Society of Belgium.

iferous rocks may belong to them. In the roof of the skull of *Cratoselache* there are symmetrically arranged hard plates which in some respects remind us of those in the Devonian armoured fishes known as *Arthrodira*.

The Ichthyotomi, or Pleuracanth sharks, are represented in the Yorkshire Coal Measures by several kinds of spines and teeth, as already described by Davis.¹ Complete fishes are known only from the Carboniferous and Permian of the European continent² and from the Permo-Carboniferous of Australia.³ They are as distinct from all modern sharks as the two other groups already mentioned, but they are in-

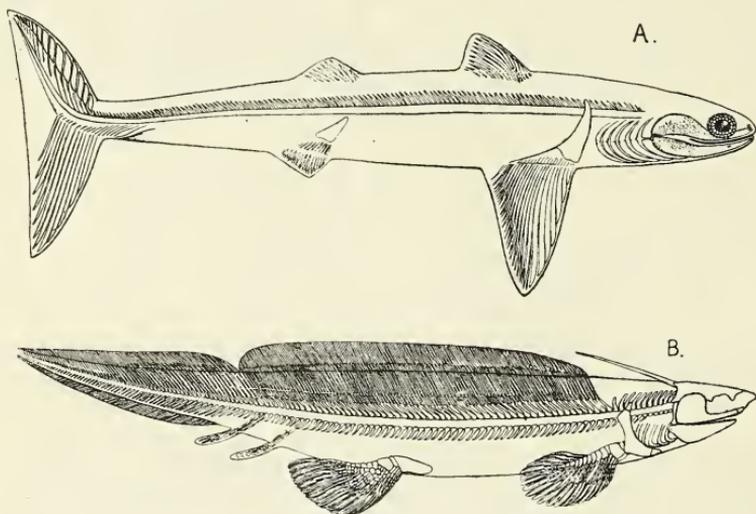


FIG. 2.—A. *Cladoselache fylleri* (Newberry); Upper Devonian, Ohio, U.S.A. Showing fins supported by parallel bars of cartilage as in *Ctenacanthus*. Much reduced, after B. Dean. B.—*Pleuracanthus decheni* (Goldfuss); Lower Permian, Bohemia. Showing paired fins with cartilages fringing a longitudinal axis; and the supports of the median fins correlated in number with the vertebral arches. Much reduced, after A. Fritsch.

teresting in another way. The internal skeleton is well-preserved, and shows that the supports of the median fins—at least the dorsal and caudal—correspond in number with the segments of the vertebral axis. Theoretically, we should expect this correlation in the earliest fishes; in Pleuracanthus we actually find it. The paddle-shaped pectoral

¹ J. W. Davis, Trans. Roy. Dublin Soc. [2] vol. iv (1892), p. 703.

² C. Brongniart, "Études sur le Terrain Houiller de Commeny," book 3 (1888).

³ A. S. Woodward, Mem. Geol. Surv. N. S. Wales, Palæont. no. 10 (1908), p. 2.

fins are strengthened by cartilages which are disposed along a central axis, an arrangement from which the modern shark's fin may well have been derived.

Most of the Acanthodians seem to have been toothless, but nearly all the other known Carboniferous Elasmobranchii have powerful teeth strengthened by a compact and even overlapping arrangement. In this respect they differ from the majority of the existing Sharks and Skates, in which, when the teeth are pointed or cutting, they are more or less loosely fixed, and used only for seizing and tearing. Even if they did not feed on shell-fish, the Carboniferous Elasmobranchs had usually to depend on armoured prey. The ganoid-scaled Palæoniscid fishes have been found in their stomach. It is, therefore, interesting to notice that the teeth are often even fused together to give strength, or inserted in the supporting soft tissue with very deep roots.

The fusion of Carboniferous crushing teeth into shell-shaped plates was noticed more than half a century ago, and the unknown Sharks to which they belonged were named by Owen the Cochliodontidæ.¹ Davis described many of them, some from the Coal Measures, the Yoredale Rocks, and the Carboniferous Limestone of Yorkshire.² They were naturally supposed to belong to Sharks closely related to the existing Port Jackson Shark (*Cestracion*), which has rows of crushing teeth, though not fused together, for a diet of shell-fish. Later discoveries in the Lower Carboniferous of Scotland, however, have proved that at least one Cochliodont (*Deltoptychius*) has a dentition and an armoured head very different from that of any existing Elasmobranch,³ and both those and specimens of *Helodus*, found by the late John Ward in the Coal Measures of Staffordshire, suggest that the Cochliodonts were not in any way closely related to *Cestracion*, but near the ancestral stock from which Sharks and Chimæroids have subsequently diverged. *Cestracion* agrees with all other modern sharks in having a rapid succession of teeth which fall away from the outer edge of the jaw as they are replaced. The Cochliodonts must have had not more than six or seven teeth in each series during the whole of the individual lifetime, and all these teeth fused into the rigid plate of the adult.

The deepening of the root of the tooth is seen in the Petalodontidæ, which are well represented in the Lower Carboniferous of Yorkshire by *Petalodus* and *Petalorhynchus*, in the Coal Measures by *Climaxodus*⁴ and *Ctenoptychius*. These must have been skate-shaped fishes, as shown by the

¹ R. Owen, Geol. Mag., 1866, p. 59.

² J. W. Davis, Trans. Roy. Dublin Soc. [2] vol. i (1883), p. 327.

³ A. S. Woodward, Quart. Journ. Geol. Soc., vol. lxxi (1915), p. lxviii.

⁴ A. S. Woodward, Quart. Journ. Geol. Soc., vol. lxxv (1919), p. 1.

Permian *Janassa*,¹ and their closely compacted teeth form a crushing pavement. There cannot have been more than seven or eight teeth in succession in each series during the individual lifetime.

The teeth of the Cochliodontidæ and Petalodontidæ consist of a peculiar cluster of tubules of dentine directed at right angles to the grinding surface, which is consequently pitted when the superficial layer is abraded. In this respect they agree with some flattened crushing teeth from the Lower Carboniferous, of which the commonest are named *Psammodus* and *Copodus*. These teeth must also have belonged

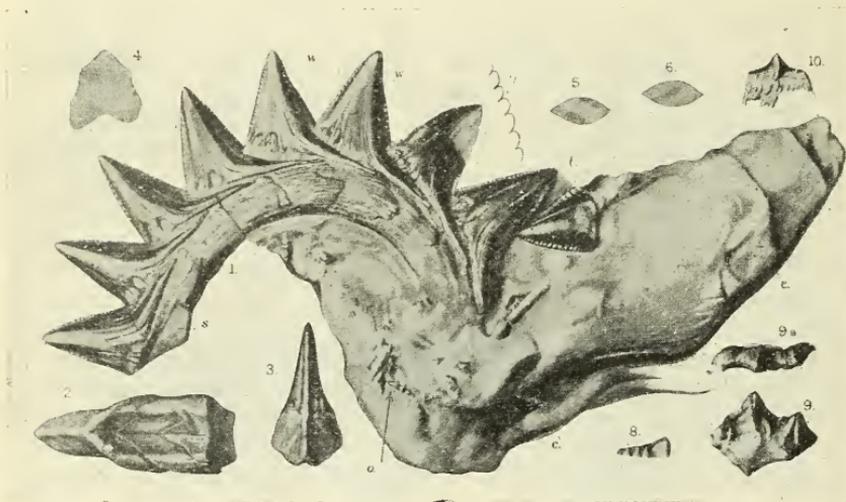


FIG. 3.—*Edestus newtoni* A. S. Woodward; Millstone Grit, Brockholes, near Huddersfield. Showing enlarged median row of front teeth fused into an arch hanging out of the lower jaw. About one-third natural size.

to Elasmobranchs, in which there was a very slow and scanty tooth-succession. Indeed, I think the Cochliodonts, Petalodonts, Psammodonts, and Copodonts should be grouped into an Order which I have named Bradyodonti ("slow teeth")² in allusion to the poverty of their tooth-supply as compared with that of modern Elasmobranchs.

There were, however, some Carboniferous Elasmobranchs with the normal modern rapid tooth-succession, and some had each tooth replaced at least 150 times in the individual lifetime. This is known, because in one family, that of the Edestidæ, some of the teeth do not fall out when done

¹ O. Jaekel, Zeitschr. Deutsch. Geol. Ges., vol. li (1899), p. 259.

² A. S. Woodward, Proc. Linn. Soc., Sess. 133 (1921), p. 34.

with, but fuse together in a spiral outside the edge of the jaw. Portions of these spirals have been known for many years, but their nature was only recognised when two specimens were discovered respectively in the Coal Measures of Iowa, U.S.A.,¹ and in the Millstone Grit of Brockholes, near Huddersfield,² which showed the teeth in association

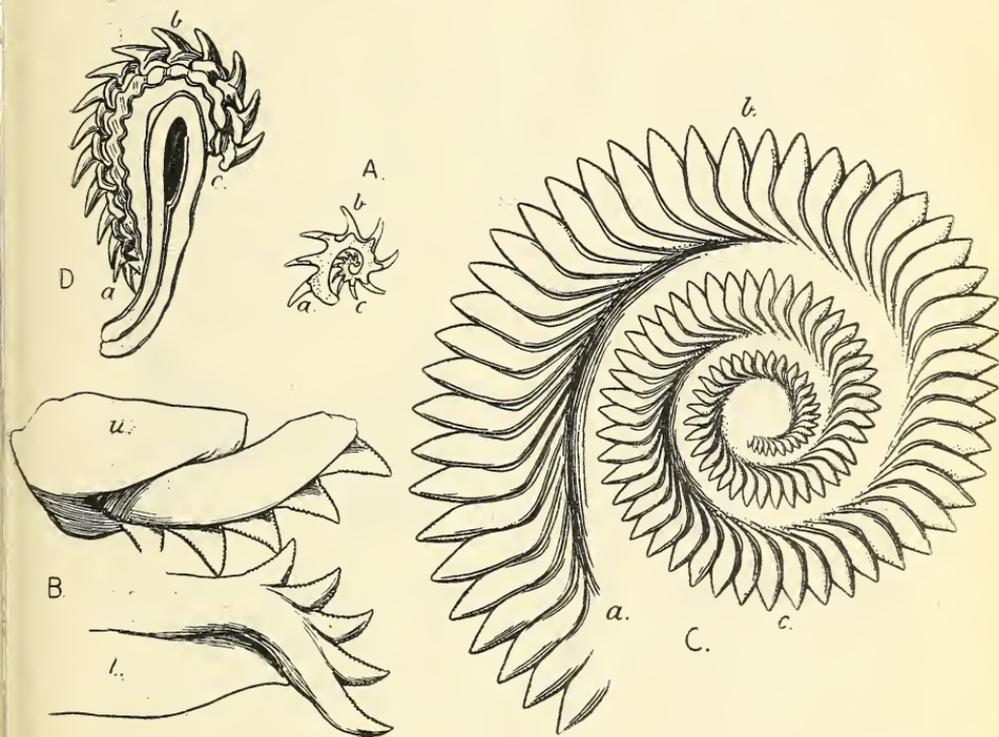


FIG. 4.—Diagrams to illustrate the nature of the front dental arch of the *Edestidae*. A.—A single row of teeth of *Protodus scoticus* (Newton), from the Lower Devonian of Scotland, all fused into a spiral, none falling out when done with. B.—Front of upper (*u*) and lower (*l*) jaws of *Edestus mirus* Hay, from the Coal Measures of Iowa, U.S.A., showing enlarged front teeth fused together into long arches which fall away at intervals. C.—A single row of teeth of *Helicoprion bessonowi* Karpinsky, from the Permo-Carboniferous of Perm, Russia, showing all the teeth of a lifetime fused together into a spiral, none having fallen away. Teeth being formed at *a*, in use at *b*, discarded after use in the spiral *c*. D.—Cross-section of the lower jaw of a modern Shark, showing a single row of teeth, being formed at *a*, passing upwards and outwards to be in use at *b*, all remaining separate and falling away when done with at *c*.

¹ O. P. Hay, Proc. U. S. Nat. Mus., vol. xlii (1912), p. 31.

² A. S. Woodward & J. Pringle, Quart. Journ. Geol. Soc., vol. lxxii (1916), p. 1.

with part of the jaws. The Yorkshire specimen is especially important because it demonstrates for the first time the nature of the large fused teeth. It now appears that the teeth of one row (sometimes a paired row) at the front, or symphysis, of each jaw, become greatly enlarged, deepened by lateral compression, and firmly fixed together by the clasping of the roots. In at least one genus, *Helicoprion*,¹ the enlarged row curves into a spiral remaining throughout life just outside the jaw; in *Edestus* and similar genera, the arch of projecting teeth breaks away at intervals. The very numerous teeth on the sides of the jaw seem to have been arranged, and to have fallen out regularly, as in the modern *Cestracion*. In *Helicoprion* and *Edestus* the large front teeth are compressed to a sharp edge; in *Campodus*,² of which one specimen was found by the late Dr. Wheelton Hind in the Millstone Grit of Hardcastle Crags, the large front teeth are less compressed and blunter. Nothing is known of the trunk and fins of the Edestidæ, but it may be assumed that they will prove very different from those of any existing Sharks.

Even the Carboniferous Elasmobranchs with the dorsal fin-spines named *Ctenacanthus* and the teeth named *Cladodus*, which were long supposed to be closely related to the existing *Cestracion*, have also proved to show no such affinities. Imperfect fishes of this kind from the top of the Devonian in America and from the base of the Carboniferous in Scotland, prove that they had much more primitive paired fins supported by parallel rods of cartilage, while their body-cavity and internal organs extended far backwards towards the tail³ as should be the case in a primitive member of the group.

A few of the Carboniferous Elasmobranchs may have been of a more modern type. The Lower Carboniferous *Tristychius*, indeed, has pectoral fins supported by two basal cartilages much like those of some existing sharks; and its dentition is not essentially different from that of the Mesozoic and later Cestracionts.⁴

Some Carboniferous Elasmobranch spines are still problematical. *Listracanthus*, for example, which has already been found by Mr. W. H. Dyson in a marine band in the Maltby Colliery near Rotherham, occurs sometimes in clusters⁵ and

¹ A. Karpinsky, Verhandl. Kais.-Russ. Min. Ges. St. Petersburg. [2] vol. xxxvi (1899), p. 361; also Bull. Soc. Oural. Sci. Nat. Ekaterinebourg, vol. xxxv (1915), p. 117.

² C. R. Eastman, Bull. Mus. Comp. Zool. Harvard Coll., vol. xxxix (1902), p. 58.

³ B. Dean, Mem. Amer. Mus. Nat. Hist., vol. ix (1909), pp. 232, 249.

⁴ See forthcoming paper by A. S. Woodward in Quart. Journ. Geol. Soc., 1924.

⁵ A. S. Woodward, Geol. Mag., 1903, p. 486.

suggests that the fish to which it belonged would appear almost as if it were covered with feathers. It is a most curious spine with frayed edges, and it would be especially interesting to discover its relationships.

Among higher fishes the commonest and most widely spread Carboniferous family is that of the Palæoniscidæ. These may be well described as the "herrings" of the period. Most of them are represented in Yorkshire only by scattered scales and bones, but at least one fine specimen of *Acrolepis hopkinsi* is known from the Millstone Grit of Hebden Bridge.¹ Being usually covered with rhombic (or ganoid) scales, the Palæoniscids were originally mistaken for extinct allies of the bony pikes (Lepidosteidæ), which are ganoids with a bony skeleton restricted at the present day to the freshwaters of North America. When, however, their internal skeleton was studied

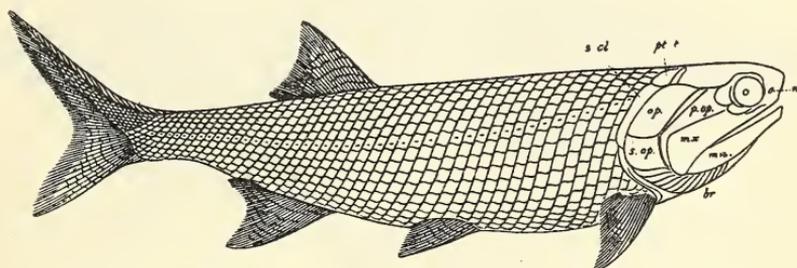


FIG. 5.—A Palæoniscid Fish, *Rhadinichthys ornatissimus* (Agassiz) from the Lower Carboniferous, Scotland. After R. H. Traquair.

in detail by the late Dr. R. H. Traquair,² he recognised that they represent a much lower grade of fish-life, of which the modern sturgeons are the sole survivors in existing seas and rivers. The sturgeons have long been regarded as among the lowest of surviving ganoid fishes, but they could not be understood until the discovery of the Palæozoic Palæoniscidæ and the Mesozoic Chondrosteidæ. It now appears that they are merely the senile, overgrown, and degenerate members of a race which at the end of Palæozoic times played a great part. Like the Palæoniscids, the sturgeons have a slightly ossified internal cartilaginous skeleton, without vertebral centra, but with a very primitive tail, the end of the body being produced into a slender lobe above the tail-fin (heterocercal) not shortened up (homocercal) as in the bony pikes, higher

¹ E. D. Wellburn, Proc. Yorks. Geol. & Polyt. Soc., vol. xiii (1898), p. 398; R. H. Traquair, "Ganoid Fishes of the British Carboniferous Formations. Part I. Palæoniscidæ" (Mon. Pal. Soc., 1877-1914), p. 109.

² R. H. Traquair, *op. cit.* p. 34.

ganoids, and bony fishes. The parallel rod-like supports of their fins, which are fewer than the fin-rays, are also theoretically primitive in arrangement, and there are other features which might be expected in the earliest true fishes. We now need more information about the internal structure of the head, so that it is specially desirable to search for uncrushed specimens in ironstone nodules. Impressions of the semicircular canals of the ear,¹ and even otoliths,² have already been seen, and much more may be expected.

Platysomus and its allies, forming the family Platysomidæ, are merely deep-bodied Palæoniscids having a small mouth with crushing teeth.³ Mr. J. W. Davis found fine pieces

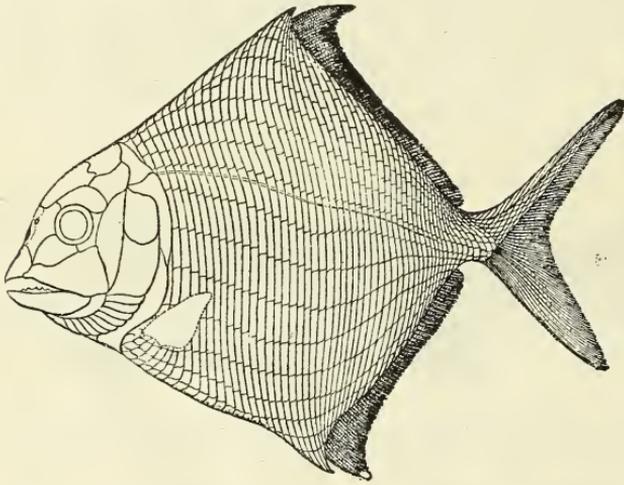


FIG. 6.—A Platysomid Fish, *Cheirodus granulosis* (Young), from the English Coal Measures. After R. H. Traquair.

of *Platysomus forsteri* in the shale of the Cannel Coal at Tingley.

Only one small fish apparently connecting the Palæoniscids with the higher ganoids has hitherto been discovered in Carboniferous rocks. It is an imperfect specimen found by the late Mr. Walter Baldwin in the Middle Coal Measures of Sparth, near Rochdale, and seems to be related to the Permian *Acentrophorus*.⁴

When Prof. Miall wrote about Carboniferous animals in 1878, he was most interested in the ancient mud-fishes or Dipnoi (double-breathers) which still survive as *Ceratodus* in the

¹ C. R. Eastman, Iowa Geol. Surv., vol. xviii (1908), p. 267.

² E. Hennig, Sitzungsber. Ges. Naturf. Freunde, Berlin, 1915, p. 52.

³ R. H. Traquair, Trans. Roy. Soc. Edinb., vol. xxix (1879), p. 343.

⁴ E. L. Gill, Ann. & Mag. Nat. Hist. [9] vol. xi (1923), p. 465.

rivers of Queensland, Australia, as *Protopterus* in Africa, and as *Lepidosiren* in South America. They were well represented during the Carboniferous period by *Ctenodus* and other genera, and their remains occur frequently in the Yorkshire Coal Measures. The tooth to which the name *Ctenodus* was first given by Agassiz is in the Leeds Museum. As the skull in the Dipnoi is in some respects more like that of the earliest lung-breathers, or Amphibia, than the skull in any other fishes, and as the breathing-apparatus, other soft parts, and the paddle-shaped paired fins make some approach to the corresponding structures of the Amphibia, the Carboniferous Dipnoi or their immediate predecessors were supposed to be the ancestors of the Amphibia. We now think that the peculiar development of the teeth and paired fins makes this theory untenable, and we must look among the next group of fishes for the more probable ancestors of lung-

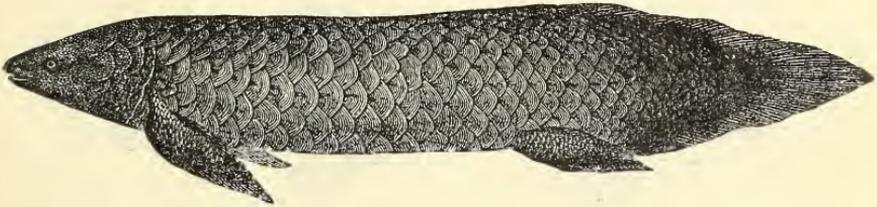


FIG. 7.—A Dipnoan Fish, *Ceratodus forsteri* Krefft, living in the rivers of Queensland.

breathers. The Dipnoi may have arisen as 'cousins,' so to speak, of the latter, but since Carboniferous times they have never advanced—they have merely degenerated into the eel-shaped fishes which now represent them in the freshwaters of Africa and South America.

The next group to which I refer is that of the Crossopterygii (fringe-finned), which also have paired fins in the shape of paddles, fringed only with fin-rays. They could hardly have been suspected of comprising the ancestors of lung-breathers if they had been known only by their two much-changed survivors in the freshwaters of Africa, *Polyp-terus* and *Calamoichthys*. Their Devonian and Carboniferous representatives, however, resemble the earliest known Amphibia, the Labyrinthodonts, in many important features. The structure of one of them, *Megalichthys*, is especially well known from specimens discovered in the Yorkshire Coal Measures described by the late Prof. Miall¹ and by

¹ Quart. Journ. Geol. Soc., vol. xl (1884), p. 347; also "Description of the Remains of *Megalichthys* in the Leeds Museum" (Leeds Lit. & Phil. Soc., 1885).

Dr. Wellburn.¹ We still wish to know more about the imperfectly ossified skull and the cartilages supporting the fins.

The skull in these early Crossopterygians is particularly interesting. Although among fishes they make the nearest known approach to the next higher group of vertebrates, their skull remains in a condition which in later fishes is passed through as a temporary stage in the embryo. *Megalichthys* itself demonstrates this fact very well, though we need more satisfactory specimens to be sure of all the details. We might learn much by making transverse sections of uncrushed examples. The skull in the fossil always tends to fall apart across the hinder border of the frontal bones, where there was evidently a transverse plane of weakness. Further examination shows that the ossified basicranial axis only extends as far backwards as this point,

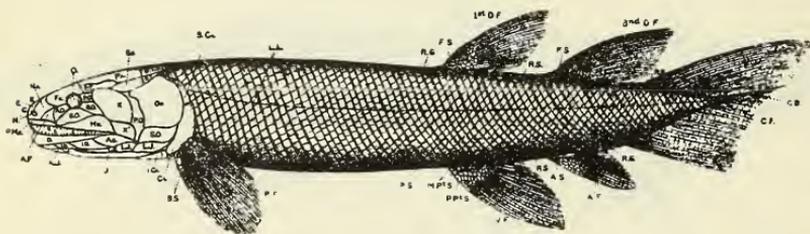


FIG. 8.—A Crossopterygian Fish, *Megalichthys hiberti* Agassiz, from the English Coal Measures. After E. D. Wellburn.

which is probably at the level of the pituitary body beneath the brain. The rest of the skull behind must have had as its basal axis only a forward extension of the notochord surrounded by partially ossified cartilage.² This is almost exactly the condition of the skull in the embryo of a modern fish.³

The cartilages supporting the short-lobed paired fins of the Devonian and Carboniferous Crossopterygii certainly make a nearer approach to the four-toed or five-toed limbs of the land vertebrates than those in any other fishes, but even the latest attempts to correlate the elements of the one with those of the other are not altogether satisfactory.⁴ We need more material, especially of Lower Carboniferous age.

¹ Proc. Yorks. Geol. & Polyt. Soc., vol. xiv (1900), p. 52.

² See description of Devonian *Eusthenopteron* by W. L. Bryant, Bull. Buffalo Soc. Nat. Sci., vol. xiii (1919), p. 6; also A. S. Woodward, Proc. Linn. Soc., Sess. 134 (1922), p. 29.

³ E. S. Goodrich, in Lankester's "Treatise on Zoology," pt. ix (1909), p. 12.

⁴ W. K. Gregory, Ann. New York Acad. Sci., vol. xxvi (1915), p. 363.

Prints of typical four-toed and five-toed feet have been found in the Upper Carboniferous in North America.¹

The real resemblances between the Crossopterygii and the Labyrinthodonts are seen in certain features in the head, of which the significance can scarcely be mistaken. The arrangement of the powerful conical teeth is very similar in the two groups. The peculiar structure of these teeth is also much the same, their walls being infolded to a varying extent, producing in cross-section the patterns that are usually described as rhizodont, dendrodont, and labyrinthodont. The lower jaw in each group consists of many pieces arranged in approximately the same way. Some of the Crossopterygii agree with the Labyrinthodonts in having a pineal foramen in the roof of the skull. Some agree in having the eye surrounded by sclerotic plates. It must also be added that the Labyrinthodonts are more fish-like than any later Amphibians in having their head-bones marked by grooves for slime-canals, and in sometimes having the pectoral arch suspended from the back of the skull by a post-temporal bone.

Only one Labyrinthodont appears to have been found in the Carboniferous of Yorkshire—*Pholiderpeton scutigerum* from the Coal Measures of Toftshaw, near Bradford, now in the Bradford Museum.² These animals must, however, occur and should be carefully sought. I have often wondered why in this country they have never been found in the decayed tree-stumps, like those in which the late Sir J. William Dawson found many small forms trapped in the Coal Measures of South Joggins, Nova Scotia.

Without attempting further details, I think I have said enough to show the interest of the Carboniferous fauna, and the desirability of renewed efforts to collect its fossil remains in Yorkshire. So many of the animals are still known only by scattered fragments, that we need specimens which will correlate parts. Several of the fishes exhibit so many features which we should theoretically expect to find in the earliest representatives of the class, that we want more specimens displaying their anatomy. There are evidently possible links between the gill-breathing fishes and the lung-breathing amphibians, and for these we should make careful search. There are also problems of distribution in the various marine and estuarine deposits which are well worthy of the geologist's attention.

¹ H. T. Martin, Kansas Univ. Sci. Bull., vol. xiii (1922), p. 103.

² T. H. Huxley, Quart. Journ. Geol. Soc., vol. xxv (1869), p. 310.

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The Association of Economic Biologists recently met at the Leeds University, under the presidency of Prof. V. H. Blackman. Papers were read by Mr. G. T. Spinks, Dr. R. C. Knight, Prof. J. H. Priestley and Dr. W. Robinson.

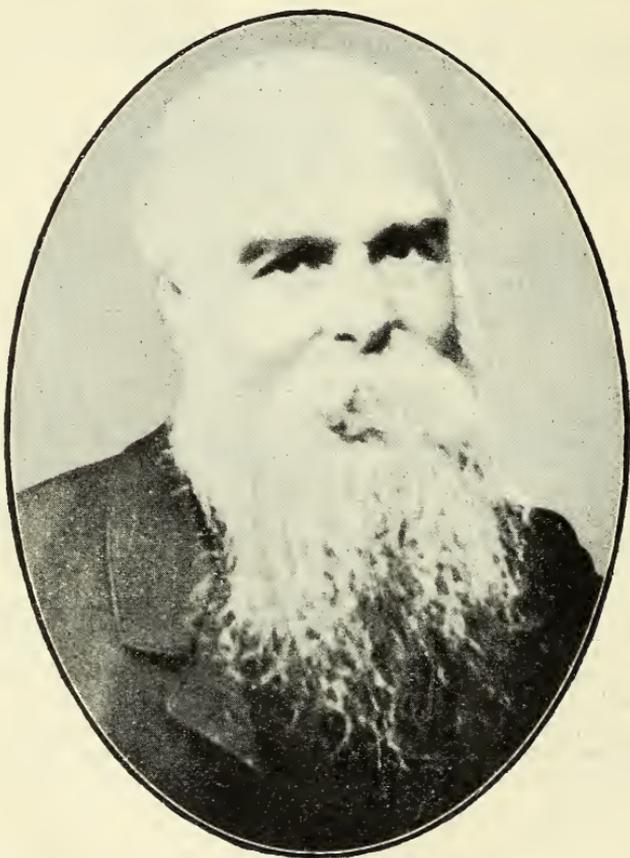
We gather from the press that Mr. W. F. Cutler, of Manitoba, is in search of the '*Gigantossaurus Africanus*,' which is, in his opinion, 8,000,000 years old, that it is probably 20 feet, and it may be 80 feet, long. Next year presumably it will be 8,000,001 years of age.

At a recent meeting of the Linnean Society of London, Mr. H. H. Pugsley exhibited specimens of an undescribed *Statice* from Pembrokeshire, which he proposed to name *S. transwalliana* in allusion to the district where it occurs. It was found growing on the coast in company with *S. binervosa* C. E. Sm., from which it differs in its much dwarfer habit, remarkably narrow, linear, oblong leaves, and very dense spikes of small flowers with stellate corollas only half as large as those of *S. binervosa*.

In Memoriam.

C. F. GEORGE, M.R.C.S.

WE much regret to hear of the death which occurred a little while ago, of 'Dr. George,' as he was known the country over, at Kirton Lindsey. He was one of our oldest contributors, and well known to our readers for his illustrated articles on



the Mites of this country, which at one time appeared regularly in our pages. Previously he was a frequent contributor to Hardwick's *Science Gossip*, and he did much to create an interest among these usually neglected organisms. He was a constant reader and critic of our Journal, but old age combined with an accident he had to one of his eyes some years ago, prevented him latterly from carrying on his researches.

So long ago as 1884 he was the President of the Postal Microscopical Society, and in *The Journal of Microscopy and Natural Science* for January, 1885, was his Presidential Address which dealt with his connexion with that Society and the study of Mites. The Society was formed in 1873, and in his in-

teresting address, Dr. George referred to the fact that he was then one of only six of the original members. His slides of mites were very familiar to old-time microscopists, and in our journal several new species were described, one of which was named after the present writer. His last contribution to *The Naturalist* appeared in June, 1916, when he described a new species of *Trombidium*, giving it the name of *parvum*. Many of his type specimens, especially his more recent ones, he presented to the Hull Museum Collection, and they have been consulted by workers in this particular science in different parts of the British Islands.

Dr. George was always fond of any natural history subject, and in his later years took a keen interest in his garden and in bee-keeping. Some time previously he had excavated some tumuli in the Kirton Lindsey district, the Bronze-Age relics from which are now in the Hull Museum.

We extend our sympathy to his daughters.—T.S.

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Deilephila livornica at Normanton.—When looking over his collection after the Annual Meeting of the South West Yorkshire Entomological Society at Normanton in January last, Mr. H. Lodge pointed out to the members a specimen of *Deilephila livornica* which had been captured in one of the streets of that town quite recently.—GEO. T. PORRITT, March 4th, 1924.

White-breasted variety of Cormorant at Scarborough.—During a strong south-easterly gale, about a month ago, a storm-tossed and much bedraggled Cormorant sought refuge in the harbour at Scarborough. With a damaged wing and lame leg it was unable either to fly or to dive efficiently, and finding a sheltered place where it is not molested, and where food is not too scarce, it has remained up to the date of writing. At first glance the white throat and breast seemed to indicate an immature bird, but careful examination with binoculars, at short range, shows that it is adult. The large size, robust build, and the rich metallic gloss upon the feathers of the wings and back indicate that it is not immature, but an old bird which has retained the white under parts usually possessed only by the juveniles. The white of these parts is more pure than the greyish white tint of the young birds. The bird seems to possess a curious aversion to the water, and one seldom sees it swimming. At low tide it hobbles about the mud, picking up scraps of fish refuse, as the water rises it retreats before it, until it reaches the top of the harbour where the small boats are moored. Into one of these it climbs, and remains there until the tide falls. This bird was still in the harbour on March 8th.—W. J. CLARKE.

YORKSHIRE HEMIPTERA IN 1923.

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

THE recorder is indebted to the Rev. C. Ash, and to Messrs. M. L. Thompson and T. B. Kitchen for consignments of specimens from their respective districts for determination, the most interesting of which are referred to in the following list.

References :—

†=New to the County. *=New to the Vice-county.
 C.A.=Rev. C. Ash. W.J.F.=W. J. Fordham.
 M.L.T.=M. L. Thompson. T.B.K.=T. B. Kitchen.
 Records not initialled are my own.

HETEROPTERA.

- Piezodorus lituratus* F. Skipwith Common, W.J.F. (*The Naturalist*, 1923, p. 266). Usually described as plentiful wherever gorse flourishes. It seems uncommon, however, in Yorkshire, the only previous record dating from 1860.
- Picromerus bidens* L. On birch, Allerthorpe, W.J.F. Skipwith Common, C.A. and T.B.K.
- Zicrona coerulea* L. One specimen, Skipwith Common, W.J.F. (*The Naturalist*, 1923, p. 266).
- Myrmus miriformis* Fall. Allerthorpe Common, T.B.K., *61. This is another uncommon species in Yorkshire, it having been recorded only twice before. It is more plentiful in southern countries. It should be looked for among long grass, especially in healthy places.
- Scolopostethus affinis* Schill. Redcar, M.L.T., *62.
- Gastrodes ferrugineus* L. Skipwith Common. The only recorded county locality up to the present for this species.
- Nabis limbatus* Dahlb. Skipwith, C.A.
- N. jesus* L. Allerthorpe, T.B.K., *61.
- Salda orthochila* Fieb. On the moors at Ringinglow, near Sheffield.
- † *Piezostethus cursitans* Fall. Under fir bark, Allerthorpe, W.J.F.
- Acompcoris pygmaeus* Fall. On firs, Ringinglow.
- Microphysa pselaphiformis* Curt. One on the trunk of an elm, Ecclesall Woods, Sheffield, and one by beating hawthorn, Fulwood. This is a very small and inconspicuous insect, and is likely to be commoner than at present appears.
- Stenodema (Miris) holsatum* F. Wike, T.B.K. Generally the commonest member of the genus with us, but this year it has been scarce.
- Miris (Leptopterna) ferrugatus* Fall. Middleton-in-Teesdale and Greatham, M.L.T. Hazelhead.
- Bryocoris pteridis* Fall. Hazelhead, *63. (*The Naturalist*, 1923, p. 343.)
- Phytocoris dimidiatus* Kb. Ecclesall Woods. Frequent on the trunks of Sycamore trees, where its colouration harmonises remarkably with that of the discoloured bark.
- P. pini* Kb. Skipwith, C.A. and J.M.B.
- P. varipes* Boh. Birley Edge, near Wadsley Bridge. Unlike most members of the genus, this species occurs frequently on low plants.
- Adelphocoris (Calocoris) lineolatus* Goeze. Redcar, M.L.T., *62. In recording this from Bridlington last year, mention was made that it would probably be taken elsewhere on *Ononis*.

- Calocoris sex-guttatus* F. Yarm, M.L.T., *62.
 †*C. roseo-maculatus* DeG. Filey, T.B.K. An interesting addition to the county list, though its occurrence might have been expected as it has been taken in Northumberland, Durham and Lincolnshire.
C. novegicus Gmel. (*bipunctatus* F.). Skipwith, C.A. Yarm and Bedale, M.L.T., *62 and *65.
Lygus pratensis L. Newton (near Pickering), M.L.T. Rievaulx and Askham, T.B.K. Fulwood (near Sheffield).
Macrolophus nubilus H.S. Fulwood and Ecclesall Woods, the only localities noted for this delicate species in Yorks.
 †*Globiceps dispar* Boh. One specimen among grass in the woods, Wharncliffe. Mr. E. A. Butler states that it is not of general occurrence, being noted in only seven English counties. I can now add two, having taken specimens in Yorks. and Derbyshire.
 †*Heterocordylus tibialis* Hahn. On gorse, Birley Edge; should be plentiful elsewhere.
Psallus variabilis Fall. Hazelhead.
P. varians H.S. Middleton-in-Teesdale, M.L.T., *65.
P. jalleni Reut. Hazelhead and Wharncliffe.
Plagiognathus arbustorum F. Tadcaster, C.A., *64. Middlesbrough, M.L.T., *62. Birley Edge.

HOMOPTERA.

- Ulopa reticulata* Fab. Ringinglow, *63. Under ling, plentiful, and probably widely distributed.
Megophthalmus scanicus Fall. Fulwood.
Euacanthus interruptus L. Bramham, T.B.K., *64.
 †*Macropsis rubi* Boh. On brambles, Ecclesall Woods, Sheffield. Mr J. Edwards was good enough to examine one of my specimens.
Idiocerus populi L. Millhouses, Sheffield. Fairly plentiful on aspens.
Acocephalus albifrons L. Birley Edge and Fulwood. Plentiful at the roots of grass.
A. bifasciatus L. Bell-Hagg (near Sheffield), and Hazelhead. Fairly common under ling.
Deltocephalus distinguendus Flor. The †long-winged form of this species (commonly entered in British lists as *D. repletus*) occurs occasionally. In the structure of the ædeagus it is identical with the short-winged form which is quite common. I have taken it at Wharncliffe. Mr. J. Edwards examined one of my specimens, and confirmed the determination.
Athysanus brevipennis Kbm. Bell-Hagg; it seems to prefer heathy places.
A. lineolatus Brulle. Greno Wood, among grass.
 †*Alebra albostriella* Fall. var. *wahlbergi* Boh. Ecclesall Woods. This variety is much less common than the type or the var. *fulveola* H.S.
Dikraneura flavipennis Zett. Skipwith, *61.
 †*Eupteryx collinus* Flor. Birley Edge. This species has very likely been confused with *E. stachydearum*, to which it bears a strong resemblance. It occurs on *Labiates*.
E. signatipennis Boh. Ecclesall Woods, on *Spirea ulmaria*.
E. concinna Germ. Greno Wood, on oaks.
Typhlocyba crataegi Dougl. Greno Wood.
T. geometrica Schr. Fulwood.
 †*T. plebeja* Edw. This is one of the unmarked yellow species, the identity of which can only be determined by dissection of the ædeagus. It was described by Mr. Edwards from specimens taken in Nottinghamshire (see *E.M.M.*, 1914, p. 169), and so far as I know, has not been reported since. I took it in considerable numbers on elm in Ecclesall Woods during July last.

- Zygina neglecta* Edw. Greno Wood, sheltering on hawthorns.
Cixius similis Kbm. Skipwith. Plentiful on birch.
Rhinocola ericae Curt. Skipwith, *61. Plentiful under ling.
Aphalara nebulosa Zett. Skipwith, *61. In considerable numbers on
Epilobium angustifolium.
Psyllopsis fraxinicola Forst. Carter Knowle, Sheffield.
Psylla mali Schm. Burton Agnes (8/22), *63. Black-brook (near
 Sheffield), *61. On crab-apple.
P. sorbi L. Fulwood, *62. On mountain ash. These two species
 are much alike, and are closely related. (See J. Edward's *E.M.M.*
 1918, p. 113).
P. spartii Guer. Birley Edge, *63. On broom.
Arytaena genistae Latr. Birley Edge. On furze.

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Discovery is now to be published by Messrs. Benn Bros.

Dr. Irvine Masson gives 'The Genesis of the Royal Society' in *Nature* No. 2832.

F. J. Stubbs refers to the 'Night Cry of the Redwing,' in *The Essex Naturalist* issued in March.

Colin Matheson contributes 'Fish Exhibits in Museums' to *The Museums Journal* for March.

A. H. Hoare describes 'Watercress and its Cultivation,' in *The Journal of the Ministry of Agriculture* for March.

British Birds for March contains a full report of the progress of its Bird Marking Scheme, and papers on the Birds of Cumberland and the Isle of Man.

Dr. E. A. Cockayne writes on 'A Somatic Mosaic or Mutation in *Abraxas grossulariata*,' with three illustrations, in *The Entomologist's Record* for February.

In *Discovery* for February, R. C. S. Walters describes the ironstone deposits at Scunthorpe, in North Lincolnshire, with a resume of the principles involved in the conversion of these deposits into iron and steel.

Conquest for March is more interesting than ever, and seems to carry out the ideals dreamt of by its contemporary, *Discovery*. R. I. Pocock's paper on 'The Gorilla's Foot' refers to a recent discussion on this interesting subject.

The Hastings and East Sussex Naturalist (Vol. 3, No.6), recently appeared, and contains the following useful local contributions: 'The Weeds of a St. Leonard's Garden,' by T. S. Dymond; 'The Ancestry of William Markwick,' by J. E. Ray; 'A List of the Birds of the Hastings District,' by W. Field; 'The Heronry at Plashett Wood, near Lewes,' by T. Parkin; and 'Notes on the Local Fauna, Flora and Meteorology for 1922,' by W. R. Butterfield.

The South Eastern Naturalist for 1923 (lxxxii.+94 pp.), besides details of the Maidstone Congress and of the work of the Society and its Committees, contains the Presidential Address of Alex Hill on 'Anti-podean Flora.' We note with regret that Mr. H. Norman Gray retires from the post of Hon. Secretary to this important Society, and that his place will be taken by Mr. E. A. Martin and an Assistant Secretary. *The South-eastern Naturalist*, however, is to have a new editor.

Volume LXXV. of the valuable *Memoirs of the Palæontographical Society* has recently appeared, and contains a further instalment of the late F. W. Harmer's monograph on Pliocene Mollusca, with excellent illustrations, dealing with the difficult genera *Trochus*, *Turbo*, *Trochocochlea*, *Solariella*, and numerous other univalves from the British Pliocene. In addition is part of Dr. L. F. Spath's monograph on The Gault Ammonites, a work which when completed will be of considerable assistance to those having to work among this difficult group.

FIELD NOTES.

Leeds Natural History Records.—Several new or interesting records have been made by members of the Leeds Naturalists' Club during 1923. Mr. R. W. Butcher reports *Archangelica sylvestris* at Woodlesford, and Mr. W. A. Sledge obtained *Viola calcarea* (Greg.) at Hook Moor and Ledsham Park. Both are new county records. On the Zoological side, Messrs. H. Whitehead and E. Percival record the following Platyzoa, those asterisked being new to Britain. *Rhynchodemus terrestris*, Thorner and Roundhay Park (E.P.); *Planaria polychroa* O. Schm., Templenewsam (E.P.); *P. alpina* Dana., Bolton Woods (H.W.); **Microstomum viride* Bened., Headingley (H.W.); **M. canum* Fuhr., Smithy Mills, Meanwood (H.W.); *Prorhynchus stagnalis* Schultz., Adel Bog (H.W.); *Dalyellia armigera* O. Schm., Thorner (H.W.); *Rhynchomesostomum rostratum* Müll., Thorner (H.W.); **Castrada viridis* Volz., Lawnswood (H.W.). In Conchology, Mr. Greezv Fysher reports *Vitrina pellucida* from Sturdy Bank, *Limnaea truncatula* from a dry quarry near Linton, and also experiments on the occurrence of the sinistral form of *Limnaea peregra*.—F. BARNETT.

Pine Marten in the West Riding.—Referring to Mr. R. Fortune's note (*antea* 94), Mr. T. R. Cockney reported to 'A Nature Lover's Diary' in *The Yorkshire Post* of January 17th, that in November last, when hunting for plants, he was so fortunate as to have a close view of a Pine Marten on Simon's Fell, Ingleborough, at an altitude of about 1800 feet. Simon's Fell is a spur of Ingleborough, and is not in Wharfedale. I learned from Mr. C. F. Procter of another Ingleborough Pine Marten, which I have since seen. It is in the small public library in the village of Clapham, and is in a very faded condition—in fact, the whole of the fur is nearly as light coloured as the breast patch. It was captured just over forty years ago on Ingleborough, where its presence was unsuspected. A party was engaged digging out Foxes when the Marten bolted. Mr. Harrison, who for many years has been in charge of Clapham Cave, was one of the party; but I understand it was a Mr. Spence who actually secured it.—H. B. BOOTH, Ben Rhydding.

—: o :—

Vivarium and Aquarium Keeping for Amateurs, by A. E. Hodge. London: H. F. & G. Witherby, 128 pp., 5/- net. This little volume contains the practical experiences of the author during his thirty years' hobby, consequently his hints as to the best methods of arranging aquaria, heating, etc., are likely to be of service to those similarly interested. The book is illustrated by photographs and sketches.

NORTHERN NEWS.

Messrs. Reid and Morton, on the Geology of Ipswich, we are relieved to find, refer to Ipswich in Queensland.

The death is announced of Henry Keeping, formerly Curator of the Sedgwick Museum, Cambridge, at the age of 96.

The death is announced of Herbert Campion of the Entomological Department of the British Museum (Natural History).

The friends of Mr. R. Standen, of the Manchester Museum, recently made a present to him on the occasion of his 70th birthday.

The South-west Yorkshire Entomological Society sends us its list of officers and members, and excursion arrangements for 1924-1925.

The old course of the Thames is referred to in a paper by Dr. R. L. Sherlock in the *Proceedings of the Geologists' Association* for February.

Snakes, frogs and toads of every possible variety and description appear to be illustrated and described in Hutchinson's *Animals of All Countries*, Part 28.

W. G. Sheldon writes on *Hedya simplana*, one of the rarest, most local and most beautiful of the British species of the Tortricidae, in *The Entomologist* for March.

Collections of freshwater and marine algae, and ferns, have been presented to the Museum of the Yorkshire Philosophical Society by Mr. Eugene Bean, of Scarborough.

W. Lang has a paper 'On the Apparently Endogenous Insertion of Roots of Stigmara,' in the *Memoirs and Proceedings of the Manchester Literary and Philosophical Society* recently issued.

Professor J. H. Myres, M.A., F.S.A., has been appointed President of the Conference of Delegates in connexion with the British Association Meeting, which will be held at Wembley on the 22nd July.

The first number of *The Scottish Naturalist* for the year (unfortunately described as 'Jan-Feb.') has a new cover—a clever sketch illustrating in a few lines a typical view of the country, with its fauna and flora.

Plymouth has commenced issuing penny 'Museum Notes,' the first of which have recently been received, viz., I., The Mammalia (20 pp.), II., Prehistoric Man (12 pp.). The pamphlets are anonymous, but presumably are written by the Curator, Mr. T. V. Hodgson.

Nearly a thousand species of British Fungi, collected by the late Sir H. C. W. Hawley, have been presented to the British Museum by Lady Hawley. The same institution has recently received the late Canon Theodore Wood's collection of Coleoptera, a gift from his widow.

The Horniman Museum has issued a second edition of its interesting pamphlet on 'The Evolution of the Domestic Arts—Part II. Basketry, Pottery, Spinning and Weaving, etc.' (77 pages, 6d.). It is written by Dr. Harrison, and is an admirable history of the subjects mentioned.

From Charles Janet we have received two further valuable publications, one entitled 'Le Volvox,' Deuxième Mémoire, 1922 (66 pp., and numerous interesting illustrations); the other 'Considérations sur L'étre vivant, III., La Characée considérée au point de vue orthobiontique' (54 pp.).

We regret to learn that Dr. A. Smith Woodward, a Past-President of the Yorkshire Naturalists' Union, retires from his position as Keeper of the Department of Geology at the British Museum, which he has held since 1901. It will come as a surprise to many that Dr. Smith Woodward has reached the age which necessitates retirement in a Government Department. At the same time we are satisfied that for some years he will continue to favour us with important contributions to Palæontological Science such as we are accustomed to receive from his pen. With many others, we had hoped that the Doctor would have held an even more important position before his retirement from active Government Service.

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RILEY FORTUNE, F.Z.S.

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NOTES AND COMMENTS.

BIRD LIFE THROUGHOUT THE YEAR.*

A volume dealing with bird life has been published, made attractive by providing a number of artistic illustrations, each in a dark brown border and mounted on stiff lighter-brown paper. These are principally from photographs by well-known naturalists, or from paintings, the coloured plates of nesting places being selected from the cases in the South Kensington Museum, which presumably form better 'sitters' than the birds and nests would be in their natural surroundings. There may be differences of opinion as to this method of illustrating popular books on birds, but in order that our readers may judge of the quality of these plates, the publishers enable us to reproduce one of them herewith, Plate IX., though in this instance, perhaps the fact that it is printed on a white ground and not mounted on tinted paper does not give quite the same effect as it does in the volume. The letterpress by Dr. Salter treats with the habits of birds and their mode of life as known by the varying seasons of the year, consequently the chapters appear under the heads of the different months. The work originally appeared in 1917 and is now reprinted.

PREHISTORIC REMAINS.

The North Lonsdale Field Club has issued Two Reports dealing with the finds of Prehistoric Remains in the Furness District: I.—'Report on some objects of archæological interest, generally relating to the late Celtic period, recently found at Low Lightburn Park, Ulverston,' by John Dobson, President of the North Lonsdale Field Club, and W. G. Atkinson, Hon. Curator; II.—'Some Prehistoric Implements recently found in Low Furness,' described by John Dobson. It seems that a little time ago, the Ulverston Urban Council purchased some land for the purpose of providing work for the unemployed, and making a recreation ground; and it was during the process of removing the turf, etc., that the objects described were found. While unquestionably the very fine perforated adze, and other specimens recorded, are of particular interest, it is not at all certain, particularly in view of the illustrations, that many of the specimens figured are what they seem. The Bronze Saw is clearly a piece of comparatively modern metal, which for some reason or other has been cut by a chisel, as is indicated by the guiding line referred to in the description. The engraved piece of bronze is surely quite modern; the graver made of Encrinital Limestone seems to be an accidental fracture, and

* By John H. Salter. London: Swarthmore Press Ltd., 40 Museum Street. 256 pp., 12/6.

to say that the 'piece of slate embedded in cement' is a 'tooth of a Tribulum,' and to dilate upon the method of grinding corn in Roman times, is surely going a little too far. Similarly the twenty small beads found together would seem to be from some early Victorian dress. The same doubt exists with regard to the alleged tools for 'decorating Bronze Age pottery,' etc. The authors seem to have been unfortunate in their choice of referees.

A PRACTICAL HANDBOOK OF BRITISH BIRDS.

Messrs. Witherby are to be congratulated upon the completion of their 'Practical Handbook of British Birds,' which has now been appearing serially with regularity for some time. The work occupies over 1500 pages of text, 350 text figures, and 30 coloured and monochrome plates, and, with the aid of these, the volume is likely to serve the ordinary needs of Ornithologists, so far as British birds are concerned, for some time to come. We are informed by the publishers that the complete work can be obtained, suitably bound, for £4 10s.

BRITISH CLIMATE.

The Spring Number of *The Geographical Teacher* is a closely printed volume dealing with all manner of subjects, British and foreign, with interleaved advertisements, etc. To readers of *The Naturalist* probably the very interesting article on 'British Climate in Historic Times,' by Sir Richard Gregory, will appeal the most, although the greatest amount of space, and certainly the best illustrated article, deals with 'An Ethno-geographical essay on Basutoland.' The particular interest to us in connection with this is that it probably gives an idea of the nature of the hut dwellings which were used by the Ancient Britons in this country.

A GREENLAND HALIBUT.

At a recent meeting of the Linnean Society of London Mr. J. R. Norman exhibited a specimen of the Greenland Halibut (*Reinhardtius hippoglossoides*), a fish apparently new to the British fauna. The specimen was caught off the south coast of Ireland, latitude 52° 30' N., at 170 fathoms, and was sent to the British Museum by Professor W. M. Tattersall, of Cardiff. Normally an arctic and sub-arctic species, it extends southwards on the western side of the Atlantic to the Grand Banks off Newfoundland (latitude 42°-50°); but on the eastern side it does not extend nearly as far southwards, and, according to Dr. Smitt, "perhaps not much south of the 70th degree of latitude." From its nearest relative, the Common Halibut, it differs especially in the plumper body, larger mouth and stronger teeth, in the left eye being on the upper

surface of the head and the dorsal fin commencing behind it, and in being coloured on both sides. In the young, however, the blind side is colourless. It appears to be a species which is in process of discarding the habits characteristic of the order, and has regained to a certain extent its original symmetry. He also showed a cast of the head of another specimen of the same species, stated to have been landed at Hull, but where it was caught is not known.'

SCIENCE AND THE FISHING INDUSTRY.

At the International Fisheries Exhibition at Leeds a little while ago, Professor J. Stanley Gardiner gave an address on 'The Application of Science to the Fishing Industry,' a copy of which has been kindly sent to us. In this he states: 'Neither public opinion nor trade sentiment is ready for the utilisation of the full knowledge that science has accumulated about the lives of our food fishes. When that time comes it will be seen that such knowledge is very great. Our fishing grounds will be farmed, especially those of the North Sea, where we shall have to repeat on a gigantic scale Petersen's successful experiments in Danish waters. Shoals will be selectively thinned. Sexes will be weeded out in accordance with the needs of the grounds. Depleted bottoms will be re-stocked. Barren grounds will be planted with fish food and stocked. Where natural forces cannot be made to act in these respects man will step in and he will carry and plant fish so as to make the most of the rich "pastures" of the Dogger and elsewhere.—I am venturing, you understand, to sketch what may seem a quite fanciful picture; if the world goes on as it has, it must come, but probably most of us will not see it.—It is a matter of surprise to me to see how much we know, and the answers to how many questions may be found in our statistics, when I try to think of the North Sea as a giant farm; at the same time I am afraid to think of all we shall require to know.

THE WRIGGLERS.

The following from the daily press, recently, shows that "our special correspondent" has broken out again! 'Gorgeous caves, hung with natural draperies of purest white formations, and believed to be the finest example of cavern beauty in England, will probably be opened to the public on the slopes of Ingleborough (2373 ft.), north-west Yorkshire, this summer, by blasting away thousands of tons of rock which now make an easy access impossible. The work, which will begin as soon as the requisite drilling machinery can be erected at the entrance to the tunnel, is being directed by Mr. C. F. D. Long, a geophysical research worker, assisted by Mr. J. H. Churchill. The present entrance is made by crawling through

a rocky tunnel, a mile from Ingleton, for a quarter of a mile. The entrance is a slit in the rock not more than 18 inches high, with a roof of limestone and floor of hard slate. No progress is possible unless one crawls on the stomach, the low and uneven roof preventing any arching of the back.'

FROZEN FINGERS.

'After perhaps 50 yards of wearisome wriggling, progress by the light of a candle is slower and more painful, as water almost fills the gallery. Clutching the rocky sides with frozen fingers, one flounders along, sometimes slipping into a deep pool, sometimes crawling along over a flat ledge. Never is there room to stand, and often the water fills the gallery to within seven or eight inches of the roof. One's head only is above water, with the body dragging along rugged rocks underneath. Occasional slips plunge the candle into the water. The zig-zag gallery comes to an end about 1000 ft. from the entrance and runs into a chamber, the roof of which goes up to a height of 30 ft. or 40 ft. To the right is the wonderful spectacle of a tributary flowing into the river from the roof, the clear water flashing down in a column 35 ft. long. The river in the bottom circles round great boulders of imposing shape, and at length the canyon is entirely filled by the river, which takes one out of his depth within two yards of the side. This underground lake stretches away for a distance which it is at present impossible to measure. It is because of the many requests he has received that Mr. Long has decided to open the caves to the public. Electric light will be installed.' But what *will* Mr. Long do if he has to walk into the cavern instead of floundering and slipping and crawling and clutching?

PETROGRAPHY OF THE TRIAS.

A paper was recently read on 'The Petrography of the Triassic Sandstones of South-west Lancashire,' by Miss Stella W. Harris, to the Liverpool Geological Society, in which she stated 'The area examined extends from Rufford on the north to Garston on the south, and the majority of the specimens were collected from the Bunter Pebble Beds, which are the most widely exposed. The most common minerals found amongst the heavy residues were tourmaline, zircon, ilmenite, anatase, and rutile. Of greater interest is the discovery of monazite and topaz, which have not hitherto been detected in the local Trias. Garnets are very rare, while staurolite, although carefully searched for, was not found, and this perhaps constitutes the most noteworthy and significant feature of the mineral assemblage, and distinguishes the deposits, markedly, from those of the Midlands and South-west England. A comparison, on the other hand, with samples

from the Trias of the Wirral Peninsula and the Vale of Clwyd revealed a great resemblance between them and those of the Lancashire area, and some similarity was also observed to specimens from Antrim and Arran. After a full discussion of the possible sources of origin of the material, Miss Harris considers that the mineral content of the Lancashire sandstones (leaving out of account the coarser material) is suggestive of a north-western origin, although there may have been subsidiary drainage from other sources, and possibly some communication with the Midlands.

MIGRATION OF EELS.

In *Nature*, No. 2832, J. T. Cunningham contributes 'The Natural History of the Common Eel,' an interesting paper in which he informs us that 'a four-masted schooner, the *Dana*, of 550 tons, was specially fitted out for the purpose of these researches. Expeditions on this ship were made in 1920 and 1921, and large numbers of the larvæ were collected at different positions in the western part of the North Atlantic. When the places of capture were plotted out according to the sizes of the larvæ it was proved that all those less than 10 mm. ($\frac{2}{5}$ in.) in length were taken in the middle of the Sargasso Sea, and the larger sizes at increasingly greater distances from this region. This region must be regarded, then, as the spawning place of the European eel. It extends from 20° to 30° N. Lat. and from 50° to 65° W. Long. In one haul of two hours' duration in this region in June, 1920, nearly 800 specimens were obtained, the largest number being 24 mm., or very nearly 1 in., in length. These are considered to be in their first year, probably hatched a few months earlier. The elvers which reach the coast of Europe are calculated to be three years old.'

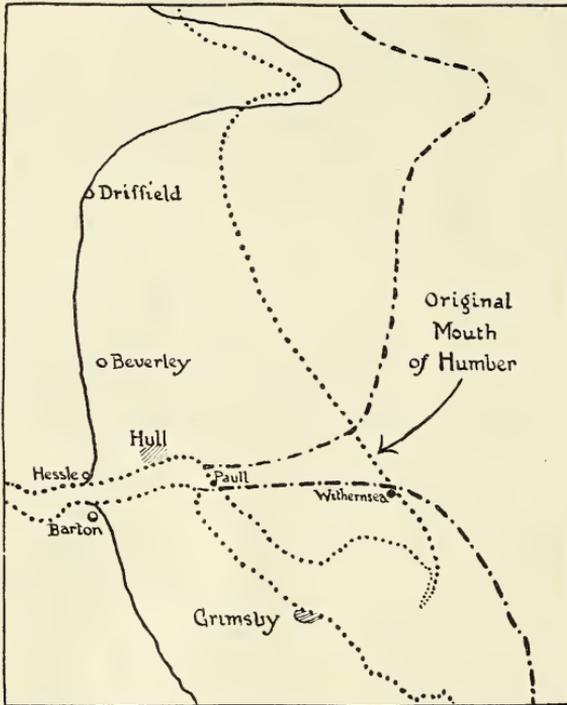
DR. SCHMIDT'S DISCOVERIES.

'The depth of the ocean in the eel-spawning area is from 3000 to 4000 fathoms. Dr. Schmidt concludes from his discoveries that the fresh-water eel, which lives the whole of its life after its metamorphosis in inland fresh waters, but is hatched and developed in the sea and returns to great depths of the ocean to breed, is to be regarded as properly a marine fish. On the other hand, there is good evidence that the earliest bony fishes were evolved in fresh water, and some of the more primitive forms, such as the carp family, are still confined to rivers and lakes; few of them live exclusively in salt water. Migration from river to sea or sea to river is not uncommon among these more primitive fishes, as for example, in the salmon family. Here the migration is in the opposite direction from that of the eel; salmon leaves the sea and ascend rivers in order to spawn, and go down

to the sea to feed and grow. The Pacific salmon (*Oncorhynchus yschawitscha*) offers a case almost as wonderful as that of the eel. It ascends great rivers of N.W. America and N.E. Asia to distances from 1000 to more than 2000 miles from the coast, and, like the eel, spawns only once and then dies.'

THE PRE-GLACIAL HUMBER.

In recent years various large firms have published house magazines, under various titles, and in this way we have seen *The Pelican*, *Mill-Stone*, *Brymay*, *As you like it*, and others,



each of which contains interesting information relating to the particular trade concerned. Perhaps the most generally interesting of these is *Ours*, the magazine of Reckitt's, which is issued monthly, and contains over 50 pages with numerous illustrations. The Editor, Mr. J. H. Noble, prepares a record of various addresses given to the Staff Association, and the magazine has thus been occupied for some time by a series of articles dealing with the story of the East Riding of Yorkshire, based on a course of lectures given by the present writer. In connection with this a map has been prepared which is reproduced herewith, and shows the present coastal line, the cliff line in immediately pre-glacial times, and a suggestion of a still much earlier cliff line when the Humber mouth was where Withersea now is.

GEOLOGICAL EXHIBITS.

There have recently been placed on exhibition at the Geological Society's Rooms, Burlington House, the hammer, chisel and leather map-case used by G. B. Greenough, the founder and first president of the Society. The hammer is a serviceable weapon, the handle being of strips of baleen fastened together. The chisel is encased in leather, with a loop for carrying, and the map-case is as much as any ordinary person would care to carry. In addition, two quaint gothic chairs now appear on the platform in the lecture room. These were formerly the property of William Smith, the father of English Geology.

MUTE SWANS.

In dealing with the 'Early History of the Mute Swan in England,' in *British Birds* for January, Mr. N. F. Ticehurst writes 'it is certainly a fact of some significance that in the tenth century Anglo-Saxon Vocabulary of Archbishop Ælfric two names are given for the Swan corresponding to the Latin equivalents *cignus* and *olor*. One of these must have been applied to the Mute Swan, and it is perhaps more probable that an indigenous species would have been known by a distinct name than a migrant. East Anglia in the tenth century, and for long after, would have afforded the largest areas in England suitable for its requirements, while at the same time it is that part of England which is nearest to those of western Europe (Denmark and S. Sweden) where it is known to be indigenous. All the evidence goes to show, moreover, that it was in this part of England that it afterwards flourished in greatest numbers, and it is in this area that the greater proportion of its later, written, history appertains, while the greater simplicity of the swan-marks used on the eastern side of Norfolk suggests very forcibly that it was here that the earliest domestications of the species was effected.'

ANCIENT MAN IN NORTH AMERICA.

We learn from *Nature*, No. 2827, that 'In the "Bulletin of the American Museum of Natural History" (December 4th, 1923), Dr. William K. Gregory and Mr. Milo Hellman analyse in still greater detail the two molar teeth attributed by Prof. H. F. Osborn to "a new and independent type of Primate"—*Hesperopithecus*—which existed in North America during Pliocene times. They find that the "type" tooth is, as has been maintained, a second upper molar of the right side, but do not definitely reject the suggestion of Dr. Gerrit Miller, that it may prove to be a third molar. While Dr. Gregory sees in these recently found fossil teeth a resemblance to the molar type of the gorilla and chimpanzee, his partner leans towards their human resemblances. With only drawings

to guide him, Dr. Smith Woodward (*Nature*, June 10th, 1922, p. 750) was disposed to regard the type tooth not as that of a primate but of a carnivore—possibly *Hyænarctos*—and he considered that the tooth had the characters of a lower rather than an upper molar. In their present paper the authors state that the tooth of *Hesperopithecus* differs profoundly from that of carnivores, and that it has fundamental points of agreement with those of the ape-man group of primates. They cite altogether ten opinions, all of them different, which experts have passed as to the nature of the two teeth ascribed to the enigmatical *Hesperopithecus*. Prof. Osborn was right when he wrote in *Nature* (August 26th, 1922, p. 283) “we must seek more material before we can determine its relationship”; and in truth the same may be said of the teeth.’

THE GEOLOGICAL MUSEUM, LONDON.

For a considerable time now geologists have been much inconvenienced by the fact that only portions of the collections in the Geological Museum, Jermyn Street, are accessible, on account of an enormous structure in the building said to be supporting the roof. On recently visiting the Museum, we found that the building was entirely closed, and consequently the maps and specimens we wished to consult were not available, and unfortunately these maps do not occur in any other Institution. On this account, therefore, we made a fruitless journey. In order to avoid doing so again we got into communication with the office by means of the telephone, and were unable to ascertain when it would be possible for anyone to visit the building, as the roof is not safe, and consequently visitors are not permitted. Presumably it does not matter if the roof falls on the members of the staff, who are still using the building. Surely it should be possible for the public to be informed of the probable date at which the treasures in the museum may again be available* ?

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F. M. Wimshurst describes ‘A New British Aphid (*Macrosiphum galiophagum* nov. sp.)’ in the *Entomologist’s Monthly Magazine* for March.

The usual valuable ‘Summary of Current Researches relating to Zoology and Botany (principally invertebrata and cryptogamia), Microscopy, etc.’, occurs in *The Journal of the Royal Microscopical Society* for March.

J. H. Smith writes ‘On the Early Growth Rate of the Individual Fungus Hypha’; F. Summers contributes ‘The Factors Governing Bud Formation: a Chapter of Plant Physiology’; and Irene M. Allen describes ‘The Cytology of *Matthiola incana* with reference to the genetics of certain cultivated varieties,’ in *The New Phytologist* for April 23rd.

* Since we made a protest in the press, an entrance has been made from Piccadilly.

SANDESEND LICHEN RECORDS, YORKS.

W. E. L. WATTAM.

DURING a holiday sojourn at Sandsend in mid-August, 1923, I spent many enjoyable hours in noting the lichen flora of that portion of the N. Riding of Yorkshire (V.C. 62) from the village of Dunsley, northward as far as Kettleless. Included in the appended list are the species noted during a day spent on the Sleights Moor, between Grosmont and Beckholes. Many species are enumerated as occurring in Mulgrave Woods, but it must not be assumed that these extensive woods were thoroughly investigated for lichens. The condition governing the ticket of admission as to straying from the paths was strictly obeyed, and thus only those species near to and by the side of the main road and some of the footpaths are included. The physical features in general are so excellent that the same ground traversed during a more favourable period, say early spring, would undoubtedly enable many additions to be made to the list.

One of the most interesting phases of the lichen flora observed was in the transition which was taking place in the greater part of the flora of the extensive old quarry workings on the coastal side about opposite to Sandsend Wyke, to the north of Sandsend Station, and near to the southern end of Kettleless Tunnel. The peculiarity of this quarry floor, mostly composed of silicious debris of the Lower Estuarine Sandstone, intermixed with a greyish coloured clay, was the area dominated solely by lichens, which, with the dwarf moss *Polytrichum piliferum* Schrieb., evidenced themselves as the pioneer vegetation of this particular area, the more pronounced when was noted the higher types of flowering plants which clothed the steep northern and southern banks of the quarry, and which latter flora was typical of the flora of the adjacent cliff tops. Here occurred zones of pure *Cladina sylvatica* and *C. uncialis* with *Parmelia saxatilis*, *P. physodes*, *Platysma glaucum* and *Lecidia granulosa* overgrowing and intermingling with the before mentioned moss. Where a more peaty humus had accumulated such areas were controlled solely by *Cetraria aculeata* and its form *acanthella* with, in a lesser degree, *Cladina sylvatica*, *Cladonia alcicornis*, *C. coccifera*, *C. cervicornis* and *C. pyxidata*. At the basal portion of the northern embankment occurred large patches of *Peltigera canina* along with a little *Cladonia alcicornis*. A further feature of interest in association with this dominant lichen growth was that the first higher types of vegetation commencing to clothe the quarry floor were of a pure heath type,

viz., *Calluna vulgaris*, *Erica tetralix*, *E. cinerea* and small tufts of *Festuca ovina*. Thus, taken as a whole, the vegetation of this quarry floor was of a characteristic moorland type. A reference to the Moorland Map in Elgee's 'Moorlands of North Eastern Yorkshire' discloses the fact that the nearest moors due west of the quarry workings are the Ugthorpe and Newton Mulgrave Moors, roughly distant about four miles, while the Hutton Mulgrave and Briscoe Moors, lying in a south-easterly direction, are distant about one and a half miles.

The following is the list of species of Lichens noted :—

- Lempholemma confertum* Nyl. Silicious debris, road through Mulgrave Woods.
- Collema furvum* Ach. Among silicious debris, Sleights Moor ; roadside to Goldsborough.
- C. pulposum* Ach. Among silicious grit debris, stream, Grosmont Wood ; Mulgrave Woods.
- C. cheilium* Ach. Among mosses, wall top Lythe Bank, Sandsend ; Castle wall, Mulgrave Woods.
- Leptogium scotinum* Fr. Silicious stones in water runnel, Mulgrave Woods.
- Peltigera canina* Hoffm. Among mosses and dead grasses, Grosmont Woods ; Cliff top, Sandsend ; Mulgrave Woods.
- P. rufescens* Hoffm. Among mosses on boulders, Mulgrave Woods. f. *praetextata* Floerke. As above.
- P. spuria* Leight. Among mosses on boulders, Mulgrave Woods.
- P. polydactyla* Hoffm. Among mosses, Mulgrave Woods.
- Pannaria rubiginosa* Del. in Dub. Silicious stones of walls, Mulgrave Woods ; Dunsley.
- Calicium hyperellum* Ach. Aged oaks, Mulgrave Woods.
- Sphaerophorus coralloides* Pers. On silicious boulders, Sleights Moor.
- Ramalina farinacea* Ach. Mountain Elms, Mulgrave Woods.
- R. fraxinea* Ach. Aged ash boles, Mulgrave Woods ; Dunsley.
- R. scopulorum* Ach. Silicious stones of walls facing sea at Kettleless.
- Cetraria aculeata* Fr. Extremely common on peat, Sleights Moor ; with heath associates, cliff top, Sandsend ; f. *hispida* Cromb, and f. *acanthella* Nyl. ; same localities.
- Platysma glaucum* Nyl. On aged oaks, Grosmont and Mulgrave Woods ; on silicious stones, cliff top, Sandsend.
- Evernia furfuracea* Fr. Aged oaks and mountain elms, Grosmont and Mulgrave Woods ; hawthorn trees, Goldsborough ; Dunsley ; f. *ceratea* Nyl., wall tops, Mulgrave Woods.
- Parmelia perlata* Ach. Apple trees, Sandsend and Dunsley ; aged oaks, Mulgrave Woods.
- P. conspersa* Ach. Silicious stones of walls, Sandsend and Dunsley.
- P. scortea* Ach. Aged oaks and palings, Sandsend.
- P. saxatilis* Ach. Silicious boulders, oak, ash, mountain elm, and hawthorn boles, Mulgrave and Grosmont Woods ; apple trees and tiled roofs at Sandsend and Goldsborough. f. *furfuracea* Schær. Aged oaks and mountain elms, Mulgrave Woods.
- P. caperata* Ach. Apple trees, Sandsend.
- P. laevigata* Nyl. With heath associates, cliff top, Sandsend.
- P. olivacea* Ach. Aged oaks, Sandsend.
- P. fuliginosa* Nyl. Aged oaks, Grosmont Woods ; Sandsend ; ash boles, Goldsborough and Dunsley. var. *laetevirens* Nyl. Apple trees, Sandsend and Dunsley.

- Parmelia physodes* Ach. Oak, ash, elm, Scot's pine, Mulgrave Woods ; silicious boulders, Grosmont Woods ; on ling and dwarf bilberry, Sleights Moor ; f. *labrosa* Ach. Aged oaks, ash, and Scot's pine, Mulgrave Woods.
- Xanthoria parietina* Th. Fr. Tiled roofs of buildings and silicious stones of walls, Sandsend, Dunsley. f. *virescens* Nyl. Palings, Mulgrave Woods and Dunsley.
- X. pulverulenta* Nyl. Aged ash and oak boles, Mulgrave Woods and Dunsley.
- X. tenella* Nyl. Silicious stones of walls, Sandsend.
- Squammaria saxicola* (Poll). Silicious stones of walls, Kettleless, Grosmont Woods ; Churchyard wall, Lythe ; Goldsborough, Sandsend, Mulgrave Woods, Dunsley.
- Placodium sympageum* Ach. Lime grouting of stones, Lythe Church.
- P. flavescens* A. L. Sm. Silicious stones, Sandsend, Beckholes, Dunsley.
- Callospisma vitellinum* Sydow. Silicious stones of bridge, Beckholes, and of walls at Sandsend, Goldsborough, Dunsley, and Mulgrave Woods.
- C. citrinum* Koerb. Mortar of walls, Kettleless, Beckholes, Sandsend, and Dunsley.
- Lecanora irrubata* Nyl. Wall of Lythe Church, Dunsley.
- L. galectina* Ach. Silicious stones of Churchyard wall, Lythe ; Dunsley.
- L. dissipata* Nyl. Grit boulders, Sleights Moor.
- L. dispersa* Nyl. Silicious stones, Grosmont Woods.
- L. crenulata* Nyl. Silicious stones, Mulgrave Woods.
- L. Hageni* Ach. Aged oaks, Mulgrave Woods.
- L. varia* Ach. Old palings and gate-posts, Grosmont and Mulgrave Woods ; Goldsborough and Dunsley.
- L. pallida* Schaer. Ash and sycamore boles, Grosmont and Mulgrave Woods.
- L. conizaea* Nyl. Boles of larch and Douglas fir, Mulgrave Woods.
- L. symmetrica* Ach. Old palings, Sandsend, Dunsley.
- L. sulphurea* Ach. On silicious stones, Sleights Moor.
- L. polytropa* Schaer. Silicious stones, Sleights Moor.
- L. atra* Ach. Silicious stones of walls, Kettleless, Sandsend, Dunsley and Goldsborough.
- L. parella* Ach. Silicious and calcareous stones, Kettleless, Sandsend, Goldsborough, Dunsley and Lythe Church.
- Aspicilia calcarea* Somm. Walls of Lythe Church.
- Acarospora fuscata* Nyl. Silicious stones of walls, Sandsend, Beckholes.
- A. smaragdula* Koerb. Silicious stones, cliff top, Sandsend.
- A. pruinoso* Jatta. Aged oaks and mountain elms, Mulgrave Woods.
- Pertusaria globulifera* Nyl. As in previous species.
- P. amara* Nyl. Aged oaks, Grosmont and Mulgrave Woods.
- P. lactea* Nyl. Aged oaks and mountain elms, Mulgrave Woods.
- P. communis* D.C. Aged oaks, Grosmont and Mulgrave Woods ; Sandsend, Goldsborough, and Dunsley.
- P. Wulfenii* D.C. Aged oaks and mountain elms, Mulgrave Woods.
- Baomyces rufus* D.C. Among mosses in chisel chinks of stones of Lythe Churchyard wall.
- Cladonia alpicornis* Floerke. On peat, Sleights Moor ; with heath associates, cliff top, Sandsend.
- C. pyxidata* Fr. Moss covered stumps and boulders, and dead grass, Kettleless, Grosmont and Mulgrave Woods, Dunsley, Sandsend.
- C. fimbriata* Fr. Among mosses, Kettleless, Churchyard wall at Lythe, Mulgrave Woods.
- C. gracilis* Hoffm. Moss covered stumps, Mulgrave Woods. Var. *chordalis* Floerke, likewise.
- C. cervicornis* Schaer. On peat, with heath associates, cliff top, Sandsend.

- Cladonia coccifera* Schaer. With heath associates, cliff tops, Kettleless and Sandsend ; humus covered boulders, Mulgrave Woods, Dunsley.
C. digitata Hoffm. Moss covered boulders, Grosmont and Mulgrave Woods.
C. macilenta Hoffm. On peaty soil, Grosmont Woods, and wall bases, Kettleless.
C. flabelliformis Wain. Among mosses to right of glen, Mulgrave Woods ; also var. *polydactyla* Wain.
Cladina sylvatica Nyl. With heath associates cliff top, Sandsend ; and on Sleights Moor.
Cladina uncialis Nyl. As in previous species.
Lecidia lucida Ach. Sandstone rock, Dunsley.
L. querneae Ach. Aged oaks, Mulgrave Woods.
L. coarctata Nyl. Silicious stones, Sandsend. Var. *elacista* Cromb. also.
L. granulosa Schaer. On peat, with heath associates, Sleights Moor ; cliff tops, Sandsend.
L. uliginosa Ach. On peat, Sleights Moor.
L. parasema Ach. Ash boles, Mulgrave Woods.
L. subumbonella Lamy. Silicious stones, Sandsend, Dunsley, Kettleless.
L. contigua Fr. Silicious stones Grosmont Woods, Sandsend, Goldsborough, Dunsley. Var. *platycarpa* Fr. Goldsborough.
L. lithophila Ach. Silicious boulders, Dunsley, Sandsend.
L. confluens Ach. Silicious stones of walls outside Grosmont Woods ; Sandsend, Goldsborough, Dunsley.
L. rivulosa Ach. On silicious stones, Sandsend.
Mycoblastus sanguinaria Ach (sterile). Silicious stones of wall, Dunsley.
Bilimbia sabuletorum Branth. et Rost. On dead moss, wall tops, Mulgrave Woods.
Buellia Parmeliarum Oliv. On *Platysma glaucum*, Sandsend.
Rhizocarpon alboatrum Th. Fr. Silicious stones of bridge, Mulgrave Woods.
R. viridiatrum Koerb. Calcareous grit stones, Sandsend.
R. confervoides D.C. Silicious boulders, Beckholes.
Opegrapha saxicola Ach. On silicious boulders, Grosmont and Mulgrave Woods ; Walls of Lythe Church.
O. varia Pers. Beech trees, Mulgrave Woods.
O. vulgata. Ash trees, Mulgrave Woods.
Polyblastia intercedens Loenur. Amongst mosses, wall tops, Kettleless, Mulgrave Woods.
Verrucaria maura Wahl. Maritime boulders, Kettleless Bay.
V. mucosa Wahl. Maritime boulders, Kettleless Bay.
V. muralis Ach. Silicious stones, walls, Mulgrave Woods.

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A new Yorkshire Pseudo-scorpion.—On several occasions while working nests of the Wood Ant (*Formica rufa* L.) at Barns Cliff, at the head of Harwooddale, near Scarborough, I have turned up specimens of the pseudo-scorpion *Chernes scorpioides* Herm. This is not recorded in Mr. Falconer's list of Yorkshire pseudo-scorpions (*The Naturalist*, 1916, pp. 156-8, 191-3). Among many other myrmecophiles, especially beetles, were the Myriapod *Julus pulchellus* Leach, the Collembolan *Cyphodeirus* (= *Beckia*) *albinos* Nic., and the woodlouse *Porcellio scaber* ; this last is not recorded by Donisthorpe (*British Ants*, p. 262) as an inhabitant of *F. rufa* nests, although at Barns Cliff it is quite common.—GEO. B. WALSH, 41 Gladstone Street, Scarborough.

VERTEBRATE ZOOLOGY IN YORKSHIRE.

A MEETING of the Vertebrate Section of the Yorkshire Naturalists' Union was held in the Library of the Leeds Philosophical Society on Saturday, February 16th, Mr. C. F. Procter presiding. The Sectional Meeting was preceded by a meeting of the Yorkshire Wild Birds and Eggs Protection Acts Committee, Mr. W. H. St. Quintin being in the chair.

A paper was read by Mr. E. W. Wade on the Fulmar Petrel which, he stated, was the most northerly of the British Petrels, having a breeding range that was almost circumpolar. Two varieties occur, one with white and one with gray underparts, the latter plumage persisting after maturity.

A visit to St. Kilda, where the bird has for ages been bound up with the life of the inhabitants, was next described. Here the Fulmar nests in great numbers, and everything on the Island has the distinctive and enduring smell of this bird. The favourite nesting sites are the grassy slopes on the cliffs, and the breeding grounds are divided up among the different families living on the island. The single egg is laid in a hollow, which is sometimes lined with a little grass, and if the egg is taken a second is not laid. Laying commences in mid-May, and the period of incubation is six weeks. According to Macgillivray, the islanders used to collect the eggs for food, and Martin, 250 years ago, stated that the natives used to keep them 7 or 8 months 'and then they became appetising.'

The present day custom is to snare one of the birds on the nest, knowing that the other will carry on the duties of incubation. It is generally stated that the Fulmar will desert on the least provocation, but this was not the lecturer's experience. After a bird has been snared it is held between the knees, head downwards, and the oil is squeezed out of its body and collected in the stomachs of gannets. The carcasses are carried slung over the shoulder and are later consumed by the islanders—even though Martin stated that they tasted strongly of train-oil.

The sheep and the Fulmars are the mainstay of the inhabitants of St. Kilda, and the gathering of the young birds commences on August 12th, when the whole population turns out, and many lives used to be lost during the climbing. Great numbers of Puffins used also to be snared, but not of recent years, when they have increased enormously in consequence.

The ejection of oil, that is the stomach contents, by the Fulmar is deliberate and calculated; the supply is usually exhausted after three discharges, and is thrown to a distance of about three feet. Other peculiarities of the bird are that it is unusually silent, and that it is unable to stand upright on its feet. In the autumn it follows the Herring shoals, and will feed ravenously on a dead whale.

In 1758 the King's Sheriff on Faroe deplored the spread of this species to his domains, in the following words; 'but now he has set his ugly foot on my Holm of Myggenaes nasty, stinking beast; why, even his egg keeps its stench for years. His flesh no man can eat, and if you sleep in a bed in which even a handful of his feathers has been put by mistake, you will leave it long before morning.'

This species has extended its range down the West Coast of Ireland and the East Coast of Scotland, and reached the Bempton Cliffs in 1919. There it is rapidly increasing, and will, in the lecturer's opinion, soon occupy all the suitable nesting ground on the Yorkshire Coast.

In the discussion which followed the paper, surprise was expressed that a bird which laid only a single egg should be one of the most numerous species in the world.

A paper was next read by Mr. W. G. Bramley on 'Bird Legends.'

Several legends were related dealing with the Lapwing and Wood Pigeon, and also the legend explaining how the North American Woodpecker came to have a red head, for which those interested are referred to Longfellow in 'The Song of Hiawatha.'

Another legend related to the time when all the birds assembled together to choose a king, and it was decided that choice should be made of the bird that could fly the highest. All started to fly upwards, until finally all were outstripped by the Eagle. Finally, when the Eagle was too exhausted to fly higher, a Wren jumped off his back, where it had hidden, and fluttered up a few feet higher, so becoming king.

The custom, which survived until recently, of hunting a Wren on certain days of the year, was attributed in Ireland to a Wren having once betrayed an Irish force to their enemies by tapping on a drum. The same custom in the Isle of Man was attributed to a legend which states that a beautiful fairy lured all men to follow her and then drowned them, when, to escape punishment, she changed herself into a Wren and was doomed by a spell to assume that form every New Year's Day.

Legends connected with the Magpie are numerous, and according to one the Wren was the only bird that could build a nest, and she gave a popular lecture on the subject. One by one all the other birds grew tired of listening, but the Magpie outstayed the others, and this explains the different kinds of nests built by different species.

There is a well-known Yorkshire rhyme, relating to the Magpie, which runs as follows :—

' One for sorrow, two for mirth,
Three for a wedding, four a birth,
Five heaven, six is hell,
Seven the deil's ain sel.'

Should one have the misfortune to encounter the latter number, however, there is no need to despair if one remembers to make seven crosses in the ground, cross the thumbs and say :—

' I cross the Magpie,
The Magpie crosses me.
Bad luck to the Magpie,
And Good Luck to me.'

In the discussion following the paper, reference was made to the many superstitions, connected with bird omens, believed in by the Romans.

At the evening meeting a paper was read by Mr. F. H. Edmondson on 'The Work of the Yorkshire Wild Birds and Eggs Protection Acts Committee.'

Prior to the formation of this Committee, the Yorkshire Naturalists' Union took a general interest in Bird Protection, but in 1906 it was decided to form a separate Committee, under the chairmanship of Mr. W. H. St. Quintin, to deal only with this matter. The lecturer then proceeded to describe the work done since that date :—

The Lapwing, or Green Plover, is known to be one of our most useful birds, but has been much reduced in numbers in the past owing to the systematic collection of its eggs, and the dangers to which it is exposed in the shooting season.

In 1920 the Committee obtained protection throughout the whole year, both for the bird and its egg, with the result that a gratifying increase in its numbers had been observed in several districts.

The Merlin, known and much prized as the Ladies' Hawk in the days of Falconry, generally nests on the ground and is confined to the Pennine ridge, the Wolds and the Cleveland Moors. Of late years it has suffered heavily at the hands of the keepers of the Grouse Moors. By obtaining the interest of the estate owners and the sympathy of the keepers, much

has been done to protect this game little Falcon, which now successfully rears its young where formerly it had no chance of doing so.

The Peregrine Falcon was also much prized by Falconers in the past, and many eyries were scattered about in the craggy parts of the county. At the present time not more than half a dozen pairs attempt to nest annually in the county. During the nesting season local watchers are appointed in the neighbourhood of the eyrie, and are paid by results, the results being confirmed by a member of the Committee.

The Norfolk Plover is another species with a very precarious footing in the county, chiefly through the cultivation of its old breeding haunts. A few pairs still nest annually in the county and are protected by a keeper to whom a small sum is paid each year.

In certain areas a more general protection is possible, and this applies to Hornsea Mere, where one half of the lake is strictly preserved during the breeding season, by a paid watcher who allows no interference with the birds breeding there, which include the Sedge and Reed Warbler, Great Crested Grebe, Mallard, Pochard and Tufted Duck.

A regular watcher is also employed during the nesting season at Spurn Point, where numerous Ringed Plover and one of the only two Yorkshire colonies of the Lesser Tern nest.

In these areas notices are posted exhibiting appropriate warnings to the public, and everything possible is done to protect those birds, which, if left to themselves, would be in danger of disappearing from the county as breeding species.

The intention is to extend rather than diminish this work in the future, if the necessary funds are forthcoming. To this end a set of popular slides has been lent and given to the Committee, and accredited Societies can, by arrangement with the lecturer, obtain the loan of the slides and lecture, and usually the services of a lecturer, on undertaking to pay a small fee or to make a collection towards the funds of the Committee.

The final paper was read by Mr. R. Chislett on 'The Status and Distribution of the Birds of Shetland.' The lecturer first described the islands, which are small in extent, so that all parts are within a few miles of the sea, and showed photographs of Lerwick, the capital, and of typical hamlets. The islands are much intersected by 'Voes.' or arms of the sea, and harbour many interesting species of birds.

A few pairs of Ravens nest on the cliffs, and the Hooded Crow and Starling are numerous. The Finches are represented by the House Sparrow and the Twite.

Among the smaller birds the Common Bunting, Skylark, Meadow and Rock Pipits, Wheatear, Wren and Swallow were observed. The hawks were represented by the Merlin and Kestrel, and the ducks by the Mallard, Red Breasted Merganser and the Eider, in considerable numbers.

The Heron, Gannet, Cormorant and Shag, Fulmar Petrel, Manx Shearwater and Great Northern Diver were seen, and nests were found of the Red Throated Diver.

The Rock Dove was the only species of pigeon noted, but the waders were well represented by the Ringed Plover, Golden Plover, Oyster Catcher, Dunlin, Red-necked Phalarope, Whimbrel, Curlew and Sand-piper; a few Turnstones were also seen.

Of sea-birds, the Arctic Tern, Black-headed, Common, Herring, Greater and Lesser Black-backed Gulls were seen, and also the Arctic and Great Skua, the Razorbill, Common and Black Guillemot and Puffin.

The lecturer's notes were in almost every case supplemented by a fine series of photographs representing much patient work.

After the discussion votes of thanks were accorded to the Lecturers and the Lanternist.

E. WILFRED TAYLOR.

In Memoriam.

HARRY MOORE, F.R.M.S.

THE death of Mr. Harry Moore took place in the early hours of Saturday morning, February 9th. He was a native of Rotherham, and born in 1845; educated at the old British School, and commenced life as a pattern maker. In 1891 he was appointed the first Curator of the Rotherham Museum, a position he held till two years ago, when he resigned through failing health.

In the early days of the Sheffield Microscopical Society—now the Sorby Scientific Society—he held the position of Hon. Secretary. He was one of the founders of the Rotherham Naturalists' Society, holding several offices, including President; he was elected a member of the Quekett Microscopical Club in 1901. He was a good botanist and microscopist, Rotifers claiming his special attention; during his illness he asked many times to be lifted up to look at this very interesting group of animals. He was laid to rest on Tuesday, February 12th, in the Rotherham Cemetery.—G. HOWARD.

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Yorkshire Species of the *Hydroecia nictitans* group.—

The discovery of *Hydroecia paludis* and *H. lucens* by Mr. H. Maxwell Stuart, at Everingham, last year, may have called to mind to the readers of this journal that I had a note under the above heading in *The Naturalist* so long ago as June, 1910 (p. 217). At that time the only species of the group we knew as occurring in Yorkshire was the common *Hydroecia nictitans*, but I was then convinced that probably the three others, which had recently been differentiated from *nictitans*, would be found if looked for. After thirteen years, two of them have been run to earth, but *crinanensis*, which one would have expected to have been the first to have been turned up, is still a desideratum to our List. It has been found in the adjoining county of Lancashire, I believe in several localities, and the object of this note is to urge our county lepidopterists to try to find it this year. Its larva feeds in the stem, just above the root, of the yellow flag (*iris pseudacorus*), and should be looked for in any locality where this plant grows freely (Askern, Askham Bogs, and many others); the larva at the end of May and in June, and the moth at ragwort flowers in August.—GEO. T. PORRITT, Elm Lea, Dalton, Huddersfield, April 5th, 1924.

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The Cambridge University Press will shortly publish a small book of 'Descriptive Labels for Botanic Gardens,' by Mr. H. Gilbert Carter, the object of which is to give information as well as pleasure to as many people as possible.

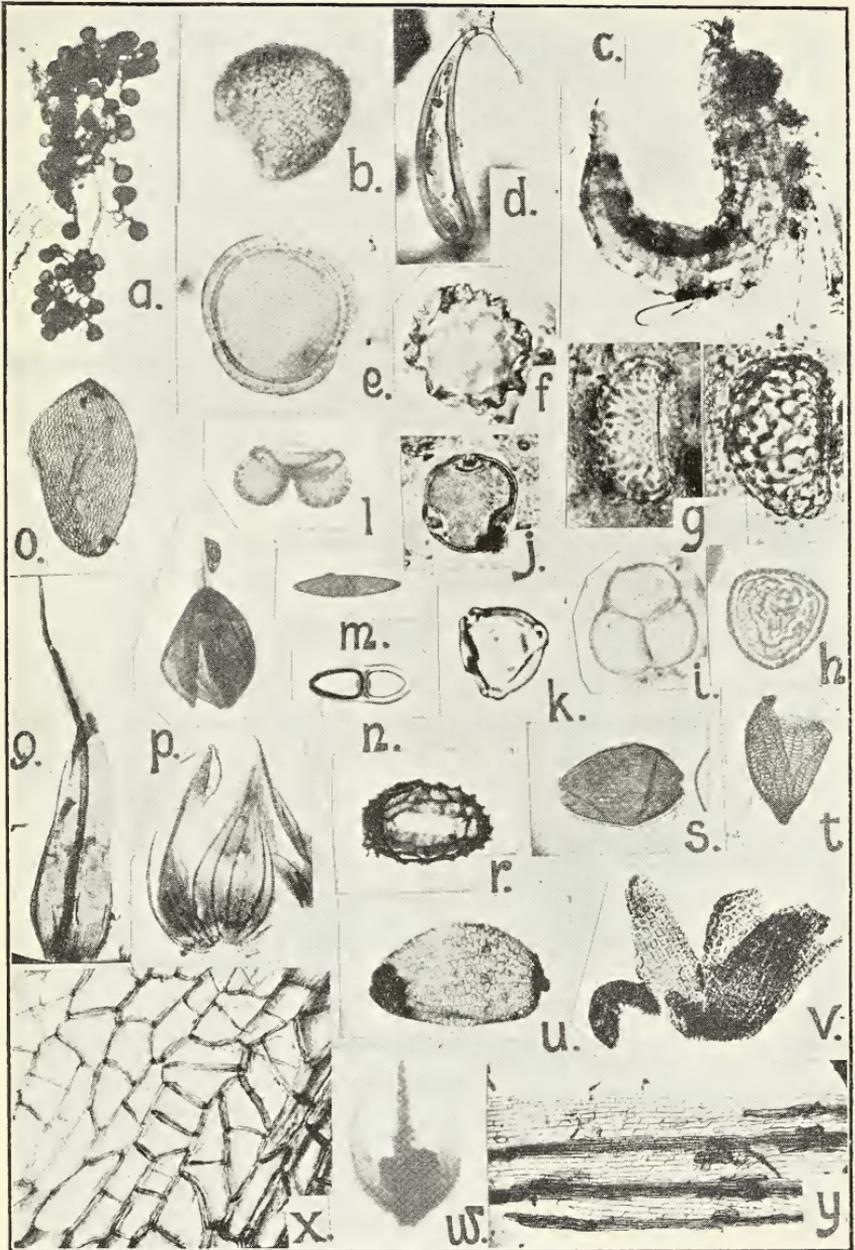


Photo by C.A.C.

Peat Organisms.

PENNINE PEAT.*

W. H. BURRELL, F.L.S.

PLATE X.

DURING the past eight years, in association with Mr. C. A. Cheetham, much time has been given to the study of upland peat, with the object of gaining first-hand knowledge of the evidence it affords of its origin in time and in structure. Attention has been paid to the living carpet, distinguishing between those plants that by their tufted habit and dominance over large areas, play a prominent part as peat formers, and those subordinates which are adapted to moor conditions and add their debris to the mass, but which play a minor part in building up deep peat, or the local dominance of which may even indicate its wastage. The peat has been examined throughout its depth (up to 10 feet) in turbaries, or by digging, or by cutting into natural exposures in hags and drainage channels, over an extensive area of the Yorkshire Pennines, including Arkengarthdale 1100 ft., Askrigg Common 1600 ft., Broomhead Moor 1200 ft., Cowling Moor, Dovenanter and Keasden 1000 ft., Fountains Fell 1500—2100 ft., Moughton Fell 1000 ft., Pen-y-Ghent 1500 ft., Simon Fell 2000 ft., Stake Fell 1900 ft., Whernside 2000 ft., Widdale Fell 1800 ft., Wissenden Moor 1500 ft. For comparison, the succession vegetation of an overgrown tarn resting on a bed of shell marl at 1200 ft., and the lowland peat of Austwick Moss, 400 ft., have been studied. The linking up of past with present has been attempted by noting the process of decay of recent vegetation on the moors, and the condition from year to year of a series of pools left by peat cutters on Austwick Moss. Special attention has been given to the subsoil; moor pan occurs generally, in sand (absent from clay), as a thin metallic layer, averaging in the district about one-eighth of an inch in thickness; it forms a sharp line of demarcation between an upper purple-grey layer, about three inches in thickness, full of vegetable debris, which leaves a colourless siliceous residue when the organic matter is destroyed by heat, and the bright coloured ferruginous mass below into which roots have penetrated only where the pan layer is defective. Professor Gilligan examined this subsoil in a swallow hole near the summit of Moughton Fell (*The Naturalist*, 1918, pp. 311 and 331), and expressed the opinion that it was detrital material from grit and sandstone, carried by melt-water into a depression, that existed in pre-glacial

* Vide *ante*, fol. 11.

times. His mineralogical analysis showed that the whole assemblage of rock fragments and mineral species was such as could have been derived from grits, sandstones and shales of the Carboniferous system, with some additions from older rocks of the district ; the purple-grey soil above the pan had the same mineralogical constitution as the buff sand below, except that it had been bleached.

Peat investigation has received much attention in the Geological Department of Leeds University. Miss Elsie Whitaker, M.Sc., whose successful field work at Foulisike Moss, Harwooddale, Thorne Moor, etc., was rewarded with a Research Fellowship, obtained new evidence of pine, birch and hazel beneath the peat ; it is regrettable that her thesis has not been made available by publication ; her method of working at minute organisms, with high power lenses, impressed us as likely to yield good results, if the evidence could be correctly interpreted, and we have developed this side of the work in addition to field observations.

The difficulties that beset the palæontologist were emphasised by Sir Joseph Hooker, when he suggested that the sweepings of the floor of a herbarium, after a good case of rejecting bad specimens from a heap of plants, should be given to the fossil botanist, to see what he would make of the *dissecta membra* ; on the other hand it must not be forgotten that the analyst relies upon the microscope for the detection of adulteration in finely powdered drugs and spices ; certain spores, pollen grains, seeds, plant tissues, chitinous remains of insects, crustaceans, etc., show an extraordinary resistance to decay, and may suffice for a reconstruction of the type of life of the moor ; their requirements and their associates at the present time are known, and this recognisable debris of the peat may be discreetly used to visualise the past.

Some characteristic features of the Yorkshire moors may here be briefly given ; over great areas they are now dominated by cotton grass, forming almost unbroken stretches of white tassels in early summer and ruddy herbage in winter ; or by ling, the purple moors of late summer ; rushes and mosses are locally abundant in swampy places caused by drainage from the water-logged mass ; bracken, bilberry, moor grasses and other gregarious species may assert themselves, while here and there, in cloughs and sheltered places, natural birch, pine and oak or mixed plantations may occur. Close observation of the living carpet shows that the moor surface is not so level as at first sight appears ; low places which may be dry in summer, become spongy mossy pools in wet seasons ; the tufted habit of the dominant plant raises small hillocks, between which one steps in dry weather for a firm foot-hold, but which form convenient steppings in winter for

crossing the wetter places ; this hummocky growth influences the subordinate vegetation, providing peat flashes for semi-aquatics and drier stations that are colonised by plants less tolerant of excessive moisture in the growing season. Local differences in the moor carpet are greatly influenced by drainage, rainfall and altitude ; where the hills reach general cloud level, or where rainfall exceeds thirty-five inches per annum, peat may be accumulating at the present time. How great the variation in rainfall may be has recently been emphasised by Dr. T. W. Woodhead, in the Huddersfield district, where he has directed attention to the steadily increasing precipitation in a south-westerly direction, from less than thirty inches at Dewsbury, to sixty inches per annum near the county boundary within easy walking distance. Rainfall statistics quoted by W. G. Smith and W. M. Rankin ('Geographical Distribution of Vegetation in Yorkshire,' *Geog. Journ.*, 1903), indicate a steadily increasing rainfall westwards, from twenty-four inches at York to sixty-one inches at Arncliffe in Littondale.

The following summary is based partly on field observations and partly on micro examination of peat samples, after treatment by the alkali process detailed by Mrs. E. M. Reid, B.Sc., in *Journ. Linn. Soc.*, XXXVIII., 454. To indicate frequency 'general' denotes presence in at least 75% of the samples, 'frequent' 50%, 'occasional' 25%, 'infrequent' 10%, 'rare' 5%. We are indebted to Dr. W. G. Smith for help with the seeds.

Potentilla silvestris Neck. Infrequent, seeds recognised.

P. palustris Scop. Infrequent, seeds recognised.

Calluna Erica DC. Occasional, leaves, twigs, flowers, capsules and seeds ; the seed coat is not well preserved, often reduced to fragments. Tetrad pollen, frequent in the subsoil and throughout, may be derived from several ericaceous plants or from crowberry.

Erica Tetralix L. Rare, in subsoil and throughout, seeds and leaves recognised.

Betula alba L. Woody debris occasional ; seeds and periderm tissue have been recognised throughout the peat ; the pollen is indistinguishable from that of hazel, but the type is one of the most constantly occurring organisms. A definite birch layer has been seen in many places over the whole district from 400 ft. altitude on Austwick Moss to 1950 ft. on Greensett Moss, Whernside.

Corylus Avellana L. Twigs and fruits have been seen in dried peats carted from Cowling Moor ; the pollen has not been distinguished from birch ; no other debris has been recognised as possibly belonging here.

Quercus Robur L. Oak logs are occasionally reported and have been seen *in situ* on Cowling Moor. No debris has been recognised.

Pinus sylvestris L. Wood, leaves, cones and seeds were sent from

Broomhead Moor, but we have not personally seen them *in situ*; pine pollen is frequent throughout, most plentiful in the subsoil and near base of peat.

- Juncus squarrosus* L. Occasional, seeds recognised; the outer seed coat is rarely preserved.
- J. conglomeratus* L. Seeds frequent, most abundant in subsoil, where many hundreds have been seen. In subsoil from Simon Fell one hundred and twenty seeds were counted in ten micro mounts.
- J. lampocarpus* Ehrh. Seeds infrequent.
- Eriophorum vaginatum* L. General, fruits rarely preserved.
- Carex* sp. Fruits occasional in subsoil and throughout; sometimes in abundance.
- Molinia cærulea* Moench. Rarely recognised.
- Polypodium vulgare* L(?) Fern capsules occasional throughout. A spore agreeing in sculpture and size with that of common polypody is frequent, in quantity, in the subsoil and throughout. The perfect state of preservation of this spore, together with other minute bodies such as spores of *Sphagnum*, or pollens of birch and calluna types, needs special mention; they are in general merely empty sacs, resistance to decay being often restricted to a particular layer of tissue, not necessarily the outermost layer. Difficulties arise from this, as in the case of *Juncus squarrosus* seeds, which are rarely present in a natural state, the inner coat with a totally different areolation being the tissue that is most durable.
- Sphagnum*. General, in subsoil and throughout. *S. cymbifolium*, *S. papillosum* and *S. cuspidatum* have been recognised by leaves, stems, capsules and spores.
- Polytrichum commune*. Frequent in subsoil and throughout; small pockets of this moss are often recognisable in the field; leaves, stems, ♂ inflorescences, capsules and calyptras identified.
- Racomitrium lanuginosum*. Seen once from Fountains Fell.
- Aulacomnium palustre*. Occasional.
- Hypnoid Mosses*. Occasional, entire plants rarely seen, more frequently separate leaves; the species include *Hypnum cupressiforme*, *H. loreum*, *H. splendens*, *H. squarrosum*. Mr. H. N. Dixon, M.A., has kindly examined some of this material.
- Carbonised Plant Remains*. Black friable remnants of small herbage occasional in the subsoil and throughout. In two cases the quantity of more solid charcoal suggested hearths.
- Fungus*. Hyphæ, spores and sclerotial tissues are general in the subsoil and throughout. Mr. A. A. Pearson and Miss E. M. Wakefield have kindly examined slides; teleutospores of *Puccinia* sp., and spores possibly belonging to black moulds were noted by them, but no definite conclusions as to genera could be reached. This section of the flora offers little help in the enquiry.
- Entomostracha*. Valves of *Daphne* type, disjointed hairs and other debris frequent. Small flask-shaped bodies first detected by Miss Whitaker, were afterwards recognised by Mr. Robert Gurney, M.A., as the spermatophores of Copepods. We are indebted to Mr. Gurney for examining some treated peat from Askrigg Common; he reported extraordinary numbers of Cladoceran shells and identified with reasonable certainty *Alonella nana*, *A. excisa*, and possibly *A. rustica*; also numbers of *Chydorus* which might

be *C. ovalis*, but it was impossible to be sure. The *Alonellas* and *Chydorus* are species Mr. Gurney finds most commonly in his district in moss round the edges of the Broads. *Alonella rustica*, on the other hand, is a species characteristic of 'lime free' water, but he was not sufficiently sure of the identification to attach much importance to it.

Other Animal Debris. Mites, beetles, jaws and limbs of many insects and larvæ, pupa cases, egg cases, etc., occur generally; some large spore-like bodies (Fig. a, b, e, f) which have not been identified, may belong here, but the material has not been worked by an expert zoologist.

The following conclusions have been drawn from the evidence:—

1. The peat of the Yorkshire Pennines has been laid down in relatively recent times, under climatic conditions similar to those now existing; recognisable debris represents a mere fraction of the whole life of the moors, but it indicates a type similar to that now existing. Lamination of the peat has not in any case suggested periods of varying climate; there is no evidence of a sequence of events such as an unbroken sheet of sphagnum giving place to cotton grass and heather periods; no evidence has been found of dwarf birch, bearberry, willows and other arctics that occur in Scottish peats: the several species are distributed in the thickness of the peat, just as they occur in the living carpet to-day; large plano-concave pockets of sphagnum indicate ancient swamps that have been dominated and ultimately filled by it; the more general distribution of this and other mosses shows that they have been always there as subordinate species in the moor community.

2. The widespread occurrence of birch as a definite layer, and of birch, hazel, pine and oak locally, support the opinion now generally accepted, that the Pennines were formerly more or less covered with scrub; the trees are natural associates on poor soils; pine and birch type pollens, found throughout the peat, often when no woody residue is present, further suggest that after the destruction of the timber, trees persisted throughout the intervening time on screes, in sheltered cloughs and near lines of drainage at lower altitudes, whence wind-borne pollen could be distributed,

3. The importance of cotton grass cannot be too strongly stated; it is often recognisable in mass in situ, and its disorganised tissues are present everywhere.

4. If the spore has been correctly identified, common polypody has persisted on the moors throughout the peat phase, probably in those better drained places that have carried timber with its attendant flora. It is not a common fern of the moors now, although it is reported at 1520 ft. on Greygarth Fell ('Flora of West Lancashire,' p. 334).

It is a matter of interest to find that crowberry does not appear in the summary; it is locally plentiful on the moors now, and has been reported as well represented in British peats by stems and seeds; excepting that its pollen may be included in the tetrads, nothing has been seen that could be placed here.

DESCRIPTION OF PLATE X.

FIG.

- a—Stalked capsules, perhaps of animal origin, each about $\cdot 04$ mm. diam.
 b and e—Surface and profile views of spore-like body, $\cdot 09$ mm. diam.
 c—A recent copepod (*Moraria sarsi*) from Norfolk, showing spermatophore *in situ*.
 d—Spermatophore from peat, $\cdot 07$ mm. long.
 f—Warted spore-like body, $\cdot 03$ mm. diam.
 g—Two views of Polypody spore (?) $\cdot 06$ mm. long, showing profile and flattened base.
 h—Sphagnum spore, $\cdot 02$ mm. diam.
 i—Tetrad spore, $\cdot 036$ mm. diam.
 j—Pollen, not recognised.
 k—Pollen, Birch type, $\cdot 02$ mm. diam.
 l—Pine pollen, $\cdot 05$ mm. wide.
 m and n—Fungus spores.
 o—Leaf of *Sphagnum papillosum*.
 p—Seed and utricle of *Carex* sp., 2 mm. long.
 q—Leaf of *Racomitrium lanuginosum*, 3 mm. long.
 r—Calluna seed, $\cdot 5$ mm. long.
 s—*Juncus lampocarpus* seed, $\cdot 5$ mm long.
 t—*J. conglomeratus* seed, $\cdot 5$ mm. long.
 u—*J. squarrosus* seed, inner coat, $\cdot 8$ mm. long.
 v—*J. squarrosus* seed, outer coat ruptured showing thick walled cells.
 w—Birch seed, 1.8 mm. long.
 x—Periderm of Birch, the cells are $\cdot 02$ to $\cdot 08$ mm. long.
 y—Epidermis of cotton grass leaf.

The measurements are intended only to show approximately the size of the highly magnified objects. A good deal of variation is found in different specimens, due to state of maturity and other causes.

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There is a memoir on Alfred Russel Wallace, with portrait, in the *Proceedings of the Royal Society*, Biological Series, No. B67.

In consequence of the author's proofs of the Diptera notes in our last issue having gone astray, the following corrections should be made by those interested: page 84, line 11, *T. atricanda*=*T. atricauda*; line 23, *Biblios*=*Bibios*; lines 34, 39 and 43, *Crinicauda*=*Crinicauda*; line 48 and page 85, line 1, *alpinum*=*alpium*; page 85, line 3, to forms =two forms; line 17, *R. albihorta*=*R. albohirta*.

PLANT GALLS OF THE HUDDERSFIELD DISTRICT.

WM. FALCONER, F.E.S.,
Waterloo, Liverpool.

IN consequence of my removal from the county of broad acres in May last, my investigation of the plant galls of the above district, begun in 1917, came to an end. The results achieved are recorded below. Mr. S. L. Mosley, as before, has communicated to me the particulars of his finds, and given me the opportunity to examine a small collection of galls, containing some local examples, in the Huddersfield Museum at Ravensknowle; all these are distinguished by his initials. Flies were bred out of many kinds. A large proportion, however, being hymenoptera, either parasitic or inquiline, were sent to the British Museum for identification, but nothing further has been heard of most of them. Other emergents were quite unexpected and previously unknown in such circumstances—the beetle, *Homalota trinotata* Kr.,* and the moth, *Chrysoclista aurifrontella* Haw. †

Counting as separate forms those produced by the same agent on different species of plants, but not on different parts of the same plant, the number for the district now reaches a total of 296. Several of those noted in the preliminary list ‡ have since been found to be generally distributed and often plentiful where the host plants occur, and others also more widely diffused, but less general. Some obtained later were first occurrences for the county, but part have been forestalled in publication. *Perrisia anglica* K., *P. trachelii* Wachtl., and *Atrichosema aceris* K., still stand as the only records for the North of England; *P. floriperda* F. L., *P. nervicola* K., *Rhabdophaga iteobia* K., *P. aparines* K., *P. brassicæ* Winn., *P. cerastii* Binnie, *P. raphanistri* K., *P. schlechtendali* K., *P. vaccinivorum* K., *Eriophyes atrichus* Nal., *E. paderineus* Nal., *E. tuberculatus* Nal., *E. pilosella* Nal., *Æcidium grossulariæ* Gmel., as records for Yorkshire; while for *P. acerispermans* K., *P. populeti* Rübs., *Rhopalomyia tanaceticola* Karsch., *P. galeobdolonitis* Winn., *Asterodiaspis quercicola* Bché., and *Coniothyrium fückelii* Sacc., there is one other county record.

LIST.

COLEOPTERON (3 forms).

Ceuthorrhynchus pleurostigma Marsh. On *Brassica campestris*, by the River Calder, Bradley. On *Sinapis arvensis*, field between Kirkheaton and Gawthorpe Green. On swedes, below Castle Hill, near Mollicar Woods.

* *The Naturalist*, August, 1920, p. 248.

† *Ibid.*, January, 1922, p. 44.

‡ *Ibid.*, May, 1918, pp. 166-8.

LEPIDOPTERA (2 forms).

- Argyresthia goedartella* Linn. Greenfield, Mr. Buckley; alder catkins, near the Canal, Slaithwaite.
- Chrysoclista aurifrontella* Haw. Swollen nodes of *Betula alba*, Honley Old Wood, several examples, 1919 and 1920. One obtained later, March, 1921, was sufficiently advanced to be bred out. The gall and insect were submitted to Mr. G. T. Porritt, who sent the latter to an authority, who seems to have appropriated it. Both were intended for presentation to the Huddersfield Museum.

HYMENOPTERA (54 forms).

- Isosoma depressum* Walker. On sheep fescue grass, Dalton Bank, Castle Hill, Crosland Moor, and Holme Moss, S. L. M.; Cook's Study, near Holmfirth, W. E. L. Wattam; Honley Old Wood; Wilberlee and Bottoms Wood, Slaithwaite.
- I. graminicola* Gir.* On creeping couchgrass, New Mill, lane above Mag Wood (Armitage Bridge), below Beaumont Park, Slaithwaite, Bradley, Brighouse, Batley, etc., not uncommon.
- Cryptocampus ater* Jur. On *Salix caprea* and *cinerea*, Drop Clough in plenty. On *S. caprea*, Honley Old Wood.
- C. venustus* Zadd. On *S. caprea* and *aurita*, Bottoms Wood (Slaithwaite), Drop Clough, Hall Heys Wood (Crosland Edge) and Honley Old Wood.
- C. medullarius* Htg.† On *S. pentandra*, Dean Head, Scammonden. First reported for the district by Mr. Inchbald.
- Pontania proxima* Lep. On *S. alba*, *cinerea*, *caprea*, *fragilis*, *viminalis* and *aurita*, widely diffused and plentiful.
- P. salicis* Christy. On *S. caprea* and *cinerea*, Drop Clough (Marsden) and Emley, but not in any quantity.
- P. pedunculi* Htg. On *S. cinerea* and *caprea*, mainly the former, Drop Clough. On *S. cinerea*, Cat's Clough, Millshaw, near Holmfirth, Thorncliff Farm (Emley). On *S. aurita*, Slaithwaite.
- The next 32 entries on oak. The asterisks (**) denotes the forms of which the alternate generations (if such there be) have not been noted.
- Andricus curvator* Htg. In the old lane leading out of Honley Old Wood to Wilshaw, Hall Heys Wood, Pike Lowe (Holmfirth), Broad Oak and Gunthwaite, near Denby Dale, in plenty.
- A. curvator* f. *collaris* Htg. The old lane leading out of Honley Old Wood, and Hall Heys Wood, in abundance.
- A. gemmatus* Adler. Mollicar Woods, probably the example previously recorded as *A. autumnalis*, was this gall in an advanced state.
- A. gemmatus* f. *corticis* Linn. Drop Clough, Hall Heys Wood, both new and old.
- A. trilineatus* Htg. Drop Clough, Sun Dean, Sinking Wood (New Mill), Boothroyd Wood, Lepton Great Wood, and Shrogg Lane, Kirkheaton. *A. inflator* of the first list should be assigned to this.
- A. trilineatus* f. *radicis* Fab. Butternab Wood and Lepton Great Wood, S. L. M.; Hall Heys Wood, Drop Clough, and Spring Wood (Netherton).
- A. pilosus* Adlr. On male catkins, Stockgate Quarry (Honley Old Wood) and Lepton Great Wood.
- A. pilosus* f. *fecundator* Cam. Widely distributed and common, and more plentiful some years than others.
- ***A. testaceipes* Htg. In midribs and petioles of leaf. Lower and Upper Butternab Wood, Sun Dean, Wilshaw, Honley Old Wood, Spring

* *The Naturalist*, January, 1922, p. 45, and March, p. 84.

† *Ibid*, August and September, 1922, p. 250.

- Wood (Netherton) and near Armitage Bridge; Kirkheaton; Coxley Valley, Skelmanthorpe.
- Andricus nodifex* Kieff. 'A small elliptical gall on midrib.' Spring Wood (Netherton).
- [*A. lucidus* Htg. Whitley Woods. 'British Galls,' S. L. M. This was doubtless *A. solitarius* Fonsc.]
- A. solitarius* Fonsc. Wherever there are groups of oak trees.
- A. ostreus* Gir. General and plentiful. Leaves are sometimes so loaded as to be bent and reddened above, becoming very conspicuous.
- A. albopunctatus* Sch. Carr Wood (Woodsome) and Lower Butternab Wood. In fluctuating quantity, plentiful in 1918, but less so since, or not noted.
- Biorrhiza pallida* Oliv. 'Oak Apple.' Holme Moss Plantation, S.L.M.; Hall Heys Wood, Butternab Wood, Tanyard Wood (Kirkburton) and Whitley Woods.
- B. pallida* f. *aptera* Bosc. Oak roots. Cawthorn, Mr. Charlesworth; Lepton Great Wood.
- ***Trigonaspis megaptera* Panz. Whitley Woods = Huddersfield of 'British Galls, S. L. M.'; Hall Heys Wood.
- Neuroterus albipes* Schr. Single examples, Lower Butternab Wood and Sun Dean.
- N. albipes* f. *læviusculus* Schr. Butternab Wood, S. L. M.; Lower Butternab Wood, Sun Dean and Boothroyd Wood.
- N. baccharum* Linn. On the leaves. Hag Wood (Honley), S. L. M.; Bottoms Wood and the Spa, Slaithwaite, Carr Wood (Woodsome).
- N. baccharum* f. *lenticularis* Oliv. Common in woods in a wide area around Huddersfield.
- [*N. bicolor* Htg. f. *fumipennis* Htg. Sun Dean, S. L. M. I have not found this gall in the district, nor seen a dried specimen, although specially looked for, only the last named; stands therefore in need of confirmation. Neither has its alternate generation been seen.]
- N. vesicator* Schl. Near Skelmanthorpe, in a field hedge, and Honley Old Wood.
- N. vesicator* f. *numismatis* Oliv. Butternab Wood, S. L. M.; Lower Butternab Wood, Sun Dean, Bottoms Wood (Slaithwaite).
- N. aprilinus* Gir. Said by Adler to be the sexual generation of *A. ostreus*. Whitley Woods, Butternab Wood, Sun Dean and Mollicar Woods.
- Dryophanta verrucosa* Schl. On buds and leaves, Lower Butternab Wood and Smith Wood (Storthes).
- D. verrucosa* f. *divisa* Htg. Butternab Wood, S. L. M.; Lower Butternab Wood, Sun Dean, Drop Clough, Barrett Clough (Slaithwaite), Hall Heys Wood, Whitley Woods, Banks Wood (Emley).
- D. taschenbergi* Schl. Barrett Clough (Slaithwaite), Butternab Wood, Sun Dean, Honley, Upper Stones Wood (Shepley), Storthes Hall Woods, Mollicar Wood, etc.
- D. taschenbergi* f. *folii* Linn. Plentiful throughout the district, more so in some years than others.
- D. disticha* Htg. Abundant throughout the district.
- Cynips kollari* Htg. Mollicar Woods, S. L. M.; Bottoms Wood and Barrett Clough (Slaithwaite), Butternab Wood, Thunder Bridge, Honley Old Wood, Storthes Hall Woods, Deffer Wood (Cawthorn) and Banks Wood (Emley).
- Cynips* spec. Houard, No. 1210. See *The Naturalist*, August, 1921, p. 270. Storthes Hall Woods in plenty, and Honley Old Wood.
- Blennocampa pusilla* Linn. On dog rose, Woodsome Lees, 1910, S. L. M.
- Rhodites rosæ* Klug. Throughout the district, but not anywhere in quantity.
- R. eglanteriæ* Htg. On wild roses, Kirkburton, Lepton, Ainley Place (Slaithwaite), Sun Dean, Carr Wood (Woodsome), Hey Wood (Honley), Pike Lowe (Holmfirth), Deffer Wood.

- Xestophanes brevitarsus* Thoms. On tormentil, Lepton, 'British Galls,' S. L. M.
X. potentillæ Ritz. On cinquefoil, Cotton's Mill dam and goit, Hoylehouse, plentifully.
Aulacidea pilosellæ Kieff. On *Hieracium pilosella*, Wilberlee and Thurstonland. At the latter, a rough field immediately on left of the Brockholes entrance to the railway tunnel.

DIPTERA (112 forms).

- Ferrisia filicina* Kieff. On bracken, widely distributed in the district, and plentiful where it occurs.
Anthomyia signata Brschk. On male fern, Ainley Place Bottoms and Barrett Clough (Slaithwaite), Drop Clough, Honley Old Wood, Banks Wood (Emley). On bracken, wood near Brockholes.
Taxomyia taxi Inch. On yew, Storthes Hall gardens, Hey Wood, Woodsome, Fixby, Kirkheaton, S. L. M.; Deffer Wood near Cannon Hall, abundant, and Cawthorn.
Chlorops tæniopus Mgn. On cultivated barley, field at Whitby Wood Bottoms, fairly numerous.
Oscinis frit Linn. On oats, field at Dalton, Huddersfield.
Mayetiola ventricola Rübs. On *Molinia cærulea*, Slaithwaite Moor, Drop Clough, and by canal at Seller's Clough (Marsden), abundant.
Perrisia marginem-torquens Winn. On *S. fragilis* and *viminialis*, widely distributed and common.
Rhabdophaga rosaria H. Löw. On *S. caprea* and *cinerea*, mostly the former. Barret Clough and Bottoms Wood (Slaithwaite), canal bank near Marsden, and near Hoylehouse, Drop Clough, Honley Old Wood, Wilshaw, Armitage Bridge, Dogley Mill dam, Lower Butternab Wood. On *S. aurita*, Honley Old Wood and Bottoms Wood.
R. iteobia Kieff. On *S. caprea*, bushes on waste ground between Slaithwaite and Holthead.
R. salicis Schrk. On *S. caprea* and *cinerea*, Drop Clough, not in any quantity.
R. saliciperda Duf. On *S. caprea*, Drop Clough. As the last.
R. nervorum Kieff. On *S. caprea*, Drop Clough, Bottoms Wood (Slaithwaite), Honley Old Wood, Hall Heys Wood. On *S. repens* and *aurita*, Honley Old Wood.
R. karschi Kieff. On *S. repens*, Honley Old Wood, one plant, several years in succession.
R. terminalis H. Low. On *S. fragilis*, Kirkheaton, Gawthorpe Green, Fleming House Lane (Huddersfield), Banks Wood (Emley); Coxley Valley.
Iteomyia capræ Winn. On *S. caprea* and *S. cinerea*, *aurita*, Drop Clough, by the river at Golcar, Houses Hill, Whitley Woods, Gawthorpe Green, Shepley Mill dam and Cat's Clough, Millshaw.
I. capræ var. *major* Kieff. On *S. cinerea* and *caprea*. Drop Clough. On *S. cinerea*, by river at Golcar; Kirkheaton.
Contarinia populeti Rübs. On the aspen, numerous examples, Thunder Bridge. The other Yorkshire record, Askham Bog.
Harmandia tremulæ Winn. On the same at the same place, abundant, upwards of forty on some of the leaves.
Massalonia rubra Kieff. On birch, Sun Dean, Beaumont Park, Fixby, Honley Old Wood, Storthes Hall Woods, plentiful.
Semudobia betulæ Winn. On birch, Beaumont Park.
Contarinia betulina Kieff. On birch, plentiful, Drop Clough, Sun Dean, Fixby, Beaumont Park, Mollicar Woods, Spring Wood (Netherton); Honley Old Wood, Wilshaw, Storthes Hall Woods, Deffer Wood, Cat's Clough, Millshaw.

- Contarinia betulicola* Kieff. On birch, Sun Dean, Spring Wood, Honley Old Wood.
- Cecidomyia* spec.* On birch, slight but distinct lateral swellings of the internodes of the twigs, larva yellow, tinged with red, especially at the extremities, solitary. Honley Old Wood.
- Stictodiplosis corylina* F. Löw. On hazel, Lepton Great Wood.
- Arnoldia quercicola* Kieff. On oak, Storthes Hall Woods, Butternab Wood, Whitley Woods.
- Macrodiplosis volvens* Kieff. On oak, Lower Butternab Wood, usually higher up in the tree than the next.
- M. dryobia* F. Löw. On oak, Ellen Springs and Thurstonland, S. L. M. ; Barrett Clough, (Slaithwaite), Beaumont Park, Butternab Wood, Brockholes, Sun Dean, Lepton Great Wood, Whitley Woods, Coxley Valley.
- Perrisia libera* Kieff. On oak, Barrett Clough, Shaw Carr Wood (Slaithwaite), Drop Clough.
- Cecidomyia* spec. Bagnall and Harrison, deformed acorns, larvæ gregarious, yellow, Boothroyd Wood, Storthes Hall.
- Hartigiola annulipes* Htg. On beech, Ellen Springs, S. L. M. ; Waller Clough and Bottoms Wood (Slaithwaite), Beaumont Park, Carr Wood (Woodsome), Honley, Honley Old Wood, Spring Wood, Brockholes, Kirkburton, Storthes Hall Woods, Nortonthorpe, Cannon Hall Park, Banks Wood (Emley).
- Oligotrophus ulmi* Kieff. On wych elm, Ainley Place Bottoms, Bottoms Wood (Slaithwaite), Almondbury, Hopton Mills, Kirkburton, Mollicar Woods.
- Perrisia urticae* Perr. On nettle, generally distributed and plentiful.
- P. persicariae* Linn. On *Polygonum amphibium*, Gawthorpe Mill Gait and Cawthorn, S. L. M.
- Atydiplosis rumicis* H Löw. On sheep sorrel, Barrett Clough (Slaithwaite) and by River Calder at Bradley.
- Contarinia floriperda* F. Löw. On bladder campion, canal side at Bradley and railway embankment at Blakestones (Slaithwaite).
- C. steinei* Karsch. On red campion, Banks Wood (Emley), Tanyard Wood (Kirkburton).
- Perrisia lotharingia* Kieff. On mouse-ear chickweed, buds and leaves, canal bank at Golcar, in a field between Smithy Mill and Mag Wood (Brockholes), and below Honley Old Wood.
- P. cerastii* Binnie. On the same Varley Road, Slaithwaite, on an earth-covered wall.
- P. traili* Kieff. On upright buttercup, Ainley Place, Wilberlee and Meal Hill (Slaithwaite), Helme, Skelmanthorpe, Nortonthorpe, Cannon Hall and Clayton West. On creeping buttercup, Wilberlee and Barrett Clough (Slaithwaite).
- P. ranunculi* Bremi. On *R. acris*, in a field near Helme Vicarage, and by the stream between Kirkheaton and Gawthorpe Green.
- Phorbia brassicae* Bcké. On cabbage and turnip, Upper Slaithwaite.
- Perrisia brassicae* Winn. On *B. campestris*, by Calder at Bradley, two plants.
- P. raphanistri* Kieff. On wild radish, field at Storthes Hall.
- Cecidomyia* spec. On swede, base of leafstalk swollen, Bradley, S. L. M.
- Perrisia ulmariae* Bremi. On meadow sweet, generally distributed and common where the plant occurs.
- P. engstfeldi* Rübs. On the same, Drop Clough, in a very wet spot by the stream ; by pond near Carr Wood (Woodsome).
- P. tortrix* or *sodalis* F. Löw. On blackthorn, larvæ white, Hall Heys Wood (Crosland Edge).

* *The Naturalist*, January, 1922, p. 44.

- Perrisia rosarum* Hardy. On wild roses, Huddersfield, S. L. M. ; Ainley Place and Barrett Clough (Slaithwaite), Helme, Carr Wood (Woodsome), Almondbury, Farnley Tyas, Thunder Bridge, Armitage Bridge, Holmfirth, Banks Wood (Emley), Skelmanthorpe and Deffer Wood.
- P. plicatrix* H. Löw. On *Rubus* spp., Ainley Place Bottoms (Slaithwaite), Kirkheaton, Mollicar Woods, Carr Wood (Woodsome), Honley Old Wood, Wilshaw.
- P. aucupariæ* K. On mountain ash, tree at Healey House, on opposite of road to Honley Old Wood.
- P. cratægi* Winn. Abundant, wherever there are hawthorns.
- P. anglica* Kieff. On cowberry, in Sykes's plantation near the top of Wholestone Moor overlooking Outlane, S. L. M.
- P. vacciniivorum* Kieff. On bilberry, two plants, Barrett Clough (Slaithwaite).
- Asphondylia mayeri* Lieb. Broom pods, Sun Dean, several bushes in plenty, and within railway railings, Lower Butternab Wood.
- Perrisia trifolii* F. Löw. On white clover, Emley, S. L. M. ; Ainley Place, Wilberlee, canal bank at Linthwaite, Bradley, Hall Heys Wood Lane, Thorpes (Almondbury) and Farnley Tyas.
- Cecidomyia* spec. On red clover, stem thickened, bent and reddened, waste ground near Old Toll Bar in Varley Road, Slaithwaite.
- Perrisia lathyricola* Rüb. On meadow vetchling, several places about Slaithwaite and Marsden, Helme, Bradley.
- P. lathyri* Kieff. On the same, river bank at Bradley ; and Slaithwaite.
- P. viciæ* Kieff. On bush vetch, Denby Dale, Slaithwaite, Meltham, New Mill, Ramsden Clough (Holmfirth), Farnley Tyas, Nell Lane (Emley). On tufted vetch, by the River Calder at Bradley.
- P. loticola* Rüb. On *Lotus major*, by the roadside, Lezzer Lane and Nell Lane, Emley ; roadside ditch between Cannon Hall Gates and Jowett House Farm.
- Cecidomyia* spec. On the same, stem thickened at apex, bent and reddened, flower aborted, Barrett Clough, Slaithwaite.
- Perrisia schlechtendali* Kieff. On tuberous bitter vetch, Pinfold Lane, on a rough bank in a field by the roadside near Barrett Clough (Slaithwaite).
- P. thomasiana* Linn. On broad-leaved limes, Cannon Hall Park, near the Hall.
- Contarinia tiliarum* Kieff. On limes, petioles, midribs, flowers, stems, twigs and floral peduncles, Lockwood, Stockmoor, S. L. M. ; Slaithwaite, Blackmoor foot, Beaumont Park, Fixby, Ravensknowle, Cannon Hall Park.
- Perrisia serotina* Winn. On *Hypericum perforatum*, Fenay Bridge, since gone, but abundant at Kirkburton.
- P. affinis* Kieff. On *Viola riviniana*, fields by path between Boggart Lane and Ainley Place (Slaithwaite), near Tanyard Wood (Kirkburton), Houard, No. 4286 ; by roadside to Meltham near Crosland Hall, Houard, No. 4283.
- P. epilobii* F. Löw. On rose bay willowherb, Beaumont Park, S. L. M.
- Macrolabis corrugans* F. Löw. On hogweed, Hall Heys Wood, Farnley Tyas, Whitley Woods, sewage works at Bradley.
- Perrisia acerocrispans* Kieff. On maple in a hedge, Roydhouse, Almondbury, by the stream from Mollicar Woods. Other Yorkshire record, Thorner.

(To be continued).

HEPATICÆ OF CARLISLE DISTRICT.

JAMES MURRAY (KELSICK, WIGTON).

I AM not aware that the Hepaticæ of this district have hitherto been listed. Several of the plants are not cited for Cumberland (V.C. 70) in the Census Catalogue, and these are here indicated by an asterisk.

- Marchantia polymorpha* Linn. Common on damp walls, rocks, etc., as at Spa Well, Wreay and Wetheral.
- Aneura pinguis* (Linn.) Dum. On wall at St. Ninian's Well.
- **A. multifida* (Linn.) Dum. Roadside ditch near Baldwinholme, associated with *Fissidens taxifolius* Hedw.
- Metzgeria furcata* (Linn.) Dum. Not uncommon on trees at Harker and Wreay.
- Pellia epiphylla* (Linn.) Corda. Harker, near a spring, and on damp shady bank at Prior Rigg.
- P. Fabbroniana* Raddi. On wall, St. Ninian's Well.
- Blasia pusilla* Linn. On wet clay by roadside near Moorhouse.
- **Fossombronina pusilla* (Linn.) Dum. On moist clay bank at Cummersdale, with fruit.
- Aplozia crenulata* (Sm.) Dum. On sides of ditches in Orton Woods.
- A. riparia* (Tayl.) Dum. On stones in river in Wreay Woods, and on rocks near river in Gelt Woods.
- Lophozia ventricosa* (Dicks.) Dum. Peaty hedge banks and among mosses at Orton.
- **L. porphyroleuca* (Nees.) Schiffn. Orton.
- L. quinquedentata* (Huds.) Gogn. Moist shady ground, Orton Woods.
- L. Floerkii* (W. and M.) Schiffn. On rocky bank, Wreay Woods.
- **L. Floerkii* var. *Naumanniana* Nees. On peaty soil, Orton Woods.
- Plagiochila asplenioides* (Linn.) Dum. Common. Grinsdale Ghylls, Wreay, Woodbank, Wetheral.
- P. asplenioides* var. *major* Nees. On hedge bank opposite Cummersdale Railway Station.
- P. spinulosa* (Dicks.) Dum. Rocky bank near the waterfall, Wreay Woods.
- Lophocolea bidentata* (Linn.) Dum. Common. Wreay, Orton and elsewhere.
- L. cuspidata* Limpr. On rotting tree stumps, Wreay Woods and Kingmoor.
- L. heterophylla* (Schrad.) Dum. Abundant on the north wall of Carlisle Castle.
- Cephalozia bicuspidata* (Linn.) Dum. Common and very variable. On decaying wood at Cummersdale, Orton, Wreay, etc.
- C. Lammersiana* (Hub.) Spruce. Wet peaty ground, Todhills Moss.
- C. connivens* (Dicks.) Lindb. Wet, peaty soil and among *Sphagnum* at Orton.
- Nowellia curvifolia* (Dicks.) Mitt. Netherby.
- Cephaloziella byssacea* (Roth.) Warnst. Mixed with *Eurhynchium myosuroides* Schp. on a stone near Wreay.
- Calyptogeia Trichomanes* (Linn.) Corda. On wet ground, Durdar, Orton, Kingmoor.
- C. fissa* (Linn.) Raddi. Roadside near Belle Vue.
- **C. arguta* Mees et Nont. In a roadside ditch between Belle Vue and Bunker's Hill.
- Lepidozia reptans* (Linn.) Dum. Sandstone rocks in shade, Wreay Woods. Plentiful.
- **L. trichoclados* K. Müll. Orton.

- Diplophyllum albicans* (Linn.) Dum. Our commonest Hepatic. Newby Cross, Belle Vue, Wreay, Gelt, etc.
- Scapania undulata* (Linn.) Dum. On a stone in a stream near Baldwinholme.
- S. curta* (Mart.) Dum. Mixed with a *Lophozia* at Orton.
- Frullania Tamarisci* (Linn.) Dum. Plentiful in Wreay Woods on trunks of oak and sycamore.
- F. dilatata* (Linn.) Dum. On an ash tree at Cummersdale, and on a stone gate post near Newby Garden Village.

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CORRESPONDENCE.

SIR.—In my paper on *Tisoa siphonalis* (*The Naturalist*, January, 1924, p. 7), after the locality St. Jérôme, I added ['near Marseilles.'] Following some correspondence on the subject, Professor Cuénot now tells me that the St. Jérôme from which the specimen came was in the Department of Ain. Kindly permit me to publish this correction.—F. A. BATHER, British Museum (Natural History), London, S.W.7.

—: o :—

Canaries, by C. A. House, 'The world-famous Expert, Judge and Journalist.' London: 'Cage Birds,' 54 Fetter Lane, 257 pp., 10/6 net. A perusal of some of the illustrations in this volume reminds us of the story of the Scotsman on first seeing a giraffe, who exclaimed 'I don't believe it.' And a mere naturalist, familiar only with the birds of the country-side, on seeing some of the extraordinary results of 'fancy' breeding might wonder whether the 'hump-backed,' 'crested,' and even 'Yorkshire Greens' are really like the illustrations. We suppose they must be, as they are the handiwork of H. Norman, the well-known 'Cage Birds' artist. The author himself tells us that 'there is no work which covers the ground . . . and there is no work that is so up to date.' Certainly everything likely to interest those 'in the Fancy' seems to occur in the volume: whether it be the shape of a perch, the preparation of a medicine cupboard, or the treatment of an egg-bound hen. Naturalists will find in the book much food for thought on the subject of variation. There are numerous suitable illustrations.

Elementary Crystallography, by J. W. Evans and G. M. Davies. London: Thomas Murby & Co., 134 pp., 7/6 net. This is one of the most attractive treatises yet produced on the subject of elementary crystallography, and should appeal strongly to university and other students who desire scientific information in this fascinating branch of mineralogy. The authors are fully conversant with the difficult sections usually encountered by the beginner in his study of crystallography, and several of these have been dealt with admirably. The mathematical side of the subject, important though it is, has not been emphasised to a too technical degree, and the symbols employed in the conventional notation are clearly explained. Up to the time of the publication of this volume it was almost impossible for a student to obtain a comprehensive idea of crystallography without first having to consult the more advanced textbooks on the subject, a task which is especially tedious for a beginner. In 'Elementary Crystallography,' however, the subject is presented in a concise and scientific manner, simple and convincing diagrams are plentiful throughout the text, and each section of the book is followed by well-chosen suggestions for practical work. Although the treatise is founded upon a series of lectures delivered to students preparing for the Intermediate Examinations of the University of London, it can certainly be read with advantage for the higher examinations. The book is well arranged and has a complete index.—G.S.

NEWS FROM THE MAGAZINES.

The new editor of *The Avicultural Magazine* is Lord Tavistock.

British Birds for April contains a record of a number of bones of starling in Roman burial vases in Hereford.

Mr. J. W. Taylor figures and describes 'A Columnar Form of *Zerophila virgata* in *The Journal of Conchology* for March.

The Irish Naturalist for February is almost entirely occupied by 'Notes on Irish Hymenoptera Aculeata,' by A. W. Steliox.

Four obituary notices of Museum officials appeared in *The Museums Journal* for March, the ages being 78, 78, 93 and 96 respectively.

O. W. Richards describes 'The Mating Habits of Certain Species of Micropteryx,' in *The Entomologist's Monthly Magazine* for February.

Mr. John Ritchie writes on 'Preservation of Zoological Specimens in Fluid to preserve their natural colour,' in *The Museums Journal* for February.

'General Hints on the Housing and Feeding of Birds, their Purchase and Care,' is the title of an article in Vol. I., No. 1, of the Fourth Series of *The Avicultural Magazine*.

So long ago as 1667 'Mr. Hooke reported [to the Royal Society] that the air had lately been so thick about London that he had not been able to see [certain] stars. (*Nature*, March 22nd.)

E. A. Cockayne illustrates some curious 'Teratological Legs in Lepidoptera,' and C. Höfer refers to 'The Variation in *Larentia (Thera) variata* Schiff.,' in *The Entomologist's Record* for March.

Among many interesting papers in *The Journal of the Chemical Society*, recently issued, are p=*Bromophenyltrimethylammonium* Perhalides; Reduction Products of the *Hydroxyanthraquinones*; and *Chloronitrobenzines* and *Thiocarbamides*.

We learn from *The Journal of Botany* that 'the discontinuation of the *Cambridge British Flora* has been definitely decided upon . . . it cannot be said that the cumbrous and expensive Cambridge publication could ever supply the want that has so long been felt.'

No. 1 of the new series of *La Feuille des Naturalistes* has recently appeared. This publication was founded by Adrien Dollfus about half a century ago, and we do not seem to have seen it for some time. The new Editors are Professor M. Molliard and E. Rabaud.

The New Phytologist for February contains 'The Fundamental Fat Metabolism of the Plant,' by J. H. Priestley; 'The Factors governing Bud Formation,' by F. Summers; and 'The Effect of Carbon Dioxide on the Tropic Reactions of Helianthus Stems,' by R. E. Clapman, W. R. I. Cook and Miss N. L. Thompson.

According to *The Yorkshire Herald*, Dr. Collinge, of the Yorkshire Philosophical Society's Museum, York, has been to Manchester in order to examine the scheme there adopted for the development of museums in connection with education, and it is hoped that as a result his museum will follow the example of the museum at Manchester, and incidentally of many others in this county.

In a note on Maglemose harpoons in *Man* for April [? April 1st], we learn 'It is probable that the upper levels of Chaleux, Martinrive and Montaigne have a more or less Maglemose complexion; a bone with punctuated design, and microliths that are not truly Tardenoisian, as at Hull'! It is stated that these harpoons were 'recently found in Yorkshire,' which is not correct.

The Essex Review, No. 128, records that during a drought one of the parishes had a deep well sunk. 'The well having been dug, the large heap of earth which had come out of it was, by common consent, voted an eyesore, which ought to be removed. A parish meeting was accordingly held . . . and at last it was proposed, and unanimously carried, that they should dig a larger hole and bury it.'

NORTHERN NEWS.

We learn from the press that 'A Bittern has been recently seen and shot at Flaxton.'

The Leeds University is to receive the collection of Mosses and Hepatics made by the late W. Ingham.

'Present and Future Problems of Metallurgy' is the title of the Third Sorby Lecture, by Dr. W. Rosenhain.

At a recent meeting of the Malacological Society, Mr. Tomlin showed *Arion subfuscus*, a new record for East Sussex.

Curious forms of reptiles, fish (and particularly sharks), appear in Hutchinson's *Animals of All Countries*, Part XXIX.

We have received the Preliminary Programme of the Fourth International Conference on Soil Science, to be held in Rome, May 12th-19th, 1924.

The death is announced of Prof. M. M. Hartog, whose writings on biological subjects at one time frequently appeared in many scientific publications.

We understand from the publishers that Latter's 'Elementary Zoology,' referred to in *The Naturalist* for December last, is now issued in two parts; the first, chapters 1-7, at 4/6, and the second, the remainder of the volume, at 8/6.

The Proceedings of the Malacological Society (Vol. XV., Pt. V.) contain A. S. Kennard's Presidential Address on 'The Holocene Non-Marine Mollusca of England.' Part VI. contains 'Masculine Deficiencies in the British Vertigininæ,' by H. Watson.

Nature is giving a series of extracts of 'Early Science at the Royal Society.' Under the date of 1684 we read: 'It was said that at Brocklesby, in Lincolnshire, there were sycamores planted in Henry VII.'s time which are bigger than any trees in the lordship, though the leaves were as small as the common maple.'

We presume the writer of the following advertisement in the press recently, hopes to get a Tutankhamen tomb—or is it Maglemose harpoons he is after?—'3500 year old burying place of an early Briton, near London. Owner will welcome expert assistance in necessary excavation and investigation'; and will share the proceeds.

Among the many interesting illustrations appearing in Part XXX. of Hutchinson's *Animals of All Countries* is one from a photograph 'taken off the Bahamas, showing a twenty-two foot Devil-fish towing a twenty-five foot motor boat at a speed of ten miles an hour. Three harpoons were fixed in the broad back of the fish, and at the time the photograph was taken the monster had already towed the heavy launch many miles and was still swimming strongly.'

The Annual Meeting of the Rotherham Naturalists' Society was held recently, when the Secretary, Mr. R. Stewart, reported an exceptionally satisfactory year of progress. A number of excursions had been held in the neighbourhood, immediately following each of which was an exhibit in the Rotherham Museum of wild flowers and pond life. Special attempts have been made to cater for the needs of the Junior Naturalists' Societies connected with the local schools. The Rev. W. Dyer was re-elected President.

We have received *Bulletin Nos. 11 and 12 of the Bureau of Bio-Technology* from Messrs. Murphy & Sons. The papers are: Acetifying Bacteria; The Red Mould of Barley and Malt; Brewery Flies; Suppression of Insects Pests; Five Bed Bugs; Comparison of Three Commercial Brands of Lead Arsenate; Use of Emulsified Oils as Ovicides; and a Further Note on the Carnivorous Habits of *Tachycineta asynamorus*. The Bulletin is well produced and well illustrated, and our Hon. Secretary, Mr. F. A. Mason, is responsible for much of the scientific matter.

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YORKSHIRE NATURALISTS' UNION.

ENTOMOLOGICAL SECTION AND GALLS COMMITTEE.

A Field Meeting will be held in Edlington Wood, June 21st, 1924. Members will assemble at the keeper's lodge at 12 noon.

Trams run from Doncaster to Balby, which is one mile from the Wood. Members and Associates of the Union invited.

B. MORLEY, *Secretary.*

BOOKS WANTED

- Alford Nat. Hist. Soc. Reports. Set.
Bath Field Nat. and Arch. Soc. Vols. VIII.-XI.
Brighton and Sussex Natural History Society Reports, 1870, 1872-3.
Burnley Lit. and Sci. Soc. Parts 8, 13, 14, 16, 17, 18, 20, 21, 23, 24, 25.
Chester Soc. Nat. Science: Ann. Reports, i.-iv.
Cleveland Lit. & Phil. Soc. Trans. Science Section or others.
Croydon Nat. Soc. 6th Report.
Dudley and Midland Geol. etc., Soc. Vols. II-IV.
Discovery. (Liverpool, 4to). 1891.
Derby Arch. and Nat. Hist. Soc. Part 21.
Devonshire Assoc. Adv. Science. Vols. I., II., III.
Dublin Geol. Soc. Vol. I., pt. 1, 1830?; Vol. VII., parts 1-3 (or complete Vols.). 1855.
Eastbourne Naturalist (1 part).
Eastbourne Nat. Hist. Soc. Vols. II.-III. (or parts), and part 6 of new series.
Frizinghall Naturalist. (Lithographed). Vol. I., and part 1 of Vol. II.
Geol. and Nat. Hist. Repository, Mackie's. Vols. II., III.
Geol. Assoc. Proc. Vol. I., Part 1.
Geol. Soc., London, Trans. 2nd ser., Vol. VI., and Pts. 1-3 of Vol. VII (or Vol.).
Geological Magazine, 1894.
Huddersfield Arch. and Topog. Society. 1st Report, 1865-1866. (38 pp.).
Illustrated Scientific News. 1902-4. (Set).
Journ. Micrology and Nat. Hist. Mirror. 1914—
Keighley Naturalists' Society Journal. 4to. Part 1.
Lancs. and Cheshire Antiq. Soc. Vols. IV., V., VIII., XXV).
Louth Ant. and Nat. Soc. Reports, 1-12, 19.
Liverpool Geol. Association Proc. Parts 1, 3, 16.
Liverpool Nat. Journ. Parts 1, 3, and 20.
Manchester Geol. Soc. Trans. Vols. XV., XVI., XXIII.
Naturalists' Guide (Huddersfield). Parts 1-38.
Naturalists' Record. Set.
Newbury District Field Club Transactions. Vols. III. and on
North Staffordshire Field Club Reports for 1869, 1871-2, 1876.
Peterborough Natural History Society. Reports 1-8, 11-12, 14-27
Quarterly Journal of Science. 1878-9, 1882-3, and 1885.
Quekett Club Journ. 1st Series, No. 25.
Royal Cornwall Geological Society Trans. Vol. V. to date (or parts).
Salisbury Field Club. Transactions, Vol. II.
Scottish Naturalist. 1881-1891.
Simpson's Guide to Whitby. 1st ed., 1862.
Smith's New Geological Atlas of England and Wales. 1819-21.
Stirling Natural History Society. Vols. 2, 8, 12, 15, 16, 20.
Sussex and Hants. Naturalist. 17 parts.
Sussex Arch. Collections. II.-III.
Tweddell's Bards and Authors of Cleveland. Parts 9-12.
Union Jack Naturalist. Any.
Vale of Derwent Nat. Field Club. Old Series, Vols. I. and III.
Wakefield Lit. and Phil. Soc. Reports. Set.
Yorks. Nat. Club Proc. (York). Set. 1867-70.

Apply—Editor, The Museum, Hull



THE CRADLES OF TWO HAWTHORN SAWFLY GRUBS.

The cocoons are brown, three-quarters of an inch long.
They are very noticeable in the hedges during winter.

NOTES AND COMMENTS.

'LITTLE NURSERIES IN THE FIELDS.'*

By the aid of large type and plenty of 'leads,' the author of this book has produced a heavy volume, but it is of more interest than the usual popular history book from the fact that it deals largely with the aspects of natural history not generally dealt with. The frontispiece, for instance, is an excellent coloured illustration of 'The Cradles of two Hawthorn Sawfly Grubs,' and there are photographs of oak galls, eggs of frog, meadow grasshoppers, and numerous other common objects not usually found in books of this sort. The photographs are mostly by the author. An idea of the excellence of the frontispiece can be gathered from its reproduction on the accompanying plate (Pl. XI.), for which we are indebted to the publishers.

HEBRIDEAN MEMORIES.†

The well-known popular writer on bird life in the present volume reproduces some charming photographs of birds in their natural surroundings, and of the rugged scenery characteristic of the area with which he deals. His book is in four sections, namely, Spring Memories; Summer Memories; Autumn, Winter and other Memories; and Some Birds of the Hebrides; and while wild life generally is his theme, he has special chapters on the Whooper Swan, Ptarmigan, Twite, Dunlin, Lesser Tern, Common Gull, Short-eared Owl, and Hen Harrier. The illustrations form a very valuable part of the book.

IRISH SEA HERRING FISHERIES.

The Port Erin Biological Station is issuing a series of special publications, No. 1 of which (50 pp., 2/6) is before us. It is entitled 'A Short History of the Irish Sea Herring Fisheries during the Eighteenth and Nineteenth Centuries,' and is by W. C. Smith, the Curator of the Port Erin Station. Mr. Smith deals largely with the Herring Fisheries, for which the Isle of Man was formerly principally responsible, and points out that so long ago as 1610 'the Legislature passed a law enforcing a close time for herrings, from 1st January till the 5th July, within nine miles of the shore, and prohibiting the shooting of the nets before sunset. This was observed by the local fishermen till about 1823, when boats from other parts of the Kingdom began to exploit the fishery, and their crews, it was declared, broke the law, a proceeding not punishable apparently in the case of fishermen belonging to

* By Marian H. Crawford. London: The Religious Tract Society, 270 pp., 7/6 net.

† By Seton Gordon. London: Cassell & Co. xii.+180 pp. 15/- net.

the United Kingdom, over whom the Manx Legislature had no jurisdiction. The bad example of the Britishers was naturally followed by the Manx fishermen themselves, and the law was allowed to become a dead letter.' This, and many other interesting incidents, are reported in the volume, and we must congratulate the author upon the thoroughness in which he has carried out his investigations.

WITCHCRAFT AND DIVINING.

It is interesting to find that in the twentieth century there still remain among us those who believe in luck, witchcraft and water-divining. According to *The Yorkshire Post* the Deputy-chairman of the Huddersfield Waterworks Committee states that 'geologists know well what are the most likely districts for (*sic*) which to obtain water, but (according to Mr. Sykes) they are unable to say exactly where or in what direction these underground rivers go. At this point the water-diviner comes in. . . . He uses an aluminium twig instead of an ordinary tree twig, and by doing so claims to possess knowledge by which he can estimate both the strength and the depth of the stream. His methods are interesting. He holds the two ends of the twig between the finger and thumb of each hand, and walks with the "Y" end of the twig in front of him. When he arrives at a position where the underground water is, the twig goes down. He then goes further on, and returns with the twig as before, and the action of the twig becomes the same before he arrives at the original position, and half-way between the two positions marked is the centre of the underground flow. Some members of the party when he was "divining" were naturally somewhat dubious of his ability to discover water. Thereupon he placed the twig in the hands of one of them, and asked him to re-walk over the ground previously traversed. The result was that no effect was felt by the bearer. He next placed one hand on one wrist and another hand on the other wrist of the gentleman walking backwards with the twig still in his hand. When he got to the point where the first mark had been made by the diviner, *a strong electrical shock went through each of the wrists of the bearer of the twig and the twig went down as before.*'

BORE-HOLES RE-DIVINED.

'Acting on these assumptions, the Waterworks Committee had eight bore-holes made: The diviner commenced divining from a point near Deerhill Reservoir, and went alongside the quickly rising hill which backs up to the Wessenden Valley, and in the space of about a mile *he discovered eight different bore-holes.* Later, going down a stream which runs through part of the moorland, a very remarkable fault was found at a point near to where the bore-holes had been

sunk. At this point, therefore, he re-divined *for the bore-holes*, and found that the whole eight were within a distance of little more than 50 yards, so that the boring has been done and the water is to be conducted either by pumps or from a natural flow into the catch-dyke close by. Thanks to the new discovery, the Huddersfield Corporation are intending to make a great sanitary improvement. Nearly 15,000 tub closets exist in the town, and the Corporation, under pressure from the Ministry of Health, propose to convert them. For this purpose an extra three-quarter of a million gallons of water a day are required. About half of this quantity must come from the biggest reservoir, that at Blackmoorfoot, but the drain upon this reservoir is so great that they are desirous of increasing the supply. Happily there is no fear of any shortage.' We suppose the fun will begin when the Government auditors refuse (as is their practice), to sanction the payment of the 'diviner's' fee!

BRONZE PEOPLE !

In *The Transactions and Proceedings of the Torquay Natural History Society*, recently received, is an abstract of a paper on 'Bronze and the Bronze People' (*sic*), by H. D. Acland. He states 'Different races and different "cultures" spread over the world, especially Europe. Various types of stone implements and dolichocephalic and brachycephalic races who buried their dead in long barrows or round barrows. The Bronze people were the brachycephalic (round-headed) people. The two races can be differentiated also by the character of their interments. The dolichocephalic (the long-headed) race were users of stone implements and buried their dead by inhumation. The Bronze people burned their dead. The two races can also be distinguished by their pottery. Lord Abercromby in his great work has traced the remains of this culture over a great part of Europe. Only one specimen has been recorded so far in Ireland. The beaker folk may have been slightly earlier than the Bronze culture. The beaker folk seem to have invaded England in two streams: one from the East, the other from the South by way of Armorica.' These ideas seem somewhat antiquated. It is well known that skulls of almost any shape can be obtained from Bronze-age barrows [not Bronze barrows!], and it was by no means the rule for the Bronze-age people to burn their dead, whatever the 'Stone men' may have done.

DR. F. A. BATHER.

We gather from *The Times* that Dr. F. A. Bather, F.R.S., who is well-known to our readers, has been appointed by the Trustees, Head of the Geological Department of the British Museum (Natural History), South Kensington, in succession

to Dr. Smith Woodward who has sent in his resignation to take effect on his attaining his 60th year at the end of May. This appointment ensures there being no interregnum with regard to this particular position, and we trust that this commonsense practice will be adhered to in the future.

DONCASTER SCIENTIFIC SOCIETY.

An interesting account of the early history of the Doncaster Scientific Society has been prepared by our contributor, Mr. M. H. Stiles, one of the two surviving founders of that Society, which dates back to 1880, about the time when so many similar societies in different parts of the country had their origin. He deals with the various stages through which the society



M. H. Stiles.



F. Milner.

Founders of the Doncaster Scientific Society.

has passed. Much space naturally is devoted to the important part played by the late H. H. Corbett, to whose memory a brass tablet has been placed in the Museum.

DONCASTER MUSEUM.

In connection with the formation of the Doncaster Museum this Society had much to do. Of this Mr. Stiles states ' In order to gain an idea of the methods adopted in other towns, some of the Committee visited the Museums of Sheffield and Hull, and eventually arranged with Mr. Thos. Sheppard, of the Hull Museum, to inspect Beechfield, and to advise the Committee as to the best means of adapting the building for their purpose. Mr. Sheppard drew up a valuable report, which he read to the Corporation and others interested in the welfare of the scheme, and thus the matter was definitely launched, the Museum being formally opened by the Mayor

(Councillor Halmshaw), on March 23rd, 1910. In the first place, Dr. Corbett was asked to be the Hon. Curator, a post for which he was eminently fitted, and, with the help of an intelligent caretaker, he acted until the appointment of a permanent Curator. Even after this he rendered most valuable service, continuing his interest until his death.'

NATURE AND ART.

From their experiences in the field, nature lovers are probably better qualified to appreciate beautiful pictures than most people, as the eye of the naturalist is trained to see the best. In these circumstances, we have no hesitation in drawing the attention to two volumes recently issued by the House of Cassell, both being written by our friend, Mr. E. Rimbault Dibdin, formerly Director of the Walker Art Gallery, Liverpool. The first is entitled 'Thomas Gainsborough, 1727-1788' (168 pp., 9½ ins. × 12½ ins., 15/- net), and contains seven chapters dealing with Early Life at Sudbury; Youthful Life in London; Marriage and Return to Suffolk; Married Life; Life at Bath; Portraits painted at Bath; Gainsborough in London. Quite apart from the human interest attached to the life story of this great artist, the volume will be prized by many for the excellence of the reproductions of some of the more famous of his works. The colouring of these is as near perfection as we can expect to attain. The two pictures, each called 'The Watering Place,' will particularly appeal to our readers. Smaller in size, but equally well written is 'George Frederick Watts, 1817-1904,' by the same author and the same publishers (94 pp., 5/- net). Here also we have some wonderful reproductions of Watts' more famous pictures, and we should like to congratulate Mr. Dibdin upon the story he has written.

AN AQUARIUM DE LUXE.

The newly-constructed aquarium at the Zoological Society of London's Gardens is an excellent and instructive place. High praise is due to Dr. Mitchell for having planned and carried out a difficult and laborious enterprise, which required much thought and anxiety. The aquarium is situated underneath the Mappin Terraces and consists of 95 tanks of varying sizes, which now contain a remarkable collection of fish, turtles, molluscs, crustaceans, echinoderms, anemones and other marine invertebrata. The hall is quite dark so that all the tanks are perfectly lighted by daylight or electricity from above, and every moving thing is seen in its full beauty and perfection. Mr. Boulenger must, indeed, be pleased with his results after so much anxiety shared with his chief, and the admirable background and surroundings speak well for the artistic skill of Miss Procter. As something like

£54,000 has been spent on the exhibit, the fee for admission (one shilling) is additional to the entrance fee to the Gardens. And as it is a first-class show, no one will be churlish enough to object, especially when he realises that the upkeep will reach nearly £5000 per annum.

IRISH SEA GLACIER.

*The Proceedings of the Llandudno, Colwyn Bay and District Field Club** contain an interesting paper on 'The Story of the Boulders on the Old Colwyn Beach,' by Mr. S. S. Platt. This is accompanied by a map, prepared by the author, which we are permitted to reproduce herewith (p. 167). This shows the direction of the various ice-streams and the way in which the boulders at Colwyn have found their way thither. They come (a) from S.W. Scotland (Criffel, Galloway, Creetown, Dalbeattie and Moffatt); (b) the English Lake District; (c) St. Bees and Penrith Districts; (d) Furness; (e) Antrim Coast and Irish sea-bed adjoining; (f) Irish Sea bed between Anglesea and North Flintshire. The author carefully summarises the various records of different rocks which have reached the Colwyn area, and his paper certainly adds an interesting chapter to the story of the Ice Age in the British Isles.

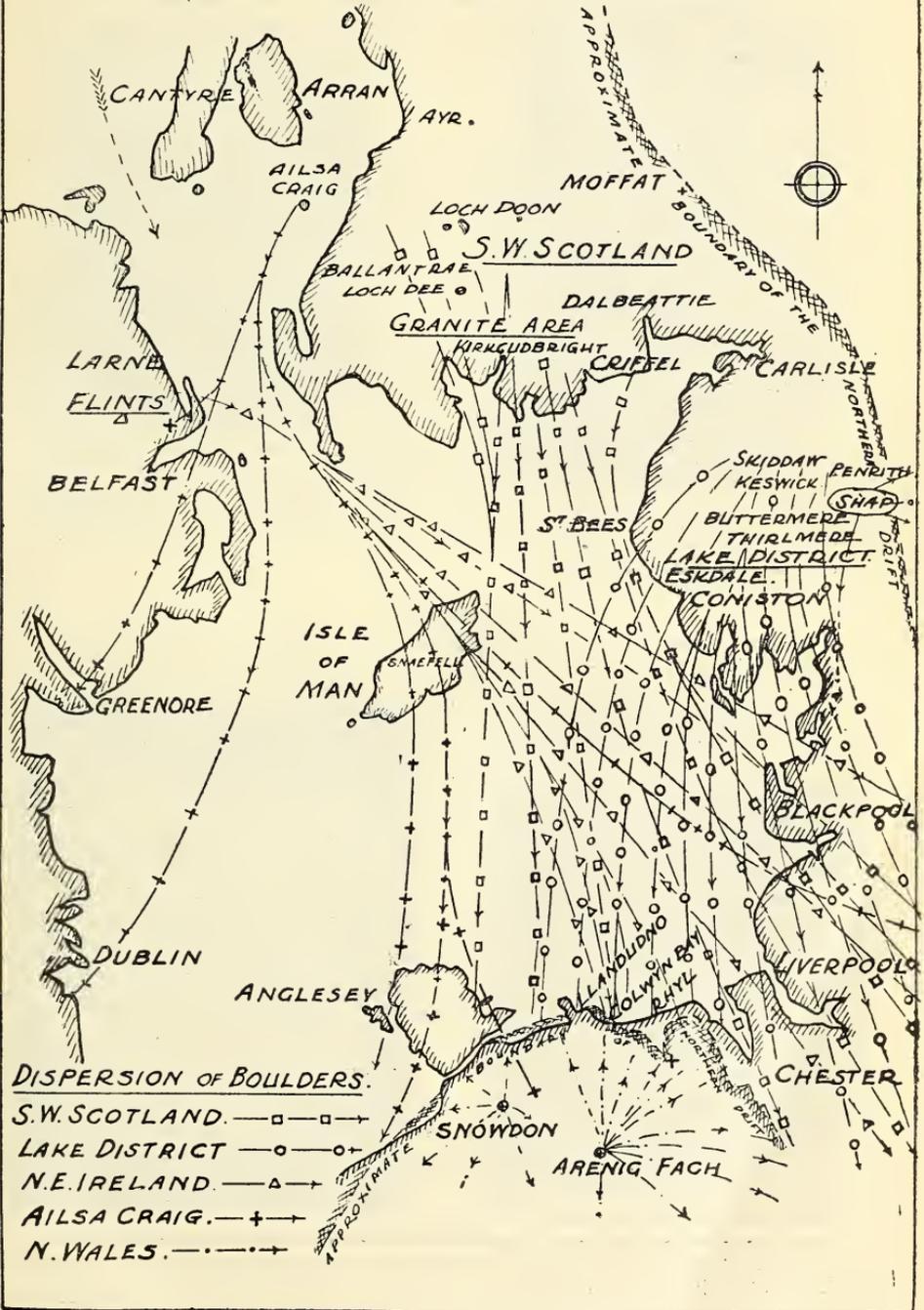
WESTS' DESMIDS.

Our older readers will remember the enthusiastic interest taken in the Yorkshire Naturalists' Union by the late W. West, and how our knowledge of diatoms and desmids was increased by his researches. Subsequently his son, George S. West, who eventually became Professor of Botany at Birmingham, was of considerable assistance to his father in his work, and these joint authors, excellent alike in the thoroughness of their work and in the beauty of their drawings, contributed four magnificent monographs on the British Desmidiaceæ, which were published by the Ray Society. The unfortunate decease of both these workers left that magnificent piece of work unfinished, but much material in a more or less complete state remained behind, in addition to which there were numerous beautiful drawings by Professor West. The Ray Society eventually secured the services of Dr. Nellie Carter, a former student under Professor West, and after a lapse of eleven years she has issued the fifth volume to this memorable work, albeit that she is inconveniently situated at the present time, being an Assistant at the Botanical Gardens at Missouri. In her preface, Dr. Carter states 'To the Department of Scientific and Industrial Research at London the writer is indebted for a grant which enabled her to spend an uninterrupted year at the work, and she is also indebted to Dr. G. T. Moore who allowed her to complete it during the tenure

* Vol. IX., 1919-23, 56 pp., 2/6.

IRISH SEA GLACIER.

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of a Fellowship at the Missouri Botanical Garden.' The present volume contains 167 plates, with descriptions, and an excellent index to the five volumes. On looking through the list of localities given to many of the species, we observe numerous favourite Yorkshire collecting grounds which were visited by the authors.

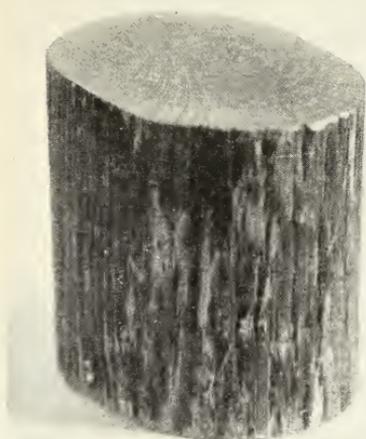
KIMMERIDGE CLAY ZONES.

In *The Geological Magazine* for April, Mr. E. Neaveison writes on 'The Zonal Nomenclature of the Upper Kimmeridge Clay.' 'The ammonites of the Upper Kimmeridge Clay, for long known by the comprehensive name *Ammonites biplex* have been identified in recent years with the Russian form *Ammonites pallasianus* d'Orb., and its allies. A detailed investigation, however, discloses that the English ammonites have no direct relation with the Russian forms, and are probably of later geological age. The Upper Kimmeridge fauna is rich in ammonites; so far twenty-five species have been described (in MS.) by the present writer, and these are distributed among eight genera, of which six are new.' The author then suggests five zones, viz., *pallasioides*, *rotundum*, and *pectinatus*; the other two 'cannot be named until the ammonites are figured.'

TIMBER.

By the aid of forty-one plates, one of which (Pl. VIII.) we are able to present to our readers, Mr. H. Stone has produced a work for the benefit of advanced students interested in Timber.* By numerous photographic illustrations of micro- and macro-structures of wood, he brings forcibly before his readers the merits and demerits of the different species, and also has an interesting chapter on Timber Diseases and the ways in which various woods are attacked by parasitic and other enemies. The thoroughness with which the subject is dealt with can be gathered from the fact that his chapters are headed:—Details of Grosser Structure; The Surface, Smell, Taste and Contents; The Tissues; The Pores or Vessels; The Wood-fibres and the Rays; The Soft-Tissue or Parenchyma; The Pith; The Mechanical Properties of Wood; Resistance to Strain; Resonance and Conductivity of Sound; Absorption and Shrinkage; Figure; Callus; Defects; Decay and Durability; Laboratory Practice. The author is evidently not a believer in waste, as while his pages measure $5\frac{1}{4}$ ins. by 8 ins., the part actually occupied by type measures 4 ins. by 7 ins. Most authors would have produced a volume of twice the size with this same material.

* 'A Text-book of Wood,' by Herbert Stone. London: W. Rider & Son. vii.+240 pp., 21/- net.



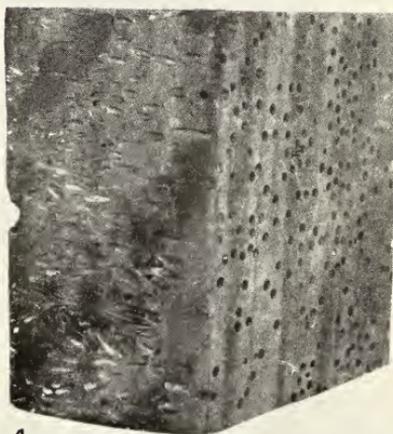
1



2



3



4

Figs. 1 & 2. Portion of branch of Evergreen Oak, the rays of which are indicated by the coarse spindle-shaped grooves.

Fig. 3. Section of Birch showing borings of the larvae of *Agromyza carbonaria*.

Fig. 4. Piece of Mahogany riddled by *Teredo navalis*.

RE-COLONISATION OF A WOODLAND FLORA AFTER BURNING.

W. G. TOWN.

A DISASTROUS fire, in 1921, in Peckett Wood, Hebden Bridge, destroyed nearly all, in many places quite all, the ground vegetation. In the most exposed parts of the wood, *i.e.*, near the rocky summit, and places thinly populated by trees, the fire has done most damage, only the blackened and charred remains of stems and roots remaining.

Among the early arrivals were a few patches of mosses. One of the first to appear was *Ceratodon purpureus*, in isolated patches on the burnt soil. While this moss forms large colonies on the Peckett roadside, and its general habitat is on sandy peat, I did not expect it on burnt soil. The moss usually found on this habitat is *Funaria hygrometrica*, but it was entirely absent here. The next moss found was *Tetraphis pellucida*—gemmaforme type, and may not be a new arrival. This moss also occurred on decaying plants on the rock ledges and under trees, where the soil was little, if at all, burnt. The very few plants to be seen apparently persisted through the fire. A third moss, at present not verified, was found in one or two small patches at the summit of the wood on the most exposed burnt soil. This is undoubtedly a new arrival, it was in good condition and colonising the burnt earth fairly well. On the sheltered rock ledges was the hepatic—*Lepidozia reptans*—the only hepatic located so far, and is somewhat scarce. This may, owing to its position, be a survival.

Turning now to the higher plants, the Rose-bay Willow Herb, *Epilobium angustifolium*, was found well up the hillside on the burnt soil, and in isolated patches. The seed of this plant must have been carried from the roadside below soon after the fire, and germinated. This plant usually extends its area by a creeping perennial rootstock, but the plants found were too far away from the roadside for this means of propagation to have been the cause of their appearance. Another plant, quite common on the adjacent land above the wood, the Sheep's Sorrel, *Rumex Acetosella*, was found colonising the burnt soil at the summit of the wood. I also found the Wood Sage, *Teucrium Scorodonia* and *Lamium purpureum* in good form and in bloom. I think *Teucrium Scorodonia* was a new arrival, as it occurred only on very burnt soil, but in the case of *Lamium purpureum* these colonies seemed too well grown and too large to be new arrivals, and occur on soil not badly burnt. What few patches remain of the Heather,

were very apparently survivals, and occur only on the sheltered rock ledges. In most cases *Rubus fruticosus* was burnt to a cinder, but in one or two instances the rootstock had escaped injury and fresh buds could be seen. *Pteris aquilina*, and *Scillia nutans* seemed to have escaped in some cases, owing to their deep-seated roots and bulbs, and made fair growth last year. *Vaccinium Myrtillus* was scarce, and only found on rock ledges on good humus, the soil here had not been burnt; these must rank as survivals.

The trees, mostly Oaks, were recovering fairly well. In the spring they were in good bud, and later in full leaf. Under the trees the fire had not damaged the soil to any great extent, and grasses occur fairly well; one, I believe a *Festuca*, and abundant on the adjacent fields, is making its way along the summit of the wood. The seed seems to have germinated on the burnt soil, and may be a new arrival. Owing to the very wet season, *Protococcus* is clothing the rocks well, and a small quantity of a Lichen, probably a *Cladonia*, was also seen. I only located one species of fungi, and this Mr. S. Fielding kindly names as *Polyporus repandi*.

In some portions of the wood are a few seedling oaks, with two, three and four leaves, also a few young Blackberry plants.

—: o :—

NEOCOMIAN AMMONITES.

As an illustration of the intensive study of a particular fossil group, reference may be made to a paper by Dr. L. F. Spath in *The Geological Magazine* for February, 'On the Ammonites of the Speeton Clay and the Sub-divisions of the Neocomian.' With regard to the Speeton Clays, Dr. Spath follows Judd (*Q.J.G.S.*, 1868) in using the Ammonites for zonal purposes, although Lamplugh (*Q.J.G.S.*, 1889), owing to the relative paucity of Ammonites, adopted the more frequent Belemnites as a basis for classification of the beds. On this point Dr. Spath writes 'The modern refinement in stratigraphical and palæontological nomenclature, and the additional knowledge of the last thirty years, necessitated a revision of the Speeton sequence; but this revision would have been impossible without the study of the splendid collections accumulated by Mr. C. G. Danford and Mr. G. W. Lamplugh, F.R.S. To the latter I am particularly indebted for continuously placing at my disposal his unrivalled knowledge of the succession, and, in the course of many discussions, both before and after my visit to Speeton, criticizing my views. The section, unfortunately, still represents the "huge mess," so vividly described by Mr. Sheppard, though, with

sufficient patience, all the beds can be examined "in place," in view of Mr. Lamplugh's excellent accounts. If I follow Professor Judd in pinning my faith to ammonites, not belemnites, it may be explained as the natural prejudice of a specialist. There may be a very marked change in the belemnite fauna at all the sectional boundaries, as Mr. Danford stated, but even Stolley's minute researches on the North German belemnite successions did not enable him to zone the Aptian of that country. For from an examination of my table of Aptian zones it will be seen that the fauna of e.g. Ahaus is later than the *deshayesi* horizon (subzone of *Chelonicerus hambrovi* in Spath, p. 147) and earlier than the fauna with *Parahoplites schmidti* and *Sanmartinoceras trautscholdi* (*aschiltaensis* subzone of my table). Nor did Stolley discover the absence, in North Germany, of probably the whole of the Lower and the lower part of the Upper Gault.'

Dr. Spath, in his microscopic examination of the difficult species of Ammonoidea from Speeton and the Lincolnshire Neocomians, finds that his predecessors have made very many erroneous determinations leading to unsound classification and zoning. This is usually the case when one worker devotes his energies to one particular group, and, doubtless, in the future even Dr. Spath's conclusions may need revision : in this way finality seems almost beyond hope.

Unquestionably Dr. Spath's work will have added to our knowledge of the palæontology of these ammonites, and for this we must be grateful, albeit the number of workers must necessarily narrow as time goes on. A quarter of a century ago the present writer could identify any of the usual ammonites found at Speeton, and he believes correctly, so far as our knowledge then went. After a further twenty-five years' acquaintance with the literature which has since accumulated on the subject, he now hesitates very much to attach a name to a single specimen ! And Dr. Spath will, I know, appreciate the position when we say that his paper does not simplify matters for us, especially in the absence of descriptions and illustrations of the new species enumerated. These, it is to be hoped, will eventually appear in the *Monographs of the Palæontographical Society*, where a valuable instalment of Dr. Spath's memoir on the Gault Ammonoidea has recently been published. In the meantime the species indicating the different zones are enumerated by Dr. Spath in a manner which puts his paper out of the reach of the amateur, and can only be grasped by a fellow-specialist, though this, it may be held, does not make it scientifically of less value. For example, the following is a description of the palæontological features of one of the divisions in the B. series at Speeton :

' B (top and upper). *Callizoniceras*? (" *Desmoceras* ") sp.n. (*hoyeri* group) *Pseudosaynella plana* (Phillips non Mantell). *Aconeceras nisoides* (Sarasin) v. Koenen and spp. juv. *Parahoplitooides fissicostatus* (Phillips). *P.* aff. *tenuicostatus* (v. Koenen). *P. bodei* (v. Koenen). *P.* sp.n. (*læviusculus* group). *Ancyloceras* sp.n. aff. *pingue* (v. Koenen). *A.*? sp. nov. ? *Hemicrioceras* sp. nov. (*rude* group). *Parancyloceras bidentatum* (v. Koenen). *P. scalare* (v. Koenen). *P.*? sp.n. aff. *ægoceras* (v. Koenen). *Toxoceratoides royeri* (d'Orb.) v. Koenen. *T.* aff. *royeri* (d'Orb.). *T.* cf. *plicatus* (v. Koenen). *T.* cf. *fustiformis* (v. Koenen, pars). *T. seminodosum* (Roemer). *T.* cf. *æquicingulatum* (v. Koenen). *T. rotundus* (Phillips, non *Helicoceras rotundum* Sowerby sp.). *T. rotundus* (Bean MS. non Phill.). *T. obliquatum* (Young & Bird). *T. sheppardi* sp. nov. (" *Ham. attenuatus* " Phillips, i, 25). *T.*? cf. *trispinosum* (v. Koenen, pars). *Leptoceras* cf. *parvulum* Uhlig.'

The terrific multiplication of names by the specialist is presumably essential, but it is exceedingly confusing to the stratigrapher and even to the palæontologists other than a small handful of ' ammonite-men.' We thought we had done well to master Pavlow's usage of ' Hoplites,' ' Polyptychites,' ' Olcostephanus ' and a few other generic terms. But now ' Hoplites ' alone—formerly lumped—quite conveniently as *Amm. noricus*—is split up into four or five genera, each with its group of species. And at present (and presumably for some time to come) these names must remain as names only, unless anyone happens to be immersed in the special literature, or to have access to the specimens labelled.

In view of a recent statement* by eminent palæontologists that the Lower Gault is absent at Speeton, it is to be noted that Dr. Spath recognises ' Lower Gault ' Ammonites from the top marls. When doctors disagree how is the poor amateur to decide?

By the courtesy of Dr. Spath, who has kindly assisted in the determination of some of the more difficult species from the Speeton series, we are able to publish for the first time photographs of some of the new species he has recently described, and we must thank him for the recognition he has given to recent workers on the Speeton Clay by naming certain species after them; in this way names have been given in honour of Pavlow, Stolley, Lamplugh, Danford, Stather and T. Sheppard. Upon these Dr. Spath kindly supplies the following note.—T.S.

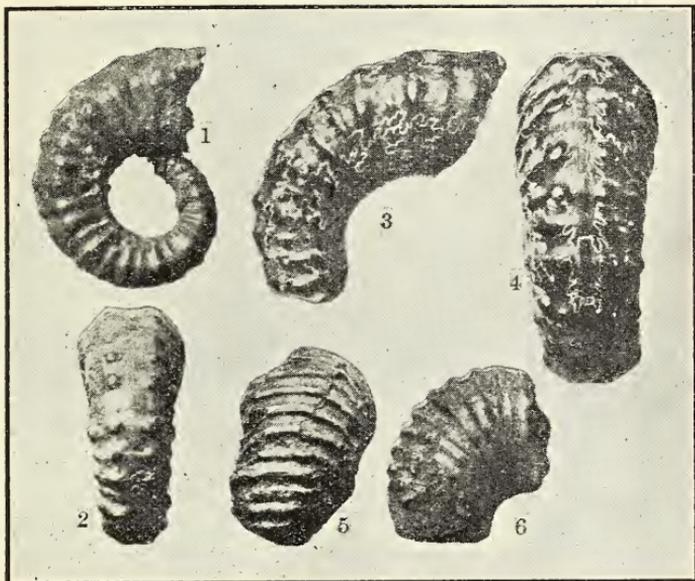
* Kitchin and Pringle, *Geol. Mag.*, May, 1924.

NEW SPEETON AMMONITES.

L. F. SPATH, D.SC., F.G.S.

The first example was labelled '*Ammonitis hystrix?*' and marked 'a good specimen of a rather rare species;' but Prof. Pavlow's later label is '*Crioceras* or *Ancycloceras* sp. indit.'

The second specimen, in all characters, and in mode of



Figs. 1, 2.—*Paracrioceras statheri* Spath. Side and peripheral views ($\times 2$) of a specimen from Speeton, 'Zone B, lower part,' in Mr. Lamplugh's Collection.

Figs. 3, 4.—*Paracrioceras statheri* Spath. Side and peripheral views ($\times 2$) of a fragment in the British Museum (Nat. Hist.) from Speeton (Bean Collection, No. 89105a).

Figs. 5, 6.—*Toxoceratoides sheppardi* Spath. Side and peripheral views ($\times 2$) of a fragment from 'B top, Speeton,' in Mr. Lamplugh's Collection.

preservation, agrees with the holotype in the Yorkshire Museum (Phillips's *Crioceras beani*, pl. I., fig. 28, non Young and Bird), and a specimen in the Museum of Practical Geology (No. 22236, Mr. Danford's Collection) that came from 'C top,' Speeton. Another example, in Mr. Lamplugh's collection is labelled 'C4, beach,' so that the range of *Paracrioceras statheri* apparently is from Upper C into Lower B, like that of e.g., *Craspidodiscus*.

Toxoceratoides sheppardi is a later (Aptian) form, and is more hamitoid in its character than the other Speeton forms recorded. The figured example was associated with *Paranycloceras bidentatum*, *P. scalare* (v. Koenen), and *Toxoceratoides* sp. ind. (*royeri* group). The form figured by v. Koenen as *Ancyloceras fustiforme* (pl. xil., figs. 4, 5, 9 non 7. *Toxoceratoides* of *fustiformis* v. Koenen, pars, in Spath, 1924, p. 78) is probably close to *T. sheppardi*, but it shows a distinctly trituberculate straight shaft. The original of Phillips's fig. 25 of pl. I. (*Hamites attenuatus* non Sowerby) does not appear to be in the Yorkshire Museum, and the figure is diagrammatic, so that the resemblance of *T. sheppardi* to *Hamites attenuatus* had to be relied on in its identification with Phillips's form.

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Fifty Years in Madagascar, by **James Sibree**. London: George Allen & Unwin, Ltd., 359 pp., 12/6 net. Mr. James Sibree is not a beginner in the way of writing books, and his 'Naturalist in Madagascar' was a particularly successful volume. In the present book he deals very largely with Missionary work, but among the pages are many interesting facts relating to the great island in which he lived for so many years. The natural history of the island having been dealt with so thoroughly in his previous volume, the subject is rather neglected here, but the information he gives about the people, their houses, religion and so on, is well worth perusal.

Downland Pathways, by **A. Hadrian Allcroft**. London: Methuen & Co., xi.+292 pp., 7/6 net. This author is already well-known as an archæologist for his admirable volume on 'The Earthworks of England.' His knowledge of the Sussex Downs and of their various archaeological and other treasures is unrivalled. Whether describing the remains of a prehistoric fortress, a mediæval castle, or modern parks and pleasure grounds, he is equally at home, and his pleasant style will make his volume popular throughout the country, though of course particularly appealing to those in the south. In the series of twenty-four chapters he deals with Lewes, Wilmington Hill, The Devil's Dyke, Steyning, Bignor, Chichester, Selsey and many other well-known places. The book is well illustrated, and though portions of it have perviously appeared, it is a welcome addition to our knowledge of Sussex topography.

The English Catalogue of Books for 1924, giving in one alphabet, under author and title, the size, price, month of publication, and publisher of books issued in the United Kingdom. London: The Publishers' Circular, Ltd., 414 pp., 15/7 net. This volume contains the Eighty-seventh Yearly Record of books published in the United Kingdom for 1923. The Editor, we presume, is Mr. R. B. Marston, the Editor of *The Publishers' Circular*, gives some interesting statistics relating to the works published. From these we gather that under 'Science,' a total of 678 volumes appeared in 1923, compared with 597 during the previous year, so that the output of scientific work seems fairly regular. Fiction reaches 2487, Juvenile 1048, History 515, Philosophy 319, and so on. The Editor's method of preparing his lists is helpful to the naturalist; thus, under Biology, or Birds, Kearton, or Witherby, one sees at once the work accomplished in a year so far as separately published volumes are concerned. A directory of publishers appears at the end, together with English Agents of American and Canadian firms. The book is indispensable to librarians.

THE PLANKTON OF THE RIVER WHARFE.

R. W. BUTCHER.

DURING 1921 and 1922, periodical collections have been made of the plankton of the River Wharfe. The samples were taken by allowing the water to flow for thirty minutes through a net (100 meshes to the inch) at Harewood Bridge. Note was also made of the hardness, turbidity, temperature and level of the water above a fixed mark. The results are given in Table I. and in Fig. 1. The hardness of the water was estimated in the field with soap tablets, and the comparative turbidity was obtained by observing the depth at which a pin on the end of a rod became invisible.

TABLE I.

Date.	Tem. °C.	Hardness in degrees. (Clark).	Water level in inches.	Rainfall in inches previous week		Turbidity in inches (see above).
				at Harewood.	at Burnsall.	
2- 1-21	—	8	38	—	—	10
5- 2-21	—	10	23	0·45	0·19	20
5- 3-21	—	11	13	0·77	0·41	25
3- 4-21	10	12	4	0·83	0·26	30
30- 4-21	16	11	3	0·22	0·42	36
27- 5-21	16	11	2	0·15	0·05	35
12- 7-21	21	11	0	0·05	0·09	24
20- 8-21	18	10	3	0·14	0·39	30
2- 9-21	12	8	36	2·38	1·50	18
16- 9-21	13	11	5	1·27	0·84	20
16-10-21	12	8	6	0·46	0·24	28
2-12-21	6	9	36	0·10	0·21	10
3- 1-22	4	11	13	3·36	1·53	17
10- 2-22	2	10	5	0·88	0·41	25
10- 3-22	4	11	9	1·82	0·88	20
26- 3-22	3	10	4	0·68	0·32	30
23- 4-22	8	12	3	0·13	0·42	22
7- 5-22	10	12	2	0·16	0·11	30
21- 5-22	12	11	2	0·56	0·41	30
22- 6-22	14	10	3	0·13	0·25	36
17- 7-22	12	11	5	0·68	1·06	20
8- 8-22	11	8	41	1·93	2·67	11
20- 8-22	12	10	6	0·66	0·19	27
20- 9-22	10	10	8	2·17	1·63	20
24-10-22	7	9	2	0·17	0·31	22
11-12-22	2	9	11	0·16	0·14	19

TOPOGRAPHY.—The Wharfe has its origin on the mountain limestone, flows over this for several miles, then over millstone-grits and alluvia, until it reaches Harewood Bridge. Unlike the rivers in the south of the county (the Aire, Calder and Don), it is little polluted, the only towns of size above Harewood being Otley and Ilkley, although much of the

drainage area is cultivated. The most important tributary is the Washburn, which is a stream flowing over the millstone grits, and passing through the Leeds Corporation reservoirs. There are no other streams of importance.

NATURE OF PLANKTON.—The composition of the plankton will be seen in Table II., and its relation to the main physical factors is shewn in Fig. 1. The amount of plankton is small, more than 2 cc's has never been collected at one time, and frequently there is much less. There is always a certain amount of debris, especially in flood times, and this prevents any quantitative records of plankton being sufficiently accurate to be of value. The plankton consists of Diatoms most abundantly, Protococcales, two genera of Myxophyceæ—*Oscillatoria* and *Merismipedia*—and a few Desmids. Only the most characteristic species are given in the table, casual individuals are not mentioned.

MAIN PERIODICITY OF PLANKTON.—From November to February the number of diatoms is very small, and represented chiefly by *Melosira varians* and *Navicula viridula*, then there is a steady increase to a maximum from the end of April to May; *Navicula viridula*, *Synedra Ulna*, *Amphora ovalis*, *Fragilaria virescens*, *Diatoma vulgare* all being very abundant, but *Melosira varians* only occasional. A rapid decrease follows in June, and afterwards the number remains about the same till the following spring. The Protococcales are abundant from June to October and almost absent for the rest of the year.

Oscillatoria is abundant in May and June, but individuals are seen throughout the year. Desmids appear at two periods. *Gonatozygon monotacnium*, some species of *Closterium* and *Cosmarium* are present in the summer maximum of Protococcales, and *Closterium Ehrenbergii* and *Cl. moniliforme* again appear in the winter months. The general nature of the plankton is thus similar to the results obtained by other workers—Fritsch (1 and 2), Kofoid (4), West (7).

Modification of Main Periodicity.—The periodicity indicated above is subject to small changes brought about by various environmental factors.

(a) **TEMPERATURE.**—Variations of temperature have usually been suggested as bringing about algal periodicity, but reference to Fig. 1 will show the period of high temperatures comes soon after the spring maximum of Diatoms, and appears to have little definite relation to the summer maximum of Protococcales, and the accompanying slight changes. Compare, for instance, Sept. 2nd and Sept. 16th, 1921—there is only one degree difference in temperature, but the plankton consists abundantly of Diatoms and Protococcales in the former instance, and Diatoms only, in

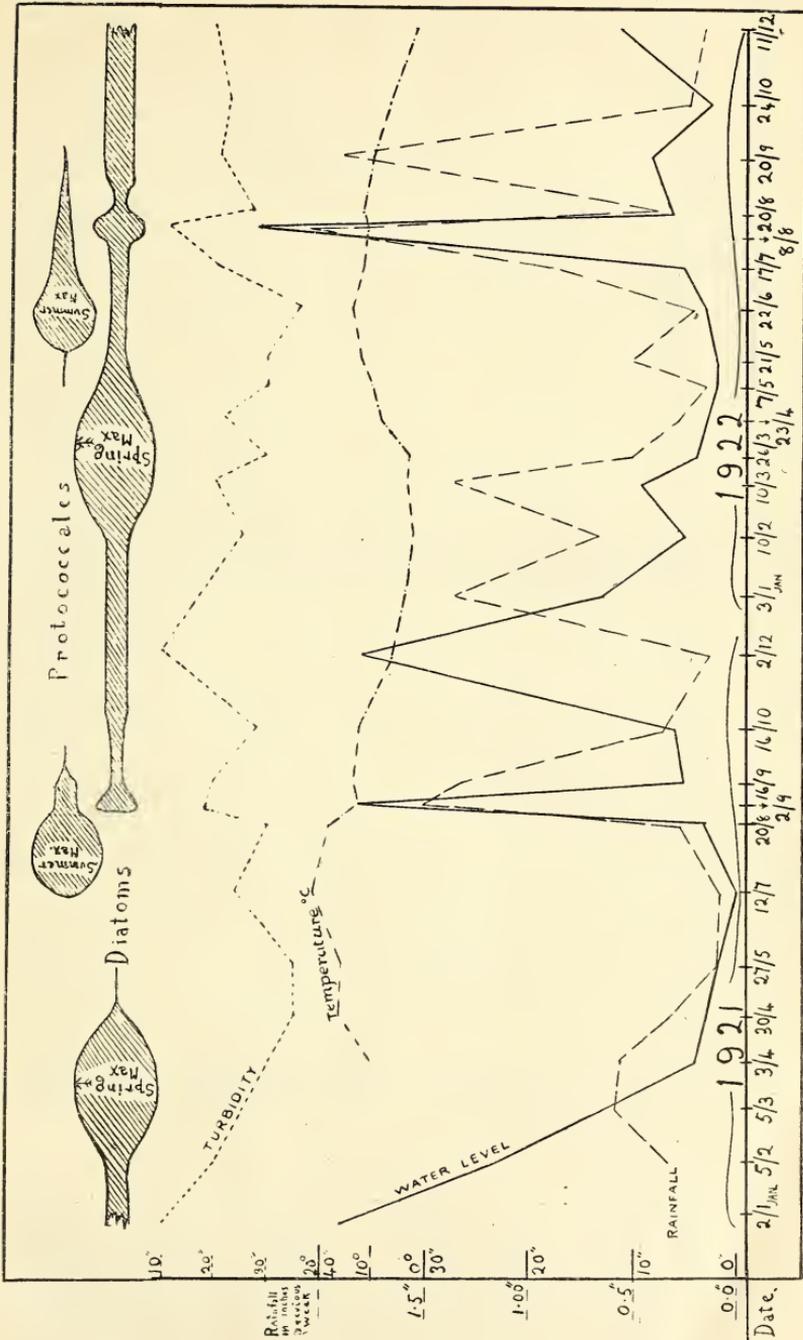


FIG. 1.

TABLE II.—COMPOSITION OF PLANKTON.

LIST OF SPECIES.	DATE—1921.										DATE—1922.													
	2/1	5/2	3/4	29/5	12/7	20/8	2/9	16/9	16/10	2/12	3/1	10/2	10/3	26/3	23/4	7/5	21/5	22/6	17/7	20/8	20/9	24/10	11/12	
<i>Tabellaria fenestrata</i> Kutz. var. <i>asterionelloides</i> ...	cc	—	IT	c	—	—	c	—	—	—	—	—	—	r	IT	—	—	—	—	—	—	—	r	c
<i>T. flocculosa</i> Kutz. ...	c	—	IT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Melosira varians</i> Ag. ...	ccc	ccc	r	—	—	—	IT	—	c	c	cc	IT	IT	ccc	cc	—	—	—	—	—	—	ccc	ccc	cc
<i>Meridion circulare</i> Ag. ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	IT
<i>Diatoma vulgare</i> Bary. ...	—	—	ccc	—	—	—	IT	—	—	—	—	IT	r	cc	—	—	—	—	—	—	—	—	—	—
<i>D. hiemale</i> Lyng. ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>D. anomatum</i> W. Smith. ...	—	—	cc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Fragilaria virescens</i> Ralphs ...	—	—	IT	—	—	—	—	—	—	IT	—	—	—	cc	c	c	ccc	cc	ccc	c	—	—	c	c
<i>F. capucina</i> Des.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Synedra Ulva</i> Ehr. ...	—	IT	cc	—	—	—	r	—	—	r	—	IT	IT	ccc	ccc	ccc	cc	cc	—	—	—	—	—	cc
<i>S. acus</i> Kutz. ...	IT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Asterionella gracillima</i> Han. ...	—	—	IT	—	—	—	—	—	—	—	—	—	—	IT	—	—	—	—	—	—	—	—	—	—
<i>Ceratoneis acus</i> Kutz. ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Cocconeis Pediculus</i> Ehr. ...	—	—	cc	—	—	—	ccc	ccc	ccc	ccc	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Navicula viridula</i> Kutz. ...	cc	ccc	cc	cc	—	—	cc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>N. pygmaea</i> Kutz. ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Pinnularia subsolaris</i> Grun. ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Stauroneis anceps</i> Ehr. ...	—	—	—	—	—	—	IT	IT	—	—	—	IT	IT	—	—	—	—	—	—	—	—	—	—	—
<i>Gyrosigma attenuatum</i> Kutz. ...	—	—	—	—	—	—	ccc	c	IT	cc	—	—	—	c	c	IT	r	IT	IT	IT	—	—	—	—
<i>Rhoicosphenia curvata</i> Kutz. ...	—	—	c	—	—	—	IT	IT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Gomphonema acuminata</i> Ehr. ...	IT	—	—	—	—	—	IT	IT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Cymbella aspera</i> Ehr. ...	—	—	—	—	—	—	IT	IT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>C. turgida</i> Greg. ...	—	—	—	—	—	—	ccc	cc	c	ccc	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Amphora ovalis</i> Kutz. ...	—	—	cc	—	—	—	ccc	cc	c	ccc	—	IT	—	—	—	—	—	—	—	—	—	—	—	—
<i>Bacillaria paradoxa</i> Gmel. ...	—	—	r	—	—	—	IT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Nitzschia subtilis</i> Grun. ...	—	—	ccc	—	—	—	—	—	—	IT	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Cymatopleura solea</i> Breb. ...	—	—	—	—	—	—	—	IT	—	IT	—	—	—	IT	ccc	ccc	cc	—	—	c	—	—	—	—
<i>Siruelia dentata</i> Schum. ...	—	—	IT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	IT	IT	IT	—
<i>S. biseriata</i> Breb. ...	—	—	IT	—	—	—	—	—	—	—	—	—	—	—	cc	c	cc	—	—	—	IT	IT	IT	—
<i>Oscillatoria tenuis</i> Ag. ...	—	—	—	ccc	cc	—	—	—	—	cc	—	—	—	—	IT	cc	ccc	—	—	—	—	—	—	—
<i>Merismipedia glauca</i> Ehr. ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	IT	IT	IT	—
<i>Tetraspora gelatinosa</i> Vauch. ...	—	—	—	ccc	cc	IT	IT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Pediastrum Boryanum</i> Turp. ...	—	—	—	cc	ccc	c	—	—	—	—	—	—	—	—	—	—	—	—	—	—	cc	IT	IT	—
<i>Chlorella vulgaris</i> Bey. ...	—	—	—	—	c	ccc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Scenedesmus quadricauda</i> Turp. ...	—	—	—	cc	cc	cc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ccc	—	—	—
<i>S. biguttatus</i> Kutz. ...	—	—	—	cc	cc	c	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ccc	—	—	—
<i>S. obliquus</i> Turp. ...	—	—	—	cc	cc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ccc	—	—	—
<i>S. acutiformis</i> Schro. ...	—	—	—	c	c	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ccc	r	IT	—
<i>Ankistrodesmus falcatus</i> Ralfs ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ccc	c	ccc	—
<i>Fandorina morum</i> Bory. ...	—	—	—	r	ccc	cc	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ccc	—	—	—
<i>Endorina elegans</i> Ehr. ...	—	—	—	IT	r	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ccc	—	—	—
<i>Volvox globator</i> Ehr. ...	—	—	—	IT	r	—	—	—	—	—	—	—	—	—	IT	—	—	—	—	—	IT	IT	IT	—
<i>Closterium moniliforme</i> Bory. ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Cl. Ehrenbergii</i> Menegh. ...	—	—	—	c	r	IT	r	—	—	—	c	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Cl. Dianae</i> Ehr. ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Cl. acerosum</i> Schrank. ...	—	—	—	—	—	—	—	IT	—	—	—	—	—	—	—	IT	IT	—	—	—	—	—	—	—
<i>Cosmarium</i> sp. ...	—	—	—	r	IT	IT	IT	—	—	—	—	—	—	—	IT	—	—	—	—	—	IT	r	IT	—
<i>Gonatozygon monotaenium</i> De Bary	—	—	—	ccc	cc	IT	IT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

NOTE :—The approximate frequencies used in the above table are those of Fritsch and Rich. (3)

ccc = very common = 100

r = occasional = 5

cc = common = 30

IT = rare = 2

c = frequent = 10

ITr = very rare = 1

small quantity, in the latter. Pearsall (6) has recently pointed out, as instanced by *Melosira granulata*, that many organisms may occur abundantly at any temperature. The above results confirm this view.

(b) TURBIDITY.—This also indicates the amount of free floating matter and the light intensity. Generally speaking, turbidity is great during the flood periods, due to the amount of debris washed into the river, and small when the river is normal or low. The Wharfe at Harewood is normally a clear river in which it differs from the Thames and the Cam. Hence important differences in turbidity occur at the same time as the important changes in water-level and are inseparable from it.

(c) WATER LEVEL.—As seen in Fig. 1, the water level has a very marked influence on the plankton. When the river is high Diatoms are always present in great numbers. This is very well shown by comparing the summers of 1921, which was a dry year, and 1922, which was wet (cf. Table III.). In the former from May to September the Diatoms are very scarce and Protococcales abundant, while in the latter year, though Protococcales are again plentiful, Diatoms are always common. A collection made on September 2nd, 1921, showed abundant diatoms and fewer Protococcales. This was immediately after two days heavy rainfall.

Water level is correlated with other changes as well as turbidity indicated above.

(i.) CURRENT.—At a given point on a river, current is directly proportional to the height of the river. It has been shown by Fritsch (1) and Kofoid (4) that a strong current decreases the quantity of plankton. There is also a change in nature as well as a change in amount to be considered.

(ii.) RAINFALL.—Heavy rainfall, which brings about floods, means that larger quantities of debris are washed into the river by its feeders, from ponds, and from littoral algæ. This view is to some extent confirmed by the increase of such diatoms as *Synedra Ulna*, *Amphora ovalis* and *Bacillaria paradoxa*. On the other hand, floods never appear to increase the number of species of Protococcales, even when the flood comes in the middle of the summer maximum (cf. September 2nd, 1921), while the species of *Closterium* appear to be connected only with the winter floods. *Oscillatoria tenuis* appears in the river in small masses of mud at the time when this is breaking up in ponds and giving place to the spring *Conjugatae*. Here is a definite example of a 'wash in.'

(To be continued).

YORKSHIRE NATURALISTS AND GEOLOGISTS AT EARBY.

W. H. PEARSALL, D.SC., F.L.S., AND F. A. MASON, F.R.M.S.,
Hon. Secretaries.

THE Union's first Excursion of the year was held in conjunction with the Yorkshire Geological Society, at Earby, during Easter week-end, April 19th to 21st. This combination demanded an almost exclusively geological programme, and as the arrangements of this were in the hands of Messrs. W. S. Bisat and John Holmes, the demand was adequately met. Several Members arrived on the preceding Thursday evening, including the leaders named above, Mr. W. B. Wright, Chief Officer of the Lancashire Section of H.M. Geological Survey, and Mr. Tonks, also of the Geological Survey.

The excursion to Barnoldswick, Weets Hill, Gill Beck, and Rough Lea were organised with definite objects in view, and these are fully dealt with in the report of Mr. Bisat, printed below. A popular account of the week-end investigations appeared in the *Yorkshire Post*, April 22nd, 1924.

A series of evening discussions proved to be a valuable feature of this Meeting, and although Mr. Bisat makes reference to them in his notes, preliminary mention here may serve to emphasize their importance. Mr. Bisat refers to Mr. Wright's masterly treatment of Wegener's hypothesis of continental drift, but one could not help feeling that it was a 'Wright and Wegener' theory that was being so lucidly, and at the same time so charmingly placed before Mr. Wright's audience, and that the workability of the hypothesis had substantially gained by the apparently unconscious collaboration.

Mr. Bisat characteristically withholds any mention of his own contribution of a lantern lecture on 'The Carboniferous Goniates of the North of England,' except to acknowledge his indebtedness to others. No other geologist could have given such a detailed account of the Goniates and their distribution, because Mr. Bisat dealt with facts, the collection and correlation of which are the products of his own work in the field and in the laboratory. More authoritative than our comments on this subject are the words of Mr. Wright, who pointed out at the close of the address that 'Members had been privileged to witness the consummation of a research which marked one of the greatest advances in geological science made during the last fifty years.' Appreciative remarks were also made by the Rev. Fr. Waddington, S.J., of Stoneyhurst College, who has himself spent many years in the study of the goniatite fauna of the neighbourhood.

On April 21st, a General Meeting was held at Headquarters under the Chairmanship of Dr. T. W. Woodhead, M.Sc., at which Sectional reports were rendered by the Chairman, Messrs. Butterfield, Fyshier, Jno. Holmes, Mason, and Winter. At this Meeting the Union had the pleasure of welcoming members of the Haworth Ramblers' Society who had spent the day in the district, and particulars of their excursion and its attendant incidents were recounted by Mr. Jonas Bradley. Votes of thanks were unanimously accorded to Messrs. Bisat and Holmes, and to the landowners who had so kindly and readily granted permission for access to their estates. A resolution protesting against the decision of the Ordnance Survey to discontinue distribution of the quarter sheets 6-in. maps was adopted, and the Hon. Secretaries instructed to convey this to the proper authorities. Eight new Members were elected, and the affiliation of the Honley Naturalists' Society was confirmed.

YORKSHIRE CARBONIFEROUS GONIAFITES.

W. S. BISAT.

THE geological section spent the greater part of the time examining the goniatite succession in the Bowland Shales and Sabden Shales. As a preliminary to the report on the results attained it is perhaps desirable to indicate broadly the present state of our knowledge of these zones. While the succession of life forms is on the whole now quite well known, there are certain gaps in our knowledge which it is desired to elucidate. There is a more or less complete succession of goniatites from the top of the Pendleside Limestone to the Lower Coal Measures, but gaps not yet filled in divide our sequence into three very unequal parts. From above, downwards, we have :—

- (3) A complete succession from the Halifax Hard Bed down through the main mass of the Grits (including the Kinderscout) into the upper portion of the Sabden Shales, as far down as the base of the Rough Lee section (*proteum* zone). The individual zones are well known in almost complete detail, and many have been proved to extend over wide areas.
- (2) A small succession in the middle and lower part of the Sabden Shales, best seen at Gill Beck, near Cowling, and elsewhere in Airedale, and with other exposures at Todmorden and Edale. These beds are not joined us definitely to (2) and (1), but must lie between the two divisions.
- (1) The broad sequence of forms found in the Bowland Shales, first pointed out by Hind, which has required considerable modification as the result of a more restricted use of specific names, but in which it cannot be said that an adequate conception of these zones is yet to hand. This arises in part from the poorness of the exposures, partly from the bad state of preservation of the shale specimens, and to some extent is due to the very inadequate collecting that has been done. As a result it is not yet known in many cases which features are constant and which merely of local value. Father Waddington's careful work at Dinckley is of the greatest help, but the section at that locality does not extend down to the Pendleside Limestone, and is therefore not tied in at the base.

It is known, for instance, that *G. crenistria* occurs both in the Mountain Limestone, also at the top of the Pendleside Limestone, and higher in the beds is still present at Dinckley, but the zone of this fossil is evidently a thick one, and includes many remarkable forms and ornament variants which probably have time value, but the true sequence of which is unknown. The same remark applies to *striatum* and *spirale*.

During this excursion the exposures seen were practically all in divisions (1) and (2) above, particular attention being paid to obscure horizons, and the following results may be recorded, working from the lowest zone seen upwards :—

Salterforth railway cutting shows steeply inclined beds of Pendleside Limestone, the top beds of which dip below rail level at the 229½ mile post. Eleven yards east of this (approximately 20 feet-25 feet above the limestone) is a thin (1-in.) black limestone containing goniatites, fragments of *Posidonomya becheri* and other lamellibranchs. Two good goniatites of the *crenistria* genus were extracted, differing widely in their adult form and ornament. The more unusual one is a stout form having the typical crenulate striæ in youth, but in the adult developing transverse costæ of considerable strength with intermediate close weak spiral striæ. This is apparently the ornament of an inner layer of the test. The umbilicus is rather wide, and a suture of the usual *crenistria* type is

seen. The specimen suggests affinities with *falcatus* (Rolmer, 1850), *subreticulatum* (Frech.) or even *Pericyclus kochi* (Holzapfel, 1889), a species which in Germany occupies the zone below *crenistria* (H. Schmidt, *Centralblatt f. Min.*, 1923, p. 741). The specimen is not unlike those from the shales in the stream at the south-west end of Hill Skelterton. The other specimen from the Salterforth band is a compressed form and has a shallow constriction, probably the last, at 20 mm. diameter. The specimen shows no trace of the transverse costæ of the first mentioned specimen. Both specimens differ considerably from the Dinckley *crenistria* seen by the writer, and may be from a lower zone.

The *spirale* zone was seen in a shale scar on the south side of Kelbrook, the spiral striæ being closer than in the Dinckley form, and nearer typical *spirale*.

The *pseudobilingue* beds were well seen in the gully on the north-west shoulder of Weets Hill, and contain two or three other badly preserved goniaticites of uncertain affinities. This zone was again seen in Elslack Brook, and rather abundant fish remains found in it.

The shale section adjoining the fault at Warley Wise Bridge, Gill Beck, was visited, and continued to yield badly preserved specimens of unusual character, belonging to three or more species. The beds are evidently very low, and may lie between the Pendle Grit and the Sabden Shales.

The higher beds in Gill Beck (above Stonehead Farm) have yielded to Mr. Holmes two well defined zones, the lower one containing a mixture of *bisulcatum*, *nuculum* sp. nov. (= *Pericyclus impressus* Hind, *Geol. Mag.*, 1918), and a cadicone species of *striolatum*-like character. Both these zones contain at least one good limestone band with well preserved goniaticites. A loose limestone block in the stream close to the outcrop of the upper zone contained typical strongly ribbed *diademas* of the same type as at Swartha Gill, and no doubt from the same horizon. This is a highly important, because wide-spread, zonal fossil, but though its position is approximately known, its exact relation to the other zones remains tantalisingly uncertain. The Rough Lee beds were visited and the five zones exposed there were demonstrated by Mr. Holmes.

The evening discussions were of great general interest. Mr. Wright favoured the members present with a short but masterly resume of the Wegener hypothesis of drifting continents, and considerable discussion followed. The writer gave a lecture on Carboniferous goniaticites, illustrated by lantern slides principally from Mr. Stiles' admirable photomicrographs. The members present and the writer in particular were greatly indebted to Mr. Hartley for providing and manipulating the lantern and accessories; also to Mr. Tonks for the loan of his fine section of the Millstone Grit in Lancashire.

In opening the discussion on the Ice Age and Early Man, the writer suggested the desirability of reconstructing, or attempting to reconstruct, from the scattered Quaternary deposits of Yorkshire some comprehensive picture of the succession of events from the beginning of the Ice Age to the advent of Neolithic man and the Pennine peat. Deposits requiring grouping and correlating include:—

The preglacial (or possibly pre-New Ice) mammalian deposits known from Sewerby, Raygill, etc., and the Sewerby and Hesse beaches.

The high level gravels of the Calder, of Brough, Holme-on-Spalding Moor, and the 'interglacial' high level beds of Kirmington.

The New Ice moraines and associated lake phenomena.

The patches of Old Ice boulder clays seen at Balby, Bentley Colliery, Tickhill, etc.

The Vale of York gravels at Heck and Doncaster, and the Vale of York warps.

The early flint implements of the Pennines and the Wolds, with a comparison of type and matrix.

The submerged forest bed.

Dr. Rowe described the great amount of careful work which had been done in the Bradford district by local collectors of the Pennine flints. Mr. Jno. Holmes exhibited and described a series of flint implements and a flint hammer stone from the neighbourhood of Cowling, and pointed out that these implements were known from Derbyshire to Wharfedale. Dr. Woodhead described and illustrated by photographs the detailed scientific work being done by Mr. Buckley in the excavation of old workshop sites on the moors around Huddersfield. He stated that these sites always underlie the peat and contain implements of Tardenoisian age, whilst scattered implements of Neolithic type occur a little way up in the peat. Mr. Wright pointed out that the occurrence of tree remains at the base of the peat, and the exposed position of the workshop sites suggested a more genial climate than at the present day, and instituted a comparison in time between this Pennine industry and the Azilian raised beach of Iban, which was contemporary with the 'climatic optimum.' Mr. Tonks pointed out that Major Collins is doing similar work on the Wharfedale hills to that of Mr. Buckley near Huddersfield, and Mr. Beaumont mentioned that flint implements are of general occurrence on the hilltops of the Rishworth area.

(To be continued).

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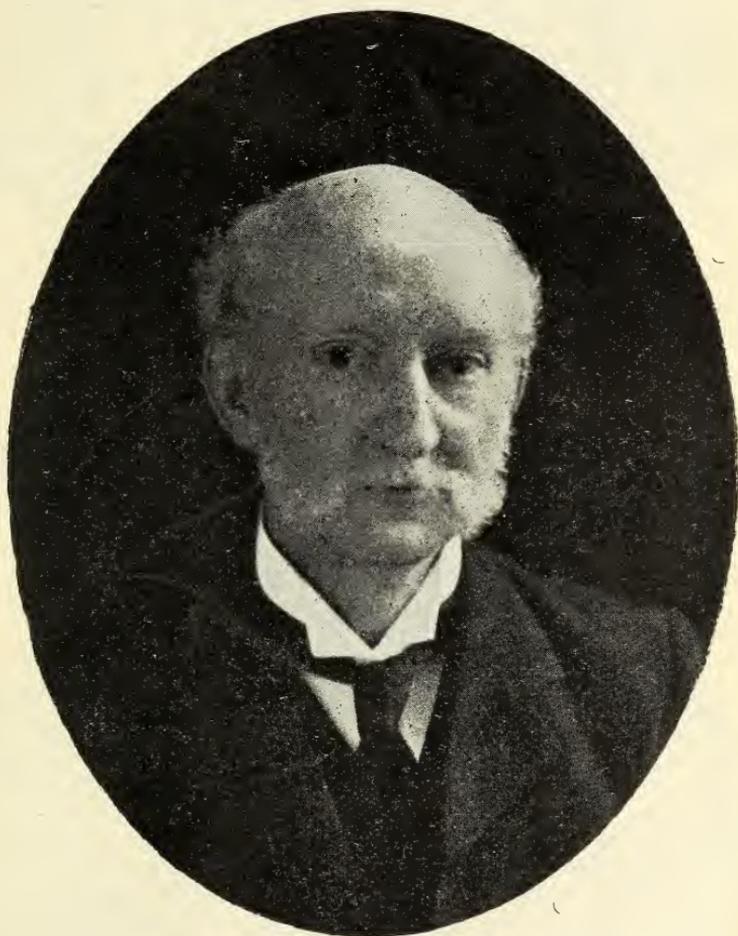
POPULAR NATURAL HISTORY BOOKS.

THERE has recently appeared an interesting number of new volumes dealing with the more popular side of natural history, which is some indication that there is a growing demand for works of this character, as already the booksellers' shelves are fairly well stocked. **Our Birds' Nests and Eggs, and How to know them**, by **E. F. Dağlish**. London: Thornton Butterworth, Ltd., 127 pp., 4/- net. This, the sixth of the 'How to know them' series, may be of some interest to beginners in identifying the more striking of the common birds' eggs, but as most of the plates are in black and white, even an expert would experience difficulty in identifying the species by means of the photographs alone. For example, the four eggs on Plate II. and the five on Plate III. might very easily be photographs of the eggs of the ordinary hen. The few coloured plates are better. The birds are dealt with under the heads of eggs, nesting period, nests, and remarks. **W. H. Hudson: a Portrait**, by **Morley Roberts**. London: Nash & Grayson, xiv.+320 pp., 16/- net. This handsome volume is a readable account of the life of one of our most popular naturalists, and contains various incidents in the life of this Sussex writer, and a photograph. In the eighteen chapters the author gives many interesting stories and reminiscences, and there is a good index. From a specimen of the late W. H. Hudson's manuscript it seems that, in common with other naturalists, his handwriting was neglected. **Birds in London**, by **W. H. Hudson**. London: J. M. Dent & Sons, xii.+251 pp., 6/- net. This is the second edition of Hudson's well-known work, which has probably already been read by most of our readers, but in its present form will no doubt be welcome. The type and illustrations are good, and we recommend the book as a very acceptable present to anyone interested in natural history, whether young or old. **The Clever Little People with Six Legs**, by **Hallam Hawksworth**. London: Chas. Scribner's Sons, 294 pp., 7/6 net. Under this title the author describes various forms of insects, and under such headings as 'In the Wonderland of Pigmy People'; 'How the Lilliputians Keep Halloween'; 'New-Year Calls on a Few First Families'; 'Washington's Birthday and the Insect Republics,' he describes the life history of the more familiar American insects. The stories are admirably written and will appeal to the young reader.

In Memoriam.

ARNOLD T. WATSON, F.L.S.
(1846-1924).

WE regret to record the death of an old and respected member of the Yorkshire Naturalists' Union, and a prominent citizen



of Sheffield, in the person of Arnold T. Watson, who, up to the time of his death, was the local representative of the Union in Sheffield, and for many years had been of assistance to the officials.

Mr. Watson joined the Yorkshire Naturalists' Union in

1885, and besides acting as Local Treasurer, he has served on the Marine Biological and other committees, and for some time was of service on the Executive Committee.

In Sheffield he took a prominent part in the work of the Literary and Philosophical Society, The Sorby Scientific Society, and many other organisations where his learning and affability were of great service. For a long time he held the position of Assay Master at Sheffield, and had a thorough knowledge of all matters relating to the assaying of silver, and gave delightful lectures upon the subject.

As a microscopist he was known throughout the country, and he took part in the Dredging Expeditions of the Liverpool Marine Biological Association.

He specialised in the study of marine annelids, and wrote a number of important papers on that subject. At the Hull Meeting of the British Association he exhibited a number of objects relating to his favourite study, and has since presented specimens of these exceptionally interesting organisms to the Municipal Museum at Hull. He was a familiar figure at the British Association Meetings, where his enthusiasm and sincerity were much appreciated.—T.S.

SIR HENRY CUSACK WINGFIELD HAWLEY, BART.

(1876-1923).

WE regret to record the death of Sir Henry Hawley, Bart. Formerly he was a regular attendant at the Fungus Forays of the Yorkshire Naturalists' Union, and took a keen interest in the work, but his removal from Lincolnshire to Sussex in 1914 prevented him from attending the Yorkshire Forays after that date.

He served during the war and was wounded.

He was a member of the British Mycological Society and of the Yorkshire Naturalists' Union, and served as referee for Pyrenomycetes for the latter up to the time of his death. He was particularly interested in this branch of the subject, and had been at work upon a monograph thereon for many years, but, unfortunately, this is not sufficiently complete for publication. His manuscripts and botanical collections have been presented to the British Museum (Botanical Department) by Lady Hawley.

He is present in the photograph group taken at Sandsend in 1914 on the occasion of a presentation to the late Charles Crossland (see *The Naturalist* for that year, page 385).

Sir Henry read for the Bar, and became a member of the Society of the Inner Temple. He was of an exceedingly



J. W. Boulton.



Sir Henry Cusack Wingfield Hawley, Bart.

retiring disposition, but his knowledge was always available to anyone interested in his particular subject.

J. W. BOULT (1847-1924).

THE death is announced of J. W. Boulton, of Hull, usually known as the 'Stonemason Naturalist,' at the age of 77. Boulton was a typical naturalist of the old school, taking a keen interest alike in butterflies, moths, land and fresh-water mollusca, and plants. He had been a member of the various natural history societies in Hull from the early 'eighties, and was proud of the fact that he prepared his own specimens and exhibited them in well-made cabinets. He was formerly employed by the Hull Corporation as a working stonemason, and no doubt his fondness for outdoor life had much to do with the fact that he lived to the age that he did. Some years ago Boulton's entomological collection was purchased by the Leeds University, but he immediately began collecting again, and has left behind large collections of local land, fresh-water and marine shells, insects, and flowering plants. His specimens were always attractive from the neat way in which they were prepared and exhibited.

Some years ago he prepared a List of Micro-Lepidoptera of the Hull District, printed in *The Transactions of the Hull Scientific and Field Naturalists Club* for 1903, and the same volume contains an appreciative account of his work from the pen of Mr. J. F. Robinson. To the Editor of these Transactions we are indebted for permission to reproduce the block.—T.S.

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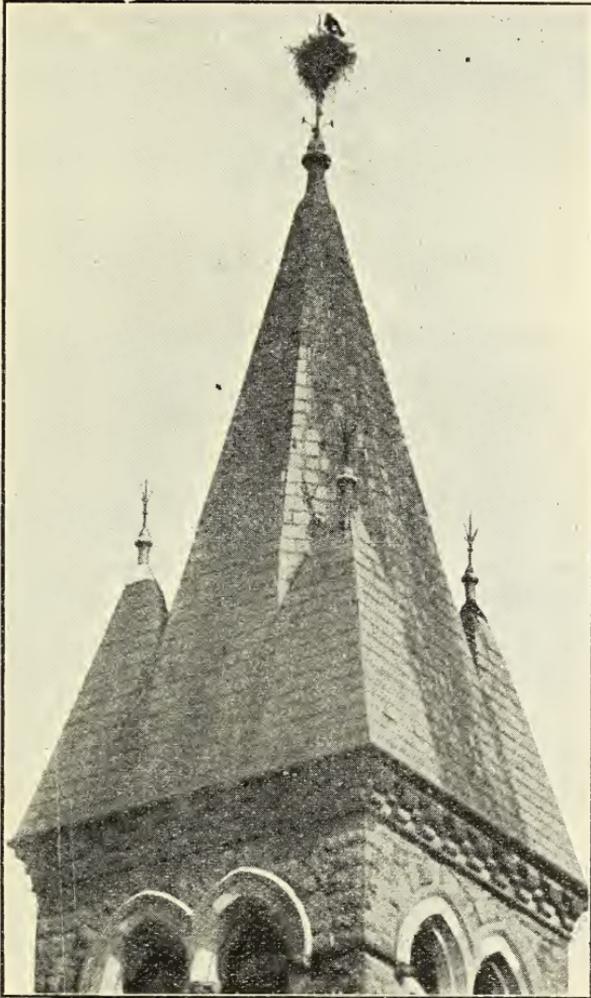
CORRESPONDENCE.

SEPARATION OF THE SEXES OF THE CHAFFINCH IN WINTER.

SIR.—Referring to *The Naturalist* for Oct., 1922, p. 333, owing to vast flocks of Chaffinches, which visited this district last autumn and remained for a considerable time, I had special opportunities of acquainting myself with facts on this question. The flocks, which I visited at frequent intervals for a considerable period, varied from a few hundreds to several thousands, and I can be quite sure the vast majority of the flocks in every instance were male birds; certainly not more than ten per cent., probably not more than five per cent., were females. It has never been my lot to see in this district a flock of Chaffinches in winter or autumn composed exclusively of females. Some assert that cocks keep to the high ground and the females follow the valleys in autumn and winter, but this does not apply to this district. Whatever diversity may exist among naturalists relative to this separation of Chaffinches in winter, I think it cannot be denied that this takes place over a large area of its distribution in some parts of Europe and Britain. Last summer a nest of the Chaffinch was found in Bingley Wood; the eggs were of a unicolorous blue colour, this being the second occurrence in this district of similar eggs. The other was found in Goit Stock Wood nearly forty years ago.—E. P. BUTTERFIELD, Bank House, Wilsden, March 15th, 1924.

FIELD NOTES.

Curious Site for a Rook's Nest.—Two Rooks have built their nest on a church spire at Boston Spa ; from a



distance it looks as if someone had decorated the spire with a huge mop. It is an exceedingly clever bit of bird engineering, and one wonders how they managed to get the first sticks to remain in position.—R. FORTUNE.

Grouse Wandering in Harrogate.—On Easter Monday a cock grouse was seen wandering down Victoria Road, Harrogate. He eventually flew away in an easterly direction. Why he wandered from the moors at this time of the year is

somewhat difficult to understand. He was evidently lost, for his flight took him away from the moors, which lie in a W. by N.W. direction.—R. FORTUNE.

Yorkshire Hippoboscid Flies.—*Stenopteryx hirundinis* L. is common and widely distributed in the Scarborough district on Sand Martins and House Martins; *Lipoptena cervi** L. has been sent to me by Mr. A. Gordon, of Helmsley, from the red deer in Duncombe Park; *Melophagus ovinus** L. (the common sheep 'ked')—Mr. Cheetham informs me that, curiously enough, this common parasite has not been definitely entered on our Yorkshire list, although it must be widely distributed; I have records from Hull, Middlesbrough, Richmond, Scarborough, Pickering and Helmsley. An account of these three insects occurs in the 'Cambridge Natural History, Insects, Part II.,' pp. 518-520.—GEO. B. WALSH, Scarborough.

Rare Yorkshire Fungi.—Mr. Frank Barnett, of the Leeds Naturalists' Field Club, recently handed to me a leaf of *Allium oleraceum* collected by him in July last in Weetwood Lane, Leeds, which was infected by a 'rust' fungus. On examination I found it to be *Uromyces ambiguus* Lévl. in the teleutospore condition, a fungus which is somewhat rare, and apparently unrecorded in this country on the present host plant (*A. oleraceum*). I sent specimens to Mr. W. B. Grove, M.A., of Birmingham, who confirmed the identification and also the fact that this is the first record of the occurrence of the fungus on *A. oleraceum* in this country. There is only one previous record of the species for Yorkshire (*The Naturalist*, March, 1912, p. 91), as follows: 'Mid. W. on *Allium Scorodoprasum*, Ripon, July, 1911, communicated by W. West to W. B. Grove, Birmingham University. Only recently recorded for Britain from Clare Island. There is a bit in the late Dr. Plowright's herbarium now at the above University, gathered by Rev. J. E. Vize, without date or locality.' The host plant, *A. oleraceum* has been verified, and has since been collected in the same spot where no other species of *Allium* occurs. Mr. Barnett also kindly gave me a 'smut' fungus occurring on a leaf of *Colchicum autumnale* at Barwick-in-Elmet, near Leeds, in June last year. This is *Urocystis Colchici* Schlecht. There are two previous Yorkshire records of this fungus (see Masee and Crossland's *Yorkshire Fungus Flora*, page 209), as follows:—'Mid. W. York., 1880, collected by J. A. Wheldon,' and N.W. Coverdale, Yorkshire Naturalists' Union Excursion, June, 1916 (see *The Naturalist*, pp. 299-300).—T. B. ROE, Leeds.

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B. Morley contributes 'Notes on Melanism in the West Riding of Yorkshire' to *The Entomologist* for May.

NEWS FROM THE MAGAZINES.

The Journal of the Ministry of Agriculture for April contains papers on the 'Hoary Peppermint, Lucerne.'

'The Protection of Nature in Britain' is the title of the leading article in *Nature* for April 19th, and should be widely read.

British Birds for May contains 'A Study of the Robin by means of marked birds,' 'The Status of the Water-Pipit in England,' and 'A Swallow's Method of Feeding Young with Flies.'

Discovery is one of the few papers which constantly enjoys the services of a new editor. Mr. R. J. V. Pulvertaft, recently appointed, retires, and at the moment Mr. H. B. C. Pollard holds the position.

The Scottish Naturalist, No. 146, shows an increasing number of records of the bittern in that country recently. Dr. James Ritchie also illustrates and describes a Pilot Whale stranded in the Forth.

'Nomenclature of Grasses and Clovers,' by Prof. R. G. Stapledon; 'The Home Range of Wild Animals,' by H. M. Batten; and 'The Food and Feeding Habits of the Blackbird,' by Dr. W. E. Collinge, are among many papers appearing in *The Journal of the Ministry of Agriculture* for May.

In *Man* for May, A. S. Barnes and J. R. Moir inform us that S. E. Glendenning and Hazzledene Warren are 'in the cart.' This reminds us that for the second time Mr. J. R. Moir resigns his position as a Fellow of the Geological Society. What we always wondered was why he became a Fellow.

We notice from *The Athenaeum* that a Librarian and Curator with 'considerable experience' is required for Chelmsford, at a salary of £250, rising by £10 to £300. The University of Liverpool requires an Assistant Librarian, 'languages essential,' for £200, rising to £245. Many hall porters are better off!

Among the contents of *Archæologia Aeliana*, recently published, are papers on 'Local Roman inscribed Stones,' by R. G. Collingwood and R. C. Bosanquet; 'Seals of Northumberland and Durham,' by C. H. H. Blair; 'Notes on the Manors of Shipley, Brandon and Branton,' by J. C. Hodgson, and an obituary notice of Robert Blair, by J. Oxberry.

We have received the first number of a new magazine, *The Amateur Aquarist* (8 pp., 6d.). It is edited by Mr. A. E. Hodge, F.Z.S., and is devoted to the study of Aquatic life. The first article is on 'The History Aquaria,' by E. G. Boulenger. There are notes on 'The Cradle of Life,' by the Editor; 'The Silver Water Beetle'; 'Trout-breeding Experiences,' etc.

The Journal of the Northants Natural History Society and Field Club appears with its customary regularity, and the parts forming Volume XXII. are occupied largely by 'The Geology of the Northampton Sands' and 'The River Systems of the County,' by the Editor, Mr. Beeby Thompson. In addition are various useful notes on fossils, mammals, birds, insects, and plants, as well as historical notes and the valuable meteorological tables, all of distinct local interest.

In *The Oologists' Record* for March we learn that the sale at Messrs. Stevens' Auction Rooms recently, of the Elwes collection, was something of a surprise to many people. 'That a man who had so persistently deprecated the taking of rare British eggs should have possessed so many British taken eggs of White-tailed Eagle and a set of Bearded Tit's eggs, taken in Norfolk as recently as 1914, struck many people as being somewhat incongruous. We do not see why collectors, however eminent—we can think of no better word—cannot be satisfied with foreign taken sets of such species as the Bearded Tit. A time will doubtless come when collectors will be ashamed of, rather than proud of, British taken eggs of such species.'

NORTHERN NEWS.

The death is announced of Prof. G. A. Grenville Cole, of Dublin, one of our most brilliant and fascinating writers on geological and allied subjects.

The Scarborough Town Council propose to take over the Scarborough Museum ; in this way one of the few remaining privately-owned museums will become public property.

It is difficult to believe that the red 'sea-dragons' on the plate accompanying Part 32 of *Animals of All Countries*, could ever have been seen by any artist in his sober moments.

The *Hull Daily Mail* for May 13th reproduces a photograph of 'A Cuckoo's Nest.' As the note truly says, 'a cuckoo's nest is not often seen, and a photograph of the bird in the nest is even more rare.'

Volume XXV. of *The Journal of the Chester and North Wales Archaeological and Historical Society* is entirely occupied by 'The Siege of Chester, 1643-1646,' by the late R. H. Morris, edited and completed by P. H. Lawson.

On the occasion of the recent Annual Pilgrimage of the Gilbert White Fellowship to Selborne, a Memorial Seat was unveiled. Dr. Martin, who spoke, recorded that the Fellowship's memorial was unpretentious. Apparently the amount of subscriptions received had been very disappointing.

Professor J. L. Myres, M.A., F.S.A., will give an address to the meeting of the Corresponding Societies' Committee of the British Association, to be held at Wembley on July 22nd in connection with the Museums Association, and he will take for his subject 'The Protection of Sites of Historic and Scientific Interest.'

We learn from *The Yorkshire Post*, May 8th, 1924, that 'A male pine marten was trapped on Tuesday in a covert, two miles from Workington. The presence there of a creature, which clings precariously to the mountain fastnesses in the Lake District, is inexplicable. It had to travel through a country in which there are collieries, iron and steel works, and iron ore mines.'

The Belfast Natural History and Philosophical Society has issued a commemorative volume (212 pages) in celebration of its Centenary. It contains a history of the Society from its earliest days, with reproductions of photographs of its founders and principal members ; a list of scientific papers contributed by the members ; a list of donors to the Museum, etc. We do not like the advertisements, usually set up in very crude type, with which the volume opens.

Judging from the frequency of the press reports, the people who are excavating what is apparently a typical Roman site at Folkstone, have secured the services of an imaginative press correspondent. After telling us that the discovery is 'one of the most important ever made in British Archæology,' we find a long paragraph headed 'Crucified Man,' this being on the strength of a bone being found, which is thought to be human, through the middle of which is 'a clean hole the size of a thick nail' !

We learn from the press that 'The Scarborough Corporation has decided to purchase, at a cost of £6000, Londesborough Lodge and grounds in the Crescent, overlooking the South Bay. The house was formerly the property of the Earl of Londesborough. The property will be used to house the Harrison collection of foreign curios and wild animals. The late Colonel Harrison, of Brandesburton, the famous big game hunter, built up the collection and bequeathed it to Scarborough. It is the largest collection of its kind in the world.' The collection was not 'bequeathed' to Scarborough, as it was offered by the widow to at least two other Yorkshire museums. 'The largest collection of its kind in the world' is also hardly correct.

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PRINCIPALLY FOR THE NORTH OF ENGLAND.

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The Museums, Hull

AND
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WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
G. T. PORRITT, F.L.S., F.E.S.
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YORKSHIRE NATURALISTS' UNION.

COMMITTEE OF SUGGESTIONS FOR RESEARCH.

A meeting of the above Committee will be held in the Botanical Department, Leeds University, on July 15th, at 7 p.m., to consider the further development of the Rivers Investigation in Relation to Pollution.

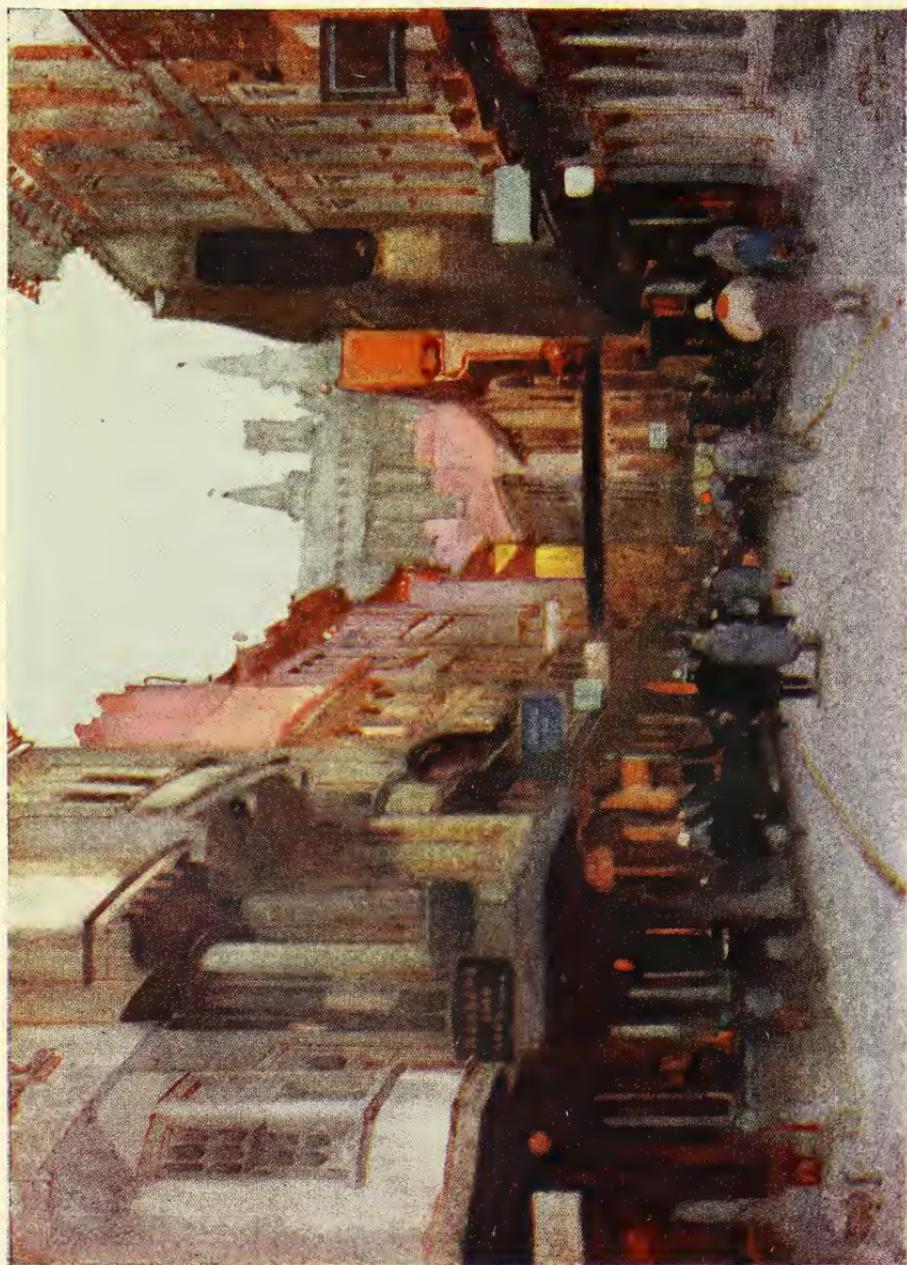
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NOTES AND COMMENTS.

YORKSHIRE.*

Under this title a sketch book by Fred Taylor, R.I., with a preface by Sir Lawrence Weaver, K.B.E., has been published. It contains a coloured frontispiece showing a street of York, presumably with reflections of the setting sun, and a large number of Mr. Taylor's well-known and excellent sketches of many of the beauty spots of our county. There are also coloured views of Knaresborough and Scarborough. It forms a useful record of many of the natural features as well as of the monastic buildings of the county. Sir Lawrence Weaver states, 'Scarborough and Harrogate, Ilkley and Robin Hood's Bay are words that ring with health and persuade to holiday. Mr. Taylor's art has opened fifty enchanting doors to the shire of broad acres; surely we shall be wise to follow where he beckons!' As Plate XII. we are kindly permitted to reproduce the above-mentioned beautiful frontispiece.

KENT'S CAVERN.

Mr. Harford J. Lowe has a useful note on 'The Excavation Products of Kent's Cavern and their Distribution' in the recently issued *Transactions and Proceedings of the Torquay Natural History Society*. It appears that probably the first geological discovery in the cave was made by Mr. J. Northmore in 1824, while searching for evidence of Mithra-worship. His specimens, however, were stolen, but subsequently, between 1825 and 1829, excavations were made, revealing bones, teeth, skulls and horns of mammals, with shaped flints and human remains.

SABRE-TOOTHED TIGER.

Dr. Buckland was consulted in 1825, and, no doubt, specimens he obtained went to the Oxford University Museum. There are notes on the disposal of teeth of the sabre-toothed tiger, and of the 22 of the 36 implements found. The general collection, according to the MacEnery notes, which are still preserved, comprised: '100 jaws of the Hyæna and 900 single teeth; Wolf, few specimens, one magnificent skull; Fox-jackal, 20 specimens; *Ursus cultridens* (*Machairodus*), 5 teeth; Bear, innumerable, thousands of teeth in floor of bear's den; Horse, great numbers of teeth, 8 portions of jaws; Rhinoceros, enormous quantities of bones, 400 enumerated teeth; Elephant, 36 perfect teeth, 2 tusks, 60 in all, 6 adults, 4 very old; Irish Elk, a dozen antler or horn specimens; Flints, 60.' Some of these went to Cuvier, in Paris, others to the British Museum, still others to the Torquay Society's collections.

* Advertising Dept., L. & N.E. Rly., York.

WHERE ARE THEY NOW?

In six manuscript volumes which are still preserved is a record of details of the discovery of over 7000 specimens, and of the disposal of many of them. From this we learn the following list of places to which objects were distributed :

- ' Bath Royal Literary and Scientific Institution, 40 specimens.
- Brighton Free Library and Museum, 58.
- Cambridge, Woodwardian Museum, 49.
- Essex and Chelmsford Museum and Nat. Hist. Society, 59.
- Exeter, Albert Memorial Museum, 209.
- Hull, Royal Institution, 41.
- Leeds Philosophical and Literary Society, 77.
- Liverpool Free Library Museum, 67.
- Manchester, Owen's College Museum, 81.
- Oxford University Museum, 54.
- Paris, Jardin des Plantes Museum, 30.
- Taunton, Somersetshire Arch. and Nat. Hist. Society, 132.
- Trinity College, Cambridge, Anatomical Museum, 24.
- Washington, Smithsonian Institution, U.S.A., 30.
- York, Yorkshire Literary and Philosophic Institution, 46.
- Dublin, Trinity College, 96.
- Edinburgh University Museum, 89.'

PENNINE MICROLITHS.

From Mr. F. Buckley we have received a privately-printed pamphlet (7 pp.) entitled 'A Microlithic Industry of the Pennine Chain. Related to the Tardenois of Belgium.' In this the author figures and describes a series of flint and chert 'gravers' and 'tools' from near Marsden, Yorkshire. He has consulted the Abbe H. Breuil, Messrs. J. Hamal-Nandrin, E. Rahir and L. Lequeux, as well as several English geologists and botanists. But we are not convinced! A very careful perusal of his pamphlet still leaves us wondering what evidence there is that there is any connexion whatever between the Pennine finds and those of Belgium! Nor are we able to understand what makes Mr. Buckley consider that one of the materials used for the manufacture of these so-called tools is 'a hard grey *Lincolnshire* flint.' He is a clever man, indeed, who can distinguish between a Lincolnshire and Yorkshire, or even foreign flint, especially when 'generally patinated white.'

GENERAL CONCLUSIONS.

However, we will give the author's own words under the above heading, albeit we cannot see that the evidence is satisfactory: 'We seem to have in these three habitation sites a glimpse at that development of the Belgian Tardenois industry, which has been so carefully worked out on Belgian sites by M.M. E. Rahir and L. Lequeux. It can hardly be

hoped that we should be able to trace the development of this industry here, where the occupation was neither so regular nor so continuous. But we are able to note in our own little series the predominance at first of the truncated blade, which later on develops towards a crescentic or triangular form. On the other hand there is no appreciable approach at any stage to the peculiarly pointed blades and triangles which we have been used to associate with our special Pennine Chain industry. That industry has a development within this area all its own. There may have been an ultimate approximation between the two industries, but it is yet to find.'

A DISCOVERY.

It is of interest to note the ways in which various publications appear. From a circular we have recently received we gather that a journal, recently announced as defunct, but since resuscitated, is now supported by Sir J. J. Thomson, O.M., F.R.S.; Sir F. G. Kenyon, K.C.B., F.B.A.; Prof. A. C. Seward, F.R.S.; Prof. R. S. Conway, F.B.A.; C. H. K. Marten, Esq.; Prof. W. L. Bragg, F.R.S.; E. Bullough, Esq., M.A.; M. P. Charlesworth, Esq., B.A.; Prof. G. A. Cole [now deceased]; The Rev. D. H. S. Cranage, Litt.D.; Prof. A. Dendy, F.R.S.; E. M. Fallaize, Esq.; Miss F. R. Gray; Col. H. G. Lyons, D.Sc., F.R.S.; Dr. W. H. Maw; Prof. Edith J. Morley; Lieut.-Col. C. S. Myers, M.D.; Mrs. G. V. Ormsby; George Peverett, Esq.; W. G. Rushbrooke, Esq., LL.M.; A. S. Russell, Esq., M.C., D.Sc.; Prof. A. C. Smithells, F.R.S.; H. R. Tedder, Esq.; Sir James Yoxall. With this galaxy of talent surely success is assured, *but*, notwithstanding, we are informed that 'in order to ensure the continuation of this periodical, the Trustees require a sum of not less than £500 to meet existing liabilities and the expenses of administration for the next four years.'

MORE 'DISCOVERIES.'

With four lines of headings in various sized types, and with the usual preface 'What is regarded by many geological and archæological experts as one of the most important discoveries made during the present century,' nearly a column is occupied recently in an important provincial paper, and we are informed that 'The discovery upon which Mr. Mann has been engaged for many years, relates to a slight veer in the meridian line. It will bring about a revolution in many sciences, and all astronomical and geodetic calculations will have to be readjusted on account of the fact, and Mr. Mann has had his theory mathematically proved beyond doubt that the datum line which hitherto was supposed to be practically stationary is of a vacillating nature.'

HARMONIC RAISED BEACHES.

Mr. Mann tells us that 'One circuit of the earth and one oscillation of the crust occurred every 8,800 years, and was the cause of the changes in the relative level of the land and sea. The amplitude of the oscillation was gradually decreasing and hence there was a succession of raised beaches and river terraces and of submerged surfaces and buried river channels all ranged in harmonic sequence. The rate of motion of the wave having been successfully measured, it was now possible to give an absolute chronological valuation of all pre-historic periods such as the various phases of the palæolithic age, and to assess the age further of the geological periods. This wave motion round the earth, hitherto unrecognised, seemed to be common to all members of our solar system as well as to those of other solar systems. It was one of two motions which seemed to be inherent in all congregations of gravitational matter, small and large, including the atom, the recently discovered internal mechanics of which demonstrated that point.'

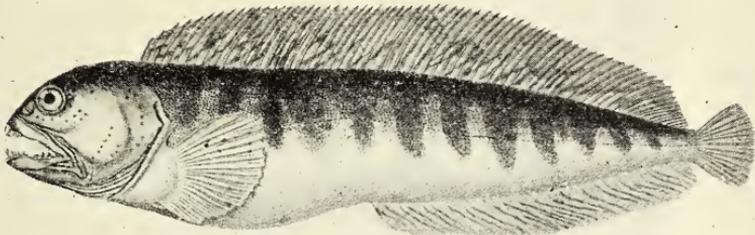
THE ILKLEY SCULPTURINGS.

Further, 'Mr. Mann states that Ilkley Moor, in Yorkshire, was probably the richest district in England in astronomical markings. The Swastika rock there had long been discussed, but the curious carvings upon it had remained an enigma. By means of the application of certain keys, however, he was now able to read the rock in the most precise manner. The Swastika cut upon the rock represented the sun's annual path in the heavens so accurately that it demonstrated incontrovertibly that those who cut the design about 2,000 B.C. were fully cognisant of the inequalities in the sun's motion, the discovery of which was usually attributed to Hipparchus, but was now known to have been common knowledge before his day. The cups and winding channel in Fylfot (or Swastika form) carved on the rock at Ilkley demonstrated by the most ingenious manner that ancient sculptors portrayed the inequalities of the sun's motion. For instance, the measurement of the medial line from the equinox to the north point of the summer solstice was $94\frac{1}{2}$ days, not a quarter of 365 days, and from that point to the autumn equinox another $92\frac{1}{2}$ days, or in all 187 days.' Notwithstanding all our journalistic friends tell us, we still think that the riddle of the Ilkley rock carvings remains unsolved, and we fail to see what bearing they have upon our raised beaches, submerged surfaces, and the chronology of prehistoric periods.

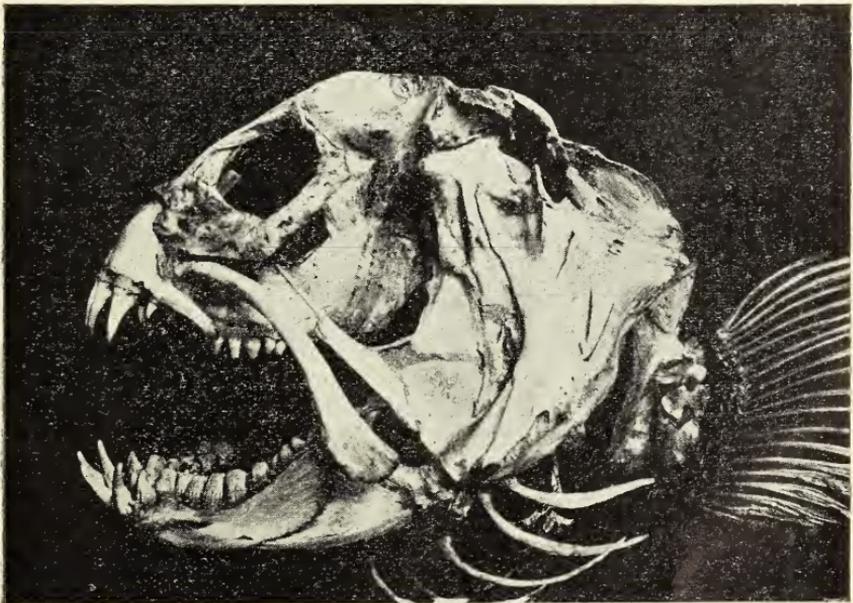
WOLF-FISH.

We are indebted to the editor of Hutchinson's *Animals of All Countries* and to the British Museum (Nat. Hist.) for

permission to reproduce the accompanying two illustrations of the Wolf-fish, a well-known species in the northern seas. It



attains a length of four feet, and is celebrated for its biting powers and the tenacity of its hold. The photograph of the skull shows the strong conical teeth in the front of the mouth



and the blunt crushing teeth behind. The Wolf-fish feeds chiefly upon crustaceans and molluscs, but is also fond of star-fishes. It is a Blennioid, which order includes the Blennies, Wolf-fishes, Kelp-fishes, Gunnels, Cusk-eels, etc., a large

and varied group of fishes that differ from the Percoids in having the pelvic fins, when present, inserted close together on the throat, or in one family between the branches of the lower jaw, and the soft rays of the pelvic fins reduced in number, never more than four.

BROADCASTING NIGHTINGALES.

We learn from *The Animal World* that 'everyone was interested in the recent statement of Captain Eckersley, that during the spring his company hoped to broadcast the song of the nightingale. It is proposed, he says, to travel by motor car into the heart of Oxfordshire, where the nightingale is a fairly common bird, and with a microphone and a small transmitting set, record the nightingale's song at some point in the near vicinity of a trunk telephone line where it would be put on to the studio at London, and from there broadcasted throughout the country. We hope that the effort will be successful, and that it will be followed by many others of a similar kind. Why stop at the nightingale? People may be induced, in this way, to think a little more about our wild birds than they now do, and this new interest will surely be for the benefit of the birds as well as for the public. The person who has learned to appreciate the song of a wild bird is not likely to wish to imprison that bird in a small cage.'

DARLINGTON NATURALISTS.

The annual meeting of the Darlington and Teesdale Naturalists' Field Club was held recently, when excellent progress was reported. The financial statement submitted by the Treasurer (Mr. R. H. Sargent) showed a balance in hand of £17. Mr. Nowers, the Secretary, reported that the past year had been most successful. The chief event had been the removal to premises in the Friends' Meeting House, Skinnergate, a step which had been justified by a considerable increase in attendance. Eight excursions had been arranged, lectures had been held, specimens had been presented to their museum, and several books had been presented to the library. Thirty new members had been elected, and this left the total at 138. Mr. R. Luck, the President, made an interesting address. He was not a specialist in any branch of the club's work, and his only claim to the position was a great love of Nature. The objects of the club were threefold. First, to provide a meeting place for those interested in natural history; secondly, to foster a love of Nature; and thirdly, to participate in a natural history survey of this country. So far they had chiefly considered the botanical and geological branches, but he hoped that some members would now do **something** to advance their work on the ornithological and entomological sides. The other

officers were elected as follows :—Vice-Presidents, Messrs. W. R. Wooler and J. B. Ord; Treasurer, Mr. R. H. Sargent (re-elected); Hon. Secretaries, Mr. J. E. Nowers and Miss Nowers; Librarian, Mr. J. Broadhead; Curators, Messrs. E. O. Sibson and C. P. Nicholson; Sectional Leaders, Messrs. H. D. Pritchett, R. H. Sargent, W. Hodgson, J. B. Ord, T. Sinclair and C. P. Nicholson. Members of Council, Dr. S. G. Mostyn, Miss Snaith, and Messrs. J. Bowker, H. Whalley, R. Borrow, and F. Young; Auditor, Mr. E. Dover.

EGG COLLECTORS.

In *The Oologists' Record*, Vol. III., No. 3, is an article on 'The Wild Bird Protection Bill, 1923,' by B. N. Carter. He states, 'Surely it is not the opinion of the authors of the Bill that all egg collectors are such unreasonable creatures. Have they (the authors) never taken an egg? How many of our experts (past and present) have commenced when boys by taking the egg of a Hedge Sparrow? How many of them would have followed this up if they had had the opportunity of adding thereto? Did the authors of our beautiful works on birds and birds' eggs, such as the Rev. F. O. Morris, H. L. Meyer, H. E. Dresser, and many others, never take an egg? Is it not a fact that many of the best collections eventually find their way to the museums? There is no object in placing every collector on a black list simply because a few may have abused their position. There would appear to be several serious omissions in the Bill, which does not take cognizance of, or define, a blown egg or an addled egg. It is seriously suggested that a person should be fined £5 for taking an addled egg? The idea is absurd. Taking another point. My only clutch of Landrails is one which was taken when the bird was killed by a mowing machine. Is a person to be prosecuted and run the risk of being involved in a possible penalty of £45 because he preserved such a clutch, instead of leaving the eggs to rot in the nest, or be sucked by the first Magpie or Weasel discovering them?'

FOUNDERS OF OCEANOGRAPHY.*

Anything from the pen of Sir William Herdman is always welcome from the freshness of its style, the originality of its matter, and the soundness of its scientific information. Few people have benefitted from the work of the Founders of Oceanography more than this author, hence his chapters on the Earliest Founders of Oceanography, Edward Forbes, Sir C. Wyville Thomson, Sir John Murray, Louis and Alexander Agassiz, and the Prince of Monaco are peculiarly welcome. Sir William tells us that 'the book is really based

* And their Work, by Sir William A. Herdman. London: E. Arnold & Co. xii.+340 pp. 21/- net.

upon a course of about twenty public lectures given in the winter of 1919-20, while I held, for the first year, the newly established Chair of Oceanography in the University of Liverpool. The purpose of the lectures was to put before my colleagues and students what I regarded as the scope and nature of this new university subject, and to interest the public of Liverpool in the deeper knowledge of the seven seas that mean so much to that great port, by giving examples of the phenomena and some explanation of the methods of investigation of the problems of the ocean.' It is well illustrated by portraits of the great men whose work is described, and by photographs of marine life and the methods of studying it.

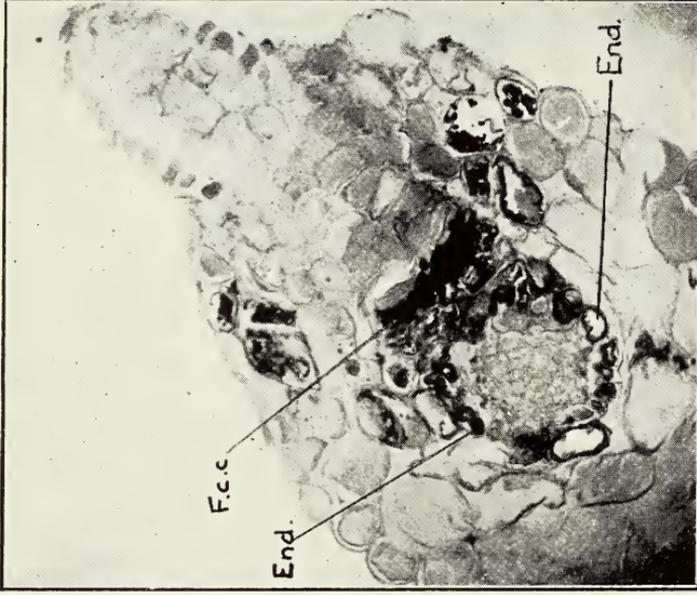
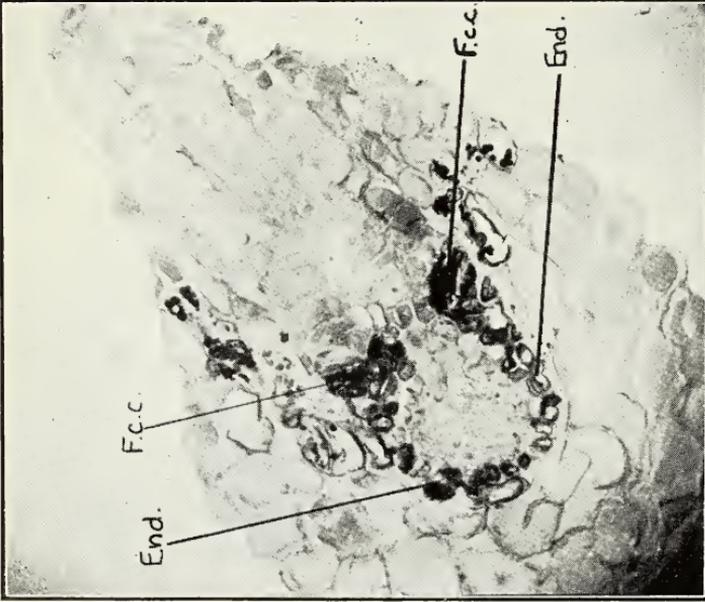
DERBYSHIRE NATURALISTS.

The Journal of the Derbyshire Archæological and Natural History Society, No. XLVI., is particularly valuable, though the archæology of the county receives most attention. F. Williamson contributes a useful 'Glossary of Words used by the Derbyshire Lead Miners during the past 250 years'; there are several short notes dealing with stone, bronze and iron (Viking) axes; H. C. Hayward gives notes on the 'Lepidoptera of Repton, 1923'; and N. H. Fitzherbert contributes 'Ornithological Notes for Derbyshire, 1923.'

THE PHYSICAL TRAINING OF GIRLS.*

This most interesting book deals with a vital subject in a vigorous manner. It contains helpful suggestions as to the merits and shortcomings of the Swedish System of Physical Training, and the need for extension. Great stress is given to the necessity for accurate knowledge of the human body, and the tendency in schools to neglect the laws of physiology, and overstrain girls in the gymnasium. There is a long chapter devoted to Eurythmics and their value—musical, physical and as general training, as well as the value of singing in physical development. A particularly interesting chapter refers to Mrs. Diana Watts; this will appeal especially to those who have had the opportunity of seeing and hearing her, and the new school of training which is being developed by Miss Atkinson, and which is probably one of the systems of the future, is here described at length; the author's references to hockey are very severe, and will probably meet with disapproval from a number of Game's Mistresses in our schools, though probably this is anticipated. There are eight full page illustrations which are excellent.—M.S.

* Mary A. Johnstone, B.Sc., F.L.S., London: Sidgwick & Jackson, 120 pp., 3/6 net.



Untouched photographs of serial sections across root of a sterile seedling of *Calluna* at point of origin of a lateral root. **End.**—Cells of the endodermis, with black-stained suberin lamella. **F.c.c.**—Fatty contents black with osmic acid, sections otherwise unstained.

FURTHER NOTES UPON THE VASCULAR PLANTS CHARACTERISTIC OF PEAT.

MILDRED HINCHLIFF AND J. H. PRIESTLEY,
Botanical Department, The University of Leeds.

PLATE XIII.

IN connexion with the demonstration of work in progress upon peat and peat vegetation included in the exhibit made by the Yorkshire Naturalists' Union at the Hull Meeting of the British Association, a brief report was made (6) of some observations upon the characteristic anatomy of the plants growing upon peat. Attention was drawn to the fact that fat-impregnated layers were exceptionally well developed in all these plants, the cuticle thickening on the young shoot whilst the stem is also characterised by the early development of a secondary endodermis. Within this layer further fat-impregnated layers usually form at an early date in the shape of cork and all the superficial tissues outside the secondary endodermis, being cut off from supplies of sap, wither and disintegrate, and contribute to the fine vegetable débris so characteristic of a peat moor.

The fatty substances accumulating in this characteristic manner in the shoot are probably largely formed as bye-products in the constructive metabolic processes proceeding at the growing points, especially the apical meristem of the root; released later from the differentiated tissue they travel in the vascular system and migrate along the permeable walls of the shoot until they deposit in cuticle or endodermis (5). The fatty deposits in the walls of the cork cells may be bye-products formed by the synthetic activity of the meristem (phellogen) which gives rise to the cork (7 and 8). It would follow then that the plants growing upon peat may be characterised by a special metabolism which release an unusual quantity of fatty products in the differentiating tissues. It was pointed out in the previous note that this type of metabolism might have selective value for the plants of a peat habitat where the roots are notoriously under anaerobic conditions [Clements (1)] as the conversion of carbohydrate into fatty acid admits of the release of energy without drawing upon atmospheric oxygen. It was not intended to suggest, however, as has been assumed by one friendly critic (12), that when these plants were growing in other habitats in which oxygen has free access to the root systems that the metabolism of the plant should change fundamentally.

It is assumed that whenever the plants of the peat may be found growing in other habitats their methods of metabolism will remain unaltered, and as a result accumulations of fat

occur that similarly affect the development of the tissue systems. Such a method of metabolism, however, would seem to render the plant particularly suitable for growth in a peat habitat, and, indeed, to judge from the widespread prevalence of these structural features amongst the plants of the Yorkshire peat moors, it would seem that in this case plants without this peculiarity of growth are excluded from the habitat, either by the direct effect of the stringent edaphic and climatic conditions or by these aided by the competitive action of the typical peat plants.

That these peat plants retain their structural characteristics when grown under other conditions is well exemplified in plants of *Calluna vulgaris* and *Nardus stricta*, supplied to us by Dr. W. H. Pearsall, which were taken from a well-developed society of these plants flourishing on well-aerated stream gravels where the PH of the water supply is 6.8 to 6.3 and that of the soil approximately 5.6. Comber's test (2) shows these soils to be rich in dissolved mineral bases.

The structure and growth of these plants, together with their high fat content, is in all respects similar to that of the same species of plants growing in deep acid peat.

EXPERIMENTAL CULTURES.

Certain culture experiments have been carried out, with the object of determining to what extent the calcium content of the culture solution influences the growth of peat plants. Seedlings of *Calluna vulgaris*, with healthy root and shoot development, and height of shoot averaging half an inch, were transplanted from deep moorland peat to well-washed coarse sand in glazed pots. The plants were watered, through glass tubes reaching to the base of each pot, with culture solutions identical in respect of their dissolved inorganic salts, but varying in dilution, and in the amounts of calcium salt present. The sand was kept in a moist condition, and undue evaporation prevented by glass bells with open necks.

At the same time, numbers of germinating seeds of *Calluna vulgaris* were similarly cultured. These were in all cases not yet free from the seed-coat, nor were the seeds yet free from the fruit and the persistent calyx of the flower.

The cultures lasted from June 16th, 1922, to February 23rd, 1923, during which time, very little growth in length of shoot occurred.

The number of plants per pot was four to six. In all, six different culture solutions were used, the number of plants per culture solution varying from four to ten.

A table giving the observed effects of the various culture solutions follows, the numbers used applying to the character of the culture solution and to the group of plants affected by

it. The effects are broadly indicated by such signs of health as growth in length of shoot and root, development of lateral branches, greenness of shoot, while discoloration, lack of growth, and attack of the plant by fungus, with subsequent death, are taken as signs of deficient vitality under the conditions of culture.

The culture solutions contained the following proportions of molecular solutions of magnesium sulphate, potassium-dihydrogen phosphate, calcium nitrate and sodium bi-carbonate, in cubic centimetres per litre of culture solution made up in distilled water.

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
MgSO ₄	18	18	18	9	9	9
KH ₂ PO ₄	15	15	15	7½	7½	7½
NaHCO ₃	10	10	10	5	5	5
Fe ...	trace	trace	trace	trace	trace	trace
CaNO ₃	2 cc	10 cc	20 cc	1 cc	5 cc	10 cc

The state of the plants, both as regards root and shoot development, is broadly indicated below:—

	July 1922	Oct. 1922	Jan. 1923	Mar. 1923
Relatively healthy } Unhealthy } Dead ...	1, 2, 4, 5 3, 6 —	1, 4, 5 2, 3, 6 —	1, 4, 5 2 3, 6	4, 5 1 2, 3, 6

The general conclusion drawn from these observations was that solutions containing low proportions of calcium salts were more favourable to the growth of *Calluna vulgaris* under the conditions of experiments, than were those of relatively high concentrations. Plants watered with culture solutions 2, 3, 6, obviously succumbed more readily than the rest to any detrimental influences. Since plants watered with culture solutions 1, 4 and 5 were relatively healthy, and growing throughout the experiment, it was not thought that the concentration of the inorganic salts other than calcium, was a limiting factor.

In the shoot, the first unhealthy signs were reddening of the base of the green stem, and of the lowest leaves of the shoot. In the germinating seedlings, the hypocotyl was distinctly red, and the leaves a dark green, contrasting with the fresh green of those germinating under field conditions. Some growth in length of shoot occurred in all cases, while lateral shoots made some growth in certain cases. In the cases of plants watered respectively with culture solutions 2, 3 and 6, especially, the red discoloration was followed by blackening of leaves and shoots, the leaves becoming discolored by degrees from the tip of each leaf downwards towards the base. The growth of the shoots was obviously arrested, the growing

tips becoming yellow, then brown. In the case of plants watered with solutions 3 and 6 a conspicuous growth of fungus hyphæ completely covered the plants at the end of the experiment, while a green growth of alga covered the surface of the sand in 2, 3 and 6.

In the roots, the changes at the end of the experiment were marked. The young roots in the germinating and young plants were white and transparent. In all cases, these changed in colour to yellow or brown. This discoloration together with lack of lateral development, and a production of thin, wiry, twisted and matted roots was most marked in the plants of numbers 3 and 6 cultures. In culture 4, the roots, though yellow-brown, seemed well-developed and fairly healthy. These results, indicating an inhibition of root and shoot development in culture solutions of marked calcium content are comparable with those obtained by M. C. Rayner (9, 10, 11) for seedling grown on calcareous soils, whose water extract had a faintly alkaline reaction. These were contrasted with the normal development of root and shoot in a heavy loam soil on clay-with-flints, with a neutral reaction.

The effect of calcium upon the process of differentiation proceeding just behind the apical meristem has been considered elsewhere [(13) *loc. cit.* p. 124]. One important factor is undoubtedly the deposit of insoluble pectates and soaps of calcium that takes place in the middle lamella as the complex nature of the cell wall changes, when the cell ceases to be meristematic and vacuolates, and distends, upon its addition to the permanent tissue systems of the plant. Now if peat plants are characterised by an abnormal quantity of fatty acid, released as the result of the synthetic metabolism of the growing point, one result may well be that in the presence of sufficient supplies of calcium, a block of insoluble calcium soaps is produced which hinders further supplies to the meristem. It is from this standpoint that we are inclined to interpret the observed fact that the plants characteristic of peat are almost invariably incapable of healthy growth in a soil containing relatively high proportion of calcium. From this standpoint an opportunity to examine the rhododendrons reported as characteristic of calcareous soils would be greatly appreciated. The typical rhododendron will not grow in a soil rich in lime, and structurally shows the usual features characteristic of peat plants and explained by an abundance of fats released in metabolism. Mr. R. J. D. Graham, of the Botany School at Edinburgh, has kindly examined some rhododendrons described as characteristic of calcareous soils, and reports that the same structural features are present in them, although their less compressed growth habit had sug-

gested possibly a slower accumulation of fat. The point obviously deserves closer examination, bearing in mind that from this standpoint a calcareous soil is not a soil containing a definite amount of calcium, but a relatively high proportion of this kation as compared with kations (potassium, sodium and magnesium) which form relatively soluble soaps with fatty acids.

Dr. Rayner has published a very full account of the calcifuge habit in *Calluna* (9, 11), and she has also shown the obligate dependence of this species upon a mycorrhizal fungus (10). Through the kindness of Dr. M. C. Rayner we have been able to examine the anatomy of seedlings of *Calluna* grown in pure culture, free from mycorrhiza, and their examination leads to an interesting suggestion as to the parallel effects produced by the presence of excess calcium and by the absence of any mycorrhiza in stunting the growth and development of *Calluna*. The seedlings were fixed in Flemming's stronger solution so that fat-impregnated walls are stained black with osmic acid, and in the photograph the microtomed section has not been stained in any manner so that the fat-impregnated wall of the secondary endodermis appears black, whilst a striking feature is the accumulation of fat in the cells at the base of the meristem of the abortive secondary root. The suggestion is irresistible that this accumulation of fat may account in part for the lack of further development on the part of this root meristem. Furthermore, as development takes place in the presence of the mycorrhizal fungus, the further suggestion follows that the growth of the meristem under normal conditions may be facilitated by the removal of the excess of fatty acids as a result of the digestive activity of the mycorrhizal fungus. If this fungus, in addition, penetrated the vascular system of the root, its presence would probably be fatal, but ability to digest fat does not mean ability to digest and penetrate a suberin lamella, which consists mainly of fats condensed and oxidised to a structurally firm layer, not easily pierced and very resistant to hydrolysis. The fungus may, therefore, live on in the cortex, ramifying in intercellular spaces as well as penetrating the cells, but fail to penetrate into the vascular system on account of the suberin lamella around each cell of the secondary endodermis.

THE FATS OF THE SEED.

During an examination of the germinating seeds of *Calluna vulgaris* from deep peat, it was noticed that the earliest roots showed a marked fat content in the cells of the vascular strand. Such seedlings were mounted, while still attached to the seed, and stained with Sudan III. The roots at this stage were white, colourless and branching freely. The

whole of the vascular strand stained a deep red, whilst the meristematic cells of lateral root initials were also stained. The contents of the seed were apparently stained a deep red, though this stain was somewhat disguised by the tough yellow seed-coat.

It was, therefore, decided to make an investigation into the quantity and nature of the fats contained in the ripe seeds of some peat plants, since the problem of their metabolism involves a consideration of the reserve food materials which are utilised during germination.

Mature seeds of *Calluna vulgaris*, *Empetrum nigrum* and *Vaccinium macrocarpum*, were carefully separated from their fruits, and were thoroughly washed, ground, and dried to constant weight in a steam oven at 50°C. The fats were then extracted for more than four hours with pure, hot chloroform in a Soxhlet apparatus, with ground glass joints.

The resulting fat extracts were distilled under reduced pressure and gave oils golden brown in colour in the case of *Calluna* and *Vaccinium*, and a greenish yellow in *Empetrum*. The weight of fat extracted from all these seeds was a high proportion of the dry weight of the seeds taken, whilst the high iodine numbers, as given in the following table, indicate the unsaturated state of the acids composing the fats.

	Weight of seed used.	Average weight of fat in seed.	Iodine numbers.	Refractive Index (at 16°C).
<i>Calluna vulgaris</i>	8.54 grms.	42.5%	132	1.4965
<i>Empetrum nigrum</i>	10.38 „	10.0%	139	1.4915
<i>Vaccinium macrocarpum</i>	24.44 „	22.7%	143	1.4858

The iodine values were estimated by Wij's method, three separate estimations being made with each oil under the same standard conditions. They indicate a large proportion of unsaturated linkages in the fatty acids present, which means a capacity for oxidation in air. It is significant that, when a thin film of any one of the oils was exposed to the air for a few days, it dried to a firm, elastic film, whilst a greater depth of fat became covered with a dry 'skin.' This property, together with the high iodine values, suggests that the extracted fats were 'drying oils.' These, owing to their containing glycerides of acids of the linoleic and linolenic series, readily undergo oxidation in the air to a firm, elastic varnish. The figure given for *Vaccinium macrocarpum* may perhaps prove ultimately to have an economic interest. This fruit is grown very considerably in the United States and the drying oil obtainable from the seed may ultimately give the seed some value as a bye-product in some process in which the cranberry fruit is pulped for utilization upon a large scale.

The occurrence of a plant with a large fat content in its tissues, from the earliest stages, together with a seed containing a high percentage of fat is striking. The question arises as to whether the two things are causally connected. Little is known of the utilisation of storage fats by the plant embryo during germination, or of the fat metabolism in plants. There is little evidence for the translocation of oils as such, from seed to growing tissue, though Schmidt held the view that such translocation of oils was possible. His view was based on his statement that less fatty acid is present in germinating oily seeds, than would be expected if the fat were hydrolysed before translocation.

The work of Schmidt, Green, Le Clerc du Sablon, summarised by Haas and Hill (3) has shown that, through the activity of lipase, hydrolysis of the fats of oily seeds, such as *Helianthus* and *Ricinus*, occurs during germination. Free fatty acid and glycerine thus occur, and sugars are detected as the fat is hydrolysed. It is not known how carbohydrates arise from oil, but it is regarded as possible, [Leathes (4)] that in both animals and plants, such a change does occur. Von Fürth found certain changes in the oil of sunflower and of *Ricinus* seeds during germination. An increase occurred in the saponification value, accompanied by a lowering of the iodine and acetyl values. The former change indicates a formation of lower fatty acids from more complex acids, whilst the latter changes indicate that cleavage has occurred by the unsaturated linkages, and by the hydroxylated carbon atoms.

From the point of view of the availability of the fats for respiratory purposes, little precise information is available. The presence of fatty acids is associated with the possibility of the splitting off of carbon dioxide in the absence of oxygen. This may account for the occurrence of these plants in badly aerated soils. Godlewski found that the energy of respiration of oily seeds was much greater than that of starchy seeds when germinated under reduced oxygen pressure.

Whilst the available data then do not permit the assumption that the unsaturated fats present in such seeds as *Calluna* are directly responsible for the early deposit of a secondary endodermis on the seedling, it is obviously highly probable that these facts are causally connected. On the other hand in the germination of a seedling from an oily seed it does not of necessity follow that unsaturated fatty acids present in the seed reserve will find their way on to the walls of the tissues during development. Thus the germination of seedlings of *Linum usitatissimum* L., and *Ricinus communis* L., has been examined from this standpoint. Both these plants have an extremely high percentage of fat in their seeds

and the iodine value of linseed oil shows a similar degree of unsaturation to that found in the oils of the peat plant seeds, but the seedlings show none of the fat deposits of the peat plants, they are in fact remarkably clear of fats and have no secondary endodermis.

SUMMARY.

(1) Peat plants are characterised by a metabolism which releases exceptionally large quantities of fatty substances in the differentiating tissues. These substances form fat deposits, cuticle, secondary endodermis, etc., which characterise the structure and growth habit of these plants.

(2) Species of plants with this metabolism always possess it wherever they grow; their possession of it renders them suitable for growth on the badly aerated soil of Yorkshire peat moors from which other plants are excluded.

(3) Experimental cultures confirm the view that high proportions of calcium in the soil are inimical to the growth of plants with such metabolism, the reason is probably that the tissues just behind the growing point become choked up with insoluble calcium soaps.

(4) Dr. Rayner's experiments show that *Calluna* seedlings are unable to grow in pure culture free from mycorrhiza.

Anatomical examination shows the lateral growing points in the roots of such plants similarly blocked with fatty deposits, and leads to the suggestion that the fungus may facilitate growth by removing these fat accumulations.

(5) Seeds of peat plants contain high proportions of fatty reserves of a relatively high degree of unsaturation. These reserves may be connected with the early production of fat impregnated layers such as the secondary endodermis, in the seedling of *Calluna*.

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The Seasons in Wood and Valley, by E. M. Williams. London : Duckworth & Co., 244 pp., 6/- net. This is a series of well-written essays under the headings of the various months, by a nature enthusiast who is evidently as familiar with the wild life in the fields as he is friendly with various pets.

The Natural History of Crystals, by A. E. H. Tutton. London : Kegan Paul, Trench, Trubner & Co., Ltd., xii. + 287 pp., 15/- net. This volume is based on that dealing with crystals published in the well-known International Scientific Series twelve or thirteen years ago, but in consequence of more recent researches by Professor Bragg and others, the whole method of the study of crystallography has been altered. As a consequence the work is entirely re-written. There are numerous photographs, diagrams, and other illustrations in the present work, and in the twenty-two chapters the author seems to have touched upon every possible aspect of the subject, and also provides a useful glossary of technical terms. To quote only a few of these chapters, namely, 'The Prescient Work of Abbé Haüy'; 'The Seven Styles of Crystal Architecture'; 'How Crystals are Described'; 'The Simple Law limiting the Number of possible forms'; 'How a Crystal grows from a Solution'; 'The Distribution of Crystal Faces in Zones, and the Mode of Constructing a Plan of the Faces'; 'The Reflecting Goniometer'; 'The Work of Eilhardt Mitscherlich and his Discovery of Isomorphism,' gives an idea of the character of the work. Students unquestionably will find the volume meeting all their requirements.

A Popular Geology, by William Platt. The Sheldon Press, 118 pp., 2/6. This type of 'popular' book should be discouraged rather than recommended. In England there is no dearth of excellent elementary text-books in geology. As a 'popular' geology, however, the book under review fails. It is written generally in the first person, innumerable questions are asked in the text, and tiresome anecdotes are included. The reader is thus bored before he has a chance to be interested. The tectonics of the eastern counties have been simplified remarkably by the author, as we read that 'Yorkshire has been submerged four times under the sea, coming up again after each submergence, to be submerged again in later ages.' The map on p. 41 is very misleading, as it indicates chalk as the 'surface rock' covering the whole of East Yorkshire from Spurn to Filey. In his description the author has ignored the presence of Boulder Clay in this area, and we fear he would have to walk a long way along the coast from Spurn northwards before he encountered 'a great mass of chalk.' Glacial clays are referred to later on, however, as we read 'when a builder is digging the foundations of a house he will find, a foot under the clay, a huge block as big as a dining table . . . the builder will be glad, for on such a rock he can build any house,' and so on. —G.S.

FIELD NOTES.

BIRDS.

Nesting of the Lesser Spotted Woodpecker at Bradford.—On May 29th, 1922, Master Jeff. Gamble obtained four eggs from a hole in a tree in the grounds of 'Thornfield,' Frizinghall, Bradford, which proved to be those of the Lesser Spotted Woodpecker, a rare bird in this district. I have to thank Mr. M. Malone for obtaining full data and a sight of the eggs. I am also indebted to Mr. Atten for having first brought it to our knowledge. Mr. Atten says that he has seen the Lesser Spotted Woodpecker in Northcliffe Wood, Shipley, which is within two miles of the site where it nested at Frizinghall.—H. B. BOOTH, Ben Rhydding.

Osprey at Scarborough.—On April 30th and May 1st a fine Osprey in mature plumage visited the neighbourhood of Oliver's Mount and the Mere at Scarborough. On both days it was seen on several occasions to take a fish out of the Mere and fly with it to a tree in the wood near by, where the prey was speedily devoured. While on the branch of a Scots Pine in the wood, on the second day of its visit, the bird was continually harried by a pair of Carrion Crows, to which its presence seemed to be objectionable, but of their presence very little notice was taken. Mr. W. J. Clarke and I watched the bird for an hour on May 1st through powerful binoculars, and were delighted to observe the graceful curves it made whilst flying above the water on the look-out for prey. Since the above dates nothing has been heard of it in the district, and it is hoped the bird has passed on to its nesting grounds in safety.—T. N. ROBERTS, Scarborough.

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MAMMALS.

Last of the Red Deer of Bolton Abbey.—When it was decided to do away with the herd of Red Deer at Bolton Abbey, in 1921 (*The Naturalist*, 1922, pp. 370-371), two stags escaped from the Deer Park. For nearly three years they have lived a free life in the wild surrounding fells, and have defied all attempts to capture or to shoot them. During the very cold weather of February last they risked coming into the valley for food, when they were followed to their hiding place by their tracks in the snow and were shot. This brings to an end a fine herd of Red Deer which many believed to have been the lineal descendants of the native wild deer which lived in a feral state in this district; infused with fresh blood by stags brought from Scotland from time to time. To the local lover of Nature it is a great loss. The cutting down of 'expenses is said to be the reason.—H. B. BOOTH, Ben Rhydding.

THE PLANKTON OF THE RIVER WHARFE.

R. W. BUTCHER.

(Continued from page 180).

TABLE III.

Monthly Rainfall for River Wharfe.												
1921												
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Buckden ...	11.76	0.16	5.96	1.95	2.95	0.46	3.39	7.84	3.08	2.95	2.89	12.29
Burnsall ...	7.42	0.40	3.92	1.15	2.21	0.26	2.55	5.52	2.31	2.68	2.87	7.23
Ilkley ...	6.31	0.30	2.18	1.54	2.10	0.12	2.38	4.23	1.19	2.56	2.96	4.51
Harewood House...	4.64	0.17	1.46	1.65	1.32	0.24	0.99	4.57	1.06	2.09	3.40	3.29
1922												
Buckden ...	6.60	5.33	4.39	3.48	3.35	2.90	6.25	5.69	4.28	2.05	2.43	6.84
Burnsall ...	4.42	4.44	3.36	3.29	0.90	2.49	5.64	4.23	4.37	0.97	1.98	5.41
Ilkley ...	4.36	4.28	2.80	3.27	0.94	1.84	4.53	4.23	4.35	0.88	1.97	3.85
Harewood House...	3.13	2.50	1.96	3.36	0.76	1.59	4.99	5.11	3.57	1.13	1.26	4.32
ENGLAND (General Mean)	3.99	3.27	2.51	2.96	1.25	1.51	4.39	3.62	2.92	1.30	1.76	4.31
Flood Rainfall at three nearest points.												
1921												
Harrogate ...	3.16	—	0.36	—	—	—	—	1.41	—	0.52	2.16	3.19
Lower Laithe (Haworth) ...	8.80	0.21	3.35	0.42	—	—	—	3.75	—	1.91	2.35	7.74
Ardsley ...	3.41	—	—	—	—	—	—	1.20	—	0.57	1.88	2.84
1922												
Harrogate ...	2.76	2.57	0.92	1.54	—	—	2.01	4.76	1.82	—	0.53	3.03
Lower Laithe (Haworth) ...	5.22	6.02	2.86	3.02	—	—	2.86	4.51	3.73	0.47	2.21	5.14
Ardsley ...	2.89	2.19	0.95	1.46	—	—	1.19	3.08	1.83	—	0.98	2.78

NOTE :—These figures have been kindly supplied by the British Rainfall Association. (10.)

There is nothing to indicate that the Protococcales are washed in in a similar way, as the floods never increase the number of these organisms. *Tetraspora gelatinosa* probably has its origin in the tributaries of the upper part of the river basin where it is abundant in May (cf. Report of Botanical Section (9)).

These facts suggest that there is not only a washing in effect to be considered, but also some influence which *sorts out* the species which are carried into the stream, favouring particularly several species of Diatoms.

(iii.) CHEMICAL CHANGES.—An indication of the effect of rainfall on the composition of the water is shown in Table IV., the data being kindly supplied by the West Riding Rivers Board. These figures do not exactly coincide with the time of my observations, but they are sufficient indication of the nature of the change brought about.

TABLE IV.
COMPOSITION OF RIVER WHARFE AT POOL.

Date.	Rainfall		Nitrates.	Organic nitrogen.	Oxygen absorbed from N/80 permanganate in 4 hrs. at 26.7°C.	Total hardness in terms of CaCO ₃
	previous 2 days.	previous week.				
4- 3-21	0.64	0.69	.03	0.74	0.07	8.1
3- 6-21	0.00	0.11	.01	0.48	0.14	13.3
2- 9-21	1.09	2.38	.04	0.76	0.69	9.1
2-12-21	0.04	0.10	.06	0.44	0.30	12.7

The chief points to note are that the amount of nitrates shews *seasonal* variation being low in the summer, and that abundant rainfall increases the amount of nitrates and organic nitrogen and decreases total hardness. Oxygen absorption appears to be seasonal and not dependent on floods. As pointed out by Pearsall (5), this increase of nitrates during flood periods should favour an increase of those organisms, such as Diatoms, that favour a water rich in nitrates. Here is evidently an additional factor to consider, that coincides with the washing in from the back-waters, and will increase the predominance in the river of the group most influenced by this factor, namely, the Diatoms.

FACTORS INFLUENCING THE MAIN PERIODICITY.—It remains yet to consider the main periodicity; the spring maximum of Diatoms and the late summer maximum of Protococcales. Since this appears to be *seasonal*, sunshine, temperature, and available food will be the chief factors.

I. THE DIATOM MAXIMUM.—This comes at a time when nitrates are abundant and before the brightest part of the

year. A plentiful supply of food will mean rapid growth, and, if there be no flood, available food will decrease in geometrical progression. Hence the decrease of Diatoms will be very rapid, due to the using up of the available food. This sudden decrease is shown well in the dry summer of 1921. The supply of oxygen may also be a limiting factor, but the Wharfe is a rapid river in its upper course, and the water is apparently well aerated. There is, likewise, always a good supply of organic matter. Here again temperature does not appear to have much influence, as the diatom maximum comes some time before the temperature maximum.

The diatom periodicity can be divided into two portions, the early *Melosira* phase from November to March and a *Synedra-Diatoma* phase from March onwards.

What decides this succession of genera is not shown in the results of this investigation.

2. THE PROTOCOCCALES MAXIMUM.—This comes at the time of high temperature and most abundant sunshine: it was more marked in the bright year of 1921 than in the wetter year of 1922, when the maximum was later and not so great. Available carbon dioxide is doubtless also a factor. Reference to Table IV. will show the hardness, in terms of CaCO_3 , is greatest during the Protococcales Maximum, and so, available food may again be regarded as an important factor. Amount of sunshine also affects assimilation, and the time when sunshine is greatest coincides with the Protococcales Maximum. It is difficult to decide what influence temperature, as such, has at this period, as it is intimately associated with the maximum sunshine. It possibly favours the more rapid liberation of the carbon dioxide from the available calcium bi-carbonate in the water, and also cell division.

The chief species of this maximum are *Gonatozygon mono-taenium*, *Tetraspora gelatinosa*, *Ankistrodesmus falcatus* and *Scenedesmus*. The first species is considered rare in the county, and it seems that the washing in of this from backwaters, where it has not been observed, is unlikely; so it is possible we here have an example of what Zimmer (8) terms an 'autopotamic' organism.

TRUE AND FALSE PLANKTON.—The difficulties of deciding which of the organisms observed are 'tychopotamic' and which are 'autopotamic' are evident because of the various backwaters and gathering grounds of any river basin, and so no attempt to divide the species is made in this paper. A further study of the chief gathering grounds of the Wharfe (the Washburn reservoirs), is now being undertaken, and this may throw light on the origin of some species, but one striking fact already observed is the comparative abundance of some species in the reservoirs which are absent in the river.

My very best thanks are due to Dr. W. H. Pearsall for his generous help with and criticism of this investigation.

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5. PEARSALL, W. H., 'A Suggestion as to Factors influencing the Distribution of Free-floating Vegetation,' *Journ. of Ecology*, 9, 1922.
6. PEARSALL, W. H., 'A Theory of Diatom Periodicity,' *Journ. of Ecology*, 11, 1922.
7. WEST, G. S., 'Algæ,' Vol. I., Cambridge Univ. Press.
8. ZIMMER, C., 'Das tiersche Plankton der Oder,' *Forschungsber a.d. Biol. Station zu Plön*, vii., 1899.
9. 'Report of the Botanical Section,' *The Naturalist*, November, 1921.
10. 'British Rainfall, 1921 and 1922.' H.M. Stationery Office.

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The Transactions of the Entomological Society of London, issued on April 15th, contain a paper on 'Some Coleopterous Remains from the Peat-bed at Wolvercote, Oxfordshire,' by K. G. Blair.

The principal papers in *The Transactions and Proceedings of the Perthshire Society of Natural Science*, Volume VII., Part 5, are 'Geological Deductions from the Strata passed through in the Artesian Boring at the Water House, Perth, August, 1917,' by Henry Coates; and 'Potamogetons of the Earn District of Perthshire,' by J. R. Matthews.

We have received the *Second Annual Report of the Worthing Archaeological Society* which, besides a record of useful work during the year, includes a Report on the Broadwater Excavations, which also refers to an extraordinary accumulation of oyster shells including mediæval remains. The present membership of the Society is 254, including one honorary member.

Volume LI. of *The Proceedings of the Royal Philosophical Society of Glasgow* contains an excellent record of the useful work accomplished by that Society, and is edited by the Secretary, Professor P. Bennett. Among the important papers printed are 'Wireless Telephony,' by C. R. Gibson; 'Earthquakes and Earthquake Waves,' by Prof. C. G. Knott; 'Isotopes,' by F. W. Aston; 'Some Theories of Light,' by Dr. J. Muir; 'Einstein's Theory of Relativity,' by J. Dougall; and 'The Progress of Education in Scotland during the last Fifty Years,' by J. Clark.

The Transactions of the British Mycological Society, published on the 31st March, contain the following valuable communications, most of which refer to Britain:—'The Bristol Foray—The Lichens of the Bristol Foray,' by W. Watson; 'Observations on some Scottish Uredinæ and Ustilagineæ,' by M. Wilson; 'Observations on *Camarosporium Abietis* n. sp.,' by M. Wilson and R. B. Anderson; 'A *Rhizoctonia* causing Root Disease in Uganda,' by W. Small; 'Observations on the "Slime-fluxes" of Trees,' by L. Ogilvie; 'Notes on *Rhytisma Acerinum* and *Rhytisma Pseudoplatani*,' by R. Bracher; '*Hormodendron olivaceum* (Corda) Bon—A New British Record,' by F. C. F. Robertson.

PLANT GALLS OF THE HUDDERSFIELD DISTRICT.

WM. FALCONER, F.E.S.,
Waterloo, Liverpool.

(Continued from page 156).

- Atrichosema aceris* Kieff. On maple, Cawthorn, in hedge of a garden between Jowett House Farm and the mill, bordering the roadside. The leaves of the same maples are crowded with *Eriophyes macrorrhyncus*, amongst which are deep conical pits, agent not seen. Mr. Mosley noted the latter also in another locality near Cawthorn.
- Perrisia fraxini* Kieff. Wherever the ash grows, in plenty.
- P. acrophila* Winn., on ash, Ainley Place, rare.
- P. fraxinea* Kieff. On ash, Ainley Place bottoms and Barrett Clough (Slaithwaite), Cat's Clough, Millshaw (Holmfirth), Nortonthorpe, Coxley Valley.
- Oligotrophus bursarius* Bremi. On ground ivy, plentiful where it occurs, in a garden at Lockwood, S. L. M.; Lascelles Hall, Shepley Mill Dam, and Farnley Wood (Almondbury).
- Perrisia stachydis* Bremi. Thunder Bridge, rare.
- P. galeobdolonits* Winn. On yellow archangel, Thunder Bridge and Dog-ley Bank. Other Yorkshire locality, Roundhay Park Gorge, Leeds.
- P. veronicæ* Vall. On Germander Speedwell, several fields about Wilberlee and Barrett Clough (Slaithwaite), Smithy Place (Honley), Thunder Bridge, New Mill, Cat's Clough (Millshaw), Bradley, Cannon Hall Park, Banks Wood (Emley).
- P. galli* H. Löw. On *G. verum*, Smithy Brook, Middletown, on a roadside wall.
- P. aparines* Kieff. In a ditch in a small wood between High Hoyland and Cawthorn, one example on goosegrass.
- P. hygrophila* Mik. On *G. palustre*, Coxley Valley, pond near Carr Wood, and wood near the home farm, Cannon Hall.
- P. periclymeni* Rübs. Deffer Wood, and Lepton Great Wood, in plenty; Sun Dean on Crosland Moor side, on common honeysuckle.
- P. trachelii* Wachtl. On hairbell, Varley Road and Wilberlee (Slaithwaite), Shrogg Lane (Kirkheaton), not common, but seen several times in these localities, low down, hidden amongst grass.
- Misopatha ptarmicæ* Vall. On sneezewort, Upper Denby and Farnley Hey, S. L. M.; Dean House (Holmfirth), W. E. L. Wattam; about Slaithwaite, Marsden and Diggle, Cat's Clough (Millshaw), Carr Wood (Woodsome), Gunthwaite, Bradley.
- Cecidomyia* spec. On sneezewort, canal bank between Bradley and Huddersfield; terminal leaves massed into a loose bud, larva red.
- Rhopalomyia millefolii* H. Löw. On yarrow, Lepton, S. L. M., fields at Wilberlee (Slaithwaite), by the canal at Bradley, low down, hidden amongst the grass. On the leaves, Wood Nook, Slaithwaite, Miss J. Grainger, but in no quantity.
- R. tanacetifolia* Karsch. On tansy, leaves, flowers, stems and in masses at nodes, river and canal from Bradley to Mirfield, in plenty; Slaithwaite churchyard. Other Yorkshire locality, Skipwith Common.
- Urophora solstitialis* Linn. On black knapweed, off Shrogg Lane, Kirkheaton, S. L. M.; on the railway tip at Kirkheaton.
- Stictodiplosis jacobacæ* H. Löw. On common ragwort. Bottoms Wood (Slaithwaite), Fixby and Bradley; on marsh ragwort, Low Shaw Carr Wood (Slaithwaite); on groundsel, Clough House (Slaithwaite), and near Carr Wood (Woodsome).

- Perrisia virgæ-aureæ* Lieb. On golden rod, corn mill tip, Hollins Row, Slaithwaite.
- Carphotricha papillata* Fallen (*Trypeta reticulata*). On hawkweeds, first on *H. vulgatum* (aggr.) and *sciaphilum*; later on *H. boreale*; very abundant by river and canal from Saddleworth to Ravens-thorpe, and for a wide area around Huddersfield.
- Perrisia nervicola* Kieff. On *H. Pilosella*, in a field at Wilberlee (Slaithwaite).
- P. cirsi* Rübs. On *Carduus arvensis*, by canal between Hoylehouse and Milnsbridge.
- Misopatha syngenesiæ* H. Löw. On scentless mayweed, Kirkheaton railway tip.
- Clinorrhyncha chrysanthemi* H. Löw. On the same.

HOMOPTERA (47 forms).

- Chermes strobilobius* Kalt. On spruce, Deffer Wood.
- C. abietis* Kalt. On spruce, Boothroyd Wood, S. L. M.; Smith Wood (Storthes Hall), Deffer Wood, Banks Wood (Emley).
- Brachycolus stellaris* Hdy. Abundant on *Holcus mollis*, much less so on *Agrostis*. On *Stellaria holostea*, Clayton West, Meltham Mills, Banks Wood and Lezzer Lane (Emley), Carr Wood (Woodsome).
- Pemphigus bursarius* Linn. On Lombardy Poplar, Dalton, Meltham Mills, New Mill, Wooldale, Brockholes; on black poplar, several places about Slaithwaite, Armitage Bridge, Ponty Gardens, Hall Ings, Brockholes, Cannon Hall Park.
- P. spirotheræ* Pass. On black poplar, Cannon Hall Park.
- P. flaginis* Fusc. On black poplar, Cannon Hall Park.
- P. affinis* Kalt. On black poplar, Beaumont Park and Ponty Gardens, S. L. M.; Slaithwaite, Kirkburton, Hopton Mills, Cannon Hall Park. On Lombardy poplar, Dalton, Woodsome Lees and Meltham Mills.
- Asterodiaspis quercicola* Bchè. Roadside above Mag Wood, Armitage Bridge, Raikes Dyke, Honley Old Wood, Sun Dean, and Shrogg Lane (Kirkheaton). The other Yorkshire locality, Wothersome.
- Callipterus quercus* Kalt. On oak, Barrett Clough (Slaithwaite), Sun Dean, Lower Butternab Wood, plentiful.
- Phyllaphis fagi* Linn. On beech, Slaithwaite, Armitage Bridge, Honley Old Wood, Ravensknowle Park.
- Aphis atriplicis* Linn. On *A. patula*, common and plentiful where it occurs. On *Chenopodium album*, Fixby, Mirfield, Cawthorn.
- Schizoneura ulmi* Linn. On *U. montana* and *campestris*, widespread and plentiful.
- Aphis urticæ* Fabr. On nettle, near Fixby.
- A. rumicis* Linn. On *R. obtusifolius* Linn, Wilberlee, Meltham, Fixby, Woodsome, Sun Dean, Thunder Bridge, etc. On *R. acetosa*, canal between Bradley and Brighouse.
- Hyalopterus melanocephalus* Bktn. On bladder campion, Kirkheaton railway tip, by the canal at Bradley, and by the roadside at Smithy Brook (Middlestown).
- Rhopalosiphum ribis* Linn. } Both species present, especially on black cur-
Myzus ribis Linn. } rant; also the red variety and gooseberry.
- Aphis brassicæ* Linn. In flowers of charlock, Mirfield.
- A. pyri* Fonsc. On crab apple, Lepton, Barrett Clough, Drop Clough, Crosland Edge.
- A. pomi* Kalt. On the same, Whitley Woods, S. L. M.
- Myzoxylus laniger* Hausm. On cultivated apple, the 'American blight,' Kirkheaton, in the vicarage grounds, and Storthes Hall, S. L. M.; Gunthwaite Hall. On crab apple, Thorpes, near Almondbury.
- Aphis padi* Linn. On blackthorn, Hall Heys Wood, Royal Clough (Scamonden), Thunder Bridge, Clayton West, Gunthwaite, Emley. On bird cherry, Slaithwaite, Dean Head, Cawthorn.

- A. sorbi* Kalt. On mountain ash, Cat's Clough (Millshaw), Honley Old Wood, Deffer Wood, Drop Clough, Barrett Clough.
- Hyalopterus pruni* Fabr. On cultivated plum in a garden at Broad Oak (Linthwaite), and in the Rectory garden, Emley.
- Nectarosiphum rubi* Kalt. On *Rubus fruticosus*, Drop Clough and the old lane leading out of Honley Old Wood to Wilshaw (verified by Mr. F. V. Theobald).
- Aphis cratægi* Schrk. On hawthorn, Lower Butternab Wood and Kirkheaton.
- Psylla cratægi* Schrk. On hawthorn, Beaumont Park, S. L. M.; near Barrett Clough.
- P. buxi* Linn. On box, Beaumont Park and Fleming Houses Lane (Huddersfield), Kirkheaton Churchyard, Netherpton, Kirkburton, Clayton West, Cannon Hall and Cawthorn.
- Aphis epilobii* Kalt. On *Epilobium montanum*, Drop Clough.
- A. hederæ* Kalt. On ivy, overhanging a garden wall at New Mill, in abundance.
- Psyllopsis fraxini* Linn. On ash, abundant and widespread.
- Aphis anthrisci* Kalt. On hedge parsley, border of Cannon Hall Park.
- Phorodon galeopsidis* Kalt. On hemp nettle, in a field of oats, Holthead, Slaithwaite.
- Macrosiphum alliariæ* Koch. On nipplewort, Greenside Allotments, Dalton, and near Farnley Hey.
- Aphis viburni* Scop. On guelder rose, Banks Wood (Emley), Coxley Valley, Carr Wood (Woodsome), and Honley Old Wood.

ACARI (49 forms).

The names of the gall mites were included in the 'Mites of Yorkshire,' published in *The Naturalist*, 1923, June, pp. 215-218, and August, pp. 267-8—49 forms—and are not now repeated.

ANGUILLULIDÆ (6 forms).

- Heterodera radiculicola* Greeff. On *Poa pratensis*, irregular and bent swellings on the roots, on the top of the boundary wall of the Grammar School at Almondbury, by the roadside, near the point where the bushes cease. Numbers can be readily seen by lifting up the mass from the stones.
- Tylenchus devastatrix* Kühn. On couch grass, bulbous swellings at the base of the stems, near Brockholes, S. L. M.; on *Trifolium pratense*, in a disused roadside quarry near Farnley Tyas.
- Tylenchus* spec. On *Pimpinella saxifraga*, stem swellings midway up, near Woodsome Lees.
- Anguilluli?* spec. On *Hypochaeris radicata*, elongated swellings on the midribs and shorter ones on the blades of the leaves, yellow green below and reddish above, Houard, 6040; old lane at the foot of Hall Heys Wood, Crosland Edge; above Boothroyd Wood and near Thunder Bridge, by the roadside.
- Tylenchus* spec. On dandelion, similar swellings to the last named, but on the flowering scapes in addition, near Farnley Tyas towards Storthes Hall, by the roadside; at the crossroads by the lodge below Almondbury Grammar School; between Kirkburton and Thunder Bridge and above Boothroyd Wood (Storthes).

FUNGI (23 forms)

- Epichloe typhina* Pers. On canal bank between Slaithwaite and Drop Clough, and at Thurstonland, grass not stated, S. L. M.; on *Aira cespitosa*, Tanyard Wood (Kirkburton) and Gunthwaite.

- Schinzia cypericola* Magnus. On toad rush, in a wet field at Goat Hill, Upper Slaithwaite.
- Taphrina aurea* Fr. On Lombardy poplar, New Mill, Wooldale, in a wet place bordering Deffer Wood by footpath to Jowett House Farm (Cawthorn); near Storthes Hall, by roadside from Farnley Tyas to Thurstonland.
- Exoascus* spec. On beech, witches broom, Lower Millshaw, Holmfirth, Mr. J. Allsopp.
- E. turgidus* Sdbk. Witches brooms, on birch, Bottoms Wood (Slaithwaite), Wooldale, Storthes Hall Wood, Mollicar Wood, Lepton Great Wood. On elm, Toothill, Mollicar Woods, Lepton Great Wood, Morley Lane (Milnsbridge) and Snow Lea (Longwood). On oak, Storthes Hall Wood, Rowley Hill, in a field; bottom of Arundel Lane near Cartworth Moor. On broad-leaved lime, Meltham Road in the angle of the Park Valley Mills below Beaumont Park. On horse chestnut, Beaumont Park, Mr. Sedley.
- E. deformans* Fückl. Witches brooms, on cherry trees, Grimescar Wood, Whitley Woods, Birks Mill Lane, Almondbury (small tree killed by it), Storthes Hall Wood, Broom Stile (Kirkburton), Deffer Wood, by footpath to Jowett House Farm (twenty examples on one of the trees). On hawthorn, Harden Clough, Meltham, S. L. M.; in a field below Barrett, Slaithwaite, sawn off by the farmer later, but photo extant.
- E. alnitorquus* Winter. On alder leaves, Barrett Clough, Drop Clough, Boothroyd Wood (Storthes) and Mollicar Woods.
- Frankiella alni* R. Maire. On alder, Clough House (Slaithwaite); Mollicar Wood, Dogley Mill dam, and Lepton Great Wood.
- Urocystis anemones* Pers. On *Ranunculus acris*, by the stream side between Kirkheaton and Gawthorpe Green. On *R. repens*, Coxley Valley and within railway fence, Lower Butternab Wood, in plenty.
- Plasmodiophora brassicæ* Wrnn. On swede, Outlane, S. L. M.
- Cystopus candidus* Lév. On shepherd's purse, the rectory garden at Emley.
- Æcidium grossulariæ* Gmel. *Æcidial* stage of *Puccinia pringsheimiana* Kleb, on gooseberry leaves, Wood Nook, Slaithwaite, Miss J. Grainger.
- Coniothyrium fückelii* Sacc. Hoylehouse Clough (Linthwaite) and Sun Dean. Other Yorkshire locality, Beast Cliff, north of Scarborough.
- Puccinia tumida* Grev.* On earthnut, fields about Wilberlee, Clough House and Ainley Place (Slaithwaite).
- P. menthæ* Pers. On garden mint, Broad Oak, Linthwaite.
- Canker, on various forest trees not enumerated, probably due to *Nectria ditissima* Tul.

Attention is drawn to a gall at the base of plants of *Chrysanthemum giganteum* in a garden at Broad Oak, Linthwaite. The basal buds become much hypertrophied, and further growth is prevented. No agent has been found, but the formation of the gall, except that there are a large number together, fits the description of *Rhopalomyia hypogæa* F. Löw. No. 5732 in Houard's work. Specimens were shown at the annual meeting of the Entomological Section of the Union in Dec. 1922, at Leeds.

* See *The Naturalist*, Nov. 1920, p. 360.

NEW YORKSHIRE RECORDS OF HEMIPTERA.

GEO. B. WALSH, B.SC.,
Scarborough.

THE following notes add to our knowledge of the distribution of Hemiptera in Yorkshire, especially in V.C. 62. In a few cases I have had the benefit of some records made by Mr. E. C. Horrell, preserved in the record-books of the Scarborough Field Naturalists' Society; all other records, unless definitely stated otherwise, are my own. Ten species and one variety of Heteroptera and five species and one variety of Homoptera are new to the County list. I am indebted to Messrs. J. M. Brown and James Edwards for help with some of the doubtful species.

†=New to the County. * =New to the Vice-county.
The numbers refer to the Watsonian Vice-counties.

HETEROPTERA.

- Piezodorus lituratus* F. One specimen beaten out of gorse in November, A. E. Winter. One specimen in a garden, G.B.W. Both from Scarborough, 62*.
- Acanthosoma hæmorrhoidale* L. Scarborough, in a garden. On mountain ash above Staintondale, 62*.
- Elasmostethus interstinctus* L. Not uncommon on birches on Seamer Moor, 62*.
- Zicrona cærulea* L. Near Fylingdales, D. W. Bevan.
- Myrmus miriformis* Fall. Pickering, 62*.
- Nysius thymi* Wolff. Spurn, 61*.
- Ischnorhynchus ericæ* Horv. Seamer Moor, Scalby High Moor, Ravenscar. It is probably common on heather on all the moors in the Scarborough district.
- Rhyparochromus prætextatus* H.S. Spurn, under *Erodium*. This confirms the only Yorkshire record of 'near Hull, J. Young' (*The Naturalist*, 1921, p. 334).
- Macrodema micropterum* Curt. Silpho Moor, E. C. Horrell, 62*.
- † *Plinthisma brevipennis* Latr. Cloughton, E.C.H. The most northern record of this species has hitherto been Cheshire.
- Stygnocoris fuliginosus* Geoffr. In the sand-pit at Flixton.
- † *Peritrechus sylvestris* F. Spurn.
- Trapezonotus arenarius* L. Stony Marl Moor, Hayburn Wyke, North Cave.
- Drymus sylvaticus* F. Silpho Moor, E. C. Horrell. Pickering, 62*.
North Cave, 61*.
- D. brunneus* Sahlb. Bubwith, 61*. Hayburn Wyke.
- Scolopostethus affinis* Schill. Bridlington.
- S. thomsoni* Reut. Forge Valley, Hayburn Wyke, 62*.
- S. decoratus* Hahn. Ravenscar, 62*. North Cave.
- † *Taphropeltus contractus* H.S. Spurn. It is strange that this common species has not been recorded before for the county.
- † *Berytus minor* H.S. North Cave.
- † *Metacanthus punctipes* Germ. Common on *Ononis* in one restricted spot on the Humber Bank near Welwick, T. Stainforth, G.B.W.
- † *Piesma quadrata* Fieb. Abundant on the Humber Bank at Welwick on salt-marsh plants, especially on *Aster tripolium* and *Statice limonium*, T.S. and G.B.W.
- Acalypta brunnea* Germ. Cotherston, 65*.

- Tingis cardui* L. Seamer, E. Ayton, G.B.W. Silpho Moor, E.C.H. Apparently widely distributed in the Scarborough district.
- Nabis major* Costa. Bubwith, Spurn, 61*.
- N. flavomarginatus* Scholtz. Seamer, in cut grass.
- N. limbatus* Dahlb. East Ayton.
- N. ferus* L. Stony Marl Moor, Forge Valley, G.B.W. Raincliffe Woods and Beedale, E.C.H., 62*.
- N. rugosus* L. Stony Marl Moor, G.B.W. Raincliffe Woods, E.C.H., 62*.
- N. ericetorum* Scholtz. Stony Marl Moor, near the 'Falcon Inn,' above Cloughton, common in August, 62*.
- Cimex lectularius* L. Hull. Scarborough, Middlesbrough, 62*. Apparently not nearly as common as it used to be.
- Anthocoris nemoralis* F. Generally distributed in the Scarborough district.
- A. nemorum* L. Generally distributed and common throughout all the districts where I have collected—Hull, Scarborough, Pickering, Helmsley, Middlesbrough, Teesdale and Swaledale. Extremely prone to 'bite' if it drops on the wrist during beating.
- Tetraphleps bicuspis* H.S. Forge Valley, Silpho Moor, 62*.
- Acompocoris pygmaeus* Fall. Skipwith. Humber Bank, Hull, far from fir trees, but probably introduced on foreign timber. Forge Valley, 62*.
- Lyctocoris campestris* F. Eston, near Middlesbrough, in stack refuse. Forge Valley, by sweeping, 62*.
- Pantilius tunicatus* F. Forge Valley, 62*.
- Phytocoris tiliæ* F. Thornton-le-Dale, on plum. Hayburn Wyke, 62*.
- P. longipennis* Flor. Raincliffe Woods, on oak.
- P. pini* Kb. Seamer Moor, 62*.
- P. ulmi* L. Hayburn Wyke, 62*.
- P. varipes* Boh. Hayburn Wyke, 62*.
- Calocoris ochromelas* Gmel. Raincliffe Woods, Seamer Moor (common on oak), and Forge Valley, 62*.
- C. sex-guttatus* F. Scarborough.
- C. norvegicus* Gmel. Scarborough.
- Dichroscytus rufipennis* Fall. On pines, Seamer Moor.
- Lygus pabulinus* L. Hayburn Wyke, Forge Valley, 62*.
- L. viridis* Fall. Hayburn Wyke, on nettle. Forge Valley on meadow-sweet, 62*.
- L. contaminatus* Fall. Hayburn Wyke, 62*.
- L. pratensis* L. Forge Valley, Scalby High Moor;
- † *L. campestris* Fall. Forge Valley.
- L. rubricatus* Fall. Seamer, 62*.
- L. kalmii* L. Forge Valley.
- Plesiocoris rugicollis*. Forge Valley, Seamer, 62*.
- Liocoris tripustulatus* F. Hull, Welwick. Generally distributed in the Scarborough area, 62*.
- Capsus ater* L. Common in Scarborough area, 62*.
- Stenodema calcaratum* Fall. Pickering, Ellerburn, Seamer, East Ayton.
- S. holsatum* F. Scarborough and Hull districts, common.
- Trigonotylus ruficornis* Geoffr. Pickering, East Ayton.
- Miris dolobratus* L. Seamer Moor, 62*.
- M. ferrugatus* Fall. East Ayton.
- Monalocoris filicis* L. Abundant throughout the Scarborough area, 62*.
- Bryocoris pteridis* Fall. Banks of Tees near Barnard Castle, 65*. Not nearly so common as the last, but widely distributed in the Scarborough area, 62*.
- Dicyphus epilobii* Reut. Abundant in Forge Valley and Hayburn Wyke, 62*.
- D. stachydis* Reut. Forge Valley, Seamer, Pickering, 62*.
- † *Campyloneura virgula* H.S. Seamer.

- Cyllocoris histrionicus* L. Seamer Moor, 62*.
C. flavo-4-maculatus De G. Forge Valley, Cloughton, 62*.
Blepharidopterus angulatus Fall. On alder, Forge Valley and Ravenscar, 62*.
Mecomma ambulans Fall. Common on nettles, Forge Valley.
Orthotylus ericetorum Fall. Common on heather, Scalby High Moor and Seamer Moor.
Heterocordylus leptocerus Kb. (*tibialis* Hahn). On broom, Langdale End, 62*.
Psallus ambiguus Fall. Forge Valley and Hayburn Wyke, 62*.
P. betuleti Fall. Seamer Moor, Silpho Moor, Hayburn Wyke.
P. variabilis Fall. Forge Valley, 62*.
P. falleni Reut. Forge Valley, Seamer Moor, 62*.
P. varians H.S. Langdale End, Raincliffe Wood. 62*.
P. roseus F. Hayburn Wyke, Seamer, 62*.
Atractotomus magnicornis Fall. Seamer, Forge Valley, 62*.
Plagiognathus chrysanthemii Wolff. Seamer, Cayton Bay, common on thistle, 62*.
P. arbustorum F. Scarborough, Hayburn Wyke, Forge Valley.
Asciodema obsoletum Fieb. Common on gorse, Raincliffe Woods, 62*.
Hydrometra stagnorum L. Seamer Carrs, E.C.H., 62*.
Gerris costæ H.S. Eston Nab, near Middlesbrough, 62*.
G. thoracicus Schum. Holmpton, near Withernsea, 61*.
G. gibbiferus Schum. Scarborough, E.C.H. Eberston, E. A. Wallis.
G. lacustris L. Raincliffe Mere, E.C.H. Seamer Moor, 62*.
G. odontogaster Zett. Eston Nab and Marton, near Middlesbrough, 62*.
G. argentatus Schum. Askham Bog, 64*.
Microvelia pygmaea Duf. Seamer Carrs, E.C.H., 62*.
Velia curvens F. Generally distributed in Hull, Middlesbrough, Whitby, and Scarborough districts, 62*. Richmond, Barnard Castle.
Acanthia scotica Curt. Richmond.
A. orthochila Fieb. Bubwith, 61*. Harwood Dale 62*.
A. saltatoria L. Harwood Dale, 62*.
A. c-album Fieb. Shingle, banks of the Derwent at Langdale End, E.C.H. Hayburn Wyke, 62*.
Nepa cinerea L. Hull, Beverley, Middlesbrough, Seamer Moor, 62*. Richmond, 65*.
Notonecta glauca L. Beverley, in brackish ponds on the Humber bank, Hull and Hedon. Middlesbrough, Scarborough, 62*. Richmond.
N. furcata F. Marton and Eston Nab, near Middlesbrough. East Ayton.
Corixa geoffroyi Leach. Hull, Withernsea, Beverley. Marton, Scarborough, Saltburn, 62*. Askham Bog.
† *C. affinis* Leach. One specimen, Hull, October, 1922.
† *Arctocoris hieroglyphica* Duf. Bubwith, Askham Bog, Saltburn.
A. sahlbergi Fieb. Askham Bog.
A. linnei Fieb. Askham Bog.
A. striata L. Askham Bog, Hull.
A. falleni Fieb. Hull.
A. mæsta Fieb. Skipwith Common, East Ayton.
† *A. lugubris* Fieb. Biller Howe Dale.
A. fossarum Leach. Skipwith Common, 61*.
A. fabricii Fieb. Scarborough, Scalby High Moor. Spurn, 61*. Richmond, 65*.

HOMOPTERA.

- Cixius pilosus* Ol. Forge Valley, Cayton Bay, 62*.
C. cunicularius L. Forge Valley, Seamer Moor, 62*.
C. nervosus L. Hayburn Wyke, Kirby-in-Cleveland, 62*.
C. similis Kbm. Seamer Moor, 62*.
Delphax discolor Boh. Ellerburn.
Conomelus limbatus F. Stony Marl Moor, above Cloughton.

- Dicranotropis hamata* Boh. On thistle, Cayton Bay.
- †*Stiroma affinis* Fieb. Ellerburn, Forge Valley.
- Aphrophora alni* Fall. Generally distributed in Scarborough district. Cotherston, 65*.
- Philænus spumarius* L. Abundant wherever I have collected in Yorkshire—Hull, Scarborough, Middlesbrough, Teesdale, Swaledale, etc.
- var. *spumaria* Edw. Generally distributed and common. On the heather above Holwick, near High Force, I once took a considerable number of this form, unmixed with any other variety, all suffused with a delicate pink colour, as is so common with insects and spiders on the moors. The same form has also occurred on the moors above Cloughton.
- var. *gibba* Zett. Skipwith, 61*. Pickering, 62*.
- var. *biguttata* F. Teesdale, 65*.
- var. *leucocephala* L. Teesdale, 65*.
- var. *marginella* F. Forge Valley, Pickering, 62*.
- var. *vittata* F. Scarborough, 62*.
- var. *lineata* F. Moors above Cloughton, Pickering, 62*. Teesdale, 65*.
- var. *populi* F. Common in Scarborough district, 62*. Teesdale, 65*.
- var. *lateralis* L. Forge Valley, Pickering, Silpho Moor, Ravenscar, 62*. Teesdale, 65*.
- P. lineatus* L. Scalby High Moor, Biller Howe Dale. Teesdale, 65*.
- Ulopa reticulata* F. Common on the heather, Biller Howe Dale, Seamer Moor, Scalby High Moor, 62*. North Cave. Teesdale, 65*.
- Megophthalmus scanicus* Fall. Spurn.
- Batracomorphus lanio* L. Seamer Moor, Forge Valley, Seamer, 62*.
- Oncopsis alni* Schr. } Seamer Moor, Silpho Moor, 62*.
- O. rufusculus* Fieb. }
O. flavicollis L. }
- Idiocerus confusus* Flor. Forge Valley, Hayburn Wyke, Seamer Moor, 62*.
- Agallia puncticeps* Germ. Cayton Bay, Pickering.
- Euacanthus interruptus* L. Forge Valley. Askham Bog. Teesdale, 65*.
- Tettigonia viridis* L. Forge Valley, Throxenby Mere, near Scarborough, 62*.
- Acocephalus nervosus* Schr. Seamer Moor. Teesdale, 65*.
- A. bifasciatus* L. Scarborough.
- A. albifrons* L. Stony Marl Moor, 62*.
- A. flavostriatus* Don. Teesdale, 65*. Scalby, 62*.
- Athysanus sordidus* Zett. Forge Valley, 62*.
- A. obsoletus* Kbm. Teesdale, 65*.
- Deltocephalus pascuellus* Fall. East Ayton, Pickering, 62*.
- D. ocellaris* Fall. Forge Valley, 62*.
- Limotettix frontalis* Scott. Seamer.
- L. 4-notata* Fab. Middleton-in-Teesdale, 65*. Pickering, East Ayton, 62*.
- L. nigricornis* J. Sahl. Seamer, 62*.
- †*Cicadula dahlbomi* Zett. In Forge Valley on *Epilobium angustifolium* in August, two specimens. This is the second British record, the only other known locality being near Cheltenham (*vide* Mr. James Edwards).
- C. 6-notata* Fall. Welwick. Seamer, 62*.
- Eupteryx urticae* Fab. Seamer, Forge Valley, 62*.
- † var. *leuconema*. Hayburn Wyke, (*vide* Mr. Edwards).
- † *E. auratus* L. Thornton Dale, 62*.
- E. atropunctata* Goeze. Seamer.
- E. signatipennis* Boh. Forge Valley, 62*.
- E. concinna* Germ. Raincliffe Wood, 62*.
- †*Typhlocyba 6-punctata* Fall. Forge Valley, on elm.

- Typhlocyba ulmi* L. Scarborough, Cayton Bay, 62*.
T. douglasi Edw. Raincliffe Woods, 62*.
T. quercus Fab. Raincliffe Woods, 62*.
 † *T. distincta* Edw. Forge Valley.
Zygina alneti Dahl. Cayton Bay, 62*.
Rhinocola ericæ Curt. Scalby High Moor, in abundance on heather.
Psyllopsis fraxinicola Forst. Raincliffe Woods, Hayburn Wyke.
Psylla mali Schbdg. Ramsdale.
P. ambigua Först. Hayburn Wyke.
 † *P. hippophæes* Först. Common on *Hippophæ rhamnoides* at Cayton Bay.
P. forsteri Flor. Hayburn Wyke.
P. alni L. Common on alder in the Scarborough district.
P. spartii Guer. Staintondale.

—: o :—

CORRESPONDENCE.

LICHEN NOMENCLATURE.

When an error is perpetrated in 'guid black prent,' it is astonishing how far it goes before it is overtaken. From the large lichen genus *Physcia* Th. Fries, in 1860, separated a section distinguished from the rest of the genus by its colourless spores and yellow thallus, the latter colour due to the presence of Xanthin or Parietin (a yellow lichen acid changed to crimson on the application of potash). This new genus was named very appropriately from its colour *Xanthoria*. In the 'Hand List of Lichens,' issued by the Lichen Exchange Club, there is an unfortunate error, the whole of the original species of *Physcia* (28 species) appearing under the generic name *Xanthoria*, instead of the first six species only. This was no doubt due to the accidental omission of the caption 'Physcia' from its place in the list, and the overlooking of the error in proof reading. The catalogue is not dated (another regrettable error), but I believe it was published about 1912, and the error referred to above is still 'going strong,' as it is quite a frequent occurrence to see *Physcia* without any yellow colour and with brown spores referred to under *Xanthoria*. In some recent reports of the Yorkshire Naturalists' Union Excursions the error has been repeated recently, and in a list of Yorkshire lichens in the May number we see figuring *Xanthoria puberulenta* Nyl. and *X. tenella* Nyl. This not only places these species in the wrong genus, but attributes to Nylander a combination of names he never used. I do not think this error in the catalogue referred to has ever been publicly corrected.—J. A. WHELDON.

—: o :—

The Oil Trusts and Anglo-American Relations, by Davenport and Russell Cooke. Macmillan & Co., 1923, 272 pp., 7/6; an interesting and instructive little book dealing with the relative petroleum policies of both American and British Governments and organisations. As, from time to time, serious misrepresentations have been made in the press of both sides of the Atlantic regarding problems of international importance in connection with petroleum, this work serves as a reminder that truth is often more acceptable than fiction. A frank discussion of the rights and wrongs of the respective American and British attitudes is given, the oil policies of both governments are criticised, and the results of various post-war oil and international conferences are dealt with in an attractive manner. Two useful maps are included, showing the oil resources of the world, and the producing oilfields of the Middle East.—G.S.

NORTHERN NEWS.

'I am not a thief, I am a collector' (*Punch*, May 14th, p. 532).

Prof. Henry Balfour recently 'opened' the Brown collection of South Sea relics in the Bowes Museum, Barnard Castle.

Punch tells us that 'A tom-tit has built its nest in a pillar-box at Catteral, near Garstang. Now at last we can get on with the summer.'

No. 15 of the *Proceedings of the Society of Antiquaries of Newcastle-on-Tyne*, recently received, contains an account of some interesting Roman inscribed stones recently added to the Museum.

Our old friend '*Ammonite jason*' now appears as *Spinikosmokeras acutistriatum* on one plate, *Hoplikosmokeras hoplistes* on another, and *H. fibuliferum* on a third (Buckman's *Type Ammonites*, Part XLV.).

In his book on 'Life,' Sir Arthur Shipley states: 'I venture to hope that this book will be not without interest to the public that is not preparing for examinations, and thank heaven that public is still in the great majority!'

We may be somewhat conservative, but we do not like the new form in which a Yorkshire Society's Excursion Programme has appeared. The paper is very flimsy, the colour is not attractive, and the fact that the programme is of a different shape from the usual makes it a little inconvenient in binding.

We learn from *Punch* that 'When summer stops the swallow pops Off to the South, for that's The quarter where he finds the air Alive with flies and gnats. Where sits the Sphinx and dreams and thinks Of bygone realms and kings, The swallow swoops and swallows troops Of sting-y, wing-y things.'

The Annual Report of The Yorkshire Philosophical Society for 1923 has recently been issued, and, besides a record of the work done and the additions made to the collections, there are the usual valuable Meteorological Statistics, and a paper by Professor Mawer on 'Yorkshire History in the Light of its Place-Names.'

Messrs. Henry Sotheran & Co. have issued a specially printed catalogue of the important Library of Books on British Ornithology, formed by Major W. H. Mullens, M.A., M.B.O.U., and described in his 'Bibliography of British Ornithology,' 1917, and 'Geographical Bibliography,' 1920, which will be of value to collectors of rare ornithological books.

We regret to hear of the death of Dr. C. W. Andrews of the Palæontological Department, British Museum (Natural History). Visitors to that Institution will remember the cheerful way in which they were always welcomed by Dr. Andrews, and many, besides geologists, are familiar with his extraordinarily good work, especially with regard to the extinct animals of Egypt.

We have received from Mr. Rodier, of Melbourne, Australia, a large quantity of literature relating to rabbit and rat extermination by the 'Rodier Method.' Briefly this seems to be the trapping and releasing of the males, while killing the females. Mr. Rodier tells us that he has been advocating this scheme for the destruction of rabbits in Australia for 36 years, but has not received the assistance that he should.

The annual meeting of the Leeds Philosophical and Literary Society, Ltd., was held recently. According to the report of the Council, there were only 180 members at the end of the session. During the year the agreed payment of £1000 had been received from the Leeds Corporation by quarterly instalments. The publication of the society's history may be expected at a very early date, which seems very advisable in case the Society shares the fate of many others. It was decided to present an address of congratulation to mark the celebration of the jubilee of the Yorkshire College, now Leeds University, in December next. The election of officers resulted as follows:—President, Professor W. Garstang; Vice-Presidents, Professor A. J. Grant and Mr. E. Hawkesworth; Hon. Secretaries, Colonel E. Kitson Clark and Mr. H. R. Lupton; Hon. Librarian, Professor. P. F. Kendall.

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Bee Orchis.

NOTES AND COMMENTS.

TREES AND FLOWERS.

Now that *Animals of all Countries* is getting towards completion, Messrs. Hutchinson & Co. are producing an entirely new work, to be completed in about 28 fortnightly parts, dealing with Trees and Flowers of the Country-side. It is being produced on similiar lines to the previous publication, is edited by Edward Step, and will contain about a thousand illustrations, including coloured plates. The accompanying illustration of the Bee Orchis (Plate XIV.), a species well known to Humberside botanists, is kindly lent to us by the publishers.

LIFE HISTORY OF THE EEL.

For sixpence the British Museum (Natural History) now issues five post-cards illustrating the life history of the eel, as well as a descriptive leaflet. From this we learn that ; 'Thirty years ago all that was known of the breeding of the Common or Freshwater Eel (*Anguilla anguilla* or *A. vulgaris*) was that in the autumn numbers of large eels made their way seaward, and that in the spring shoals of elvers, or little eels about $2\frac{1}{2}$ inches long, entered the rivers from the sea and made their way upstream. It was naturally supposed that the eels bred in the estuaries or in the sea near the mouths of the rivers, and that the elvers were the progeny of the eels that had descended the river a few months before. Then, in 1896, came Grassi's discovery that the little transparent fish known as *Leptocephalus brevirostris* was the larva of the Common Eel. In the Straits of Messina a series of specimens were (*sic*) found swimming at or near the surface showing the transition from the leptocephalid to the elver ; as these had been found nowhere else it was supposed that the eels bred in deep water near the coasts, that the larvæ lived at the bottom, but that in the Straits of Messina the strong currents brought some to the surface. In 1904 Dr. Johannes Schmidt found one of these larvæ near the surface of the sea west of the Faroes ; he followed up this clue, and, as the result of work carried on all over the North Atlantic, he has now demonstrated that all the freshwater eels of Europe breed in an area south-east of Bermuda, probably at a depth of two or three hundred fathoms below the surface ; from this area the larvæ spread across the Atlantic, swimming in the upper layers of the ocean.'

LINCOLNSHIRE NATURALISTS.

We have received the *Lincolnshire Naturalists' Union Transactions*, 1923, edited by A. Smith and R. W. Goulding (42 pp.), and as an Index to Vol. V., 1919-1922, is enclosed, we presume this is Part I. of Vol. VI. But it does not say so. The part begins with a list of officers, list of members,

subscriptions, etc., objects and rules, balance sheet, and then we have G. A. Grierson's Presidential Address, delivered on November 22nd, 1923, on 'Lessons from a Limited Area.' The balance sheet is reminiscent of that of other Unions, as we find the 'balance in the Secretary's hands' is 2s. 10d. Besides the Secretary's Report, there are notes on Conchology, by J. F. Musham; Entomology, by A. E. Musgrave; Birds, by G. H. C. Haigh; Skegness Birds, by F. Hind; and Botany, by Miss S. C. Stow. Then follows an account of the achievements of a well-known and honoured past President of the Union, John F. Musham, F.E.S., M.C.S. (with portrait), which, we believe, for the first time has an accurate title, viz., 'The Nineteenth President of the Lincolnshire Naturalists' Union.' Possibly the initials T. S. at the end, may account for this. We trust in future the next one will be 'The Twentieth,' and so on. N. S. Stevenson, of Edinburgh, follows with an account of 'The Submerged Forest on the Coast of Lincolnshire,' in which, after quoting Drayson to the effect that 'a glacial age occurs (roughly speaking) every 30,000 years,' the astounding statement is made that 'Thus, the age of the coast forest must be 37,000 years *at least*, but *it may easily* be more, in which case the age would increase by multiples of 30,000 years.'

AMBITION.

Some years ago the naturalists of the world were to be organised and banded together in what was known as a B.E.N.A., and badges and certificates and printed matter and an 'organ' appeared. The only badge the present writer ever saw was on the coat of a 'student' who obtained an introduction therewith, and then 'worked' his railway fare to a far-distant place, being 'hard up.' We now have before us a circular about a similar society called—

THE NATURE LOVERS' FELLOWSHIP.

From this we learn that this fellowship has for its aims the following objects:—(1) To stimulate and foster a love for Nature, *and to* (2) Protect and preserve all forms of Wild Life not inimical to mankind. (3) Encourage interest in Regional Studies. (4) Bring into communication Nature Lovers all over the world. (5) Form a Nature Lovers' Club and Library. (6) Arrange for Lectures and Lecturers on all cognate subjects. (7) Identify and exchange specimens. (8) Give advice on Insects, Fungi, etc., of economic importance. (9) Loan and exchange Books, Photographs, and Lantern Slides. (10) Form Adult and Junior Branches. (11) Publish a Fellowship Magazine. (12) Hold Nature Study Exhibitions. (13) Support the formation of Regional Museums and Nature Sanctuaries. (14) Give advice on Scientific Books, Apparatus, etc.

(15) Offer assistance as to suitable Holiday Haunts. (15) Afford advice in all Natural History Studies and Pursuits. (17) Give advice as to how to treat Pets and other Animals, and (18) Generally to bring together under one fellowship Nature Lovers everywhere.'

FUNDS, AGAIN !

We also learn that *donations*, subscriptions (5s. for seniors, and 2s. 6d. for juniors) should be sent to the Hon. Secretary of the Fellowship, The Museum, Letchworth. But what we fail to find is any reference to anyone but this anonymous person. What we should like to know is the name of the others, if any, interested in the Fellowship, especially the *treasurer* and *auditor*. What becomes of the donations and subscriptions, and who will edit, print and publish the Fellowship Magazine, apparently the principal return for the cash? The Fellowship also sells books by Mr. W. P. Westell, it arranges lectures by Mr. W. P. Westell, and gives terms and dates. In fact the 'Fellowship' seems to be doing quite well for Mr. W. P. Westell! On the back of the circular we learn that the Letchworth Museum, which 'purports' to be an educational institution, is *in urgent need of funds*, which should be sent to still another anonymous hon. secretary. We believe Mr. W. P. Westell, who writes books, lives in the neighbourhood. Perhaps he will enquire into the matter for us?

FACTS AND FIGURES.

The Lancashire and Cheshire Naturalist for April tells us that 'Putting the origin of the Flowering Plants 30 million years ago in the Upper Cretaceous, the length of a period works out at 270,000 years. The increase in the rate of production began two or three periods back, between 540,000 and 810,000 years ago. I suggest that the normal rate of 1 in 17 held during the long fall of temperature from the Oligocene, through the Miocene and Pliocene well into the Pleistocene, and that the rapid rise in temperature in our latitudes from 15° F. to 40° F. since the passing away of the Ice Age has caused a normal rate of 1 in 17 per period of 270,000 years to rise for the present time and the population of 162,000 species to about 36 per annum. The Compositæ and Leguminosæ are given as the largest families, and contain 1450 species in the genus *Senecio* and 1600 in *Astragalus*. Using the normal rate, and deducting the extra production since the Glacial Epoch, I get about 31 and 33 million years for the ages of the two genera. This world-wide distribution and largest number of species show that they must have been earliest and most vigorous, so this ratio would be above normal and their ages less. The agreement, then, with the age assigned to Flowering Plants is quite satisfactory.' or, as the Americans say, 'quate.'

SEVENTEENTH CENTURY ORNITHOLOGY.

Mr. J. H. Crow contributes the following interesting extracts from the Description of the 'Shyre of Barwick,' in Sibbald's 'Description of Scotland,' the MS. of which is preserved in the Advocates' Library, to the *History of the Berwickshire Naturalists' Club*, Vol. XXV., Part 1. The account is said to have been written by the Rev. John Veitch, minister of Westruther, about 1680. An account in many respects identical, was printed in 1908, by *The Scottish History Society*, in Macfarlane's Geographical Collections, Vol. III. :—(1) 'The Dotterells frequent about Bastenrig on the East hand, and the Moristons and Mellerstain downs on the West, the 14 neeght of Aprile and first 14 neeghts of May' (*i.e.* the last fortnight of April and first fortnight of May). The later reference to dotterels in Camden's *Brittania*, referred to by Mr. Muirhead, was evidently derived from this MS. (2) 'Lambermore . . . is a Ground excellent for pastouradge in the summertyme abounding with moorfowl, partradge, plivers green and gray, which afoord much sport to ye nobility and Gentrye.' The third extract has been omitted in the Macfarlane MS. :—(3) 'Ther is a Lough at Swinton much frequented by wild Swans.'

BARNACLES.

Besides its Proceedings and Fifty-seventh Annual Report, the *Journal of the Quekett Microscopical Club* for November contains the Presidential Address of D. J. Scourfield on 'Physical Factors in Freshwater Biological Problems.' In this he states that 'The idea that the Stalked Barnacle is a stage in the life-history of the Barnacle Goose was at one time generally prevalent, and the Barnacle Goose, being thought to be partly a fish, was eaten during Lent. The bird is a migrant and does not breed in this country, and the myth probably had its origin in this fact, plus the finding of tree-trunks with Stalked Barnacles attached. There is a figure of the Barnacle Tree in Gerard's "Herbal," and Izaak Walton refers to it. The true history is quite as marvellous. When the triangular larva, which swims about with a jerky movement, reaches the end of its free-swimming stage, it attaches itself to a rock or ship and pours out a cement which forms the shell. The barnacle casts off its swimming legs, its eye disappears, and it stands for the rest of its life on its head, kicking its food into its mouth.'

OPENING OF TODMORDEN MUSEUM.

We learn from *The Yorkshire Post* of May 26th, that 'Todmorden Museum, housed in the Central Vale Mansion, was opened on Saturday by the Mayor (Ald. F. Pickles). Ald. E. Crabtree, Chairman of the Parks Committee, presided.

Since the war, when the Mansion was used for hospital purposes, the building has remained empty. In the entrance hall are two pictures by Mr. W. Hanson, a local artist, which for several years hung in the local free library. In one room there is a collection of urns from the prehistoric burial ground at Blackheath, and fossils, and on the walls are portraits of the Fielden family and other public men. There are also oil paintings by Mr. A. W. Bayes, a number of local banknotes, handloom shuttles, constables' truncheons and handcuffs formerly used in the old townships of Langfield and Stansfield, birds' eggs, flints and flint implements, minerals and ores. Another room is devoted to the collection of the late Mr. Wm. Hardacre, and a third to old furniture lent by Mrs. Rhodes, of Hipperholme (formerly of Todmorden).'

TYPE AMMONITES.

In commencing Volume V. of this remarkable work, Mr. S. S. Buckman explains that 'the manner in which Type Ammonites is issued—single plates for each specimen, with rare exceptions—allows of the work being bound in various ways: 1, bibliographic, or exactly as it is issued; 2, notational, the pages and plates being taken from the parts and rearranged according to their numerical order; 3, chronological-zoological, the text arranged by itself in notational order, the plates placed according to the chronological order of the strata—from Caloceratan to Gigantitan—without reference to their notational order; 4, zoological-chronological, the text as before, the plates according to the zoological order of the genera; 5, geographical, the plates arranged according to the particular districts from which the specimens came. All these different methods of arrangement have special advantages. The first, or bibliographic, method is particularly useful to the bibliophile, giving the order in which the work was issued, and the dates when new names were proposed—valuable evidence of priority of publication: for such manner of binding, which involves no trouble of rearrangement, all the wrappers should be retained, otherwise the work, from the bibliophile standpoint, is incomplete.

FISHERY INVESTIGATIONS.

The Ministry of Agriculture and Fisheries has issued valuable 'Quantitative Studies on the Fauna of the Sea Bottom,' No. 1. 'Preliminary Investigation of the Dogger Bank,' by F. M. Davis, (54 pp., 6s.). From this we gather that it was originally intended to investigate the following grounds intensively once a year: 1, the central portion of the Dogger Bank, which is known to be a comparatively rich feeding ground and one on which transplanted plaice thrive and grow at an exceptional rate; 2, the Lemn Ground, which, at certain seasons, yields good catches of fish; 3, the Haaks area, which is representative of the Dutch young plaice grounds. Trawling, with a view to the investigation of the stomach

contents of fishes, was also to be carried out on the same grounds, and, as nearly as possible, at the same time. It was also hoped that time might be found for work with the Naturalist's dredge, Agassiz trawl, etc., in order to gather data on the predatory fauna of the ground, it being unusual for such material to be taken in the bottom-sampler. Various events have, however, conspired to alter the programme, and, with the exception of 57 stations worked near the Haaks Light Vessel and a few scattered stations in the different areas, the bottom sampling has been confined to the Dogger Bank, and it is to the results obtained on this ground that the present paper is devoted.

POLLEN IN PEAT.

At the recent meeting of the Linnean Society ' Mr. Ramsbottom gave an account of a paper by Mr. G. Erdtman, entitled "Studies in the Micropalæontology of Post-glacial Deposits in Northern Scotland." This is an account of an investigation of the pollen grains preserved in the peat from thirty-eight localities situated in Ross-shire, the Isle of Skye, the Isle of Lewis, Sutherlandshire, and the Orkney and Shetland Islands. The method employed is that which was devised by Von Post, to whom, to Dr. C. H. Weber and Prof. Lagerheim, we owe most of our knowledge respecting fossil pollen. A sample is taken by means of a borer to various depths and the cores obtained are sub-sampled, boiled with 10 per cent. caustic potash and the pollen grains counted. With care the samples counted can be made of sufficient uniformity to yield quantitative results, which, if the number of samples examined be large, provide average percentages for the various species which may be regarded as fairly representing their relative frequency in the then flora. Weber, in 1893, emphasized the view that pollen must, owing to its abundance and the frequency of its preservation, give a truer picture of past floras than the infrequent fossil remains usually relied on.

LIST OF SPECIES.

From the thirty-eight localities examined, Mr. Erdtman has found pollen of the following tree genera: *Acer*, *Alnus*, *Betula*, *Carpinus*, *Fagus*, *Fraxinus*(?), *Pinus*, *Quercus*, *Tilia*, *Ulmus*, *Ilex* and *Salix*. Of these *Betula* is by far the most abundant, usually providing 70 per cent. of the total pollen. Next in order come *Pinus* (14.6 per cent.), *Alnus* (11.8 per cent.), *Salix* (11.25 per cent.), *Carpinus* (4.25 per cent.), *Quercus* (2.4 per cent.), and *Ulmus* (1.2 per cent.). The beech was represented by a single pollen grain in three separate localities. Holly also occurred but rarely, viz., in five loci, of which three were the same as those containing beech. *Acer* was rare, as in Scandinavian post-glacial deposits. The first appearance of the pollen of *Alnus* probably marks a definite horizon and it is suggested that this may correspond to the level of the first appearance of alder pollen in Scandinavia. The latter is late Boreal or about 6000 B.C. A striking difference,

as compared with Scandinavia, is the total absence of *Picea*. The occurrence of *Carpinus*, though very rare, is extremely interesting, since it has only been recorded hitherto from fossil deposits in Great Britain from pre-, late-glacial and Roman deposits south of the Wash. The presence of *Fagus*, too, in these post-glacial peats of the north of Scotland rather negatives the idea that the present restricted range of this species is the outcome of its recent immigration. Pine pollen is always associated with that of birch, and it seems probable that these two trees were the principal constituents of the post-glacial forests of northern Scotland.'

THE BRITISH ASSOCIATION.

The General Committee of the British Association recently received deputations from the Borough and University College of Southampton, and from the University and City of Oxford. Local officers were appointed for the Southampton meeting next year, and the date of the meeting was fixed for August 26th to September 2nd. The Oxford deputation presented an invitation for the meeting of the Association to be held there in 1926, and this was accepted unanimously. This meeting of the General Committee took place, by kind invitation of the Council of the Zoological Society, in that Society's rooms at Regent's Park, and the members were afterwards entertained to tea in the Gardens by the Secretary of the Society, Dr. P. Chalmers Mitchell, and were invited to inspect the Gardens and the new aquarium.

EARLY SCIENCE AT THE ROYAL SOCIETY.

We learn from *Nature* that, at the Royal Society, on June 17th, 1669, 'The operator was ordered to attend the president at the Navy-office and to receive his lordship's orders how to fit some of the instruments to be sent to sea with the Lord Howard. It was moved also, that that instrument might be fitted for the Lord Howard, which had been formerly contrived by Mr. Hooke for fetching up from the bottom of the sea what might be there, as stones, shells, plants, etc. ; which is done by a couple of springs shutting and catching as soon as the instrument touches the ground.'

CORN SMUT IN 1663.

Nature (June 14th) tells us that so long ago as 1663, 'Col. Long communicated his observations concerning smut in corn, with the description of it, and its difference from other vices in corn ; together with his conjectures of the causes of it, and the most probable means to avoid it. His paper was ordered to be registered. It was ordered that Mr. Packer should be asked, who it was at Ballinghurst, in Sussex, that had the skill in marking those ears of corn in flowering time, which would not smut afterwards in two or three years.'

LORD AVEBURY.*

This interesting volume contains a series of essays dealing with the extraordinary variety of interests of the late Lord Avebury, written by Sir Bernad Mallet, Sir Arthur Keith, Dr. A. Smith Woodward, Professor J. Arthur Thomson, H. St. J. K. Donisthorpe, Dr. A. C. Seward and Sir Michael E. Sadler. The illustrations consist of portraits of Sir John Lubbock, by George Richmond, in 1867, and a reproduction of a painting by Sir Hubert Herkomer, in 1911, two reproductions which no one would realise referred to the same individual. The volume has a limp cloth cover, is handy for the pocket, is cheap, and unquestionably will be very popular.

CHARADRIFORMES. †

This is not a volume which is likely to be very popular from a readable point of view, though as a bibliography of the principal references to the Bustards, Snipe, Plover and Wading Birds it is invaluable. In Sharpe's Catalogue of Birds in the British Museum, 1896, were references to papers on this subject, and the present work deals with the great mass of literature which has accumulated during the past thirty years. Quite apart from the value of the references the notes have been prepared in systematic order, and by the aid of an elaborate index all the latest information with regard to records and general information of any particular species can be obtained at a glance.

MARINE PLANKTON. ‡

The authors of this book are well-known for their fine work in connection with the Department of Oceanography at the University of Liverpool, the late head of which, Sir William Herdman, contributes an Introduction. The Plankton which is usually looked upon as small and insignificant, has much more importance on the distribution of the larger forms of marine life than is usually assumed, a fact ably demonstrated in this excellent volume, which has a wealth of information in the form of tables, statistics, and illustrations. The treatise is a sound scientific publication which should be in the hands of all interested in marine zoology.

* 'The Life-work of Lord Avebury,' by his Daughter, The Hon. Mrs. Adrian Grant Duff. London: Watts & Co., vii. + 261 pp., 5s. net.

† 'The Literature of the Charadriformes from 1894 to 1924, with a Classification of the Order and Lists of the Genera, Species and Sub-species,' by George C. Löw. London: H. F. & G. Witherby, Ltd., xi. + 220 pp., 12s. 6d. net.

‡ 'The Marine Plankton, with special reference to investigations made at Port Erin, Isle of Man, during 1907-1914. A Handbook for Students and Amateur Workers,' by James Johnstone, Andrew Scott and H. C. Chadwick. The University Press of Liverpool, xiv. + 194 pp., 12s. 6d. net.

VARIATION IN THE SHELL OF THE COMMON COCKLE.

T. NEVILLE GEORGE,
University College, Swansea.

MODERN refinements in the study of invertebrate fossils are making it more and more necessary to examine slowly evolving or long-range species of fossils more carefully, in order to determine what factors may be used in correlation. Changes in the shape of shells, differences in the number of ribs, and such small modifications may serve to differentiate those members of a 'species' that characterise distinct horizons. On the other hand, there is naturally considerable variation among members of a 'species' which are found in one bed, and which presumably lived at the same time.*

Although a considerable amount of work on the variation

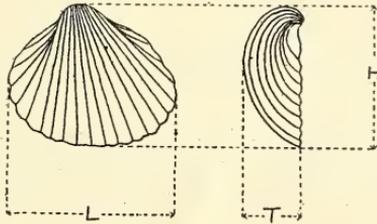


Fig. 1.—Diagram of shell of *Cardium edule*, showing length (L), height (H), and thickness (T).

of mollusca has been carried out by biologists during recent years,† yet there is still a lack of information regarding the nature and range of variation that may be expected in the skeletal structures of co-existing members of a living 'species,' and such information as has been obtained has rarely been considered in relation to palæontology.

The present paper is an attempt to describe the variation found in the shells of the common cockle (*Cardium edule*) with the intention of applying the results to the investigation of certain fossil mollusca.

All the specimens examined were single valves collected from the beach at Swansea Bay, within a radius of about half a mile. The species breeds in enormous numbers in this

* See e.g. 'The Use of *Gryphæa* in Correlation,' A. E. Trueman. *Geol. Mag.*, 1922.

† See e.g. various papers by Dr. G. Hickling and Mr. W. E. Atkins in *Mems. Manch. Lit. and Phil. Soc.* during recent years.

locality, and shells of all sizes may be obtained. Only those of length greater than 20 mm. are now considered.

One thousand individuals were collected and the following characteristics noted :—

1. Number of ribs.
2. Length.* The greatest distance from the anterior to the posterior margin.

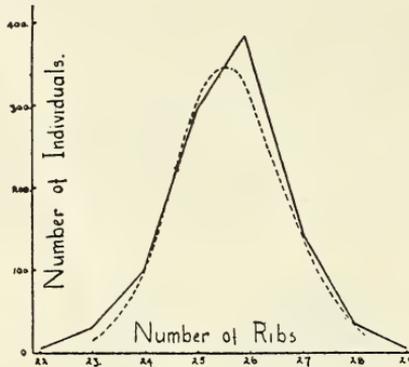


Fig. 2.—Variation in number of ribs in *Cardium edule*.

Actual graph obtained, continuous line.

Algebraic curve, $y = 0.35 N e^{-0.43x^2}$, broken line.

3. Height. The least height from the umbo to the posterior margin ; not always at right angles to the length.
4. Thickness. (Of one valve.)
5. Weight.

Measurements were made by means of sliding calipers, in the cases of the length, the height, and the thickness, to the nearest 0.5 mm. The weight was measured to the nearest 0.5 dgm.

The number of ribs.—The variation extends from a minimum of 22 to a maximum of 29, 26 being the most common number. The curve obtained is a symmetrical variation curve with a mean of 25.6. It is approximately represented by the algebraic curve $y = 0.35 N e^{-0.43x^2}$, where y is the number of individuals having $(25.6 + x)$ ribs, and N the total number of individuals. (Fig. 2).

* The terms used are those given by Dr. A. M. Davies in his 'Introduction to Palæontology,' 1920.

As one would expect, since new ribs are not intercalated, the number of ribs does not increase with increasing size of shells, but remains constant throughout life. This is shown by the variation of groups of individuals of different sizes. Thus the mean number of ribs in specimens less than 30 mm. long is 25.7, and in those greater than 30 mm. long it is 25.5. The variation curves obtained in both cases are the same, allowing for experimental error in measurement and fewness of specimens, as the curve for all the individuals.

The proportion of height to length.—The shells are all longer than high; the extremely low forms are 79.9% as high as long, while a noticeably deformed specimen, the highest

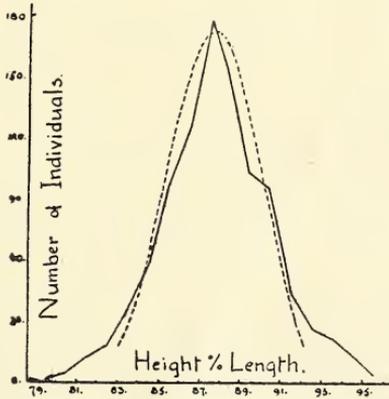


Fig. 3.—Variation in the proportion of height to length in *Cardium edule*.

Actual graph obtained, continuous line.

Algebraic curve, $y = 0.175 N e^{-0.10x^2}$, broken line.

noted, is 98.4% as high as long. The mean proportion of height to length is 87.6 : 100, and the variation curve for the whole of the specimens, as might be expected, is symmetrical about that mean. It is very approximately represented by the algebraic curve $y = 0.175 N e^{-0.10x^2}$, where y is the number of individuals having height $(87.6 + x)\%$ length, and N is the total number of individuals. (Fig. 3).

The proportion of height to length does not remain constant for all sizes of shells. The specimens of length less than 27.5 mm. have a mean of height 88.9% length; those of length between 27.5 mm. and 32.5 mm. have a mean of height 87.7% length; and those of length greater than 32.5 mm. have a mean of height 86.8% length. In other words, the

height of the shell in proportion to the length decreases as the shell gets larger. (Fig. 4).

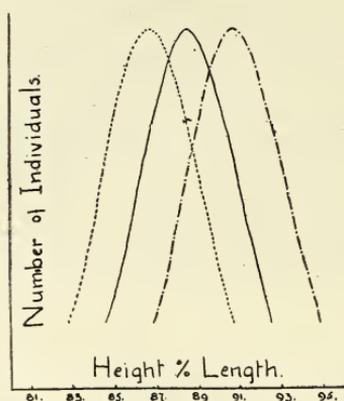


Fig. 4.—Variation curves showing the relative decrease in height with increasing length.

Algebraic curve, $y = 0.175 N e^{-0.10x^2}$, for

- (i.) specimens length less than 27.5 mm., dot-dash line.
- (ii.) specimens length 27.5 mm. to 32.5 mm., continuous line.
- (iii.) specimens length greater than 32.5 mm., dotted line.

The mean height for any given length may be obtained approximately from the formula $H = 1.5 + 0.82L$, where H = height, L = length, in mm.; the formula is at least correct for shells of length between 20 mm. and 40 mm. (Fig. 5).

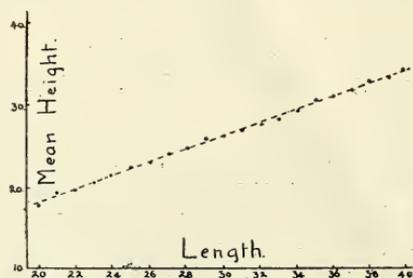


Fig. 5.—Graph showing the rate of increase of height with increasing length.

Actual points obtained,

Algebraic equation, $H = 1.5 + 0.82 L$, broken line.

The proportion of thickness to length.—There is similarly a variation in the proportion of the thickness to length of

the shells. The variation extends from a minimum of thickness 31.7% length to a maximum of thickness 45.3% length, with a mean of thickness 37.0% length. The variation is again given by a symmetrical variation curve of typical form and is approximately represented by the algebraic curve $y = 0.20 N e^{-0.125x^2}$, where y is the number of individuals having thickness $(37.0 + x)\%$ length, and N is the total number of individuals. (Fig. 6).

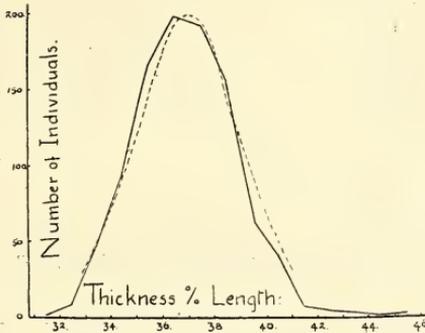


Fig. 6.—Variation in the proportion of thickness to length in *Cardium edule*.

Actual graph obtained, continuous line.

Algebraic curve, $y = 0.20 N e^{-0.125x^2}$, broken line.

The proportion of thickness to length does not vary so markedly with difference in size of the shells as does the proportion of height to length, but, nevertheless, there is a regular increase in the proportion of thickness to length with increasing length. Thus the individuals of length less than 27.5 mm. have a mean of thickness 36.8% length; those of length between 27.5 mm. and 32.5 mm. have a mean of thickness 37.0% length; and those of length greater than 32.5 mm. have a mean of thickness 37.3% length. It is interesting to note, therefore, that in large (old) shells the thickness is greater and the height is less in proportion to the length than in small (young) shells.

The proportion of weight to length.—A graph showing the mean weight for different lengths shows that the weight varies approximately as the cube of the length (Fig. 7). Hence for our purpose the proportion of the weight to the cube of the length will be considered. This is found to vary between $W = 0.000051L^3$, (where W = weight in gms., L = length in mm.) and $W = 0.000196L^3$, though in this latter instance the specimen was obviously deformed. The variation obtained is given by a symmetrical variation curve with a mean of $W = 0.0001027L^3$.

It is approximately represented by the algebraic curve $y = 0.15 N e^{-0.33x^2}$, where y is the number of individuals with $W = (0.0001027 + 0.00001x)L^3$, and N is the total number of individuals. (Fig. 8).

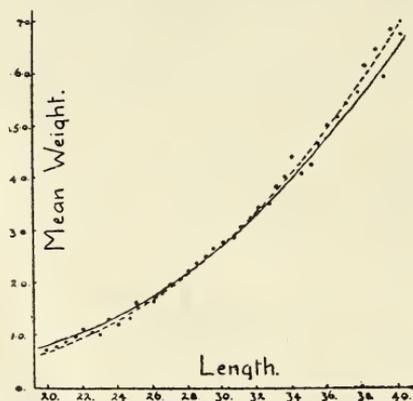


Fig. 7.—Graph showing increase of weight with increasing length
 Actual points obtained, . . .
 Algebraic curve $W = 0.000103 L^3$, continuous line.
 „ „ „ $W = 0.0298 L - 0.00271 L^2 + 0.000160 L^3$, broken line.

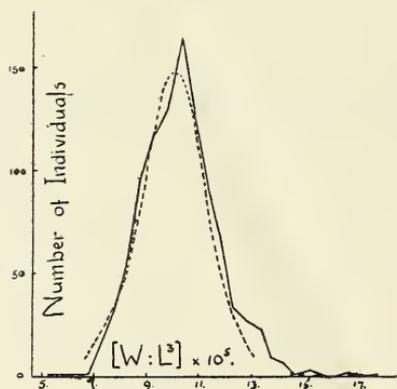


Fig. 8.—Variation in the proportion of weight to length in *Cardium edule*.

Actual graph obtained, continuous line.

Algebraic curve $y = 0.15 N e^{-0.32x^2}$, broken line.

(In constructing this algebraic curve, a tail of heavy individuals was ignored, so that the mean of the algebraic curve is given by $W = 0.00010L^3$).

That the weight does not vary directly as the cube of the length is shown by the variation of groups of individuals of

different sizes. The specimens of length less than 27.5 mm. have a mean of $W=0.0000997L^3$; those of length between 27.5 and 32.5 mm. have a mean of $W=0.0001031L^3$; and those of length greater than 32.5 mm. have a mean of $W=0.0001071L^3$.

The mean weight for any given length may be obtained approximately from the formula $W=0.0298L-0.00271L^2+0.000160L^3$, where W =weight in gms., L =length in mm., the formula is at least correct for shells of length between 20 mm. and 40 mm. (Fig. 7).

From these results we may conclude that with increasing size of shell the weight increases at a relatively greater rate than does the length.

SUMMARY OF VARIATION.

- (i). The number of ribs in *Cardium edule* has a mean value of 25.6, and remains constant throughout life.
- (ii). The proportion of height to length has a mean value of height 87.6% length. During growth, however, the height gets proportionally less, according to the equation $H=1.5+0.82L$.
- (iii). The proportion of thickness to length has a mean value of thickness 37.0% length. During growth the thickness gets proportionally greater.
- (iv). The weight (in gms.), compared to the cube of length (in mm.) is found to have a mean value of $W=0.0001027L^3$. During growth, the weight increases at a relatively greater rate than does the length, according to the equation $W=0.0298L-0.00271L^2+0.000160L^3$.

Variation in each of the characters measured is normal and regular, and for each character the group is homogeneous. The shells may, therefore, be regarded as consisting of a single biological group that cannot further be sub-divided.

It has recently been noticed that fossils collected at one horizon and presumed to be co-existent exhibit in some cases wide variation among themselves, and that the variation is shown by those characters which are progressive in the stock; in other words, some members are more advanced, others more retarded, than those with which they presumably lived.

It is significant, therefore, that the limits of variation in the shells of the cockle are relatively narrow, and the suggestion may be made that the lineage of the common cockle is not tending to any marked change in the shape of the shell.

**GAGEA LUTEA KER. (=FASCICULARIS SALISB.)
AND ITS PARASITE.**

A. A. DALLMAN, F.G.S.

ON April 12th several hundred plants of *Gagea lutea* were seen by the writer and others in its old station near Doncaster, where this interesting species still thrives. Many were in bloom, and had evidently been flowering for some time, but the inconspicuous scentless blossoms, which are easily overlooked, were devoid of insect visitors. The weather was not too favourable for insect activities on this occasion, however, and as another visit failed to reveal any creatures frequenting them, further observations in this connection are desirable. The flowers appear very sensitive to variation in intensity of illumination (and perhaps to temperature), and when closed the greenish colour of the perianth exterior renders them difficult of detection among the surrounding grassy vegetation.

According to Kerner, autogamy may occur pseudo-cleistogamously through flowers remaining closed under unfavourable weather conditions. On my last visit (May 14th) the flowering period was past, only an occasional etiolated blossom remaining. None of the plants shewed any signs of seed formation or capsule production. It was evident that the species is largely, if not entirely, propagated here vegetatively. Many individuals shewed bulbil development, and careful search revealed that many tiny plants were present, but had so far been unable to flower. The necessity for this species concentrating its activities into the early period of the year and ahead of potential competitors was obvious. By mid-May the plants were largely hidden and overgrown by other vegetation (*Allium*, grasses, etc.), while the canopy formed by adjacent trees and shrubs was also obvious.

Many examples shewed sori of the rare micro-fungus *Uromyces Gageæ* Beck, which has previously been recorded from here some years ago. These were found to contain abundance of teleutospores. Plowright (*Monograph of British Uredineæ and Ustilagineæ*, 1889), states that the mycelium causes pale blotches on the leaves of the host. None of the examples which I examined in the field shewed them. Infected leaves which I kept under observation in the laboratory where mature sori developed, also failed to reveal any spotting.

I believe the three records which are given for the Don and Dearne district, in the *Flora of West Yorkshire*, probably all refer to the one station. It is very probable that this station is also identical with that which Tofield knew, and formed the basis of his record which appears in Hudson's *Flora Anglica* (Ed. ii., 1778), and yields our earliest notice of *Gagea lutea* as a West Yorkshire plant.

THE CRADLE OF THE HUMAN RACE.

FOR a long time we have suspected that the East Anglian 'prehistorians' would be claiming their area as the cradle of the human race. In the current number of *Science Progress* there is still another 'essay' on 'The Antiquity of Man in East Anglia,' in which this claim is now made. This essay is remarkable from the fact that it is not accompanied by a single footnote referring to Mr. J. R. Moir's various and numerous essays on the same or similar subjects; nor is that person once referred to in the text. Whether this is due to a sudden modesty on the part of the author, or to the editorial blue pencil, we cannot say; but the fact remains. The 'author,' who is now an 'F.G.S.,' tells us that 'the whole series of strata forming the earth's crust have (*sic*) been divided up by geologists into various periods, ranging from the most ancient archæan to that of the present day.' Fortunately for us, archæan rocks do not occur in East Anglia, so that human remains are not recorded from that deposit, as yet. Then, 'in geological parlance, this (? present) is the Recent Period, and, going back in time, we find that behind us, in successive order, are the Pleistocene and Pliocene epochs. *There are, of course, many others.*' He then refers to the eoliths—'dawn-stones,' found by the late Benjamin Harrison. These are correctly described as 'of the simplest possible description, being mostly, naturally, fractured pieces of tabular flint'; but when Mr. Moir adds 'exhibiting human flaking along one or other of their edges, which were evidently used for scraping and cutting purposes of a rough and primitive nature,' and 'thus, both from the geological and morphological standpoints, the Harrison eoliths of the Kent plateau appear to represent the handiwork of the earliest human beings'—I must join issue with him. Speaking as an amateur geologist, I deny that the dawn stones give any evidence whatever of human beings—and what morphology has to do with the question we fail to see. Perhaps Mr. Moir means morphia-ology—'sleep-stones' rather than 'dawn-stones.'

Then this F.G.S. gives the geological information that 'towards the close of the Pliocene period the land surface of Norfolk and Suffolk—*owing probably to a sinking of the earth's crust in this area*—was submerged beneath the sea.' It was not, therefore, due to the weight of the tribes of 'Ipswich men,' nor of those who carved models of mammoths, made rostro-carinates and mighty 'palæoliths.'

The author states, 'Beneath the Crag have been found several examples of Harrisonian eoliths, considerably abraded, and indicating that they had a long history before arriving in the detritus bed.' As they were presumably found by the

author, and as they were once part of a Cretaceous sea floor, this statement cannot be denied. But when, on this evidence, we learn that, 'It is thus possible to arrive at the conclusion that the makers of these primitive implements lived during some period prior to that in which East Anglia was submerged beneath the waters of the Crag sea,' we reply that it is only possible if one has Moir imagination.

Nor can a geologist accept, without some little evidence, the statement that 'Among the numerous animals whose (*sic*) remains have been found beneath the Crag may be specially mentioned the Mastodon [surely not a misprint for Ammonite?] an elephant-like creature of great size and strength—which, with early man, existed in the warm and genial climate of pre-Crag times.'

Also, probably to very few but the author can it be that 'there would seem little doubt that both the implements and the mammalian remains of the Forest Bed are referable to the early Palæolithic-Chellian period, and it will be realised that to thus (*sic*) place these specimens in the first interglacial epoch is to depart very widely from the old view of the post-glacial age of all evidence of man in this country.'

Reference is then made to the hollows in the Forest Bed series, formed by the Scandinavian ice-sheet. 'These depressions were afterwards filled with gravels, sand and brick-earth, which have been found [by the author?] to contain the flint implements of the Acheulian and Early Mousterian races, who were evidently moving northwards as the ice slowly retreated. The occurrence in these deposits of central 'stations,' or occupation levels of these people, would seem to indicate that the small lakes then existing were frequented by wild-fowl, which no doubt formed an important item in the *menu* of the ancient Acheulian and Mousterian hunters.' Could not Mr. Moir prove all this by finding some of the Maglemose harpoons the wild fowls were slain withal?

After more ice invasion, 'there is not much doubt that the Upper Palæolithic races, the Aurignacians, the Solutrians, and the Magdolenians [what about the Maglemosians?] arrived in East Anglia on their hunting expeditions towards the close of glacial times. . . . The last phase of Upper Palæolithic times occurred about 15,000 years ago. . . . Since the close of the Palæolithic period no great geological changes have taken place in East Anglia, and the relics of the later, neolithic, pastoral peoples are found scattered upon the present surface of the ground.' Now what possible geological or morphological evidence can Mr. Moir produce to support that '15,000 years?'—and the author seems to have forgotten that it is not so very long ago since an East Anglian pre-historian 'proved' that neolithic man existed in that area

in pre-glacial times, because flint implements of unquestionable neolithic date were found in large numbers, which had undoubtedly 'glacial' striæ made *after* the implement had been fashioned. After all this, we are not at all surprised to learn that 'the clear proof (*sic*) of the existence of man in a limited area like East Anglia, from the earliest eolithic period to the end of the Stone Age, is unique, and raises important considerations as to the place of origin of the human race, which, however, it is beyond the scope of this present article to discuss.'

We are also informed that 'man has flourished in the past in England, as he did elsewhere, in warm inter-glacial epochs, and that to regard all his *remains* found in this country as referable to post-glacial times is entirely erroneous.' It is that word 'remains' upon which the whole question rests. Tons upon tons of 'fractured pieces of tabular flint,' which may or may not be artificially worked, are not 'remains of man.' And with the exception of the now notorious 'Ipswich man,' which Mr. Moir himself 'found' to be pre-glacial, and has himself admitted is modern, we still want *remains* of early man in East Anglia. Surely this whole series of races of alleged hunters could hardly have had their scores of stations and made their thousands and thousands of weapons, and have 'left not a wrack behind'?

There is also the question of the use to which the alleged eoliths were put by their makers. Surely the 'dawn-stone' men would want to kill something or somebody—and they would not do it by 'scraping and cutting,' which is all that their alleged myriads of implements were capable of doing?

However, we hope to have something to say with regard to the alleged Harrisonian 'dawn-men' later.—T. S.

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REPTILIA.

Viper in North Yorks.—An unusually large Viper, 25¼ inches long, was killed at Darnholme, near Goathland, Saturday, 5th July, 1924.—R. T. FLINTOFF.

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BIRDS.

Black-throated Diver near Whitby.—On February 15th an adult male Black-throated Diver was shot at Littlebeck, about six miles inland from Whitby. Mr. J. W. Clarke, who examined the skin, found the change from winter plumage in progress: the square white spots of the summer plumage appearing on the scapulas. Another adult of this species was picked up dead at Langdale End, near Hackness, on April 3rd.—F. SNOWDON.

YORKSHIRE BRYOLOGISTS AT INGLETON.

F. E. MILSOM.

THE charms of Ingleton, both from a scenic and a natural history point of view, are too well known to need description. The members of the Bryological Section spent a very profitable week-end there from March 29th to 31st. The weather was uniformly kind, and many interesting species were noted. On Saturday, both glens were well worked, and on Sunday the party divided, part ascending Ingleborough, and part working the glens again. Among species most worthy of note were three hepatics, *Plagiochila tridenticulata*, *Moerckia Flotowiana* and *Saccogyna viticulosa*, all new to the district. The *Plagiochila*, usually considered a species of the extreme west, is the first record for Yorkshire. *Moerckia Flotowiana*, also usually a coast species, occasionally occurs inland, and as such has been found once previously in Yorkshire by Mr. Burrell, near Whernside. *Saccogyna viticulosa* is also a western species, though not so rare as the other two. Taken as a whole, the hepatic flora of the glens is distinctly that of a western coast glen. In this connexion it is worth noting that Ingleton, usually regarded as an inland place, is after all only about fifteen miles from the west coast.

The more interesting species noted were :—

MOSSES.

<i>Diphyscium foliosum</i>	<i>Zygodon mougeotii</i> .
var. <i>acutifolium</i> .	<i>Ulota Bruchii</i> .
<i>Rhabdoweisia denticulata</i> .	<i>Bartramia pomiformis</i> var. <i>crispa</i> .
<i>Ptychomitrium polyphyllum</i> .	<i>Webera elongata</i> .
<i>Barbula rubella</i> var. <i>ruberrima</i> .	<i>Mnium orthorrhynchum</i> .
<i>B. rubella</i> var. <i>dentata</i> .	<i>Pterogonium gracile</i> .
<i>Weisia crispata</i> .	<i>Thuidium delicatulum</i> .
<i>Trichostomum crispulum</i> .	<i>Hylocomium brevirostre</i> .

HEPATICES.

<i>Moerckia Flotowiana</i> .	<i>Saccogyna viticulosa</i> .
<i>Lophozia barbata</i> .	<i>Bazzania trilobata</i> .
<i>Plagiochila spinulosa</i> .	<i>Radula complanata</i> (on rock.)
<i>P. tridenticulata</i> .	<i>Fruillania fragilifolia</i> .

: o :

The Genesis of Petroleum, by P. E. Spielmann. Ernest Benn, Ltd., 72 pp., 5/- net. Dr. Spielmann presents a concise summary of the many theories which have been advanced regarding the origin of petroleum. Although modern research, particularly from the chemical side, has largely discounted the value of the earlier hypotheses such as, for example, the inorganic theories of Berthelot, Mendelejeff and others, it must not be assumed that these ideas are entirely abandoned. At the present time the organic origin of petroleum appeals to the majority of scientific investigators, and although there is reason to believe that the vegetable hypothesis claims many eminent supporters, nowadays there are instances in the known oilfields of the world where apparently the evidences suggest that animal material has contributed largely to the formation of the oil. Chemical research is still being addressed vigorously towards a solution of this problem, though it must be remembered that the question is essentially a geological one, and the accumulation of petroleum in certain horizons has been governed fundamentally by geological conditions, such conditions can neither be reproduced nor even approximated within the confines of a laboratory. The author has furnished an invaluable bibliography. The student and the professional technologist will find much to stimulate further research on this absorbing topic in the pages of this work, and for this reason alone it can be thoroughly recommended.—G.S.

FREE-FLOATING MICROFLORA OR PHYTO- PLANKTON OF HORNSEA MERE, EAST YORKS.

BY BENJAMIN MILLARD GRIFFITHS, D.SC., F.L.S.

Department of Botany, Armstrong College, Newcastle-on-Tyne.

THE free-floating microscopic organisms or plankton of fresh water, form a biological association which is of considerable interest both to the scientist and to water-engineers and others concerned in the purity of drinking-water supplies. The microflora of the larger lakes of the mountainous areas in Western Scotland, Cumberland and Wales, has been investigated by Messrs. W. and G. S. West (4, 5), and those of Cumberland by Dr. W. H. Pearsall (2). The microflora of the smaller bodies of water which are scattered over the lowlands of England has been examined and recorded by the writer (see Griffiths, 1, pp. 211-212). In the course of the latter survey an examination was made of the plankton of Hornsea Mere.

The Mere is of particular interest to plankton algologists because of its size, origin and situation. It is about 500 acres in area, and is therefore one of the largest of lowland waters. It is natural in origin, and is probably a relic of a lowland lake system which has been eroded by the waves (see Sheppard, 3),—a system doubtless resembling that of Denmark on the other side of the North Sea. Like the Danish lakes, it tends to be shallow, and is barely 10 feet deep. The natural kettle-hole meres of Shropshire and Cheshire greatly exceed this figure, but they are much smaller in area (see Griffiths, 1, p. 203). The lakes of Anglesey are also deeper, and moreover are largely rock-basins in very ancient geological strata. The Anglesey lakes, in fact, differ from most English lowland pools, and resemble certain lakes of Sweden. The Broads of Norfolk are also shallow, but they are parts of a fairly active river-system, and are more to be considered as riverine enlargements than lakes of the reservoir type.

Hornsea Mere might therefore be considered as an English representative of the Danish and Northern Germanic type of lake. It is broad and shallow, and lies amidst glacial gravels, sands and clays, and there is no large inflow or outflow of water. Owing to its shallowness, most of the bottom is within range of the sunlight, and consequently submerged aquatic vegetation can flourish over the larger part of the floor. These plants affect the quality of the water to a considerable degree, because they remove from the water the carbon-dioxide which has been absorbed from the air, and during daylight convert the carbon into starch, sugar and other carbon compounds. In the process, oxygen is set free into the water,

and on decay of the plants, the water is enriched with various organic compounds which it would not otherwise possess. The plankton organisms depend on these compounds, and without the activities of the submerged vegetation the water would probably not be rich enough to support a copious plankton. The waters of lakes in rocky and boggy mountain areas are relatively poor in nutritive substances, and can only support a scanty though exceedingly interesting plankton consisting largely of Desmids.

On September 12th, 1922, the phytoplankton of Hornsea Mere contained the following species :—

- Anabæna Lemmermannii* P. Richter. Occurring in great abundance. It is a blue-green alga (*Cyanophyceæ* or *Myxophyceæ*), consisting of a very much coiled and twisted thread of rounded cells, diversified by occasional colourless cells or heterocysts, and several large sausage-shaped bright blue cells (gonidia or spores), which often persist as a cluster when the rest of the cells have perished. The alga is well known on the Continent, and has been found by the writer in the Anglesey lakes and in Westwood Great Pool, Droitwich, Worcs.
- Microcystis aeruginosa* Kuetz. Numerous specimens. This common Cyanophycean consists of numerous spherical cells embedded irregularly in a copious jelly. The cells are usually dark brown in colour owing to the presence of innumerable minute bubbles or pseudo-vacuoles in the cell protoplasm.
- Botryococcus Braunii* Kuetz. Numerous specimens. This somewhat peculiar green alga may be green, yellow or red in colour. It consists of lobulated clusters of cells, and is very widely spread in pools.
- Volvox aureus* Ehrenb. Numerous specimens. Resembles the well-known *Volvox globator* of weedy pools, but is smaller, and its oospores are smooth and of a golden colour.
- Cosmarium Turpinii* Breb. Many specimens. This Desmid is frequently found in shallow fresh waters along the east coast (see West & West, 6).
- Ceratium hirundinella* O.F.M. Rather rare, compared with the above. This species of Peridiniæ is very common in the moderately large and deep pools of England. The specimens in the Mere were small. It is probable that the shallowness of the water is not favourable to it. In some of the deep and steep-sided Shropshire and Cheshire meres, the alga attains an enormous abundance and colours the water brown.

The rather unique character of Hornsea Mere, and the provision of boating facilities, makes this body of water highly suitable for periodic examination. All that is required is a small conical net, about six inches in diameter and eighteen inches long, which can be towed behind a rowing boat for fifteen or twenty minutes in the open water of the Mere. The net must be of silk, either the standard No. 20 bolting silk used by millers, or best quality Jap silk of approximately .05 millimetres mesh. The contents of the net are poured into a tube or small bottle and preserved as soon as possible with a few drops of strong formic aldehyde solution

(sold as Formalin 40%). This reagent not only fixes and preserves the organisms, but decolourises them very little, and a little copper acetate added to the solution will intensify the green colour of the preserved algae even more.

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5. WEST & WEST.—British Freshwater Phytoplankton, *Proc. Royal Society, B.*, Vol. LXXXI., 1909.
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CORRESPONDENCE.

BIRDS IN NIDDERDALE.

SIR,—In 'Studies in Nidderdale,' by J. Lucas, made from notes during the progress of a Geological Survey of the district from 1867 to 1872, the author deals with the birds of Nidderdale, etc., and states that the Lesser Whitethroat is by far the 'commonest bird in the whole district from the Vale of York up to the borders of the moors,' while the Whitethroat does occur, 'but not plentifully,' which scarcely accords with my experience (not a wide one, perhaps) of the status of these two species in Nidderdale. Formerly, however, these two species were often confused. Referring to the Sand Martin, he says it does not ascend above 500 or 600 feet, but I have seen it breeding in Nidderdale up to nearly 1000 feet, and in this district (Wilsden) up to 900 feet. Mr. Lucas further says that the Rock Dove breeds at Guyscliff and Brimham Rocks, which record requires confirmation. The Wood Wren is said to be local, but the Chiffchaff ranges up to little above 700 feet. It is not so common as the Lesser Whitethroat, but more common than the Wood Wren; from which it would appear that the Chiffchaff is far from being a scarce bird in Nidderdale. On July 1st, 1869, Mr. Lucas saw a Red-backed Shrike at Hole Bottom, 950 feet, which I presume must have been breeding in or about that locality, the Nuthatch is rare, the Lesser Spotted Woodpecker was shot in 1868 or 1869 in Backstone Gill by Mr. Omerod, the Wryneck he never saw. He alludes to one of the few natural nesting places of the House Martin at Kilnsey Crag, in Wharfedale, a beetling cliff of about 165 feet, where thousands of Martins may be counted in the breeding season—which number is far in excess of that I saw on my last visit to that remarkable cliff. There is one record in Mr. Lucas's book which has some reference to a note of mine in *The Naturalist* for June last, on the separation of the sexes of the Chaffinch in autumn and winter. Mr. Lucas writes :—'On February 22nd, 1868, I saw an immense flock of Chaffinches numbering thousands, which were apparently *all cock birds*; this was two miles east of Shipley, Aire-dale.'—E. P. BUTTERFIELD.

Lucas's notes upon the Birds of Nidderdale are so unreliable, that they suggest he knew practically little or nothing about them. His notes upon the species mentioned by Mr. Butterfield, viz., Lesser and Greater Whitethroat, Rock Dove, Chiffchaff and Wood Wren are altogether wrong.—R.F.

YORKSHIRE RIVERS INVESTIGATION.

CHRIS. A. CHEETHAM.

AT a meeting convened by the Committee of Suggestions, the question of the rivers investigation was carefully considered. Prof. Priestley, who was in the chair, outlined what had been done; the initial suggestion came from the Yorkshire Geological Society, and included the whole river system of the county; a series of letters in *Nature* of a more recent date pointed to the need of a detailed knowledge of the biology of our rivers before the question of pollution could be dealt with. Dr. Pearsall pointed out that the quality of the water differed, though little polluted, and he suggested starting on one river, and that free from pollution if possible. Prof. Garstang suggested that help might be available from the Leeds Philosophical Society. Dr. McClean Wilson, of the West Riding Rivers Board, promised help in the chemical analysis of monthly samples when his new laboratories were ready. Dr. Russel, of the Board of Agriculture and Fisheries, undertook to send details of the system of investigation adopted by them, that our work might be co-ordinated with theirs. A long discussion ensued on the advisability of taking two contrasting types of rivers or of the opportunity of investigating the changes of a polluted stream as the sources of pollution were gradually cut off, but ultimately the meeting agreed to confine the scheme to the river Wharfe, and to four points on that, the places suggested being:—Above Beckermonds Bridge; Grassington Bridge; Bolton Woods; Ulleskelf railway bridge. A sub-committee was arranged to inspect the suitability of these. Help was promised by Dr. Pearsall, Messrs. Burrell and Milson, on the botanical side; Messrs. Brown, Percival and Whitehead, zoological; Messrs. Mason and Johnson, mycological. Other helpers will be welcomed, and observers on the spot for daily records of the height of water at the bridges would be very useful.

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FUNGI.

Didymium tubulatum in Yorkshire.—*Didymium tubulatum* Jahn has appeared in profusion on a 'myxo' decoy heap in my garden. This organism was described by Miss Lister in *Journ. Bot.*, 1921, as *D. difforme* var. *repandum*, but later on it was found that Dr. Jahn had described and named it two years before. It differs from typical *D. difforme* in the sporangia being often closely clustered in small groups or else forming expanded almost net-like plasmodicarps; the individual sporangia also are smaller than, and not so white as, *D. difforme*. The capillitium in some specimens is composed of simple or slightly branched threads, and in others being much branched, with flat triangular expansions at the axils of the branches, and sometimes with perforations of the expansions. The spores measure 12-15 μ in diam. It has been recorded from the south of England. Miss Lister informs me that this is the first north country record. This does not appear to be a well defined species, and seems better fitted for the position assigned to it by Miss Lister as a variety of *D. difforme*.—W. N. CHEESMAN.

YORKSHIRE NATURALISTS AT EARBY.

W. H. PEARSALL, D.SC., F.L.S., AND F. A. MASON, F.R.M.S.,
Hon. Secretaries.

(Continued from page 181).

MOLLUSCA (Greevz Fysher).—The weather, with the exception of one or two misty mornings with slight drizzle, was fair, and land mollusca kept out of sight. Not a single specimen of the larger snails was seen. Earby Beck, as far as Kellbrook, yielded very little variety.

EARBY AND KELLBROOK BECK.

<i>Arion circumscriptus.</i>	<i>Limnæa peregra.</i>
<i>Agriolimax agrestis.</i>	<i>Ancylus fluviatilis.</i>
<i>Helix nemoralis.</i>	<i>Sphaerium corneum</i> (very abundant).

MARTON WOOD AND L. & L. CANAL.

Marton Wood and the canal towards Thornton showed a more interesting molluscan fauna.

<i>Arion ater.</i>	<i>Helix striolata.</i>
<i>A. subfuscus.</i>	<i>Pyramidula rotundata.</i>
<i>A. hortensis.</i>	<i>Neritina fluviatilis.</i>
<i>A. circumscriptus.</i>	<i>Bithynia tentaculata.</i>
<i>Limax lævis.</i>	<i>Planorbis vortex.</i>
<i>L. agrestis.</i>	<i>P. spirorbis.</i>
<i>Hyalinia nitidula.</i>	<i>Limnæa peregra.</i>
<i>H. crystallina.</i>	<i>L. palustris.</i>
<i>H. cellaria.</i>	<i>Ancylus fluviatilis.</i>
<i>Helix arbustorum.</i>	<i>Sphaerium corneum.</i>
<i>H. hispida.</i>	

(QUARRY) THORNTON-IN-CRAVEN.

Clausilia bidentata.

FOULRIDGE RESERVOIR.

Foulridge upper reservoir had a dense population of *L. peregra*, but not a single specimen of any other species was found. The main reservoir and canal added a few species.

<i>Vallonia pulchella</i> (dead).	<i>Zua lubrica.</i>
<i>Hyalinia crystallina.</i>	<i>Limnæa peregra.</i>
<i>Pyramidula rotundata.</i>	<i>Planorbis albus.</i>
<i>B. tentaculata.</i>	<i>Sphaerium corneum.</i>
<i>Planorbis carinatus.</i>	

CANAL, FOULRIDGE.

The dead *Anodon* shells shown at the meeting, I think, are *Pseudanodonta rothomagensis*, but cannot be certain without seeing better specimens.

RIVER RIBBLE AND GISBURN BANKS.

<i>Agriolimax agrestis.</i>	<i>Ashfordia granulata.</i>
<i>Limax lævis.</i>	<i>Pyramidula rotundata.</i>
<i>Arion hortensis.</i>	<i>Zua lubrica.</i>
<i>A. circumscriptus.</i>	<i>Clausilia bidentata.</i>
<i>Hyalinia cellaria.</i>	<i>Ancylus fluviatilis.</i>
<i>H. alliaria.</i>	<i>Paludestrina jenkinsi.</i>
<i>H. crystallina.</i>	<i>Hyalinia nitidula.</i>
<i>H. helvetica.</i>	<i>Zonitoides nitidus.</i>
<i>H. striolata.</i>	

BOTANY (Dr. T. W. Woodhead).—During the week-end at Earby, the previous cold weather emphasised the bleakness of the rounded hills which flank the valley sides. The great stretches of pasture-land scarcely showed a trace of the bright green of spring, and in keeping, were the barren heatherlands crowning the higher summits. On one side of the valley stone walls bounded fields acres in extent, while on

the opposite side the fences were low, scrubby hedgerows often broken down, the scattered lines of alder, hawthorn, sycamore and common ash being the indicators of previous fences, thus the fields seemed of great extent. Over the hillside straggled a network of grass-grown footpaths. Sheep and lambs nibbled the brown herbage, but there was nothing for cattle, and they were conspicuously absent.

A visit to Thornton Wood, a plantation of beech, oak, common ash, birch, alder and sycamore, likewise showed few signs of spring. Soon, however, the carpet of bluebells will be a sight to see among the soft and hair grasses. In the moister drainage channels were the lesser celandine, anemone and alternate-leaved golden-saxifrage, the latter in fine flower. It was also seen in the hedge banks at Elslack along with *Adoxa* and *Ranunculus Auricomus*. On the Monday, a brief visit was made to the more picturesque woods at Gisburn. Entering Spring Wood and following the left bank of the stream, one was struck with the contrast of the two banks; the right bank, a plantation of oak with a few Scots pine and backward ground flora, the left bank a plantation of common ash with oak, birch, spruce, elm and alder. Here the ground was brightly carpeted with the young leaves of garlic and still younger shoots of dogs-mercury. A few primroses, anemones and celandines were the only plants yet in bloom.

FUNGI (F. A. Mason).—Few agarics were seen, even the common spring species being absent. A fine specimen of the Conical Morel, *Morchella conica* Pers., was collected from the railway embankment near Earby. Another ascomycete, *Disciotis venosa* (Pers.) Boud., occurred in association with *M. conica* at Earby, and was not infrequent elsewhere in the district. The species found in greatest abundance was *Sclerotinia Cureyana* (Berk.) Karst., on rushes. A search for the ascophores of this species was directed by the presence of large numbers of the sclerotia over-wintering in the rushes. An interesting fact was established in connection with its appearance on *Juncus effusus* only in this district. Although it is said to occur on various species of *Juncus*, in no case was it found on *J. conglomeratus* growing alongside *J. effusus*, although specially searched for by Dr. Woodhead and the writer. Still another discomycete worthy of note was *Apostemidiam Guernisaci* (Cr.) Boud., which occurred on damp rotting twigs in Springs Plantation, Gisburn; the discs of these small fungi exhibited the sticky covering of long waving spores as seen in *Vibrissea*. The banks of the Ribble at Gisburn proved to be the most productive of fungi, the following additional species being collected:—

Pyrenomycetes:—

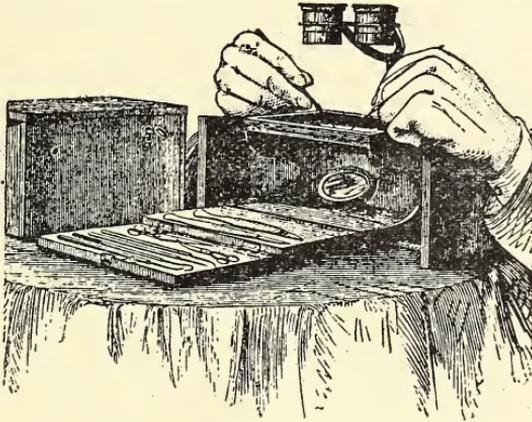
- Hypocrea rufa* (Pers.) Fr.
- Endothenella junci* (Fr.) Theiss et Syd.
- Leptospora ovina* (Pers.) Fück.
- Mycosphaerella fragariæ* (Tul.) Johan.
- Pleospora herbarum* (Fr.) Rabenh.
- Melanconis alni* Tul.
- Diatrypella quercina* (Pers.) Ces. et de Not.
- Diatrype stigma* (Hoffm.) Fr.
- Daldinia concentrica* (Bolt.) de Not.
- Xylaria hypoxylon* Linn.

Discomycetes:—

- Mollisia cinerea* (Batsch.) Fr.
- Coccomyces coronatas* (Schum.) de Not.
- Coryne sarcooides* (Jacq.) Tul.
- Helotium virgultorum* (Wahl.) Karst.
- Dasyscypha nivea* (Hedwig fil) Sacc.
- Stegia Ilicis* Fr.
- Rhytisma acerinum* (Pers.) Fr.

AN EARLY BINOCULAR DISSECTING MICROSCOPE.

THROUGH the good offices of Mr. C. Davies Sherborn, who has previously been the means of valuable additions being made to our collection of early microscopes, a fine example of a 'dissecting microscope,' of over half a century ago, has been placed in the Hull Museum collections. The instrument seems to be identical in every way with what was then described as 'A new binocular dissecting microscope,' in *Science Gossip* for 1868 (p. 201), by H. Lawson, as follows:—'In making dissections of the lower animals, I have frequently found that much more satisfactory results are attained by the employment of low magnifying powers of considerable penetration, than by the use of the inch and half-inch lenses of such instru-



ments as the Quekett microscope. The advantages of low powers are:—1st. That an abundance of room is left between the lens and the object, so as to admit of freedom of action of the operator's hands; 2nd. That the object may be easily and well illuminated by means of the "condenser"; and 3rd. That several structures situate at different levels are brought simultaneously into view. From a knowledge of the qualities I have alluded to, I was led to think that an arrangement of simple lenses for the production of binocular vision would be of infinite service to the anatomist. I therefore caused such a combination to be effected, and, having added to it a few contrivances calculated to facilitate dissection, I now submit the result to working microscopists.

'The microscope when closed and packed, with its various apparatus, forms an oblong mahogany box about six inches long and three and a half inches deep, provided with a lock and key. When unlocked, the cover and one side, which are connected by hinges, unfold so as to lie out in front of the

operator, displaying at the same time the lenses, mirror, and dissecting instruments. The stage consists of a gutta percha trough having a small circle of glass cemented into its centre, and placed (when in use) upon ledges attached to the two ends of the case. The objects of this species of stage are:—(a) to enable mollusks and similar creatures to be dissected under water; (b) to allow the object to be fixed by means of pins, which may be driven into the gutta percha; and (c) to permit light, when required, to travel through a tissue by being reflected from the mirror to the glass circle. Outside the real ends of the case, which sustain the trough, there are two false ones, slightly bevelled above and connected below with horizontal pieces, which slide easily and uniformly into the bottom of the case. These are intended as supports for the wrists of the anatomist, and can be drawn out for a distance of six inches or less on either side. The lenses, which are two in number, are fixed in moveable eye-pieces, and these are sunk in an oblique arm, which has the power of vertical rotation on the perpendicular bar employed in producing the proper focus. This vertical bar slides freely and steadily in a brass fitting which perforates the back of the case. By means of the rotating power to which I have referred, the arm bearing the lenses is, when not intended for use, depressed so as to fit into the centre of the case. The trough also slides beneath the mirror. When the object examined is opaque, a "bright spot" of light is thrown upon it by the condenser, which springs from the front angle of the case. The dissecting instruments are placed in depressions in those portions of the case which unfold upon the table; they consist of two pairs of scissors ("curved" and "straight"), two curved and two straight needles, and a pair of scalpels of forms adapted to the requirements of the dissector.'

'The magnifying power, with the binocular arrangement, does not exceed six diameters, but the field of view is large, and the "relief" of the object under examination well and clearly marked.'—T. S.

—: o :—

Prof. W. Bateson's address to the Birkbeck College, on 'Progress in Biology,' appears in *Nature*.

W. H. S. Cheavin writes on 'Insects and their Vision,' in *English Mechanics* for June 6th and 13th.

The Irish Naturalist for May contains 'Some New and Rare Irish Spiders,' by D. H. Pack-Beresford.

Some new or little known British Thysanoptera are described in *The Entomologist's Monthly Magazine* for May.

The Journal of the Ministry of Agriculture for June, contains a paper on the 'Improvement of Grassland in Yorkshire,' by J. A. Hanley.

Among the contents of *The Avicultural Magazine* for May, we notice 'A Thieving Falcon,' by F. D. Welch, and 'The Feeding of Young Kestrels,' by T. Sheppard.

FIELD NOTES.

Dingy Skipper near Louth, Lincs.—On June 22nd, on the Sunny Bank of Stranmore Hill, near Louth, I saw a Dingy Skipper (*Thanaos tages*) on the wing and at rest. This butterfly has not been previously recorded for the south of Louth, and only once (in 1905) for the north. It is evidently a rare insect in this district.—C. S. CARTER, Louth, June 23rd.

Spoonbill at Whitby.—An immature Spoonbill was found dead on the beach at Saltwick, about a mile S.E. of Whitby, on July 3rd. The bird was in an emaciated condition, and its weight was 2 lbs. 14 ozs. This notable addition to the number of rare birds which have occurred in the Whitby district has been secured by the Whitby Literary and Philosophical Society, and the skin will be mounted and added to the local collection at the Whitby Museum.—F. SNOWDON.

Skull of Goat in North Lincolnshire Warp.—The skull with horn cores and jaws of a goat have recently been obtained at a depth of six feet in soft blue warp clay which overlies the boulder clay at East Halton, North Lincolnshire. From the nature of the bone, etc., it is apparent that the specimen is not recent. The horn cores are sabre-shaped, and $7\frac{1}{2}$ inches in length. The specimens have been presented to the Municipal Museum at Hull by Mr. Leonard W. Pye.—T.S.

The Red Squirrel and its Liability to Epidemics.—In the February number of *The Naturalist*, I referred to some weakening disease, to which, I suggested, is largely due the Red Squirrel's disappearance from localities where it was formerly common. I have just returned from a visit in Kent, where my host had lately seen a terrier catch a squirrel in an unaccountably easy manner. He sent the body to Mr. N. S. Lucas, the Prosector of the Zoological Society, who reports on the 28th May 'It showed one of the stages of coccidiosis, in large numbers in the fœces. The Helminthologists also found a round worm. It was undoubtedly weakened by this condition, which would enable the dog to catch it. I think the Red Squirrel dies from epidemics, which are of cyclic occurrence.' My keeper tells me that within the last few weeks he has picked up a dead Red Squirrel which showed no external signs of violence. He also lately saw another squirrel which fell back several times when trying to climb a spruce fir before it got out of reach. So far, we have seen no signs of any such disease among the few remaining Grey Squirrels.—W. H. St. QUINTIN, Scampston, Malton.

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The Photographic Journal for June contains 'Stalking Big Game with a Camera in East Equatorial Africa,' and 'The appreciation of the Beautiful,' the latter by J. C. Dollman. Both are well illustrated.

REVIEWS AND BOOK NOTICES.

Charlie Mackintosh, by **Henry Coates**. London : T. Fisher Unwin, 142 pp., 3s. 6d. net. This volume originally appeared last year, and in its present abridged form will possibly be welcomed by many naturalists. Charlie Mackintosh was a typical naturalist of the old school, and the life-story as set out in this book is a very fascinating and encouraging one.

What is Man? by **J. A. Thomson, LL.D.** London : Methuen & Co., 244 pp., 6s. 6d. The fact that well within a year a second edition of this book has been called for speaks for its popularity, though we have yet to learn of anything from the pen of Mr. Thomson that was not popular! The book contains the ten lectures delivered in Aberdeen, and serves as an introduction to an all-round study of Man as Organism and Social Person. The tenth chapter appropriately is headed, 'What is man not?'

The Nature-World of London, by **Walter Johnson**. London : The Sheldon Press, viii. + 118 pp., 3s. net. Our contributor, Mr. Walter Johnson, describes the botanical treasures to be met with in the immediate vicinity of the metropolis, and illustrates his remarks by photographs and sketches. In six chapters he deals with the Timber Trees; Ornamental Trees and Shrubs; Wild Flowers and Weeds; and London's Mushrooms and Toadstools. The volume is admirably written, as might be expected from the pen of Mr. Johnson.

Man before History: A Short Account of Prehistoric Times, by **Mary E. Boyle**. London : G. Harrop & Co., Ltd., 128 pp., 3s. 6d. The writer of this little book was secretary to Mr. Miles Burkitt, at Cambridge, and she has secured an Introduction from the Abbé Henri Breuil, who has supplied her with illustrations of paintings in the caves of France and Spain. Those who are familiar with the writings of Messrs. Breuil and Burkitt will therefore have an idea of the lines upon which this book is written. We cannot find much that is new in the volume.

Go to the Ant: A Popular Account of the Ant in all Countries, by **Edward Step**. London : Hutchinson & Co., xii. + 276 pp., 18s. net. Mr. Edward Step has excelled his previous works in the extraordinarily fascinating series of stories which he has gathered together relating to the achievements of various species of ants, at home and abroad, which are described so interestingly in the present volume. Some of the accounts almost read like fairy tales, but those who know Mr. Step are aware he is sound in his observations and descriptions. The volume is well produced and well illustrated, and forms a valuable contribution to the life history of these interesting insects.

The Birds of Portugal, by **William C. Tait**. London : Messrs. H. F. & G. Witherby, xii. + 260 pp., 18s. net. In this volume, Messrs. Witherby put ornithologists under a debt of gratitude, as it is still another contribution in English to the avifauna of Europe. British ornithologists interested in migration necessarily need knowledge of the birds of the continent, and in this interesting book special attention is paid to the subject of migration and distribution. The greater portion is devoted to an account of the birds, species by species, but there are also chapters on Ringed Birds; The Physical Features of Portugal; and an Appendix with the publications which have been consulted in the compilation of this useful work.

British Mosses and How to Identify Them, by **J. H. Crabtree**. London : Epworth Press, 1924, 62 pp., 1/6 net. This little volume is one of several Mr. Crabtree has written for this series, on very varied subjects. In the present work, sixty of the more common British species of mosses are illustrated from photographs, on 27 plates, and there is a coloured frontispiece of Gill Beck, Bolton Woods, 'a favourite haunt of mosses.' Many of the species make attractive photographs, but only the habit, not the structure, is shown by this process. All the

species figured are described in non-technical language and arranged according to Wilson's *Bryologia Britannica*. Some of the phrases used are misleading, e.g. 'Mosses have . . . flowers, fruits and seeds,' and again, 'moss flowers appear at the summit of the branch or stem in most genera, and lateral in others. A bud or *gemma* is first seen, this contains cells of antheridia (male) or pistillidia (female).' Such misuse of terms is not justified even in a book for beginners.

Les Echinodermes des Mers d'Europe. Par R. Koehler. Tome I., pp. xiv.+362, 9 pls., $7 \times 4\frac{1}{2}$ ins. Encyclopédie Scientifique, Bibliothèque de Zoologie. Doin, Paris, 1924. 16.50 francs. A comprehensive work on the Echinoderms of Europe should be welcomed by the marine biologist, especially when the author is so distinguished an authority as Professor Koehler, of Lyons. The fact that it is written in French need present no difficulty to the Englishman, who will accept the reduced price as more than a compensation; and even if he does stumble over such unaccustomed technical terms as 'corbeilles,' 'crépus,' and 'plume,' he will find them explained in the glossary which is thoughtfully prefixed to the work. There does not, however, seem to be anything in the French language that necessitates the change of 'secundibrachial' into 'secondibrachiale,' of 'syzygy' into 'sizygie,' or of 'quinquerradiate' into the barbarism 'pentaradiée.' After a brief note on the place of the Echinoderms in the Animal Kingdom, Prof. Koehler describes their general morphology and development. Then follow notes on their bionomics, geographical and bathymetric distribution, number of existing species (estimated at from nine to ten thousand), palæontology, and method of preservation. This general part concludes with a table distinguishing the classes of living Echinoderms. The number of species living in European seas, interpreting the latter phrase broadly enough to include some interesting deep-sea forms, is taken as about 250. The present volume deals only with the Asterozoa, namely 65 species of Asteroidea and 60 of Ophiuroidea. This is a good deal to get into 269 small pages of long primer type and nine plates of photographs; but Prof. Koehler manages it by conciseness of statement, restriction but not suppression of morphological discussion, and an ingenious crowding of his figures that would win him the prize in any jig-saw competition. For the starfishes, Prof. Koehler adopts a simplification of E. Perrier's classification; for the brittle-stars, while stating the system recently proposed by Matsumoto, he contents himself with the ten families into which the species under discussion naturally fall. In this, as in other matters, Prof. Koehler places first the needs of the working naturalist, and refers the more philosophic zoologist to morphological treatises and original monographs. This is the first book that has attempted to deal with the Echinoderm fauna of Europe. Points in it will, no doubt, be subject to criticism, but it is here our pleasanter duty to recommend it as a sound work of the kind, eminently well-suited to its purpose.—F.A.B.

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Mr. H. B. C. Pollard, recently appointed, is still the editor of *Discovery*, and in the June issue follows his predecessors in telling us the old, old story 'the fluctuating fortunes of the paper are now stabilised, and I would ask readers who are in sympathy with the objects of the paper to use their personal influence to extend its range of readers.'

The Seventy-second Report of the Marlborough College Natural History Society contains no fewer than 115 pages, and includes a remarkable record of great achievements on the part of its members. There are papers on flint implements, excavations, fungi, geology, Barton farm in the 13th century, mammals, birds, insects, etc. There are several illustrations, and altogether the publication is very creditable, and must have entailed much work on the part of the editor, L. G. Pierson.

NORTHERN NEWS.

Miss F. A. Rogers has been appointed guide-demonstrator to the Leicester Museum.

'The Geology of the Winchester District,' by W. Whitaker, is printed in *The Transactions of the Institution of Water Engineers*, Vol. XXVIII.; most of the other papers therein also refer to the Winchester area.

The Transactions of the Lincolnshire Naturalists' Union record the deaths of two members who have done much to further the natural history of the county, viz., Joseph Larder, of Louth, and John Singleton Sneath, of Lincoln.

Our newspapers are surely getting too much power, and using that power badly. We learn from the headings to a paragraph in *The Yorkshire Post* recently: "'Northern Transvaal overrun by Locusts.'" (By arrangement with *The Times*, London.)

In *The Scientific Proceedings of the Royal Dublin Society* for March there are several valuable papers, including 'The Habits of *Limnaea truncatula* and *L. pereger* in relation to Hydrogen ion concentration,' by W. R. G. Atkins and Marie V. Lebour.

We notice the East London College (University of London) is advertising for an Assistant Lecturer and Demonstrator 'with hons. degree,' for which the magnificent salary of £200 per annum is offered. This must make labourers and lavatory attendants laugh!

Leicester has commenced a new publication, *The Leicester Museum Art Gallery and Library Bulletin*, No. 1 of which is before us (8 pp., illustrated). It describes recent activities in the various departments under the charge of the Director, Dr. E. E. Lowe.

An article in a contemporary on an Anglo-Saxon Cemetery at Bidford-on-Avon is said to describe 'the most important Anglo-Saxon burial ground yet discovered.' We are not quite sure whether the author, editor, or other authority is responsible for the statement, but it is far from being correct.

At the recent Conference of the South Eastern Union of Scientific Societies, held at Guildford, Mr. C. H. Grinling, 'speaking as a Nature lover, pleaded that all of his hearers might become in an increasing measure transmitters and builders of truth and knowledge, and suggested that they could never hope to be effective transmitters unless they were willing to become builders also.'

The Report of the Castle Museum Committee of Norwich records the fact that Bridewell, a magnificent flint-faced building associated with William Appleyard, first Mayor of Norwich in 1403, has been presented to the city by Mr. H. N. Holmes, Lord Mayor of Norwich in 1921-22. The report contains the usual lengthy list of additions, and details of the achievements of 'The Friends of the Norwich Museum.'

We have received from the Honorary Secretary of the Joint Committee of Learned Societies of Liverpool and District, a useful pamphlet giving details of the activities of the various societies in the area. 'An associated soirée was held on November 4th in the Liverpool Museum and Technical School.' As a result a standing joint-committee was formed. The pamphlet forwarded is certainly a healthy record of the work being accomplished in Liverpool.

The 'Borough' Guide to Scarborough and Neighbourhood (32 pp., 6d.) contains a good index to the various paragraphs dealing with the attractions of Scarborough and neighbourhood. There are some excellent photographic illustrations, and a plan (E. J. Burrow & Co., Cheltenham). A similar volume as regards pages, illustrations, plan, price and publisher, has been issued dealing with Harrogate. Visitors will agree that it is worth the money. But Harrogate is going ahead nowadays with 'Guides' and 'Handbooks.'

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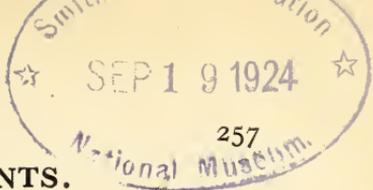
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NOTES AND COMMENTS.

THE NATIONAL TRUST.

The Report of the National Trust for 1923-24 records 'one of almost unexampled progress in the history of the trust.' No fewer than nine new acquisitions have been added to its list of properties. These include the Fell and Rock Climbing Club Memorial of 3,000 acres in the English Lake District; Hatfield Forest, near Bishop's Stortford; Paycock's House, Coggleshall; Box Hill (550 acres); the Farne Islands; twenty-one additional acres at Reigate Hill; Roman Camp at West Runton, Norfolk; Rayleigh Mount, Essex; Rhaeadr Ddu, near Dolgelly, and the Roman Villa at Chedworth. £1000 still is required to purchase Cissbury Ring in Sussex, and we trust this will soon be forthcoming.

THE WHITBY 'LIT. AND PHIL.'

Few of the remaining Literary and Philosophical Societies can give such evidence of vitality, after a century's work, as can the Whitby Society, the 101st Report of which is before us. The membership is not large. £47 was taken in admission fees for the museum, and during the year Mr. F. M. Sutcliffe has been appointed Curator. There are some valuable 'Local Natural History Notes,' a useful and well-illustrated paper on 'The Crosses on the North York Moors,' by T. H. Woodwark; and 'Ptolemy's Yorkshire Coast in Roman Times,' by Lieut-Col. T. English. According to his map this author places the Roman Coastline to the east of the Smithwick Sands, and Ocellum Promontorium about eight or ten miles east of Dimlington. We would suggest that this author should read a certain volume on 'The Lost Towns of the Yorkshire Coast.'

NEW FISH FROM THE NOTTINGHAM KEUPER.

At a recent meeting of the Geological Society of London, Prof. H. H. Swinnerton read a paper 'On a New Catopterygoid Fish from the Keuper of Nottingham.' 'Certain excavations made at Woodthorpe, near Nottingham, passed through the lowest beds of the Keuper Waterstones, and brought to light numerous well-preserved remains of fossil fishes belonging chiefly to the genus *Semionotus*. Among these were found specimens of a small fish which proved to be a new species of the genus *Dictyopyge*. These were sufficiently well preserved to throw valuable light upon the osteology of this comparatively little-known genus. This small fish is only 4.5 centimetres long, and slightly more than 1 cm. deep. Its head occupies a fifth of the length of the body, and in the sum total of its osteological characters resembles the Eugnathidæ rather than the Palæoniscidæ. The pectoral girdle, however, has an infraclavicle, a feature which is diagnostic of the

Catopteridæ. The trunk and tail are clad with enamel-covered scales. Both paired and unpaired fins are of moderate proportions, and have their anterior margins strengthened by short spiny rays and a few fin fulcra. While the tail may be described as hemiheterocercal, it differs from typical examples of this type, in the fact that the upturned lobe of the caudal pedicle is produced towards the tip of the fin by means of an attenuated scale-clad extension. This feature does not appear to have been noticed in other Mesozoic fishes, and may be regarded as indicative of a more primitive condition than that usually seen in them. The detailed study of this new species confirms the usually accepted opinion that the Catopteridæ, although classed with the Chondrostei, approach the Protospondyli. It shows, however, that this approach is closer than is generally supposed, and that some members of the family Catopteridæ, as at present constituted, may be described as primitive Eugnathidæ.'

STEM ANATOMY OF TRADESCANTIA FLUMINENSIS.

At a recent meeting of the Linnean Society, Prof. J. H. Priestley read a paper by Miss Lorna I. Scott and himself on 'Leaf and Stem Anatomy of *Tradescantia fluminensis* Vell.', illustrated by many lantern slides. 'This investigation commenced as a study of vascular development in order to clear up the problem of the sap supply to a leaf which grows by means of the long continued activity of a basal meristem. As a result it was ascertained that vascular development in the leaf is first basifugal and subsequently basipetal, and that the backward development of the subsidiary veins through the leaf sheath is associated with the subsequent development of the system of peripheral bundles, which lie in the sclerenchyma very near the periphery of the adult stem. As a result the functional vascular supply to the leaf proves to pass through two stages in the stem. In the young internode communication is maintained by means of the medullary and perimedullary bundles; as the growing internode extends in length the xylem of these bundles is disorganised, but at this time the peripheral bundles are differentiated throughout the internode and become functional. The development of the vascular supply in stem and leaf has interesting correlation with meristem distribution in the growing shoot. These are traced at some length and thus some light is thrown on two problems:—(1) The method of growth of *Tradescantia* and other monocotyledonous plants when etiolated. (2) The auricled leaf of Monocotyledons such as *Sagittaria* and *Alisma*, and the leaf form found in these plants when grown in darkness or under conditions of submergence.'

INDEX ANIMALIUM.

We should like to congratulate the compiler, Mr. C. Davies Sherborn, the Trustees of the British Museum, and the printers on the prompt appearance of Part IV. of the second volume of *Index Animalium*, which contains the entries 'Bail to Byzos,' 1801 to 1850 (pages 641-943, 15/-). Working zoologists must, and do, appreciate the great work Mr. Davies Sherborn is doing, and certainly in the future his *Index Animalium* will be even much more appreciated than it is to-day.

EARLY SCIENCE.

June 30, 1666—Ordered that the treasurer, to encourage the measuring of the degree of the earth, do give to Mr. Halley fifty pounds or fifty copies of the '*History of Fishes*,' when he shall have measured a degree to the satisfaction of Sir Christopher Wren,' etc. (Early History of the Royal Society, in *Nature*, No. 2853). Similarly, under date July 22, 1667, we learn 'the king had made an experiment of keeping a sturgeon in fresh water in St. James's Park for a whole year; it was moved to kill it, and to see how it would eat.'

MANCHESTER 'LIT. AND PHIL.'

Mr. F. Nicholson has prepared a paper on the history of the Manchester Literary and Philosophical Society during its first seventy years. 'The Society had acquired a world-wide reputation by its publication of the early volumes of its *Memoirs* and its connexion with Dr. Dalton, and often used its influence both locally and nationally. It encouraged the formation of the short-lived College of Arts and Sciences, 1783, and its members founded, though the Society disclaimed responsibility, the Manchester Academy, 1786, still existing as the Manchester College, Oxford. It invited the British Association on its first visit to Manchester, 1842, and took a leading part in securing the exemption of scientific and literary societies from taxation, 1843. Owing entirely to its representations to the Government, the northern counties were surveyed by the Ordnance Survey on an adequate scale, 1841. It established meteorological recording stations in Manchester, 1843, and in its rooms the founders of medical education in Manchester delivered their lectures prior to the establishment of the Pine Street School of Medicine.'

BIRDS AS DIVERS.*

Dr. Dewar describes the Diving Ducks, Cormorants, Grebes, Divers, Auks and the Coot. The first fifteen chapters deal with Historical Summary; Areas and Methods of Observations; The Dive; A Three-Dives Criterion of Depth;

* 'The Bird as a Diver,' by John M. Dewar. London: H. F. & C. Witherby, xii. + 173 pp., 10s. 6d. net.

A Second Approximation to the Time-depth Relation ; Favourite Depth and Bathymetric Distribution of Dives ; Exceptions to the Rule of the Time-Depth Relation ; The Pause ; The Dive-Pause Ratio ; Variation in the Periods of Dive and Pause ; Sex-Differences ; Age-Differences ; and The Evolution of the Diving Habit. The Great Northern Diver and the Cormorant yielded the longest dives and the greatest depths. The Diver reached sixty-nine seconds and thirty-three and a half feet ; the Cormorant seventy-one seconds and thirty-one feet. But, whereas the Divers showed no sign of heavy breathing nor of bodily exhaustion, and appeared equal to plunging to still greater depths, the Cormorants, while they were working in water about five fathoms deep, showed during each pause manifest signs of exhaustion by panting and by lying heavily on the water for a time. It appears as if Cormorants, in descending to a depth of five fathoms of water are approaching their physiological limit in deep diving. The Guillemot and the Red-throated Diver come next in order, the former being credited with sixty-eight seconds and twenty-eight and a half feet, the latter with sixty-seven seconds and twenty-nine feet. Like its relative, the Great Northern Diver, the Red-throated Diver never showed the appearance of exhaustion. The Guillemot, however, in making deep dives, either worked in short spells of diving, or rested after each dive.'

SIR ARCHIBALD GEIKIE.*

It is somewhat remarkable that a scientific man born so long ago as 1835 should be able to give an account of his life's work in the interesting style with which we are so familiar. He seems early to have been impressed with the desirability of keeping records of his work and achievements, and in this volume we hear much of his early days and the many successes and honours of his later life. The narrative is quite readable, and will be much appreciated by Sir Archibald's many admirers. There are, however, occasional evidences that the author in his zeal for giving credit for all that is Scotland's, has suffered from mental lapses, due to his great age. This is peculiarly noticeable when dealing with the history of the great problem of the north-west Highlands. The reader might easily assume that this fine piece of work was due to Peach and Horne, the magnificent achievements of Nicol and Lapworth being apparently overlooked. Sir Archibald would be the last wittingly to do injustice to Lapworth.

' NEOLITHIC ' MAN AGAIN.

' Towards the end of last year ' two skeletons were found

* ' A Long Life's Work : An Autobiography,' by Sir Archibald Geikie, London : Macmillan & Co., xii. + 426 pp., 18s. net.

at a depth of four feet while excavating for sewage works at Alcester, Warwickshire. The remains were well preserved. Prof. Brash, of Birmingham, saw them, and states that 'in all probability they are neolithic bones.' How this conclusion was arrived at without any apparent evidence whatever, we are not able to say, but no reference is made to any associated relics. We learn from *The Antiquaries Journal*—our principal publication in these matters—that 'The discovery, therefore, can be regarded as unique, for although there are examples of the work of neolithic man in the midlands, this is the first instance of his physical remains having been brought to light.' Yet, because this Birmingham professor considers that 'probably' they are neolithic bones, the editor of *The Antiquaries Journal* considers himself justified in giving a heading to the notice (which will be copied in all the Bibliographies, etc.): 'Neolithic skulls [query skeletons, or are the rest of the bones doubtful?] found at Alcester.' Surely the time has arrived when, in a publication issued by the world's premier Antiquarian Society, a little caution should be exercised before accepting such records as these as authentic.

SCIENCE AND WEMBLEY.

Those who had the rare privilege of being conducted round the science section, arranged by the Royal Society, in the British Government Pavilion at Wembley during the recent Museums Association Conference, will long remember the excellence of the Exhibition. In this connexion we have recently been favoured with a copy of the 'Handbook to the Exhibition to Pure Science' (228 pp., 1/-), which is considerably more than the title might lead one to believe. There are twenty-two memoirs on various aspects of science, by some of our greatest exponents, as well as a descriptive catalogue of the exhibits. Among them are: 'The Circulation of the Atmosphere,' by Sir Napier Shaw; 'The Origin of Man,' by Sir Arthur Smith Woodward; 'Biological Action of Light,' by Prof. D. T. Harris; 'Insect Mimicry and the Darwinian Theory of Natural Selection,' by Prof. E. B. Poulton; 'The Origin of the Seed Plants,' by Dr. D. H. Scott; while Mr. C. Tate Regan gives an excellent Introduction to the specimens under the head of Zoology and Botany. The Ministry of Agriculture and Fisheries has also issued a valuable *Guide to the Agricultural Exhibit* in Gallery II. of the Government Pavilion (166 pp., 6d.). This exhibit is confined to Research and Education.

BRITISH BROOCHES.

Mr. Parker Brewis favours us with a copy of his admirable paper on 'British Brooches of the Backworth type in the Black Gate Museum, Newcastle-on-Tyne,' reprinted from

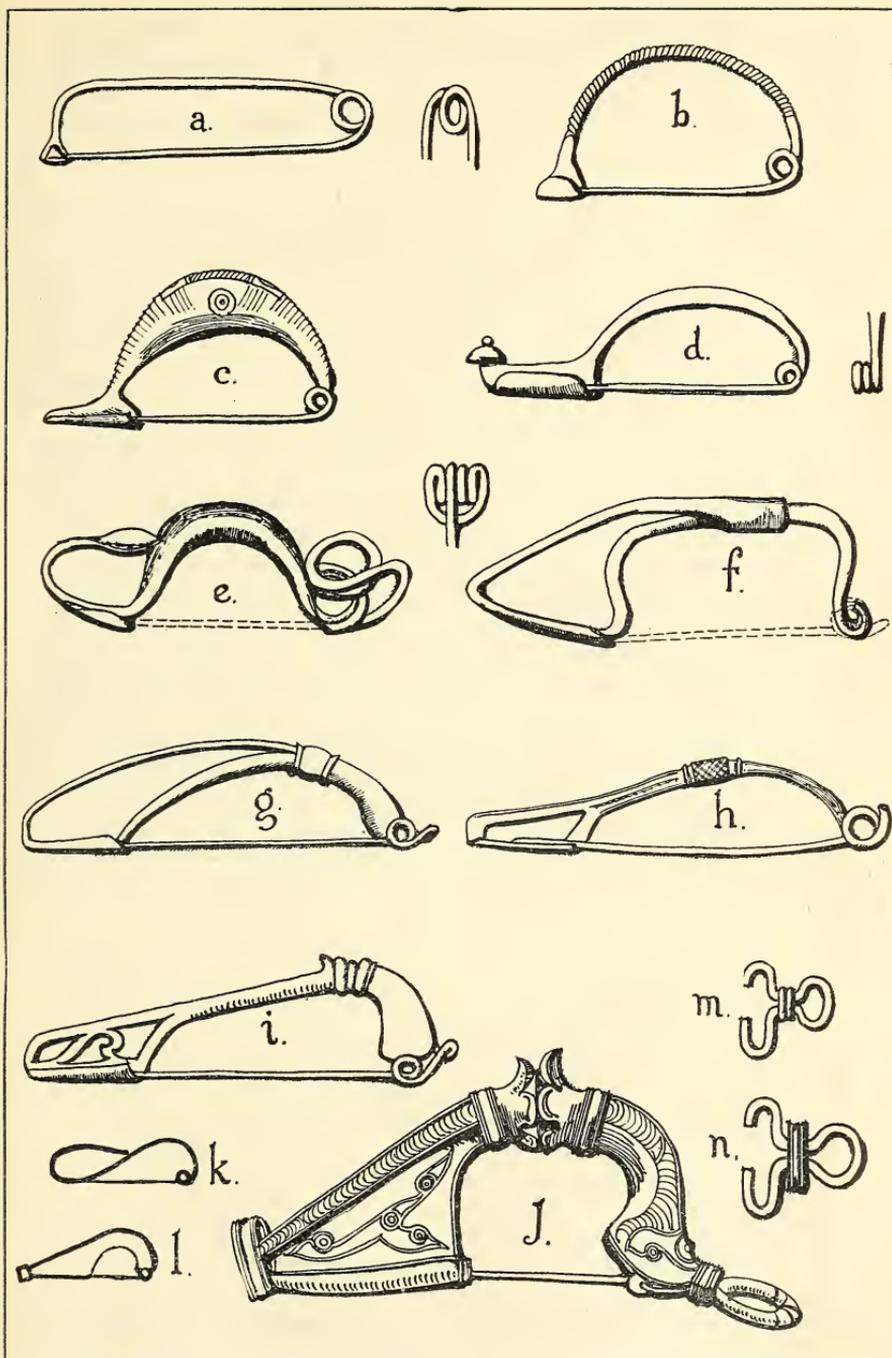
Archæologia Aeliana. His illustration showing the development of the safety-pin to the Blackworth type of brooch is particularly well worked out, and we are permitted to reproduce it herewith.

SAFETY PIN.

'The simplest form of brooch is that of the safety-pin constructed out of a single piece of wire, by making a coil in the middle of its length to act as a spring, a point at one end and a hook at the other (page 263, a.). This simple safety-pin type of brooch was invented more than 3000 years ago. In cold countries, where thick garments were necessary, the simple safety-pin did not allow sufficient space between the pin and the bridge for much stuff, hence towards the end of the Bronze Age, the bridge of the safety-pin was arched into a bow (page 263, b.). The arch of the bow was at first high, usually semicircular, but it was lowered in later examples. In the Hallstatt period the bow was thickened to give solidity, and also to afford scope for ornamentation (page 263, c.). These brooches are termed "Leech," or "Boat-shaped Brooches," and sometimes have an extended foot. In the next stage this extension of the foot was exaggerated, the foot terminating in a turned up tail appendage, the purpose of which is purely decorative (page 263, d.). This type is termed the "Certosa" pattern, because a large number was found in the graves at Certosa near Bologna, in Italy. In these graves was also found a number of Greek and Etruscan objects of 5th century B.C. The extension of the foot continued, and in the next type the foot was turned back until it touched the bow (page 263, e.). The example shown was found by the Rev. Wm. Greenwell in a barrow at Cowlam in Yorkshire, and is now in the British Museum. This type is termed "La Tène I.," and is widely distributed. The oldest La Tène examples are almost as old as the Certosa pattern.'

LA TÈNE TYPES.

'The extended foot was liable to be accidentally bent, therefore its termination was attached to the bow, either by bending it round the bow (page 263, f.) or by binding the two together by a separate collar (page 263, g.). In both these cases the type is termed 'La Tène II.' In the course of time the foot merged into the bow without a joint, but a raised ring usually marks what had been the place of union (page 263, h.). The triangular space at the foot was sometimes left open, but in later examples it is usually filled by a thin plate frequently pierced (page 263, i.). These forms (h. and i.) are known as "La Tène III." The term "La Tène" means "the shallows," and is the name of an important late Keltic settlement at the east end of Lake Neuchâtel in



Showing the development of Safety-pin to the Blackworth type of brooch.

Switzerland, where a number of these brooches has been found, mainly La Tène II. The importance of this early Iron Age settlement has resulted in the attachment of its name to three stages, during which the brooch also passed through three well-defined phases.'

OOLOGY.

A somewhat sumptuous publication called *The Comparative Oologist and Journal of the International Museum of Comparative Oology*, Vol. I., No. 1, marked 'Sample Copy, skeletonized, with Birds of California Supplement,' has reached us. We understand it is eventually to be issued as a quarterly, but now put out as a semi-annual, and is from Santa Barbara, California, U.S.A. It is edited by William Leon Dawson; the first article on 'The Meaning and Promise of Oological Science,' is by William Leon Dawson, the second article on 'The New Museum,' where he hopes to have a world's repository of birds' eggs, is also by Mr. Dawson, as is 'The Philosophical Approach,' etc. There are notes by other writers. Whether the publication of this journal, and the foundation of the suggested museum, are likely to be in the interests of natural history, however, is a matter of opinion, as may be gathered from the following paragraph selected at random from a number of others: 'Mr. John M. Davis, of Eureka, who has so ably represented the "humid coastal strip" for seven years past in the collection of the old M.C.O., has entered the exclusive service of the International Museum. Mr. Davis gets for us such rarities as Vaux Swift (*Chatura vauxi*) and Varied Thrush (*Ixoreus naevius*), while California Purple Finch (*Carpodacus purpureus californicus*), Pine Siskin (*Spinus pinus*) and Golden Warbler (*Wilsonia pusilla chryseola*) are staples.'

CARNELIAN'S JEWEL-CASKET.*

'Carnelian Bay is a lure at low tide;
 Its name suggests gems by rich hues beautified;
 But seekers won't find precious stones cut and dried—
 Its caves aren't Aladdin's kind, jewelled inside!
 O, lady in search of a treasure most rare,
 You may not find jasper or moss-agate there
 (In that sense Carnelian Bay is a snare—
 It hasn't a heap of red-seal stones to spare),
 But soon, ere the hours of morning are sped,
 Eye-diamonds will sparkle like stars in your head;
 Your lips will be rubies, your cheeks coral-red;
 Ah, surely such gifts are worth having instead!'

* From 'Songs of Scarborough,' by R. A. H. Goodyear. York: T. A. J. Waddington. 42 pp., 1/-. Mr Goodyear is also the author of 'Songs of a Sea-side Village,' which contains many poems of interest to East Yorkshire people.

MUSEUM DIRECTORS AT WEMBLEY.

THE Annual Conference of the Museums Association was held in the Conference Hall at Wembley towards the end of July. The gathering was well attended by representatives of Museums and Art Galleries from various parts of the Empire.

In his Presidential Address, Dr. H. Bolton covered a wide area but took a rather pessimistic view of things. At first he dwelt largely upon the old form of museum, which has been the theme for many museum addresses in the past, but surely in these days it is beating the dead horse to talk about what museums should not be, that they should be educational, and so on. This has been taken for granted by every qualified museum director for the past quarter of a century at least.

Dr. Bolton's many references to what museums will be in the future might almost give the impression that his paper had been written in his youth, as many of the reforms for which he appeals have long since been carried out. The address is all the more remarkable, seeing that Dr. Bolton presides over one of the most efficient museums and art galleries in the country, and, moreover, has the full support of his committee in his various schemes. He agreed with last year's President in suggesting that museums can be too large, 'and the temptation for visitors to go on and on through gallery after gallery, and from case to case, is almost irresistible, until the senses reel, and only a strange phantasmagoria remains in the mind as the result of seeing a long vista of cases and exhibits which are in themselves orderly.'

Like the Hull President, Dr. Bolton advocated the provision of museums in the parks, where the children can see the natural history collections.

His suggestions with regard to the future control of museums, classification, museums in small towns, and their association with elementary and secondary schools, the work of museums in our larger towns, etc., have long been anticipated. The same may be said with regard to his remarks on the relationships between museums and universities. He was very severe on Manchester! 'In this country no exactly similar co-ordination of museum and university seems to exist, the nearest approach being that of the Manchester Museum and University. In Manchester the Public Museum is also the University Museum, and is mainly supported by the latter. Whilst by means of lectures and demonstrations the public are encouraged to visit the museum, it remains so ultra systematic that it fails to attract so well as many others,' and it was in Manchester, we believe, that Dr. Bolton was trained as a museum director.

He had a good opinion of the value of the proper museum director, and seemed hopeful that in future museums will

become an important factor in almost every aspect of municipal life. Here, again, however, many of Dr. Bolton's hopes have been already realised.

Apparently he considered it desirable that all museums should be under some general control. There are two sides to this question, however, and such a scheme might result in a sameness with regard to our museum collections, whereas it is the individual character of each special collection which particularly appeals to the average public. For example, the Hall-i'-th'-Wood Museum at Bolton, the Strangers' Hall at Norwich, the Bowes Museum at Barnard Castle, the London Museum in our greatest city, or the Wilberforce Museum at Hull, would lose their charm were it not for the special purpose for which each exists.

With regard to what is usually known as honorary curators and the assistance of local bodies, Dr. Bolton is very severe, possibly as a result of his own experiences. He says 'It is still an article of faith with many that anyone can understand and "run" a museum, and the best energies and knowledge of more than one curator are being stifled by vain-glorious local naturalists, antiquarians and others, who value their spasmodic and occasional studies as far more useful in the direction of a museum than the training of a lifetime. They do not realise that years of close study and special technical skill are essential requisites for the successful working of museums. The co-option of gentlemen credited with a keen interest and knowledge of one or more departments of museum work is not always a success. Usually they lay claim to far more knowledge than they possess, and carry their colleagues with them in unwise or unnecessary plans of their own to the dismay of the curator. Very often these men are admirable workers in one small field, conchologists, ornithologists, etc., but in spite of even many years' observation or collection of shells or bird-skins, I should accept with great diffidence any positive views these gentlemen put forward upon the arrangement of, say, Mexican antiquities or the formation of a typical series of mammals. They do not, or will not realise that the curator gives days and weeks of study to the collections, where they scarcely give hours, and accordingly cramp his efforts and drive him along lines of work which are not his best. With the thorough ventilation of means to ensure good government should be considered also the question of the curator's ability, freedom of action, and security of tenure. I would draw your attention to the progress which museums have made in spite of all handicaps, and with a woeful lack of means. This is, I believe, because the curators have established principles of development as far as they could. Too often, however, have they been cribbed, cabined and

confined by an unsuitable management, and my sober experience is that curators are often better than their work.'

Dr. Bolton advocates some Government scheme for proper supervision of our museums. Here, we presume, he refers to those that are out of date, and in these few instances such a scheme might be desirable. The present writer, by the co-operation of the British Association and other important bodies, by correspondence in *The Times* and elsewhere, and with the powerful support of the late Lord Sudeley, endeavoured to secure a Royal Commission on Museums in order that the ideal now suggested by Dr. Bolton might be carried out, but while the scheme has not been definitely shelved it has certainly been delayed by the very individuals whom it was expected would have welcomed such a scheme, namely, some of the heads of the National Museums.

Following his predecessor also, Dr. Bolton complains very strongly about the wealth of material stored or unused in our National Museums which might be of service to the provincial collections up and down the country.

With regard to research, Dr. Bolton states 'The Bristol Museum, alone, I believe, amongst provincial museums, recognises research as a definite part of the work of its staff, and even there it is in its infancy, and the reserve collections are as yet barely touched.'

Dr. Bolton happens to be at the Bristol Museum, but, judging from the publications which we have received, much valuable research has been carried out by the staffs in several of our provincial museums, whether such research is looked upon as a definite part of the work of the museum or not.

The President concluded by appealing for English commercial museums, which, he says, must be unavoidable in the future, as they now are in America and other countries. In this respect Hull is likely to lead, as a suggested commercial museum is now in preparation, in order to perpetuate the excellent commercial exhibit held by the Hull City Council at the Civic Hall at Wembley in July.

Other papers read and discussed were:—'Some Notes on Botanical Museums,' H. Hamshaw Thomas, M.A.; 'The Policy and Scope of the Science Museum,' Col. H. G. Lyons, D.Sc., F.R.S.; 'The Preservation of Wild Life,' C. W. Hobley, C.M.G., C.M.Z.S.; 'Fossils as Museum Exhibits,' F. A. Bather, M.A., D.Sc., F.R.S.; 'The Outlook for Art,' Lawrence Haward, M.A.; 'The Vancouver Museum,' Commander Pybus, R.N.R.; 'Industrial Art,' Sir Cecil Harcourt Smith, C.V.O., LL.D.; 'Museums and Ethnography,' H. S. Harrison, D.Sc.

Reports of the Associations' four Committees on Circulating Art, Preservation of Pictures, Cements, and Preservatives,

were presented. Official visits were paid to the Victoria and Albert Museum, the Science Museum, and the Natural History Museum at South Kensington. In the Wembley Exhibition itself the Biological Section of the Royal Society Exhibits was described by Mr. Tate Regan and Dr. R. B. Rendle.

The Conference concluded by a visit to Eton College and its Museum, and Windsor Castle.

During the Conference week a meeting of the Corresponding Societies' Committee of the British Association was held, Mr. Sheppard being in the chair. At this, Prof. J. L. Myres gave an address on 'The Preservation of Sites, Natural and Historical.' He reviewed the history of the movement for the preservation of monuments, and subsequent speakers referred to the work being done in their areas, Yorkshire being particularly fortunate in its active natural history and archaeological societies.—T.S.

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We have received the well-printed and well-edited *Report of the Felsted School Scientific Society*, No. 28, which, as usual, is full of valuable records. Those relating to Zoology will be of more particular interest to readers of this journal. There are useful summaries of the lectures given to the Society, carefully compiled meteorological reports, and various reports of the society's sectional activities.

Besides many matters of historical and genealogical interest, *The Transactions of the Dumfriesshire and Galloway Natural History and Antiquarian Society* recently produced, under the editorship of Mr. G. W. Shirley, contain 'The Value of Birds,' by H. S. Gladstone; 'The Romans in Dumfriesshire,' by G. Macdonald, and 'Meteorological Observations taken at Jardington, 1920,' by J. Rutherford.

We learn from the *Fifty-third Report of the Rochdale Museum Committee* that twenty-two organised parties of school children have visited the Institution; Gifts of Egyptian antiquities have been made by Alderman J. R. Heap and Mr. C. Heap; and a collection of minerals and fossils has been presented by the family of the late George Healey. The Rochdale Field Naturalists' Society assisted by arranging an exhibition of wild flowers during the summer.

The Fifty-third Annual Report and Proceedings of the Chester Society of Natural Science, Literature and Art, has been issued from the Grosvenor Museum, Chester (50 pp.). Besides lists of additions to the library and museum, the Report contains details of the work of its Botanical, Geological, Zoological, Microscopical and other sections, abstracts of lectures, and other items likely to interest the members. Among the additions to the Museum we notice the tooth of a mammoth from Cefn-y-Bedd.

Volume XXIV. of *The Transactions of the Leicester Literary and Philosophical Society* contains Dr. E. E. Lowe's Presidential Address on 'The Society and the Museum,' and 'The So-called Junctions at Bardon Hill,' and 'Charnwood Forest Rocks,' by Dr. F. W. Bennett. One of the many subjects dealt with by Dr. Lowe in his address is 'Twins.' He tells us that in one instance *A* married first, but both twins met the lady together for the first time, and fell in love with her there and then; *A* managed to see her home and to gain her affection, though *B* went sometimes courting in his place, and neither the lady nor her parents could tell which was which.' We remember a similar case in Hull some years ago, but one of the twins pricked a little red ink in the middle of his nose so that he could distinguish himself from his brother!

YORKSHIRE NATURALISTS AT HOLME-ON-SPALDING MOOR.

W. H. PEARSALL, D.SC., F.L.S., AND F. A. MASON, F.R.M.S.

THE three hundred and thirteenth meeting of the Yorkshire Naturalists' Union was held at Holme-on-Spalding Moor, near Selby, on Saturday, May 17th. Fine weather prevailed, and there was consequently a good attendance, both of Selby naturalists and also of members from further afield. The geologists confined their attention chiefly to the clay and gravel pits, while the botanists and zoologists were led through the woods by Mr. G. Maxwell-Stuart and Mr. T. Stainforth. At the close of the day, the general meeting was held in the Old Cross Cafe, Selby, Mr. T. Sheppard being in the chair. A vote of thanks to the Duchess of Norfolk, for her courtesy in allowing the Union to visit her estates, was passed unanimously, and the thanks for the meeting were also accorded to Messrs. Stather, Sheppard, Hutchinson, Kendall, Maxwell-Stuart and Stainforth for their services in arranging and guiding the meeting. Three new members were elected and following reports presented :—

GEOLOGY (G. Sheppard) :—The Geological Section of the Union had an interesting time under the joint leadership of Mr. J. W. Stather, and Mr. T. Sheppard, M.Sc.

The Keuper Marls, underlain by curiously stratified gravels, and the more recent 'warps,' or re-distributed river muds, were investigated in turn.

The original drainage area of the Derwent and its tributaries has been of considerable extent in the past, and the confines of the present stream by no means give any idea of the bygone channel, nor series of meanders, which occupied the primary valley.

Periods of flood (which yet occur) have been frequent episodes in the history of the river, and there is reason to believe that large areas of country have been repeatedly submerged for a considerable time.

This is suggested by the presence of appreciable thicknesses of fine, laminated mud, or 'warp,' which is largely, in effect, re-distributed glacial drift. In one of the operating brickyards of the Holme district a well preserved section of 'warp' was examined which had a thickness varying from twenty to thirty feet. The fine texture of the silt, and the nature of its lamination, indicate clearly that the mud had been laid down under quiet and undisturbed conditions. Fragments of rock are scarce in the mud, and such as were identified apparently were derived from the west, and included Carboniferous types.

The outstanding hill of Holme, upon which the church stands, has probably an interesting geological history, being underlain for the most part by typical Keuper Marls.

Topographically, the hill is important, and its presence as a well-known landmark for miles around can be explained satisfactorily with difficulty, and with a considerable amount of conjecture.

In all probability the hill can be defined as a typical 'erosion remnant,' occurring in pre-glacial times as part of a pronounced ridge or escarpment. As an isolated hill its history began towards the close of the Ice Age, there being no doubt that its earlier contours were determined by direct ice action.

In its later stages its shape was certainly modified by the channels of the Derwent, and its associated tributaries.

At the present time (on account of the paucity of exposures) we have no evidence regarding the present attitude of the underlying Keuper beds; they may be more or less horizontal in the Holme district, but, on the other hand, a tilting of the formations would, in the first place, directly express the topography. This being the case it can be clearly

seen that the 'remnant' now known as Holme Hill may, in the past, have formed part of a recognised escarpment.

The nature of the gravels which cover, and also flank the hill, indicates very plainly that they give evidence of a bygone drainage from the west which was of considerable intensity. No doubt this drainage was of a fluvio-glacial character, the gravels being glacial outwash deposits.

More recent river channelling, however, has also played an important part in the general sculpture of the district.

The following series of boulders, collected from the Holme Gravels, was identified by Mr. T. Sheppard:—

LIST OF BOULDERS OBSERVED IN THE HOLME GRAVELS, MAY 17, 1924.

Light green Keuper Marls, varying to red (with included fragments & salt pseudomorphs)	85%	Ganister (Carboniferous)	...	1%
Soft sandstones (Carboniferous)	5%	Millstone Grit	...	2%
Carboniferous sandstone	...	Black Chert (Carboniferous)	...	$\frac{1}{2}$ %
Quartzites	...	Carboniferous Limestone	...	$\frac{1}{3}$ %
	...	Liver-coloured quartzite	...	$\frac{1}{2}$ %
	...	Jasper	...	$\frac{1}{2}$ %

VERTEBRATE ZOOLOGY (S. H. Smith):—The district is highly cultivated and well wooded, and no doubt the list of birds observed might be considerably extended. In all I noted thirty-one species, none of them rare nor of outstanding interest. Near to Barlby a great spotted woodpecker was seen, and in the top of a Scotch fir tree a jay was busily occupied feeding the brood of hungry youngsters that filled her nest. A golden crested wren was noticed near Everingham, but it was not known whether nesting or not. Amongst mammals the fox, stoat and red squirrel were seen beside more ubiquitous species, and near to Holme-on-Spalding-Moor the geologists reported finding a piece of rhinoceros hide. In reply to a later question, Mr. Sheppard assured the meeting that to his knowledge this had not been stripped from any member of the Yorkshire Naturalists' Union present. During the excursion the writer paid special attention to the landrail (or cornrake). None of the party heard this species anywhere in the district traversed, and I conclude that it is more rare than ever this year. One is at a loss to account for the scarcity of landrails in the Plain of York and East Yorkshire, and it would be interesting if a special effort was made by this section to concentrate observation upon the distribution of these birds in Yorkshire during the summer of 1924.

MOLLUSCA (Greevz Fysher):—The naturalists had access to the woods and parks at Everingham, but it happened to be a dry forenoon, and there were very few stones or fallen logs to harbour terrestrial mollusca. The fish pond also was rather disappointing.

The lower end, where there was plenty of vegetation, must have had a great molluscan population, but dredging was very difficult in consequence of the great amount of old vegetation which had accumulated almost the full depth of the water.

The following is a list of the species actually observed:—

<i>Hyalinia alliaria.</i>	<i>Anodonta cygnea.</i>
<i>Limnæa peregra.</i>	var. <i>arenaria.</i>
<i>Helix nemoralis</i> (one).	var. <i>rostrata.</i>
<i>Planorbis carinatus.</i>	<i>Pseudanodonta rothomagensis.</i>

COLEOPTERA (T. Stainforth).—On the mud along the sides of the River Foulness was a very interesting association of littoral species. *Elaphrus riparius*, *Bembidion dentellum* (*flammulatum*), *B. ustulatum* (*littorale*), *Stenus pubescens*, and *Heteroceris marginatus* were in extraordinary abundance, with smaller numbers of *Loricera pilicornis*, *Bembidion lampros*, *B. quadriguttatum* and *Homalium rivulare*. *Helophorus nubilus* and *H. brevipalpis* were also in the mud. Tapping a keeper's 'tree' in the wood at Harsley produced only such carrion

feeders as *Necrophorus humator*, *Silpha rugosa*, *S. atrata*, *Soronia grisea*, *Omosita discoidea*, *Dermestes undulatus*, *Aleochara curtula* (*fuscipes*) and *A. mæsta*.

DIPTERA (C. A. Cheetham).—Diptera were more plentiful than seemed possible during the previous week, the fine day was probably the first of the year for many of the flies, and the list must be considered in that respect; as Diptera records from East Yorks. are very scanty, all are given; more than half are additions for the Riding. A few are left over for confirmation of the identifications by experts later. A visit to the woods when the hemlock is in flower or to the Carrs when ragwort is blooming would certainly repay a dipterist.

<i>Mycetophila lineola</i> Mg.	<i>Myiospila meditabunda</i> F.
<i>Bibio marci</i> L.	<i>Pyrellia eriophthalma</i> Mcq.
<i>B. nigriventris</i> Hal.	<i>Mydæa</i> (<i>Hyetodesia</i>) <i>lucorum</i> Fln.
<i>B. johannis</i> L.	<i>Hebecnema</i> (<i>Hyetodesia</i>) <i>umbratica</i> Mg.
<i>Chironomus plumosus</i> L.	<i>Phaonia</i> (<i>Hyetodesia</i>) <i>errans</i> Mg.
<i>Anopheles bifurcatus</i> L.	<i>Hydrotæa dentipes</i> F.
<i>Ochlerotatus nemorosus</i> Mg.	<i>Hydrophoria linogrisea</i> Mg.
<i>Dicranomyia chorea</i> Mg.	<i>Hylemyia variata</i> Fln.
<i>D. morio</i> F.	<i>H. lasciva</i> Ztt.
<i>Limnobia nubeculosa</i> Mg.	* <i>Hylephila obtusa</i> Ztt.
<i>Empeda nubila</i> Schum.	<i>Fannia</i> (<i>Homalomyia</i>) <i>manicata</i> Mg.
<i>Amalopsis immaculata</i> Mg.	<i>F.</i> (<i>Homalomyia</i>) <i>serena</i> Fln.
<i>Pæcilostola punctata</i> Schrk.	<i>Pegomyia bicolor</i> Wied.
<i>Erioptera tanionota</i> Mg.	<i>P. nigritarsis</i> Ztt.
<i>Tipula lateralis</i> Mg. (Tonn.)	<i>Amauosoma fasciata</i> Mg.
<i>T. oleracea</i> L.	<i>Scatophaga lutaria</i> F.
<i>Rhyphus punctatus</i> F.	<i>S. stercoraria</i> L.
<i>Rhamphomyia sulcata</i> Fln.	* <i>Lauxania cylindricornis</i> F.
<i>Empis trigramma</i> Mg.	<i>Sepsis nigripes</i> Mg.
<i>E. chiroptera</i> Fln.	<i>S. cynipsea</i> L.
<i>Chilosia albitarsis</i> Mg.	* <i>Themira pusilla</i> Ztt.
<i>Lonchoptera lutea</i> Pz.	<i>Parhydra quadripunctata</i> Mg.
<i>Ascia podagrica</i> F.	<i>Elachyptera cornuta</i> Fln.
<i>Rhingia campestris</i> Mg.	* <i>E. scrobiculata</i> Stbl.
<i>Helophilus pendulus</i> L.	<i>Phytomyza notata</i> Mg.
<i>Onesia sepulchralis</i> L.	
<i>Siphona cristata</i> F.	

* Additions to the Yorkshire list.

PLANT GALLS (A. A. Dallman).—No detailed observations were made by the writer on this occasion, but three cecidia were noticed:—

Eriophyes fraxini Karp.

On Ash (*Fraxinus excelsior* L.), causing conspicuous and distinctive galls due to marked deformation and hypertrophy. The flower buds are attacked and the inflorescence forms curious cauliflower-like growths. Abundant on a single tree by the road between Everingham Station and the village.

E. goniothorax Nal.

New galls commencing to form on leaves of Hawthorn (*Crataegus monogyna* Jacq.) on the hillside below Holme-on-Spalding Moor Church.

Rhabdophaga salicis Schrank.

Causing an abundant crop of conspicuous woody tumours on the twigs of a hedgerow willow (*Salix* sp.) between Everingham Station and the village.

BOTANY (W. H. Pearsall).—Owing perhaps to the backward season, few flowering plants of interest were seen. *Zannichellia palustris* occurred in a running ditch near Everingham. Messrs. Dallman and Cheetham

obtained *Ophioglossum vulgatum* in two stations and Mr. Burrell also observed *Ranunculus auricomus* and *R. sceleratus*.

The natural vegetation of the district bears a distinct resemblance to that of the Cheshire plain. The woodlands, on deep, rather sandy soil, are dominated by oak (*Q. robur*, with a little *Q. sessilis*), and have in places a large proportion of birch (*B. pubescens* and some *B. alba*). The ground flora is chiefly of the bracken-*Scilla* type, with locally dense carpets of *Mercurialis* or *Urtica*, where the soil is less open or damper. No seedling oaks were seen, and, according to Mr. Maxwell Stuart, the woods have to be replanted if they are cut. Otherwise, birch replaces the oak, as it apparently tends to do under natural conditions. As patches of calluna-heath mark the sites of former woodlands, it is evident that the native vegetation belongs to the oak-birch woodland and calluna-heath types so well known in Cheshire.

BRYOLOGY (W. H. Burrell).—The best moss ground traversed by the party was in Haswell, where, on low peaty ground, recently cleared of timber, *Polytrichum gracile*, *Dicranella cerviculata* and *Aulacomnium androgynum* were in great luxuriance. In Holme, the church hill, a roadside swamp, and 'Low Plantation,' were examined. The plants noted including *Dicranella Schreberi*, *Aulacomnium androgynum*, *Hypnum cuspidatum* and *Hypnum aduncum*, group *pseudofluitans*. An extension of time beyond Saturday allowed visits to Weighton Common where *Dicranum undulatum*, in nice condition, was again seen in its only known Yorkshire station; and to Haughton Moor with the hope of seeing *Goodyera repens*, which was found there over thirty years ago. The orchid was not found, but a number of mosses was noted, including *Sphagnum fimbriatum*, *S. rufescens*, *S. inundatum*, *S. cymbifolium* and *Leucobryum glaucum* in detached cushions; the last was again seen in Low Plantation, Holme; some perfect double convex cushions showed no difference in colour or shape to distinguish upper and lower surfaces. These detached tufts are believed to be caused by game birds scrapping for food, turning the moss repeatedly; growth proceeds at whichever part happens to be uppermost, the tendency of the plant to develop buds and its ability to store water in special storage cells being factors in the phenomenon.

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YORKSHIRE NATURALISTS AT RAVENSCAR.

W. H. PEARSALL, D.SC., F.L.S., AND F. A. MASON, F.R.M.S.

THE 314th meeting of the Yorkshire Naturalists' Union was held at Ravenscar, on June 7th to 9th, for the investigation of the Robin Hood's Bay district. There was a good attendance, and the weather being favourable, a full and interesting programme was carried out. On Saturday, June 7th, the party worked in the direction of Robin Hood's Bay, some time being spent on the beach, and in visiting the Leeds University Biological Station under the guidance of Mr. E. Percival. On Sunday, attention was devoted to the undercliff south of Ravenscar, and on Monday, members visited Ramsdale Beck and the Fyling Hall Estate, under the personal guidance of Mr. F. W. Mills, who kindly provided tea at the close of the day. Through Mr. Mills's courtesy, the general meeting was also held at Fyling Hall, the President, Mr. P. H. Grimshaw, being in the chair. A message of congratulation was sent to Sir Arthur Smith Woodward, F.R.S., an Ex-President of the Union, on the honour recently bestowed on him. Votes of thanks were unanimously accorded to Mr. A. I. Burnley, for the success of the local arrangements, to Mr. F. W. Mills, and to other landowners who had permitted the Union to have access to their estates. The following reports were presented, and two new members were elected:—

VERTEBRATE ZOOLOGY (W. G. Bramley).—The outstanding feature of the excursion was the abundance of the Brown Linnet, which was seen in every suitable locality. Yellow-hammers, Chaffinches and Willow-wrens were also very numerous. On the cliffs a large colony of Herring Gulls was busy nesting in company with Cormorants. The House Martin had also selected the cliffs for domestic purposes, although the Sand Martin was fairly common, no nesting holes were seen. Other species noted on the cliffs were the Carrion Crow, Jackdaw and Rock Dove, while one or two Fulmar Petrels were seen passing on the coast. On the lower slopes Stonechats, Tree and Meadow Pipits, White-throats and Chiffchaffs were seen. The Rock Pipit was apparently absent.

In the woods at Ramsdale Beck, Green Woodpeckers were found nesting. Garden Warblers and Wood Warblers were singing in the open glades near the mill, while the Goldcrest pursued his entomological studies high up in the trees. Among the other birds seen were the Bullfinch, Wheatear, Sedge Warbler, Marsh and Blue Tits, Dipper, Pied and Grey Wagtails, Magpie and Brown Owl. At Foul Syke a colony of about twenty pairs of Black Headed Gulls was visited.

Of the other vertebrates noted were the Stoat, Common Newt and Frog. A Badger earth was seen by Mr. Burnley.

I am indebted for much information to Messrs. Astin and Gyngell.

[The Corncrake was heard near Robin Hood's Bay.—W.H.P.]

MOLLUSCA (Greevz Fysher).—Rains brought terrestrial mollusca under observation in great numbers. The most conspicuous undoubtedly was the little grey slug *Agriolimax agrestis*, which has really become a very troublesome pest. The black slug *Arion ater* was also very abundant, and the less common slugs were much more conspicuous than usual.

Little was done to observe the Marine Mollusca between high and low water mark, and the shingly nature of the beach was unfavourable to the preservation of the more delicate shells of deep sea species.

A few ponds were examined for fresh water mollusca, but in every case the level of the water was far above its normal height, and the dredge could only be applied among brambles, bracken, heather and the like. The result was a blank.

The following is a list of the species collected and submitted to Mr. J. W. Taylor :—

Fyling Hall, 8th, 9th June, 1924.

Helix hortensis plentiful; several varieties—those without bands being far the most numerous on the cliff below Raven Hall.

Arion ater var. *pallido-dorsalis*, and var. *brunnea albolateralis*.

Helicigona arbustorum and v. *cincta*.

H. nemoralis libellula 12345.

H. hortensis lutea 12345,00000.

Hyalinia cellaria.

Pyramidula rotundata.

Clausilia laminata.

Limax arborum juv. ?

Hyal. alliaria.

Collected by Mr. Gyngell.

Clausilia bidentata.

Pupa umbilicata v. *rufolabris*.

Hyalinia crystallina.

H. pura.

Carychium minimum.

ENTOMOLOGY (P. H. Grimshaw).—Owing to the paucity of entomologists and the very unfavourable weather, the list of insects seen or taken is not an extensive one. Of Lepidoptera few species were noted, but among them may be mentioned *Vanessa atalanta*, *V. urticae*, *Polyommatus phlaeas* and *Cænonympha pamphilus*. Coleoptera taken included a

single example of *Clytus arietis*, *Curculio abietis*, *Geotrupes sylvaticus*, *Aphodius fossor*, *Athous hæmorrhoidalis*, *Helodes marginata* and the pretty *Ancistronycha abdominalis*. *Meloë proscarabæus* and *Gastroidea polygoni* were also taken. The only Dragon-fly seen during the week-end was the common *Pyrrhosoma nymphula*, while of Trichoptera the only species noted was *Limnophilus centralis*. A single Hemipteron, the common *Miris holsatus* was noted, and two Sawflies, *Athalia lineolata* Lep. (*rosæ* Cam.) and *Tenthredella livida* L. captured. Bumble-bees were represented by *Bombus agrorum* Fab., *venustus* Sm., *oroensis* L., and *lapidarius* L. Diptera, to which special attention was paid, were not plentiful, and most of the specimens had to be taken by sweeping the damp vegetation. Sun-loving flies, e.g. Syrphidæ, were scarce, owing to the dull, showery weather and absence of sunshine, but *Eristalis pertinax*, *Melanostoma scalare*, *Rhingia campestris*, *Syritta pipiens*, *Platychirus manicatus*, *P. angustatus*, *Chilosia albitarsis* and *C. antiqua* Mg. (*sparsa* Lw. and Verr.) were all taken by sweeping. Crane-flies were represented by the handsome *Tipula maxima* Poda and also *T. variipennis*, *T. vernalis*, *Pachyrrhina maculata*, *Ptychoptera scutellaris*, *Rhipidia maculata*, *Tricyphona immaculata*, *Erioptera trivialis*, *Ormosia lineata*, *O. nodulosa*, *Limnophila meigenii* and *L. ochracea*. A single gall-midge, not identified, was taken accidentally, also *Sciara morio*, *Chironomus dorsalis*, and *Pericoma nubila*. *Dilophus femoratus* was common (both sexes) among the grass on the cliff-tops. *Bibio marci* was taken, while among the Empidæ captured may be mentioned *Empis tessellata*, *Rhamphomyia nigripes*, *R. albosegmentata*, *R. flava*, *R. hybotina*, *Hilara maura*, and a *Hemerodromia* which I believe is *stigmatica* Schin., a species of which I have few British records. Single examples of *Onesia sepulchralis* and the handsome *Mesembrina meridiana* were taken, and of Acalyprate Muscidæ the following were noted:—*Hydrellia griseola*, *Ochthiphila geniculata*, *Borborus nitidus*, *Tetanocera elata*, *Sciomyza dubia*, *Sapromyza inusta*, *S. decempunctata* and *S. decipiens*. Lastly, the list of Anthomyiidæ, taken during the week-end includes *Phaonia incana*, *Mydæa mediatubunda*, *M. pagana*, *M. impuncta*, *M. obscuripes* Ztt., *Trichopticus longipes* Ztt., *T. decolor* Fln., *T. nigrifellus*, *Hydrotæa irritans*, *Hylemyia strigosa*, *H. variata*, *Azelia macquarti*, *Fannia coracina* and *F. armata*.

Mr. W. J. Fordham obtained the following Diptera at Robin Hood's Bay during his stay in June:—

<i>Bibio marci</i> .	<i>Tipula variipennis</i> .
<i>B. leucopterus</i> .	<i>T. vernalis</i> .
<i>Mesembrina meridiana</i> .	<i>T. hortulana</i> .
<i>Empis trigramma</i> .	<i>Eristalis tenax</i> .
<i>E. tessellata</i> .	<i>E. arbustorum</i> .
<i>E. stercorea</i> .	<i>Melanostoma scalare</i> .
<i>Dilophus febrilis</i> .	<i>M. mellinum</i> .
<i>D. femoratus</i> .	<i>Syrphus auricollis</i> v. <i>maculicornis</i> .
<i>Platychirus manicatus</i> .	<i>S. corollæ</i> .
<i>P. scutatus</i> .	<i>S. lunulatus</i> .
<i>P. peltatus</i> .	<i>S. balteatus</i> .
<i>P. albimanus</i> .	<i>S. ribesii</i> .
<i>P. angustatus</i> .	<i>Sargus iridatus</i> .
<i>Rhingia campestris</i> .	<i>Sarcophaga carnaria</i> .
<i>Rhamphomyia sulcata</i> .	<i>Anthomyia pluvialis</i> .
<i>Scatophaga stercoraria</i> .	<i>Helophilus pendulus</i> .
<i>Chilosia albitarsis</i> .	<i>Leptis scolopacea</i> .
<i>C. honesta</i> .	<i>Rhyphus punctatus</i> .
<i>C. sparsa</i> .	<i>Microchrysa cyaneiventris</i> .
<i>C. pulchripes</i> .	<i>Catabomba pyrastris</i> .
<i>C. variabilis</i> (Hayburn Wyke).	<i>Helomyza variegata</i> Lw.
<i>C. maculata</i> .	<i>Gymnochæta viridis</i> (Hayburn Wyke)

<i>Hilara maura</i> (Hayburn Wyke).	<i>Merodon equestris</i> .
<i>Pipiza lugubris</i> .	<i>Ptychoptera albimana</i> .
<i>Argyra diaphana</i> .	<i>Macroceva stigma</i> .
<i>A. argyria</i> .	<i>Micropeza corrigiolata</i> .
<i>Dolichopus brevipennis</i> .	<i>Baccha elongata</i> .
<i>D. trivialis</i> .	<i>Bacchozona lucorum</i> .
<i>D. popularis</i> .	<i>Scellus notatus</i> .
<i>D. æneus</i> .	<i>Chrysochlamys cuprea</i> .
<i>Sphegina clunipes</i> .	<i>Tetanocera punctulata</i> .
<i>Lonchæa chorea</i> .	<i>Fucellia maritima</i> .
<i>Syrirta pipiens</i> .	<i>Psila fimetaria</i> .
<i>Chloromyia formosa</i> .	<i>P. nigra</i> .
<i>Xylota segis</i> .	<i>Chrysopilus auratus</i> .
<i>Volucella bombylans</i> .	

COLEOPTERA (M. L. Thompson).—Among a number of the commoner beetles met with in Ramsdale Wood the following may be mentioned as being of interest :—A single specimen of the rare *Aleochara ruficornis* Gr. was obtained by sweeping, together with *Helodes marginata* F., *Cantharis abdominalis* F. var. *cyanea* Curt. and *Psylloides napi* Koch. *Meloe proscarabæus* L. was found on Fylingdale Moor.

LEPIDOPTERA (J. H. Rowntree).—The following species were noted in Ramsdale Wood and on the moors :—Common Heath Moth, *Fidonia atomaria*, *Plusia gamma*, and Oak Eggar, *Lasiocampa quercus* (larvæ).

FLOWERING PLANTS (A. I. Burnley).—On Saturday an investigation was made of the flowering plants of the shaly refuse heaps connected with the old alum works.

In a general way it may be said that the flora was similar to that of the moorland escarpments to the south. One big difference was the absence of Oak and the presence of Sycamores. The undulations in the shale tended to separate the area into drier and wetter patches. On the drier knolls were Mountain Ash, Broom, Whin, Ling, Heath Bed-straw, Wood Sorrel and Wood Sage, while the damp hollows contained much Sycamore and *Deschampsia cæspitosa*. Other plants seen were *Corydalis claviculata* and *Lastrea Borreri*. *Lastrea dilatata* was the commonest fern.

The principal feature of the valleys opening out into Robin Hood's Bay was the abundance of Maple, this generally being high up in the wood along with Oak and Ash, Alder, Sycamore and Willows being nearer the stream. The undergrowth included Hazel (abundant), *Carex pendula*, *Equisetum maximum*, Angelica, Enchanter's Nightshade, Wood Sanicle, Celandine and Spurge Laurel (rare).

In the meadows above the wood were Adder's Tongue, Moonwort, Frog, Green-winged, Early Purple and Late Purple Orchids.

Common Cliff and Beast Cliff gave the members who ventured on to them a good scramble. A noticeable feature on parts of these undercliffs is a compact mass of stunted shrubs, so close in places that one can almost walk on the top of them, and all lean to the upper cliff. This effect is caused, not so much by the strength of the wind, as by the cold killing the buds on the seaward side. The ponds on the undercliff yielded Bog-bean, Marsh Cinquefoil, Tussock Sedge and both Reed-maces. *Typha angustifolia* is recorded by J. G. Baker as growing in Scarborough Mere, but is not there now, and the Beast Cliff locality is a new record for the Scarborough Society. Other plants of the undercliff were Butterwort, Fragrant Orchid, Crowberry and Hart's Tongue Fern. The White Water Lily, although not seen, is still on the cliff.

The best excursion for the botanist was that on Monday, to Ramsdale and Foul Sike. Although not providing anything in the way of rare species, the constantly slipping boulder clay of the steeply sloping Ramsdale Woods had a clay vegetation strikingly different from the permanent soils on the adjacent flat top with oak and bracken.

One of the most interesting areas examined was near Ramsdale Beck head, where several springs on the edge of the moor empty their water across sphagnum swamps. These are abundant in the moorland valleys in North East Yorkshire, and those seen were fairly typical. On the sides of the runnels grew *Selaginella*, Butterwort and sedges such as *Carex dioica*, *C. flava* and *C. echinata*. Out through the bog moss grew *Erica tetralix*; on the moss was Sundew and Cranberry. On the drier areas were Ling and *Nardus stricta*. A somewhat similar swamp might have produced, in addition to the above, Sweet Gale, Bog Asphodel, two cotton grasses and the Black Bog Rush. Other plants in the vicinity were the club moss, *Lycopodium clavatum*, Petty Whin, Dwarf Twayblade, Chickweed, Wintergreen and *Carex laevigata*.

The Black Mustard seen at Robin Hood's Bay in 1914, and long ago recorded in Baker's "North Yorkshrie," was not found at Whitsuntide.

PLANT ECOLOGY (W. H. Pearsall).—The woodlands near Robin Hood's Bay afford an interesting comparison with those on the southern edge of the North Yorkshire Moors. The latter have been described in previous reports (*The Naturalist*, 1922, p. 289, 1923, p. 207). The outstanding features of the Robin Hood's Bay area are due to the enormous deposit of glacial clay, which, masking the underlying rocks, exerts a decisive influence on the vegetation. According to Mr. Burnley this clay contains a considerable amount of lime (2-4%), and this fact would account for the rather calcareous nature of the vegetation in the valleys. The gently sloping clay bears naturally woodlands of the oak-ash type—rarely possessing more than 50% of oak and with *Acer campestre* quite frequent. Where the drainage accumulates there are extensive patches of Ash-Alder woods, with *Carex pendula* and *Equisetum maximum* usually very abundant. The ground flora is normally dominated by *Mercurialis*, *Urtica* or *Allium ursinum*, with 'clay species' like *Sanicula*, *Ficaria*, Primrose, *Arum*, *Carex sylvatica* and *Catharina undulata* frequent. *Scolopendrium*, *Polystichum aculeatum* and *Daphne laureola* are local.

The woods at the entrances to the Stoupe and Ramsdale Becks belong to the general type thus indicated. If, however, one works up either of these streams, a definite change in the vegetation is observable. The influence of the clay first decreases and then vanishes as the deposit becomes thinner. Where the clay is still present but thin, Oak (chiefly *Q. sessilis*) is dominant (80%) while Elm is present (10%), and but little Ash. The slopes are gradual, and *Pteridium*, *Sanicula* and *Mnium hornum* are the constant elements of the ground flora. Where clay is absent, the shallow, rather acid soil bears practically pure oak woods, with a grassy ground flora of *Anthoxanthum*—*Holcus mollis* and *Oxalis*, as at the head of Ramsdale.

These main types are further diversified in a very striking manner along the banks of the streams. In many places, the water has cut through the deep clay leaving steep slopes, sometimes fairly stable, elsewhere continually slipping downwards. On the stable slopes, Elm (35%) and Oak (35%) are the chief trees, with Ash, Mountain Ash and *Acer campestre* frequent. On the slipping slopes, Ash is most abundant (50%), Oak and Alder (15-20%) come next, while the ground flora is scanty—*Athyrium filix-femina* and *Polystichum aculeatum* being perhaps most abundant. Ash appears to be the only tree capable of growing effectively on the unstable clay. It is possible that the instability is largely due to higher water content. In the upper parts of the gills there is little clay, and the streamside is rocky. Here the Oak-wood has a few Ashes present, the ground flora being a carpet of *Luzula maxima*.

The trees colonising the shale heaps below Ravenscar, indicate the earlier stages of woodland development. Sycamore (40%) and Elm (35%) were most important. Ash (15%) and *Pyrus aucuparia* (10%)

were frequent. In the older stages, Sycamore was much more abundant, to the partial exclusion of Elm. Other colonising plant communities are developed along the cliffs south of Ravenscar.

Most of this area is free from trees owing to grazing. The more stable surfaces of the cliffs are partly covered with a sparse *Festuca ovina*—*Anthoxanthum* grassland, *Calluna* tending to become dominant at the tops, and *Pteridium* being abundant on the deeper soils at lower levels. There are also well defined patches of scrub in the grazed areas, dominated by *Cratægus* (8%) with Willows frequent (*S. capræa* and *S. cinerea*). Elm and Oak are occasional. Where the woods are practically inaccessible to animals, Ash (50%) and Elm (10%) are more abundant along with birch (*B. pubescens*, 15%), *Pyrus aucuparia*, Sycamore and Willows. In the places examined, *Luzula maxima* and *Dryopteris dilatata* seemed to be the most abundant plants in the ground flora. This ground flora community usually occurs under oak. Observations were limited however, and the Beast Cliff woods require, and are well worth, detailed study.

BRYOLOGY (F. E. Milsom).—Due to a deficiency of lime in the geological strata, the bryological and especially the hepatic flora was poor. The most interesting species gathered were the hepatics *Sphenolobus exsectiformis* and *Calyptogeia arguta*, found on the borders of Ramsdale Wood. On the moors at the higher end of Ramsdale Beck, more success was obtained. Growing in association with Cranberry, Sphagnum, various *Hypna*, *Dicranella squarrosa*, etc., were found. *Leptoscyphus Taylori*, *Cephalozia connivens*, *C. macrostachya*, *Cephaloziella bifida* and *Calyptogeia Trichomanis* var. *aquatica*. The *Cephalozia macrostachya* is interesting as being the first record for the vice-county.

The Sphagnum associates, not needing lime, have an opportunity to display their characteristics irrespective of the subsoil.

LICHENS (W. E. L. Wattam).—The area for investigation enabled a further portion of the North Riding of Yorkshire (V.C. 62) to be worked for this class of plants. The majority of the species previously recorded was again noted, additions to the lists already published (see *The Naturalist* 1922, pp. 292-293; 1923, pp. 250-252; and 1924, pp. 137-140), being now marked with an asterisk. The most interesting piece of ground was the old Peak, or South Cheek, for here are immense boulders of Estuarine Sandstone, at the immediate base of the high cliff. The dominant species was *Parmelia saxatilis* Ach., with its form *furfuracea* Schaer. The type covered these rocks in great silvery bosses, several of which bore the dull red-brown apothecia. *Cladonia pyxidata* Fr. was likewise a prominent species where humus, with mosses, had accumulated. Other species here occurring were *Peltigera canina* Hoffm., *Pelt. rufescens* Hoffm., *Parmelia fuliginosa* Nyl., *Gyrophora polyphylla* Turn et Borr., *Lecidia contigua* Fr., *L. confluens* Ach., *L. coarctata* Nyl, and var. *elacista* Cromb., and *L. rivulosa* Ach., as well as small tufts of *Ramalina scopulorum* Ach. Extending seaward from this rock zone, the hillocks and lower ground exhibit a dry-loving vegetation, with a dominancy of heath plants, and the lichen association is typical:—

Cetraria aculeata Fr. and its form *hispidata* Cromb.

Parmelia saxatilis Ach.

Platysma glaucum Nyl.

Cladonia coccifera Schaer.

Cladonia furcata Hoffm.

Parmelia physodes Ach.

Lecanora varia Ach.

Cladonia alpicornis Floerke.

Cladonia sylvatica Nyl.

Cladonia uncialis Nyl.

The undercliff, as far as Petard Point, was also traversed, the scattered sandstone boulders yielding the species hitherto enumerated as occurring at South Cheek, along with *Lecanora parella* Ach., *L. subfusca* var. *campestris* Nyl.,* *Acarospora fuscata* Nyl., *Lecidia lithophila* Ach. Boulders of calcareous grit were chiefly denized by *Lecanora atra* Ach.,

Aspicilia calcarea Somm., *Placodium callopismum* Naeg., *Rhizocarpon geographicum* D.C., * *Rhiz. confervoides* D.C., and *Xanthoria parietina* Th. Fr., with *Sphaerophorus coralloides* Pers., in their niches. When covered by a growth of plants of a heath type, most of the species hitherto mentioned also occurred.

A visit was also made to Langdale End, the cart road beyond the village being traversed as far as High Birch house, afterwards crossing to High Wykeham Moor by way of Hipper Beck. *Cladonia sylvatica* Nyl., *C. uncialis* Nyl., and *C. coccifera* Schaer, in varied form, are common species. *Cladonia pyxidata* var. *chlorophæa* Floerke* and var. *picillum* Fr.,* were also noted, as well as *Lecidia parasema* Ach. on the stems of *Myrica gale*, *Pertusaria globulifera* Nyl. on aged oak, and *Lecanora sophodes* Th. Fr., on medium sized ash trees.

During the investigation of Ramsdale Woods a good number of species was noted. *Cladonia gracilis* Hoffm. was an abundant ground species among mosses. *Lecanora rugosa* Nyl.* and *Lecanora subfusca* Nyl. occur on aged oak, *Gyalecta cupularis* Sch.* on damp stones, and *Opegrapha vulgata* Ach. on Ash trees.

GEOLOGY (J. W. Stather).—The geologists had an opportunity of studying a series of rocks unsurpassed in this country for the completeness of their development and the excellence of the exposures both on the coast and inland.

On Saturday a descent of 600 feet was made to the shore by the well-known path which follows the line of the great peak fault down to the beach. The evidences of this great dislocation were very clear both in the cliff and on shore, and during the subsequent walk across the seam towards Bay Town the succession of the various Liassic beds was easily recognisable. The glacial clays capping the cliffs of shale, and the abundance of boulders of shap granite on the beach were also noted.

On Whit Monday the geologists joined the general party and proceeded inland to the high ground behind Robin Hood's Bay, in the neighbourhood of Kirk Moor Gate, between five and six hundred feet above sea level, at the point where Mill Beck crosses the Scarborough and Whitby road. Even at this height, many of the pebbles in the beck were obviously of glacial origin, and among the foreigners was an undoubted specimen of Rhomb porphyry.

Leaving Kirk Moor Gate the geologists gladly accepted the kind offer of Mr. Burnley, of Scarborough, to conduct them to Biller Howe, from whence could be seen part of that remarkable series of trench-like valleys described and explained by Prof. Kendall in his classical paper on the "Glacier-Lakes in the Cleveland Hills." This detour was most enjoyable. The view point was admirably chosen, the visibility was good, and the explanation of the guide lucid and convincing.

On Tuesday, the geologists, diminished in numbers but not in energy, again descended the cliffs, but this time south of Blea Wyke, and spent the day examining the beds between the Dogger and the Alum Shale, peculiar to this locality. Fossils from the Nerinæa bed (Dogger) are easily obtainable at the present time.

Several evening excursions were made to the Crag Hall Quarry,* to collect specimens of *Equisetites columnaris*, from a band of Estuarine sandstone which occurs there.

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In the *Revue de Géologie* is a report on the Committee on Zoological Bibliography and Publication, in which it is stated 'A letter on this subject has been sent to the *Revue Critique de Paleozoologie*,' and gives reference to a footnote, which appears as follows, 'But has not yet appeared (F.A.B.). Not received.—Edit.'!

In Memoriam.

SIR JETHRO JUSTINIAN HARRIS TEALL, F.R.S.,
Sc.D., D.Sc., etc. (1849-1924).

By many of the older school of geologists in the North of England, the death of Sir Jethro Teall will be felt as a personal loss. Ever since he came among us in the late 'seventies and early 'eighties of last century as an inspiring young University Extension lecturer, he has been honoured and held in friendly remembrance, for there was that about him which always commanded esteem and trust, ever growing with acquaintanceship and becoming an abiding influence. Born in 1849, he retained his vigour of mind and body almost unabated until quite recently, when a mercifully short illness terminated his life, on July 2nd, at his home at Dulwich. Not geology alone, but the whole circle of British Science, has lost in him a leading spirit; for Teall's scientific sympathies and activities were of the widest, and were fortified by his deep interest in general literature and the arts.

Teall's career was determined at Cambridge, where his qualities carried him easily to distinction, and he was elected a Fellow of his College (St. John's) in 1875. By the influence of his tutor, T. G. Bonney, he had been attracted especially to Geology, and became one of the foremost of the band of vigorous workers in the science trained about that time at Cambridge. His first independent field-work was an investigation of the Lower Cretaceous rocks of the Eastern and Midland counties, resulting in an illuminative essay, entitled 'The Potton and Wicken Phosphatic Deposits' (published 1875), which gained him the Sedgwick Prize for 1873. Thereafter he devoted himself almost wholly to the domain of petrology, a study then comparatively neglected in Britain, though based mainly on the foundations laid here by H. C. Sorby. Teall recognized the importance of the advances made abroad in this subject, and took up the new methods with characteristic ardour, giving the first-fruits, in 1884, in two papers, now classics, on 'North-of-England Dykes' and on the 'Whin Sill' (*Quart. Journ. Geol. Soc.*). Two years later he began the issue, in monthly parts, of his masterpiece, 'British Petrography, with special reference to the Igneous Rocks,' which was published complete, as a beautifully-illustrated volume, in 1888. In the same year Teall accepted an appointment on the Geological Survey, under Sir Archibald Geikie, being given responsibility for the petrographical work of the institution. His descriptive work in this capacity is distributed through various later 'memoirs' of the Survey, supplemented by a few separate papers.

With a fixed residence now near London, he was fittingly called upon to take a vigorous part in the duties and activities

of the scientific societies of the capital. He served on the Council of the Geological Society from 1884, with brief periods of intermission, until his death; acting as Secretary (1893-99), Vice-President (for four terms) and President (1900-02). He was elected a Fellow of the Royal Society in 1890, served two terms on the Council and as a Vice-President (1900-01). He was also President of the Geological Section of the British Association in 1893, and of the Geologists' Association (1898-1900). It is in his various presidential addresses that the breadth and suggestiveness of his outlook has, in some degree, found permanent expression.

In 1901 Teall succeeded to the Directorship of the Geological Survey, and from then until his retirement under the age-limit in 1914, his time was almost wholly occupied by the administrative work of his office. With a high sense of duty in this, as in all things, he strove to fulfil every requirement laid upon him without regard for his personal aspirations. But the strain told on him, as he himself was well aware. His later years were spent restfully in his domestic circle, cheered by the happy young life of grandchildren.

He was, of course, the recipient of many honours: the Bigsby Medal (1889) and the Wollaston Medal (1905) of the Geological Society; the Delesse Prize of the French Academy of Sciences; Honorary D.Sc. of Dublin and Oxford; Hon. LL.D. of St. Andrews; and Knighthood (1916). But the affections of his family and of his many friends manifestly counted more to him than all these. He married, in 1879, Harriet M. Cowen, of Nottingham; his wife and the two sons of the marriage survive him.—G.W.L.

SIR WILLIAM HERDMAN, F.R.S.

While the meeting of the Conference of Delegates of the British Association was being held at Wembley, on July 22nd, the tragic news of the sudden death was brought into the room, and resulted in the proceedings being brought to an abrupt conclusion.

Sir William, who was 65 years of age, was the President at the British Association's Cardiff meeting in 1920, and an expert on fisheries and marine biology. After graduating at Edinburgh in 1879 he was appointed assistant to Sir Wyville Thomson in the "Challenger" Expedition office. There followed a long connection with the British Association, of which he became successively President of the Zoological Section and General Secretary. He was President of the Linnean Society in 1904. During the war Sir William did much to conserve our fish supplies, and to emphasise their food value to the nation, he being one of the founders of the

hatchery at Piel, Barrow, and of the experimental station at Port Erin. For many years Professor of Natural History at Liverpool, Sir William became in 1919 the first Professor of Oceanography, the Chair of which—the first in the United Kingdom—he had himself founded. His scientific attainments were recognised by the receipt of honorary degrees of Edinburgh, Durham, Harvard, Sydney and Western Australia. He had written many technical books on biological and zoological subjects, which included the Report to the Government on the Ceylon Pearl-Oyster Fisheries, published by the Royal Society in five volumes. He was also much interested in early archaeology, and was an ardent yachtsman. He also gave £10,000 to provide a Chair of Geology in memory of his son, killed in the war. He was knighted in 1922. He married twice, his second wife dying in 1922, on which occasion Sir William gave £20,000 to Liverpool University to provide a memorial building for the Department of Geology.



DAVID WOOLACOTT, D.Sc.

EARLY in August, Dr. David Woolacott died after a short illness at Oxford, where he was on holiday. He was a native of Sunderland, was educated at Durham University, where he obtained his B.Sc. degree in 1895, he was on the Board of the Faculty of Science and examiner and lecturer in geology at the Armstrong College, Newcastle. He held the degree of Doctor of Science, and was a Fellow of the Geological Society.

Dr. Woolacott was a recognised authority on the geology of the North-east Coast, and he frequently lectured on geological subjects to scientific and literary societies in the North-east district. He was the author of several books on the subject, among them being 'The Geology of North-east Durham,' several papers on the geology of Northumberland and Durham, 'Thrust and Crush—Brecciation in Magnesian Limestone,' and others. He was connected with the governing body of the Sunderland Museum, and was an ex-president of the Sunderland Naturalists' Society. Dr. Woolacott was a bachelor, 52 years of age.

G. A. BOOTH, F.Z.S., F.E.S., M.B.O.U.

It is with extreme regret we have to announce the death, on August 11th, after a long illness, of Mr. G. A. Booth. His death has deprived Lancashire and Yorkshire naturalists of

one of their most esteemed members. Mr. Booth was a keen entomologist and ornithologist, but it was as a nature photographer that he was best known. In this direction his skill, combined with sympathy and love of his subject, enabled him to excel, and there was no better exponent in depicting wild life. A naturalist of the best type, and although not a collector in the generally accepted term, he had, at his home, The Hermitage, Kirkham, an interesting museum, with a



valuable collection of butterflies, moths, and varieties of birds; his collection of old china, too, is large and unique.

As a lecturer upon natural history subjects, profusely illustrated by his own photographs, he had a national reputation, and his services were willingly given to any naturalist or photographic societies. The demand upon his time in this direction was very great. Even during his illness he endeavoured to carry on, giving several lectures when he was not really fit, having to be seated to deliver them. As President of the Zoological Photographic Club he was always ready to lend a helping hand to the novice, and his expert advice was willingly given to anyone desiring it. As a judge at Photographic Exhibitions he was also in great demand, and during

his illness, when confined to bed, his enthusiasm enabled him to fulfil one or two engagements of this kind, the prints being sent to his house for the purpose.

The tragedy of his illness was that, although his friends recognised that his case was hopeless, he, even when his strength was failing fast, never gave up hope, and quite believed he would get better; to the writer, only a month ago, he discussed his plans for next season, by which time he looked forward to being in the field again.

To his friends, of which he had many, his end is a sad blow, and his kindly and genial presence will be greatly missed, and to no one more than the writer, who for a long time has had the privilege of his friendship.—R.F.

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Cumberland Mosses.—Last March, while returning from Ireby to Mealsgate Station, I made a few gatherings of mosses, which included *Dicranoweisia cirrata* Lindb., on walls, Bolton Gate; *Grimmia pulvinata* Sm., walls, common; *Tortula lævipila* Schwæg., on Hawthorn trees, Bolton Gate; *Encalypta streptocarpa* Hedw., common; *Bryum capillare* Linn., Mealsgate.; *Neckera complanata* Hübn., plentiful on Hawthorn trees near Bolton Gate; *Orthotrichum affine* Schrad., on trunk of Willow tree near Ireby. Some leaves of this bore a few small green gemmæ less in size and not so prominent as in *O. Lyellii* H. and T. A small quantity of the hepatic *Metzgeria furcata* Linn., was associated with this. Another hepatic, *Frullania dilatata* Linn. almost covered the trunk of a tree near Bolton Gate. The only previous records I can find for this locality were made by W. Borrer in 1845 (*The Naturalist*, 1897, p. 5), who recorded *Barbula cylindrica* there.—JAS. MURRAY, Kelsick, Wigton.

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As *Quarterly Notes*, No. XLVIII., Mr. Arthur Deane, of the *Belfast Museum*, has issued an interesting pamphlet showing the evolution of the bicycle.

Part IV. of Hutchinson's 'Trees and Flowers of the Countryside' includes illustrations of the Blackthorn, Bladder Campion, Brittle Bladder Fern, Bladderwort, Blinks, Bluebell, Bluebottle, Bog-bean, Bog Myrtle, Bog Orchis, Bog Rush, Box, Bracken and Bramble.

In a pamphlet, 'Fifty Years of Pioneer Work at Woolwich' (32 pp., 1/-), Mr. C. H. Grinling gives an account of his work at the settlement there. He says: 'I am sometimes asked how I came to Woolwich? What our work is? How we do it? What it means to us? I was born a Londoner. At five years old I was taken into Staffordshire. Till eleven I grew in a country garden. My only schooling was with an aunt for one or two hours a day. At eleven I followed three brothers to a school near Derby. At fourteen I won a scholarship at the Forest School, Walthamstow. That led to a scholarship for five years at Oxford. During the last year I had to face the great choice—what was I to do? Should I follow the usual life to which Oxford leads? . . . All proceeds of the sale of the pamphlet will go directly to the support of our Settlement work.'

EAST YORKSHIRE TOPOGRAPHY.

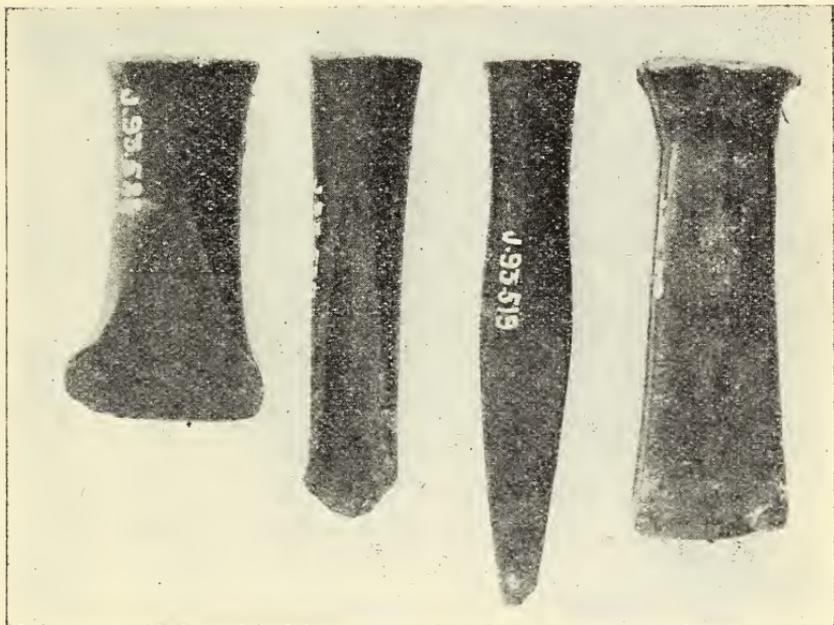
East Yorkshire seems to have received particular attention recently in the way of books, and before us are a few which have just been published. **The Curiosities of East Yorkshire**, by **Canon A. N. Cooper** (Hull : A. Brown & Sons, Ltd., 114 pp., 3/6), is written by our friend, 'the Walking Parson,' who for some years has been entertaining readers of the local papers by articles dealing with the curiosities of the district. Many of these are now reprinted, and with the help of the illustrations which are given, will doubtless appeal to many. There are thirty-six chapters in all, and in these the author has gathered together such information as is likely to be of interest to his readers, though, as with most books dealing with the topography of the county, too much reliance must not be placed on some of the statements ! For example, the cross said once to have been at Ravenspurne is surely later in date than the disappearance of that place from the mouth of the Humber. An idea of the variety of the subjects treated may be gathered from the following titles of the first eight chapters : The Stone Circle at Cloughton ; The Abbey House, Whitby ; The Beggar's Bridge at Glaisdale ; The Fox Hounds Inn, Carlton ; Staithes ; Newburgh Priory ; Epitaph at Easingwold ; Welburn Hall. Immediately beneath the title on the cover, 'The Curiosities of East Yorkshire,' appears the portrait of Canon Cooper, ready for a walk, but we assume the juxta-position is merely accidental.

Yorkshire tourists and others have long been indebted to the three charming handbooks to the ridings by **Mr. J. E. Morris**. This author has now completed his historic survey of the county by issuing a special **Handbook to York** (London : Methuen & Co., 182 pp., 6/- net), which is as informing and as reliable as his previous volumes, which is the greatest praise we can give it. There are many excellent illustrations from photographs, etc.

The East Riding of Yorkshire, by **Bernard Hobson**. London : Cambridge University Press, 174 pp., 4/6 net. This is one of the last of the series of county geographies issued by the Cambridge University Press. Fourteen or fifteen years ago the present writer was asked to write the volume, and, indeed, did so, but differences arose between the Editor and the author, with the result that most of the book was published in 'The Lost Towns of the Yorkshire Coast, and other chapters bearing upon the Geography of the District,' which was printed so long ago as 1912. A dozen years have elapsed, and Mr. Bernard Hobson has managed to produce the book, covering the same ground, in which much of the information already prepared is repeated, and illustrations which appeared in 'Geological Rambles in East Yorkshire' and other well-known local works here occur, but whether accidentally or designedly, no mention whatever is made of the various volumes by the present writer which the author certainly has consulted in the preparation of his book, though in his preface, and also on page xi., particular care seems to have been taken to give credit to everyone else who has been useful to him. We are told that the illustration on page 130 was lent by a certain publishing firm. There is no illustration on page 130, but assuming that the one on page 129 is meant, it happens to be the private property of the present writer, though this is not mentioned. The only adverse criticisms (which appeared in *Nature*) we remember to have seen relating to 'Hull and the East Riding of Yorkshire, a Handbook prepared for the British Association,' were from Mr. Barnard Hobson. Among his suggestions were that such Handbooks 'Should have a complete index for facilitating rapid consultation,' also 'Practical details such as railway stations, hotels, cab fares, post office, etc., should be given.' The handbook Mr. Hobson criticised had to be prepared under great stress on short notice, while the compiler was busy organising the British Association meeting. Mr. Hobson has had no such disadvantages,

and apparently has had unlimited time, but his handbook contains no index, nor does it give the practical details which he considers such a handbook should contain. In these circumstances we can only assume that Mr. Hobson himself considers his book unsatisfactory.

The Early History of the North Riding, by **William Edwards**. London: Messrs. A. Brown & Sons, Ltd., xvi.+267 pp., 10/6. Mr. Edwards has very carefully searched through the literature dealing with the past history of the North Riding, a particularly rich area, and has produced a magnificent volume in which he reviews the important changes in the district from Prehistoric Times to comparatively modern ones. With the British barrows, cup-and-ring markings, stone and Bronze Implements; Camps and other objects of Roman date; Saxon

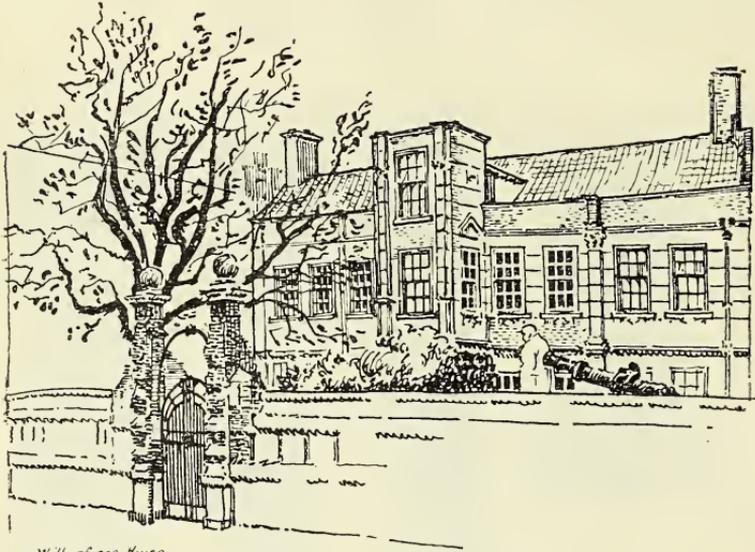


Bronze Socketed Chisels and Gouges from Roseberry Topping.

sculpturings; and the fine buildings at Whitby, Middleton, Middleham, Pickering, Bolton, Byland, Jervaulx, Eggleston, Coverham, Mount Grace, Rievaulx and a host of other places within the riding, there is no shortage of material for a scholar such as is Mr. Edwards. There are several illustrations from photographs and sketches, and the author appears to have given a conscientious and reasonable summary of the history of the district, in addition to which he has written it in a way which can be followed by anyone, and keeps up an interest in his narrative from cover to cover. Speaking with some knowledge of the cost of printing we cannot understand how it is that this fine quarto volume, with its illustrations, good paper, and substantial binding, can be produced at the low price of 10/6. That however, is a matter for the author and publishers, or both. We are permitted to reproduce one of the illustrations herewith.

Hull: Britain's Third Port, by **T. Sheppard**. (The Museum, Hull, 56 pp. with coloured plates, 1/-, plus postage). This was specially

prepared in connexion with Hull's Civic Fortnight at Wembley, by the Secretary of the Hull Exhibition Committee. Its illuminated cover illustrates the evolution of shipping from early Viking times, when the first settlers came over to Hull from the continent, through the old whaling days, which are represented by 'The Swan,' whaler, of Hull, to a modern liner. Inside are excellent coloured plates of the Hull docks, etc., after paintings by Mason and others, and there are illustrations in the text, one of which we are permitted to reproduce herewith. The handbook was written for the representatives from the Dominions. It



Wilberforce House.

The Wilberforce Museum, Hull.

draws attention to the facilities for trade at the port, and briefly describes the ancient history of the city of Kingston-upon-Hull.

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Some of the most extraordinary forms of foraminifera that we have seen for a long time are figured to accompany a paper on 'The Foraminifera of Lord Howe Island, South Pacific,' by E. Heron-Allen and A. Earland (*Linn. Soc. Journ. Zoology*, Vol. XXXV., pp. 599-647). Several new genera and new species are described.

Notwithstanding the difficulties of publication and the expense now attached to plates, it is pleasing to find that our contributor, Mr. T. Petch, of the Botanical Gardens, Peradeniya, is able to produce such excellent results of his original investigations, a batch of which has recently reached us. These include, reprinted from *The Annals of the Royal Botanic Gardens, Peradeniya*, Notes on *Aristolochia*; A note on *Diplodiella*; *Xylariaceæ zeylanicæ*; reprinted from the *Indian Botanical Society's Journal*, *Monotospora Oryzæ* B. and Br.; *Cæsalpinia bonducella* Fleming, and a new *Sciaphila*; A New *Bulbophyllum*; reprinted from the *Transactions of the British Mycological Society*, Studies in Entomogenous Fungi; III., *Torrubiella*; The Genus *Cladosterigma* Pat; The Genus *Trichosterigma* Petch; Parasites of Scale-insect Fungi; reprinted from the *Annals of Botany*, The Replacement of the Terminal Bud in the coconut palm.

CORRESPONDENCE.

KEY TO THE HARPIDIROID HYPNA.

In the above key, which appeared in *The Naturalist* for January, July and October, 1921, and January and March, 1922, a number of errors occurred, some due to defects in the manuscript, others to slips in proof reading, owing to my inability to attend to the latter myself. Will readers who are interested in the subject kindly make the following corrections in their copies:—Under *Drepanocladus*, paragraph 43, for 'straight,' read 'stem' Under *Limprichtia*, par. 8, for (8) read (9); Under *Sanionia*, par. 3, for (5) read (6); par. 4, for (7) read (5); par. 6, read par. 5; par. 7, read par. 6; for (8) read (7); for (9) read (8); par. 8, read par. 7; par. 9, read par. 8. Under *Warnstorfia*, par. 1, for (29) read (30); par. 4, for (5) read (6); for (20) read (21); par. 5, delete the whole; par. 6, for (19) read (13); par. 39, line 1, after 'percurrent,' insert (40); line 2, for (40) read (43); par. 40, for (43) read (49); par. 46, delete the whole; par. 47, should be 46, and for (48) read (47); and (49) read (48); par. 48 should be 47; par. 49 should be 48; par. 50 should be 49.—J. A. WHELDON.

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The Insect Hunter's Companion, by the Rev. Joseph Greene, M.A. Revised and extended by A. B. Farn, with an Appendix by L. N. Staniland. Adlard & Son, and West Newman, Ltd., 144 pp., price 3/6. Sixth Edition. We welcome another edition of this little book. Mr. Farn has kept it practically as in the original edition—we think a little too much so. For instance, Mr. Greene's recommendations as to breeding-cages now seem very primitive, and Mr. Farn might very well have described the present day cages, which are infinitely in advance of those used in Greene's time. The books, too, recommended by Mr. Greene are now of course much superseded. The memorable paper on 'Pupa Digging,' which Greene afterwards embodied with extensions in his little book, is still entertaining reading, although it never revolutionised the study of the Lepidoptera, as at the time it was expected by many it would. Greene resided in an exceptionally good district for that kind of work, and we have never heard of anyone else who had anything like the success with it which he had. Still, the first hundred pages of the book, practically entirely Greene's, contain an amount of useful information for the beginner, which is truly marvellous. Advice on almost everything we can think of seems to be given in them, and, along with Knaggs' 'Lepidopterist's Guide,' it still remains *the* book for this special purpose. The next twenty pages contain chapters on 'Micro-Lepidoptera,' by A. B. Farn; 'A Chapter about Coleoptera,' by Edward Newman; 'Hymenoptera,' we presume also by Newman, although this is not stated; and 'Breeding of Gall Flies,' by E. A. Fitch. The remainder of the book consists of the Appendix, by L. N. Staniland, and contains among other things, the methods of collecting and preserving the various so-called 'Neglected Orders' of insects. This part will appeal more to the advanced student than to the beginner.—G.T.P.

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Bees, Wasps and Ants are illustrated and described in Part 38 of Hutchinson's *Animals of all Countries*.

We have received a quantity of circulars and other literature demonstrating the activities of the Belfast Naturalists' Field Club, which seems to be in a particularly flourishing condition at the present time.

In the August issue of a contemporary the editor calls it a 'holiday number.' 'Many readers will be at the seaside with their families. Hence the fascinating article on the early life of baby herrings. Others will doubtless come into contact with the irrepressible harvest bug!' 'Greenland's Icy Mountain,' a splendidly cooling topic if August is a real holiday month!' And the inevitable 'but we again ask you to do a little missionary work'!

NORTHERN NEWS.

'Crystals which talk' appeared in a scientific contemporary.

Mr. G. T. Porritt has been elected an honorary member of the Entomological Club.

The Duke of York recently laid the foundation stone of the new Municipal Museum and Art Gallery at Belfast.

The London University has conferred the degree of Ph.D. upon Mr. E. E. Lowe, Leicester's Librarian and Curator.

Mr. E. Neaverson has received the London D.Sc. degree for a thesis on 'The Ammonites of the Upper Kimmeridge Clay.'

The Quarterly Notes of the Belfast Municipal Art Gallery and Museum (Publication No. 82) refer to Memoirs of the MacCormack family.

Mr. F. G. Parsons has an elaborate paper 'On the Brachycephalic Skull' in *The Journal of the Royal Anthropological Institute* recently issued.

A skull and antlers of *Cervus giganteus*, said to be 'with massive brow-lines, measuring six feet from point to point!' has been presented to the Belfast Municipal Museum.

We have been favoured with 'The Forty-sixth Annual Report of the Art Museum of Nottingham' (7 pp.), which contains a record of the valuable additions to that institution.

The Haworth Ramblers had a pleasant ramble to Hubberholme in July, Messrs. E. Whitaker and E. Earnshaw being the leaders, and Mr. J. Bradley prepared the usual informative programme.

Part XLVI. of Buckman's *Type Ammonites* contains illustrations of *Devoceras anguiforme* (*A. tubellus*) from Bay Town; *Tubellites tubellus* (also called *A. tubellus* by Simpson) from the same locality.

Dr. Horace Lamb has been elected President of the British Association for the meeting at Southampton in 1925. For the meeting of the Association in 1926, an invitation has been received from the University and City of Oxford.

The Report of the Curator of the Somerset County Museum, just received, is evidence of Mr. H. St. George Gray's enthusiasm for the Collections under his charge. The list of additions, mostly local material, is a remarkably good one.

In *Wonders of the Woods* (Epworth Press, 96 pp., 1/6), J. H. Crabtree illustrates and describes, in his typical way, many of the insects, flowers, fungi, birds, trees, galls and pond life to be met with in the woods. There are ten chapters and several plates from good photographs.

The North-East Lancashire Naturalists' Union continues to flourish. At a recent meeting at Blackburn, although rain fell persistently all day, *three-fourths of the members attended!* Fancy three thousand members and associates attending a meeting of the Yorkshire Union!

We have received the excellent 'Nineteenth Annual Report of the Manx Museum and Ancient Monuments Trustees,' published by the Museum at Douglas. The list of valuable additions of local interest is most encouraging. The library and collections of Mr. G. W. Wood, dealing principally with the Island, have also been purchased during the year.

Mr. R. W. Goulding, F.S.A., favours us with a copy of his pamphlet on Sir John and Sir Charles Bolle; *The Ballad of the Spanish Lady's Love*; and *Notices of the Plague and Civil War at Louth*. This is an enlarged edition of his paper published in 1912, is for sale by Goulding and Sons, Mercer Row, Louth (1/-), and any profits are to be given to the Louth Hospital.

'The Second Report of the Grantham Public Library and Museum' contains a record of the activities of our Grantham friends, Mr. H. Preston being the Chairman and Mrs. W. G. Summers the Curator. There are illustrations of a fine 'Blue John Vase,' a carved inscription of 'I. Newton' in King's School, Grantham, and a stone containing Saxon Knot-work, found at Allington Church in 1923.

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THE NATURALIST

A MONTHLY ILLUSTRATED JOURNAL
PRINCIPALLY FOR THE NORTH OF ENGLAND.

EDITED BY
T. SHEPPARD, M.Sc., F.G.S., F.R.G.S., F.S.A.Scot.,
The Museums, Hull;
and **T. W. WOODHEAD, Ph.D., M.Sc., F.L.S.,**
Technical College, Huddersfield,

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
G. T. PORRITT, F.L.S., F.E.S.
JOHN W. TAYLOR, M.Sc. **RILEY FORTUNE, F.Z.S.**

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YORKSHIRE NATURALISTS' UNION.

BOTANICAL SECTION ANNUAL MEETING.

Leeds University, Botanical Dept., **October 4th**, 3-30 p.m.

Business : Annual Report and Election of Sectional Officers and Committees.

Dr. Woodhead will read a paper on 'The Peat Problem in the Light of Recent Excavations near Huddersfield.' Dr. Pearsall will exhibit and discuss the effect of various culture solutions on Cotton grass. A discussion will be held on the date of the introduction and the recent dispersal of *Impatiens glandulifera*.

Exhibits and other papers will be welcome.

CHRIS. A. CHEETHAM.

GEOLOGICAL SECTION.

President : Mr. W. S. BISAT, F.G.S.

The Annual Meeting of the Section will be held in the Salt Schools, Saltaire, on Saturday, **October 11th**, at 6 p.m. Members and Associates are invited to bring notes, specimens, etc., and to take part in the discussions.

In the afternoon Mr. W. P. Winter will lead a field excursion to Baildon Moor. Meet at Railway Bridge, Victoria Road, Saltaire, at 2 p.m. Tea at Charlesworth's, Victoria Road, Saltaire, at 5 p.m.

JOHN HOLMES, *Hon. Sec.*,

Crosshills, Keighley.

ANNUAL MEETING OF THE ENTOMOLOGICAL SECTION.

President : G. T. PORRITT, Esq., F.Z.S., F.E.S.

Meetings will be held in the Leeds City Museum, Park Row, on **Saturday, October 18th, 1924**, at 3-15 p.m., to consider and pass the sectional reports and to elect officers for 1925, and at 6 p.m., at which entomological topics will be discussed. Exhibits of all orders of insects are requested. Notes and records made during the season on entomological subjects in the county may be read at the meeting or previously sent to one or other of the secretaries for inclusion in the Annual Report of the Union.

Secretaries :—*Lepidoptera* : B. MORLEY, Skelmanthorpe. *Hymenoptera* : ROSSE BUTTERFIELD, Keighley. *Diptera* : CHRIS. A. CHEETHAM, Old Farnley, Leeds. *Hemiptera* : J. M. BROWN, B.Sc., Sheffield. *Coleoptera* : M. L. THOMPSON, Middlesbrough. *Neuroptera*, *Orthoptera* and *Trichoptera* : G. T. PORRITT, Huddersfield.

B. MORLEY (Sectional Secretary),

Skelmanthorpe.

VERTEBRATE SECTION.

President of the Section : C. F. PROCTER, Hull.

Meetings will be held in the Library of the Leeds Philosophical Society, Park Row, Leeds, at 3-15 p.m. and 6-30 p.m., on **Saturday, October 25th, 1924**.

BUSINESS AT THE AFTERNOON MEETING.—(a) To consider and pass Sectional Reports for 1924 and to elect Officers for 1925 ; (b) The General and Financial Reports of the Yorkshire Wild Birds and Eggs Protection Acts Committee for 1924, and to elect Officers and Committee for 1925 ; (c) The Report of the Yorkshire Mammals, Amphibians, Reptiles and Fishes Committee for 1924, and to elect this Committee for 1925. The following papers will be given :—

'Animal Ecology,' by C. F. Procter.

'Bird Life on two Baltic Islands,' by R. Chislett, M.B.O.U., F.R.P.S. (with illustrations by J. Atkinson and the author).

Members or Associates are invited to attend and bring notes, specimens and lantern slides. Will Officials of Affiliated Societies kindly notify their members?

NOTE.—A Meeting of the Zoological Photo. Club will be held as above at 6-15 p.m.

E. WILFRED TAYLOR, *Hon. Sec.*,

10 Telford Terrace, York.

NOTES AND COMMENTS.

C3 MEN.

Dr. Austin Freeman, who, during part of the war, was charged with the medical examination of the recruits, had ample opportunities for observing the C3 class, and this is how, in the current issue of *Science Progress*, he describes the 'sub-man': 'His mental condition is generally rudimentary. He is quite unable to take in a general idea even of the simplest kind. Since propositions remain in his mind separate and unconnected, he is practically unable to reason, and is insusceptible to demonstration or proof. The sub-man's vocabulary is extremely limited, he is ignorant of the meaning of quite ordinary words. He tends to speak with abnormal rapidity and to articulate imperfectly, and he seems to be unable to control this tendency. He is quite indifferent to noise, but is usually quite devoid of musical faculty. He has a rudimentary conception of cleanliness. He cannot be induced to keep dirty hands away from wounds or sores. He is usually quite helpless and unhandy, and has, as a rule, no skill or knowledge of handicraft or knowledge of any kind. Contrasted with him the negro is rather sprightly and humorous.' Dr. Freeman concludes that the sub-man represents a 'throw-back' to a far more primitive evolutionary level than that represented by the negro. The writer (for the past twenty-two years) of these Notes and Comments was classified as a C3 man during the war.

WEATHER AND GRANITE.

In a paper on 'The Influence of Weather on Granite Kerbs, Setts and Broken Stone Roads' (*Quarry*, July), Mr. B. H. Knight concludes:—(1) The amount of chemical disintegration of a fresh crystalline igneous rock used as a sett, kerb or roadstone, is in fifty years inappreciable. (2) Mechanical disintegration is more important than chemical, but in the period mentioned the effect is small. The long period required to produce appreciable effects is well shown by the Shap Dyke. (3) The lines of inclusions in quartz are especially prone to become cracks under the influence of weathering. (4) The writer is of the opinion that the evidence afforded by the cracking, although significant, is not yet sufficiently conclusive to warrant the assumption that the rock is seriously affected by extremes of temperature in fifty years, though the effects seem quite noticeable under the microscope. This opinion is supported by the unchanged cleavages of the micas and the felspars.'

GILBERT WHITE.

Sir David Prain favours us with a copy of his Presidential address to the Gilbert White Fellowship, which deals with

'The Rev. Gilbert White and Moral History.' Sir David refers to one aspect of Gilbert White's work, usually neglected by later writers, and incidentally gives facts of peculiar interest to some of our readers:—"The use of linen changes, shirts or shifts, in the room of sordid and filthy woollen, long worn next the skin, is," our Founder remarks, "a matter of neatness comparatively modern, but must prove a great means of preventing cutaneous ails. At this very time, woollen instead of linen prevails among the poorer Welch, who are subject to foul eruptions." This reference to Wales takes us back to the first attempt to establish wool-weaving as an industry, as contrasted with a domestic occupation, in these kingdoms. The assertion of Norman dominance in England in 1066 was followed by a wholesale, if accidental, immigration of Flemish artisans, who were taken under the protection of the Conqueror's Consort, and dispersed throughout the country.'

SAXON SPINNERS.

'The Conqueror hoped that his Saxon subjects might avail themselves greatly by spinning wool in the dead months, to be made into cloth by Flemish weavers. But these weavers were disliked by "our Saxon ancestors"; partly because of the privileges accorded them; mainly because they were industrious and thrifty. The third Norman king had, for political reasons, to seek Saxon support; he obtained it on the understanding, among other things, that the strangers addicted to these two non-Saxon vices be sent away. The weavers were settled forcibly in south-west Wales, where they proved, so Giraldus declares, *gens Cambrensis inimicissima*, but at the same time, so Giraldus admits, *gens lanificiis, gens mercimoniis usitatissima*. The most important feature in this statement is its indication that this early immigration from Flanders included only weavers of woollen cloth. Perhaps the preference for woollen wear, which still prevailed in Wales when Mr. White wrote, may be traced to the advent of these Flemish wool-weavers and pack-merchants of the eleventh century.'

EARLY WOOL EXPORTS.

'How comparatively modern the matter of neatness our Founder refers to really was, we learn from the subsequent story of the wool industry. The Norman scheme for making this an industrial as well as a grazing kingdom had to be given up in deference to the judgment of "our Saxon ancestors." They considered that England should still, as in the days of the earlier Hanse, send her wool abroad rather than convert it into cloth at home. The production and export of the commodity was well looked after by our religious houses, whose sites were often chosen with reference to the

pasturing capacity of the adjacent country, and whose respective "clips" were scheduled to an ounce by the Florentine and Flemish authorities who competed for their purchase. The bulk of our wool was finding its way to Flanders when Edward III., in the fourteenth century, revived the policy of the Conqueror and strove to overcome the influence of the Staple by offering "good franchises" to such Flemish woollen weavers as might choose to settle in England. The same policy was pursued as effectively, if less openly, by our first Welsh king. While Richard III. reigned Henry Tudor found it convenient to accept the hospitality of the Duke of Burgundy, under whose domination Flanders had come. Struck by the industry of his host's Flemish subjects, Henry arranged to give some of these better franchises than they enjoyed at home if they would settle as woollen weavers in England when he should "come into his kingdom." As Henry VII., our ruler, was able to pay his protector the compliment of adopting his policy, and make some return for the hospitality he had enjoyed, by establishing at Bradford, in Yorkshire, a community to compete with Bruges.'

NATURAL RESOURCES IN RELATION TO THE ARTS.

Under the above title Mr. C. E. N. Bromehead has a useful paper in *The Geographical Journal* for June. 'Since many of the arts and crafts involve the use of rocks and minerals found in the Earth's crust, it is clear that the distribution of such substances in nature must to some extent influence the development of those arts.'

LOCAL ARCHITECTURE.

'Another good example of a local style is afforded by the ancient halls and cottages of the Halifax neighbourhood, built of the sandstone and grits of the Millstone Grit formation, the flaggy members of which yield roofing stone. The general design and the slight ornament are both eminently suitable to the material; a prominent characteristic—the great width of the mullioned windows—is indirectly dependent on the geology. The sandstone uplands are not of much agricultural value, but afford good pasture for sheep; every householder wove his own wool, and the windows were wide to give ample light for the work.'

ENGLISH SCULPTURE.

'The only English sculpture to attain a European reputation was the alabaster work of the fourteenth and fifteenth centuries. The stone is found in abundance in the Trias of Chelaston in Derbyshire, where it is still worked, and it is probably the finest in the world. The centres where it was wrought were London, Nottingham and York. Magnificent altar pieces and sepulchral figures were sent all over Europe. One

particularly fine example has been brought back to England from Spain. One of the best effigies in alabaster is that of Prince John of Eltham, in Westminster Abbey (d. 1334). A beautiful specimen of modern alabaster carving, in part gilt and coloured, may be seen at the Lady Altar in All Saints Church, Margaret Street.'

WIGAN.

We learn from *The Yorkshire Post* that 'A distinguished medical man, who wishes to remain anonymous for the present, has given to the Wigan Public Libraries Committee, of which the Earl of Crawford is chairman, an endowment fund of £400 Stock, bearing 5 per cent. interest, the annual income of which is to be utilised for the purchase of important medical works for the Reference department in the Central Library.' The report goes on to state that the Wigan Public Library is regarded as one of the finest in the provinces. We knew that this applied to almost every provincial Public Library, but it is the first time we remember it being said about Wigan. However, now that it is to have £20 worth of medical books added to its shelves each year, there is some hope for it!

MUSEUMS AND SALES.

Complaint is made by Mr. H. D. Skinner, of the University of Otago, in *The Museums Journal* for August, that he has purchased from a London dealer, for a large figure, certain Maori relics which were formerly in the York Museum. He concludes therefore that the York Museum has been selling its Ethnographical Collections recently, and asks that in future should similar sales take place, the Museums in the countries interested should be consulted and given the opportunity of purchasing before the objects get into the hands of dealers and others. Mr. Skinner adds, 'We do not wish to eliminate the dealer, but we believe that in such cases as this the museum which is selling off should receive full money value for exhibits, while the museum, which is in the position of having to purchase, should have the satisfaction of knowing that the whole of its money goes towards the advancement of science.' We notice from the *Report of the Yorkshire Philosophical Society* for 1921 that there is an amount from 'Sale of Specimens, £278.' We presume this refers to the Ethnographical Collection.

SPELÆOLOGY.

The Proceedings of the Spelæological Society of the University of Bristol (98 pp., 2/6), contains a well-illustrated record of the great achievements of this Society during the years 1922-23. There is an excellent 'Third Report on Aveling's Hole,' by J. A. Davies, with descriptions of the different specimens therefrom by Sir Arthur Keith, A. S. Kennard, A. C. Hinton

and E. K. Tratman. There is a further 'Report on Towberrow Cavern,' by H. Taylor, and the 'Fourth Report on Read's Cavern,' by F. Langford, together with notes on the specimens therefrom by J. W. Jackson and O. V. Darbishire. In addition there are 'Reports on Investigations at Goatchurch Cavern,' by L. Y. Baker; 'Mendip Barrows,' by R. F. Read; 'Kings Weston Hill,' by W. K. Tratman, and 'Field Work' by D. C. Prowse. Dealing with a little further afield are 'Some Derbyshire Caves,' by L. S. Palmer and E. K. Tratman, and 'Spanish Dolmens,' by M. C. Burkitt. In addition to photographs and sketches of the relics found, there are plans and sections of the excavations. The Society is certainly to be congratulated upon the work it has accomplished.

THE PLYMOUTH AQUARIUM.

With a remarkably effective coloured cover, illustrating sea anemones, etc., the Marine Biological Association for Plymouth has issued a substantial 'Guide to the Plymouth Aquarium,' by E. W. Sexton, illustrated by L. R. Brightwell (165 pp., price 1/-, or post free 1/3). It illustrates and describes some of the principal forms of marine life to be found in this well-known Aquarium, and is one of the most substantial, and at the same time one of the most readable guides we have seen for some time, bearing in mind its low price. The descriptions are given in non-technical language, and there is no doubt that its large sale will popularise this Institution.

A BIBLIOGRAPHY OF BIBLIOGRAPHIES.

Occupying 228 pages of closely-printed matter, in double columns, is the Bulletin of the National Research Council, Washington, No. 36, which contains a Catalogue of Published Bibliographies in Geology, 1896-1920, compiled by Edward B. Mathews. We have carefully examined this, and it is certainly a truly remarkable compilation, and seems to be what it professes to be. As a test the present writer examined the various out-of-the-way lists and bibliographies for which he is responsible, and finds them all included, not omitting such papers as the list of publications of Martin Simpson and others accompanying various obituary notices. Apparently the compiler has not seen *The Naturalist* for 1906, or he would have known the name of the compiler of the list of papers which had been written by the late Dr. Henry Clifton Sorby, which there appeared.

MOTORS AND MARRIAGE.

G. Howell gives 'A Look into the Future: the Automobile Industry,' in *Oil Engineering and Finance* for August. He tells us that in 1909 the U.S.A. had a national income amount-

ing to less than 29,000,000,000 dollars. But in 1923, the national wealth had *risen* to 60,000,000 dollars. *Some rise!* He also states that there are now 80,000,000,000 tyres used per annum. Also 'a car was just as essential to man as a wife; that many a man is "made" by marriage, and not a few are developed by motor-car ownership.' 'The Ford Motor Company sell some of their cars at five dollars down and five dollars a week until the car is paid for. . . . In America car-ownership has proved one of the most valuable assets in the working man's life. . . . The motor car has caught the imagination of the American people. . . . The purring, as they call it, of the motor car, has a fascination for them, for it thrills and exhilarates, bringing to them a sort of sub-conscious reverence for its mechanical merit.' And so on.

WINDY KNOLL.

On an excursion of the Manchester Geological and Mining Society recently to Windy Knoll, Prof. Sir William Boyd Dawkins 'called attention to the elaterite and bitumen, which represent the residue of a former deposit of petroleum, pointing out that the petroleum found at great expense to the Government by American engineers near Chesterfield occurred, as at Windy Knoll, at the junction of the shales and the limestone, and that the expensive borings proved no more in regard to the rocks than could have been seen at the surface.

FOSSIL BLOOD STAINS.

At a recent meeting of the Geologists' Association, Mr. R. T. Gunter read a paper on 'On some Vertebræ of Mesozoic Crocodiles showing colour stains of blood vessels.' 'Five consecutive vertebræ of *Steneosaurus* from the Kimeridge Clay of Shotover Hill, near Oxford, show Y-shaped colour markings which can only be explained on the assumption that they are the stains of intercostal blood vessels. The observation of these colour markings has since led to the discovery of lateral grooves on the sides of other reptilian vertebræ, including *Teleosaurus subulidens* Phillips, from the Great Oolite, and in an exceptional specimen of a vertebra of a recent crocodile. The specimens exhibited are believed to be the first recorded cases of such colour marking.'

RAMBLING.

No. 16 of *The Yorkshire Ramblers' Club Journal* is a substantial production. It is printed on good paper, and has a wealth of illustration, and the publication has been carefully edited by Ernest E. Roberts, although some objects of trivial value are photographed or sketched. The principal articles deal with mountain climbing abroad, but there are notes on

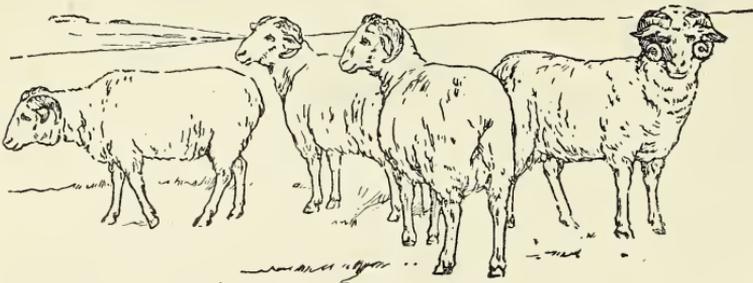
' Fox Holes, Clapdale Rock Shelter,' by H. Brodrick ; ' Diccan Pot, Selside,' by H. V. Brown ; ' Little Hull Hole, Penyghent,' by the Editor ; ' Oxlow Cavern, Castleton,' by A. Humphreys, as well as shorter notes. Mr. Brodrick records the finding of three flakes of ' Bridlington flint.' If he means flint similar to that from which implements found at Bridlington are made, it is derived from the drift, and has a non-Yorkshire origin. If he means, however, that it is from the flint occurring in the chalk at Bridlington, we very much doubt this identification. The descriptions of the explorations, etc., in the pot holes are of more general interest to Ramblers, for whom, after all, they are largely written, than to the student who wishes to get scientific results. There are plenty of references, for instance, to ' horizontal squirms,' ' roar of falling water,' ' awe-inspiring noises,' ' thunder rolling all around,' etc. In one place we learn that ' A quick rush was made down this, a quicker through the waterfall, a hurried inspection of the rift for some 30 or 35 feet to a large chockstone, and then a return to the ledge, from which six whistles were sent up to Roberts, who soon joined us, being played down over the block on a 250 foot line.' In another, ' Never have I known food bolted, ropes and ladders wrapped up so fast ; to change was impossible, and not until I had run half a mile with a heavy ladder bumping on my chest and a heavy rucksack on my back did I begin to feel I should some day be warm again.' ' I, lying almost submerged in the water, with the electric lamp jammed between chest and wall, felt that faint widening that encourages one to persevere.' ' It went and I rose dripping.' ' With groans and curses Stobart's mighty frame passed by the same route,' and so on. There are obituary notices and plates of J. C. Atkinson, and C. R. B. Wingfield.

A BIRMINGHAM SOCIETY.

Not many scientific societies have existed half a century without publishing something, but apparently this is the record of the *Birmingham and Midland Institute Scientific Society*, which, in ' Volume I.' (38 pp.), has issued its ' Record, 1872-1922, and Proceedings, 1922-1923.' Besides a brief account of the Society's origin, and a list of its officers for the fifty years, there is an abstract of Sir Oliver Lodge's ' Priestley Lecture,' in which Sir Oliver states, ' Priestley is best known for his chemical work, and for the numerous gases which he discovered. He also made the minor invention of " soda-water," finding that carbonic acid gas dissolved readily in water under pressure and was liberated when the pressure was removed.' Abstracts of other addresses are given.

A SHEPHERD'S LIFE.*

This well-known work has now reached its sixth edition : we have read it again, and it is as refreshing as ever. In the present edition excellent type and paper are used, and Mr. Bernard C. Gotch supplies a large number of well executed and appropriate sketches, one of which we are kindly enabled to give to our readers. In these 'impressions of the South Wiltshire Downs' the author deals with an extraordinary variety of subjects, including adder-bites, bird-life, bustards, devil's-guts (the convolvulus, not the dodder), destruction of earthworks, gipsies, hares and hedgehogs, Iberian types, lynchetts, poaching, sheep-dogs and sheep-bells, shepherds,



Old Wiltshire Horned Sheep.

Stonehenge, Canon Wilberforce and 'Young Gaarge.' The stonecrop in Wiltshire rejoices in the name of 'Welcome-home-husband-though-never-so-drunk.'

JOURNAL OF ECOLOGY.

The substantial *Journal of Ecology* for July, edited for the British Ecological Society by Professor A. G. Tansley (pp. 145-352, 18/- net), has been issued from the Cambridge University Press. The contributions are particularly varied and well illustrated. Those most likely to appeal to our readers are : 'On the Ecology of British Beechwoods, with special reference to their Regeneration,' by A. S. Watt ; 'The Edaphic Factors accompanying the succession after Burning on Harpenden Common,' by Thomas Eden ; 'Studies on the Ecology of English Heaths,' by V. S. Summerhayes, L. W. Cole and P. H. Williams ; '*Primula elatior* Jacquin : its Distribution in Britain,' by Miller Christy ; and 'Notes on the Ecology of Radipole Lake, Weymouth,' by R. D'O. Good and C. D. Day. Mr. W. S. Cooper also illustrates a simple but effective apparatus for photographic recording of Quadrats.

* By W. H. Hudson. Methuen & Co. 307 pp., 10/6 net.

THE LONDON NATURALIST.

The Journal of the London Natural History Society, for the year 1923 (48 pp., 3/-), is full of useful notes and records. The address of the President, Mr. E. B. Bishop, deals with the preservation of natural sites. He writes, 'Those who have seen the ghastly eye-sores which Manchester has created at Longdendale (Cheshire) and Darlington (or is it Stockton?), at Lunedale (Yorkshire), or who have gazed in pained amazement at the "Jumbo" Water Tower at Colchester, may well wonder what next to expect when the average heavy-footed town council is permitted to work its anything but sweet will upon a hitherto smiling landscape.' There follows reports of the various sections of the Society's work; Mr. M. Greenwood gives details of 'The Medico-entomological Researches of Arthur William Bacot.' There are 'Preliminary Observations on the British Vanessids,' a summary of eight Annual Reports on 'The Birds of Epping Forest,' etc.

ST. JOHN OF BRIDLINGTON.

The Bridlington Augustinian Society has issued No. 2 of its Journal, which is devoted to an account of the life and miracles of St. John of Bridlington (50 pp., 1s. 6d.). This has been prepared by Mr. J. S. Purvis, M.A., and contains a remarkable record of the achievements of the Bridlington Saint, who apparently was 'the last English Religious actually canonised by the Pope previous to the Reformation.' The Text of the 'Bull of Canonisation of John of Thwing' (1379), with a translation, is here given, apparently for the first time. Illustrations of the Saint occur, taken from stained glass windows. The miracles of 'the Last English Saint' are set out in detail. One of these miracles we are tempted to quote, though in these more matter-of-fact days there are those who would say that John was having a little wine and not water.

WATER AND WINE.

'A certain nobleman in that province, hearing frequently of the fame of the Blessed Prior, arranged one day to go to the monastery, that he might know more surely by some trial if what he had received by hearsay from others were true or not. He coming there was received by the Prior and his brethren, and for such a man certain of the finer foods were prepared. The server, who knew the Prior's abstinence, put on the little silver cup with a cover, filled with water. As they ate and talked, the nobleman wished in some decent way to know what drink was in the cup from which the Prior drank. It is the custom in that province for men, as well religious as worldly, to drink from silver cups, and Prelates, like other nobles, have always by them on the board covered cups, and the server always sets the cover on the cup before he sets it

down. Observing a fit time, he said to the Prior, "Lord Prior, I should like to taste a little out of your cup, if you please." Then he began fairly and in kindly words to oppose and as it were forbid this, because the noble had another cup with wine placed before him, and the noble, smiling, stretched out his hand and wished to seize the Prior's cup. Now the Prior John, fearing and grieving within himself because he did not wish the secret of his abstinence to be revealed, held back the cup in the other hand, lest he might in any way taste of it. And when the noble insisted that he should grant his wish that time, the Prior said "Withhold a little, until I ask a blessing," and raising the eyes of his heart and pouring in silence a short prayer to God, that the water might take the savour of wine, he blessed the cup and gave to the noble to drink; and he, tasting a little from it, said that for a long time he had not tasted better wine; but afterwards, through others, the truth of the secret was made known to him, that truly pure water had been placed in that silver cup. NOTE.—The biographer considers this miracle to prove the Saint's faith in God.'

FOOD OF THE BLACKBIRD.

In *The Journal of the Ministry of Agriculture* for May, Dr. W. E. Collinge, of the York Museum, discusses 'The food and feeding habits of the Blackbird,' and as a result of the examination of the stomach contents (by the volumetric method) of 285 specimens, he utterly condemns the bird, and somewhat rashly, we think, states 'that at the present time we have too large a resident population of blackbirds,' and that 'the blackbird will continue to be one of the most destructive birds with which the fruit grower has to contend.' The statement is made that these birds have increased enormously of late years, and that practically every writer except Yarrell condemns them, but we are told to bear in mind that in his day the blackbird was by no means so plentiful as at the present time. From these and other remarks it is evident that a good deal of information has been obtained from greatly prejudiced sources; we are perfectly sure that the complaint of this enormous increase is not justified; indeed, we will go further and assert that in many districts with which we are acquainted, instead of there being an increase, the reverse is the case, and that a considerable decrease in numbers has taken place during the last twenty years; we further doubt if there has been any appreciable increase since Yarrell's time.

NOT AS BLACK AS PAINTED.

Coming into regular and close contact with these birds when feeding their young, at a distance of only a few feet, in

a hide, it is very evident that a good work is being done by them, from the numbers of insects brought to the nest for food. Dr. Collinge admits that among the contents of the stomachs examined, is an average of 22 per cent. of injurious insects, which includes wire worms, leather jackets, etc.. When, however, we recognise the speed with which these injurious insects increase, the value of the effort in destroying this 22 per cent. is much greater than it appears from these figures ; in any case, however, the results of the examination of 285 specimens out of a vast, and, according to the report, increasing number, can hardly be taken as convincing. The character of the blackbird is not as black as it is painted in this report, and the evidence as to the numbers and damage from prejudiced and somewhat casual observers is not of great value. That he does some damage is beyond doubt, but not sufficient to merit this universal condemnation. It is the juices of the fruits which attract in summer weather, when the birds are likely to suffer from thirst, and if fruit growers would see that the birds have access to a supply of fresh water in their gardens during the hot months (this does not apply to seasons like the present !) they would find the fruit would not receive much damage.—R.F.

BRITISH MUSEUM (NATURAL HISTORY) PUBLICATIONS.

We have received two packets of post-cards of British Birds, each contains five pictures in colour, one representing five winter visitors, and the other five summer visitors. They are sold at 1/- the set, and are certainly not dear at the price. The colours are well reproduced, and a little booklet is included with a short and valuable description of each species. There are, however, some very obvious and unfortunate defects. No scale is given, and the Snow Bunting, from the pictures, is evidently a bigger bird than the Redwing and about the same size as a Fieldfare. While the general colouring is good, the drawing is not always equally good. The Hooded Crow and especially the beak is an example of this. On the whole, however, they are a valuable contribution, and should assist the budding ornithologist very considerably in identifying the birds he sees ; but it will certainly be an advantage in future issues to give an idea of the size of the birds.—R.F.

THE ADVANCEMENT OF SCIENCE.

ON the first day of the Meeting of the British Association in Toronto, the London Office of the Association issued the familiar publication (at 6/-) with the above title, containing the Presidential Address of Major General Sir David Bruce, on 'The Prevention of Disease,' as well as addresses of the Presidents of the various sections. These include 'The

Analysis of Crystal Structure by X-rays,' by Professor Sir William H. Bragg ;* 'Chemistry and the State,' by Sir Robert Robertson ; 'Geology in the Service of Man,' by Professor William W. Watts ; 'Construction and Control in Animal Life,' by Professor F. W. Gamble ; 'Inter-racial Problems and White Colonization in the Tropics,' by Professor J. W. Gregory ; 'A Retrospect of Free Trade Doctrine,' by Sir William Ashley ; 'A Hundred Years of Electrical Engineering,' by Professor G. W. O. Howe ; 'Health and Physique through the Centuries,' by Dr. F. C. Shrubshall ; 'Progress and Prospects in Chemotherapy,' by Dr. H. H. Dale ; 'Purposive Striving,' by Professor W. McDougall ; 'Physiological Aspects of Parasitism,' by Professor V. H. Blackman ; 'Academic Freedom in Universities,' by Principal E. Barker ; and 'Present-day Problems in Crop Production,' by Sir John Russell. This year, possibly designedly, the addresses are all more than usually important, and are particularly readable. The *Journal* of the Toronto Meeting is also a remarkably useful document, and contains 108 closely printed pages with summaries of the principal addresses.

THE SPITTAL AT FILEY BRIG.

After several threats, we learn from *The Yorkshire Post* that at last 'Professor Gilligan spent a recent week-end in Filey, and together with Canon A. N. Cooper made a thorough investigation of the Spittal, † the projecting spur on the Brig which local tradition regards as the relic of a 'Roman harbour.' A paragraph communicated by a Scarborough correspondent appeared in *The Yorkshire Post* of the previous day, recording the researches ; but the inferences to be drawn from the observation made were misunderstood in stating that they supported the idea that the Spittal was 'part of the pier which the Romans had made.' The truth was the direct opposite, and *it is now clear* that the Roman tradition in association with the Spittal will not hold water.'

NOT ROMAN.

This is the view put forward in an article prepared after a careful review of all the evidence, which appeared in *The Naturalist* for August, 1922. It is satisfactory to get Prof. Gilligan's confirmation of these views. 'During the past summer a considerable length of the Spittal below the lowest tides was cleared of seaweed by a diver, and Professor Gilligan said he and his friends were able to examine this area at low spring tide, though the water was lower than had been expected.'

* This is given as 'Sir W. ' ; there are also 'Sir R.,' 'Sir J.,' etc. Surely this unnecessary abbreviation is not permissible?

† Spelt 'Spittle' throughout, in error.

He found the Spittal to consist mainly of such an accumulation of stones as would result from the washing of boulder-clay. Beneath a covering of fragments of the local rocks were Scandinavian gneisses and granites, together with large quantities of whinstone quartzites (*sic*), and carboniferous limestone, none of them of large size, the largest being about 18 inches in its longest axis. Another day was devoted to sounding in the bay to ascertain the exact extent of the Spittal below water. It was ascertained that the width of the accumulation at the end where the Spittal joins the Brig is 60 yards, and that it extends over four hundred yards from that point southward, ending in a spread of gravels shaped like a fish tail—a shark's tail, in fact, for the two parts are unequal in size. The enormous mass of accumulation of itself, Dr. Gilligan added, quite put an end to the idea that the Spittal was of human construction. The inward face of one of these curved portions of the tail showed a very steep slope on the landward side, but an investigation of the currents showed that the tide sets into Filey Bay from the south—the great promontory of the Brig determining this direction—and there is consequently a great scour on the landward side of the Spittal, accounting for the steepness of the accumulation on its inner curve. The 'Fess Rock' and the so-called Quay rocks were equally natural features, giving not the slightest sanction to the idea of human workmanship.'

A SIXTY-FEET GASTROPOD.

A recent writer in *Nature* states, 'Wit is appropriate "in the pages of *Punch*"—but in the pages of *Nature* we should try to keep to strict truth.' Notwithstanding, we cannot refrain from quoting the following extracts from an innocent-looking article in that journal recently, headed, 'Chalky Boulder Marl at Hastings':—'Excavations in the Wadhurst clay have brought to light a remarkable richness of both vegetable and animal life, particularly among the mollusca, in which Nature has shown herself most energetic, not only in the cases of well-known genera and species of ordinary character—necessitating a revision of the Wealden mollusca—but in others she has shown great prodigality, some of the gastropods—dextral and sinistral—*attaining a length, or height, of sixty feet and upwards*. These sections have also given the life-history of important rocks and rock-structures, and furnished serial examples of the metamorphoses by which the dense hard "blue-stone" is gradually altered into a soft, brilliantly coloured agate-like sandrock.'

PLIOCENE.

'Beds of this age have been cut through, showing deposits of beautiful red-yellow loam, fifty feet thick, now lying at

various altitudes, from a little above O.D. up to more than five hundred feet. These overlie a series correlative with those of Piltdown. The underlying flint gravel is very much panned and of an orange-red colour, so familiar in East Anglia. The basement original sand is now indurated into a sandstone requiring heavy steel tools to work it, in which were found worked flints. This, I think, is the first time worked flints have been found in a dense tertiary sandstone; naturally, the flints have undergone a great deal of alteration since they were chipped.'

PLEISTOCENE.

'The latest revelation has been made in the forming of battered-down lawn-tennis courts, upon the adjoining hillsides, and overlying the loam. The most southern court is cut out of chalky boulder marl, very white in colour. The associated boulders were often between two and three feet long, and consist of various gneisses, schists, granites, and numerous volcanic and metamorphic rocks; and sedimentary rocks foreign to the locality; and palæozoic and mesozoic fossils and rocks. The upper part of this big boulder drift was associated with *immense worked flints*, especially Wealden "flints," bulbed facets *sometimes reaching one hundred square inches.*' [This beats Ipswich!] 'In the overlying material came the orange-red-brown implements which I regard as of Aurignacian age. The latter occur by thousands on certain hill-tops and valley shoulders in a quartzite drift full of glacially striated and faceted foreign rocks, originating in the destruction of just such glacial drift as is now revealed. Above these came quantities of the productions of the Hastings Kitchen Midden men. It now appears certain—if there be such a thing as a certainty—that glacial conditions reached even beyond our present shore line, and probably extended over the Great South river, as is shown by similar deposits near the French coast.' We much fear, however, that it is very difficult to be certain of *anything* in this world!

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In the first number of *The Journal of Conchology*, issued precisely fifty years ago, there was an introduction by our colleague, Mr. J. W. Taylor, and the first article in the journal, just received, is by the same author. This must be a rare record. May Mr. Taylor delight us with his well-illustrated notes for many years to come.

The Transactions of the Institution of Mining Engineers (Vol. LXVII., part 2) contains a number of papers of interest to northern geologists: 'Pyrites as a cause of Spontaneous Combustion in Coal Mines,' by J. I. Graham; 'A Fire in the Bickershaw Seven Feet Mine at Leigh, Lancs.', by M. Ashurst and F. N. Siddall; 'The Calorific Values of the Coals of Derbyshire and Nottinghamshire,' by J. W. Whitaker, and 'History of Early Coal—and Ironstone—Mining in Nottinghamshire,' by G. C. Bond.

**METHOCA ICHNEUMONIDES LAT., AND OTHER
HYMENOPTERA ON ALLERTHORPE COMMON,
EAST YORKS.**

WM. J. FORDHAM, M.R.C.S., L.R.C.P., D.P.N., F.E.S.

ON August 12th, 1923, I took a male of **Methoca ichneumonoides* Lat. among mixed roadside herbage with a large proportion of the umbelliferous plant *Torilis*, on the road crossing Allerthorpe Common to Sutton-on-Derwent. Numerous aculeates and ichneumon flies were taken in the same spot, and the *Methoca* was put away with these for future examination, and only discovered among them in July this year—in time for me to make a fruitless search for more during the August Bank Holiday week-end—and also to examine the burrows of the Tiger Beetle for the apterous female. The insect is of considerable rarity, and the male has only been taken very infrequently on flowers. As far as I can ascertain it has only hitherto occurred in the counties bordering the coast from Essex to Cornwall, inland in Berkshire, and on the Gower Sandhills, Glamorgan, Wales.

For a long time its life history was unknown, but Messrs. H. G. and R. J. Champion have described this fully in *The Entomologist's Monthly Magazine* (1914, p. 266; 1915, p. 40; and 1916, p. 90). The apterous female frequents sandy places, and preys on the larva of the Tiger Beetle, first paralysing it, and then laying an egg and closing the burrow. *Methoca* has been recorded from three species of *Cicindela*—*campestris*, *sylvatica* and *maritima*, and it is the former species upon which it evidently preys on Allerthorpe Common. There is no doubt that the insect should occur in the intervening counties between the south coast and Yorkshire, in suitable localities where the Tiger Beetle occurs.

Other insects taken at the same time and place include the following:—* (1) *Salix exaltatus* F. (not uncommon, and able to sting rather severely if care be not taken), **Ceropales maculatus* F. (several), †*Mimesa equestris* F. (this species is fairly well distributed over the common), **Crabro leucostomus* L., †*C. cetratus* Shuck. (a rare species with few records), **C. chrysostomus* Lep., **C. cribrarius* L. (abundant), and the sawfly, **Allantus vespa* Retz. (two males. I suspect that holes eaten out of the centre of alder leaves in the neighbourhood were made by the larva of this species, but I have so far failed to find the larva).

Numerous other interesting *Hymenoptera* occur in various parts of the common, and are enumerated below:—

FOSSORES.

- **Myrmosa melanocephala* F. Several ♀♀ of this species in a sandpit, 14/8/22.
- * (1) *Pompilus viaticus* L. This handsome fossor, which provisions its nest with spiders, has occurred a few times in May and June.
- **P. pectinipes* V.d.L. Two ♀♀, June, 1921. A local species with three or four other Yorkshire Stations.
- **Salius parvulus* Dhlb. Two ♀♀, with the last. A common insect in the West Riding.
- **Tachytes pectinipes* L. Burrowing in a sand pit, August, 1924.
- Ammophila sabulosa* L. Odd specimens have occurred of this large and handsome insect for several years, but in Aug., 1924, it occurred in fair numbers, and appeared to be well distributed all over the common. It seems particularly fond of the flower heads of *Epilobium angustifolium*, the Rose Bay Willow Herb, which plant has spread considerably since the fire on the common a few years ago. On hot sunny days the insect sits on the outside of the flower heads, and is very quickly alarmed, but on dull days it is more torpid and, resting well among the flowers, is difficult to see at first, being almost a case of protective resemblance, the stalked abdomen closely resembling an unopened bud. Its burrows occur in sandy places, but I have not yet been successful in observing it provision the nest with caterpillars.
- **Pemphredon lethifer* Shuck. { Three common small black species not
**Diodontus minutus* F. { previously recorded from East York-
**D. tristis* V.d.L. { shire.
- They breed in bramble stems, provisioning the nest with Aphides, and the perfect insects are not uncommon at Allerthorpe on bramble leaves, etc.
- †*Gorytes tumidus* Pz. A ♀ among herbage, August, 1924. This is a somewhat scarce species, as far as I can discover not previously taken further north than Birmingham and Wallasey.
- * (1) *G. mystaceus* L. Common in many places, but only once taken at Allerthorpe (♀, June, 1922).
- * (1) *Mellinus arvensis* L. Several ♂♂ and ♀♀, August, 1922, and Sept., 1920. This generally distributed species preys on flies.
- * (1) *Oxybelus uniglumis* L. Not uncommon in sandy places, varying in size and colour. This species captures flies on the wing.
- **Crabro clavipes* L. Once, June, 1921.
- †*C. nigritus* Lep. (*pubescens* Shuck). An uncommon species, with few recorded localities. Two males, June, 1922, and August, 1924.
- **C. palmipes* L. This local species is not uncommon, both sexes occurring from June to August. The insect seems to be common in the West Riding, but is a southern species not yet recorded from Scotland or Ireland.
- **C. elongatulus* V.d.L. A generally distributed species, which is widely distributed in the lower Derwent Valley. Several other common fossors, e.g., *Trypoxylon figulus* L., *Pemphredon lugubris* Latr., etc., occur at Allerthorpe.

OTHER FAMILIES OF ACULEATES.

The interesting ant, *Leptothorax acervorum* F., which occurs on Skipwith Common under bark of birch stumps, has been taken at Allerthorpe, in December, 1922, in a pine stump. Numerous bees occur on the common, the most noteworthy being the following:—

Colletes glutinaus Cuv. (*succinctus* L.) and *C. daviesanus* Sm., the latter, however, not in the abundance with which it occurs in one sandpit on Skipwith Common. The parasite bee, *Epeolus*

productus Th., which occurs with *C. daviesanus*, has been taken once, a male occurring on ragwort in August, 1923.

†*Hyloeus (Prosopis) brevicornis* Nyl. Saunder's says that this species is generally distributed in the south, but not recorded from the north. One ♀, August, 1922.

**Sphecodes divisus* K. (*similis* Wesm.). Three specimens in all, September, 1920, and June, 1922. Its host, *Halictus leucozonius*, has not yet been found, but doubtless occurs on the common,

* (1) *Sphecodes affinis* U. Nag. One ♂, August, 1923. A common and generally distributed species.

* (1) *Halictus freygessneri* Alf. Both sexes of this species, which is common on the West Yorkshire heaths and moors.

* (1) *Andrena clarkella* Kirb. Several females were dug out of their burrows (25th March, 1921) in fine condition. They were just under the heap of earth at the mouth of the burrow, and occasionally the head was peeping out. One male was taken in flight. This early spring species is widely distributed, but not as a rule very abundant. It is well distributed in Yorkshire. A careful search in 1921 and the succeeding years for its special parasite, **Nomada borealis* Zett., was unsuccessful, until April 20th, 1924, when several were seen hovering about the burrows, and one was captured.

* (1) *Andrene coitana* Kirb. A northern species has occurred once. Its parasite, *Nomada obtusifrons*, has so far eluded capture.

**Nomada solidaginis* Pz. One on ragwort, a flower to which it appears very partial, August, 1924. So far its host, *Andrena fuscipes*, has not turned up.

**Coelioxys elongata* Lep. The capture of two females of this species, in August, 1922 (one also occurred in August, 1923) led to a search for its host, **Megachile circumcincta* Lep., which was taken (one specimen only) on a thistle head, on June 24th, 1923. The burrows of the latter bee have so far remained undiscovered, but rose leaves have been seen with the characteristic pieces cut out. The *Coelioxys* is widely distributed and common in many places, but has not been recorded from Scotland or Ireland. Mr. A. E. Bradley has taken it near Leeds, always with *Megachile circumcincta*, though it has been recorded as occurring with several other species of *Megachile*, and also with *Osmia rufa*.

The only *Bombus* worthy of note is **distinguendus* Moraw, a northern species which is apparently widely distributed in the West Riding. This insect occurred not uncommonly on *Epilobium angustifolium*, on the common, on August 2nd, 1924.

Several *Chupids* or Ruby-tailed Wasps occur on the Common
* (1) *Notozus pangeri* F. was in large numbers in flight, and settled on bracken, on June 18th to 20th, 1921, near a sandy patch where one of its hosts, *Mimesa equestris*, occurs. Another species, †*Hedychridium ardens* Cog. (*minutum* Lep.), is suspected of parasitism upon *Mimesa* species, and has been taken twice on the common, August, 1923 and 1924.

The brilliant blue **Chupis cyanea* L. has occurred once, as has also **C. viridula* L., while the common *C. ignita* L. has occurred occasionally.

Sawflies are abundant on the common, the most interesting species being :—

†*Pamphilius pallipes* Zett. A rare species, with few records.

Pamphilius vaffer L. A ♀ on birch; previously taken on Skipwith Common.

**Cephus pallipes* Klug. Previously taken by Dr. Corbett in Wheatley Wood.

†*Arge enodis* L. One ♀ in June, 1923, of this uncommon species.

The rare Ichneumon, †*Scolobates auriculatus* F., which has been bred

from *Arge enodis* (Morley, *Brit. Ichn.*, IV., 273), was taken on the common by sweeping herbage, in August, 1923.

**Pristiphora pallidiventrifera* Fall. Has occurred once.

**Ardis sulcata* Cam. A ♀ in June, 1922. This species is of especial interest as being first described by Cameron on specimens taken among roses at Holgate, York, by Mr. T. Wilson.

**Tomostethus luteiventris* Kl. One, June, 1921. (Occurs also in Wheatley Wood, near Doncaster.)

†*Emphytus truncatus*. A male, June, 1922.

**Dolerus nitens* Zadd. A rare species, previously taken at Coxwold.

Pachyprotasis variegata Kl. A male of this rare species was taken in June, 1921. The species was once taken (♀) at Bubwith.

**Tenthredella colon* Kl. On two occasions—a rare insect in Britain. (Another of H. H. Corbett's Wheatley Wood captures.)

†*T. ferruginea* Schr. By no means a common species.

The signs * and † indicate respectively new County and new Vice-county records. A few of these have, however, been mentioned in an article by the present writer on the *Hymenoptera* of the East Riding, in the British Association Handbook for the Hull meeting, and are indicated by the number (1). I am indebted to the Rev. F. D. Morice and Mr. H. E. Bradley for much kind help in the identification of many of the above species.

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The Rev. F. C. R. Jourdain's Ornithological Report for 1923, and Dr. G. C. Druce's Botanical Report are the principal items in *The Proceedings and Report of the Ashmolean Natural History Society of Oxfordshire*, recently issued.

The Transactions of the Entomological Society of London, issued August 30th, record that at a recent meeting Mr. Donisthorpe exhibited a map showing the British Distribution of *Acanthomyops* (*Denorolasius*) *fuliginosus* Latr., and its occurrence in Colby Glen, Isle of Man.

'The Birds of Sutton Park,' by Miss B. A. Carter; 'The Sandwell-Handsworth Railway Cutting,' by W. W. King; and 'Natural History Records of the Midlands (Keuper Sandstone, Glacial Boulder, Scots Pine)' occur in *The Proceedings of the Birmingham Natural History and Philosophical Society*, Vol. XV., pt. II, pp. 31-51, 2/-.

Among the contents of *The Transactions of the British Mycological Society*, issued in August (pp. 189-266, 7s. 6d.) are 'A New Species of *Monochaetia*,' by M. Wilson and F. C. Ford-Robertson; '*Fistulina hepatica* and Hollow Stag-headed Oaks,' by K. W. Braid; 'Tree Mycorrhiza,' by R. Paulson; 'Life History of *Polythrincium trifolii* Kunze,' by J. S. Bayliss-Elliott; 'Epidemic Plant Diseases,' by F. T. Brooks; and 'The Flora of a Blackbird's Nest in August,' by the late Sir Henry C. Hawley.

The Annual Report and Proceedings of the Bristol Naturalists' Society contains some important geological papers, namely, 'The Avonian of the Wickwar Ridge, Glos.,' by F. S. Wallis; 'The Avonian of Cheddar Valley to the Sea,' by Agnes E. Bamber; and 'The Old Red Sandstone and Carboniferous Limestone of Portishead-Clevedon Area,' by S. H. Reynolds and E. Greenly. In addition there are other papers likely to interest our readers, especially as some of them deal with unusual topics, namely, 'The Apterygota of the South-west of England,' by H. Womersley; 'The Intelligence and Sense Organs of Dragonflies,' by T. F. Hewer; 'Notes on the Fauna of the Bristol Channel,' by L. H. Matthews; '*Spartina Townsendi* in West Gloucestershire,' by Ida M. Roper; and 'Bristol Botany in 1923,' by Jas. W. White.

NOTES ON SOME 'PENDLESIDE' FOSSILS.

J. WILFRID JACKSON, M.Sc., F.G.S.

WHILE on a recent visit to London, I had the opportunity, through the kindness of Professor E. J. Garwood, of examining the British Association collection of fossils illustrating Life-zones in the British Carboniferous Rocks, housed at University College, Gower Street. These consisted mainly of specimens collected at various times for the purpose of illustrating the fauna of the Pendleside Series. Among them were several from the Pendle area, and from Poolvash, Isle of Man. As *Glyphioceras reticulatum* (among others) has been recorded in past years from both these areas, and as I have never been able to find the species there myself, I searched for specimens labelled as such in the collection, and found several which had been determined by various authorities, including Dr. A. H. Foord, Mr. G. C. Crick and Dr. Wheelton Hind. Close examination of these proved that, as already suspected, serious errors had been made in identification. Seven specimens, all of the same general type, previously determined as *G. reticulatum*, appear to be *G. striatum* Sow., possibly var. *plana* Frech. These specimens include Nos. 139, 146 from above Little Mearley Hall, an unnumbered specimen from Pendleton Hall, No. 224 from stream near Ribble, and Nos. 239, 246, 247 from Holden. I have recently found this species in numbers in a section east of Manor Farm, N. Staffs., in black shales succeeding the Brachiopod Beds of Wetton Hill. It seems highly probable that this species formed the basis of Dr. Hind's Zone of *Glyphioceras reticulatum*, lying between his Zones of *P. becheri* and of *G. spirale*.*

Two specimens labelled *G. bilingue* (No. 150, Little Mearley Hall Clough; No. 267, Dinckley Hall), are *Eumorphoceras pseudobilingue* Bisat, with rather strong sculpture, as is probably also No. 269 (Dinckley Hall), labelled *Gastrioceras listeri*. Another specimen, No. 229, near Dinckley Hall, labelled *G. reticulatum*, is a typical *G. spirale*. No. T78, Poolvash, Black Limestone, labelled *G. reticulatum*, bears no resemblance to Phillips' species, but is more akin to the *truncatum* group.

I failed to find specimens of the *Pterinopecten papyraceus*, listed from Poolvash, but strongly suspect that the species so named will turn out to be the same form as that associated with *P. becheri* in the Lower Bowland Shales at Pendle and

*See *The Naturalist*, April, 1909, p. 154; *Proc. Geol. Assoc.*, Vol. XXI., 1910, pp. 463-4; and other papers by Dr. Hind.

Lothersdale, and in the *becheri*-beds at Teilia Quarry and Lady Maclaren's Quarry, Prestatyn, N. Wales, and Tissington, Derbyshire. I have examined specimens from all these places and find that the species differs from the typical Lower Coal Measure form, and am hoping in the near future to complete my revision of the forms recorded as *Pt. papyraceus* from beds ranging from the Upper Visean, through the Millstone Grit to the Coal Measures.

The fact that, under the term Pendleside Series, two totally distinct faunas and groups of strata have been confused together (*i.e.*, the Bowland Shales, etc., of the Pendle area on the one hand, and the equivalents of the Sabden Shales in North Derbyshire, Yorkshire, etc., on the other)* has naturally led to considerable discrepancies in correlation. A case in point is the shale of Foynes Island, Co. Limerick, where the fauna (16 species) listed and in part figured by Dr. Hind† from the black shales with bullions overlying the Carboniferous Limestone, is absolutely that of the Sabden Shales of Rough Lee, and their homotaxial equivalents at Todmorden and in the Edale valley, Peak District. It in no way resembles that of the Bowland Shales. Such being the case, and as the shales overlie the limestone so closely, one is inclined to suspect an unconformable relation between the two, the shales overlapping and transgressing the limestone massif. Angular unconformities of this nature, indicating post-Visean upheaval and denudation, are known or suspected in other places, including Derbyshire.

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Dr. A. G. Butler has an illustrated article on 'Larks (*Alaudidæ*),' in *The Avicultural Magazine* for August.

Dr. H. O. Forbes writes on 'Pre-Columbian Representations of the Elephant in America,' in *Nature*, August 2nd.

Miss M. Mason, writing to *The Wild Flower Magazine* from Kirkby Stephen, says, 'I never saw anything like the Bee Orchis at Bonchurch this year: masses of it! Some nearly 18 inches high.'

The Irish Naturalist for September informs us that following up a press announcement that a cuckoo might be seen hatching her own eggs, many people went to see 'what is so rare.' The cuckoo proved to be a nightjar.

'The Loggerhead Turtle in Scotland,' by Dr. J. Ritchie; 'Report on Scottish Ornithology in 1923,' by the Misses Rintoul and Baxter; and 'The Identity of the Sea-Anemone, *Actinia elegans*, Dalyell,' by Mr. W. E. Evans, appear in *The Scottish Naturalist*, No. 148.

In *The Entomologist's Monthly Magazine* for September, H. Donisthorpe adds *Oxyboda nigrocincta* Reg. to the British list of Coleoptera. F. W. Edwards writes on the British species of *Thalassomyia* and *Cardiocladius*; A. E. J. Carter writes on *Cryptolucilia caesarion* Mg. in Britain; and W. R. Wright described the Mosquitoes of North Wales.

*See *The Naturalist*, October, 1923, pp. 337-8.

†See *Proc. Roy. Irish Acad.*, Vol. XXV., Sect. B., No. 4, 1905, p. 101, pls. V.-VI.

EPHIALTES TUBERCULATUS FOURC., AN ICHNEUMON FLY NEW TO YORKSHIRE.

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

A LITTLE while ago Mr. C. A. Cheetham handed me a large black ichneumon fly which he found on June 23rd, 1924, at Pateley Bridge, hunting about pine trees and flying slowly; on the wing very like a dragon fly in appearance. This proves to be a female of *Ephialtes tuberculatus* Fourc., a species which, according to Morley (*British Ichneumons* III., 38-39) is not very uncommon in Britain, but has not hitherto been recorded from Yorkshire. It has been bred from several wood-feeding Coleoptera—especially *Saperda populnea* and *Rhagium mordax*, the long ovipositor being of use in reaching the larvæ. The Pately specimen probably was in search of *Rhagium bifasciatum*, the larva of which is not uncommon in Yorkshire in pine stumps, and an adult specimen of which was taken by Mr. Cheetham the same day.

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GALERUCA (ADIMONIA) TANACETI L. IN EAST YORKSHIRE.

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

THIS species, which had previously been recorded from East Yorkshire at Filey by the late Rev. W. C. Hey, was noted from Allertorpe Common by the writer in the 1920 Yorkshire Coleoptera Report, several having occurred on *Scabiosa succisa* in September, 1920. It was first found on the common in November, 1919, when a solitary specimen was seen crawling on the road. In 1920 several were taken, but the insect was not abundant. On September 15th and 16th, 1923, it was very abundant near the Sutton Road end of the Common on Knapweed (*Centaurea nigra*) eating the leaves, and many were found *in cop.* Only two were seen on *Scabiosa*, one on the flower and another devouring a bract. One was resting on a thistle leaf. Out of at least a hundred specimens seen all but three were on Knapweed. In August, 1924, not a single larva or perfect insect could be found.

Mr. G. C. Champion (*Ent. Mo. Mag.*, 1911, p. 258), describes two forms as occurring in this country, one probably the true *tanaceti* L., which feeds on *Achillea millefolium*, and another form, larger and duller, with more densely punctate head, with anterior angles of thorax dentiform and upturned and elytra more or less costate on the disc, with a broadly

sulcate outer margin, which is apparently our insect, and which has been taken in Lincolnshire by Mr. C. S. Carter on *Scabiosa succisa* (*The Naturalist*, 1902, p. 227), and by Mr. H. Wallis Kew on *Scabiosa* commonly and once on Knapweed (*Ent. Mo. Mag.*, 1886, p. 107). Mr. Kew bred the insect from the larval state, and Bedel suggests that this species is possibly *pomonæ* Scop., which has a black variety (*anthracina* Wse.).

The specimen from Allertorpe, though agreeing with this latter form, appear to vary somewhat *inter se*. The males are on the whole rather more shining than the females, and the elytra usually less costate, though a few are as strongly ridged as the females. All agree in being somewhat dull, coarsely punctured on the head, with the anterior angles of the thorax upturned, and the elytra mainly broadly sulcate along the outer border, especially in the females. Though the specific name suggests some connexion with the Tansy, and this association is mentioned in Canon Fowler's book, it is very doubtful whether the insect is attached to that plant in any way.

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Highways and Byways in the Lake District, by A. G. Bradley. London: Macmillan & Co., xii.=332 pp., 6/- net. By the use of thin but good paper, this volume of over 300 pages gives an admirable account of the charms and attractions of the English Lake District, in addition to which the numerous admirable illustrations from sketches give the volume an additional charm. The work is more than a topographical account of the area; it deals with Traditions, Spirits, Roman Remains, Old Mines, The Helm Wind, Ghostly Associations, Border Ferocity, Emigration, and other items likely to be of interest to the tourist. There is also a map upon which suggested routes are shown.

Outlines of Fungi and Plant Diseases, by F. T. Bennett, B.Sc. (Macmillan & Co., Ltd.). This little volume embodies a course of lectures delivered to students of horticulture and agriculture in the Agricultural Department of the University of Leeds, and it is a text-book of a type too long denied the student of the fungi. The types of fungi selected to serve as an introduction to the subject have been well chosen, and are confined to species readily available for study. The portion on plant diseases is more comprehensive than might have been expected, and the author has done well to limit himself to short but useful accounts of the fungi causing diseases, their methods of attack and preventive or remedial measures to be taken in combating them, and then to cite the more important literature under the disease discussed; the references given are well up-to-date. Many of the diagrams are original, although others are rather time-worn, as in the case of Plate III., which illustrates Eurotium. There is a lapse into mis-statement in a paragraph on classification, p. 43, in which the author says that 'the sub-order Saccharomycetaceae comprises two genera, viz., Saccharomyces and Torula.' In a book specifically written for the student of plant diseases, the practical work might with advantage have included instructions for differentially staining fungus and host tissue. The book is of a useful size for the pocket, is suitably bound for the laboratory bench, and its price (7/6) is a commendable feature; it should be in the hands of every gardener and agriculturalist.—F.A.M.

FIELD NOTES.

***Pupilla muscorum* (L.) monst. sinistrorsum.**—This very scarce monstrosity was observed by me in a single perfect specimen several years ago in a lot from Christianshavns Vold, in Copenhagen.—HANS SCHLESCH, M.A.S., Copenhagen.

***Margaritana margaritifera* (Linné) in Labrador.**—Through the kindness by the Rev. W. W. Perrett, of the Moravian Mission in Hopedale, I have received a number of *Margaritana margaritifera* (L.) collected in a river in the neighbourhood of Hopedale, situated about $55\frac{1}{2}^{\circ}$ North, Br. 60° W. l. The largest of the quite typical specimens measure :—length, 120 mm. ; height, 65 mm. ; diam., 30 mm.—HANS SCHLESCH, M.A.S., Copenhagen.

Bonito in North Wales.—On Saturday, 2nd August, a large fish was noticed floundering in shallow water off Menai Bridge, Anglesey, by Mr. John Lucas, who secured it. In the evening he took it to Professor Philip J. White, of Bangor University, who identified it as the Bonito, or Striped Tunny. This species is a native of tropical or sub-tropical seas, and very rarely wanders as far as the coasts of Britain. So far as I can learn it has not previously been recorded off any part of Wales, so is a new addition to the local fauna. The Menai Bridge specimen measures two feet in length, and weighs ten pounds. It will be preserved in the museum at Bangor University.—H. E. FORREST, Shrewsbury.

***Hypolepia sequella*, etc., near Bingley.**—A young man lately showed me a Wood-Tiger (*Chelonia plantaginis*), which he had taken on Blackhills. This is the first record for this immediate neighbourhood, although it is regarded as a fairly common species in many districts. Not many miles away it has been taken several times on the moors. On the 6th inst. I took two *Hypolepia sequella* in Bingley Wood. I first took it near the same place in 1880, and not more than once or twice since. In Mr. Porritt's first List (1883) of lepidoptera, it is recorded from Richmond, Scarborough and York. In his Supplement, published 1904, Edington, Elland, Harrogate, Loftus-in-Cleveland and Mirfield are added. *Scoparia ambigualis* var. *atomalis* has occurred in thousands this season on Blackhills, but *S. conspicualis* (unlike some years, when it has been abundant) has been somewhat scarce.—E. P. BUTTERFIELD, August, 1924.

H. sequella is now known to be a fairly common South-west Yorkshire species. Mr. B. Morley some seasons takes it in abundance on sycamores at Skelmanthorpe.—G.T.P.

***Acherontia atropos* at Todmorden.**—A specimen of the Death's Head Moth was caught in a garden at Cornholme, near

Todmorden, on July 3rd, 1924. This is apparently the third record for the Borough of Todmorden during the last thirty years, the previous ones being one in Todmorden on September 8th, 1896, and one a mile east of Todmorden on May 28th, 1899.—EDWARD B. GIBSON.

Large Gatherings of Swifts.—On June 18th, I saw a vast concourse of Swifts hawking over a field near Stratford-on-Avon, the field was clover, and there could not have been much fewer than a thousand birds flying over it. A week later I saw a similar gathering, but about half the numbers, near Harrogate. Evidently they must have been attracted by the abundance of some minute food, but I could not see what it was.—R. FORTUNE.

Effects of Waste Oil on the Yorkshire Coast.—The serious problem of floating oil discharged by sea-going vessels, and also washed into the sea in quantities from our streets, after every shower of rain, continues to grow, and to have very serious effects upon our marine fauna. Between May 31st and June 22nd, 1924, I observed upon the beach in the North and South bays at Scarborough nineteen Guillemots and a single specimen each of Herring Gull, Fulmar Petrel and Puffin. Some were already dead; all were disabled from swimming or diving, and were incapable of flight. Some of the living birds had their eyelids tightly gummed together by the sticky oil, and could not see. During the same period thousands of tiny fish fry—sprats, herrings and whittings—were washed ashore dead at Scarborough, chiefly upon May 24th and June 1st. These all showed unmistakable signs of having been suffocated in the water by lack of oxygen, and had certainly not died through being driven ashore by the attacks of larger fish, as often occurs during the summer months. Mr. F. Snowdon, of Whitby, told me that on April 5th, 1924, he counted upon a stretch of sand two miles long, ten Guillemots, seven Puffins and four Razorbills, all killed by the floating oil. Small dead fish were also seen. The effects upon the smaller marine organisms is also very disastrous.—W. J. CLARKE.

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The famous Barnsley bed of coal has been reached at the colliery which Messrs. Pease and Partners, of Darlington, have sunk at Thorne Moor End, twelve miles east of Doncaster. The seam was struck at a depth of 921 yards, thus making the pit the deepest colliery in Yorkshire. Thorne Colliery was first begun as far back as 1909. Tremendous difficulties were encountered, and for a long time the inflow of water into the shafts from water-bearing strata defied the most powerful pumps obtainable. Plans are already laid for the erection of a model village, which will accommodate at least 10,000 people. It is expected that the bulk of the coal drawn from the pit will find its outlet through Hull.

CORRESPONDENCE.

The Editor of *The Naturalist*.

I trust that your sense of fairness will permit me to reply to the serious allegations you make against me in your review of my book on 'The East Riding of Yorkshire' in *The Naturalist*, p. 284. You, rather inconsistently, suggest that, after years of work, I have produced a book which is, you allege, a copy of your book prepared like mine to a printed Outline Scheme, supplied by the editor of the series and incorporated (the book) in your 'Lost Towns of the Yorkshire Coast.' My book is not a copy of yours, but, if it were, a few weeks would have sufficed for its preparation. My book is founded on personal visits to seventy localities in the riding, the special information supplied by correspondents mentioned in the text and in the preface and a careful study of the literature of the subject, based on a card-index of 900 references, drawn up by myself. Only one illustration in my book, p. 43, Carr Naze, by G. Bingley, occurs in your 'Geological Rambles,' and only two, p. 16, Hornsea Mere, by R. Fortune, and p. 163, Old Kilnsea Cross (by York Philosophical Society) in your 'Lost Towns,' and, in each case, by permission of the owners. As to Hollar's View of Hull in 1640 on my p. 129, the electro was supplied by Messrs. Brown, without a hint that the block was your property, and they decline to either admit or deny your claim, but state that they acted in perfectly good faith. I regret that the electro supplied should have been used instead of a new copy of Hollar's plate.

I wonder whether you have read my book, for, if you have, you will find your work duly acknowledged on pages 49, 50, 51. It is obvious that the new statistics of Coast Erosion, Population, Agriculture, Industries, Minerals, Fisheries, Shipping and Trade in my book cannot have been taken from yours. There is nothing in your book to correspond with my account of York, Roll of Honour, Chief Towns and Villages. Your account of County History, pp. 275, 276 occupies 1 page, 6 lines; mine 7 pages 10 lines; your p. 306 devotes 8 lines to Industries; my book 3 pages 23 lines; your account of Minerals, pp. 306, 307, is in 20 lines; mine in 3 pages 12 lines, and so on. There are hundreds of facts and details in my book not to be found in yours. I never wrote any criticism of the Hull Handbook, prepared under your editorship, for the British Association. In *Nature* of November 4th, 1922, I suggested what an ideal British Association Handbook should be. You, quite gratuitously, chose to regard this as a criticism of the Hull Handbook, which was not alluded to.—BERNARD HOBSON, Thornton, Hallamgate Road, Sheffield, *September 12th, 1924.*

The present writer repudiates having made a statement that Mr. Hobson has 'copied a book' of his; what he does state, most emphatically, however, is that much of the information bearing upon the Lost Towns and other matters has unquestionably been extracted from one or other of his books, and in thanking various and numerous friends for assistance, Mr. Hobson has forgotten to pay any acknowledgment whatever to the one person who has supplied him with much of the matter for his publication. Obviously, from Mr. Hobson's details of the reviewer's 'Geological Rambles' and 'Lost Towns,' given in his letter above, he is very familiar with these works, but they are not referred to in his preface, nor on page 11.

The reviewer did not state, nor imply, that *everything* in Mr. Hobson's book had been copied, and in the volume, the sub-title of which is 'Other Chapters bearing upon the Geography of East Yorkshire,' he did not include statistics about population, lists of towns and villages, etc.,

which would not have been of general interest, and could be obtained from the usual channels.

Mr. Hobson's letter to *Nature*, of November 4th, 1922, distinctly refers to the notice of the Hull Handbook which the present writer prepared : of that there is no question.

The criticism was replied to in a letter in *Nature*, No. 2775. If this reply did not bear upon the Hull Handbook, why did not Mr. Hobson say so at the time? It has taken him since his letter of October 20th, 1922, to find out that he did not refer to the Hull Handbook, but to handbooks generally!

We are glad that Mr. Hobson admits we have a 'sense of fairness.' Had Mr. Hobson shared this sense, the review about which he complains would not have been written.—T.S.

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REVIEWS AND BOOK NOTICES.

Everyday Life in Prehistoric Times, by Marjorie and C. H. B. Quennell. London: B. T. Batsford, Ltd., x.+109 pp., and x.+119 pp., 10/- net. With this title the two volumes, to which reference has previously been made in these columns, have been bound together, and with their cloth cover will prove of interest to young people, for whom it will make a charming present. As we have previously stated, the authors have an excellent way of presenting the details with regard to early man, and with the aid of their numerous illustrations, produce a fascinating story.

Big Game and Pygmies, by Cuthbert Christy. London: Macmillan & Co., xxxi.+313 pp., 21/- net. We have seen some of Dr. Christy's work previously, and welcome the present volume with its wealth of illustration from photographs and maps. While the principal part of the volume is devoted to The Ituri Forest, the Equatorial Forest Belt, Pygmies, and The Okapi, there are interesting chapters on the Elephant, Rhinoceros, Buffalo, Hog, Champanzi, etc., but, what is not often dealt with in volumes of this sort, there are contributions to the natural history of the smaller mammals, birds, fishes, 'frogs and reptiles,' insects, as well as practical notes on cleaning and preserving, Forest Hunting and Armament, etc. The author has likewise much to say on sleeping sickness, and gives photographs of victims of that terrible disease.

Fishes, the Source of Petroleum, by John Muirhead Macfarlane. New York: the Macmillan Company, 1923, 451 pages. In this work Dr. Macfarlane has compiled an enormous amount of geological information regarding the distribution of fish life throughout the known stratigraphical formations of the world, and to the effects of this distribution a probable source of natural petroleum is attributed. At the beginning of his geological career the author had the good fortune to be interested in the fossil flora and fauna of the Edinburgh Coal Basin, and in the succeeding years of his life the more or less constant association of fish remains with oil shales became a subject of detailed study and investigation. The volume under present review is the result of these latter researches, and Dr. Macfarlane is certainly to be congratulated upon the wealth of information which is included, and the readable manner in which his various facts and theories have been assembled and discussed. Probably no geological subject of controversial interest has attracted more attention during the present decade than has that relating to the origin of petroleum. At the moment the supporters of the organic theory hold the field, yet these are split up into two distinct schools, the one claiming that petroleum is of vegetable origin, whilst the other (of which Dr. Macfarlane is an ardent and enthusiastic supporter) is of opinion that mineral oil has resulted primarily from the accumulation

and decomposition of animal remains. The author has marshalled his facts ably and systematically, and though his enthusiasm for his subject has probably allowed certain of his conclusions to be slightly biased, this does not detract from the value of the book. The volume is well arranged, there is an interesting review and summary of results, a valuable bibliography and a complete index.—G.S.

With Dickens in Yorkshire, by **T. P. Cooper**. York: B. Johnson & Co., Micklegate, 145 pp., 2/-. In this little book the author brings forward the evidence of the various visits to Yorkshire by Charles Dickens, and gives an interesting collection of illustrations. The book was first issued last year, and its popularity is shown by the fact that already a second edition has been called for, which has been revised.

For the small price of two shillings has been issued **Bristol Geology and Geography**, for the use of School Teachers and others, by **Professor S. H. Reynolds** (98 pp., 2/-), with an introduction by Professor Lloyd Morgan. Few people are more qualified to deal with the subject than Professor Reynolds, and with the help of numerous diagrams, plans and sections, he has produced a work which will certainly be of service to the students in his area.

Growth, by **G. R. de Beer**. London: E. Arnold & Co., viii. + 120 pp., 7/6. Under this title the Demonstrator in Zoology and Comparative Anatomy in the University of Oxford deals with the Growth of the Frog, Growth in Plants, Growth in Animals, Regeneration, Asexual Reproduction, Abnormal Growths, Causes and Nature of Growth, Substances which speed up Growth, The Effect of External Conditions on Growth, and numerous other subjects, which, with the excellent illustrations, will appeal to the naturalist.

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Based upon material collected in the Isle of Man, and tested by comparison with material from Ireland, Wales, Northumberland and Yorkshire, Margery Knight describes the Life-History and Cytology of *Pylaiella littoralis* Kjellm, one of the marine algæ, in *The Transactions of the Royal Society of Edinburgh*, recently published.

The Caradoc and Severn Valley Field Club has issued its *Transactions* (Vol. VII., No. 3), and *Record of Bare Facts* (No. 33). The former contains reports of meetings and excursions, a paper by Miss F. Pitt on 'Shetland Pirates [Skuas],' and a reprint of Mr. H. E. Forrest's paper on 'Sheep and Early Man in Britain,' which originally appeared in *The Naturalist*. The *Record* includes new notes on Flowering Plants, Coleoptera, Mammals, Birds, Amphibians and Fishes, and useful meteorological records.

Mr. H. C. Chadwick illustrates and describes some Abnormal and Imperfectly Developed Specimens of the Sea Urchin (*Echinus esculentus*) in *The Proceedings of the Zoological Society*, 1924, pt. 1. The specimens were collected at various points around the south end of the Isle of Man. In the same journal, Dr. J. R. Garrod describes and figures two skeletons of the Cetacean, *Pseudorca crassidens*, from Thorney Fen, and Mr. Robert Gurney describes the larval development of some British Prawns (*Palæmonidæ*)—I. *Palæmonetes varians*.

We have been favoured with the following three papers reprinted from *The Transactions of the Optical Society*: 'The Mechanical Construction of the Microscope from an Historical Standpoint, with special reference to certain instruments now in the Science Museum, South Kensington,' by Prof. Alan Pollard; 'Early Telescopes in the Science Museum, from an Historical Standpoint,' by David Baxandall; 'Surveying and Navigational Instruments from the Historical Standpoint,' by L. C. Martin. Included are descriptions of early forms of microscopes, some of which are similar to those illustrated in these pages for August, 1912, and July, 1924.

NEWS FROM THE MAGAZINES.

'British Neuroptera in 1923,' by W. J. Lucas, appears in *The Entomologist* for August.

B. Jenkins writes on 'Cornish Marl Clover' in *The Journal of the Ministry of Agriculture* for August.

A memoir (with portrait) of the late Prof. Grenville A. J. Cole, appears in *The Irish Naturalist* for June.

J. H. Orton contributes notes on 'An experimental effect of light on the sponge, *Oscarella*, to *Nature*, No. 2852.

R. F. Ruttledge contributes a 'Note on the Distribution of the Squirrel in Ireland' to *The Irish Naturalist* for July.

Dr. J. J. Simpson describes the Economical Uses of Animal Products, I., Rabbit Skins, in *The Museums Journal* for July.

The Avicultural Magazine for June contains notes on Typical Finches; Variations of Hunting by Kestrels; and Flesh Food eaten by Rooks.

The Wild Flower Magazine for June-July contains details of the lists of flowers collected by various members of the Wild Flower Society.

The Entomologist's Monthly Magazine for August contains 'Luminosity in Insects,' by K. G. Blair, and some British Species of *Corynoneura* by F. W. Edwards.

The Irish Naturalist for August is entirely occupied by a portion of a valuable paper on 'The Breeds of Dogs peculiar to Ireland and their Origin,' by Dr. R. F. Scharff.

H. S. Gladstone writes on the Distribution of Black Grouse in Great Britain, and H. Boase on Courting Display of the Golden Eye on Salt Water, in *British Birds* for August.

In *Man* for July, Dr. Julian Moscheles writes 'On the Late-Quaternary History of Scandinavia,' and endeavours to correlate the deposits there with those of the 'Scotland Alps.'

Mr. H. Donisthorpe describes three additions to the British list of Coleoptera, and the Myrmecophiles found with *Acanthomyops (Donisthorpea) brunneus* Latr. in Britain, in *The Entomologist's Record* for September.

Mr. C. L. Withycombe writes on 'The Biology of some British Neuroptera'; W. J. Lucas on 'British Orthoptera'; H. W. Dobson on 'The Two Years' Life-cycle of *Chrysomela fastuosa* Scop., to *The Entomologist* for July.

British Birds for July contains 'The Migrations of the Herring-Gull and Lesser Black-backed Gull,' by A. L. Thomson; 'Courting Display of the Fulmar,' by H. Boase, and 'The Light and Dark-breasted Brent Geese,' by Rev. F. C. R. Jourdain.

In *Man* for August, Mr. Miles C. Burkett figures two flint axes of obvious Danish origin, and his descriptions clearly indicate that their 'English' origin is out of the question. But why head the note 'A Danish Type of Axe in England.' Such a heading can only mislead.

The Scottish Naturalist, No. 147, contains 'The Egg-laying Vagaries of Birds,' by the Editor; 'Roosting Habits of Lanarkshire Rooks,' by W. Stewart; 'Observations on the Swift,' by J. K. Nash; and 'The Distribution of the Ox Warble Flies in Scotland,' by R. S. MacDougall.

Among the many papers in *The Lancashire and Cheshire Naturalist* for July are 'Lepidoptera for 1922-23,' by W. Mansbridge; 'The Ink-cap Fungus,' 'The Genus *Claytonia* in Lancashire and Cheshire,' by A. A. Dallman; 'Birds of Adderley Edge,' by E. W. Hendy; 'Pyrallides of Lancashire and Cheshire,' by J. F. G. Wynne, etc.

The Geological Magazine for July contains 'The West Cumberland Brockram,' by Dr. Bernard Smith; 'The Flint Flakings of the Weybourne Crag,' by S. H. Warren; 'New Fossil Echinoidea from Jamaica,' by H. L. Hawkins; 'A Further Study of the Nomenclature of Rocks,' by A. K. Wells, and 'The Gravels of the Great Ouse Basin,' by J. T. Banton.

Vol. IV., No. 1., of *The Hastings and East Sussex Naturalist* is almost entirely occupied by Mr. W. R. Butterfield's useful 'Notes on the Local Fauna, Flora, and Meteorology for 1923.' There is a portrait of Mr. Butterfield as frontispiece.

The summer number of *The Geographical Teacher* contains 'British Climate in Historic Times, II.,' by Sir Richard Gregory; 'The Teaching of Geography in Elementary Schools,' by E. Young; and the Liverpool Regional Survey Association.

'The Badger: its Habits and Life History,' by H. M. Batten; 'The Frit Fly and its Relation to the Yield of Oats,' by N. Cunliffe; and 'Apple and Pear Scab,' by E. S. Salmon and W. M. Ware, appear in *The Journal of the Ministry of Agriculture* for September.

'Notes on the Brya of the District,' by J. A. Wheldon; 'Local Pyralides,' by J. F. G. Wynne; 'Disappearing Plants in Cheshire,' by W. Plant, and 'A Sketch of Kersall Moor,' by J. Cosmo Melvill, occur in *The Lancashire and Cheshire Naturalist*, Vol. XVI., No. 5.

In *The Wiltshire Archaeological and Natural History Magazine*, Mr. E. H. Stone gives a scientific and well-illustrated account of what he considers to have been 'The Method of Erecting the Stones of Stonehenge.' In the same journal Mr. R. C. C. Clay gives a description of a remarkable 'Early Iron Age Site on Fifield Bavant Down.'

The Summer number of *Bird Notes and News* is a particularly attractive issue. There are important contributions on Bird Protection viewed Imperially and Nationally; the work of the Royal Society for the Protection of Birds; The Oil Menace (to which many of our contributors supply facts), and Economic Ornithology.

We learn from *Nature* that on June 22, 1664, at the Royal Society, 'the dog, that had a piece of his skin cut off [for grafting purposes], being inquired after, and the operator answering that it had run away, it was ordered that another should be provided against the next meeting for the like experiment, Dr. Williams and Dr. Charleton to have the better care.'

We are glad to find that many of the features of *The Naturalist* are being copied by our contemporary *The Lancashire and Cheshire Naturalist*. We are also pleased to observe that our journal inspires so many of the notes appearing therein. After saying this we may be pardoned if we congratulate the editor upon his July issue, which we believe is the best he has ever produced.

Among the contents of *The New Phytologist*, issued July 23rd, are 'Some factors governing bud-formation,' by F. Summers; 'The Ceramidium of *Polysiphonia*,' by R. W. Phillips; 'Periodicity of Leaf-form on *Teraxacum officinale*,' by B. M. Griffiths; 'Cell-wall in the Radicle of *Vicia faba* and the shape of the Meristematic cells,' by R. M. Tupper-Carey and J. H. Priestley; and 'Abnormal Flower of the Honeysuckle,' by R. H. McCrea.

In *The Journal of Conchology* for July, Mr. J. W. Taylor refers to 'The Significance of the Internal Convolution and Shell Structure in the genus *Milax*, with remarks upon the Hyperstrophic Inversion,' and Mr. A. E. Ellis gives a list of the 'Mollusca of Flamborough.' In his notes Mr. Ellis states he has 'not been able to find any reference to the mollusks' of this area. It seems a pity he did not look in the usual channels.

In No. 721 of *The Entomologist's Monthly Magazine*, Mr. J. V. Pearman describes two *Psocids* new to Britain; F. V. Theobald describes New and little known British Aphides; and in No. 722 of the same journal Mr. G. B. Walsh refers to the Passage of Apterous insect parasites etc., from host to host, and Mr. W. S. Bristowe describes 'A Bee-eating Dragon-fly and a Spider-eating Asilid Fly.' Mr. Theobald's paper includes descriptions of *Myzus vaccinii* n.sp., found on *Vaccinium vitis-idaea* at Penistone by Mr. Dallman; and *Aphis dallmani* n.sp., also found by Mr. Dallman, on *Agrimonia eupatoria*, near Doncaster.

'The Suggested Relationships of Psychides,' by Rev. C. R. N. Burrows, and 'Cumberland Coccinellidæ,' by T. F. Marriner, are in *The Entomologist's Record* for June.

Discovery emulates its now departed fellow-trumpeter, *The Country Side*, in its desire to impress its readers with its true value, and prefaces a column of appeals for more support by the subtle statement that it 'enjoys the support of the most intelligent reading public in the kingdom.' And yet it does not get the modest £500 asked for; perhaps the readers *are* the most intelligent!

'Natural History,' the journal of the American Museum of Natural History, New York, January to February, 1924, is an extremely charming number because of the many fine illustrations which it contains regarding natural history in Australia. We cannot afford such scientific luxuries in this poor country, says *Science Progress*, and if we could afford the money we would not spend it in this way, but on sports and kinematographs. There are some beautiful photographs of Australian mammals, birds and reptiles, and of the great barrier reef of Australia, the geyser region of New Zealand, and the Taos Indians.

Among the contents of the last issue of *The South-Eastern Naturalist* we notice 'Antipodean Flora' (Presidential Address), Dr. A. Hill; 'Vitamins,' by Mr. F. W. F. Arnaud; 'The Fungus Root,' by Mr. R. Paulson; 'Prehistoric Man in Kent,' by Mr. R. A. Smith; 'Some Common Garden Plants,' by Sir David Prain; 'The Sciences and the Humanities,' by Mr. F. V. Branford; 'Recent Advances and Discoveries in Insect Mimicry,' Prof. E. B. Boulton. As we understand there is to be a change in the editorship, we will refrain from quoting some of the usual editorial tit-bits in this issue.

—————: o :—————

NORTHERN NEWS.

Prof. J. B. Baillie has been appointed Vice-Chancellor of the Leeds University, in succession to Sir Michael Sadler.

Mr. Horace Donisthorpe favours us with reprints of his Myrmecophilous Notes for 1923 and other interesting matter.

The Seventy-fifth Annual Report of the Ipswich Museum contains a record of many valuable acquisitions, especially to the Christchurch Mansion.

We should like to congratulate our contributor, Mr. H. B. Booth, on being appointed judge for wool at the recent Royal Agricultural Show at Leicester.

The collection of reprints of geological papers, consisting of over 3000 items, formed by the late Prof. G. A. J. Cole, has been forwarded to the University of Liverpool.

Temple Newsam was the scene of the Haworth Ramblers' Excursion on August 30th, and the familiar circular gives interesting facts relating to the latest museum for Leeds.

An excellently coloured plate of Comfrey, which has been specially painted for the work, appears as frontispiece to Part VIII. of Hutchinson's 'Trees and Flowers,' 1s. 3d. net.

A 'Central Correlating Committee for the Protection of Nature' has been formed, the Hon. Secretary being Dr. G. F. H. Smith, of the Natural History Museum, South Kensington.

Mr. W. M. Webb recently gave a lecture and demonstration on 'The Cinematograph and Education,' during the Vacation Course arranged by the West Riding Education Committee at Bingley.

Mr. R. J. Welch contributes an article on 'The Sinking of Southern England and Ireland' to *The Belfast News-Letter* of August 28th. It is illustrated by some of Mr. Welch's beautiful photographs.

Mr. L. Hawkes favours us with a copy of his paper on Calcareous

'Rings' found in Glacial Clays. Happily, Mr. Hawkes is a geologist, and we are not asked, therefore, to accept these 'rings' as bracelets worn by Glacial woman.

The Report of the Earthworks Committee issued by the Congress of Archæological Societies, for 1923, records that 'In the laying out of a building estate near Victoria Park Mount, Scarborough, a tumulus has been removed, but under competent authority.'

Young and Bird's *Ammonites scarburgensis* from the 'second shale,' Scarborough, is figured in Buckman's 'Type Ammonites,' part XLVII., as *Scarburgiceras scarburgense*; and the same author's *A. maximus*, from Pickering, appears as *Arisphinctes maximus*.

We regret to see the announcement of the death of W. R. Ogilvie-Grant, Keeper of Ornithology at the British Museum (Natural History), South Kensington. He was formerly Assistant to Dr. Bowdler Sharp, and was a prominent member of the British Ornithological Union.

We notice the announcement of the retirement of Mr. H. Ling Roth, who for 24 years has been Curator of the Bankfield Museum, Halifax, which reflects in its collections the great interest Mr. Ling Roth has had in ethnographical specimens, particularly those relating to weaving. Mr. Ling Roth is the author of many well-known works on ethnology and history.

Prof. R. Newstead gives an excellent 'Report on the Excavations on the Site of the Roman Camp, at the Deanery Field, Chester,' in *The Annals of Archæology and Anthropology*, recently issued by the University of Liverpool. Under 'Animal Remains,' the mussel and cockle are mentioned, ox (*longifrons* type), sheep or goat, red deer, pig or wild boar, horse, cat, dog, domestic fowl, and possibly pheasant and duck.

For the nominal sum of one penny, the National Museum of Wales has issued a pamphlet dealing with 'The Coals of South Wales (Notes on an Exhibit in the Department of Geology),' by F. J. North, D.Sc. It is well illustrated with maps and diagrams, and both the Museum and author are to be congratulated upon producing such an interesting publication at so low a figure.

Part XL. of Hutchinson's *Animals of All Countries* is devoted to illustrations and descriptions of Butterflies and Moths. It contains an excellent coloured plate of British Butterflies which we notice includes a 'Small Capper' (sic). Part 7 of the same publisher's companion work on *Trees and Flowers* has some admirable illustrations of the Red Centaury, Wild Carrot, Catchfly, Celandine, Celery, Chamomile, Charlock, Cherry, Chestnut, Chickweed, etc.

The September issue of a scientific contemporary has an editorial on the 'Broad-bellied Purple Peril' (*chars-a-banc*), or as it is there called, charabancs, in the Doone Valley; on the necessity for more subscribers; Measuring the Universe; Photographing Wild Elephants; Alchemy in Islam; Shooting the Wind; Power from the Poles; Scottish Humour, and other scientific subjects. The editor informs us that this last 'most dangerous subject is boldly treated by the author.'

The Leeds Mercury for July 17th has an illustration of a tree of stone, said to be a remarkable relic of the 'amphibian age' (whatever that may be), which was recently discovered in a quarry at Batley Carr, at a depth of 40 to 50 ft. from the surface. The fossil is about 5 ft. high and 2½ ft. in diameter, the roots spreading out nearly 5 ft. The trunk is in a perpendicular position, but is cut horizontally into slabs, which have been slightly displaced by earth movement. The specimen has been offered to the Batley Museum.

We learn from one of the illustrated daily papers that a certain prehistorian is only forty-five years of age, 'and did not get interested in archæology till he was approaching the thirties. He was playing golf one day on the Ipswich links when his partner, a local architect and antiquarian, stopped now and again to pick up and examine stones. The

golf suffered some interruption, but he received his first lesson on fossils, and was so interested that he took the subject up for himself. This seems a pity, as golf is quite a good game!

The press the other day recorded a 'Find of Giant Bones.' 'Bones dragged up by a trawler from the sea bottom about ten miles off Brighton are suggested to be the remains of a prehistoric monster that lived in the distant ages when England and the Continent were joined by dry land. They are to be brought to the notice of a British Museum expert to-day.' We have not heard the British Museum expert's opinion, but we presume it will be that the remains are of an animal 'very like a whale.'

We have received the excellent Report of the Dove Marine Laboratory, Cullercoats, Northumberland (New Series, No. XI.), edited by Prof. A. Meek. The editor writes on Trawling Experiments, Salinity of Inshore Waters, Tyne Pollution, Effect of Temperature on Growth of Young Blennies, and a New Species of *Euteropneusta* from the North Sea. B. Storrow and Dorothy Cowan write on Herring Investigations, and F. W. Flattely on A New Variety of *Pleurocryta galatheæ* from the Northumberland Coast. There are also some faunistic notes.

The annual meeting of the Hull Scientific and Field Naturalists' Club was held recently. The annual report indicated that a year of satisfactory work had been accomplished in spite of the abnormal unsettled weather conditions that had prevailed. The Treasurer's statement showed that financially the society was in a sound condition. The officers for the coming year were elected:—President, Mr. W. H. Arnott; Vice-president, Mr. B. Cook; Hon. Secretaries, Mr. E. W. C. Kidder and Mr. T. Stainforth; Hon. Treasurer, Mrs. B. Cook; Lanternist, Mr. C. W. Mason.

A certain 'prehistorian' in his own account of his own excavations at Cromer, printed in *The Times*, begins: 'At a very remote period, possibly 500,000 years ago, the present land surface represented by the beach and foreshore at Cromer was inhabited by races of early palæolithic people. If it were possible for any of these ancient men to revisit the Cromer area they would see nothing in the existing configuration of the land to remind them of their former habitation.' It is perhaps as well such a visit is not possible, as these early men, quite apart from warning us against the extravagant use of dates, would probably upset many 'results of researches.'

In a recent issue of *The Belfast Telegraph* is an interesting account of a visit by the Belfast Naturalists' Club to Beanna Boirche—the beautiful mountains of Mourne. 'Augmented by members staying at Newcastle, and those who came in their own motors, the party numbered 112 members and visitors.' That seems quite cheering, but when we read that 'This was probably the largest full-day excursion ever made by a British or Irish Field Club,' we must protest. The day the newspaper arrived, the writer saw quite as many naturalists from a certain Yorkshire Town, and to his knowledge the Yorkshire Naturalists' Union frequently reaches that number, and has been known to double it.

In his *Nature Notes* appearing in the *Shrewsbury Chronicle* recently, Mr. H. E. Forrest writes: 'The following paragraph, received from a newspaper reporter at Rhyl, has been sent on to me by Mr. T. Sheppard, Editor of *The Naturalist*':—'A Nightingale was heard in the woods at Cwm, in the Vale of Clwyd, Flintshire, on Sunday evening, July 20th: the bird was heard singing beautifully for upwards of half an hour. It is many years since the Nightingale has been heard in this district, as it seldom gets so far north.' Such a statement as the above cannot be accepted unless confirmed by a skilled ornithologist. It is altogether improbable for two reasons. Firstly, the district is quite outside the ordinary range of the Nightingale. Secondly, the date is far too late. The Nightingale sings from the date of arrival—towards the end of April—until the brood is hatched, about the end of May. After that it does not sing at all.'

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Oct., 1924.

THE NATURALIST

A MONTHLY ILLUSTRATED JOURNAL
PRINCIPALLY FOR THE NORTH OF ENGLAND.

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T. SHEPPARD, M.Sc., F.G.S., F.R.G.S., F.S.A.Scot.,
The Museums, Hull;

and T. W. WOODHEAD, Ph.D., M.Sc., F.L.S.,
Technical College, Huddersfield.

WITH THE ASSISTANCE AS REFEREES IN SPECIAL DEPARTMENTS OF
G. T. PORRITT, F.L.S., F.R.S.
JOHN W. TAYLOR, M.Sc. RILEY FORTUNE, F.Z.S.



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YORKSHIRE NATURALISTS' UNION.

COMMITTEE OF SUGGESTIONS.

A Meeting will be held in the Botanical Department of the Leeds University on November 12th, at 6 p.m., to receive the Sub-Committee's report and to decide on the stations for the Rivers Investigation. All interested in this subject are invited to attend, whether members of the Committee or not.

CHRIS. A. CHEETHAM.

BOOKS WANTED.

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Cleveland Lit. & Phil. Soc. Trans. Science Section or others.
Croydon Nat. Soc. 6th Report.
Dudley and Midland Geol. etc., Soc. Vols. II.-IV.
Discovery. (Liverpool, 4to). 1891.
Derby Arch. and Nat. Hist. Soc. Part 21.
Devonshire Assoc. Adv. Science. Vols. I., II., III.
Dublin Geol. Soc. Vol. I., pt. 1, 1830?; Vol. VII., parts 1-3 (or complete Vols.). 1855.
Eastbourne Naturalist (1 part).
Eastbourne Nat. Hist. Soc. Vols. II.-III. (or parts), and part 6 of new series.
Frizinghall Naturalist. (Lithographed). Vol. I., and part 1 of Vol. II.
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Geol. Soc., London, Trans. 2nd ser., Vol. VI., and Pts. 1-3 of Vol. VII (or Vol.).
Geological Magazine, 1894.
Huddersfield Arch. and Topog. Society. 1st Report, 1865-1866. (38 pp.).
Illustrated Scientific News. 1902-4. (Set).
Journ. Micrology and Nat. Hist. Mirror. 1914—
Keighley Naturalists' Society Journal. 4to. Part 1.
Lancs. and Cheshire Antiq. Soc. Vols. IV., V., VIII., XXVI.
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Peterborough Natural History Society. Reports 1-8, 11-12, 14-26.
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NOTES AND COMMENTS.

THE BOOK OF BRADFORD *

is the title of an excellent handbook which has been prepared in connexion with the ninety-second annual meeting of the British Medical Association. It contains thirty chapters, dealing with various aspects of the history of Bradford, from Prehistoric times, Roman, Anglian, Danish, Norman, Tudor and more recent periods. There are chapters on various industries, Coal, Iron, Tanning, etc. ; others on the Geology, Botany, Fauna, Arachnida, Learned Societies, and then follow articles on the Infirmary, Eye and Ear Hospital, Children's Hospital and other items of more general interest to the Congress. The editor is Dr. J. Hambley Rowe, who is responsible for several articles, and other familiar names of contributors are Viley, Maltby, Wroot, Rhodes, Winter, etc. There are several illustrations, and we hope that it is only an accident that that of the ' Old Grammar School ' appears as a tail piece to the chapter on Tanning ! Altogether it is a very creditable production.



It has been said that poets lack wits ;
 Musicians, sense of harmony.
 Fain would I ask, then, how it fits,
 That Walter Garstang, lacking wits, †
 Can write his verse so charmingly ?

PREHISTORIC FIND AT WITHERNSEA.

Under the above heading the following paragraph recently appeared in a Hull paper, and it is not surprising to find that

* W. H. Brocklehurst, 246 pp.

† 'Songs of the Birds,' by Prof. W. Garstang (John Lane, 115 pp. 6/-), has reached a second edition. The book is illustrated by J. A. Shepherd's inimitable sketches, one of which appears as the heading to this note, by permission.

the 'fossilised head' turns out to be part of the skull of a young, and quite modern, whale:—'What is believed to be the fossilised head, or part of the head, of a prehistoric animal was picked up on the beach at Withernsea by Mr. Arthur Turner, painter, of Park Avenue, son of Councillor A. J. Turner. Mr. Turner was strolling on the beach this week when he sat down on what appeared to be a big stone, partly covered with sand. Noticing there was a hole in it, he scooped the sand away, and found it was a fossilised skull. Apparently the find is part of the head of a huge animal, possibly of the hippopotamus species. One nostril is clearly marked, and there is the socket of the eye and what appears to have been the ear. The shape is much like that of one side of the head of a hippopotamus. Certain parts do not bear such strong traces of exposure as others. Councillor Turner expresses the opinion that the head has been buried in the cliffs, and has been released by the action of the sea. He believes there may be other parts of the animal in the vicinity. This part of the head weighs probably four stones; at any rate, it is as much as one man can lift without effort.'

BRITISH FLOWERING PLANTS.

The authorities of the Natural History Museum, South Kensington, are issuing series of post cards illustrating, in colour, common British Flowering Plants. We have received series 3 and 4 (1/- each), recently published, and they form a very attractive collection. Each illustrates five species, and is accompanied by three pages of letterpress. An introduction deals briefly with the elements of the British Flora, and this is followed by a popular account of each species in the set. The figures give an excellent idea of the plants, and there are clear dissections of flower and fruit which render them especially helpful to the student. The plants illustrated are:—Series 3, Gorse, Wild Cherry, Dropwort, Wild Strawberry and Dog Rose; Series 4, Hawthorn, Snake's-Head, Daffodil, Flowering Rush and Common Sedge. Of the Hawthorn it is said that 'the spines form an effective protection against browsing animals.' If this were only true, farmers would be saved much trouble with their hedgerows.

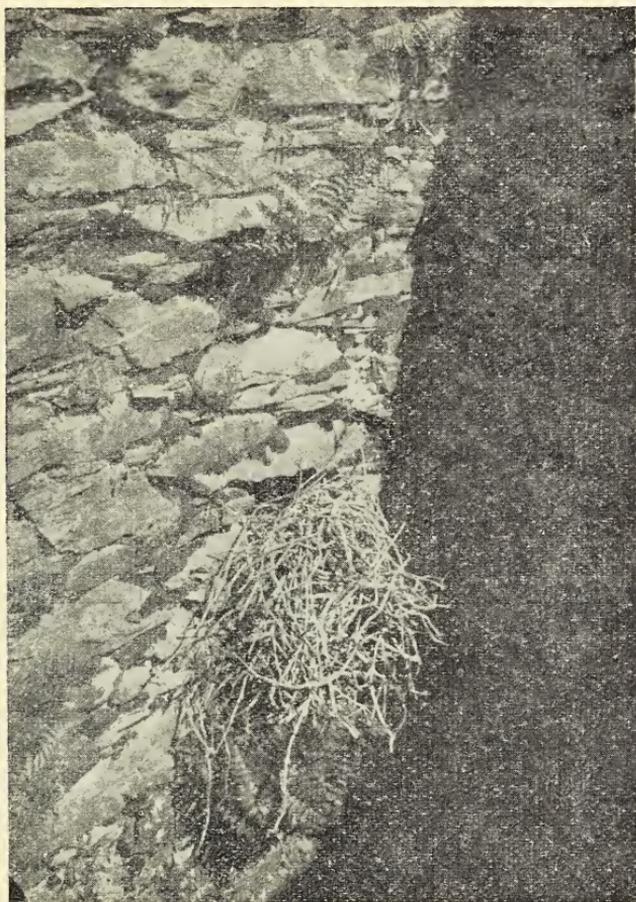
LINCOLNSHIRE NOTES AND QUERIES.

After a lapse we are glad to find that *Lincolnshire Notes and Queries* makes its re-appearance, and before us we have a substantial part issued as for 'April to October, 1923' (pp. 113-184, 4/6). It contains the usual historical and archæological notes bearing upon the county, and there is a particularly interesting paper on Roman Remains from the Ulceby-Dexthorpe site. The editor is R. C. Dudding, F.S.A., the Rector of Saleby, Alford, who would be glad to hear of

new subscribers ; otherwise this valuable journal may have to cease publication.

MANX BIRDS.

Some years ago an admirable account of ' The Birds of the Isle of Man ' was prepared by P. G. Ralfe. Since then the



Photo]

Chough's Nest in Mine Building.

[A. Harrison.

author has by publication and note-book kept a record of additional occurrences, etc., with the result that ' Supplementary Notes to " The Birds of the Isle of Man," ' July, 1923 (Edinburgh : Douglas & Foulis, 40 pp., 3/-), have now appeared. All who possess the earlier volume will require this supplement to bring the account of the Manx avifauna up to date. There are several illustrations from photographs, one of which we are kindly permitted to reproduce.

A TAXIDERMIST'S ADVERTISEMENT.

The editor of the *Proceedings of the Isle of Wight Natural History Society*, besides providing valuable papers on the Alien Flora, Marine Algæ, Birds, and meteorology of the Island, and numerous local natural history notes, gives the following quaint printed advertisement, dated 1795, on the back of a case containing a 'white-faced hare,' which was thought, when captured, to have been a witch, and is still in good condition :—' Pasted on the back of a taxidermist's case containing a white-faced hare, shot at Niton in 1795, is a quaintly worded advertisement in the form of a small bill, of which the following is the wording, the spelling, capitals, and punctuation being adhered to. At the foot of the printed bill appears the date, in writing, Nov. 28, 1795. "To the Curious observer of Natural Phaenomena. T. HALL. Well known to the Virtuosi, as the first Artist in the World for preserving Birds Beasts and all Sorts of Reptiles, to resemble the Attitude and Perfections of Life, employ'd by his Grace the Duke of Richmond, the British Museum, Dr. Letsom, and most of the Nobility and Gentry in this Kingdom. Specimens of his curious Art may be seen at his House.

LADIES AND GENTLEMEN, SIXPENCE EACH.

Opposite the Terrace, City Road, Moorfields. As there are many Ladies and Gentlemen who are partial to their Birds and favorite Animals, this is respectfully to inform them that they may have their remains (*sic*) preserved (in appearance so near life as scarcely to be distinguished), and warranted to last beyond expectation. Ladies and Gentlemen, six Pence each. Servants and Children three pence each. All Sorts of Curiosities bought and Sold." Another label, in MS., is also attached to the back of the case, which reads: "This curiously marked hare was shot on Niton Farm on Nov. 28th, 1795, by Mr. Joseph Kirkpatrick, of St. Cross, Newport. She had been repeatedly coursed, but had always succeeded in beating the greyhounds, and this fact, coupled with her strange appearance, led the Niton people to believe that she was a witch. Dec. 1888." Mrs. Pendergast, of Windcliff, Niton-Undercliff, who has kindly presented this interesting specimen to our Society, informs me that the hand-writing of this label is that of her father, the late Mr. Temple Kirkpatrick. The hare appears to have been in the Kirkpatrick family for 128 years, and as the donor suggests would now be almost more suitable to a museum of Archæology than of Natural History. As it is still in excellent condition, the taxidermist's claim that his preserved animals were "warranted to last beyond expectation" seems to have been quite justified.'

NORTHUMBERLAND NATURALISTS.

The Transactions of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne (Vol. VI., pp. 1-114+i.-lxxii., 5/-) include the reports of the meetings and excursions of this society from 1918 to 1922. There are papers on 'Ryton Willows Pool,' by R. M. Griffiths and



A series of upperside and underside views of varieties of *A. medon*, all, except the last but one, from Durham.

R. B. Cooke ; 'Bats,' by G. Bolam ; 'East Coast Crab Fisheries,' by A Meek ; 'Botanical Notes,' by G. Bolam ; shorter notes and records, and obituary notices of G. S. Brady and H. Temperley. Perhaps the most generally interesting paper is on 'The British Races of *Aricia medon* Esp., with Special Reference to the Area in which they Overlap,' by J. W. H. Harrison and W. Carter. This is accompanied by a block shewing the varieties of this species, which we are

permitted to reproduce herewith. We trust it is due to the usual printer's errors that the trivial names begin with capital letters ?

THE BIOLOGICAL FOUNDATIONS OF SOCIETY.*

Prof. Dendy has brought together the lectures he delivered at King's College. They form 'the contribution of a biologist towards the discussion of those social and political problems which confront us to-day in a peculiarly aggravated form, and upon the solution of which the stability of society and the progress of mankind must always depend.' Prof. Dendy shows that the laws which governed organic evolution in its earlier stages were not repealed when man arrived upon the scene, and perhaps our best hope for the future lies in the current understanding of the lessons of the past and in the intelligent application of those lessons to our own particular case. There are several suitable illustrations.

TALES FROM NATURE'S WONDERLAND.†

In his 'Before the Curtain Goes Up,' the author appeals to the American boy to have some imagination. His twenty-three chapters include 'Tales from the Past' and 'Tales of To-day.' In the first we have 'How Some of our Big Game Came to North America,' 'The Wild Elephants of North America,' 'The Greatest Wild Animal Tragedy,' and 'The Great Tyrant Dinosaur of "Hell Creek."' Among the latter we have 'The Great Red Ape of Borneo,' 'A Wild Animal Pigmy from Africa,' 'Sea-Fur Millions,' and 'A Wild Sheep Tale from South America.' There are several illustrations, including The Greatest Wild Animal Tragedy. The asphalt death trap at Rancho la Brea, Los Angeles, as it caught thousands of wild animals 30,000 years ago; and 'The Unbelievable Wild Mountain Sheep of South America, drawn from a description by the man who said he saw and photographed it!' We quite believe the author was an American boy once, with 'some' imagination!

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'Field Notes on the Magpie,' as observed in Cumberland,' by R. H. Brown, and 'Some Further Notes on the Courtship Behaviours of the Great Crested Grebe,' by J. S. Huxley, are among the contents of *British Birds* for October.

Among the varied contents of *The Proceedings of the Zoological Society of London* for 1924, Part II., we observe 'Note on an Ichthyosaurian Paddle, showing traces of Soft Tissues,' by C. W. Andrews; *Mesoplodon* and other Beaked Whales,' by Sir Sidney F. Harmer, and 'The Necessity for Quantitative Methods in the Investigation of the Animal Life on the Sea-bottom,' by C. G. Joh. Petersenn.

* By Arthur Dendy, D.Sc., F.R.S. Constable & Co., 197 pp., 7/6 net.

† By W. T. Hornsby. London: Charles Scribner's Sons, 235 pp., 12/6 net.

YORKSHIRE TIPULIDS.

CHRIS. A. CHEETHAM.

DURING the past season the lack of sun-loving diptera has given the Tipulids an opportunity of being more noticeable than usual, the following data are given for future reference. The first species were noted on May 17th at Holme-on-Spalding Moor, where *T. oleracea* L. and *T. lateralis* (Mg.) Tonn. were taken; the first named in the early months, and the closely related *T. paludosa* Mg. later were seen throughout the year, being very abundant in some districts. These are from the troublesome 'leather jacket' grubs. *T. lateralis* Mg. is generally found near water. I once saw the ♀ ovipositing on a mass of floating alga (*Vaucheria* sp.); it persists throughout the season. In the hills *T. montium* Egg. (*pseudolateralis* Tonn.) takes its place. *T. pierrei* Tonn. I have only seen on two or three occasions in August-September. Another of this group, *T. coerulescens* Lack., I caught at Austwick in June this year. I have not seen it recorded previously as British. *T. variicornis* Schum. (*Pachyrrhina annulicornis* of list) is widespread in June-July. A small-sized type of it was frequent about tufts of *Sesleria caerulea* on the limestones of Oxenber (9/6/24). In June *T. vernalis* Mg. was widespread in rough pastures, and *T. luna* Westf. (*lunata* of list) abundant in more marshy fields, whilst wherever Cotton-grass grows, *T. subnodicornis* Ztt. (*plumbea* F.) was plentiful, as was *T. diana* Mg., now known as *Prionocera turcica* Fab., in places like Austwick and Helwith Mosses and Skipwith Common. In the woods the variable *T. scripta* Mg. was the most abundant species, June-August, though *T. unca* Wied. (*longicornis* Schum.) ran it close sometimes, and in places the large yellow species, *T. ochracea* Mg. and *T. cava* Riedel, were more noticeable; the other yellow woodland species, *T. fascipennis* Mg., I have never caught in Yorkshire, but it has been taken in the Ilkley district by Mr. J. H. Ashworth. *T. hortulana* Mg. and *T. varipennis* Mg. are common species at this time, but not as abundant as the foregoing species. *T. flavolineata* Mg. appears in our list for the first time; it has a larva that feeds in rotting timber, and it should be more frequent than records show at present. *T. pabulina* Mg. is also an addition this year. The two largest species of the genus, *T. maxima* Poda (*gigantea* Schrnk.) and *T. fulvipennis* Deg. (*lutescens* F.) have been fairly frequent, though never in large numbers, throughout the summer. Austwick Moss gave the following succession of dominant species. *T. subnodicornis* Ztt., *T. diana* Mg., *T. melanoceras* Schum. (September), *T. luteipennis* Mg. (October), and finally *T. pagana* Mg., the species with the almost wingless female; this

is not restricted to the Moss, but widespread. Another damp-loving species, *T. nigra* L., has not been seen often, and appears to belong to the ditches and swamps of the low-lying country. Two other additions to the list are *T. truncorum* Mg. and *T. irrorata* Mcq., whilst *T. pruinoso* Wied. and *T. vittata* Mg. have only been seen very sparingly. On the mountains in the early months *T. alpium* (Bergr.) Edw. abounds. It is also found occasionally at much lower altitudes, but the closely related *T. obsoleta* (Mg.) Edw., which is common in the south of England, we have not yet had in our lists. A new species described by Mr. Edwards, *T. cheethami*, was in fair numbers in a ghyll on Whernside in June, but not later in the year, whilst *T. excisa* Schum. prefers the more rocky places higher up the hills. I have taken it on Ingleborough, Whernside and Cronkley; Dr. Pearsall brought me specimens and stated it was plentiful on Bow Fell in Cumberland.

The next group is that of *T. marmorata* Mg. (*confusa* v.d. Wulp.). This is a widespread species appearing in May and June, and also in September-October, especially up on the hills at the later date; *T. rufina* Mg., though much less frequent is also seen early and late. The following two have been badly mixed up—*T. staegeri* Nielsen (*signata* of list) and *T. signata* (Staeg.) Nielsen (*marmorata* of list, and *anonyma* of Bergr.). They are October species and occur together in the same place and time, they are much alike, and only the males can be safely named by the genitalia. The females perhaps may be known by the size of the stigma, but there seems to be all intermediates between the shorter and longer types; I saw these two species in great numbers in a small wood on a windy day. They were resting on tree trunks, their wings folded closely over their backs, and so close together that their outspread legs overlapped, and it would have been possible to cover ten to twenty with one hand. That two species so closely alike in every way but the male genitalia should occur in the same place and at the same time suggests the question can these two be dimorphic males of one species, this might be decided by breeding experiments, but the conditions required by the larvæ seem difficult to imitate. They appear to like the damp sides of small runlets in woodland, but I cannot say what is their food, though it may be the decaying leaf bases or roots of the grass *Aira cæspitosa* which grows there.

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A third edition of R. Kirkpatrick's 'Biology of Waterworks' (British Museum, Natural History, Economic Series, No. 7, 58 pp., 1/-) has been called for. It contains a few small alterations and an addition to the appendix.

THE LOWER CARBONIFEROUS SUCCESSION IN THE SETTLE DISTRICT.

W. S. BISAT, F.G.S.

THE publication in the current issue of the *Quarterly Journal of the Geological Society* of the long awaited paper by Professor Garwood and Miss Goodyear* is a boon to geologists in general and to Yorkshire geologists in particular. In this paper the authors publish the result of researches in the North Craven area, initiated as long ago as 1889, and apply to the well-known and complex district of the Craven Faults, the faunal zones first worked out by Professor Garwood in Cumberland and Westmorland. They shew that these zones are traceable with but little variation in character as far east as Wharfedale, and the two excellent coloured maps indicate for the first time the outcrop of these zones in the field. The authors are to be congratulated on the completion of a brilliant stratigraphical and palæontological survey of the classic area of the Craven highlands.

The earliest beds recorded are referred to the *Michelinia* Zone (C of the Avonian sequence). North of the North Craven Fault this lowest zone is only present in patches, the *Michelinia* sea probably abutting against an old shore line of early Palæozoic rocks passing through Chapel-le-Dale and Norber. The overlying *Seminula* beds rest in most places directly on the early Palæozoic floor and occupy a large portion of the valley to the east, west and south of Ingleborough. Whereas in the Ribble valley, north of the North Craven Fault, there are practically no C beds, there is the best development in the whole district immediately south of the fault, at Stainforth, suggesting movement on or near the fault-line as early as that period. A small outcrop of the *Michelinia* zone is also recorded near Kilnsey, in Wharfedale.

By far the largest area, however, is occupied by the various divisions of the *Dibunophyllum* zone, the successive horizons in which, marked by the occurrence of *Cyrtina septosa*, *Girvanella*, and *Orionastrea*, being mapped clearly and in detail all round Ingleborough, and also to a large extent round Penyghent, Fountains Fell, and between the Craven Faults.

In the district lying between the Craven Faults remarkable numbers of additional subsidiary faults are indicated, no doubt brought out by the zonal mapping, and one is also

* "The Lower Carboniferous Succession in the Settle District, and along the Line of the Craven Faults" (*Q.J.G.S.*, Vol. LXXX., pp. 184-273, Pl. X-XXI.).

brought face to face with Tiddeman's old problem of the difference between the northern and southern types of deposit. In the district between Settle and Malham there occurs an abrupt change in the character of the limestones and their fauna, the knoll phase appearing for the first time in a southerly traverse from Westmorland. In all the vast northern Pennine area, the various beds of the 'rigid block' of Marr extend uniformly, but come to an abrupt end at or near the South and Middle Craven Faults. The map (*op. cit.* Pl. XXI.) shews clearly how this southern phase is projected in several places northwards over this fault line, and the suggestion is advanced by the authors that this is probably due to a forward thrusting of the beds of southern type over the northern type beds lying north of the fault. Thus at High Hill, near Settle, knoll limestones (presumed to be D_3 in age) are pressed against D_1 limestones of normal northern type. The question arises, is this due to thrusting of the one against the other, or non-sequence and overlap? A dogmatic answer seems at present impossible, and, as pointed out by the authors, the question is further complicated by the occurrence of outcrops of the northern phase south of the faults at Black Gill Beck and Low South Bank.

The section at Black Gill Beck is indeed a most remarkable one: here, embedded in a high and clearly exposed shale scarp by the side of the stream, occurs a lenticular mass of highly fossiliferous Yoredale limestone partially broken into loose blocks. The limestone clearly rests on the shales, and is indeed practically surrounded by shale, the only part not covered being a very small portion outcropping on the hillside. The shales apparently represent the upper portion of the Bowland Shales, but the limestone blocks in the centre of the section have a queer appearance, and make the section seem artificial.

The Lower Carboniferous rocks of the Craven area are really divisible not merely into two phases, a northern and a southern, but into three phases—a northern, a southern (Bowland Shale), and a knoll-reef phase intermediate between the two others, agreeing largely with the Bowland Shales in the goniatite fauna, and with the northern beds in that the beds are grey limestone and not shale. Wherever the knoll beds are developed the Bowland Shales lapping round them consist of the higher horizons only, there being little if any doubt that there is replacement of the lower part of the Bowland Shales by knoll limestone.

It is interesting to learn that the three limestone domes west of Pateley Bridge represent as many different horizons in the *Dibunophyllum* zone, and that there is probably a considerable non-sequence between the limestone and the

overlying Grits. Here arises a pretty problem. Do these domes (of Greenhow, etc.) owe their structure to the same cause as the knolls south of the Craven Fault (Elbolton, Hill Stebden, etc.), and why does the Millstone Grit rest on a different limestone horizon in each case? Were the *Girvanella* and *Orionastrea* beds ever deposited on Greenhow Hill, and, if so, when were they eroded?

As the authors state, there are many problems in these Lower Carboniferous rocks still unsolved, but they have undoubtedly carried our knowledge of the structure and fauna of these rocks forward a long way towards completion, and enabled geologists in general to envisage what really are the facts, and what are the problems still awaiting solution.

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MAMMAL.

Whiskered Bat at Scarborough.—At a meeting of the Scarborough Field Naturalists' Society, held on May 30th, 1924, Miss Bruce exhibited in the flesh a small bat which had been found on the previous day clinging to a bush by the side of the Scarborough Mere. Examination showed it to be a Whiskered Bat in the dusky black fur of immaturity. This is only the third occasion on which I have identified this little bat in the Scarborough district, but it probably occurs not very uncommonly, opportunity for examination of these creatures rarely offering themselves.—W. J. CLARKE.

COLEOPTERA AND FUNGI.

Beetles and Stinkhorn.—On September 8th, in a wood near Lockton, Mr. A. Clarke and the writer came across a couple of prostrate Stinkhorns, *Phallus impudicus*, lying a few feet apart. From each was collected a number of beetles which appeared to be feeding on the strong-smelling mucus which envelopes the cap. Although it is a common occurrence to find numerous 'blue-bottle' flies thus engaged, neither of us remembers having observed beetles so doing. Masee writes: 'Now flies of various kinds devour this slime greedily, and consequently swallow the spores which are eventually deposited here and there, many of which in due course germinate and produce the fungus in a new locality.' The beetle has been identified as *Silpha thoracica* Linn., one of the 'Sexton' beetles. I have since brought home an 'egg' of *Phallus* and placed it in loose soil. A week elapsed before it 'shot,' and very shortly afterwards its cap was covered with blue-bottles. Although a very strong wind was blowing, I lifted and carried the fungus indoors without one fly leaving its feast, which proves what a strong attraction the Stinkhorn is to these insects. Probably *Silpha thoracica* also takes a part in the dispersal of its spores.—A. E. PECK.

ADDITONS TO THE YORKSHIRE DIPTERA LIST.

CHRIS. A. CHEETHAM.

THE following list does not contain any species which have been included in the reports of the excursions.

Our thanks are again due to Messrs. J. E. Collin and F. W. Edwards for kindly examining the species to which their initials are added in brackets.

- Brachypeza spuria* Verr. Pateley, F.W.E., 23/6/24.
Phronia dubia Dz. Pateley, F.W.E., 23/6/24.
Thienemanniella clavicornis Kieff. See Edwards, *E.M.M.*, 1924, p. 185.
 This was previously recorded as *Corynoneura minuta*.
Simulium tuberosum Lndst. Whernside, Cautley, Teesdale, F.W.E., June, 1924.
Cardiocladius capucinus (Zett.) Edw. Whernside and Teesdale, Edwards, *E.M.M.*, 1924, p. 206.
Culicoides (Ceratopogon) arcuatum Win. Pateley, F.W.E., 23/6/24.
Palpomyia (Ceratopogon) lineata Mg. Whernside, F.W.E., 19/6/24.
Uatomyia (Psychoda) fuliginosa Mg. Whernside, F.W.E., 19/6/24.
Limnobia bifasciata Schrk. Thorner, 21/6/24, C.A.C.
Dicranomyia ornata Mg. Crag Wood, 8/7/24, C.A.C.
Peronecera lucidipennis Curt. Coverdale, 22/6/24, F.W.E.
Tricyphona (Amalopsis) occulta Mg. Whernside, 9/8/24, C.A.C.
Nephrotoma dorsalis F. Wistow, 13/7/24, C.A.C.
Pachyrrhina guestfalica Wstf. Wistow, 13/7/24, C.A.C.
Tipula pabulina Mg. Thorner, 14/6/24, C.A.C.
T. flavolineata Mg. Austwick, 8/6/24, Pateley, 24/6/24, C.A.C.
T. irrorata Mcq. Austwick, 22/6/24, C.A.C.; Pateley, 24/6/24, F.W.E.
T. truncorum Mg. Pateley, F.W.E., 24/6/24; Adel, 28/6/24, C.A.C.
T. caerulescens Lack. Austwick, 9/6/24, C.A.C. (F.W.E.).
T. cheethami Edw. See Edwards, *E.M.M.*, 1924, p. 82. This was fairly plentiful on Whernside, 19/6/24, and also taken in Ingleton Ghylls, 20/6/24.
Syntormon pumilus Mg. Austwick, 23/6/23, C.A.C.
Xiphandrium albomaculatum Beck. Austwick, 23/6/23, C.A.C.
Verrallia pilosa Zett. Pateley, 24/6/24, C.A.C.
Pipunculus terminalis Thoms. Ulleskelf Mires, 13/7/24, C.A.C.
P. confusus Verr. Adel, 27/6/24, C.A.C.
Gymnomera tarsea Fal. Austwick, 23/6/23, C.A.C.
Helomyza humilis Mg. Austwick, September, 1923, C.A.C. (J.E.C.).
H. fuscicornis Zett. (*montana* Lw.). Pateley, 22/7/22; Allerthorpe, 5/9/23; Bishopdale, 6/8/22, C.A.C. (J.E.C.).
Heteromyza atricornis Mg. Nidd, 1/8/21, C.A.C. (J.E.C.).
Leria (Blepharoptera) ruficeps Ztt. Allerthorpe, 25/9/20, C.A.C. (J.E.C.).
Sapromyza lupulina F. Farnley, 30/6/19, C.A.C. (J.E.C.).
Tetanocera unicolor Lw. Austwick, 15/7/22, C.A.C.
Chyliza permixta Rnd. (*leptogaster* Mg.). Crag Wood, 25/6/24, C.A.C.
Lissa loxocerina Flin. Crag Wood, 15/6/21, C.A.C.
Henicita annulipes Mg. Adel, 5/7/21, C.A.C.
H. leachi Mg. Cowthorpe, 13/6/21, C.A.C.
Themira pusilla Zett. Adel, 23/6/23, Austwick, C.A.C.
Ochthiphila polystigma Mg. Skipwith, 20/8/22, C.A.C.

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The Rev. C. R. N. Burrows writes 'Upon the suggested Relationships of Psychides,' and R. S. Bagnall and J. W. H. Harrison upon 'New British Cecidomyiidae in *The Entomologist's Record* for July-August.

SECTIONS EXPOSED IN A BORING AT HESSLE, E. YORKS.

J. W. STATHER, F.G.S.

TOWARDS the end of 1922 the then North Eastern Railway Company put down a boring for water at their pumping station at Hessele, on the north Humber shore. This reached a depth of 181 feet, and as the core was practically continuous, 18 ins. in diameter, and was laid out on the floor piece by piece as taken out, an exceptional opportunity was obtained of investigating the beds.

The water level varied from 18 to 21 feet from the surface, and yielded close upon 20,000 gallons per hour, but unfortunately, owing to its proximity to the Humber, was too saline to be of any practical use, and much of the boring had to be plugged with cement.

The following details are supplied by Messrs. Isler and Co., who carried out the work :—

	Thickness.	Depth.
	Feet	Feet.
Hard Chalk	45	45
Chalk and flint	1	46
Hard chalk with <i>Inoceramus</i> sp. ...	103½	149½
Red chalk with some grey chalky streaks. A few small, well-polished quartz grains in matrix	11	160½
Fine brown incoherent sand	2	162½
Bluish-black clay containing a few molluscan borings in-filled with a gritty glauconitic clay	18½	181

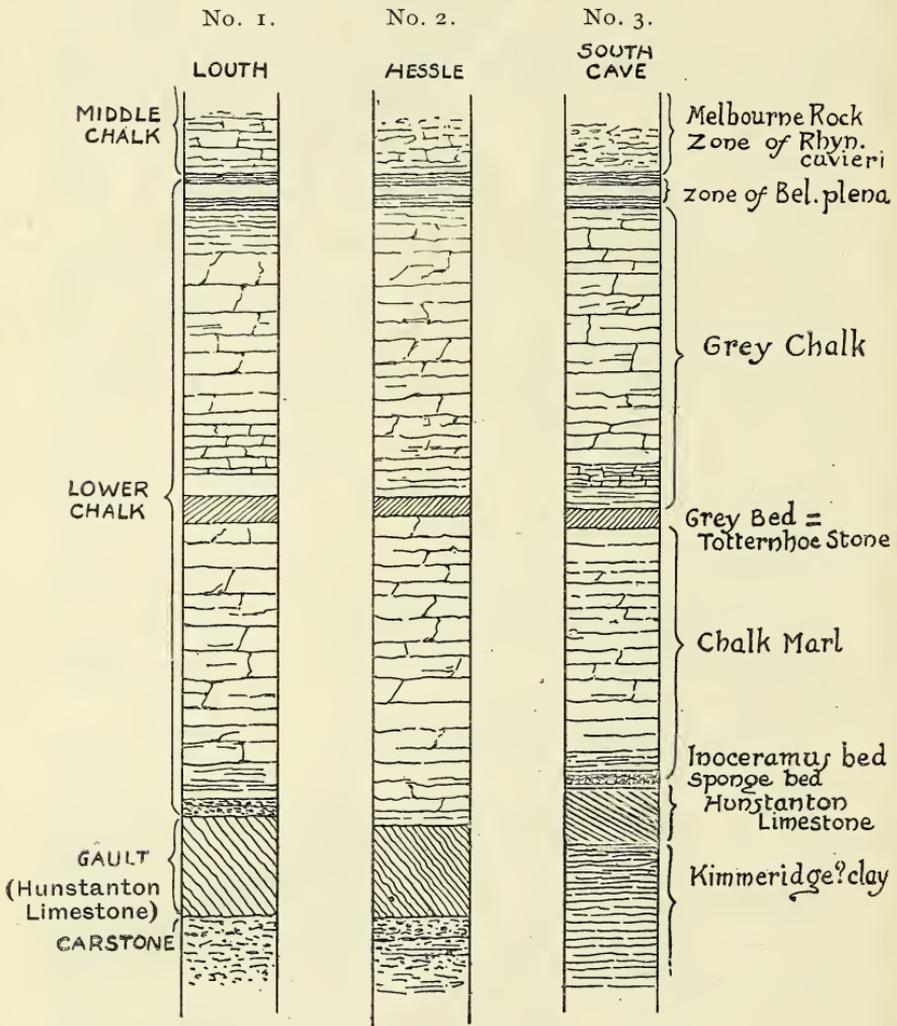
The core really commenced at a depth of 17 feet from the surface at this point, which is 10 feet above Ordnance Datum, as it commenced at the bottom of a well made to that depth.

An examination of the core shows that the beds are in very hard white chalk with occasionally small finger flints, which entirely disappear at a depth of 60 feet, the only definite flint band being at a depth of 45 feet from the surface.

Fossils, as is the case elsewhere in the immediate neighbourhood, were exceedingly scarce, and beyond a few fragments of *Inoceramus*, nothing occurred to assist in identifying the precise zones.

At a depth of 70 feet from the surface, traces of the 'black band' or *Bel. plena* zone were unmistakable. This zone is important, separating as it does the Middle from the Lower Chalk. Below this, pink bands and the familiar 'grey bed' described by Hill, were also unmistakable, and still further

down, as shown in the accompanying section, were beds of the red chalk proper, containing *Belemnites minimus* and fragments of *Inoceramus*. At the base of this Red Chalk occurred a bed of 'fine brown incoherent sand, 2 feet thick.' This



Scale $\frac{1}{24}$ inch = 1 foot.

we did not see in place, though a small heap shown to us by the men, kept near the boring, indicated a sharp, coarse green grain.

Immediately beneath this, and at a depth of 162½ feet, a bluish-black clay was penetrated, in general appearance greatly resembling the Oolitic clays occurring at Melton and

other places. This contained a number of fossils, upon which Mr. Pringle gives the following report:—‘*Grammatodon* sp., *Protocardia morinica* ? de Lor., *Thracia* sp. and ammonite fragments, but these shells were not sufficiently well-preserved to indicate the zonal position of the clay. The *Grammatodon*, which we have not identified specifically, has some resemblance to Blake’s *Grammatodon longipunctata*, which came from the Lower Kimmeridge of Market Rasen. Although the ammonites are too fragmentary to be named, they strongly suggest that the clay belongs to the Lower Kimmeridge Clay.’

On plotting this section to scale with the sections given in the plate accompanying Hill’s paper on the Lower Beds of the Upper Cretaceous Series in Yorkshire and Lincolnshire (*Q.J.G.S.*, Vol. XLIV., 1888) several important features call for comment.

In the first place, the extraordinary regularity in the occurrence of the various beds as proved by sections in South Lincolnshire near Welton, Central Lincolnshire near Louth, the present section at Hessle, and the Sections exposed in the railway cuttings at South Cave. We have placed two of these (Nos. 1 and 3) in the accompanying sketch, inserting the Hessle Boring (No. 2) in its geographical position between the others.

The Hessle boring shown in No. 2 of the accompanying section, which is drawn to the same scale as the others, is of interest as showing the depth of the Red Chalk on the north Humber shore, when it occupies precisely the relative position that it does at South Cave, further north, and also at Louth and at several other places over a large area in Lincolnshire. In thickness also it is fairly constant. Below it, at Hessle, the bed of sand is clearly the Carstone, which does not occur in the South Cave cuttings, though possibly represented by a few polished phosphatic pebbles at the base of the Red Chalk.

It is remarkable that while the Red Chalk occurs at a depth of 160 feet at Hessle, on the south shore of the Humber, at South Ferriby, it occurs on the beach, and can be examined at low water. At this point, however, the Lower, or Grey Chalk on the beach is, now and then, at a high angle, occasionally almost perpendicular, no doubt largely due to a squeezing-out process at the foot of the Lincolnshire Wolds, where, as on the northern escarpment of the Yorkshire Wolds, similar phenomena are observable, due to the great weight of the chalk resting on wet Oolitic clays.

In preparing these notes I have had the advantage of assistance from Messrs. J. Pringle and T. Sheppard.

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‘Thrushes’ (with plate), by H. Astley, is the title of an important paper in *The Avicultural Magazine* for September.

ACMÆA TESTUDINALIS (MÜLLER) VAR. ALBIDA
NOV. VAR.

HANS SCHLESCH, M.A.S.

SHELL.—Outside greyish dull, inside shining polished, chocolate colour in centre.

HABITAT.—Shore of Tjörnes at Hallbjarnarstadir, North Iceland (collected by myself, July, 1921).

REMARKS.—As far as I can see the colour varieties of this northern form are not the same as those of its near related southern representative *A. virginea* (Müller), which is very variable. I therefore propose the following names of colour varieties in the northern forms :—

var. *paucipunctata*, shell whitish dull, with few dark brown figures ;

var. *striata*, regular stripes round the margin ;

var. *marmorata*, marmorated, and forms a transition form to

var. *fusca*, dark coloured.

(All Types in the Schlesch Collection, Hull Museum.)

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YORKSHIRE BRYOLOGISTS AT HOLMBRIDGE.

THE bryological flora of Ramsden Rocks, near Holmbridge, about ten miles south of Huddersfield, was studied in detail during the course of an interesting week-end, September 27th-28th. The district is a typical valley in the Middle Grits, with sandstone and shale in alternate strata, topped at about 1500 feet with a six to ten feet layer of peat. *Orthodontium gracile* var. *heterocarpa* was frequent on the peat among Calluna, and this station further extends its distribution in southern Yorkshire. Another feature was the sheets of *Seligeria recurvata* on the vertical sandstone faces. Of the hepatics, *Gymnocolea inflata* and *Lophozia Floerkii* were ubiquitous. A representative list of mosses and hepatics is given below.

MOSESSES.

<i>Orthodontium gracile</i> var. <i>heterocarpa</i> .	<i>Webera albicans</i> .
<i>Seligeria recurvata</i> .	<i>Tetraphis pellucida</i> .
<i>Brachyodus trichodes</i> .	<i>T. Browniana</i> .
<i>Dicranella heteromalla</i> .	<i>Pleuroidium alternifolium</i> .
<i>D. cerviculata</i> .	<i>Campylopus flexuosus</i> .
<i>D. varia</i> .	
<i>D. squarrosa</i> .	

HEPATICES.

<i>Gymnocolea inflata</i> .	<i>Alicularia scalaris</i> .
<i>Lophozia Floerkii</i> .	<i>Aplozia riparia</i> .
<i>L. ventricosa</i> .	<i>A. pumila</i> .
<i>Calyptogeia Trichomanis</i> .	<i>Scapania dentata</i> .
<i>Ptilidium ciliare</i> .	<i>S. undulata</i> .

F. E. MILSON, B.Sc.

Naturalist

MYCOLOGISTS AT SHEFFIELD.

A. E. PECK,

Hon. Secretary, Mycological Committee, Y.N.U.

THE Fungus Foray of 1924 (the 317th meeting of the Union) was held at Sheffield, from August 30th to September 4th, by the kind invitation of the Sorby Scientific Society. The following members of the Committee were present: Harold Wager, D.Sc., F.R.S. (Chairman), A. Clarke, R. Fowler Jones, F. A. Mason, Thos. Smith, Greevz Fysher, E. Snelgrove, B.A., Miss D. Hilary, B.Sc., and A. E. Peck (Hon. Secretary).

The following also took part in the proceedings: Mrs. Greevz Fysher, Mrs. T. Smith, Miss M. Brett, M.Sc. (Northern



Back row :—T. Smith, Mrs. Smith, Greevz Fysher, Mrs. Fysher, R. Fowler Jones, D. Hilary, P. Fysher, M. Brett.

Front row :—A. Clarke, H. Wager, A. E. Peck, F. A. Mason.

Polytechnic, Holloway, London), H. S. Holden, D.Sc. (Nottingham University), D. G. McIver (Ministry of Agriculture, Leeds), Mr. P. Fysher (Leeds), and Messrs. A. Bayliss, R. Ducker, E. G. Green, C. H. Wells, H. L. Belbin, A. E. Dalton and other members of the Sorby Scientific Society.

Excellent Headquarters were provided at Abbeydale Hall, near Dore and Totley Station, four miles from Sheffield, and just within the borders of Derbyshire.

The weather throughout was unsettled and rainy, being, in fact, fairly representative of the 'summer' of this year. The factors named, and the rather early date of the meeting, are reflected in the unusually small number of records made, viz., 204 species and varieties.

Another adverse factor was that Ecclesall Wood had, almost everywhere, a dense undergrowth of bracken. Further, while several attractive woods were within near view of Headquarters, they were more or less forbidden ground, being in the county of Derbyshire. Yorkshire Mycologists, officially assembled, usually confine their operations to their own county.

One little party, however, ventured over the border in the neighbourhood of Beauchief Abbey, and brought back with them several showy samples of the Fly Agaric (*Amanita muscaria*), a species which always adds to the attraction of an indoor display of fungi. This fungus was not found within our home county district, although the Birch tree, with which it is usually found in association, flourishes abundantly in Ecclesall Wood, and also in Wharncliffe Wood. In both these woods the Birch trees are badly afflicted by the Birch polypore (*Polyporus betulinus*), this being the only large polypore noted during the visit.

The district appears to be singularly free from tree parasites of the larger kind. Only one specimen of the 'Beef-steak' fungus (*Fistulina hepatica*), a parasite on ancient Oaks, was met with, and this was very small.

A Boletus which might easily have passed as *B. chrysen-teron* was recognised by Mr Clarke to be *Boletus Rostkovii*, the special characters of which are the obconic stem and the exaggerated pores. The writer recognised that he had something exceptional when he brought in from Ecclesall Wood specimens which grew from under the bark of a Pine-stump. These proved to be *Collybia laxipes*, a first record for the county. This species was also collected at Wharncliffe.

A feature of Ecclesall Wood was the fair distribution of the white and rare *Amanita verna*, a poisonous species probably nearly allied to the deadly *A. phalloides* and *A. mappa*. A photograph of this fungus is reproduced herewith. A specimen of *Amanita magnifica*, regarded by some as only a variety of *A. rubescens*, provided discussion.

Ten species of *Lactarius* were found, none uncommon. Of Russules no fewer than twenty-four species were discovered, of which three only were noteworthy.

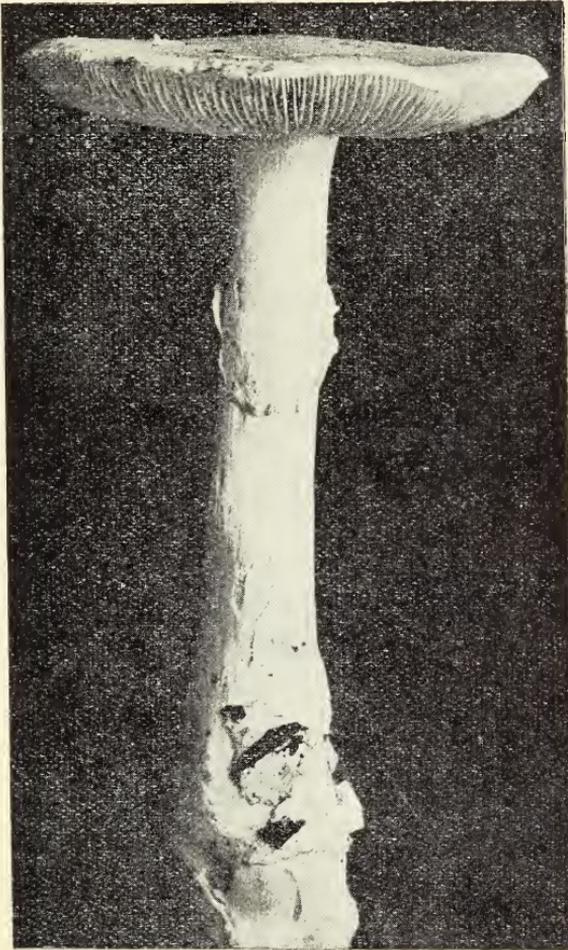
Cantharellus aurantiacus (relegated to the genus *Clitocybe* by a recent author) provided a few specimens.

Cantharellus carbonarius was brought in, apparently from Ecclesall Wood. Of this species there is only one previous Yorkshire record, this being for Wharncliffe Wood.

Specimens of *Nyctalis parasitica* were found on an old Russula. Numerous and very fine specimens of *Cortinarius* (*Tela.*) *armillatus* from Ecclesall Wood were quite a feature of the display tables. Grasslands were rather neglected

owing to their wet condition. Only two or three diminutive specimens of the 'Common' Mushroom were collected, not a single 'Horse' Mushroom, and no quantity of a recognised esculent fungus was encountered throughout the visit.

Ecclesall Wood certainly produced some fine specimens of



A poisonous fungus, *Amanita verna*.

Collybia maculata, but our Huddersfield representative spoke rather depreciatively of this species as an esculent, and our Mycophagist members failed to add to their experiences.

Recognising a piece of semi-waste ground near Dore and Totley Station as a likely habitat for *Coprinus comatus*, Mr. Clarke and the writer searched it diligently, and eventually discovered one solitary specimen. This was subsequently

placed in a drinking-glass at Headquarters, and its process of delequescence observed during several following days.

Of Boleti, thirteen species were found, from the little red-pored and peppery *Boletus piperatus* to the big 9-inch diameter *Boletus scaber*.

The Jews-Ear, *Hirneola Auricula-Judae*, was found on an Elder at Rycroft Glen, but apparently nowhere else. A remarkable feature of Ecclesall Wood at the time of our visit was the great abundance of Earth-balls, *Scleroderma aurantium*, and its varieties. A stipitate Earth-ball, *Scleroderma verrucosum*, provided the writer with subject for a photograph. Some excellent samples of the Dry-rot fungus *Merulius lacrymans* were brought in by some visitors for identification, and advice was sought for its eradication from a dwelling-house where it had already done grievous damage to floors and wainscotting. As is usually the case, ventilation under the floor had been neglected and impeded in the present instance. Several members had had personal bitter experience of this pest, and were able to furnish useful advice.

The more noteworthy species of the larger fungi are set out in the list following, with their respective distinctions. Mr. Clarke has searched the county records as usual, and he is responsible for the annotations.

Following there is a list of Micro-fungi, which was compiled by Mr. F. A. Mason.

Our proceedings received more than usual attention from the press, and a photograph of the party was reproduced in the *Sheffield Daily Telegraph* of September 2nd. It was remarked that this was the first known occasion upon which a party of mycologists had been vouchsafed such distinction!

At Abbeydale Hall, on Saturday evening, Mr. Mason delivered an address entitled, 'Outlines of Fungus Ecology,' and on Tuesday evening Dr. Wager spoke on 'The Distribution of the Larger Fungi.' Members of the Sorby Scientific Society attended both lectures.

On Monday evening, under the auspices of the Sorby Scientific Society, at the Church Rooms, St. James Row, Sheffield, the present writer gave his illustrated lecture, entitled 'Edible and Poisonous Fungi,' to a good audience, which included members of the Rotherham Naturalists' Society.

Our thanks are due to Councillor E. Snelgrove, B.A., for kindly acting as local guide throughout the meeting.

RECORDS.

Amanita verna.
A. phalloides.
A. mappa.
A. pantherina.

Amanita magnifica Fr.
 **Clitocybe infundibuliformis* var.
membranaceus.
C. odora.

- **Clitocybe pithyophila* Fr. **Russula fragilis* var. *fallax*.
 †*Collybia laxipes* Fr. **R. fingibilis*.
 **Mycena rubromarginata* Fr. *Cantharellus carbonarius*.
 **M. inclinata* Fr. **Nolanea proletaria*.
 **M. tenuis* Bolton. **Inocybe Godeyi* Gillet.
 **M. speirea*. **Boletus flavidus* Fr.
 **Pleurotus petaloides*. **B. variegatus* Swartz.
 †*P. mutilis* Fr. *B. Rostkovii*.
 **Russula chamaeleontina* Fr. *Polyporus intybaceus* Fr.
 †*Dacryopsis nuda* (Berk.) Masee.
 * New to Yorks. S.W. † New to Yorks.

Micro-Fungi, Sheffield Foray, August 30th to September 2nd.
 Garden and Grounds, Abbeydale Hall, Derbyshire:—

- | | |
|--------------------------------------|--|
| <i>Cystopus candidus</i> Lév. | <i>Erysiphe polygoni</i> D.C. |
| <i>Plasmopara epilobii</i> Schroet. | <i>Puccinia Menthae</i> Pers. |
| <i>Bremia lactucae</i> Regel. | <i>Nectria cinnabarina</i> (Tode) Fr. |
| <i>Peronospora Schleideni</i> Unger. | <i>Cheilymenia coprinaria</i> (Cke.) Boud. |
| <i>P. rumicis</i> Corda. | <i>Coprobria granulata</i> (Bull.) Boud. |
| <i>P. parasitica</i> De Bary. | <i>Cladosporium herbarum</i> Link. |
- Macrosporium tomato* Cke.

A 'Victoria' plum tree was found to be badly attacked by 'Silver Leaf,' a disease due to the common fungus, *Stereum purpureum*, and it was pointed out to the gardener.

Ecclesall Woods, Yorks.:—

- | | |
|-----------------------------------|---|
| <i>Plasmopara nivea</i> Schroet. | <i>U. ficariae</i> Lév. |
| <i>Peronospora violacea</i> Berk. | <i>Hypocrea rufa</i> (Pers.) Fr. |
| <i>P. rumicis</i> Corda. | <i>Hyaloscypha hyalina</i> (Pers.) Boud. |
| <i>P. violae</i> De Bary. | <i>Oidium aliphitoides</i> Griff. and
Maubl. |
| <i>P. ficariae</i> Tul. | |
| <i>Uromyces Poæ</i> Rabenh. | <i>Fumago vagans</i> (Pers.) Fr. |

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Evolution at the Crossways, by **H. Reinheimer**. The C. W. Daniel Co., 191 pp., 6/- net. This is a collection of articles which have appeared in *Psyche*, *Hibbert Journal*, *Science Progress*, *Sociological Review* and *Quest*. The seven chapters deal with 'Evolution, Old and New'; 'Compensation in Nature'; 'The Problem of Succession in Evolution,' 'Symbiosis and the Biology of Food,' 'Symbiosis and the Integration of Life, and the eternal difference between good and evil.' The book is printed on thick paper.

Moonlight Tales, by **Gordon English**. John Murray, 245 pp., 7/6 net. In this book is a collection of essays which has been published in English and American periodicals. 'Scientific accuracy, however, is not a professed feature of the book, nor does it aim at advancing knowledge.' The sixteen chapters include, 'The Jungle Cat's Choice,' 'A Woodpigeon's Nest,' 'Crow Nature,' and several titles which do not convey anything as to the nature of the essays. There are illustrations of the Peewit, Jaguar, Marten, Squirrel, Crows and Foxes.

The Study of Living Things, Prolegomena to a functional biology, by **E. S. Russell**. Methuen & Co., 139 pp., 5/- net. The object of this work is to outline a study of living things which is neither materialistic nor vitalistic, but renders possible the elaboration of a truly autonomous science of life, a real biology. The first part deals with the Morphological altitude, physiological method and classical materialism, the vitalistic method, the psychological point of view and the biological method. The second refers to the individuality of the living thing, the study of behaviour, response by chance of form, the analysis of organic activity, and the outlook for functional biology. Having indicated the nature of the volume, our interested subscribers must read it for themselves.

YORKSHIRE NATURALISTS' UNION :

ANNUAL MEETING OF THE BOTANICAL SECTION.

THROUGH the kindness of Prof. Priestley and the University authorities the above meeting was held in the Botanical Department of the Leeds University on Saturday, October 4th. There was a good attendance, and Mr. E. Snelgrove took the chair. The report, prepared by the secretaries from numerous widespread observations and communications, was read, and after some discussion was adopted. Officers and committees for the Section were prepared for the Annual Meeting of the Union; the question of future excursions brought a suggestion that Easter was too early for a general excursion, and it would be best for one or two meetings to be arranged for that date, say, by the Geological and the Bryological sections.

A welcome cup of tea was provided very kindly by Mrs. Pearsall and Miss Scott, to whom the meeting voted its best thanks.

After tea, Dr. T. W. Woodhead showed a series of photographs and specimens of flints dealing with the work in progress in the Huddersfield district on the Peat areas. From the very numerous workshop sites strewn with chippings, it was evidently the hill tops where early man first settled. A recent excavation at Warcock Hill gave a suggestive succession, two types of flints being found in distinct layers in the same sand bed, above these in the peat was an arrow point, and still higher up a barbed arrow head of Bronze Age type, and also a small piece of bronze and a horn of *Bos primigenius*.

He also stated that recent work at the paved Roman road over the Blackstone Edge had shown that a portion of this was actually laid on peat, proving that some of our peat is Pre-Roman. Careful work of this nature will help towards a clearer knowledge of the early vegetation of this country and its subsequent variation.

Dr. W. H. Pearsall followed with some interesting experiments in growing Cotton-grass in culture solutions. He pointed out that the botanist thinks of a type of soil as acid, and distinguishes this by the vegetation—Heather, Cotton-grass, etc.; whereas the agriculturalist knows a sour soil when Barley will not grow, and when weeds like Spurrey and Sheep's Sorrel are too frequent. This sourness can be remedied by the application of lime, and the experiments were made with the idea of seeing the result of lime on the growth of Cotton-grass. He found that the presence of some lime was not deleterious if the basic ratio or proportion of soda and potash to lime was high, but in concentrated lime solutions this did not apply. An interesting point shown by the examples was the development of much branched roots in the lower basic ratio experiment, while the roots were almost simple in the higher one. The conclusion was, that although Cotton-grass was usually found and looked upon as an acid soil indicator, it could be grown successfully in lime solutions given a high enough Basic ratio.

The question of the introduction and the recent spread of *Impatiens glandulifera* had to be left for a later date, as time had flown so rapidly with the two papers cited and the discussion thereon.—C. A. C.

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We learn from *Nature* that the University of Leeds and 'the Literary Society have arranged a joint programme of lectures and music for the autumn term. The lectures include one by Prof. L. Bairstow on some aspects of modern aerodynamics, one by Mr. J. S. Huxley on recent progress in developmental physiology, and three by Prof. A. Gilligan on the geology of Yorkshire, all of which are free. Prof. S. Brodetsky and Mr. S. Stoneley are giving a popular course of six lectures on astronomy, and Prof. P. F. Kendall three lectures on Man and the Ice Age.'

YORKSHIRE NATURALISTS AT SCARTHINGWELL PARK.

W. H. PEARSALL, D.SC., F.L.S., AND F. A. MASON, F.R.M.S.

ALTHOUGH the Circular issued for the 315th Meeting of the Yorkshire Naturalists' Union particularised Saxton in the field of operations, the excursion of July 12th resolved itself into an investigation of Scarthingwell Park, the time at disposal proving insufficient to explore either Towton or Saxton, the General Meeting only being held at the latter place. Members met at Church Fenton, and at once proceeded, under the guidance of Mr. H. Maxwell-Stuart, to Scarthingwell Park, where they were given a very kindly reception by Mr. Arthur Maxwell-Stuart and members of his family. Here the Fishpond and Parklands were thoroughly examined, and although conditions were rather too dry for making observations advantageously, the reports which follow indicate that workers in certain sections were well occupied. These reports do not give any clue to the very pleasurable time spent by members in seeing the gardens and shrubberies in company with Miss Maxwell-Stuart, who, for many years, has taken expert interest in the cultivation of herbaceous plants and shrubs, and for whom, almost every tree on the estate appeared to provide affectionate reminiscences.

A General Meeting was held at Saxton in the afternoon, under the chairmanship of Mr. Greevz Fysher. Reports on the work of the day were rendered by the Chairman, the Rev. C. Ash and Messrs. W. G. Bramley, W. H. Burrell, Chris. A. Cheetham, E. Hepworth, M.Sc., F. A. Mason, W. A. Sledge and H. Whitehead, B.Sc.

Votes of thanks to landowners who had so readily given access to their estates, to the leaders (Rev. Cyril Ash and Mr. H. Maxwell-Stuart) and to the local Secretary (Mr. Riley Fortune) were unanimously accorded.

FLOWERING PLANTS (W. A. Sledge).—The botanical members of the party investigated the vegetation round the extensive fish-pond in Scarthingwell Park, and the calcareous pasture lands behind the Hall.

In the pond was a quantity of the large white Water Lily (*Castalia alba*), which, though an introduced plant, was well established and in fine flower. In the shallower muddy parts of the pond the Mare's-tail (*Hippuris vulgaris*) and Water Milfoil (*Myriophyllum spicatum*) were plentiful. The margins of the pond were occupied chiefly by the Yellow Iris (*Iris Pseudacorus*) and Common Sedge (*Carex acutiformis*). The ground vegetation included an abundance of Moneywort (*Lysimachia Nummularia*), Celery-leaved Buttercup (*Ranunculus sceleratus*) and Distant Spiked Sedge (*Carex remota*), while the common marsh plants *Myosotis palustris*, *Veronica Beccabunga*, *Lotus uliginosus*, *Glyceria aquatica* were present.

On the north-east side of the pond where the beech-wood extends to the water's edge, some fine specimens of the Bird's-Nest Orchis (*Neottia Nidus-avis*) were found.

The vegetation on the drier ground behind the Hall was that of a typical calcareous pasture. The characteristic plants were Rock Rose (*Helianthemum chamaecistus*), Purging Flax (*Linum catharticum*), Thyme (*Thymus Serpyllum*), Betony (*Stachys officinalis*), Birds-foot Trefoil (*Lotus corniculatus*) and Sheep's Fescue (*Festuca ovina*). A single specimen of the Bee Orchis (*Ophrys apifera*) was seen by some members of the party.

Messrs. Burrell and Cheetham report that they saw a great display of *Astragalus glycyphyllos* by the roadside in Saxton. There was an unbroken stretch of this plant for thirty yards, and with small intervals the patch extended for eighty yards in length. *Hottonia palustris* was seen in a ditch in Ulleskelf Mires.

BRYOLOGY (W. H. Burrell).—With the exception of *Fontinalis antipyretica*, which was in great abundance in the lake, the only species seen in Scarthingwell Park were *Hypnum molluscum*, *Eurhynchium confertum*, *Fissidens taxifolius* and *Pellia epiphylla*. Arboreal mosses were conspicuously absent.

A roadside quarry at Saxton yielded *Dicranella Schreberi*; *Tortula mutica* was seen on Willows by the Wharfe near Ulleskelf, and *Hypnum cordifolium* was plentiful in swampy woodland near Biggin.

FUNGI (F. A. Mason).—Three types of gathering ground presented themselves on this excursion, viz., moist decaying vegetation and herbage bordering the fishpond, beech woods, and pasture. In the first situation the following species occurred :—

<i>Puccinia Menthæ</i> Pers.	<i>Erysiphe Polygoni</i> D.C.
<i>P. Caricis</i> Schum.	<i>Helotium herbarum</i> (Pers.) Fr.
<i>Urocystis anemones</i> .	<i>Hyaloscypha hyalina</i> (Pers.) Boud.
<i>Erysiphe graminis</i> D.C.	<i>Trichoderma viride</i> (Pers.) Fr.

The beech woods produced a few agarics, as well as a small number of saprophytic fungi growing on fallen timber. Here were

<i>Inocybe rimosa</i> (Bull.) Fr.	<i>Irpex obliquus</i> (Schrad.) Fr.
<i>I. Godeyi</i> Gillet	<i>Amanita rubescens</i> Fr.
<i>Androsaceus polyadelphus</i> (Lasch) Pat.	<i>Hypoxylon multiforme</i> Fr.
<i>Marasmius peronatus</i> (Bolt.) Fr.	<i>H. coccineum</i> Bull.
<i>Russula cyanoxantha</i> Fr.	<i>Diatrype stigma</i> (Hoff.) de Not.
<i>R. ochroleuca</i> Fr.	<i>Xylaria hypoxylon</i> (Linn.) Grev.
<i>R. fragilis</i> Fr.	<i>Reticularia Lycoperdon</i> Bull.
<i>R. virescens</i> Fr.	<i>Fuligo septica</i> (Linn.) Gmel.

The coprophilic and other fungi of the pastures and lawn were not abundant; the following were observed :—

<i>Psathyra corrugis</i> Fr.	<i>Anellaria separata</i> (Linn.) Karst.
<i>Coprinus sterquilinus</i> Fr.	<i>Stropharia semiglobata</i> (Batsch) Fr.
<i>C. plicatilis</i> Fr.	<i>Coprobola granulata</i> (Bull.) Boud.
<i>Panæolus sphinctrinus</i> Fr.	<i>Ascobolus furfuraceus</i> Pers.

Several ash trees on the estate harboured *Daldinia concentrica* (Bolt.) Ces. et de Not.

PLANT GALLS (Miss J. Grainger).—

HYMENOPTERA.

<i>Biorrhiza pallida</i> Oliv.	On Oak.
<i>Pontania proxima</i> Lepel.	On <i>Salix fragilis</i> .

DIPTERA.

<i>Perrisia fraxini</i> Kieffer.	On Common Ash.
<i>P. acrophila</i> Winn.	On Common Ash.
<i>P. cratægi</i> Winn.	On Hawthorn.
<i>P. ulmaricæ</i> Bremi.	On Meadowsweet.
<i>P. urticæ</i> Perris.	On Nettle.
<i>P. veronicæ</i> Vallot.	On <i>Veronica Chamædrys</i> .

HOMOPTERA.

<i>Psyllopsis fraxini</i> Linn.	On Common Ash.
<i>Schizoneura ulmi</i> Linn.	On Elm.

ACARI.

<i>Eriophyes tristriatus</i> Nal. var. <i>erinea</i> Nal.	On Walnut. The second record for Yorkshire.
<i>E. tiliæ</i> Pagenst var. <i>lisoma</i> Nal.	On Lime.

FUNGI.

<i>Puccinia Menthæ</i> Pers.	<i>P. Caricis</i> Schum.	<i>Urocystis anemones</i> .
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VERTEBRATA (W. G. Bramley).—Not many birds were in song, and only a short list was made. The Turtle Dove and Sedge Warbler, Heron, Yellow Hammer and Greenfinch were common, the Chaffinch being rather scarce. Rooks were taking new potatoes from the fields. On the pond in the Park several broods of Waterhens were heard, but few were seen.

Pike, Roach and Eels were observed in the ponds, the former in shoals of 30 to 40 individuals of varying sizes. It is reported that they are known to have taken the young of the swans which breed on the pond.

Other Vertebrates noted during this excursion include the Stoat, Rat, Common Shrew (Sherburn) and the Pipistrelle and Noctule Bats, both the latter also at Sherburn.

MOLLUSCA (Greevz Fysher).—The day was very fine and dry, but owing to the industry of Mr. J. Digby Firth and the Rev. Cyril Ash and others, some terrestrial species were observed.

Collected by Mr. J. Digby Firth:—*Bithynia tentaculata*, *Hygromia striolata* and young, *Pyr. rotundata*, *Clausilia bidentata*, *Valvata cristata*, *Limnaea peregra*, *Planorbis carinatus*, *P. fontanus*, *P. contortus*, *Velvetia lacustris*.

Collected by Mr. Fysher:—*Theba cantiana*, *Limnaea auricularia* var.

The fish pond contains great numbers of *Anodonta cygnea*, and empty pairs of a large size were obtained, but the means at our disposal did not enable us to observe the living mussels.

Mr. Ash mentioned that *H. nemoralis* and *hortensis* were very plentiful in the district in wet weather, but they were all hiding from the drought.

The specimens were submitted to Mr. J. W. Taylor.

DIPTERA (Chris. A. Cheetham).—Diptera were not very numerous, but a few interesting species were seen, and two mosquitoes were added to the County List, viz., *Tæniorhynchus richiardi* Fic. and *Ochlerotatus maculatus* Mg. (*waterhousei* Theo.). Mr. F. W. Edwards kindly identified these. Among the Syrphids, *Helophilus lineatus* F. and *Chilostia illustrata* Harr. have not often been recorded, the large *Volucella bombylans* L. and *pellucens* L. were most noticeable, but *Eristalis* and *Syrphus* little in evidence, in fact the common *S. ribesii* was not noted, the scarcity of this species has been general this season. *Baccha elongata* F. (I cannot make two species of the Yorkshire *Bacchas*) and *Leucozona lucorum* L. were also taken. Tipulas were disappointing, *oleracea* and *scripta* frequent, and odd *ochracea*, *longicornis* and *rufina*, *Pachyrrhina quadrifaria* frequent; and a few *Ptychoptera contaminata* and *scutellaris*. The solitary representative of the fungus gnats was *Leiomyia fascipennis*.

Leptis had two species, *lineola* F. and *tringaria* L., with *Chrysopilus cristatus* Verr. and *Dioctria rufipes* Deg. as close relatives; the Empids, *livida* L., *grisea* Flin. and *Tachista arrogans* L.; and Stratiomyids, *Beris vallata* Först., *fuscipes* Mg., *geniculata* Curt., and *Microchrysa cyaneiventris* Ztt.; Dolichopods, *brevipennis* Mg., *trivialis* Hal., *griseipennis* Stan., *Argyra leucocephala* Mg., *Chrysotus gramineus* Flin. and *Psilopus platypterus* F.

Among the Acalypterates were *Sciomyza albocostata* Flin., a species I have found frequent this year though previously only odd specimens, *Acidia cognata* W., *Tetanocera elata* F., *Paralleloma albipes* Flin., *Palloptera umbellatarum* F., and *Cetema elongata* Mg.

The following day a visit to Ulleskelf Mires (a promising place), where I got *Tipula nigra* L., and to a bit of old scrub between Wistow and Bishopwood, where the best capture of the week-end, *Nephrotoma dorsalis* F., was made, completed the week-end collecting.

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Mr. E. Wooler has a paper on 'Roman Lead Mining in Weardale. Discovery of Bronze Lead-pouring Ladle,' in No. 109 of *The Yorkshire Archæological Journal*.

YORKSHIRE NATURALISTS IN TEESDALE.

W. H. PEARSALL, D.SC., F.L.S., AND F. A. MASON, F.R.M.S.

AFTER an interval of thirty-two years, Darlington was revisited as Headquarters for the 316th Excursion of the Yorkshire Naturalists' Union, held during Bank Holiday week-end, August 2nd to 4th. By the courtesy of the Darlington and Teesdale Naturalists' Field Club, a room at the 'Friends' School Premises,' in which the Club meets, was placed at the disposal of the Union during this visit. The museum and library maintained by the local society were made good use of by Members, who much appreciated the opportunity of consulting local literature.

Under the guidance of Mr. C. P. Nicholson, Saturday's excursion lay through the 'Wilderness,' Blackwell, to Croft, returning by Monkend. Among those present on this excursion were the President, Mr. Percy H. Grimshaw, F.R.S.E., the President of the Darlington and Teesdale Naturalists' Field Club (Mr. R. Luck) and the Hon. Secretary (Mr. John E. Nowers).

Visits to Piercebridge and Gainford, to Halnaby Carr, and to Barton Limestone Quarries, together with a visit by some members to the curious ponds known as 'Hell Kettles,' completed the week-end excursions.

On Saturday evening, in the Field Club's room, under the chairmanship of the President of the Union, supported by the President of the local Society (Mr. R. Luck), one of the writers (F. A. M.) gave a lecture on 'The Field Study of the Fungi.' The meeting was well attended.

On Monday, a General Meeting was held at Headquarters, the President in the chair. Sympathetic reference to the loss sustained by the Union through the death of Dr. R. Kidston, F.R.S., of Stirling, was made from the chair, and the Hon. Secretaries were requested to convey the sincere condolence of the meeting, as representing the Union, to Mrs. Kidston.

Interesting reports of the field work were then submitted by the President and Messrs. H. B. Booth, Greevz Fysher, J. Hartshorn, M. L. Thompson, F. A. Mason and W. P. Winter, B.Sc. Votes of thanks were accorded the landowners of the district for permission to visit their estates, to the officials and members of the local Society who had entertained the Union and led its excursions, and to Mr. J. Hartshorn, the Local Secretary.

PLANT ECOLOGY (W. H. Pearsall).—The areas visited on Monday, August 4th, proved to be interesting but difficult to describe without more detailed examination. Willow Carr, near Croft, from which a number of species are recorded in Baker's 'North Yorkshire,' proved to be a very fine remnant of fenland of the 'open carr' type. It is, however, peculiar in the absence of Alders and the scarcity of *Phalaris arundinacea*. These characteristic fen species are, in the Lake District carrs, confined to places where silting takes place. They evidently require some soil condition absent from Willow Carr, where the soil is rather acid and where willows and birches are abundant. Willow Carr resembles some parts of Askham Bog, near York, but in the latter place, Alder is quite frequent, and willows are much less prominent, although the soil is equally acid.

FUNGI (F. A. Mason).—The species listed below include only those fungi noted on the Yorkshire side of the Tees, and they represent gatherings from two very distinct types of vegetation (a) the 'carrs' or 'ings,' near Halnaby, to which reference is made in Dr. Pearsall's notes, and (b) beech woods and plantations by the Tees, from Cliffe upwards towards Gainford.

Omphalia fibula (Bull.) Fr.

Androsaceus androsaceus (Linn.)
Pat.

A. rotula (Scop.) Pat.

Entoloma sericeum (Bull.) Fr.

Galera hypnorum (Schrank.) Fr.

<i>Galera hypnorum</i> var. <i>bryorum</i> (Pers.) Fr.	<i>Hypoxyylon semiimmersum</i> Nke.
<i>Polyporus hispidus</i> (Bull.) Fr. (large specimens on ash).	<i>Diaporthe revellens</i> Nke.
<i>Poria sanguinolenta</i> Fr.	<i>Melanomma pulvis-pyrus</i> (Pers.) Fcke.
<i>Fomes igniarius</i> (Linn.) Fr.	<i>Daldinia concentrica</i> (Bolt.) Ces. et de Not.
<i>F. salicinus</i> (Pers.) Fr.	<i>Hysteriographium fraxini</i> de Not.
<i>Dædalea confragosa</i> (Bolt.) Fr.	<i>Ciliaria scutellata</i> (Linn.) Quel.
<i>Puccinia menthæ</i> Pers.	<i>Helotium virgultorum</i> (Wahl.) Karst.
<i>P. iridis</i> (D.C.) Wallr.	<i>Botrytis cinerea</i> Pers.
<i>P. caricis</i> (Schum.) Reb.	<i>Reticularia lycoperdon</i> Bull.

In the beech woods and plantations :—

<i>Armillaria mellea</i> (Fahl.) Fr.	<i>L. subdulcis</i> Fr.
<i>Lepiota granulosa</i> (Batsch.) Fr.	<i>Inocybe rimosa</i> (Bull.) Fr.
<i>Amanita rubescens</i> Fr.	<i>Cortinarius elatior</i> Fr.
<i>A. muscaria</i> (Linn.) Fr.	<i>Fomes annosus</i> Fr.
<i>Tricholoma terreum</i> (Schaeff.) Fr.	<i>F. ulmarius</i> Fr.
<i>Laccaria laccata</i> (Scop.) B. & Br.	<i>Boletus elegans</i> (Schum.) Fr.
<i>Collybia butyracea</i> (Bull.) Fr.	<i>B. badius</i> Fr.
<i>C. confluens</i> (Pers.) Fr.	<i>B. chrysenteron</i> Fr.
<i>Mycena rugosa</i> Fr.	<i>B. submentosus</i> Fr.
<i>M. galericulata</i> (Scop.) Fr.	<i>B. luridus</i> (Scæff.) Fr.
<i>M. galopus</i> (Pers.) Fr.	<i>Phlebia merismoides</i> Fr.
<i>M. hæmatopus</i> (Pers.) Fr.	<i>Thelephora terrestris</i> Fr.
<i>Lactarius blennius</i> Fr.	<i>Corticium sambuci</i> (Pers.) Fr.
<i>L. quietus</i> Fr.	<i>Clavaria cinerea</i> (Bull.) Fr.

During the excursion to Monkend, the rare rose, *Rosa Sabini*, was found to be very severely attacked by *Sphaerotheca pannosa* (Wallr.) Lévy. Four other species of parasitic fungi are recorded in Mr. Winter's list of plant galls.

PLANT GALLS (W. P. Winter, B.Sc.).—

HEMIPTERA.

Chermes viridis Ratz. On Larch. Insects in Colonial stage.
Chermes and *Cnaphalodes* galls. On Spruce.
Schizoneura ulmi Linn. On Wych Elm.
Aphis atriplicis Linn. On White Goosefoot.
A. crategi Buckton. On Hawthorn.
Myzus mercurialis. On Dog's Mercury.
Psylla buxi Linn. On Box.
Trioza ægopodii F. Löw. On Goutweed.
Psyllopsis fraxini Linn. On Ash.
Aphis viburni Scop. On Guelder Rose.

HYMENOPTERA.

Cryptocampus medullarius Hartig. On Bay Willow.
Pontania proxima Lepel. On Crack Willow and White Willow.
Cryptocampus testaceipes Zadd. On White Willow.
Pontania salicis Christ. and *P. femoralis* Cameron. On *Salix nigricans* Smith.
Biorrhiza pallida Oliv., *Neuroterus baccharum* forma *lenticularis* Oliv.,
Cynips kollari Hartig. On Oak.
Rhodites eglanteriæ Hartig and *R. rosæ* Linn. On Dog Rose.

DIPTERA.

Perrisia marginemtorquens Winn. On Crack Willow.
Rhabdophaga salicis Schrank. On *Salix nigricans* Smith.
Perrisia urticæ Perris. On Nettle.
P. ulmaricæ Bremi. On Meadowsweet.
P. crategi Winn. On Hawthorn.
P. vicicæ Kieff. On Tufted Vetch.

Contarinia tiliarum Kieffer. On Common Lime (on the Durham side).
Perrisia fraxini Kieffer. On Ash.
P. veronicæ Vallot. On Germander Speedwell.
Oligotrophus bursarius Bremi. On Ground Ivy.
Rhopalomyia millefolii H. Löw. On Yarrow.
Cecidomyia sp. [as 5864 Houard]. On Ragwort.

ACARI.

Eriophyes brevitarsus Focken, *E. lævis* Nal., *E. nalepai* Focken. On Alder.
E. goniothorax Nal. On Hawthorn.
E. macrorrhyncus Nal. and *Phyllocoptes acericola* Nal. On Sycamore.
Eriophyes galii Karp. On Goosegrass.

FUNGI.

Taphrina aurea Fr. On a Black Poplar (species doubtful), taken on the Durham side.
T. bullata Tul. On Hawthorn.
Urocystis anemones Pers. On Creeping Crowfoot.
Puccinia agopodii Schum. On Goutweed.

VERTEBRATE ZOOLOGY (H. B. Booth).—Bird life was not as plentiful as expected, but many of the smaller species were in the dense foliage with their families, and keeping as quiet as possible.

The Yellow Hammer was the predominating bird of the district (just as it was at an August excursion to Northallerton several years ago), and it was practically the only bird that was in song at the time. Other species noted were the Kingfisher, Common Sandpiper, Kestrel, Sparrow Hawk, Tawny Owl, Jay and Magpie. The two last-named birds occurred together, which is unusual, as for some unknown reason, often when one is fairly numerous in a district, the other is scarce or absent. The best record was produced in a preserved specimen of the Little Owl which was shot by the gamekeeper in the woods on the Halnaby estate in 1923. A pair was believed to be nesting at the time, and the gamekeeper informed me that he shot one of them really because he did not know what it was. After that, every precaution was taken not to drive the other bird away, in the hope that it might obtain another mate; the lady of the house in particular taking great interest in the bird's welfare, but it disappeared. This is the most northerly record of the nesting (or rather attempted nesting) of this species in Yorkshire, and probably also in the British Isles.

MOLLUSCA (Greevz Fysher).—Terrestrial mollusca had not yet all hidden away after the recent heavy rain which caused the River Tees to run so high that aquatic species there were quite out of reach. Its tributary, the Skern, has lately been greatly artificialized, and its course altered near the town, so that its molluscan fauna in the accessible portion would be far from representative. One of the lakes in the park is known to harbour a variety, but the gatherings made were from the Wilderness on the Tees bank, from Hell Kettles, from Barton and from Halnaby Fish Pond. These have been submitted to Mr. John W. Taylor, M.Sc., who has ascertained the following species:—*Limax maximus*, *Helix aspersa*, *H. hortensis* v. *lutea*, 00000, 12345 (123) 45, 1(23)45, 1(2345), *H. nemoralis* var. *castanea* 12345, *Helicigona arbustorum* type and var. *fuscescens*, *Hygromia hispida*, *H. striolata*, *Ashfordia granulata*, *Xerophila caperata*, *Ena obscura*, *Clausilia laminata*, *C. bidentata*, *Succinea elegans*, *Planorbis albus*, *P. contortus*, *P. marginatus*, *Limnæa peregra*, *Physa fontinalis*, *Bithynia tentaculata*, *Pisidium subtruncatum*, *P. milium*, *P. pusillum*.

This list does not confirm the admirable record of the late R. Taylor Manson in 1898, but there is no doubt that residence on the spot and continuous observation would probably extend to the same number of species.

A visit was paid to a pond at Monk Hesleden, where sinistral *L. peregra* have been found from time to time. The result was disappointing. Domestic ducks now visit the pond and seem to have cleared it of every trace of mollusca.

COLEOPTERA AND HEMIPTERA (M. L. Thompson).—The following species of Coleoptera and Hemiptera were met with in Halnaby Carr and along the route from Halnaby to Croft :—

COLEOPTERA.

<i>Loricera pilicornis</i> F'	<i>Phylodecta vitellinæ</i> L.
<i>Pterostichus vulgaris</i> L.	<i>Phyllotreta undulata</i> Kuts.
<i>P. minor</i> Gyll.	<i>Phyllobius argentatus</i> L.
<i>Agonum fuliginosus</i> Panz.	<i>Polydrusus pterygomalis</i> Sch.
<i>Aitha fungi</i> Grav.	<i>Barypithes araneiformis</i> Schr.
<i>Tachyporus obtusus</i> L.	<i>Strophosomus melanogrammus</i> Forst
<i>T. pusillus</i> Grav.	<i>Ceuthorrhynchus contractus</i> Marsh.
<i>Stenus impressus</i> Germ.	<i>Cidnorrhinus 4-maculatus</i> L.
<i>Oxytelus rugosus</i> F.	<i>Cœliodes rubicundus</i> Hbst.
<i>Brachypterus urticæ</i> F.	<i>Orchestes quercus</i> L.
<i>Meligethes æneus</i> F.	<i>O. fagi</i> L.
<i>Aphidecta (adalia) obliterated</i> L.	<i>Cionus scrophulariæ</i> L.
<i>Coccinella 10-punctata</i> L.	<i>Apion violaceum</i> Rich.
<i>Cyphon variabilis</i> Thunb.	<i>Apion nigrirtarse</i> Rüb.
<i>Rhagonycha fulva</i> Scop.	<i>Rhynchites betulæ</i> L.

HEMIPTERA.

<i>Drymus brunneus</i> Sahlb.	<i>Calocoris sexguttatus</i> Fab.
<i>Gastrodes ferrugineus</i> Linn.	<i>C. bipunctatus</i> Fab.
<i>Anthocoris sylvestris</i> Linn.	<i>Lygus pabulinus</i> Linn.
<i>Pithanus maerkeli</i> H. S.	<i>L. viridis</i> Fall.
<i>Miris holsatus</i> Fab.	<i>L. rubricatus</i> Fall.
<i>Leptopterna dolabrata</i> Linn.	<i>Plagiognathus arbustorum</i> Fab.
<i>Monalocoris filicis</i> Linn.	

LEPIDOPTERA (T. Ashton Lofthouse).—Halnaby Carr and the rough ground and mixed plantations in the neighbourhood, including Halnaby Park, looked very promising to a Lepidopterist.

Among the Butterflies the Meadow Brown was pleasantly abundant on the rough open ground, but apart from this species, only odd specimens of the Green Veined White, Small Heath and Common Blue were noticed.

The usual common moths such as *Eubolia limitata*, *Melanippe sociata*, *Scoparia lutealis*, etc., were in evidence; also sparingly *Fidonia piniaria*, *Cidaria fulvata* and *Uropteryx sambucaria*, the Swallow Tail moth, was reported. Two *Apamea didyma* are only noted as they were beaten out of the 'Gamekeeper's Larder' by the coleopterist of the party, and had been either attracted there by the 'smell' or for shelter!

Among the smaller species, *Stenopteryx hybridalis*, *Penthina betulæ-tana*, *P. pruniana*, *P. variegata* and *Grapholitha ramella* were noted on or near Halnaby Carr. *M. plagiodyctylus*, one of the plumes, was plentiful on some rough ground where scabious was plentiful. *Eudorea ambigua* common on fir trunks; and beaten out of the firs, principally spruce, were *Coccyx nanana*, only one record for this in Yorks. list, and since for two other Yorkshire localities by myself. *Scardia arcella*, of which there are only two or three previous records. *Cedestis gysselinella*, added by me to the Yorkshire list at the Yorkshire Naturalists' Union meeting at Great Ayton some years ago, and 'curiously another specimen was taken later in the same week near Guisborough.

Tortrix viridana, *T. xylostiana*, *Prays curtisellus*, *Cerostoma radiatella*, *Argyresthia albistria*, *A. nitidella* and *A. goedartella* were also noted.

DIPTERA (Percy H. Grimshaw).—The weather turned out very favourably. There was plenty of sunshine, and about 150 species were

taken, of which several are new to the county list. The woods and marshes along the riverside between Piercebridge and Gainford yielded a good harvest of specimens, and Syrphidæ, the most attractive group, were plentiful. Some 15 species were taken belonging to this family, including *Syrphus lineola* Ztt. (new to the county), *Helophilus hybridus* Lw., and *Xylota silvarum* L., an uncommon species. The marshy ground adjoining the woods at Halnaby was swarming with mosquitoes, and three species were taken, viz., *Ochlerotatus annulipes* Mg., which was abundant and a vicious biter, *O. nemorosus* Mg., and the common *Culex pipiens* L. Crane-flies were abundant, and represented by *Limnobia tri vittata* Schum., *Tricyphona straminea* Mg., *Limnophila nemoralis* Mg., *L. ochracea* Mg., *Dicranomyia morio* F., *Tipula fulvipennis* Deg., *T. paludosa* Mg., and *Pachyrrhina lineata* Scop. Eleven species of Empidæ and fifteen Dolichopochidæ were taken during the week-end, including *Bicellaria spuria* Fln., *Empis livida* L., *Psilopus platypterus* Fab., *Argyra leucocephala* Mg., *A. argentina* Mg., *A. argyria* Mg., *Dolichopus wahlbergi* Ztt., *D. festivus* Hal., *Campsicnemus curvipes* Fln., *Chrysotus neglectus* Wied., and *S. gramineus* Fln. The only member of the Phoridaæ taken, *Phora crassicornis* Mg., is new to the county; as is also the Tachinid *Morinia nana* Mg., of which five specimens were captured. Of Anthonyiidæ in the broad sense, no fewer than forty-three species have been identified as taken during the week-end, the novelties including *Alloeostylus sudeticus* Schnabl, *Mydæa tincta* Ztt., *Trichopticus semicinereus* Wd., *T. innocuus* Ztt., and *Limnophora vana* Ztt. Many of the Acalyptrate Muscidæ were also collected, but these have not yet been identified. The district is apparently a rich one, and would well repay attention by students of this order of insects. Altogether 107 species have been identified, all of which were obtained during the course of two short days by a single collector.

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New British Moss.—During the annual meeting of the British Bryological Society, August 29th to September 4th, held this year at Llanberis for investigation of the Snowden district, Miss L. I. Scott, B.Sc., of the Botanical Department, Leeds University, made an addition to the list of British mosses by gathering *Grimmia andreaeoides* Limpr., a plant hitherto known only from a few high alpine localities in Switzerland, Tyrol and Carinthia.—W. H. BURRELL, October 4th, 1924.

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CORRESPONDENCE.

HYMENOPTERA ON ALLERTHORPE COMMON.

SIR.—As the proof of my article in the October *Naturalist* was unfortunately not corrected, owing to my absence from home, there are errors of spelling, etc., the most glaring being *Chupids** for *Chrysidæ*. A more important matter is an error in the explanation of the use of the dagger and asterisk. The former represents a new county record, and the latter a Vice-county one, and not as stated. *Methoca* occurs in Surrey, and this county should have been specifically mentioned, but I inadvertently included it among those bordering the coast.—W. J. FORDHAM.

* A chupid error.—Ed.

NEW BOOKS ON EARLY MAN.

Prof. Sollas and his publishers are to be congratulated on the appearance of the third edition of his **Ancient Hunters**,* a valuable work already referred to in our pages. We find that the Galley Hill and Ipswich skeletons are now considered to be 'comparatively recent' interments. We also search in vain for any reference to Mr. Moir's famous 'palæolithic' mammoth statuette (which geologists considered to be part of an ammonite) or to Mr. Armstrong's ancient carvings on flints from Grime's Graves. As so much importance has been attached to those objects by their discoverers, surely we might have had some reference to them in this new edition? Apparently the author accepts the authenticity of the famous 'Maglemose Harpoons from Holderness,' as he states 'two harpoons, more Magdalenian than Azilian in character, have been found beneath the peat.' All the same, we observe that the figures of the two bone harpoons which ornamented the back of the cover of the last edition, do not appear on the present one! Possibly, of course, merely a coincidence. English Archæologists, however, will particularly value the book from the excellence of the description of the continental sites, many of which have recently been visited personally by Prof. Sollas.

The Early Iron Age Inhabited Site at All Cannings Cross Farm, Wiltshire, by **M. E. Cunnington**. Devizes: G. Simpson & Co., Ltd., 204 pp., 25/- net. The extraordinary series of specimens unearthed at All Cannings Cross has long been of value to archæologists, as it relates to the Hallstatt and La Tène period, and probably represents a much more complete set of specimens of this age than has been recorded anywhere else in the British Islands. The objects are of a particularly interesting type, and especially the pottery, which contains many unusual features, and some of the vessels have much in common with the later Saxon pottery. The various objects of bone, stone, iron, clay, etc., are illustrated on upwards of fifty large plates, which form a valuable part of the volume. Mrs. Cunnington is to be congratulated on the thoroughness with which the description of the objects found during twelve years' excavations has been made. The illustrations will assist in dating many objects hitherto doubtful.

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Insects: their Structure and Life, by **George H. Carpenter**, D.Sc. J. M. Dent & Sons, Ltd. Second edition, price 10/6 net. This is essentially a student's book, and a very good one. In the six long chapters it contains (323 pages), Dr. Carpenter has brought together an array of facts which seems to embrace everything necessary for anyone wishing to commence the study of Entomology in its wide aspect; but to most specialisation will have to come afterwards. An idea of what the book contains will at once be gathered from the headings of the chapters, as follows:—I. 'The Form of Insects'; II. 'The Life-History of Insects'; III. 'The Classification and Evolution of Insects'; IV. 'The Orders of Insects'; V. 'Insects and their Surroundings'; VI. 'The Pedigree of Insects.' Each of these chapters deals thoroughly with its subject, and we can think of scarcely anything that has been omitted, so thoroughly exhaustive is it. But what strikes one most on going through the book is, how very much of it is from the work of other entomologists rather than from the author's own study and observation. Chapter I. is largely based on Miall and Denny's book on the Cockroach, and this sort of thing applies more or less throughout the book. No fewer than 237 'References to Literature' are given at the end of the book, from which authors much of Dr. Carpenter's book has evidently been culled. Even the four coloured plates in the work were previously quite familiar to most lepidopterists who keep up with entomological literature;

* Macmillan & Co., 1924 (697 pp., 25/- net.)

and in the profusion of black-and-white figures in the text, the great majority have been taken from the works of other authors, all duly acknowledged, of course. Surely it would have been easy to obtain four original coloured plates and many new figures to illustrate the subjects treated on at little extra expense. In the short space which can be given in *The Naturalist* it is impossible to review such a book as this at all adequately, and most aspects of it must remain untouched. The classification of the Orders of Insects is somewhat different from that to which we have been accustomed, but that is a matter which is largely dependent on an author's ideas as to what should be its basis. But we venture to think that the arrangement of the Lepidoptera as given in this book (pp. 194 to 210) is not in the least likely to be followed by students in this country, in their cabinets. An arrangement which commences with the lowest family of the Microlepidoptera, and finishes with the Satyrid butterflies would look so utterly unnatural in the cabinet, as almost to make Doubleday and Stainton rise from their graves! The fact is that no satisfactory arrangement can be made from any characteristic based on one idea. We are glad to see that Dr. Carpenter uses the term variety in its proper sense. We say this because two out of the three of our entomological journals often, in one of them almost habitually so, use the term incorrectly. A variety is, of course, local or constantly recurrent variation from the type of a species, whilst an aberration is, as the word implies, a casual variation which may never, or rarely occur again. As an instance, to write or speak of *Cidaria suffumata* ab. *piceata* is altogether wrong, and yet many of our best lepidopterists always do this. The book is nicely got up, well and clearly printed, and for its special purpose is in every way excellent.—G.T.P.

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H. Donisthorpe gives some 'Notes on the European Species of the Coleopterous Genus, *Euryusa* Erickson,' in *The Entomologist's Monthly Magazine* for October.

G. C. Robson gives a well illustrated account of the Mollusca in Hutchinson's *Animals of All Countries*, Part 43. There are excellent pictures of land, fresh-water and marine shells.

In the *Proceedings of the Royal Irish Academy*, recently published, is a paper 'On Deoxycatechin-tetramethylether and Dihydroveratrylidene-3,5-Dimethoxycoumaranone. One of the three authors of the paper is a lady.

We regret to hear of the death of M. Cossmann, whose critical notices of various Palæontological publications have been welcomed by students for a considerable number of years. These principally appeared in the *Review de Palæontologie*, which he edited, and other similar publications.

A Dominion correspondent draws attention to the fact that at the recent meeting of the Yorkshire Naturalists' Union, a paper was read on 'Neglected *Acquatic Fungi*.' He presumes the printer thought that they required another 'see.' We have heard Bishops called by different names at one time and another, but this seems a new one.

We see from *The Petroleum Times* for September 20th an account of a successful demonstration of the work of the Pirbright oil separator. Judging from this report, the question of the pollution of the sea by waste oil would be avoided if these separators were universally adopted, in addition to which there would be a saving in the oil fuel.

We should like to congratulate Mr. W. N. Cheesman, J.P., of Selby, on his election as President of the British Mycological Society. Incidentally this is also a compliment to the Yorkshire Naturalists' Union. Mr. Cheesman was one of the founders of the Society. We believe it was at his house at Selby 'over a cup of tea' that the Society was first mooted. Now there are well over 350 members. He has served on the Council and has been Vice-President.

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Nov., 1924.

THE NATURALIST.

A MONTHLY ILLUSTRATED JOURNAL
PRINCIPALLY FOR THE NORTH OF ENGLAND.

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NOTES AND COMMENTS.

TYPE SPECIMENS OF LEPIDOPTERA.*

Catalogue of the Type Specimens of Lepidoptera Rhopalocera in the British Museum. Part I., Satyridæ. We learn from the preface that the present work is the 'outcome of a decision, arrived at some two years ago, to catalogue and label all the Type specimens of Rhopalocera in the British Museum (Natural History). Until recently many undoubted Type specimens stood in the Collections without any indication of their especial value; and, as a consequence, in the past, not a few were discarded and replaced by 'better' specimens. It was largely through a desire to ensure against any possibility of a recurrence of such treatment in the future that the work was undertaken.'

REARING RARE FALCONS.

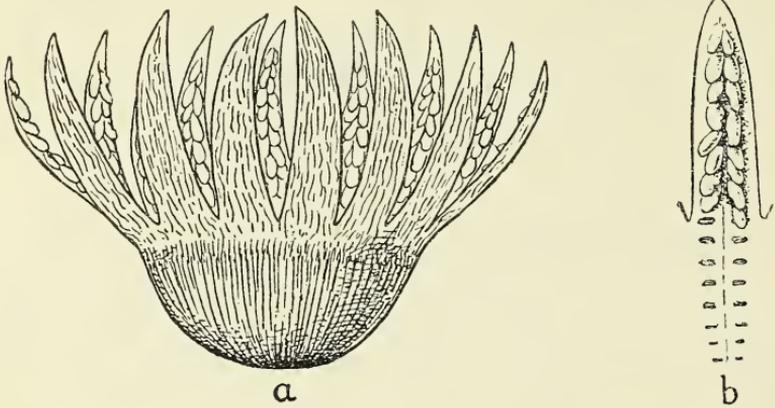
In the '290th Bulletin of the British Ornithologists' Club,' it is recorded that at a recent meeting, 'Professor P. P. Sushkin, of the Academy of Petrograd, exhibited some very beautifully-coloured photographs of a family of the extremely rare *Falco altaicus* Menzb. He said that the family was obtained from a nest, at an altitude of about 2500 metres, during the Sushkin expedition of 1914 in south-east Russian Altai. The adult male was killed and five downy young taken and successfully reared. Most of them survived to the fully adult stage of plumage, records being kept of intermediate stages by means of descriptions and photographs. Extremes of individual variability are exhibited by this family: (1) some birds in adult plumage are barred above, and present bluish tints proper to the northern jersfalcons; (2) others are dark, and while being nearly uniformly bluish-slate above are heavily marked below on a darkened ground-colour; (3) some birds which are barred above exhibit a preponderance of red colours, recalling the central Asian forms of *F. cherrug* group. Adult coloration is assumed after the first moult, subsequent changes being insignificant. As to the nomenclature, the dark, nearly unbarred type has been described as *F. altaicus* Menzb., and this name must stand as having priority. The barred type has been described as *F. lorenzi* Menzb., and this name becomes a synonym. As to taxonomical values and relations, *F. altaicus* must be accorded specific rank, its breeding-area (W. Sayan, Altai, Tarbagatai, Russian and Chinese Turkestan) covering a part of the breeding-area of the *F. cherrug* group. It is, to a certain extent, intermediate between that group and the northern jersfalcons, since strongly reddish specimens are individual reversions to the primitive

* By N. D. Riley and A. G. Gabriel. London: British Museum (Natural History), 62 pp., 4/6.

type.' It seems very awkward for the 'splitters' when different 'species' come out of the same nest!

EXTINCT PLANTS AND EVOLUTION.*

Probably few sciences have made such strides in recent years as has Palæobotany, and in the forefront of its workers is Dr. D. H. Scott. Two years ago the author gave a course of public lectures on this subject at the University College of Wales, Aberystwyth, upon which this book is based. As those familiar with Dr. Scott's work know, his volume is by no means technical, and the large number of exceedingly beautiful and striking illustrations makes it particularly interesting. Among these are restorations of fossil plants;



Williamsonia whitbiensis. a.—Restoration of male flower, showing the whorl of stamens, united below, and bearing pollen-sacs on their free limbs. b.—A single stamen seen from above, showing the simple structure, with a double row of pollen-sacs. After Nathorst.

photographs of actual specimens, and photo-micrographs showing plant structures. One of the blocks we are permitted to reproduce herewith.

PLIOCENE CRAG IN ICELAND.

In the *Abhandlungen des Archiv für Molluskenkunde*, published in Frankfurt, Mr. Hans Schlesch, of Copenhagen, has an important monograph on the Pliocene Crag formation in Iceland and its Molluscan Fauna ('Zur Kenntnis der pliocänen Cragformation von Hallbjarnarstadur, Tjörnes, Nordisland und ihrer Molluskenfauna'). In this the author describes an interesting series of shells, which he has presented to the Museum at Hull. Among them is a species of *Admete shepardi*, a new species recently described in this journal by Mr. A. Bell, based on specimens found in England.

* 'Extinct Plants and Problems of Evolution,' by Dukinfield Henry Scott. London: Macmillan & Co., xiv.+240 pp., 10/6 net.

BRITISH WADERS.*

Perhaps one remarkable feature in connection with the works on natural history in recent years has been the appearance of elaborately illustrated volumes, which have been produced at a price one would have considered prohibitive. Evidently, however, there are people sufficiently interested to purchase these sumptuous volumes. The Cambridge University Press has now produced 'British Waders.' This consists of fifty-one plates, reproductions from excellent water-colour drawings, and each is accompanied by one or two pages of letterpress. The paintings are delicately reproduced, the lack of too vivid colours being an agreeable feature. It is difficult to pick out any outstanding plates, but those of Oystercatcher, Turnstone and Avocet particularly appeal to us.

THE MARVEL SERIES.†

Messrs. Thornton-Butterworth have issued these three volumes in their 'Marvel' series, each containing about 250 pages, with numerous illustrations (6/-). The first originally appeared with the title 'Animal Curiosities' in 1922, and the second book published in 1921, both being reviewed in these columns at the time. It is unfortunate that the title of a book should be altered in this way, as those interested may easily purchase it under the assumption that they are getting a new publication. The last-named volume does not appear to have been issued previously, and contains fourteen chapters dealing with such subjects as How Plants Feed; Sensitive Plants; Going to Sleep; Leaves; The Story of the Flower; Some Strange Marriage Rites and Customs; The Seed and the Fruit; The Dispersal of Seeds; How Plants Protect Themselves. There are many good illustrations from photographs, as well as figures in the text. The work is an attempt to popularise the study of the more interesting plants.

ROMANCE OF THE ROSTRUM.‡

This is an account of Stevens' Auction Rooms, of the various members of the firm, together with a fascinating account of the extraordinary variety of natural history specimens which have passed through the firm's hands. An idea of the nature of the miscellaneous character of the material dealt with can be gathered from the illustrations, which

* By E. C. Arnold. London: Cambridge University Press, vii.+102 pp., 70/- net.

† 'Marvels of Natural History,' by W. S. Berridge; 'Marvels of the Animals World,' by W. S. Berridge; and 'Marvels of Plant Life,' by E. Fitch Daghish.

‡ Compiled by E. G. Allingham. London: H. F. & G. Witherby, 333 pp., 20/- net.

include : A photograph of thirty-four Maori heads collected by Major-General Robley ; A Great Auk ; Goliath and other Beetles ; Eggs of *Aepyornis maximus*, etc. ; Bronzes from Benin ; Blue silk vest worn by Charles I. at his Execution ; Breeches worn by George II. at the Battle of Dettingen ; Chinese Screen made of Kingfisher feathers ; and a ' Carved Native Model of Queen Victoria from South Africa.' The book is exceedingly interesting, particularly that part relating to insects, birds and ethnology.

—: o:—

Blasia pusilla Linn. in Cumberland.—On September 19th last, while with the Rev. C. H. Binstead, I found this Hepatic growing in considerable quantity in an old sandstone quarry near Aspatria. It was on the ground in damp, shaded places, among old blocks of sandstone. *Blasia* is not common in this county.—JAS. MURRAY, Kelsick, Wigton.

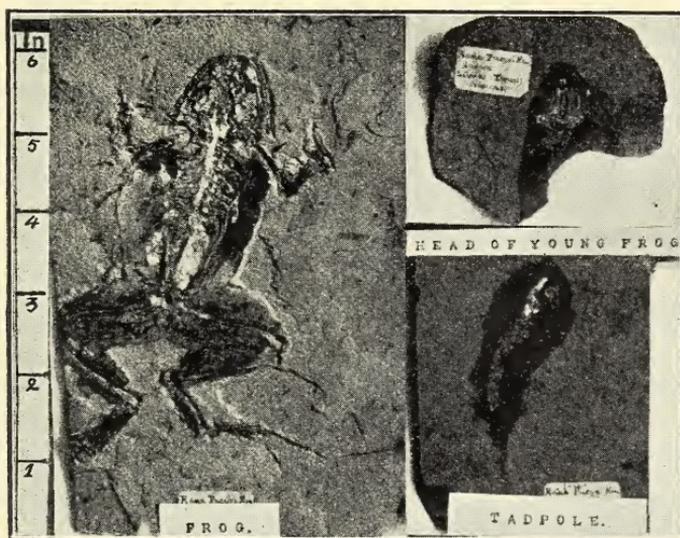
Scenopinus fenestralis L. in Yorkshire.—I took a single specimen of this Dipteron on a shop window in Leeds during October. This is only the second occurrence of this species in Yorkshire, it being previously taken by the Rev. R. H. Meade at Bradford, about 1860. It should occur quite commonly in the county, and it is surprising that it has not been taken before, as all the text-books refer to it as being common, and generally distributed on windows. I am indebted to Mr. C. A. Cheetham for verifying my identification of this species.—W. D. HINCKS, 9 Grange Avenue, Chapeltown, Leeds.

Ulex minor Roth., in Yorkshire.—Mr. J. Green, of Thornton Dale, well known as an ardent and capable naturalist, has just forwarded to me a piece of ' Furze,' in flower, for identification. As we noticed it did not conform to the ordinary type of Furze, *Ulex europæus*, specimens were submitted to certain botanical authorities, who have unanimously named the plant *Ulex minor* Roth. It grows very sparingly among *U. europæus* in a field at Thornton Dale, where Mr. Green found it. No mention of this species occurs in Baker's ' Flora of North Yorkshire,' although he records *U. Gallii*, a near relation, as being rare. F. A. Lees, for the West Riding, states that *U. minor* is very rare, while Robinson's ' East Riding Flora ' makes no reference to any Whin but the ordinary *U. europæus*. Mr. Green has been investigating the fauna and flora of Thornton Dale for many years, and has found no fewer than 634 flowering plants, ferns and horsetails in that interesting district. All doubtful identifications have been submitted to the highest botanical authorities, so that there can be no doubt about the identity of the plants named in his list.—R. J. FLINTOFF, Bridlington, October 30th.

A NEW SWAMP-FAUNA FROM SPAIN.

F. A. BATHER, D.SC., F.R.S.

THERE has recently been discovered in Spain, at the sulphur mines of Libros, in the province of Teruel, an interesting bed of bituminous shale, which appears from its fossil contents to have been deposited in a quiet swamp, liable to occasional flooding by freshets. The fauna has been described by the Rev. Professor Longinos Navás, S.J., of Saragossa (see



Oligocene Frogs from Spain.

Photographs by 'The Sphere.'

especially *Bol. Soc. Iberica Cienc. Nat.*, Marzo-Abril, and Nov.-Diciembre, 1922), and since he has been good enough to present some excellent specimens to the British Museum (Natural History), where they are for the present installed in a table-case newly established for the display of 'Recent Acquisitions,' this brief note may interest readers of *The Naturalist*.

The most numerous fossils belong to a new species of frog, *Rana pueyoi*, and are in a wonderful state of preservation. There are all stages from the tadpole to the full-grown adult. The skeleton is clearly seen, and the whole outline of the body plainly defined; there are even some bluish-grey patches with a fine granulation, which seem to be imprints of the skin.

In the adults the cranium attains a length of 24 mm., with a width of 40 mm., and the vertebral column to the end of the pubis is 63 mm. long. These frogs lie in various positions, usually indicating that the muscles were contracted, and this suggests that they were suddenly overcome by a deposit of mud, a view confirmed by the fact that some individuals retain in the position of the intestine shells of *Limnaea* which they had not been allowed time to digest. The species resembles *Rana aquensis* Coquand, from the Middle Oligocene of Aix, Provence, but the absolute and relative proportions are somewhat different. Another species, apparently represented by a unique specimen, is rather smaller, and has a much narrower cranium; it is named *Rana quellenbergi*.

Another amphibian belongs to a new genus of Salamanders resembling the Lower Miocene *Polysemia* of H. v. Meyer, and called *Oligosemia*. Two specimens of the type-species, *O. spinosa*, are among the specimens presented. The general shape is not unlike that of the recent *Molge palmata*.

Among the other fossils are the fragmentary remains of a snake, one of the Colubridæ, not precisely determined, but compared to the genus *Pilemophis* Rochebrune. This is the first fossil snake recorded from Spain.

Particular interest attaches to the remains of two birds—both water-fowl. One is the skull of a swan or a goose. The other is the nearly complete skeleton, with traces of feathers, of a rail of the sub-family Gallinulinæ, for which the new genus *Thiornis* is instituted. The fossil includes in the position of the stomach some flint pebbles and remains of undigested food.

Arthropods are represented by a beetle, a Libellulid larva, a fly (?) and the distinct impression of a spider, possibly an *Araneus*.

There appears to be some doubt as to the age of this deposit. It has formerly been assigned to the Upper Miocene, but Dr. Navás considers it to be Oligocene. It reminds one in some respects of the Brown Coal of Rott, near Bonn, which is Lower Miocene.

—: o :—

Long-eared Bat.—On August 25th last, the Rev. Alfred Booth brought to the Museum a Long-eared Bat, which had been picked up dead that morning on the Longley Park Golf Course. This is not a common species locally.—CHARLES MOSLEY, Huddersfield.

—: o :—

Messrs. Wheldon and Wesley have issued a valuable Catalogue of Books on Zoology, Part I., Vertebrata (80 pp.)

NOTES ON SOME NEOCOMIAN CEPHALOPODA FROM SPEETON.

F. W. WHITEHOUSE, M.SC., AND A. G. BRIGHTON, B.A.

THE unsatisfactory condition of the classical cliff-section of the Speeton Clay has been graphically described by all who have visited it in late years. Detailed and accurate collecting is, however, by no means impossible; and on a recent visit, although there was no exposure of the beds on the foreshore, and very little of the D and lowest C beds was visible in the cliff, the upper beds from C₉ to the top of lower B were examined in detail.

Everyone who examines the exposure must pay a tribute to Mr. Lamplugh's excellent description of the lithology and general fauna. Certain lithological horizons, for example, the ironstone band with abundant crioceratids at the top of C₇ and the various nodule bands in B, are of fundamental importance in collecting. Dr. Spath has recently revised the Speeton Ammonoidea, correlating the section with the zones of the North German Neocomian; and as a result the identification of beds by the ammonite fauna is now far more satisfactory. In most cases, however, more definite information of the range of ammonite species within the beds is needed. A rich fauna may still be collected, and it is hoped that future workers will note the exact position of specimens above or below the well-marked lithological datum-lines.

For recognising the main divisions (B. C. D., etc.), the Belemnites are of paramount importance; but it should be noted that the divisions as generally recognised are no doubt possible because of the peculiar palæo-climatic fluctuations which affected the area. In the Speeton section the *Cylindroteuthidæ** (i.e., the 'lateralis' type' of Belemnite) which dominate the D beds are replaced throughout C by the *Hastatidæ* ('jaculum' type'), but reappear, and again dominate the fauna in lower B. *Cylindroteuthidæ*, however, have been recorded occasionally from the C beds; and in contemporary deposits from northern regions (e.g., the Hauterivian beds of the Simbirsk district in Russia), *Cylindroteuthidæ* are dominant. Except for such forms as *N. cristatus* (Pav.) and *N. pistillirostris* (Pav.), which occur at the base, the various forms of *Neohibolites* (i.e., the 'Belemnites jaculum' assemblage) appear to range throughout C, so that it does not seem possible that the various beds of this division may ever be distinguished one from another by their Belemnite content. But in D and B the wealth of belemnoid forms is hardly appreciated; and

* Including *Pachyteuthinæ* as a sub-family.

when the fauna is worked out in detail it will almost certainly give valuable data for correlation, and may serve as a check upon Ammonite sub-divisions. The important family *Oxyteuthidæ* Stolley* is first known in lower B where *Oxyteuthis* and some undescribed genera connecting it with the *Cylindroteuthidæ* appear.

The two persistent families, *Lytoceratidæ* and *Phylloceratidæ*, which characterise the Mediterranean province, are remarkably rare in the English Neocomian. A specimen of *Lytoceras* aff. *vogdti* Karakasch (now in the Sedgwick Museum) from the Tealby Limestone is the only representative of the *Lytoceratidæ* hitherto recorded, while no example of the *Phylloceratidæ* is known from the deposits. One of the most interesting results of the authors' work at Speeton was the discovery of two further Lytoceratids.† An imperfect specimen of *Lytoceras* cf. *subfimbriatum* (d'Orb.) Sar. and Schönd. was found in situ six feet above the base of C₆; while a second specimen, *L. sp. ind.* (? aff. id.) was found lying loose on the surface of the lower part of C₇. The Mediterranean Neocomian is further characterised by a peculiar belemnite fauna (mainly represented by the genera *Duvalia* and *Mesohibolites*) which hitherto has been thought to be unrepresented at Speeton. A single specimen of *Mesohibolites* cf. *varians* (Schwetzoff), however, was found three feet above the base of C₇.

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Galapagos : World's End, by William Beebe. London : G. P. Putnam's Sons, xxi.+443 pp., £2 2s. This sumptuously illustrated volume is a record of a trip to Galapagos, one of the less frequented parts of the earth. The expedition was initiated and financed by Harrison-Williams, and the volume records the accomplishments of the twelve members of the party who were successful in securing many valuable living creatures for the collection in the Zoological Park in New York. The American Museum of Natural History also benefited by an enormous number of valuable specimens, large and small. Twenty-two valuable scientific contributions have already been made on different subjects as a result of the expedition, but the present volume is a summary of the achievements of the party written in a more popular style. The giant tortoise, for which these islands were once so famous, are dealt with fully. There are hundreds of giant tortoises in Albemarle, and there is evidence of the destruction caused by the natives of Ecuador in killing these animals for oil. The giant Iguanas, Sea Lions, etc., come in for much attention, the coloured plates of the former being a feature of the book. The fishes are remarkable, and there is much variety in colour, some of the plates of the latter being remarkably brilliant. The Galapagos Islands, the importance of which was pointed out by Darwin and Wallace, probably represent as interesting a natural history area as is to be found anywhere, hence the volume will particularly appeal to readers of this journal.

* The name *Oxyteuthidæ* may have to replace the name *Dimitobelidæ* Whitehouse; but the genus *Aulacoteuthis* Stolley cannot possibly be a member of the family. (F. W. W.).

† Specimens mentioned in the paper are now in the Sedgwick Museum.

RARE TRILOBITES FROM THE CARBONIFEROUS LIMESTONE.

W. B. R. KING, M.A., F.G.S.,
Sedgwick Museum, Cambridge.

SOME of the last survivors of the great group of the trilobites are to be found in the Carboniferous rocks of England. These usually belong to one of three closely allied genera, namely, *Phillipsia*, so called after the pioneer of Yorkshire Geology, *Griffithides* and *Brachymetopus*; occasionally, however, survivors of other genera occur, notably *Proetus* and, more rarely, single specimens probably referable to the genus *Cyphaspis*.

In the present note two forms from the reef-knoll limestones of Cracoe and Settle will be considered, that from the former locality is a head, and was described in 1890 by Miss Coignou as *Cyphaspis acanthina** while that from Settle is a pygidium, which was collected by a field-mapping class, conducted by the author this summer, from the reef-knoll at the upper end of the gorge-like part of the Scaleber Valley above Scaleber Force.

Both these specimens are peculiar among Carboniferous trilobites in that they possess spines. It has been pointed out by various authors that a spinose state is frequently associated with the old age of a genus or race, so that it is not surprising to find spiny or tuberculate forms among the Carboniferous trilobites; in fact, the majority of the species shows considerable tuberculation on the glabella or minute spines on the axis and pluræ of the thorax and pygidium. Very few specimens, however, have been discovered which have any marked spiny border to the head or which have a pygidium with anything but an entire margin, with the exception of *Phillipsia eichwaldi* var. *mucronata* in which the well-marked border is produced to form a short blunt spine or mucro.

In *Cyphaspis acanthina* is a survival of a genus which was abundant in the Devonian seas and many of the forms of that time possessed a well-developed fringe with stout short projecting teeth.

The Cracoe specimen can therefore be considered as a survival from the Devonian, which has not undergone serious modification. It may then be asked, can the pygidium from Settle also belong to this species? A study of the pygidia of the Devonian *Cyphaspis* lends no support to this suggestion. All *Cyphaspis* pygidia appear to be of a simple type and always have an entire margin, whereas, as will be seen below, the Settle pygidium is of a complex advanced type, not of the kind into which a *Cyphaspis* pygidium might be expected to evolve.

* Coignou, *Quart. Journ. Geol. Soc.*, 1890, p. 422, fig. 5.

The Settle pygidium (see fig. 1) is only $\frac{1}{5}$ inch across and little more than $\frac{1}{2}$ inch long; that is to say about half the size of a small pea. It has a marked axis, well arched above the level of the rest of the pygidium and consisting of twelve distinctly defined rings; these are ornamented with a row of fine granules. The pleural portion consists of four well-marked ribs with intervening hollows. These ribs are constricted immediately before reaching the raised rim, which marks the outer edge of the pygidium. We thus get in general effect an outer ridge, a broken inner hollow, and the main portion occupied by the four ribs and their intervening hollows.

The first two ribs are associated with the first two rings

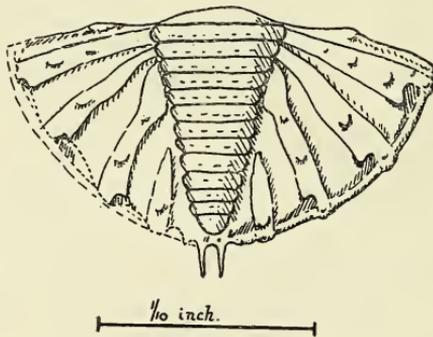


Fig. 1.

of the axis, the third rib appears to be in the nature of a compound rib, seeing that it springs from opposite the next three axial rings; while the fourth rib appears to have no definite relationship to the axis.

The ribs are ornamented with large, low, irregular tubercules. The marginal ridge is slightly swollen opposite the ribs, and opposite the axis there project from it two delicate spines. It is this feature as much as any other which seems to preclude any connection with the genus *Cyphaspis*.

It is difficult to suggest a genus or even a family to which this pygidium may be referred. *Proetus*, a form common in the Devonian and also recorded from the Carboniferous and Permian, does in some species have a double forked final segment in the pygidium; but all species which have this feature also have all the plural portions spinose.

A spinose pygidium from the Carboniferous of America is described by Prof. E. W. Claypole under the name *Dalmanites? cuyahogae*.* From the figure given it is clear that this form has no affinities with the specimen under discussion.

* Claypole. *Geol. Mag.*, 1884, p. 303.

The systematic position of the Settle specimen must, it appears, wait until further material has been discovered, and it is largely to draw attention to these rare and often minute forms that the present note has been written, and the author would be very grateful to hear of any specimens which throw further light on this obscure form.

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Snow Buntings in Yorkshire.—On the 3rd inst. (November), I was one of a party driving grouse on the moors to the north-west of Scarborough, when a flock of about twenty Snow Buntings passed along the ground close to the line of butts. Several of them were evidently adults, but the majority appeared to be birds of the year.—W. H. ST. QUINTIN.

Vanessa and Sparrow.—To-day I saw a *Vanessa* on the wing (probably *atalanta*, of which species there have been a few about lately). It was careering at a height of about twenty feet down the middle of a street lined with houses. Suddenly from a spout a House Sparrow made straight for the butterfly as though to capture it. But when it got within six inches or so of its expected prey, the sparrow held off hesitatingly for some seconds, and ultimately left the field without having attempted to catch the insect.—CHARLES MOSLEY, Huddersfield, October 5th, 1924.

Probably *Vanessa* (*Pyrameis*) *atalanta* is an unpalatable species to birds, and its colours 'warning colours,' which the sparrow had failed to see until it came to close quarters.—G.T.P.

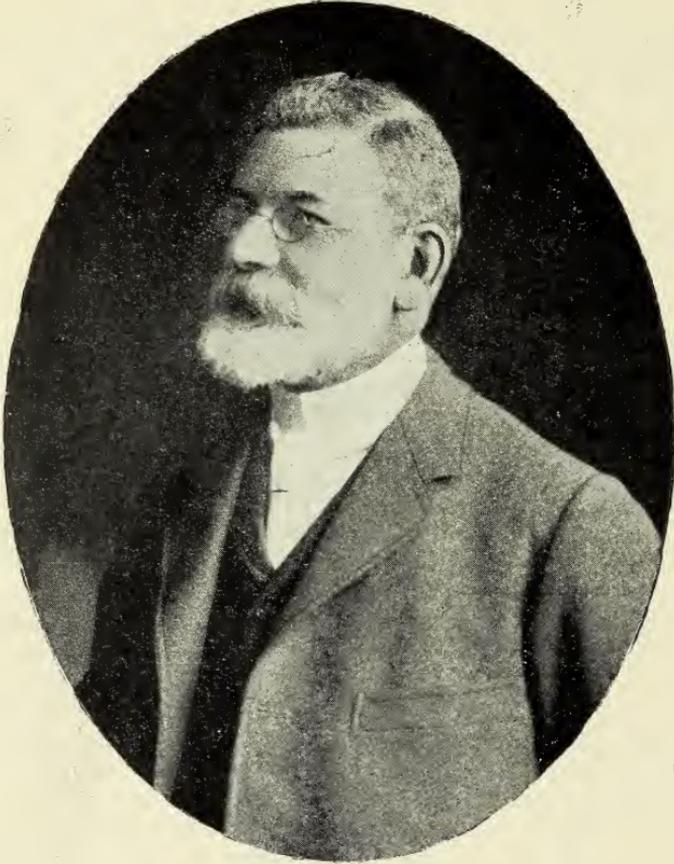
Macrocheles submotus—New Name for *M. cognatus Falcr.* (nom. præocc.)—Adverting to the two mites described and figured as new species in *The Naturalist* for April, 1923, pp. 152-3, I find, to my regret, that the specific name of one of them had already been utilised for an Argentine species, belonging, however, to a different subgenus, by Berlese (*M. coprholaspis*) *cognatus* Berl. Redia, 1918, Vol. XIII., p. 159, so that a new name will be required for it. To that end I now propose *M. submotus*.—WM. FALCONER, Waterloo, Liverpool.

Dispersal of Molluscs by Commerce.—In the latter part of August, 1924, numbers of living snails were found in a bunch of bananas by a local fruiterer. He saved a single example for me to see, saying they were all alike. Mr. J. A. Hargreaves identified the specimen as *Hemitrochus graminicola*, from Jamaica. A few days previously I had a living snail given which had been brought to Scarboro' in a basket of Orleans plums which were sent from the neighbourhood of Paris. This proved to be the common *Helix nemoralis* of our hedgerows.—W. J. CLARKE.

In Memoriam.

ROBERT KIDSTON, LL.D., D.Sc., F.R.S., F.G.S.
(1852-1924).

THE unexpected death of Dr. Kidston is a serious loss to the science of palæobotany. Apparently in the best of health, he



had gone on a visit to Gilfach Goch, in South Wales, to examine a large series of fossil plants at the house of his friend, Mr. David Davies. Soon after his arrival, however, he was taken ill with influenza, and before the seriousness of his condition was fully realized, he died of heart-failure on July 13th.

At the time of his death, Dr. Kidston was engaged on the great task of preparing a monograph of the Carboniferous Plants of Great Britain. Fortunately he had just finished the first volume before he left his home in Stirling for South

Wales. Four parts of this work, profusely illustrated by colotype plates, have already been published by the Geological Survey of Great Britain. The fifth and sixth parts will shortly appear.

Dr. Kidston was born at Bishopston House, Renfrewshire, on June 29th, 1852, and was educated at Stirling High School. Later he was engaged in business, and had some useful experience in a banking house. His interest in botany led him to attend classes in that subject at Edinburgh University, under Hutton Balfour. He had already commenced to collect Carboniferous plants, and was in touch with the Geological Survey Office in Edinburgh. Eventually, through the instrumentality of Dr. Peach, then acting Palæontologist in Edinburgh, all Carboniferous plants collected by the Survey in Scotland were sent to him for determination. Being endowed with private means, he was able to devote his whole time and attention to his subject, and was thus soon in a position to speak with authority; and from 1880 onwards more than a hundred of his papers have appeared.

His collection of fossil plants grew steadily until, at the time of his death, it had reached the number of nearly 7000 specimens. Not only were British collectors sending specimens constantly to him, but workers abroad, in the United States and in Europe, were also adding to his numbers. Only the best examples of each species were kept; and these were fully labelled, registered and indexed. It is almost certainly the most representative collection of its kind formed by one man. His library of palæobotanical literature also was nearly complete; and from this he had prepared a bibliographic index of every species. Thus equipped, he worked regularly from morning until nearly midnight. Holidays abroad brought him in touch with the leading palæobotanists on the Continent.

Of his numerous publications only a few need be mentioned here: summaries of his more important results already find their place in the text-books on palæobotany. Among his early works is the Catalogue of Palæozoic Plants in the Geological Department of the British Museum (1886). In the following year appeared his important paper on the fructification of ferns. Subsequent investigation in this direction led to great discoveries. Two quarto memoirs on the Fossil Flora of the Yorkshire Coalfield were published in Transactions of the Royal Society of Edinburgh in the years 1896 and 1897. In 1890 the first of a series of reports on the Yorkshire Carboniferous Flora appeared in the 'Transactions of the Yorkshire Naturalists' Union'; and a useful sketch of the Flora of the Carboniferous Period was published by the Yorkshire Geological Society in their Proceedings (1901 and 1902). Dr.

Kidston arranged the Carboniferous Plants in the Brussels Museum, and published in 1911 an account of the Coal Measures plants of Hainault (Belgium) in the *Memoirs of the Royal Belgian Museum of Natural History*.

With Dr. W. J. Jongmans as joint author, he produced a handsomely-illustrated 'Monograph of the Calamites of Western Europe,' published by the Dutch Government in 1915, with the unusual number of 158 plates. Dr. Kidston collaborated also with Prof. W. H. Lang, of the Victoria University of Manchester. The plants of the famous Rhynic Chert Bed were described by them jointly in a series of papers in 'The Transactions of the Royal Society of Edinburgh.' The early loss of Prof. D. T. Gwynne-Vaughan was felt very much by Dr. Kidston, with whom he had done much important structural work. Together they had published the history of the fossil Osmundaceæ, which appeared as another of the handsome memoirs in the *Edinburgh Transactions*.

Dr. Kidston was an expert photographer, as the illustrations of his works testify. His collection of photographic negatives (nearly 4000 in number) is preserved with the same care in labelling and indexing as are his fossil plants.

With the object of using the various floras and species as zonal indices, Dr. Kidston paid particular attention to the horizons from which the plants were collected. Elaborate records of the distribution of each species in the various coal-fields were prepared by him in manuscript, and were intended to form the basis of a stratigraphical resumé for his *Survey Monograph*, when the systematic portion was finished.

Dr. Kidston's scientific work entitled him to distinguish rank among palæobotanists; his personality won for him an equally honoured place in the esteem of those who knew him. Entirely without affectation, he was sincerely courteous to all, and averse to any form of pretence. His early business training showed its influence in his handling of everyday affairs; he was prompt in correspondence, and his methodical habits made him an ideal curator for his own collection. He had, moreover, an extensive knowledge of finance. A familiar figure in Stirling, he was a J.P. for the county, and had been Joint Secretary of the Stirling Natural History and Archæological Society since its foundation in 1878. His wife and two daughters survive him.

Many honours fell to his lot. He was made an honorary LL.D. of the University of Glasgow in 1908, and the Victoria University of Manchester conferred the honorary D.Sc. on him in 1921. The Geological Society of London awarded him the Murchison Fund in 1887, and the Murchison Medal in 1916. He was elected a Fellow of the Royal Society in 1902.—C.P.C.

NEWS FROM THE MAGAZINES.

'Observations on a Female Cuckoo,' by G. R. Humphreys, appear in *The Irish Naturalist* for November.

Prof. J. H. Priestley writes on 'The Ecology of Moorland Plants' in *Nature*, November 8th, p. 698.

Mr. H. Mortimer Batten describes 'The Lapwing' in *The Journal of the Ministry of Agriculture* for October.

The first four papers in *The Entomologist* for November refer to South America, the Argentine, Brazil, etc., and Costa Rica respectively.

F. E. Weiss and D. Rosén write on 'The Supposed Constancy of the Hybrid between the Common and the Water Avens, *Geum urbanum* × *rivale*, in *Nature*, No. 2866.

Colonel H. G. Lyons' recent Address to the Museums Association on 'The Aim and Scope of the Science Museum,' appears in *The Museums Journal* for November.

Mr. H. Donisthorpe continues his useful 'Notes on the Myrmecophiles found with *Acanthomyops brunneus* Latr., in Britain,' in *The Entomologist's Record* for October.

The Lancashire and Cheshire Naturalist for September contains a sheaf of new records to the fauna and flora of the two counties. There is a valuable paper on the Diptera by H. Britten.

The Quarterly Journal of the Geological Society, No. 319, contains a paper on the Upper Viséan Corals of the Genus *Caninia*, by H. P. Lewis, in which a number of north-country examples are figured and described.

At the Royal Society in 1663, 'The History of Whale Fishing, and of the making of Whale-oil, was delivered in by the secretary, from Mr. Gray, of the Greenland Company, who had been in those parts, and was present at the killing of whales and the making of oil.' (*Nature*, November 1st.)

Among the contents of the *Transactions and Proceedings of the Botanical Society of Edinburgh* (Vol. XXIX., Pt. 1) we observe *Carex microglochis* Wahl., a species new to Scotland, and Scottish Taraxaca, both by Dr. G. C. Druce; Notes on *Potagameton*, by A. Bennett; and Additions to the Flora of Orkney, by Col. H. H. Johnston.

The New Phytologist, issued on October 30th, contains 'A Study in the Endodermis in the Filicineæ,' by J. H. Priestley and Frances M. Radcliffe; 'The Diffusion of Ions from Living Plant Tissues in relation to Protein Iso-electric Points,' by W. H. Pearsall and J. Ewing, and 'Flowering in the North of England in 1922 and 1923,' by R. H. McCrea.

There has recently been issued *The Journal of the Manchester Geographical Society*, Vols. XXXVII-XXXVIII, Parts 1-4. 1921-32' (280 pp.), in which the proceedings of that useful society are published for a further two years. It contains various papers read to the society during that period, and an interesting Delegates' report of the British Association meeting in Edinburgh in 1921, and Hull in 1922.

The Rochester Naturalist, No. 130 (edited by J. H. Evans, 59 Corporation Street, Rochester, pp. 38-70, 1/-), contains interesting notes on 'The Cuckoo,' by C. J. Scholey; 'An Ancient Boat from Murston,' by G. E. Dibley; '*Helicella neglecta* Drap. at Luddesdown,' by A. S. Kennard; 'Eocene Deposits of Upnor,' by A. Wrigley; and 'Archæological Discoveries and Researches in the Regional Survey Area,' compiled by J. H. Evans.

The Antiquaries Journal for October has a record of Discoveries at Cissbury, an Anglo-Saxon jug, English alabaster carvings, and the preservation of seals. There are figures of a 'sculptured stone from Alderney.' Judging from the illustrations we are inclined to agree with the verdict of the local geologist who 'unfortunately declared the markings on the stone to be due to natural causes.' We observe that it has been submitted to the archæological department of the British Museum, but we think the opinion of the Geological Department should be sought.

NORTHERN NEWS.

Our readers will share our sorrow and sympathy with Mr. Riley Fortune, F.Z.S., on the recent death of Mrs. Fortune.

A Seventh Edition of British Museum (Natural History) 'Instructions for Collectors, No. 4, Insects' (12 pp., 6d.) has been called for.

The collection of rocks and rock-slices formed by the late Sir Jethro Teall has been presented to the Sedgwick Museum, Cambridge, by Lady Teall.

The death is announced of Lord Abercromby, an authority on pre-historic pottery, and author of 'The Bronze Age Pottery of Great Britain and Ireland.'

The fourth edition has been issued of the British Museum (Natural History), *Instructions for Collectors*: No. 8, *Spiders, Centipedes, Peripatus, etc.* (4 pp., 3d.).

'The Hull Museum and Education' is the title of a paper by Mr. T. Sheppard in the illustrated Handbook to the Hull Education Week, November, 1924 (A. Brown and Sons, 6d.).

Mr. E. Leonard Gill, formerly Curator of the Hancock Museum, Newcastle, recently assistant at the Royal Scottish Museum, Edinburgh, has been appointed Director of the South African Museum, Cape Town.

The Forty-sixth Annual Report of the Bradford Historical and Antiquarian Society records that the present membership is 137, and congratulates the Editor and Vice-President, Dr. J. Hambley Rowe, on being elected a Fellow of the Society of Antiquaries.

With commendable promptitude C. Davies Sherborn's *Index Animalium* (Part V., containing entries C-Ceyl., pp. 945-1196, price 10/-) has been published by the British Museum. Quite apart from the herculean task of preparing the list, the proof-reading alone is an undertaking few but Mr. Sherburn could tackle.

The Annals of the South African Museum, Vol. XIX., Pt. III., are entirely occupied by an account of South African Trypanid Diptera in the Museum Collection, by Professor M. Bezzi; and Vol. XX., Part 2 contains 'The Fresh-water Entomostraca of the Cape Province (Union of South Africa),' by G. O. Sars.

In connection with the late F. A. Lees' Supplement to the Flora of Yorkshire, which that author proposed to issue a few years ago, the late W. Ingham brought up to date the Supplementary List of Mosses for the three ridings. This manuscript was lent out and its present whereabouts has been forgotten. If any readers of *The Naturalist* can assist in tracing it, perhaps they will communicate with the office of this journal.

Parts XLIV. and XLV. of Hutchinson's *Animals of All Countries* are devoted to the Mollusca, and illustrate many quaint forms of the fresh-water and marine species, some of which are represented on coloured plates. The same publisher's *Trees and Flowers of the Countryside*, Part XII. has an excellent coloured plate of Elecampane, a rare plant which is found in moist fields and copses in some parts of England and Ireland.

An illustration of 'Shells of Ammonites,' reproduced 'by permission of James's Press Agency,' and accompanied by the legend that 'The Ammonites once formed a large group, which was allied to the primitive ancestors of *Nautilus*. They are now, however, extinct, and are known only by fossil remains which are found plentifully in many countries, including England,' occurs in Hutchinson's *Animals of All Countries*, part XLVI.

The Report of the Director of the Warrington Museum for the two years ending 30th June, 1924, although 'considerably curtailed owing to high cost of printing,' gives an excellent classified list of additions to the collections, and as frontispiece has a photograph of 'School Class at work in the new Extension of the Zoology Room,' from which we gather that the clean nature of the floor suggests a paucity of visitors? We hope we are mistaken.

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.

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CORRIGENDA₃

Page 139, lines 8 and 10, for 'Xanthoria,' read 'Physcia.'

„ 223, line 35, for 'puberulenta,' read 'pulverulenta.'

„ 278, line 27, for 'seam,' read 'scars.'

Note letter from Mr. J. A. Wheldon as to corrections requisite in his 'Key to the Harpidioid Hypna,' appearing in *The Naturalist*, 1921 and 1922, 287.

Note letter from Dr. W. J. Fordham as to corrections in 'Hymenoptera on Allerthorpe Common,' (pp. 303-306, *The Naturalist*, 1924), 350.

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